

# **NCR 7167 Two Station POS Printer Owner's Manual**

Release 1.0



B005-0000-1406  
Issue A

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To maintain the quality of our publications, we need your comments on the accuracy, clarity, organization, and value of this book.

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## **Important Information to the User**

In order to ensure compliance with the Product Safety, FCC and CE marking requirements, you must use the power supply, power cord, and interface cable which were shipped with this product or which meet the following parameters:

### **Power Supply**

UL Listed (QGGQ), Class 2 power supply with SELV (Secondary Extra Low Voltage), non-energy hazard output, limited energy source, input rated 100-240 Vac, 1.5/0.8 A, 50/60 Hz, output rated 24 Vdc, 2.3 A. or 3.15A

Use of this product with a power supply other than the NCR power supply will require you to test this power supply and NCR printer for FCC and CE mark certification.

### **Interface Cable**

A shielded (360 degree) interface cable must be used with this product. The shield must be connected to the frame or earth ground connection or earth ground reference at EACH end of the cable.

Use of a cable other than described here will require that you test this cable with the NCR printer and your system for FCC and CE mark certification.

### **Power Cord**

A UL listed, detachable power cord must be used for this product. For applications where the power supply module may be mounted on the floor, a power cord with Type SJT marking must be used. For applications outside the US, power cords which meet the particular country's certification and application requirements should be used.

Use of a power cord other than described here may result in a violation of safety certifications which are in force in the country of use.

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**Federal Communications Commission (FCC)**  
**Radio Frequency Interference Statement**

**Warning:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Communication Cables**

Shielded communication cables must be used with this unit to ensure compliance with the Class A FCC limits.

**Information to User**

This equipment must be installed and used in strict accordance with the manufacturer's instructions. However, there is no guarantee that interference to radio communications will not occur in a particular commercial installation. If this equipment does cause interference, which can be determined by turning the equipment off and on, the user is encouraged to contact NCR immediately.

The NCR company is not responsible for any radio or television interference caused by unauthorized modification of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by NCR. The correction of interferences caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

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**Industry Canada (IC)**  
**Radio Frequency Interference Statement**

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

*Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.*

## Quick Reference

This Quick Reference will direct you to key areas of the Service Manual. For a complete listing of topics, consult the Table of Contents or the Index.

### ***Setting Up the Printer.....page 9***

Basic requirements for unpacking and installation, connecting the printer, turning it on, and running the print test.

### ***Diagnostics.....page 53***

Procedures for setting up the printer for items such as communications, diagnostics, and other printer options.

### ***Printer Commands.....page 73***

Printer firmware commands

## How to Use this Book

Use this book as a general and technical reference manual and as a guide when replacing parts on the printer. The service guide is intended as a guide for service representatives, field engineers, and those who will be installing and learning about the 7167 printer. It can also be used as a reference for service courses.

See the Quick Reference page, the Contents, or the Index for detailed listings of what is contained in this book.

## Who Should Use this Book?

You must be a trained service representative to service the 7167 Thermal Receipt and Impact printer.

## How to Obtain More Information

For more information see the following documents:

7167 Two - Station POS Printer: Service Manual (B005-000-1407)

7167 Two - Station POS Printer: Parts Identification Manual (B005-000-1408)

For this and additional copies of the Owner's Manual, contact your sales representative.

## Revision Record

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# Contents

Quick Reference .....	v	
How to Use this Book.....	vi	
Who Should Use this Book?.....	vi	
How to Obtain More Information .....	vi	
Revision Record.....	vi	
Contents.....	vii	
 <b>Chapter 1: About the 7167 Printer</b>		<b>1</b>
Features and Options .....	1	
Receipt Station .....	2	
Slip Station .....	2	
Both Stations .....	2	
General Features.....	3	
Options.....	3	
Thermal Print Head .....	4	
Impact Print Head .....	4	
Ordering Paper and Supplies.....	5	
Ordering Thermal Receipt Paper .....	5	
Ordering Ribbon Cassettes .....	6	
Ordering Other Supplies.....	7	
Ordering Documentation.....	7	
Cleaning the Printer .....	8	
Cleaning the Cabinet.....	8	
Cleaning the Thermal Print Head .....	8	
 <b>Chapter 2: Setting Up and Using the Printer</b>		<b>9</b>
What Is in the Box?.....	9	
Removing the Packing Material .....	10	
Re Packing the Printer.....	11	
Choosing a Location.....	11	
Setting Switches.....	12	
Connecting the Cables .....	14	
About the Universal Serial Bus .....	16	
Advantages of USB connections.....	16	
Advantages of the NCR USB Solution .....	16	
Checking for USB Support on the Host Computer .....	17	
Host Configuration .....	17	
Configuring the Printer.....	18	
Installing the USB Printer Drivers.....	20	
Checking the Installation.....	30	
Configuring Serial Port Number Assignments .....	33	
Running the Edgeport Utility .....	33	
Serial Port Configuration Methods .....	34	

Uninstalling the Drivers.....	34
Using the Printer .....	36
Loading and Changing the Receipt Paper.....	37
Removing the Paper Roll.....	38
Loading the Paper Roll.....	39
Advancing Paper.....	40
Installing and Changing the Ribbon Cassette .....	41
Removing the Ribbon Cassette.....	41
Putting In the Ribbon Cassette .....	42
Printing in Forms or Checks.....	43
Validating and Verifying Checks.....	45
 <b>Chapter 3: Solving Problems</b>	 <b>47</b>
Green LED Does Not Come On/Printer Will Not Print.....	47
Green LED Blinking (Slow) .....	48
Green LED Blinking (Fast).....	48
Slip or Forms Printing is Light .....	49
Receipt Printing is Light or Spotty.....	50
LED (Slip Table) Does Not Come On.....	50
Forms Skew or Catch .....	50
MICR Check Reader Not Reading Properly.....	50
Other Serious Problems .....	52
Contacting a Service Representative.....	52
 <b>Chapter 4: Diagnostics</b>	 <b>53</b>
Level 0 Diagnostics .....	53
Level 1 Diagnostics .....	54
Printer Configuration.....	54
Configuring the Printer.....	56
Communication Interface Modes.....	58
Diagnostic Modes.....	59
Emulation/Software Options.....	64
Hardware Options.....	65
Default Code Page.....	68
Level 2 Diagnostics .....	70
Level 3 Diagnostics .....	71
 <b>Chapter 5: Communication</b>	 <b>72</b>
Communication Overview .....	72
Interface.....	72
Sending Commands.....	72
RS-232C Interface .....	73
Print Speed and Timing .....	73
XON/XOFF Protocol.....	74
DTR/DSR Protocol.....	74
RS-232C Technical Specifications .....	74
RS-232C 9-Pin to 9-Pin Cable Diagram .....	75



USB Cable Connector .....	76
Power Cable Connector .....	76
Cash Drawer Connector and Pin Assignments .....	77
Setting Extra RS-232C Options .....	78

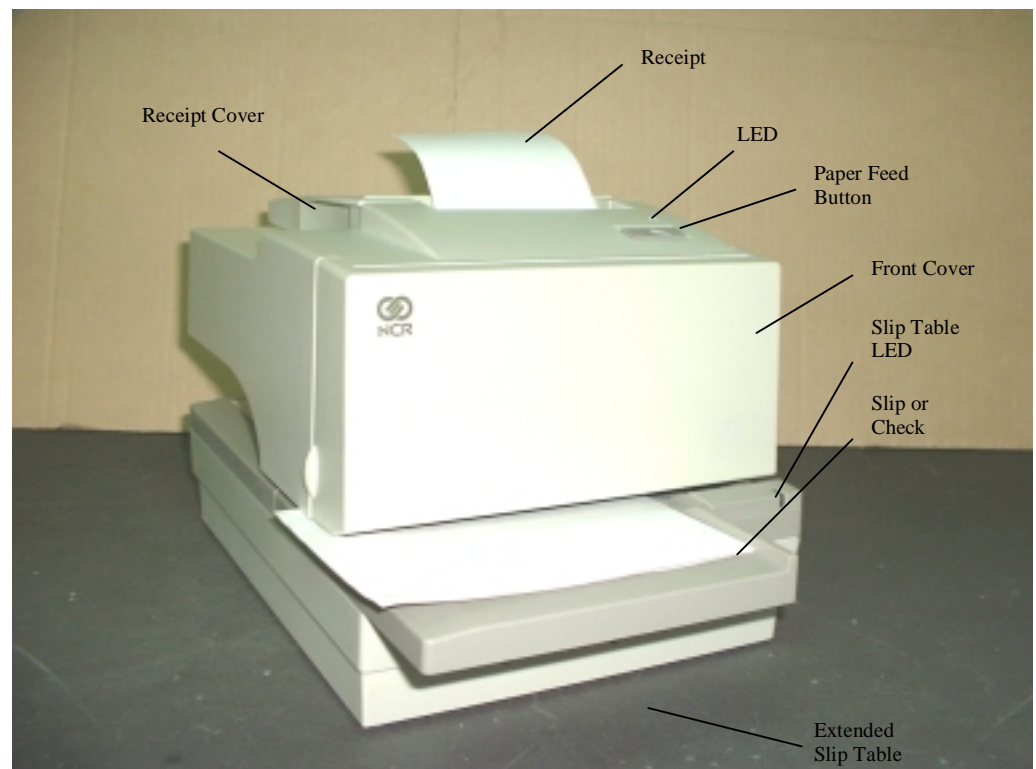
**Chapter 6: Commands****73**

Introduction.....	73
List of Commands and Location .....	73
By Command Code .....	74
Printer Function Commands .....	79
Vertical Positioning and Print .....	80
Horizontal Positioning Commands.....	80
Print Characteristic Commands .....	81
Graphics Commands.....	82
Status Commands.....	82
Real Time Commands.....	83
Auto Status Back Commands .....	83
Bar Code Commands .....	83
Page Mode Commands.....	84
Macro Commands .....	84
MICR Check Reader Commands .....	84
MICR Parsing.....	84
Check Flip Command .....	85
User Data Storage Commands .....	85
Asian Character Commands.....	85
Flash Download Commands .....	86
Comparison Chart .....	87
Command Descriptions .....	89
Printer Function Commands .....	90
Vertical Positioning and Print Commands .....	104
Horizontal Positioning Commands.....	113
Print Characteristic Commands .....	121
Graphics Commands.....	140
Status Commands.....	151
Real Time Commands.....	162
Auto Status Back Commands .....	170
Bar Code Commands .....	174
Page Mode Commands.....	180
Macro Commands .....	188
MICR Commands.....	190
MICR Parsing.....	191
Check Flip Command .....	199
User Data Storage Commands .....	199
Asian Character Commands.....	207
Flash Download Commands .....	211

<b>Appendix A: Specifications</b>	<b>211</b>
Printing Specifications .....	211
Power Requirements .....	212
Environmental Conditions .....	212
Reliability .....	213
Dimensions and Weight .....	213
Density of Receipt Print Lines .....	213
Duty Cycle Restrictions (Printing Solid Blocks) .....	213
 <b>Appendix B: Print Characteristics</b>	 <b>215</b>
Character Size .....	215
Receipt Station .....	215
Slip Station .....	216
Print Zones .....	219
Receipt Station .....	219
Slip Station .....	220
Character Sets .....	221
Index .....	226

## Chapter 1: About the 7167 Printer

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The 7167 printer is a fast, quiet, relatively small and very reliable multiple- function printer. It prints receipts, validates and prints checks, and prints on a variety of single- or multiple-part forms. There is no journal as it is kept electronically by the host computer.

The industry-standard RS-232C communication interface allows the 7167 to be connected to any host computer that uses RS-232C or USB communication interface.

With thermal printing technology on the more frequently used receipt station, there is no ribbon cassette to change and paper loading is extremely simple. Printing on single- or multiple-part forms, validating checks, and printing checks is also easy in the accommodating slip station. An additional option is the Magnetic Ink Character Recognition (MICR) check reader with parsing which reads account numbers on checks for easy verification. An extended slip table is available for handling large forms and is standard with the MICR option.

## Features and Options

The 7167 printer comes with several features and options.

## Receipt Station

Thermal printing

Standard pitch (host selectable): 15.2 characters per inch, 44 columns

Compressed pitch (host selectable): 19.0 characters per inch, 56 columns

Resident bar codes

- Code 39
- Code 93
- Code 128
- UPC-A
- UPC-E
- JAN8 (EAN)
- JAN13 (EAN)
- Interleaved 2 of 5
- Codabar
- PDF417

Drop-in paper loading requiring no spindle or threading paper

Paper low indicator

Paper exhaust indicator

## Slip Station

Bi-directional, impact printing

Standard pitch (host selectable): 13.9 characters per inch, 45 columns

Compressed pitch (host selectable): 17.1 characters per inch, 55 columns

Printing of forms up to five plies

- Front insertion of forms with forms stop
- Side insertion of forms with override of forms stop
- Automatic and manual insertion of forms

Form alignment sensors and Slip In LED indicator

Horizontal flat-bed slip table with optional extension (standard with MICR check reader)

Snap-on ribbon cassette

## Both Stations

Variety of print modes: double high (receipt station only), double strike (slip station only), double wide, upside down, and rotated

14 resident character language Code Pages:

- PC Code Page 437 (US English)
- PC Code Page 850 (Multilingual)
- PC Code Page 852 (Slavic)
- PC Code Page 858 (with Euro symbol)
- PC Code Page 860 (Portuguese)
- PC Code Page 862 (Hebrew)
- PC Code Page 863 (French Canadian)
- PC Code Page 864 (Arabic)

- PC Code Page 865 (Nordic)
- PC Code Page 866 (Cyrillic)
- PC Code Page 874 (Thai)
- PC Code Page 1252 (Windows Latin #1)
- PC Code Page Katakana
- Space Page

16K RAM for downloaded character sets or bit-mapped graphics (such as logos)

## General Features

Cover open sensors

Industry standard RS-232C and USB communication interface

History EEROM for custom settings

Audible tone (controlled by application)

**Note:** The 7167 does not have a paper journal. The journal is kept electronically by the host computer.

## Options

Magnetic Ink Character Recognition (MICR) check reader built into the slip station for verifying checks (includes custom MICR field parsing)

Extended slip table for handling large forms (standard with MICR check reader)

Knife

Remote power supply

One cash drawer connector (supports 2 cash drawers)

Communication cables

## Thermal Print Head

The 7167 Receipt Station uses a thermal print head for printing receipts, and is extremely fast and quiet. Since it uses heat to print directly on paper, there is no cassette or ribbon to change, eliminating soiled fingers and paper dust.

There is no regularly scheduled maintenance for the print head and it does not need to be regularly cleaned. However, if it does appear dirty, wipe it with cotton swabs and rubbing alcohol. If spotty or light printing problems persist after the thermal print head has been cleaned, see “Chapter 3: Solving Problems” for more information.

**Note:** The thermal print head does not normally require cleaning if the recommended paper is used. If non-recommended paper has been used for an extended period of time, cleaning the print head with cotton swabs and rubbing alcohol will not be of much benefit. See “Ordering Receipt Paper” on the next page for the recommended paper.

The print head is designed for a very long life, but it may be replaced if needed. Only a trained service representative may replace the print head. See “Chapter 3: Solving Problems” to determine if the print head needs to be replaced.

## Impact Print Head

The bi-directional, impact print head is designed for a very long life, but it may be replaced if needed. Only a trained service technician may replace the impact print head. See “Chapter 3: Solving Problems” to determine if the print head needs to be replaced.

## Ordering Paper and Supplies

Thermal receipt paper, ribbon cassettes, and forms can be ordered. Documentation is also available.

### Ordering Thermal Receipt Paper

The 7167 requires NCR qualified thermal paper to be used on the thermal receipt print station to insure proper operation of the printer. In addition the paper rolls must be have the following dimension.

Diameter	Length	Width
80 mm max. (3.15 in.)	83 meters (273 ft.)	80 mm $\pm$ .5 mm (3.15 $\pm$ .008 in.)

The paper must not be attached at the core. Otherwise the receipt station will be damaged when the paper is exhausted.

Paper grades available from NCR

Paper Stock	Paper Grade Description
856911	Economy (for text printing)
856966	Standard Sensitivity (for text and simple graphics)
878559	High Sensitivity (for text, bar codes & detailed graphics)
856380	For improved archiveability and added resistance to incompatible substances
Two Color	Please contact your local SMD sales representation for more detail

The paper must not be attached at the core. Otherwise the receipt station will be damaged when the paper is exhausted.

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 The NCR Media Products sales office

It is critical that only certified thermal paper be used with this printer, otherwise damage may result causing poor print quality or cause damage to the printer.

## Ordering Forms

The 7167 prints on single- or multiple-part forms in the slip station (up to five-part forms). Forms and slips must meet the following requirements:

Front insertion (minimum):

51 mm (2.0 inches) wide

70 mm (2.75 inches) long

Side insertion (minimum):

203 mm (8.0 inches) wide

51 mm (2.0 inches) long

Single-ply forms should be on paper that is greater than 15 pounds

Multiple-part forms (up to five parts) should be no thicker than .406 mm (.016 inches)

To order forms, 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 The NCR Media Products sales office

## Ordering Ribbon Cassettes

To order ribbon cassettes, 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

**Stock Numbers:** (purple ribbon cassette—8 million characters) 127022  
(black ribbon cassette—5 million characters) 127035



## Ordering Other Supplies

Contact your NCR 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	75 Watt Power Supply	7167-K331-V001
Power supply ( w/o power cord)	75 Watt Power Supply	7167-K302-V001
Power supply cord (to outlet)	United States	1406-C325-0030
	International (no plug)	1416-C319-0030
	United Kingdom	1416-C321-0030
	S.E.V.	1416-C320-0030
	Australia	1416-C322-0030
	International (with plug)	1416-C323-0030
RS-232C Communication Cables		
9-pin to 9-pin	0.7 meters	1416-C359-0007
9-pin to 9-pin	3.0 meters (9.8 feet)	1416-C266-0040
DC Plus Power Cable		
DC Power from NCR POS Terminal	1.0 Meters	1416-C712-0010
DC Power from NCR POS Terminal	4.0 Meters	1416-C712-0040
USB Communication Cables		
USB Type A to Type B Connector	2.0 Meters	1416-C528-0010
USB Type A to Type B Connector	4.0 Meters	1416-C528-0040
USB Plus Power Cables		
USB Plus Power to Type B Connector	3.0 Meters	1416-C713-0010
USB Plus Power to Type B Connector	4.0 Meters	1416-C713-0040
Extended Slip Table (Standard)		7167-K280-V001
Cash Drawer	2189	2189-K002-V001
		(Switchable for Drawer 1 or Drawer 2)
Cash Drawer Cable	Y Cable	1416-C372-0006

## Ordering Documentation

Contact your sales representative to obtain the following documentation:

7167 Thermal Receipt and Impact Slip Printer: Parts Identification Manual (B005-0000-1408)

7167 Thermal Receipt and Impact Slip Printer: Service Manual (B0005-0000-1407)  
(includes Troubleshooting Guide and the Preventative Maintenance Guide)

## Cleaning the Printer

### Cleaning the Cabinet

The external cabinet materials and finish are durable and resistant to these items:

Cleaning solutions

Lubricants

Fuels

Cooking oils

Ultraviolet light

There is no scheduled maintenance required for the 7167.

Clean the cabinet as needed to remove dust and finger marks. Use any household cleaner designed for plastics, but test it first on a small unseen area. If the receipt bucket is dirty, wipe it with a clean, damp cloth.

### Cleaning the Thermal Print Head

**Caution:** Do not spray or try to clean the thermal print head or the inside of the printer with any kind of cleaner as this may damage the thermal print head and electronics.

If the thermal print head appears dirty, wipe it with cotton swabs and rubbing alcohol.

If spotty or light printing problems persist after the thermal print head has been cleaned, see “Chapter 3: Solving Problems” for more information.

**Note:** The thermal print head 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 print head with cotton swabs and rubbing alcohol will not be of much benefit. See “Ordering Paper and Supplies” earlier in this manual for recommended paper.

## Chapter 2: Setting Up and Using the Printer

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### What Is in the Box?

The following items are packed in the shipping box:

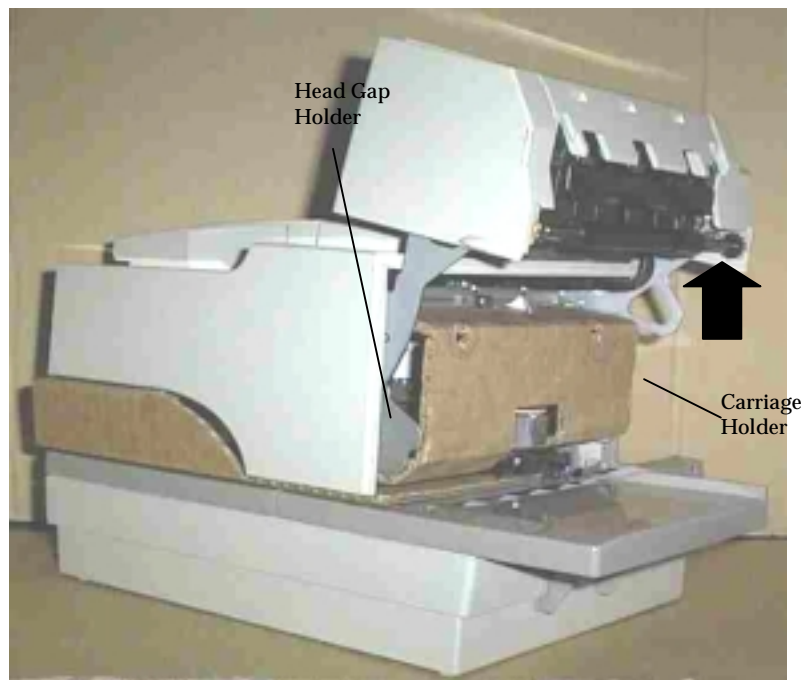
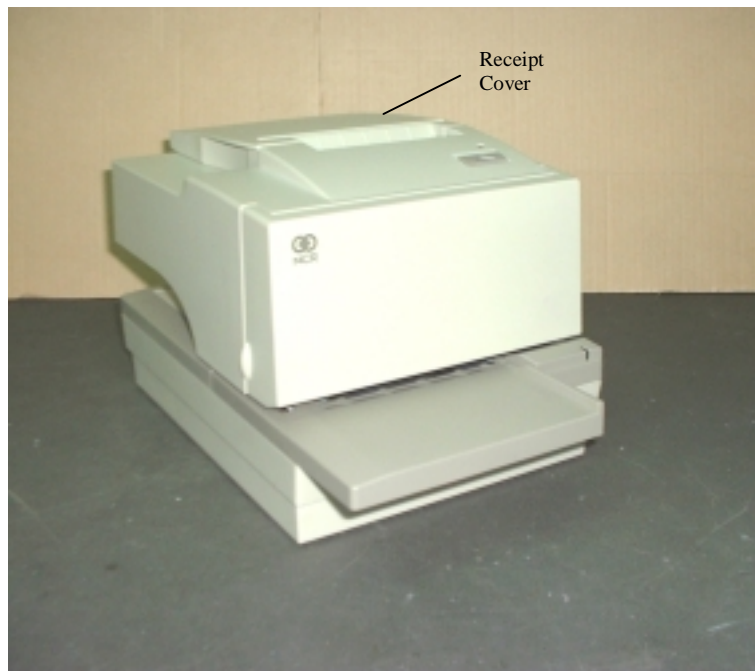
- Printer enclosed in a plastic bag and foam pack
- Ribbon cassette
- Thermal receipt paper roll

Cardboard restraint for carriage (behind front cover)

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

- Communication cable (from host computer to printer)
- DC Power Cable
- Remote Power Supply
- USB plus Power Cables
- Cash drawer cables (may be ordered from other equipment suppliers: see “Ordering Other Supplies” in chapter 1)

## Removing the Packing Material



1. Remove the printer from the foam pack and plastic bag.
2. Open the front cover and remove the carriage holder.
3. Remove the head gap holder from the slip table.

4. Remove the ribbon cassette / receipt paper roll and cables from the foam packing material.
5. Save all packing materials for future storing, moving, or shipping the printer.

**Caution:** Remove the carriage holder and the head gap holder before using the printer.

Do not pickup the printer using the slip table as a handle.

## Re Packing the Printer

Review the illustrations on the previous pages to pack the printer.

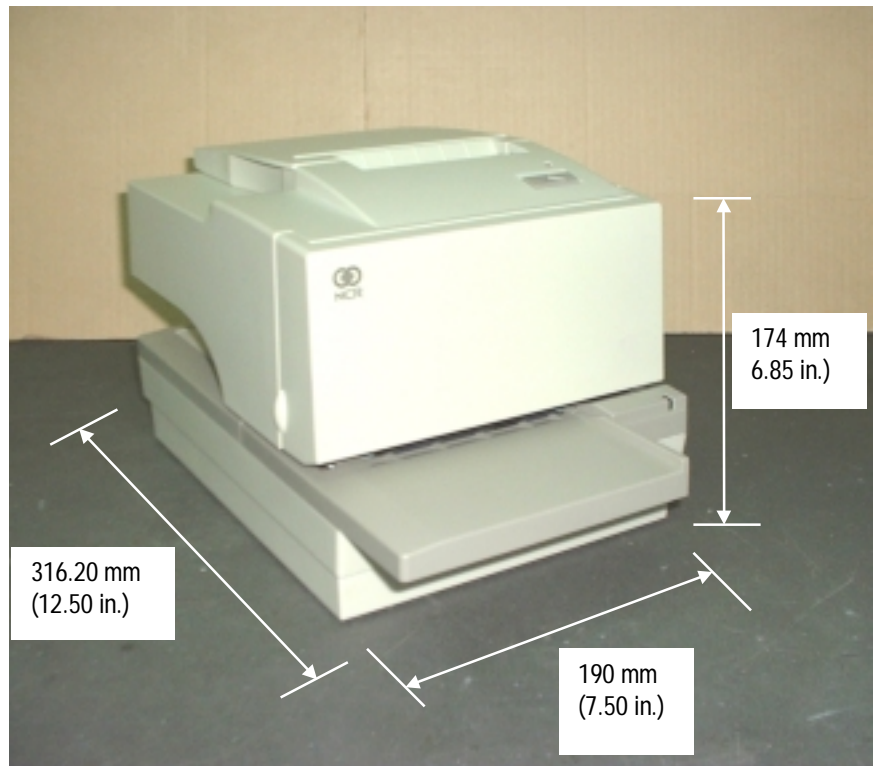
1. Place receipt paper between the receipt cover and the print head for protection.
2. Remove the ribbon cassette, move the carriage to the corner, and place the cardboard restraint in the slip carriage area.
3. Place the cardboard support on the slip table.
4. Place the printer in the plastic bag and foam pack, place the packed printer in the box, and secure the box with packing tape.
5. If you are sending the printer 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 7167 printer takes up relatively little counter space and may be set on or near the host computer. Make sure there is enough room to open the receipt cover to change the paper and to open the front cover to change the ribbon cassette. The illustration shows the actual dimensions of the printer, but leave several inches around the printer for connecting and accessing the cables.

**Note:** The optional Magnetic Ink Character Recognition (MICR) check reader feature is designed to operate under a normal operating environment with a host computer. However, additional devices, such as CRT monitors, or large metal surfaces that are near the printer can affect the printer's magnetic field, causing intermittent reading errors when the MICR check reader is in operation. Relocating these devices may be required to prevent this interference.

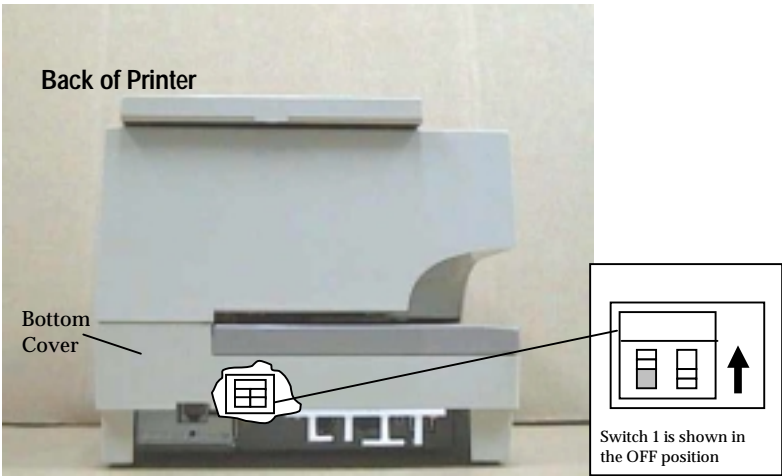


## Setting Switches

The DIP switches, located at the back of the printer, are used for three purposes:

- To set variables for several printer functions (see the sections for the various printer functions in “Level 1 Diagnostics” in “Chapter 4: Diagnostics” for Setting Up The Printer)
- To perform diagnostic tests (see the sections for the various diagnostic tests in “Level 1 Diagnostics” in “Chapter 4: Diagnostics” for Setting Up The Printer)

**Caution:** The DIP switches are set to OFF.



**Note:** Switch 1 is shown in the Off position for reference.

Use a paper clip or other pointed object to set the switches.

- 1. Set the switches to the desired settings shown in the table.
- 2. Reset the printer.

DIP Switch Settings for RS-232C Parameters		
Switch 1 Settings	Switch 2 Settings	Printer State
OFF (0)	OFF (0)	On-line Mode (default)
OFF (0)	ON (1)	Diagnostic Mode
ON (1)	OFF (0)	Flash Download Mode
ON (1)	ON (1)	Vendor Adjustment Mode

## Connecting the Cables

There are three different types of cables that connect to the printer:

- Power supply cable supplying power from the host POS terminal or from a external power supply
- Communication cable (RS-232 or USB) connecting the printer to the host computer
- Cash drawer cable connecting the printer to one or two cash drawers

**Caution:** Disconnect the power before connecting the cables. Always connect the communication cable and cash drawer cables before connecting power to the power source. Always disconnect power to the power source before disconnecting the communication and cash drawer cables.

Follow these steps to connect the cables. See the illustration on the next page.

1. Unplug the power cable from its power source.
2. Connect the power and communication cables to their respective connectors under the printer as shown in the illustration.

For RS232 cable, be sure to screw the communication cable to the communication connector.

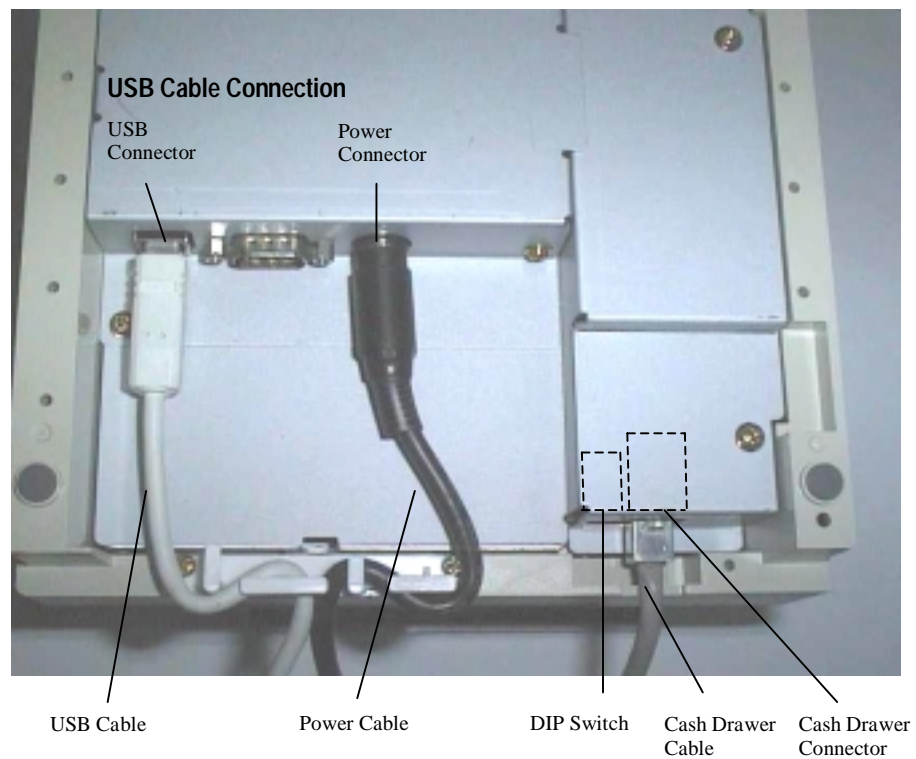
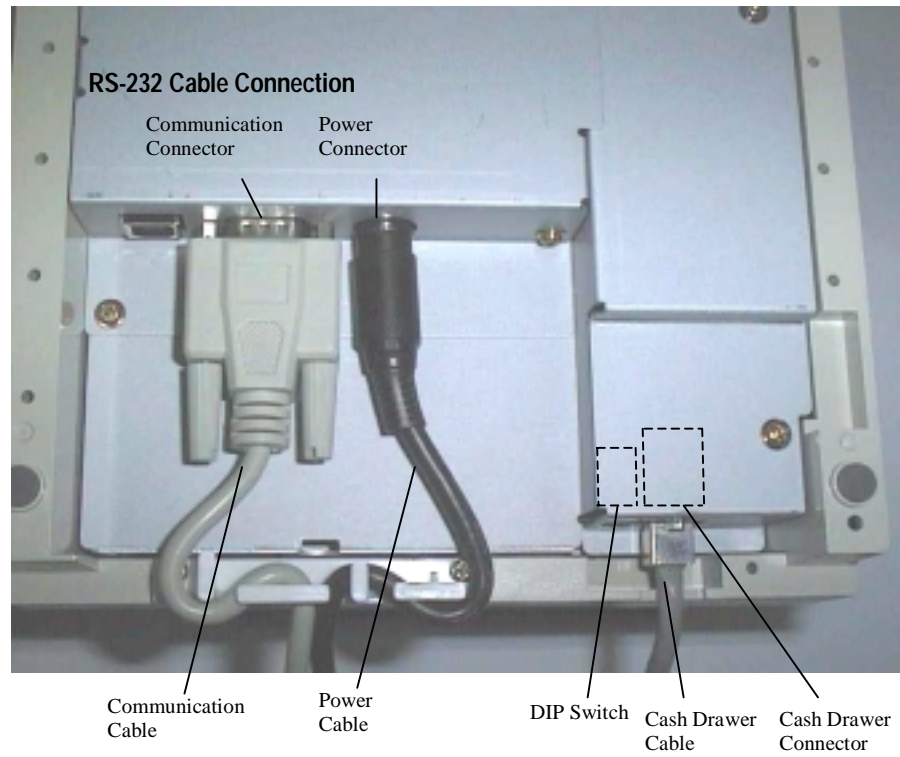
3. Route the cables through the cable strain relief on the bottom of the printer, then through the two slots in the cable access cover as shown in the illustration.
4. Connect the communication cable to the appropriate host computer connector.
5. Connect the cash drawer cable to the printer and cash drawer.

The connectors is a standard phone jack located at the rear of the printer.

6. For Host powered installation plug the DC cable into the POS terminal or plug the power cord into the power supply for remote power supply installation, then plug the power supply into an outlet.

At this point, the printer receives power. If the On Line LED (green) is on, the printer is on-line. Otherwise, the printer is not receiving power. Check to insure that the host terminal is on or that the power supply is on.





### Bottom of the Printer

## About the Universal Serial Bus

The Universal Serial Bus (USB) is a peripheral bus for personal computers that was first released in January 1996. Since that time, virtually all Intel Architecture personal computers have the hardware to support USB, and a large number of computers exist that have both the hardware and software support required to interface with USB peripherals.

### Advantages of USB connections

USB has a number of advantages over legacy connection schemes (e.g., serial RS-232). These advantages include:

- **High Speed:** up to 12 MB/second for high-speed devices.
- **Plug and Play:** Devices are automatically recognized and configured at installation.
- **Hot plug:** Bus supports installation and removal of devices with the power applied.
- **Up to 127 devices:** One host can support up to 127 devices with the use of hubs.
- **“Free ports”:** Most PC architecture machines contain two USB ports in the base hardware.

These advantages have become attractive to the POS industry for a couple of reasons.

**Additional POS devices.** Some POS systems are required to host more peripherals than can be supported by two RS-232 ports typical in a platform. With the addition of one (or two) USB connectors, the platform can now support the additional devices that had previously required a serial port expander card.

**Higher bandwidths.** New devices coming into use have bandwidth requirements that are higher than the bandwidth that can be supported on legacy interfaces. These devices include image scanners and printers. As the speed and capability of POS printers increases, the performance of the printer in an application can become limited by the speed of the communications interface. USB provides ample bandwidth to support current and future POS printer requirements.

### Advantages of the NCR USB Solution

NCR has eliminated any cost associated with porting applications to USB by implementing a USB solution that simulates standard serial communications in Windows 98 (SR2), Windows 98 USB Hot Patch, ID: Q236934, NT 4.0 (Service Pack 3 or higher) and Windows 2000. Application developers need only redirect their software to the virtual serial ports created by the NCR USB solution to use the printer.

## Checking for USB Support on the Host Computer

If the 7167 is equipped with a USB interface, the host computer must be equipped and setup properly. If it is not, you need to install a USB interface card. With the required hardware in place, Windows 98 (SR 2), Windows 98 USB Hot Patch, ID: Q236934, NT 4.0 (Service Pack 3 or higher) and Windows 2000 natively support plug-and-play USB with a built-in driver; Windows NT does not, and the NCR windows NT USB driver needs to be installed.

**IMPORTANT:** You need to have internet access to download the USB drivers from the NCR Web site://[www.NCR.com](http://www.NCR.com)

### Host Configuration

Verify that the proper hardware has been installed in the host terminal.

#### Windows 98:

1. Open the Control Panel.
2. Click on System (Windows 98).
3. Click the Device Manager tab.
4. In the Device Manager window, scroll down the list of installed hardware devices until you find an entry for "Universal serial bus controller."

If this entry exists, your host computer is set up for USB operation. If this entry does not appear:

- Consult your computer documentation to see if USB must be enabled in the CMOS setup.

#### Windows NT:

To see if your POS terminal is USB-compliant, look at the back.

- If it has a USB connector port, your hardware is all set.

**Note:** Even though the host may have a USB port, Windows NT does not natively support plug-and-play USB because it does not have a built-in driver. You will need to load the NCR Windows NT USB driver (see "Installing the USB Printer Drivers").

#### Windows 2000:

1. Open the Control Panel.
2. Click on System.
3. Click on Hardware.
4. Click the Device Manager tab.
5. In the Device Manager window, scroll down the list of installed hardware devices until you find an entry for "Universal serial bus controller."

If this entry exists, your host computer is set up for USB operation. If this entry does not appear:

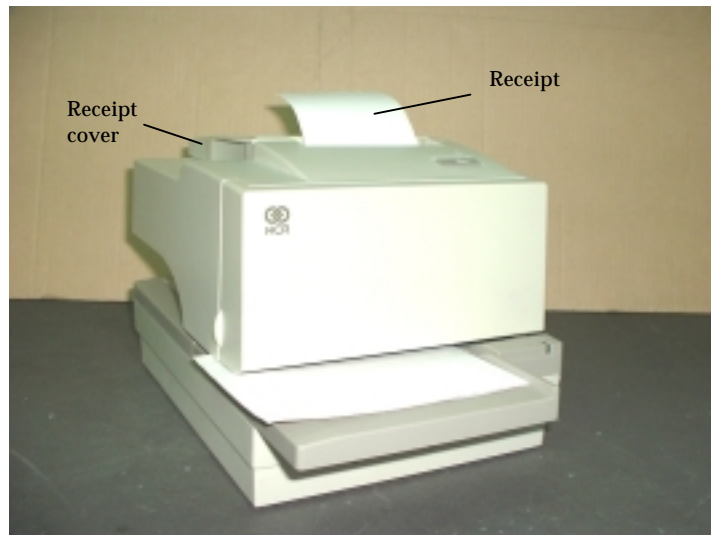
- Consult your computer documentation to see if USB must be enabled in the CM nOS setup.

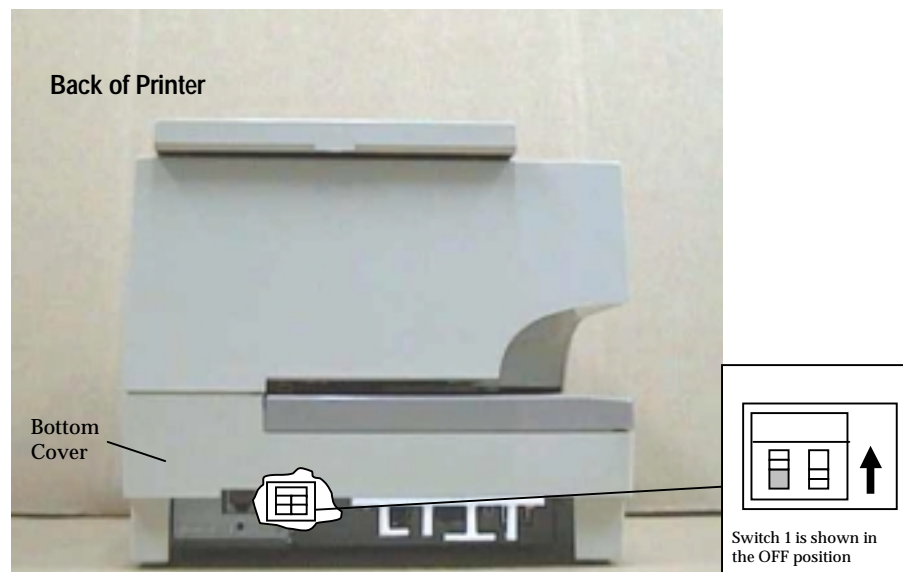
## Configuring the Printer

USB is a plug-and-play environment. As such, neither the printer nor the host requires user configuration to work. However, since the NCR solution simulates a serial communication interface, you must configure “handshaking” on the printer for proper operation. The printer can be configured to use hardware flow control (using DTR/DSR) or software flow control (using XON/XOFF). All other serial communication parameters (i.e., baud rate, parity, stop bits, and data bits) are ignored.

### To define software or hardware handshaking:

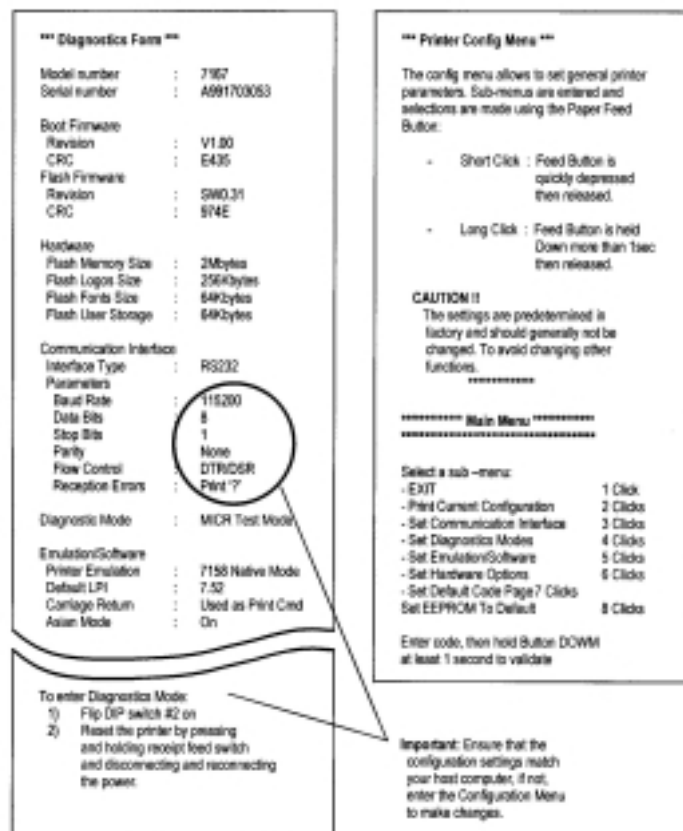
1. Open the Receipt Cover and check whether there is paper in the printer. If there isn't, insert the paper roll, as described in the *Owner's Manual*.
2. Turn the printer so the back is facing you.
3. Set DIP switch 2 to the On position (up).





4. Open the Front Cover of the printer and press the Reset button, while pressing the Paper Feed button.

The printer beeps, prints the current configuration, then waits for you to make a selection from the Main Menu on the printout.



Configuration Menu and Print Test samples (show approximately 60% of size).

Follow the instructions on the scrolling menu, pressing the Paper Feed button to make selections. Indicate Yes with a long click, and No with a short click.

- Press and hold the Paper Feed button for at least one second for a long click.
- Press the Paper Feed button quickly for a short click.

5. Select Set Communication Interface from the Main Menu.

The printer scrolls to the first menu selections.

6. Select RS232/USB.
7. Skip through the parameters with short clicks until Set Flow Control Method is displayed.
8. Follow the instructions to select either XON/OFF or DTR/DSR, then skip the remaining communications parameters.
9. When you have finished, set DIP switch 2 to Off (down).
10. Press the Reset button.

The printer resets with the new selection. You can verify the new setting by pressing the Paper Feed button to print out a diagnostics form or by holding the Paper Feed button while closing the Top Cover.

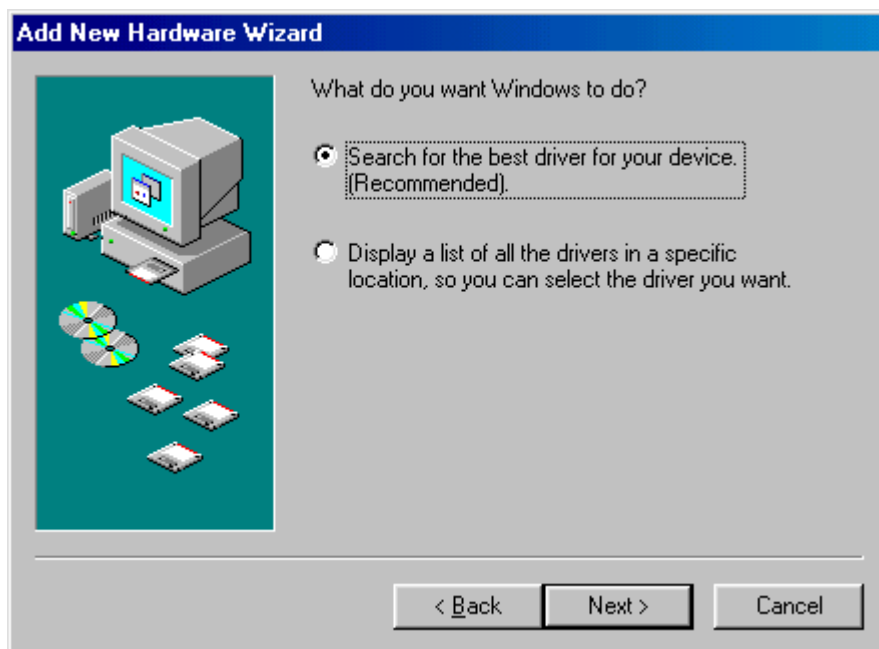
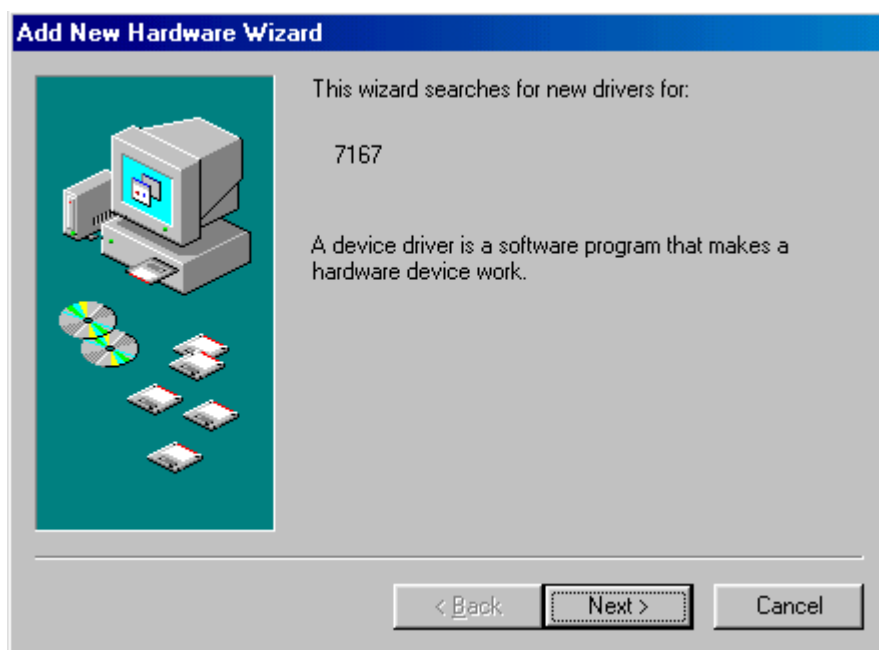
## Installing the USB Printer Drivers

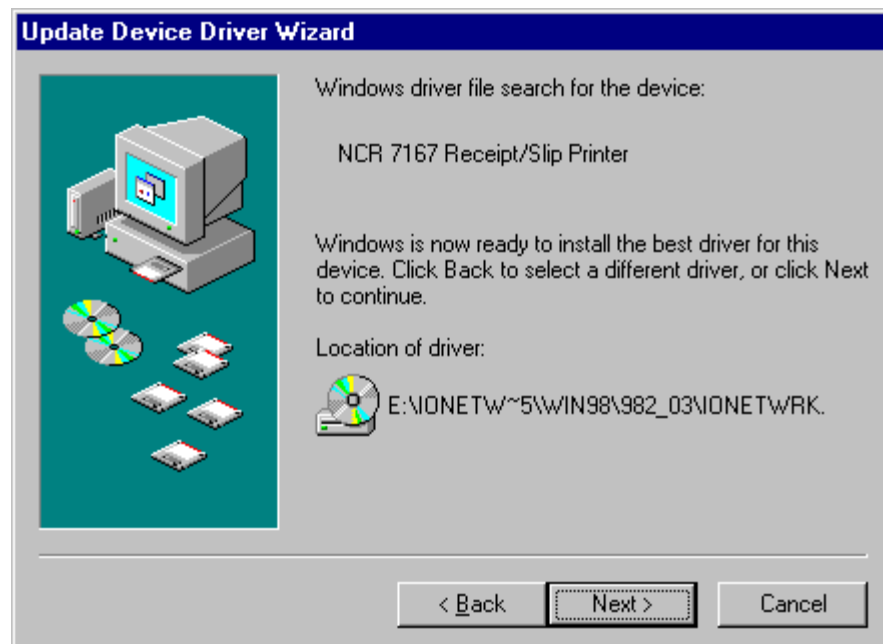
Windows NT users need to run Service Pak 3 or higher for a successful installation and should exit all Windows programs before starting.

1. Verify that the printer is plugged in and the power is on.
2. The installation varies depending on the operating system.

### Windows 98

Follow the on-screen instructions. The printer beeps when the USB device is recognized. Go to the location where you downloaded the drivers and double click the file.





Note: Location of the IONetworks files on the CD-ROM may vary depending on the version of the CD that is being used.

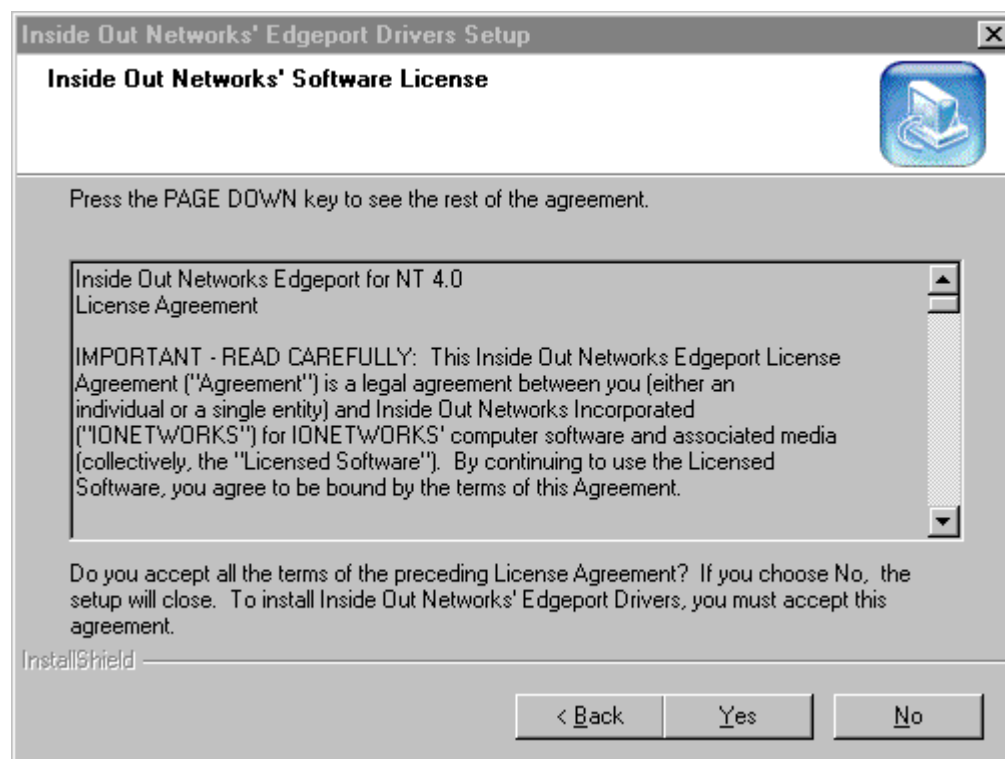
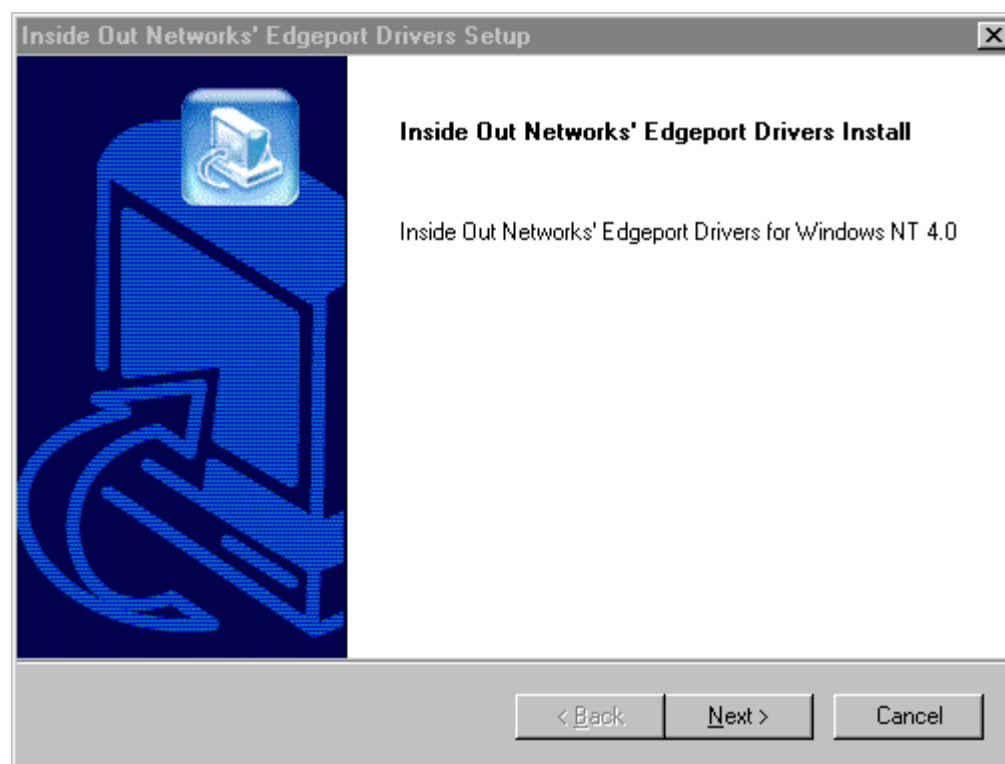


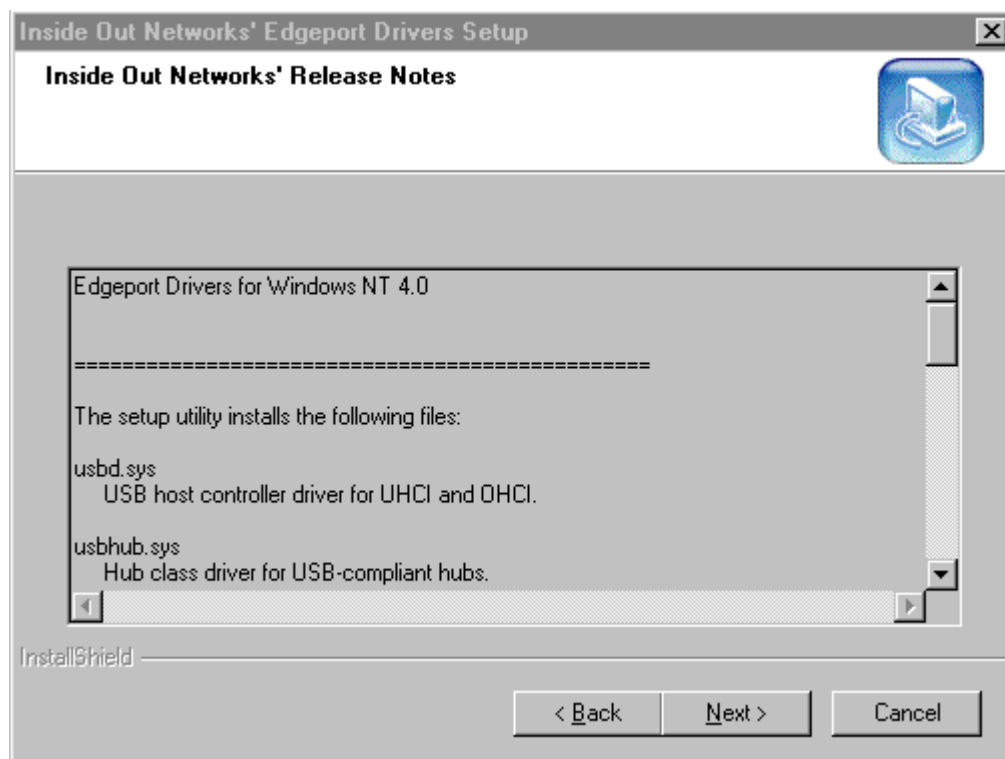


Also verify that you have the Windows 98 USB Hot Patch, ID: Q236934, created: 08-Jul-1999 and modified: 10Aug-1999 installed. To verify if this hot patch is installed check file `c:\Windows\System32\Drivers\usbhub.sys`. This file should be dated 08/13/99, size 36,672, version 4.10.22223.

## Windows NT

The printer beeps when it is plugged in to show the USB device is recognized. Click on the file you downloaded and follow the on-screen instructions.

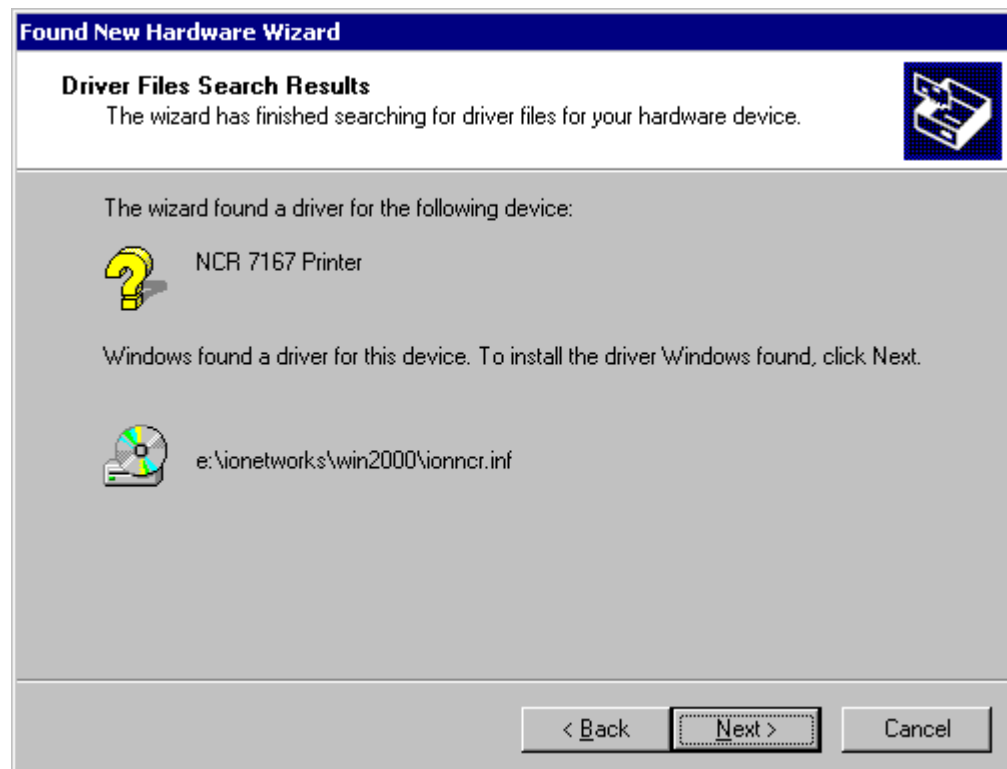
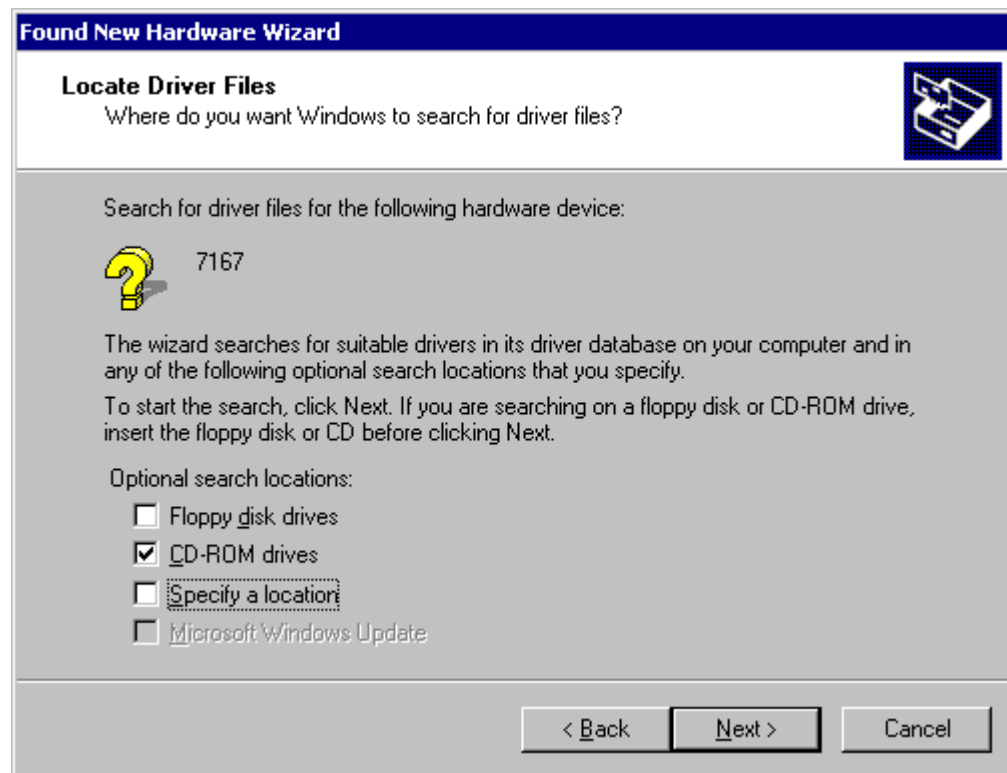




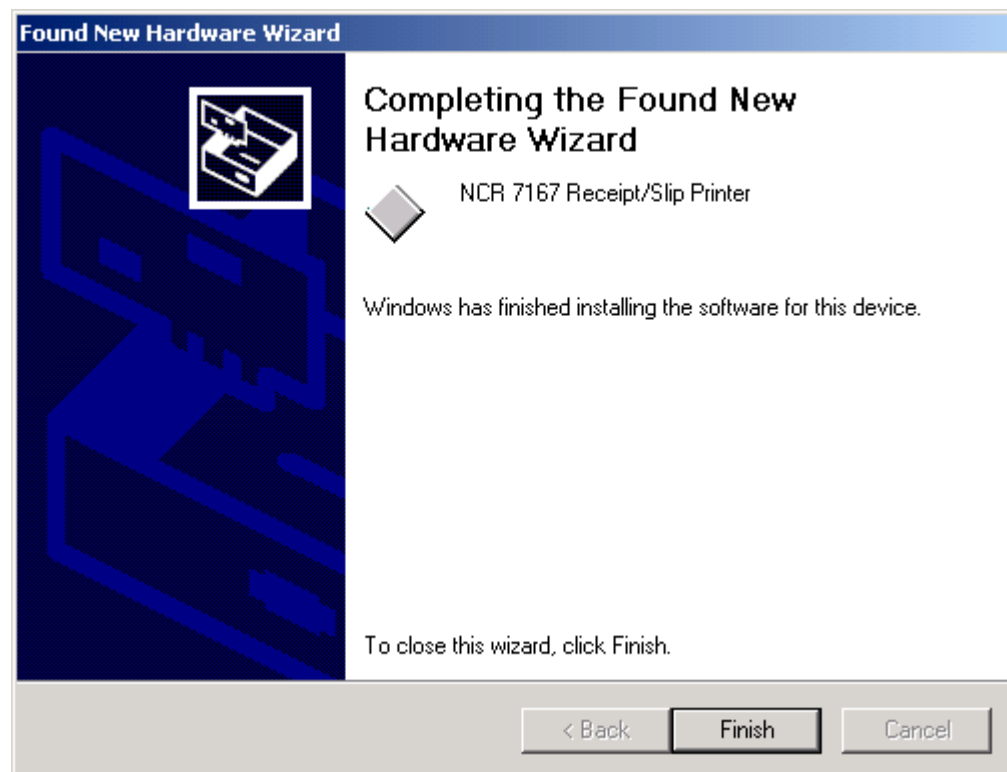
### Windows 2000

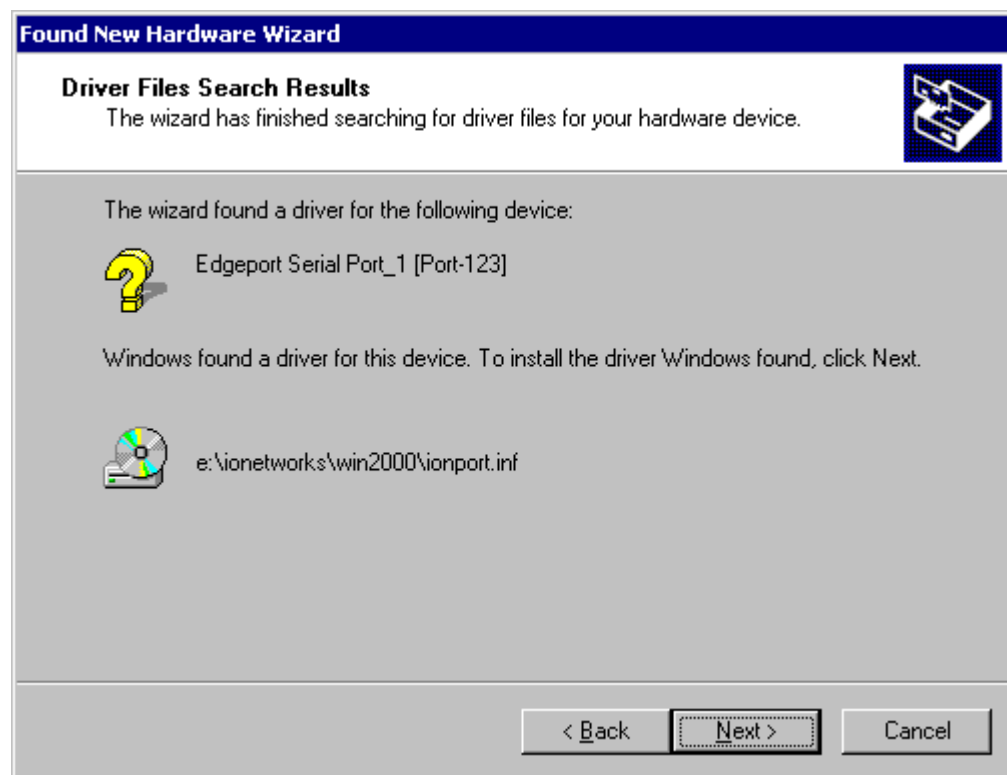
Follow the on-screen instructions. The printer beeps when the USB device is recognized. Go to the location where you downloaded the drivers and double click the file.



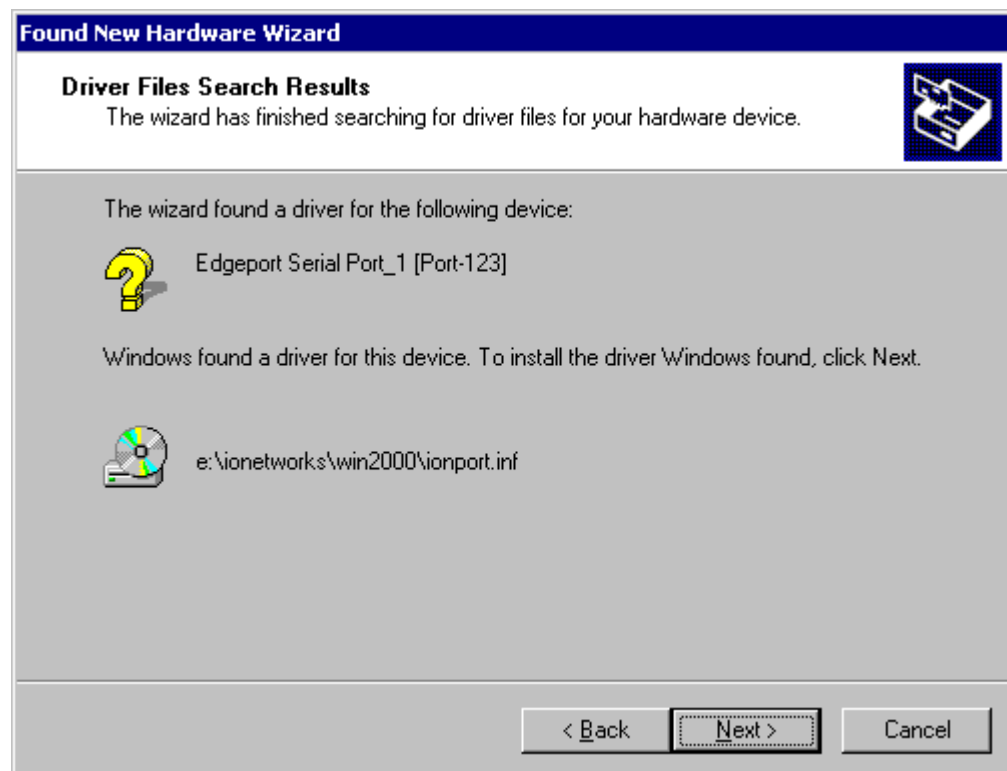


Note: Location of the IONetworks files on the CD-ROM may vary depending on the version of the CD that is being used.





Note: Location of the IONetworks files on the CD-ROM may vary depending on the version of the CD that is being used.





## Checking the Installation

You need to verify that the device drivers were installed correctly:

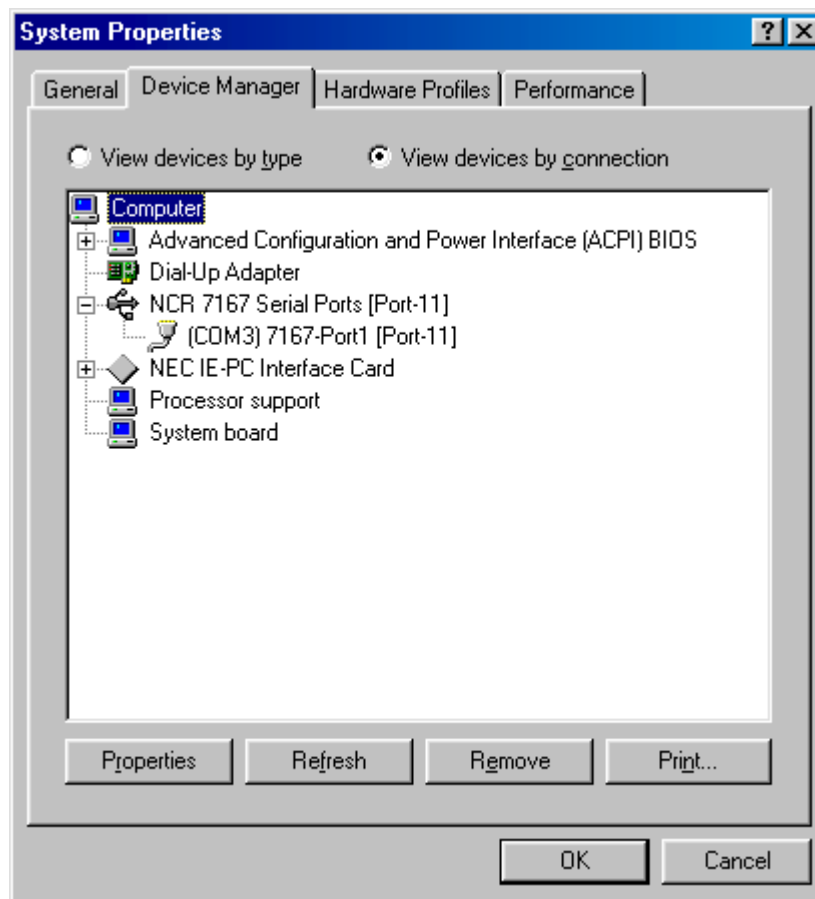
### Windows 98:

1. Open the Device Manager window, as you did in “Checking for USB Support.”
2. Scroll down to “Universal serial bus controllers.”

The following devices should be displayed:

- NCR 7167 Printer
- NCR 7167 Serial Ports [Port#] (where the # is the location of the printer)





3. Scroll back up to “Ports.”

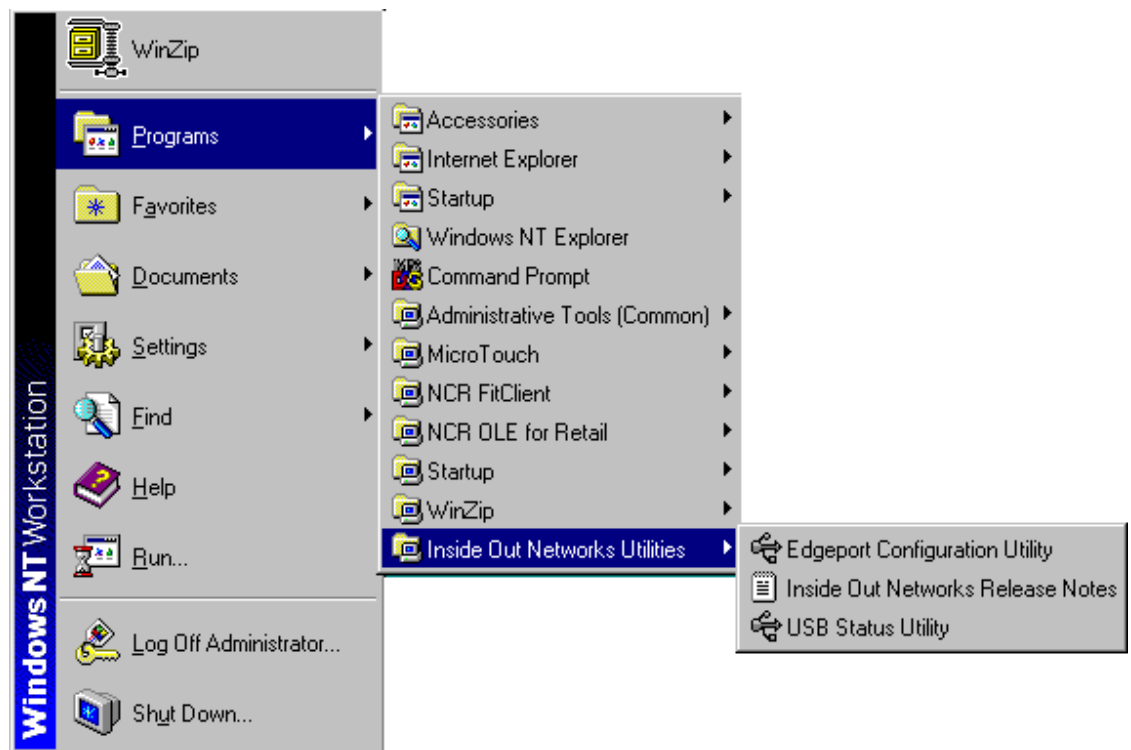
You should see a COM number and port description for the **NCR** printer.

If the devices are missing or are not listed correctly, the installation wasn't successful. You will need to reinstall the drivers.

**Windows NT:**

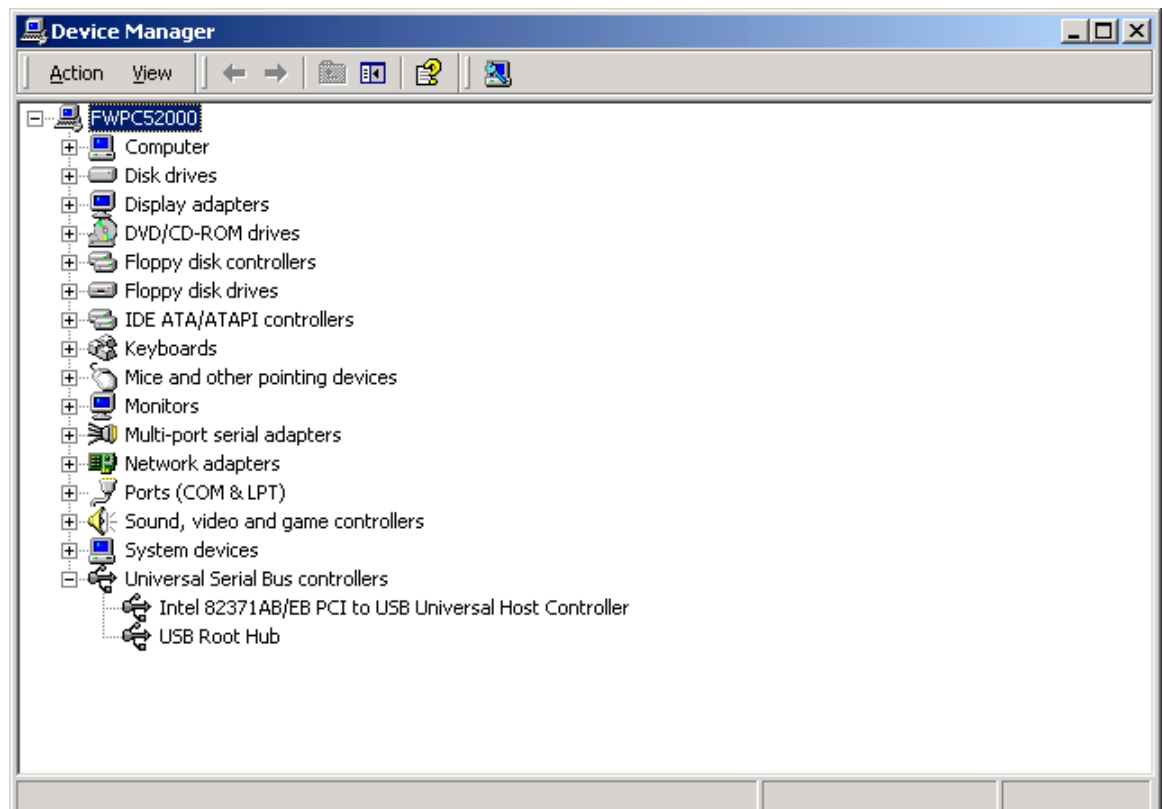
Go the Windows Start button and select Programs > InsideOut Networks Utilities > Edgeport Configuration Utility. A window opens that contains the name of the printer, and the port assignment.

If this information is not listed, then the installation was not successful. You will need to reinstall the drivers.



### Windows 2000:

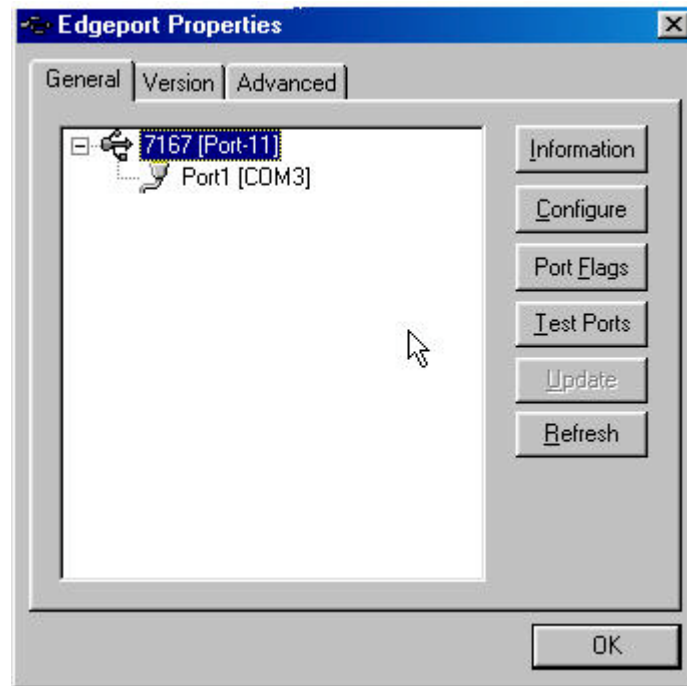
1. Open the Device Manager window, as you did in “Checking for USB Support.”
2. Scroll down to “Universal serial bus controllers.”



### 3. Scroll back up to “Ports.”

If the devices are missing or are not listed correctly, the installation wasn't successful. You will need to reinstall the drivers.

If this information is not listed, then the installation was not successful. You will need to reinstall the drivers.



## Configuring Serial Port Number Assignments

This section describes how the NCR USB solution assigns serial port numbers (e.g., COMx) to the printer. The information that determines the assigned port number is stored in the host computer and not in the printer. This assignment is made in one of three ways. The first method is the default method that automatically assigns a serial port number to the printer. The other two methods require the user to specify a port number. These methods are described more fully in “Serial Port Configuration Methods” on the following page.

### Running the Edgeport Utility

You'll need to run the Edgeport utility to check which serial port has been assigned to the printer. This utility queries and configures the operating system and driver for the information regarding the virtual serial port.

#### Windows 98

1. Open the Device Manager and make sure “View Devices By Type” is selected.
2. Scroll down to Universal serial bus controller, and expand the list by pressing the “+” symbol. You'll see two entries for your NCR printer.

3. Select the printer name and click Properties.
4. Select the Details tab, then press the Details button to start the Edgeport utility.

### **Windows NT 4.0**

From the Windows Start menu, select Programs > Inside Out Networks Utilities > Edgeport Configuration Utility.

### **Windows 2000**

1. Open the Device Manager and make sure "View Devices By Type" is selected.
2. Scroll down to Universal serial bus controller, and expand the list by pressing the "+" symbol. You'll see two entries for your NCR printer.
3. Select the printer name and click Properties.
4. Select the Details tab, then press the Details button to start the Edgeport utility.

## **Serial Port Configuration Methods**

**Automatic (Default).** When the printer is plugged into the USB port of the host and the drivers are loaded, the printer will default to the next available serial port number. In many cases this is exactly what is desired. You can check the assigned serial port by clicking the General tab in the Edgeport utility. You'll see an entry for the NCR printer. Expand the list to see which serial port has been assigned to the printer.

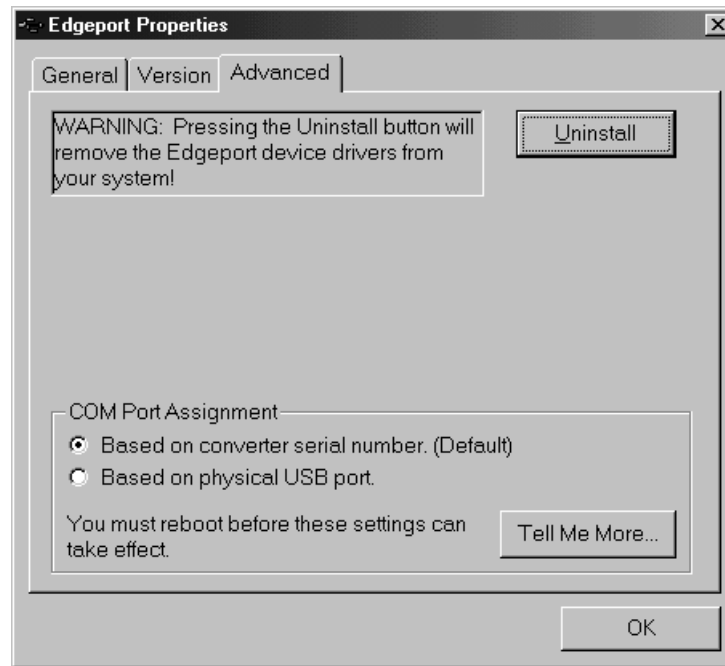
**Assigning a serial port to the printer.** If the default assignment does not meet the requirements of the installation, you can assign a different serial port to the printer. From the General tab of the Edgeport utility, select the printer and press Configure. Follow the directions on the resulting form to assign a new port to the printer.

**Associating a serial port with a specific USB port.** (Windows 98 and NT) In certain installations it is desirable to associate a serial port number with a specific USB port. This is particularly important if multiple identical printers are installed on one host. Select the Advanced tab in the Edgeport utility, and follow the instructions for configuring the serial port number based on the physical USB port.

## **Uninstalling the Drivers**

### **Windows 98:**

1. Open the Device Manager and make sure "View Devices By Type" is selected.
2. Scroll down to Universal serial bus controller, and expand the list by pressing the "+" symbol. You'll see two entries for your NCR printer.
3. Select the printer name and click Properties.
4. Select the Details tab, then press the Details button to start the Edgeport utility.
5. Click the Advanced tab.
6. Click the Uninstall button and follow the on-screen instructions.

**Windows NT:**

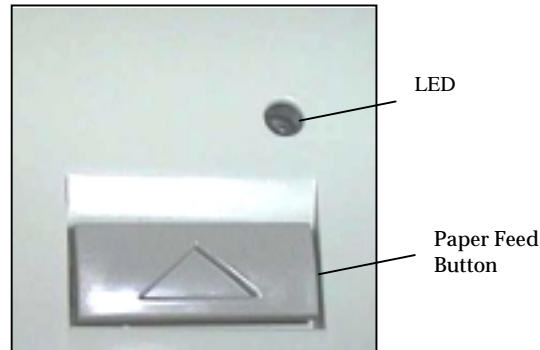
Windows NT users will need to run the Edgeport Configuration Utility to uninstall the drivers.

1. Press Windows Start Menu button.
2. Choose Programs, then Inside Out Networks Utilities.
3. Choose Edgeport Configuration Utility.
4. Click the Advanced tab.
5. Click the Uninstall button and follow the on-screen instructions.

**Windows 2000:**

1. Open the Device Manager and make sure "View Devices By Type" is selected.
2. Scroll down to Universal serial bus controller, and expand the list by pressing the "+" symbol. You'll see two entries for your NCR printer.
3. Select the printer name and click Properties.
4. Select the Details tab, then press the Details button to start the Edgeport utility.
5. Click the Advanced tab.
6. Click the Uninstall button and follow the on-screen instructions.

## Using the Printer



**Note:** See “Setting Switches” earlier in this book for instructions on setting the DIP switches.

1. Connect the power supply cable to the printer and turn on the power source.

The printer goes through a self-test routine to ensure everything is working properly then “beeps.” After the printer has completed its “startup” cycle, it is ready to receive data.

If the LED blinks, or the host computer indicates that there is a problem, see “Chapter 3: Solving Problems” for more information.

2. To perform a Configuration check (optional), reset the printer while holding the Paper Feed Button, or open the receipt door and while pressing the paper feed button close the receipt door, let go of the Paper Feed Button once the printing begins.

**Note:** The printer receives power when the power supply is on even if the printer is off-line. To completely remove power, unplug the power supply from the outlet, or turn the POS terminal off.

## Loading and Changing the Receipt Paper

Although the illustrations show a used roll being removed, the instructions apply to loading paper for the first time.

Change the paper when either of the following two conditions occurs:

- LED blinks (slow): the paper is low

There are approximately 1 ½ to 7 ½ meters (5-25 feet) of paper remaining on the roll. Change the paper as soon as possible to avoid running out part way through a transaction.

Depending on the application program, the host computer may alert you when the paper is low.

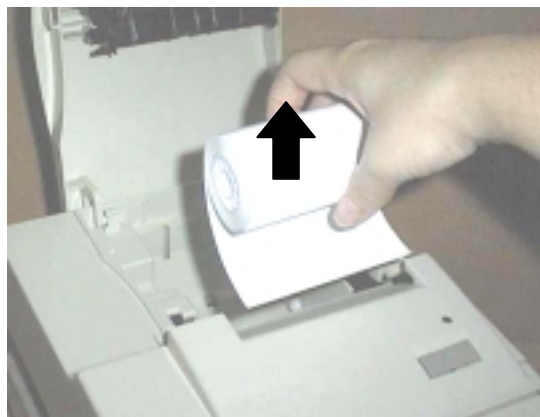
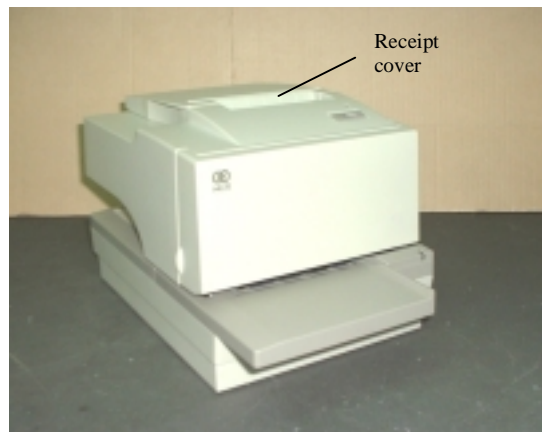
- LED blinks (fast): the paper is out

Change the paper immediately or data may be lost.

**Caution:** Do not operate the printer or host computer if the printer runs out of paper. The printer will not operate without paper, but it may continue to accept data from the host computer. Because the printer cannot print any transactions, the data may be lost.

## Removing the Paper Roll

1. Open the receipt cover.
2. Remove the used roll.





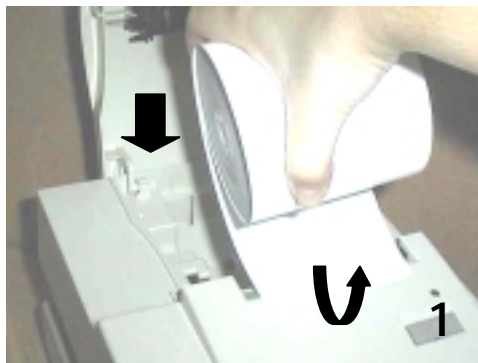
## Loading the Paper Roll

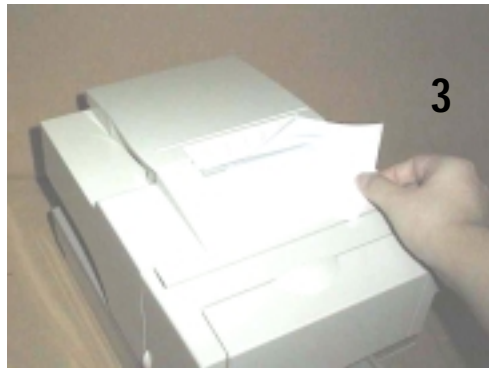
**Note:** Tear off the end of the new roll so that the edge is loose.

1. Place the new roll in the bin with a little extra paper extending over the front.

Be sure the paper unrolls from the bottom of the roll. Otherwise the paper will not be printed on because the thermal coating will be on the wrong side.

2. Close the receipt cover.
3. Remove the excess paper by tearing it against the tear-off blade.





### **Advancing Paper**

1. Press the Paper Feed button on the operator panel to advance the paper.

The cover must be closed. To ensure print quality and the proper alignment of the paper, advance about 30 cm (12 inches) of paper.

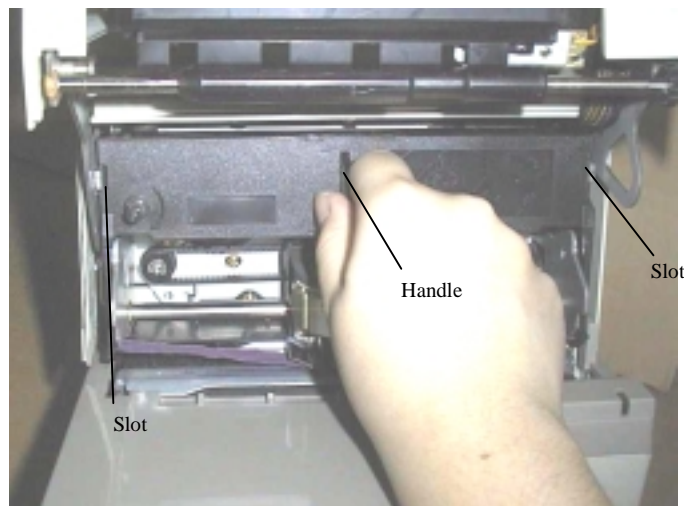
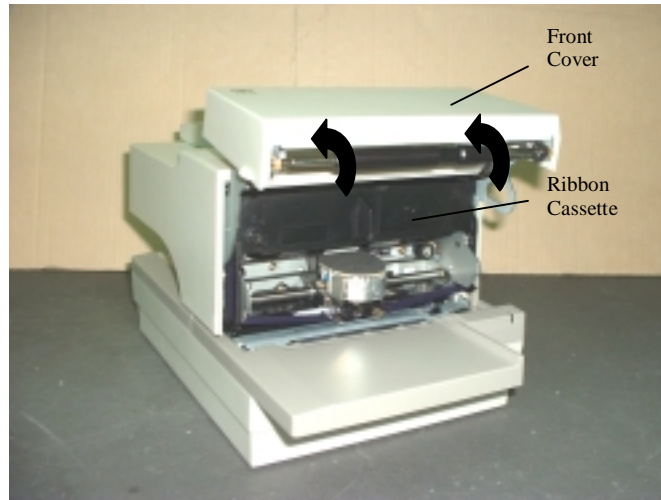
2. Tear off the excess paper against the tear-off blade.

## Installing and Changing the Ribbon Cassette

Change the ribbon cassette when the print is too light or the ribbon is frayed.

### Removing the Ribbon Cassette

1. Open the front cover.
2. Use the handle on the cassette and pull the cassette from the printer.



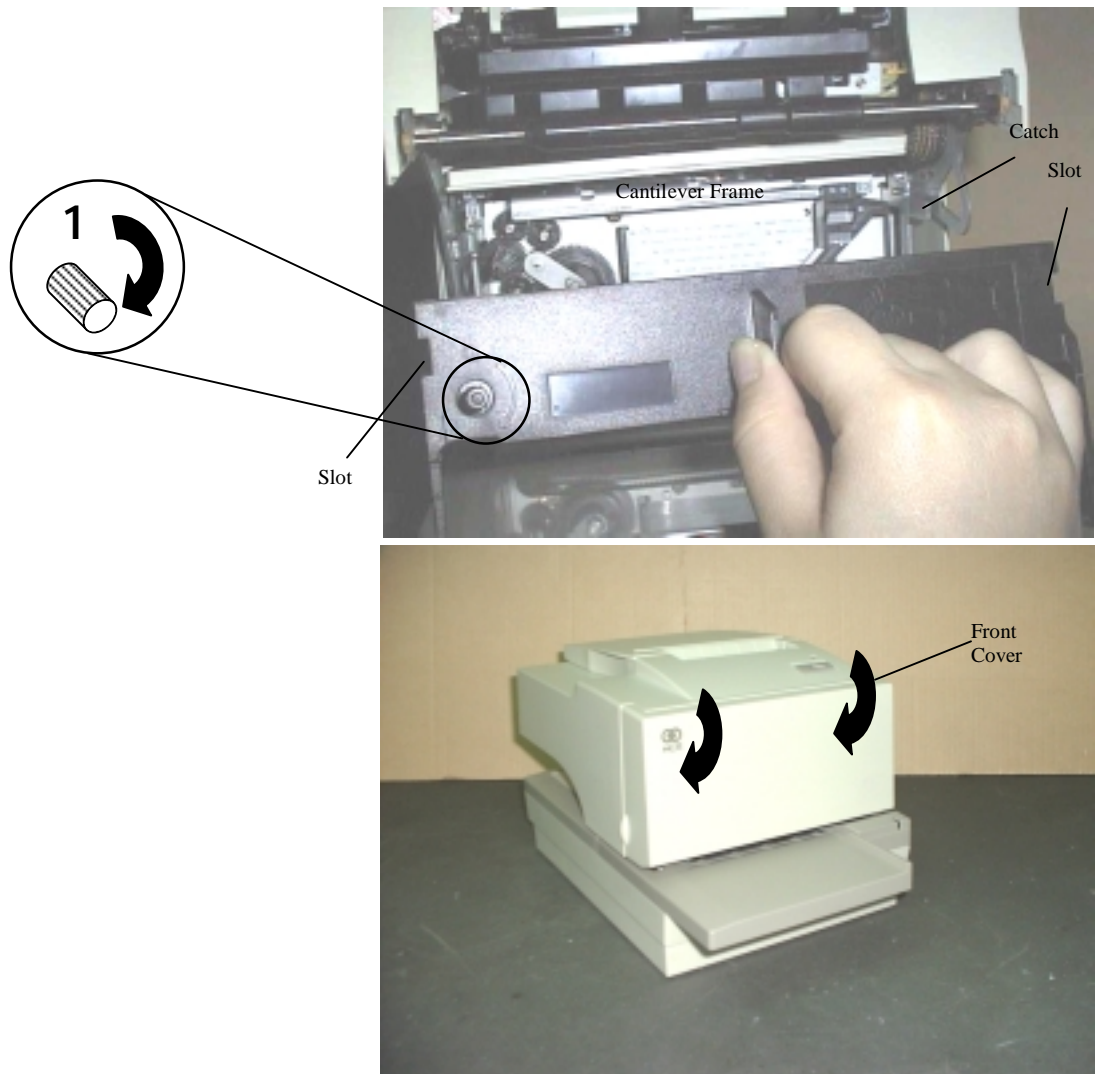
## Putting In the Ribbon Cassette

1. Tighten the ribbon by turning the knob in the direction of the arrow.
2. Position the ribbon cassette slot at the catch on the printer slip frame and push it into place.

Be sure the ribbon is in front of the or underneath the print head.

Tighten the ribbon using the shaft at the upper left corner of the cassette. Rotate the shaft clockwise until the ribbon is positioned between the print head and the metal ribbon guide.

3. Close the front cover.



## Printing in Forms or Checks

There are several types of transactions that require you to insert a form or check into the printer:

- Credit card transaction (some credit card transactions may be printed on the receipt station and not require any forms)
- Multiple-part forms such as credit transactions or merchandise returns
- Electronic funds transfers
- Check printing (printing the date, payee, and amount on the check face)
- Check endorsement

Although the illustration on the facing page shows a check being inserted into the printer, the instructions apply to any type of form. The 7167 can print on forms up to five-parts thick. See “Ordering Forms” in chapter 1 for more information about the type of forms that can be used.

1. Insert the form or check (check shown in the illustration) from the front and place it on the slip table top first and with the print side up.

If the form is extra long, you may need to insert it from the side.

2. Slide the form or check to the right until it lines up against the guide (wall).

If the form is extra long, you need to slide it over the form stop to disengage it. In this case, you need to mark the slip table to line up the form for the proper placement of the print on the form.

3. Slide the form or check toward the back of the printer until it contacts the form stop (it won't be able to go any further);

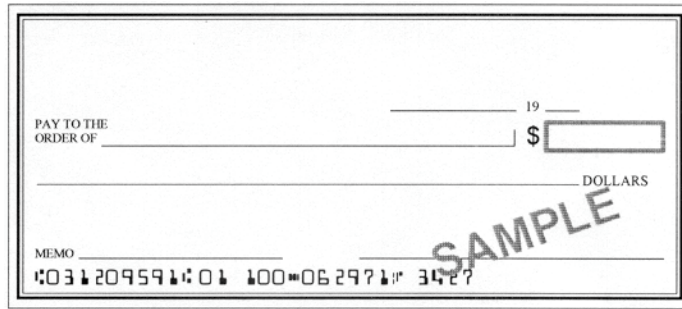
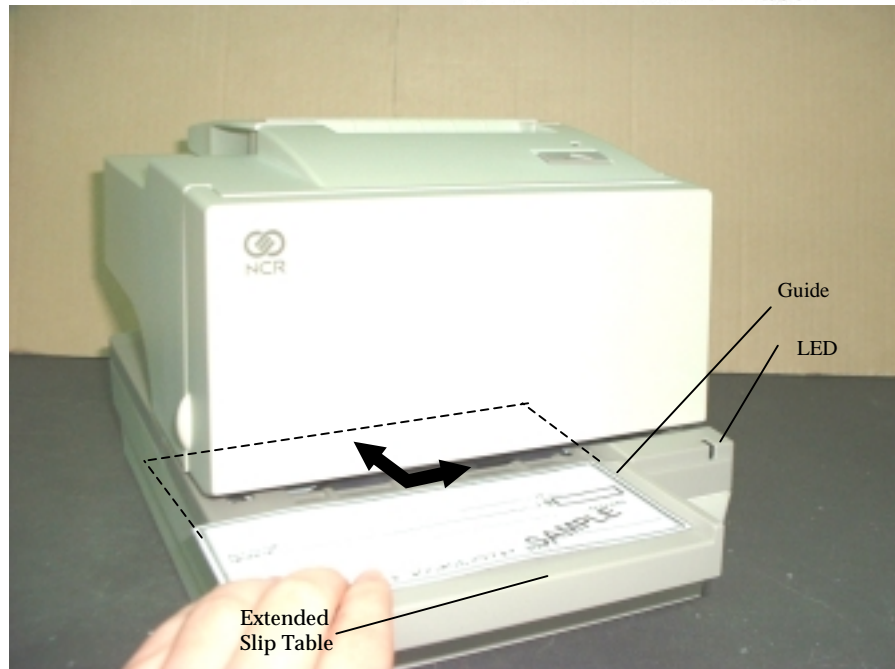
Or, align the form or check with any preset mark you may have made on the slip table for custom forms.

The green LED on the slip table turns on when the form or check is properly inserted (the form has to cover two sensors on the slip table).

4. Follow the instructions from the host computer.

The printer begins printing.

5. Remove the form or check after it has been fed back out.
6. Follow the instructions from the host computer to finish the transaction.

**Check Orientation**

## Validating and Verifying Checks

**Note:** If the MICR check reader feature is present, checks are verified then validated.

1. Insert the check from the front and place it on the slip table face down as shown in the illustration on the facing page.
2. Slide the check to the right until it lines up against the guide (wall).
3. Slide the check toward the back of the printer until it contacts the form stop (it won't be able to go any further);

Or, align the check with any preset mark you may have made on the slip table.

The green LED on the slip table turns on when the form or check is properly inserted (it has to cover two sensors on the slip table).

4. Follow the instructions from the host computer.

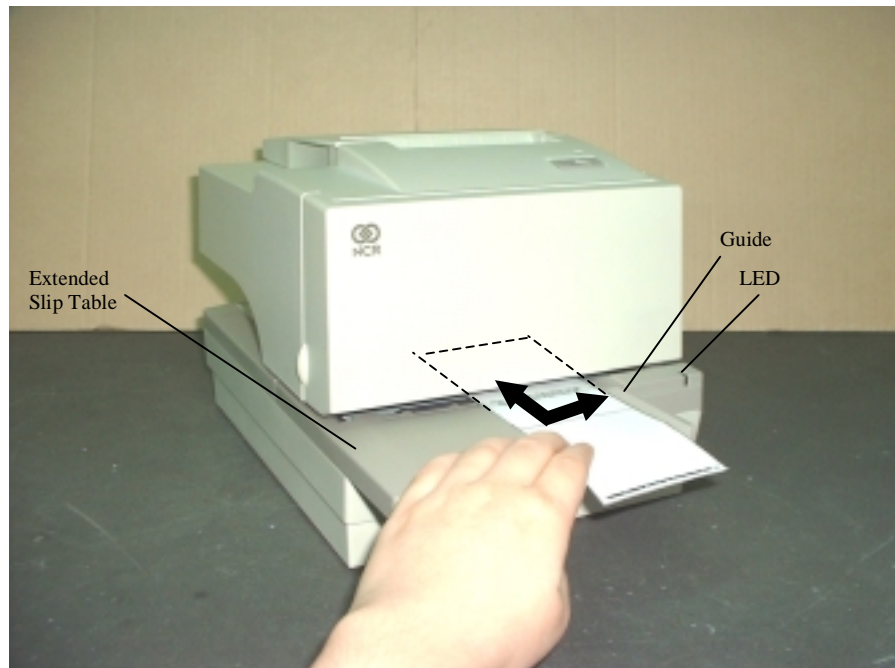
If the MICR check reader feature is present, the check is fed in and out while the check numbers are read. If the check is verified as good, it is then validated. If the check is not verified as good, it is not validated.

**Note:** Do not hold or keep the check from moving during the MICR check reader transaction or the check numbers will not be read accurately.

5. Remove the check after it has been fed all the way back out.
6. Follow the instructions from the host computer to finish the transaction.

ENDORSE HERE
DO NOT WRITE, STAMP OR SIGN BELOW THIS LINE RESERVED FOR FINANCIAL INSTITUTION USE
FEDERAL RESERVE NOTE PROCESSING SYSTEM, LLC

Check Orientation





## Chapter 3: Solving Problems

---

The 7167 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 thermal print head may overheat.

A green LED on the operator panel signals that something may be wrong.

For some problems, the printer communicates the information to the host computer and relies on the application to indicate what the problem is.

The information on the following pages describes some problems that you may encounter: problems that you can easily fix, and others that you will need to contact a service representative for.

You may be able to correct many of the conditions or problems without calling for service. However, if a problem persists, contact a service representative. See “Contacting a Service Representative” at the end of this chapter.

### Green LED Does Not Come On/Printer Will Not Print

Problem	What to Do	Where to Go
Cables may not be connected properly	Check all cable connections. Check that the host computer and power supply are both on (the power supply is turned on by plugging it into an outlet).	See “Connecting the Cables” in chapter 2.
Power supply may be defective	If the power supply is plugged in, but does not come on, you will need to order a new power supply.	See “Ordering Other Supplies” in chapter 1.

## Green LED Blinking (Slow)

Problem	What to Do	Where to Go
Receipt paper is low*	There are about 4 ½ meters, ± 3 meters, (15 feet, ± 10 feet) of paper left. Change the paper soon to avoid running out of paper part way through a transaction.	See “Loading and Changing the Receipt Paper” in chapter 2.

## Green LED Blinking (Fast)

Problem	What to Do	Where to Go
Receipt paper is out	Change the paper now. Do not run a transaction without paper as the data may be lost.	See “Loading and Changing the Receipt Paper” in chapter 2.
Receipt cover or front cover is open	Close the cover. The printer will not operate with either of the covers open.	
Knife failure	Open the receipt cover and check the knife. Clear any jammed paper you can see. Tear off any excess paper against the tear-off blade.	
	Contact a service representative if this does not resolve the problem.	See “Contacting a Service Representative” later in this chapter.
Paper jam in slip station	Open the front cover and check the slip table and under the carriage. Remove any paper you see.	
	If you cannot see a paper jam or other obstruction, contact a service representative.	See “Contacting a Service Representative” later in this chapter.
Paper jam in carriage	Open Front Cover and clear paper from path.	
Paper jam during flip	If visible through Front Window, open access door and clear paper jam, if not, open Front Cover and clear jam.	
AC supply voltage is out of range	If paper is not low and no conditions indicate that the thermal print head is too hot, then it is likely that the power supply voltage is out of range.	
	Contact a service representative if this does not resolve the problem.	See “Contacting a Service Representative” later in this chapter.
	The print head may overheat when printing in	See “Environmental

Thermal print head temperature is out of range	a room where the temperature is above the recommended operating temperature or when printing high-density graphics continuously, regardless of the room temperature. In either case, the printer will shut off.	Conditions” in Appendix A for the recommended temperature range for operating the printer.
	<p>If the temperature of the print head is too hot, adjust the room temperature or move the printer to a cooler location.</p> <p>If the print head is overheating because of printing high density graphics continuously, reduce the demand on the printer.</p>	
	If the printer continues to overheat, contact a service representative.	See “Contacting a Service Representative” later in this chapter.
Power supply voltage is out of range	If paper is not low and no conditions indicate that the print head is too hot, the power supply voltage is out of range. Contact a service representative.	See “Contacting a Service Representative” later in this chapter.

## Slip or Forms Printing is Light

Problem	What to Do	Where to Go
Ribbon cassette is worn	Replace the ribbon cassette.	See “Putting In and Changing the Ribbon Cassette” in chapter 2.
	Contact a service representative if this does not resolve the problem.	See “Contacting a Service Representative” later in this chapter.

## Receipt Printing is Light or Spotty

Problem	What to Do	Where to Go
Thermal print head may be dirty	Open the receipt cover and clean the thermal print head with cotton swabs and isopropyl alcohol.	See "Cleaning the Printer" in chapter 2.
	<b>Caution:</b> Do not use the alcohol to clean other parts of the printer. Damage will occur. Contact a service representative if this does not resolve the problem.	See "Contacting a Service Representative" later in this chapter.
	<b>Note:</b> The thermal print head 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 print head with the alcohol and cotton swabs will not be of much benefit. See "Ordering Thermal Paper" in chapter 1 for recommended paper.	

## LED (Slip Table) Does Not Come On

Problem	What to Do	Where to Go
Form or check not inserted properly	Line up the form or check against the guide (wall) and slide it toward the back of the printer until it contacts the form stop and can't go any further. Extra long forms may need to be inserted from the side to disengage the form stop.	See "Printing on Forms or Checks" or "Validating and Verifying Checks" in chapter 2
	Contact a service representative if this does not resolve the problem.	See "Contacting a Service Representative" later in this chapter.

## Forms Skew or Catch

Problem	What to Do	Where to Go
Form or check skewing or catching in slip station due to an obstruction or paper jam	Open the front cover and check for any paper jams or obvious obstruction in the slip station. Clear the obstruction or jammed paper.	
	Contact a service representative if this does not resolve the problem.	See "Contacting a Service Representative" later in this chapter.

## MICR Check Reader Not Reading Properly

Problem	What to Do	Where to Go
MICR (Magnetic Ink Character Recognition) check reader does not read or misreads checks	Open the slip cover and clean the MICR read head with cotton swabs and isopropyl alcohol.	See "Adjusting the MICR Check Reader" in chapter 4.

## Other Serious Problems

The following problems all need to be corrected by a qualified service representative. See the next section, "Contacting a Service Representative."

MICR check reader not operating properly

Forms not feeding into the slip/forms area properly

Missing dots in slip or forms printing

Printer will not cycle or stop when required

Illegible characters

Paper will not feed

Knife will not cycle or cut

Platen will not open or close

Printer will not communicate with Host

## Contacting a Service Representative

For serious problems, such as the printer not printing, not communicating with the host computer, or not turning on, contact your NCR-authorized service organization to arrange for a service call. In addition to the service manual listed below, other service-related materials may be available. Contact your NCR-authorized service representative to obtain the service manual.

*7167 Thermal Receipt and Impact Slip Printer: Service Manual (B005-000-1407)*  
(includes the Troubleshooting Guide and the Preventative Maintenance Guide)

## Chapter 4: Diagnostics

---

The following diagnostic tests are available for the 7167:

Level 0 Diagnostics (Startup)

Performed during the startup cycle.

Level 1 Diagnostics (Printer Configuration)

Allows configuration of the printer using a Configuration Menu that is printed on a receipt.

Level 2 Diagnostics (Runtime)

The printer checks the status of these conditions during normal operation.

Level 3 Diagnostics (Remote)

The printer keeps track of counters during normal operation.

Vendor Adjustment

Performed in off-line mode. Allows to change settings for mechanical and perform printer test.

Modifications of these settings are to be made by service personnel only.

### Level 0 Diagnostics

The printer automatically performs level 0 diagnostics when it is put on-line. 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.

- The green LED on the slip table flashes once if this action succeeds.
- Level 0 diagnostics stop if this action fails. Failure is indicated by the printer going dead: knife and print head do not home, the platen does not open, LEDs are not lit, the printer is unable to communicate with the host computer.

Knife is homed. A fault condition is caused if this action fails.

Slip platen is opened.

Slip print head is homed. A fault condition is caused if this action fails.

The status of all sensors is checked, and the status bytes are updated.

If the printer has not been turned on before, the default values for the printer functions will be loaded into the non volatile memory during level 0. These values can be changed in level 1 diagnostics. See "Level 1 Diagnostics" for the functions and their settings.

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

## Level 1 Diagnostics

Level 1 diagnostics (setup mode) allow you to change the settings for various printer functions and run certain tests.

Keep the following information in mind when changing the settings:

The settings can only be changed when the printer is in level 1 diagnostics (setup mode): Switch 1 must be set to Off and Switch 2 must be set to On.

The default options are set at the factory and are stored in the history non volatile memory

Once the settings have been changed and stored in the non volatile memory, the diagnostic setup is exited which saves the settings.

**Caution:** If you are changing the printer 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 you must reenter the setup mode and reenter the correct settings. If you need assistance, contact a service representative. See "Contacting a Service Representative" in chapter 3.

## Printer Configuration

Printers are generally shipped with all appropriate configuration settings pre-set at the factory. The only time the user should need to change the printer configuration is if a new option is installed or the firmware is changed. It is also possible the user may need to run certain tests using the Configuration Menu.

The user configures the printer using a convenient Configuration Menu that is printed on receipt paper. The Configuration Menu prints instructions and setting options interactively as the user goes through the configuration process. The following functions and parameters can be changed with the scrolling Configuration Menu:

Configuring the Printer

Communication Interface

Interface Type

Baud Rate

Number of Data Bits

Number of Stop Bits

Parity

Flow Control

Data Reception Errors

Setting Diagnostic Modes

Off, Normal Mode

Datascope Mode

Slip Test Mode

Receipt Test Mode

MICR Test Mode

Check Flip Test Mode

Print Head Gap Adjust Test Mode

Setting Emulation/Software Options

Emulation

Default Lines Per Inch

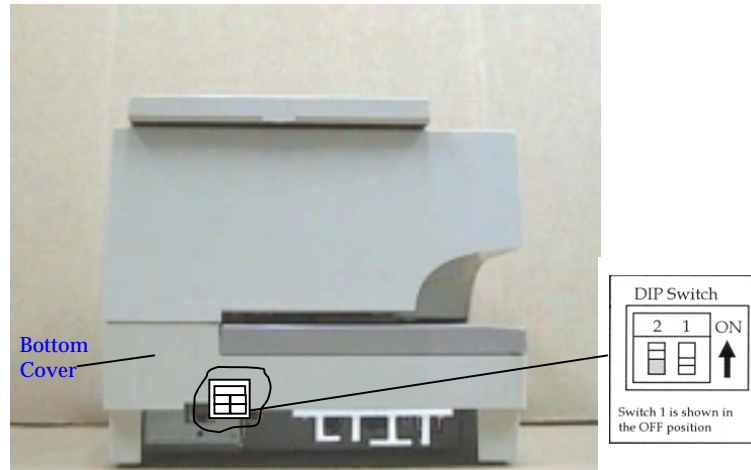


- Carriage Return Usage
- Asian Mode
- Setting Hardware Options
- Print Density
- Paper Low Sensor
- Paper Width
- Knife Options
- MICR Option
- Check Flip Option
- Maximum Power Option
- Color Paper Option
- Setting Default Code Page
- Setting EEPROM to default settings

## Configuring the Printer

Use the Configuration Menu to select functions or change various settings as indicated in the preceding sections. The Configuration Menu prints instructions and setting options interactively as the user goes through the configuration process.

**Caution:** Be extremely careful in changing any of the printer settings to avoid changing settings that might affect the performance of the printer.



1. Set DIP Switch 2 to On, Switch 1 to Off.
2. Reset the printer while holding the Paper Feed Button and opening and closing the slip cover door or disconnecting and reconnecting the power cable. The printer will print the current configuration, then cuts the paper.

This configuration menu allows you to set mechanical adjustment parameters and select printer test.

Sub-menus are entered and selections are made using the Paper Feed Button.

- Short Click: Feed Button is quickly depressed and released
- Long click: Feed Button is held down more than 1 second

Press the paper feed for the configuration you want.

Defaults are marked with asterisk (\*).

\*\*\*\*\* **Main Menu** \*\*\*\*\*  
\*\*\*\*\*

Select a sub-menu:

- |                                  |             |
|----------------------------------|-------------|
| - EXIT                           | -> 1 Click  |
| - Print Current Configuration    | -> 2 Clicks |
| - Set Communication Interface    | -> 3 Clicks |
| - Set Diagnostics Modes          | -> 4 Clicks |
| - Set Emulation/Software Options | -> 5 Clicks |
| - Set Hardware Options           | -> 6 Clicks |
| - Set Default Code page          | -> 7 Clicks |
| - Set EEPROM To Default Settings | -> 8 Clicks |

Enter code, then hold Button DOWN  
at least 1 second to validate

**\*\*\* Diagnostics Form \*\*\***

Model number : 7167  
 Serial number : A991703053

Boot Firmware  
 Revision : V1.00  
 CRC : E435

Flash Firmware  
 Revision : SW0.31  
 CRC : 974E

Hardware  
 Flash Memory Size : 2Mbytes  
 Flash Logos Size : 256Kbytes  
 Flash Fonts Size : 64Kbytes  
 Flash User Storage : 64Kbytes

Communication Interface  
 Interface Type : RS232  
 Parameters  
 Baud Rate : 115200  
 Data Bits : 8  
 Stop Bits : 1  
 Parity : None  
 Flow Control : DTR/DSR  
 Reception Errors : Print '?'

Diagnostic Mode : MICR Test Mode

Emulation/Software  
 Printer Emulation : 7158 Native Mode  
 Default LPI : 7.52  
 Carriage Return : Used as Print Cmd  
 Asian Mode : On

To enter Diagnostics Mode:  
 1) Flip DIP switch #2 on  
 2) Reset the printer by pressing and holding the receipt feed switch and disconnecting and reconnecting the power.

**\*\*\* Printer Config Menu \*\*\***

The config menu allows to set general printer parameters. Sub-menus are entered and selections are made using the Paper Feed Button:

- Short Click : Feed Button is quickly depressed then released.
- Long Click : Feed Button is held Down more than 1sec then released.

**CAUTION !!**  
 The settings are predetermined in factory and should generally not be changed. To avoid changing other functions.

\*\*\*\*\*

**\*\*\*\*\* Main Menu \*\*\*\*\***

Select a sub -menu:

- EXIT 1 Click
- Print Current Configuration 2 Clicks
- Set Communication Interface 3 Clicks
- Set Diagnostics Modes 4 Clicks
- Set Emulation/Software 5 Clicks
- Set Hardware Options 6 Clicks
- Set Default Code Page 7 Clicks
- Set EEPROM To Default 8 Clicks

Enter code, then hold Button DOWM at least 1 second to validate

**Important:** Ensure that the configuration settings match your host computer, if not, enter the Configuration Menu to make changes.

**Configuration Menu and Print Test samples (show approximately 60% of size).**

4. Press the Paper Feed Button to make the selections.

The instructions indicate whether to select something with a short click, a long click, or a series of short clicks. Indicate Yes with a long click, No with a short click.

Press and hold the Paper Feed Button for at least one second for a long click. Press the Paper Feed Button quickly for a short click.

5. When finished, set DIP Switch 2 to Off and reset printer.

## Communication Interface Modes

The Configuration Menu gives the user the option of setting the printer to use an RS-232C serial port. (See "Configuring the Printer" for instructions on how to enter the Configuration Menu.)

### RS-232C Interface Settings

If the user sets the printer to use an RS-232C serial interface, the Configuration Menu can be used to set the following RS-232C specific settings:

Set a baud rate 115200, 57600, 38400, 19200, 9600, 4800, 2400, or 1200 baud

Set the number of data bits to seven or eight

Set the number of stop bits to one or two

Enable or disable parity

Set flow control to software (XON/XOFF) or Hardware (DTR/DSR)

Set the printer to ignore data errors or print a "?" upon encountering an error

The settings used will depend on the software the operator is using and the capabilities of the host computer.

Press the paper feed button for the communications settings you want.

Defaults are marked with asterisks (\*).

#### \*\* SET INTERFACE TYPE ?

YES -> Long Click  
NO -> Short Click

RS232/USB\* -> 1 Click  
RS232 -> 2 Clicks  
USB -> 3 Clicks  
Enter code, then hold Button Down  
At least 1 second to validate

#### \*\* SET BAUD RATE ?

YES -> Long Click  
NO -> Short Click

115200 Baud\* -> 1 Click  
57600 Baud -> 2 Clicks  
38400 Baud -> 3 Clicks

19200 Baud -> 4 Clicks  
 More -> 5 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

9600 Baud -> 1 Clicks  
 4800 Baud -> 2 Clicks  
 2400 Baud -> 3 Clicks  
 1200 Baud -> 4 clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

**\*\* SET NUMBER OF DATA BITS ?**

YES -> Long Click  
 NO -> Short Click

8 Data Bits\* -> Long Click  
 7 Data Bits -> Short Click

**\*\* SET NUMBER OF STOP BITS ?**

YES -> Long Click  
 NO -> Short Click

1 Stop Bits\* -> Long Click  
 2 Stop Bits -> Short Click

**\*\* SET PARITY ?**

YES -> Long Click  
 NO -> Short Click

No Parity\* -> 1 Click  
 Even Parity -> 2 Clicks  
 Odd Parity -> 3 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

**\*\* SET FLOW CONTROL METHOD ?**

YES -> Long Click  
 NO -> Short Click

Software (XON/XOFF) -> Long Click  
 Hardware (DTR/DSR)\* -> Short Click

**\*\* SET DATA RECEPTION ERRORS OPTION ?**

YES -> Long Click  
 NO -> Short Click

Ignore Errors -> Long Click  
 Print '?'\* -> Short Click

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Diagnostic Modes

This function allows the user to put the printer into the following diagnostic modes:

OFF, Normal Mode: this is the normal operating mode of the printer.

Datascope Mode: the receipt printer prints incoming commands and data in hexadecimal format.

Slip test Mode: the slip printer prints two code pages.

Receipt Test Mode: the receipt printer prints two code pages.

MICR Test Mode: the receipt printer prints all characters recognized by the MICR.

Check Flip Test Mode: the check flip mechanism will flip an inserted check.

Print Head Gap Adjustment Mode: the slip printer prints several lines of rolling ascii even receipt cover is open.

The diagnostic modes are enabled or disabled by using the Configuration Menu. See "Configuration the Printer," for instructions on how to enter the Configuration Menu.

Press the Paper Feed Button for the diagnostic mode you want.

## **\*\* SET DIAGNOSTICS MODE ?**

YES -> Long Click

NO -> Short Click

OFF, Normal Mode\* -> 1 Click

Data Scope Mode -> 2 Clicks

Slip Test Mode -> 3 Clicks

Receipt Test Mode -> 4 Clicks

More Options -> 7 Clicks

Enter code, then hold Button DOWN

At least 1 second to validate

MICR Test mode -> 1 Click

Check Flip Test mode -> 2 Clicks

Print Head Test Mode -> 3 Clicks

Enter code, then hold Button DOWN

At least 1 second to validate

## **Datascope Mode**

Datascope Mode allows the user to test the printer's communications. When in Datascope Mode the printer receives all communications, but instead of executing the commands it prints them out on receipt paper as hexadecimal numbers in the order received. For example, the ASCII character "A" is printed as the hexadecimal number 41 and so on.

To run the Datascope Mode:

1. Enter the Configuration Menu. See "Configuring the Printer" for instruction on how to enter the Configuration Menu.
2. After you have enabled the Datascope Mode through the Configuration Menu, exit the Configuration Menu.
3. Run a transaction from the host computer.

All commands and data sent from the host computer will be printed as hexadecimal numbers as shown in the illustration.

30	31	32	33	34	35	36	37	38	39	40	41	:	0	1	2	3	4	5	6	7	8	9	@	A
41	42	43	44	45	46	47	48	49	50	51	52	:	A	B	C	D	E	F	G	H	I	J	K	L

To exit the Datascope Mode:

1. Enter the Configuration Menu again
2. Disable the Datascope Mode
3. Exit the Configuration Menu

The printer is in Normal Mode and can communicate with the host computer.

### **Slip Test Mode**

To run the Slip Test Mode:

1. Enable the Slip Test Mode through the Configuration Menu, (See “Configuring the Printer,” for instructions on how to enter Configuration Menu). Then exit the Configuration Menu.
2. Insert a slip into the slip station.
3. Push the Paper Feed Button
4. All code pages will be printed.
5. Go to step 2 again to repeat this test.

To exit the Slip Test Mode:

1. Enter the Configuration Menu again.
2. Disable the Slip Test Mode.
3. Exit the Configuration Menu.

The printer is in the Normal Mode and can communicate with the host computer.

### **Receipt Test Mode**

To run the Receipt Test Mode:

1. Enable the Receipt Test Mode through the Configuration Menu. See “Configuring the Printer,” for instructions on how to enter the Configuration Menu.
2. Push Paper Feed Button and the receipt station will print all code pages.
3. The test ends with a cut.
4. Go to step 2 again to repeat this test.

To exit the Receipt Test Mode:

1. Enter the Configuration Menu again.
2. Disable the Receipt Test Mode
3. Exit the Configuration Menu

The printer is in Normal Mode and can communicate with the host computer.

### **MICR Test Mode**

MICR Test Mode allows the user to test whether the MICR is operating correctly. When the printer is in this mode the MICR reads characters on a cheque as usual, but instead of transmitting the values to the software it prints on receipt paper.

To run the MICR Test Mode:

1. Enter the Configuration Menu. See “Configuring the Printer,” for instructions on how to enter the Configuration Menu.
2. After enabling the MICR Test Mode through the Configuration Menu, exit the Configuration Menu.
3. Insert a check into the slip station. (See “Verifying and Validating Checks” section.)
4. The printer waits until a check is inserted and detected before the platen closes and the characters are read by the MICR check reader. The decoded data is printed on receipt paper, the platen is opened, and the test is re-started.
5. The printed numbers should match the numbers on the check. If the MICR check reader misreads a character, the test prints question mark “?”. If the MICR check reader is unable to read any characters, the test prints “NO MICR DATA TO DECODE.”

\*\*\* GOOD READ \*\*\*  
MICR Data:  
5001234UT33456789T 123 67 5

To exit the MICR Test Mode:

1. Enter the Configuration Menu again.
2. Disable the MICR Test Mode.
3. Exit the Configuration Menu.

The printer is in the Normal Mode and can communicate with the host computer.

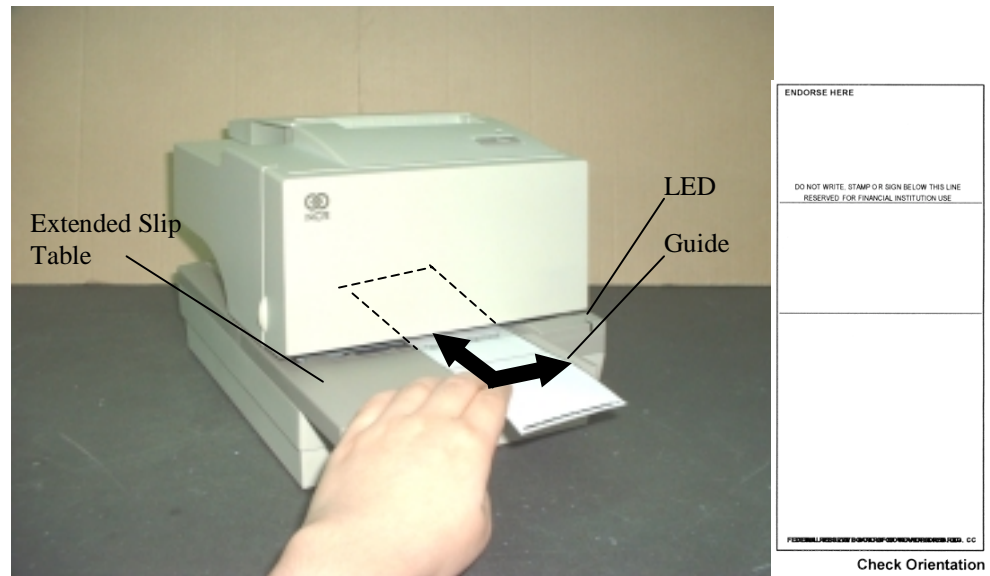
## Check Flip Test Mode

To run the Check Flip Test Mode:

1. Enable the Check Flip Test Mode through the Configuration Menu (See “Configuring the Printer,” for instruction on how to enter the Configuration Menu), then exit the Configuration Menu.
2. Insert a check as if validating the check, lengthwise and face down into the slip station. (See “Verifying and Validating Checks” section to insert check.)

A check must be used – if any other slip or form is inserted the printer will not conduct.





3. Push Paper Feed Button.
4. The check then goes through the flip routine only – no printing takes place.

To exit the Check Flip Test Model:

1. Enter the Configuration Menu again.
2. Disable the Check Flip Test Mode.
3. Exit the Configuration Menu

The printer is in Normal Mode and can communicate with the host computer.

### Print Head Gap Adjustment Mode

Print Head Gap Adjustment Test Mode prints several lines of 'H' character. This is the slip print testing during the print head gap adjustment. During adjustment, some covers will be removed from the printer, even in this condition, slip printing need to be run when paper is inserted. Print Head Gap Adjustment Test Mode is enabled and disabled using the Configuration Menu.

To run the Print Head Gap Adjustment Test Mode:

1. Enable the Print Head Gap Test Mode through the Configuration Menu, ("See Configuring the Printer," for instructions on how to enter the Configuration Menu.
2. Insert a slip into the slip station.
3. Push Paper Feed Button.

4. Several lines of Rolling ASCII character will be printed.

Note: Printing will take place even when receipt cover is open.

5. Go to step 2 again to repeat this test.

To exit the Print Head Gap Adjustment Test Mode:

1. Enter the Configuration Menu again.
2. Disable the Print Head Gap Adjustment Test Mode.
3. Exit the Configuration Menu.

The printer is in Normal Mode and can communicate with the host computer.

## Emulation/Software Options

### Printer Emulations

Printer emulations determine the commands that are available to the printer. They are set by using the Configuration Menu. (See "Configuring the Printer," for instructions on how to enter the Configuration Menu.). The available options are:

7158 Native Mode

7156 Mode

7150 Mode

Press the Paper Feed Button for the emulation you want.

#### **\*\* SET EMULATION ?**

YES -> Long Click

NO -> Short Click

7158 Native Mode\* -> 1 Click

7156 Mode -> 2 Clicks

7150 Mode -> 3 Clicks

Enter code, then hold Button DOWN

At least 1 second to validate

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

### Default Lines Per Inch

This function allows the user to set the default lines per inch printed by the thermal printer to 6, 7.52 or 8.13. (See "Configuring the Printer" for instructions on how to enter the Configuration Menu to change this setting.)

Press the Paper Feed Button for the lines per inch you want.

#### **\*\* SET DEFAULT LINES PER INCH ?**

YES -> Long Click

NO -> Short Click

8.13 Lines per Inch -> 1 Click

7.52 Lines per Inch\* -> 2 Clicks

6 Lines per Inch -> 3 Clicks

Enter code, then hold Button DOWN

At least 1 second to validate

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

### Carriage Return Usage

This function allows the printer to ignore or use the Carriage Return (hexadecimal 0D) command depending on the application. Some applications expect the command to be

ignored while others use the command as a print command. (See “Configuring the Printer” for instructions on how to enter the Configuration Menu to change this setting.)

Press the Paper Feed Button for the carriage return usage you want.

**\*\* SET CARRIAGE RETURN USAGE ?**

YES -> Long Click  
NO -> Short Click

Ignore CR -> Long Click  
Use CR as Print Cmd\* -> Short Click

Note: Press the Paper Feed Button for at least one second to validate the selection.

## Asian Mode

This function makes it possible for the user to select an Asian character for the printer. (See “Configuring the Printer” for instructions on how to enter the Configuration Menu to change this setting.)

**Note:** For Asian code pages, only one (either 932, 936, 949 or 950) will exist in the firmware.

Press the Paper Feed Button for the asian mode you want.

**\*\* SET ASIAN MODE ?**

YES -> Long Click  
NO -> Short Click

Asian Mode On\* -> Long Click  
Asian Mode Off -> Short Click

Note: Press the Paper Feed Button for at least one second to validate the selection.

## Hardware Options

### Print Density

This function makes it possible to adjust the energy level of the print head to darken the printout. An adjustment should only be made when necessary. The factory setting is 100%.

**Warning:** Choose an energy level no higher than necessary to achieve a dark printout.

Failure to observe this rule may result in a printer service call or voiding of the printer warranty. Consult your NCR technical support specialist if you have any questions.

Press the Paper Feed Button for the print density you want.

**\*\* SET PRINT DENSITY ?**

YES -> Long Click  
NO -> Short Click

100 %\* -> 1 Click  
110 % -> 2 Clicks

120 %      -> 3 Clicks  
Enter code, then hold Button DOWN  
At least 1 second to validate

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Paper Low Sensor

Paper Low Sensor makes it possible to enable or disable the paper low sensor for particular printer configurations.

Press the Paper Feed Button for the option you want.

### **\*\* SET PAPER LOW SENSOR OPTION ?**

YES          -> Long Click  
NO          -> Short Click

Enable Paper Low Sensor\*      -> Long Click  
Disable Paper Low Sensor      -> Short Clicks

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Paper Width

This function allows the user to set the default paper width for the receipt thermal printer to 58mm or 80mm wide.

Press the Paper Feed Button for the paper width option you want.

### **\*\* SET PAPER WIDTH ?**

YES          -> Long Click  
NO          -> Short Click

Paper Width = 80 mm\*      -> 1 Click  
Paper Width = 58 mm      -> 2 Clicks  
Enter code, then hold Button DOWN  
At least 1 second to validate

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Knife Option

This option makes it possible to set the Knife Option if it is installed in the printer. This setting should only be changed if the option is added or removed.

Press the Paper Feed Button for the option you want.

### **\*\* SET KNIFE OPTION ?**

YES          -> Long Click  
NO          -> Short Click

Enable Knife*	-> Long
Disable Knife	-> Short

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## MICR Option

This function makes it possible to set the MICR Option if it is installed in the printer. This setting should only be changed if the option is added or removed.

Press the Paper Feed Button for the option you want.

### \*\* SET MICR OPTION ?

YES	-> Long Click
NO	-> Short Click

Enable MICR*	-> Long
Disable MICR	-> Short

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Check Flip Option

This function makes it possible to set the Check Flip Option if it is installed in the printer. This setting should only be changed if the option is added or removed.

Press the Paper Feed Button for the option you want.

### \*\* SET CHECK FLIP OPTION ?

YES	-> Long Click
NO	-> Short Click

Enable Check Flip*	-> Long
Disable Check Flip	-> Short

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Maximum Power Option

This function allows the user to set the maximum power for the printer to 75W or 55W.

Press the Paper Feed Button for the option you want.

### \*\* SET MAX POWER OPTION ?

YES	-> Long Click
NO	-> Short Click

55W Power Supply*	-> Long Click
75W Power Supply	-> Short Click

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Color Paper Option

This function allows the user to set the color paper for the receipt thermal printer to one color paper or two color paper.

Press the Paper Feed Button for the option you want.

### **\*\* SET COLOR PAPER OPTION ?**

YES -> Long Click

NO -> Short Click

Monochrome\* -> Long Click

Color Paper -> Short Click

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Default Code Page

This function makes it possible to select the default code page.

These are the code pages available for printing:

Code page 437 (US English)

Code page 850 (Multilingual)

Code page 852 (Slavic)

Code page 858 (with Euro symbol)

Code page 860 (Portuguese)

Code page 862 (Hebrew)

Code page 863 (French Canadian)

Code page 864 (Arabic)

Code page 865 (Nordic)

Code page 866 (Cyrillic)

Code page 874 (Thai)

Code page 1252 (Windows Latin #1)

Code page Katakana

Code page 932 (MS Japan)

Space page

**Note:** For Asian code pages, code page 936, 949, or 950 replaces code page 932. Only one Asian code page (either 932, 936, 949, 950) will exist in firmware.

Press the Paper Feed Button for the Default Code Page you want.

### **\*\* SET CODE PAGE ?**

YES -> Long Click

NO -> Short Click

**FOR 7158 Mode:**

Code Page 437\* -> 1 Click  
 Code Page 850 -> 2 Clicks  
 Code Page 852 -> 3 Clicks  
 Code Page 858 -> 4 Clicks  
 More Options -> 5 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

Code Page 860 -> 1 Click  
 Code Page 862 -> 2 Clicks  
 Code Page 863 -> 3 Clicks  
 Code Page 864 -> 4 Clicks  
 More Options -> 5 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

Code Page 865 -> 1 Click  
 Code Page 866 -> 2 Clicks  
 Code Page 874 -> 3 Clicks  
 Code Page 1252 -> 4 Clicks  
 More Options -> 5 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

Code Page Katakana -> 1 Click  
 Code Page 932 -> 2 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

#### **FOR 7156 Mode:**

Code Page 437\* -> 1 Click  
 Code Page 850 -> 2 Clicks  
 Enter code, then hold Button DOWN  
 At least 1 second to validate

**Note:** Press the Paper Feed Button for at least one second to validate the selection.  
 For Asian code pages, code page 936, 949 or 950 replaces code page 932 in the above shown menu. Only one Asian code page (Either 932, 936, 949 or 950) will exist in firmware.

## **EEPROM to Default Settings**

This selection resets the configuration to the Default Settings.

**Caution:** Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

#### **\*\* RESET EEPROM TO DEFAULT VALUES ?**

YES -> Long Click  
 NO -> Short Click

**Note:** Press the Paper Feed Button for at least one second to validate the selection.

## Level 2 Diagnostics

Level 2 diagnostics run during normal printer operation. When the following conditions occur, the printer automatically turns off the appropriate motor, disables printing to prevent damage, and turns on the green LED (flashes the green LED if the receipt print head is too hot or the voltages are out of range):

Paper out  
 Cover open  
 Knife unable to go back to home position  
 Print head too hot  
 Power supply voltage out of range  
 Slip or flip motor jam

See “Chapter 3: Solving Problems” for more information about other conditions that may occur and how to correct them.

Status	LED Behaviour
Power Off	Off
Firmware Download	Very Fast Blink
Level 0 Diagnostics	No Blink
Receipt Paper Low	Slow Blink
Temperature Error	No Blink
Voltage Error	No Blink
Cover Open	Fast Blink
Receipt Paper Out	Fast Blink
Knife Jam	Fast Blink, then Slow Blink
Slip Cover Open	Fast Blink
Flip Cover Open	Fast Blink
Receipt Cover Open	Fast Blink
Slip Motor Jam	Fast Blink
Flip Motor Jam	Fast Blink
Slip Ribbon Carriage Error	Fast Blink
All other states	On



## Level 3 Diagnostics

Level 3 diagnostics keeps track of the following tallies and prints them on the receipt during the receipt test. See “Sample Print Test” later in this chapter.

Serial number

Model number

CRC number

Number of receipt lines printed

Number of knife cuts

Number of slip lines

Number of slip characters

Number of MICR reads

Number of hours printer is on

Number of flash cycles

Maximum temperature reached

Number of cutter jams

Number of times the door is open

# Chapter 5: Communication

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## Communication Overview

In order for a receipt to be printed, a program must be in place that translates the data from the host computer into a language that the printer can understand. This program must tell the printer exactly how to print each character. This chapter describes how to create such a program or modify an existing one.

## Interface

In order for the printer to communicate with the host, a communication link must be set up. The 7167 supports the industry standard RS-232C communication interface. This interface has a protocol associated with it that the host computer must understand and adhere. The printer also supports USB communications.

Only when the interface parameters are matched and the proper protocol is used will the host and the printer be able to communicate. See the section, "RS-232C Interface" on the next page for a description of the protocol associated with the RS-232C interface.

## Sending Commands

Once the communication link is established, commands can be sent to the printer. This section describes how to send commands to the printer using DOS and BASIC. This section does not take into account the necessary protocol, but is meant as a general introduction to how the printer functions.

### Using DOS to Send Commands

One way of getting commands to the printer is to send them directly from DOS. For example, the command

```
COPY CON: COM1:
```

This sets the computer up such that the Hex code corresponding to any key that was pressed would be sent to the RS-232C communication port COM1 when the COPY mode is exited. If the printer is connected to COM1, then the data will go to the printer.

Exit the COPY mode by typing

```
CTRL Z
```

and then pressing the ENTER key. This directs the data from any print command to the proper port, commands can be sent from any software program.

## Using BASIC to Send Commands

In BASIC, printer commands are sent as a string of characters preceded by the LPRINT command. For example,

```
LPRINT CHR$( &H0A )
```

sends the hexadecimal number 0A to the printer, which causes the printer to print the contents of its print buffer. Previously sent commands tell the printer exactly how this data should appear on the paper. For example,

```
LPRINT CHR$( &H12 ) ; "ABC" ; CHR$( &H0A )
```

sends the Hex numbers 12 41 42 43 0A to the printer. This causes the printer to set itself to double wide mode (12), load the print buffer with “ABC” (41 42 43), and finally, print (0A). Again, the communication link that the BASIC program outputs to must be matched to that of the printer.

## RS-232C Interface

The RS-232C interface uses either XON/XOFF or DTR/DSR protocol. For XON/XOFF, a particular character is sent back and forth between the host and the printer to regulate the communication. For DTR/DSR, changes in the DTR/DSR signal coordinate the data flow.

The RS-232C version of the 7167 offers the standard options which are selectable in the Diagnostic mode. See “Diagnostics: Communications Interface Settings” later in this book.

## Print Speed and Timing

The fast speed of the printer requires the application to send data to the printer at least as fast as it is printed. This application must also allow receipt lines to be buffered ahead at the printer, so the printer can print each line immediately after the preceding line, without stopping to wait for more data. Ideally, the application will send all the data for an entire receipt without pausing between characters or lines transmitted.

If the application sends data at 9600 baud and pauses between lines for as little as 50 milliseconds, the printer will never be able to print at full speed. But, if the application sends data at 19.2 K baud and does not pause between lines, the printer will be able to print at its full speed of 1020 lines/minute.

The table shows that with a pause of 50 milliseconds after each line, the transmit time equals or exceeds the print time, slowing down the printer, regardless of the baud rate.

Char./Line	Lines/Receipt	Transmit Time: (9600 Baud)	Transmit Time: (19.2 K Baud)	Print Time
20	20	1.4 Seconds	1.2 Seconds	1.2 Seconds
20	40	2.8 Seconds	2.4 Seconds	2.4 Seconds
44	20	1.88 Seconds	1.44 Seconds	1.2 Seconds
44	40	3.76 Seconds	2.88 Seconds	2.4 Seconds

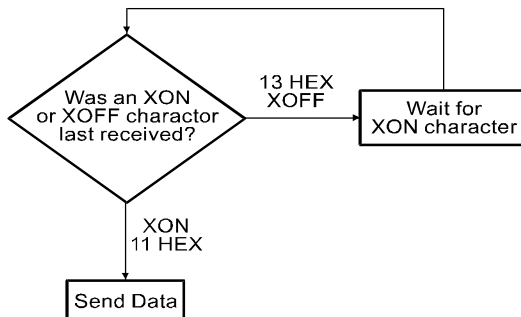
The next table shows that with no delay between lines, the transmit time is much less than the print time, allowing the printer to print at full speed.

Char./Line	Lines/Receipt	Transmit Time: (9600 Baud)	Transmit Time: (19.2 K Baud)	Print Time
20	20	0.4 Seconds	0.2 Seconds	1.2 Seconds
20	40	0.8 Seconds	0.4 Seconds	2.4 Seconds
44	20	0.88 Seconds	0.44 Seconds	1.2 Seconds
44	40	1.76 Seconds	0.88 Seconds	2.4 Seconds

## XON/XOFF Protocol

The XON/XOFF characters coordinate the information transfer between the printer and the host computer. The printer sends an XON character when it is ready to receive data and it sends an XOFF character when it cannot accept any more data. The software on the host computer must monitor the communication link as shown in the following flowchart in order to send data at the appropriate times.

If XON/XOFF has been selected, the printer also toggles the DTR signal, as described in the next section, but it does not look at the DSR signal to transmit data.

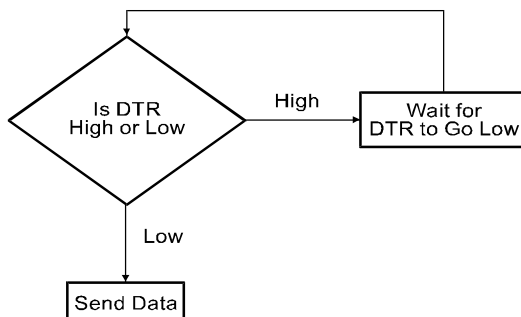


XON character = Hex 11.

XOFF character = Hex 13.

## DTR/DSR Protocol

The DTR signal is used to control data transmission to the printer. It is driven low when the printer is ready to receive data and driven high when it cannot accept any more data. Data is transmitted from the printer after it confirms that the DSR signal is low.



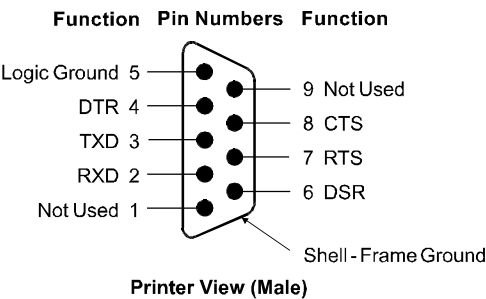
## RS-232C Technical Specifications

This section describes the pin settings for the connectors and the RS-232C interface parameters. The RS-232C parameters are selectable in the Diagnostic mode. See "Diagnostics: Communications Interface Settings" in chapter 4 for the position of the DIP switches. The RS-232C parameters must match those of the host.

Connectors

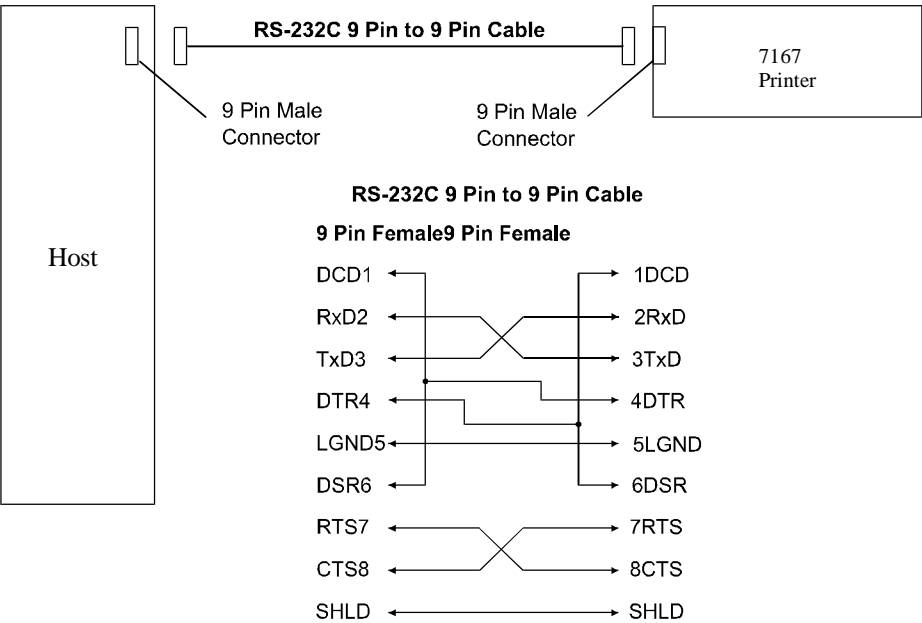
RS-232C Communication Connector Pin Assignments

The illustration shows the RS-232C communication connector and pin assignments. The connector is a 9-pin male D-shell connector and is located in the hollow cavity under the printer at the rear.



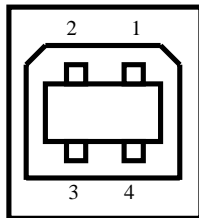
RS-232C 9-Pin to 9-Pin Cable Diagram

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



## USB Cable Connector

The following illustration is for the USB Type B communication connector and pin assignment.

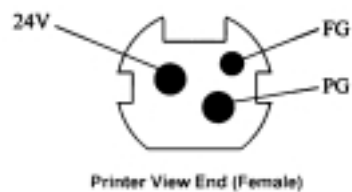


Printer View End

Pin No	Signal
1	+5 V – USB
2	Data -
3	Data +
4	Ground

## Power Cable Connector

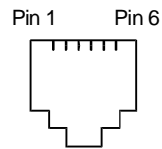
The illustration shows the power cable connector and pin assignments. The power cable connector is a 3-pin DIN plug and is located in the hollow cavity under the printer at the rear.



Printer View End (Female)

## Cash Drawer Connector and Pin Assignments

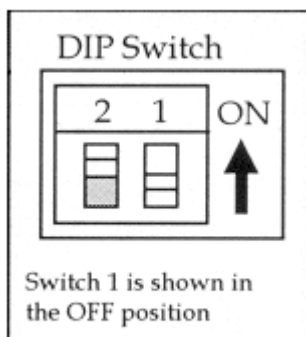
The following illustration shows the pin out designation for the cash drawer connectors. The following table provides the pinout assignments for cash drawers one and two. The cash drawer connectors are located at the rear of the printer.



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

## Switch Settings

The DIP switches are located on the PC board at the back of the printer as shown in the illustration in “Level 1 Diagnostics” in chapter 4. The switches are used to put the printer into various modes for printer configuration set up.



Use a paper clip or other pointed object to set the switches.

1. Set the switches to the desired settings shown in the table.
2. Reset the printer.

**Caution:** Do not set switch 2 to On. Setting switch 2 to On puts the printer in level 1 diagnostics (setup mode) where other functions and tests can be changed.

DIP Switch Settings for RS-232C Parameters

Switch 1 Setting	Switch 2 Setting	Printer State
OFF (0)	OFF (0)	On-line Mode (default)
OFF(0)	ON (1)	Diagnostic Mode
ON (1)	OFF (0)	Flash Download Mode
ON (1)	ON (1)	Vendor Adjustment Mode

## Setting Extra RS-232C Options

The following extra options are available for the RS-232C Interface:

Data errors

- Print “?” for data errors (default)
- Ignore data errors



# Chapter 6: Commands

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## Introduction

The different features and functions provided by the printer are controlled by sending commands from the host computer to the printer. This section describes the commands that are supported by the printer. The printer commands are made up of one or more bytes of data starting with a command control code followed by its supporting parameters.

Commands control all operations and functions of the printer. This includes selecting the size and placement of characters and graphics on the receipt or the slip and feeding and cutting the paper. Unless otherwise noted, any of the commands may be used in any combination to communicate with the printer from a program in a host computer.

In order to allow the graceful handling of commands that may be available in other printers but are not available in this printer, some commands will be listed and described but identified as "not implemented." If the printer receives one of these "not implemented" commands, the command and its supporting operands will be discarded. Any other data bytes, including unrecognized commands, are sent to the print buffer as data, and the printer will attempt to print the data when it is instructed to print the buffer.

## List of Commands and Location

This section presents groups of lists of the hexadecimal command codes, parameters, and the command names. A page reference is provided for the page on which the command is more fully described. If this document is being viewed online, the page reference will be linked to the actual page and may be clicked to go to that page.

The first section lists all of the commands. The following lists are separated into functional category groupings.

All commands **listed in bold** are new or have additional functionality when compared to the NCR 7156.

## By Command Code

All items in **BOLD** are new or have additional functionality when compared to the 7156.

Hexadecimal Command Code and Operands	Command Name	Page
09	Horizontal Tab	113
0A	Print and Feed Paper One Line	104
<b>0C</b>	<b>Print and Return to Standard Mode</b>	<b>180</b>
0C	Print and Eject Slip	104
0D	Print and Carriage Return	105
10	Clear Printer	90
10 04 n	Real Time Status Transmission (DLE Sequence)	164
10 05 n	Real Time Request to Printer (GS Sequence)	167
11	Close Form	91
12	Select Double-Wide Characters	121
13	Select Single-Wide Characters	121
14 n	Feed n Print Lines	105
15 n	Feed n Dot Rows	106
16 n	Add n Extra Dot Rows	106
17	Print	107
18	Open Form	91
<b>18</b>	<b>Cancel Print Data in Page Mode</b>	<b>181</b>
19	Perform Full Knife Cut	92
1A	Perform Partial Knife Cut	92
<b>1B (+ *.bmp)</b>	<b>Download BMP Logo</b>	<b>140</b>
1B 07	Generate Tone	93
<b>1B 0C</b>	<b>Print Data in Page Mode</b>	<b>181</b>
1B 12	Select 90 Degree Counter-Clockwise Rotated Print	122
1B 14 n	Set Column	113
1B 16 n	Select Pitch (Column Width)	122
1B 20 n	Set Character Right-Side Spacing	123
1B 21 n	Select Print Modes	125
1B 24 n1 n2	Set Absolute Starting Position	114
1B 25 n	Select or Cancel User-Defined Character Set	126
1B 26 3 c1 c2...dn	Define User-Defined Characters	127

Hexadecimal Command Code and Operands	Command Name	Page
1B 27 <i>m a0 a1 a2 d1 ... dm</i>	Write to User Data Storage	199
1B 2A <i>m n1 n2 d1 ... dn</i>	Select Bit Image Mode	142
<b>1B 2E</b>	<b>Print Advanced Raster Graphics</b>	
<b>1B 2D <i>n</i></b>	<b>Select or Cancel Underline Mode</b>	<b>129</b>
1B 32	Set Line Spacing to 1/6 Inch	108
1B 33 <i>n</i>	Set Line Spacing	108
1B 34 <i>m a0 a1 a2</i>	Read from User Data Storage	200
1B 3A 30 30 30	Copy Character Set from ROM to RAM	129
1B 3C	Return Home	93
1B 3D <i>n</i>	Select Peripheral Device (For Multi-Drop)	93
1B 3F <i>n</i>	Cancel User-defined Characters	130
1B 40	Initialize Printer	94
1B 43 <i>n</i>	Set Slip Paper Eject Length	94
1B 44 [ <i>n</i> ] <i>k 00</i>	Set Horizontal Tabs	115
1B 45 <i>n</i>	Select or Cancel Emphasized Mode	130
1B 47	Select Double Strike ( <u>7156 Emulation</u> )	131
1B 48	Cancel Double Strike	132
<b>1B 49 <i>n</i></b>	<b>Set or Cancel Italic Print</b>	<b>132</b>
1B 4A <i>n</i>	Print and Feed Paper	109
1B 4B <i>n</i>	Print and Reverse Feed Paper	109
<b>1B 4C</b>	<b>Select Page Mode</b>	<b>182</b>
1B 4C <i>n1 n2 d1...dn</i>	Select Double Density Graphics ( <u>7156 Emulation</u> )	145
<b>1B 52 <i>n</i></b>	<b>Select International Character Set</b>	<b>133</b>
<b>1B 53</b>	<b>Select Standard Mode</b>	<b>183</b>
<b>1B 54 <i>n</i></b>	<b>Select Print Direction in Page Mode</b>	<b>184</b>
1B 55 <i>n</i>	Select or Cancel Unidirectional Printing Mode	134
1B 56 <i>n</i>	Select or Cancel 90 Degrees Clockwise Rotated	134
<b>1B 57 <i>n1, n2,...n8</i></b>	<b>Set Printing Area in Page Mode</b>	<b>185</b>
1B 59 <i>n1 n2 d1...dn</i>	Select Double Density Graphics	145
1B 5B 7D	Switch to Flash Download Mode	211
1B 5C <i>n1 n2</i>	Set Relative Print Position	116
1B 61 <i>n</i>	Select Justification	117
1B 63 30 <i>n</i>	Select Receipt or Slip for Printing; Slip for MICR Read	94
1B 63 31 <i>n</i>	Select Receipt or Slip for Setting Line Spacing	96

Hexadecimal Command Code and Operands	Command Name	Page
1B 63 34 <i>n</i>	Select Sensors to Stop Printing	97
1B 63 35 <i>n</i>	Enable or Disable Panel Buttons	98
1B 64 <i>n</i>	Print and Feed <i>n</i> Lines	110
1B 65 <i>n</i>	Print and Reverse Feed <i>n</i> Lines	110
1B 66 <i>m n</i>	Set Slip Paper Waiting Time	99
1B 69	Perform Full Knife Cut	92
1B 6A <i>k</i>	Read from Non-Volatile Memory	201
1B 6D	Perform Partial Cut	92
1B 70 <i>n p1 p2</i>	Generate Pulse to Open Cash Drawer	100
1B 72 <i>n</i>	Select Print Color	135
1B 73 <i>n1 n2 k</i>	Write to Non-Volatile Memory (NVRAM)	201
<b>1B 74 n</b>	<b>Select International Character Set</b>	<b>133</b>
1B 75 0	Transmit Peripheral Device Status	152
1B 77 01	Read MICR Data and Transmit	190
<b>1B 77 46</b>	<b>Check Flip</b>	<b>199</b>
1B 77 50	Define Parsing Format, Save in NVRAM	191
1B 77 52	Reread MICR Data	190
1B 77 70	Define Parsing Format, Do Not Save Permanently	191
1B 7A <i>n</i>	Select or Cancel Parallel Printing Mode on R&J	101
1B 7B <i>n</i>	Select or Cancel Upside Down Printing Mode	135
1C	Select Slip Station	101
1C 21 <i>n</i>	Select print modes for Kanji characters	207
1C 2D <i>n</i>	Turn underline mode ON/OFF for Kanji	208
1C 32 <i>c1 c2 d1...dn</i>	Define user-defined Kanji characters	208
1C 53 <i>n1 n2</i>	Set Kanji character spacing	209
1F 56 <i>n</i>	Send Printer Software Version	
1c 57 <i>n</i>	Set quadruple mode ON/OFF for Kanji	210
1D 00	Request Printer ID	211
1D 01	Return Segment Number Status of Flash Memory	212
1D 02 <i>n</i>	Select Flash Memory Sector to Download	212
1D 03 <i>n</i>	Real Time Request to Printer (DLE Sequence)	167
1D 04 <i>n</i>	Real Time Status Transmission (GS Sequence)	164
1D 05	Real Time Printer Status Transmission	169
1D 06	Get Firmware CRC	213
1D 07	Return Microprocessor CRC	213
1D 0E	Erase the Flash Memory	213
1D 0F	Return Main Program Flash CRC	214
1D 10 <i>n</i>	Erase Selected Flash Sector	214
1D 11 <i>al ah cl ch d1...dn</i>	Download to Active Flash Sector	215

Hexadecimal Command Code and Operands	Command Name	Page
1D 14 <i>n</i>	Reverse Feed <i>n</i> Lines	111
1D 15 <i>n</i>	Reverse Feed <i>n</i> Dots	111
<b>1D 21 <i>n</i></b>	<b>Select Character Size</b>	<b>136</b>
1D 22 <i>n</i>	Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts	202
<b>1D 22 55 <i>n1 n2</i></b>	<b>Flash Allocation</b>	<b>203</b>
1D 23 <i>n</i>	Select the Current Logo (Downloaded Bit Image)	146
<b>1D 24 <i>nL nH</i></b>	<b>Set Absolute Vertical Print Position in Page Mode</b>	<b>186</b>
1D 2A <i>n1 n2 d1...dn]</i>	Define Downloaded Bit Image	147
1D 2F <i>m</i>	Print Downloaded Bit Image	149
<b>1D 3A</b>	<b>Start or End Macro Definition</b>	<b>188</b>
1D 40 <i>n</i>	Erase User Flash Sector	204
<b>1D 42 <i>n</i></b>	<b>Select or Cancel White/Black Reverse Print Mode</b>	<b>137</b>
1D 48 <i>n</i>	Select Printing Position for HRI Characters	174
1D 49 <i>n</i>	Transmit Printer ID	153
1D 49 40 <i>n</i>	Transmit Printer ID, Remote Diagnostics Extension	154
1D 4C <i>nL nH</i>	Set Left Margin	118
1D 50 <i>x y</i>	Set Horizontal and Vertical Minimum Motion Units	112
1D 56 <i>m</i>	Select Cut Mode and Cut Paper	101
1D 56 <i>m n</i>	Select Cut Mode and Cut Paper	101
1D 57 <i>nL nH</i>	Set Printing Area Width	119
<b>1D 5C <i>nL nH</i></b>	<b>Set Relative Vertical Print Position in Page Mode</b>	<b>187</b>
<b>1D 5E <i>r t m</i></b>	<b>Execute Macro</b>	<b>189</b>
1D 61 <i>n</i>	Select or Cancel Automatic Status Back	170
1D 66 <i>n</i>	Select Pitch for HRI Characters	175
1D 68 <i>n</i>	Select Bar Code Height	175
<b>1D 6B <i>m d1...</i></b>	<b>Print Bar Code</b>	<b>176</b>
1D 6B <i>m n d1...dn</i>	Print Bar Code	176
1D 72 <i>n</i>	Transmit Status	155
1D 77 <i>n</i>	Select Bar Code Width	179
1D FF	Reboot Printer	216
1E	Select Receipt Station	103
<b>1F 04 <i>n</i></b>	Convert 6 Dots/mm Bitmap to 8 Dots/mm Bitmap	150
<b>1F 05 <i>n</i></b>	<b>Select Superscript or Subscript Modes</b>	<b>138</b>
IF 11 [ <i>m n</i> ],[ <i>m n</i> ]...[ <i>m</i>	Printer Setting Change	205

Hexadecimal Command Code and Operands	Command Name	Page
<i>n) OFFH</i>		
1F 56	Send Printer Software Version	<b>160</b>
<b>1F 74</b>	<b>Print Test Form</b>	<b>103</b>

## Printer Function Commands

Hexadecimal Command Code and Operands	Command Name	Page
10	Clear Printer	90
11	Close Form	91
18	Open Form	91
19	Perform Full Knife Cut	92
1A	Perform Partial Knife Cut	92
1B 07	Generate Tone	93
1B 3C	Return Home	93
1B 3D	Select Peripheral Device (for Multi-Drop)	93
1B 40	Initialize Printer	94
1B 43 n	Set Slip Paper Eject Length	94
1B 63 30 n	Select Receipt or Slip for Printing; Slip for MICR Read	94
1B 63 31 n	Select Receipt or Slip for Setting Line Spacing	96
1B 63 34 n	Select Sensors to Stop Printing	97
1B 63 35 n	Enable or Disable Panel Buttons	98
1B 66 m n	Set Slip Paper Waiting Time	99
1B 69	Perform Full Knife Cut	92
1B 6D	Perform Partial Knife Cut	92
1B 70 n p1 p2	Generate Pulse to Open Cash Drawer	100
1B 7A n	Select or Cancel Parallel Printing Mode on R&J	101
1C	Select Slip Station	101
1D 56 m	Select Cut Mode and Cut Paper	101
1D 56 m n	Select Cut Mode and Cut Paper	101
1E	Select Receipt Station	103
<b>1F 74</b>	<b>Print Test Form</b>	<b>103</b>

## Vertical Positioning and Print

Hexadecimal Command Code and Operands	Command Name	Page
0A	Print and Feed Paper One Line	104
0C	Print and Return to Standard Mode/Print and Eject Slip	104
0D	Print and Carriage Return	105
14 n	Feed <i>n</i> Print Lines	105
15 n	Feed <i>n</i> Dot Rows	106
16 n	Add <i>n</i> Extra Dot Rows	106
17	Print	107
1B 32	Set Line Spacing to 1/6 Inch	108
1B 33 n	Set Line Spacing	108
1B 4A n	Print and Feed Paper	109
1B 4B n	Print and Reverse Feed Paper	110
1B 64 n	Print and Feed <i>n</i> Lines	111
1B 65 n	Print and Reverse Feed <i>n</i> Lines	110
1D 14 n	Reverse Feed <i>n</i> Lines	111
1D 15 n	Reverse Feed <i>n</i> Dots	111
1D 50 x y	Set Horizontal and Vertical Minimum Motion Units	112

## Horizontal Positioning Commands

Hexadecimal Command Code and Operands	Command	Page
09	Horizontal Tab	113
1B 14 n	Set Column	113
1B 24 n1 n2	Set Absolute Starting Position	114
1B 44 [n] k 00	Set Horizontal Tabs	115
1B 5C n1 n2	Set Relative Print Position	116
1B 61 n	Select Justification	117
1D 4C nL nH	Set Left Margin	118
1D 57 nL nH	Set Printing Area Width	119



## Print Characteristic Commands

Hexadecimal Command Code and Operands	Command	Page
12	Select Double-Wide Characters	121
13	Select Single-Wide Characters	121
1B 12	Select 90 Degree Counter-Clockwise Rotated Print	122
1B 16 n	Select Pitch (Column Width)	122
1B 20 n	Set Character Right-Side Spacing	123
1B 21 n	Select Print Modes	125
1B 25 n	Select or Cancel User-Defined Character Set	126
1B 26 s c1 c2 d1...dn	Define User-Defined Characters	127
<b>1B 2D n</b>	<b>Select or Cancel Underline Mode</b>	<b>129</b>
1B 3A 30 30 30	Copy Character Set from ROM to RAM	129
1B 3F n	Cancel User-Defined Characters	130
1B 45 n	Select or Cancel Emphasized Mode	130
1B 47	Select Double Strike (7156 Emulation Mode)	131
1B 47 n	Select Double Strike (7158 Native Mode)	131
1B 48	Cancel Double Strike	132
<b>1B 49 n</b>	<b>Select or Cancel Italic Print</b>	<b>132</b>
<b>1B 52 n</b>	<b>Select International Character Set</b>	<b>133</b>
1B 55 n	Select or Cancel Unidirectional Printing Mode	134
1B 56 n	Select or Cancel 90 Degrees Clockwise Rotated Print	134
1B 72 n	Select Print Color	135
1B 74 n	Select International Character Set	133
1B 7B n	Select or Cancel Upside Down Printing Mode	135
<b>1D 21 n</b>	<b>Select Character Size</b>	<b>136</b>
<b>1D 42 n</b>	<b>Select or Cancel White/Black Reverse Print Mode</b>	<b>137</b>
<b>1F 05 n</b>	<b>Select Superscript or Subscript Modes</b>	<b>138</b>

## Graphics Commands

Hexadecimal Command Code and Operands	Command	Page
1B (+*.bmp)	Download BMP Logo	140
1B 2A m n1 n2 d1...dn	Select Bit Image Mode	142
1B 4C n1 n2 d1...dn	Select Double-Density Graphics (in 7156 Emulation Mode)	145
1B 59 n1 n2 d1...dn	Select Double-Density Graphics	145
1D 23 n	Select Current Logo (Downloaded Bit Image)	146
1D 2A n1 n2 d1...dn]	Define Downloaded Bit Image	147
1D 2F m	Print Downloaded Bit Image	149
1F 04 n	Convert 6 Dots/mm Bitmap to 8 Dots/mm Bitmap	150

## Status Commands

Hexadecimal Command Code and Operands	Command	Page
1B 75 0	Transmit Peripheral Device Status	152
1D 49 n	Transmit Printer ID	153
1D 49 40 n	Transmit Printer ID, Remote Diagnostics Extension	154
1D 72 n	Transmit Status	155
1F 56 n	Send Printer Software Version	160

## Real Time Commands

Hexadecimal Command Code and Operands	Command	Page
10 04 n	Real Time Status Transmission (DLE Sequence)	164
10 05 n	Real Time Request to Printer (GS Sequence)	167
1D 03 n	Real Time Request to Printer (DLE Sequence)	167
1D 04 n	Real Time Status Transmission (GS Sequence)	164
1D 05	Real Time Printer Status Transmission	169

## Auto Status Back Commands

Hexadecimal Command Code and Operands	Command	Page
1D 61 n	Select or Cancel Auto Status Back	169

## Bar Code Commands

Hexadecimal Command Code and Operands	Command	Page
1D 48 n	Select Printing Position for HRI Characters	174
1D 66 n	Select Pitch for HRI Characters	175
1D 68 n	Select Bar Code Height	175
<b>1D 6B m d1...dk 00</b> <b>or</b> <b>1D 6B m n d1...dn</b>	<b>Print Bar Code</b>	<b>176</b>
1D 77 n	Select Bar Code Width	179

## Page Mode Commands

Hexadecimal Command Code and Operands	Command	Page
0C	Print and Return to Standard Mode/Print and Eject Slip	180
18	Cancel Print Data in Page Mode	181
1B 0C	Print Data in Page Mode	181
1B 4C	Select Page Mode	182
1B 53	Select Standard Mode	183
1B 54 n	Select Print Direction in Page Mode	184
1B 57 n1, n2...n8]	Set printing Area in Page Mode	185
1D 24 nL nH	Set Absolute Vertical Print Position in Page Mode	186
1D 5C nL nH	Set Relative Vertical Print Position in Page Mode	187

## Macro Commands

Hexadecimal Command Code and Operands	Command	Page
1D 3A	<b>Start or End Macro Definition</b>	<b>188</b>
1D 5E r t m	<b>Execute Macro</b>	<b>189</b>

## MICR Check Reader Commands

### MICR Reading

Hexadecimal Command Code and Operands	Command	Page
1B 77 01	Read MICR Data and Transmit	190
1B 77 52	Reread MICR Data	190

## MICR Parsing

Hexadecimal Command Code and Operands	Command	Page
1B 77 50	Define Parsing Format, Save in NVRAM	191
1B 77 70	Define Parsing Format, Do Not Save Permanently	191

## Check Flip Command

Hexadecimal Command Code and Operands	Command	Page
<b>1B 77 46</b>	<b>Check Flip Command</b>	<b>199</b>

## User Data Storage Commands

Hexadecimal Command Code and Operands	Command	Page
1B 27 m addr d1...dm	Write to User Data Storage	199
1B 34 m addr	Read from User Data Storage	200
1B 6A k	Read from Non-Volatile Memory	201
1B 73 n1 n2 k	Write to Non-Volatile Memory (NVRAM)	201
1D 22 n	Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts	202
<b>1D 22 55 n1 n2</b>	<b>Flash Allocation</b>	<b>203</b>
1D 40 n	Erase User Flash Sector	204
IF 11 [m n],[m n]...[m n] 0FFH	Printer Setting Change	<b>205</b>

## Asian Character Commands

Hexadecimal Command Code and Operands	Command	Page
1C 21 n	Select print modes for Kanji characters	207
1C 2D n	Turn underline mode ON/OFF for Kanji	208
1C 32 c1 c2 d1...dn	Define user-defined Kanji characters	208
1C 53 n1 n2	Set Kanji character spacing	209
1c 57 n	Set quadruple mode ON/OFF for Kanji	210

## Flash Download Commands

Hexadecimal Command Code and Operands	Command	Page
1B 5B 7D	Switch Flash Download Mode	211
1D 00	Request Printer ID	211
1D 01	Return Segment Number Status of Flash Memory	212
1D 02 n	Select Flash Memory Sector to Download	212
1D 06	Get Firmware	213
1D 07	Return Microprocessor CRC	213
1D 0E	Erase the Flash Memory	213
1D 0F	Return Main Program Flash CRC	213
1D 10 n	Erase Selected Flash Sector	214
1D 11 aL aH cL cH d1...dn	Download to Active Flash Sector	215
1D FF	Reboot the Printer	216

## Comparison Chart

The following table details the list of commands whose behavior differs from the NCR 7156 because of the physical differences of a 6 dots/mm head (7156) versus an 8 dots/mm head (7167). Where the 7156 made movements in  $n/152$  inch increments, the 7167 makes  $n/203$  inch movements.

Command	Description	Difference between a 7156 and a 7167 configured in 7156 Emulation Mode.
15 <i>n</i>	Feed <i>n</i> Dot Rows	This command will move the paper on the receipt in $n/203$ inch steps instead of $n/152$ inch steps.
16 <i>n</i>	Add <i>n</i> Extra Dot Rows	The dot rows will be measured in $n/203$ inches versus $n/152$ inches.
1B 20 <i>n</i>	Set Right-Side Character Spacing	This command sets the right side spacing to “ <i>n</i> ” horizontal motion units. By default, these units are in terms of $1/203$ inches versus $1/152$ inches.
1B 24 <i>n1 n2</i>	Set Absolute Starting Position	For graphics commands, the position is scaled to best match the previous product. In text mode, the equivalent character position is calculated.
1B 26 <i>s c1 c2 n1 d1...nn dn]</i>	Define User-Defined Character Set	Since the dots on the new print head are smaller, user-defined characters that were used on the previous 7156 printer will appear smaller on the 7156 printer.
1B 2A <i>m n1 n2 d1...dn</i>	Select Bit Image Mode	In 7156 Emulation Mode, graphics are scaled to best match the size of the graphic in the 7156 printer.
1B 33 <i>n</i>	Set Line Spacing	This command uses <i>n</i> in terms of $n/360$ inches. Since the previous product had a fundamental step of $1/180$ inch and the new product has a fundamental step of $1/203$ inch, the actual line spacing will not exactly match the requested spacing.
1B 4A <i>n</i>	Print and Feed Paper	(Same as above)
1B 59 <i>n1 n2 d1...dn</i>	Select Double-Density	In 7156 Emulation Mode, the

Command	Description	Difference between a 7156 and a 7167 configured in 7156 Emulation Mode.
Graphics		printer scales the graphics to provide the best match.
1B 5C <i>n1 n2</i>	Set Relative Print Position	The parameter to this command is in units of dots. However, the command moves and aligns to character positions. In 7156 Emulation Mode, this command calculates how many character positions to move based on the 7156's character width in dots (10) versus the 7167's width (13).
1B 61 <i>n</i>	Select Justification	This command does true dot resolution alignment for centering versus character-aligned centering.
1D 2A <i>n1 n2 d1...dn]</i>	Define Downloaded Bit Image	In 7156 Emulation Mode, this command scales the incoming data to provide a best match to the size of the image as it printed on the 7156 printer.
1D 2F <i>m</i>	Print Downloaded Bit Image	(Same as above)



## Command Descriptions

This section provides the detailed description of the commands. These commands are separated into groups according to their function or use. The previous sections can be used as an index for the following sections.

The following lists and describes the headings used to present the elements of the commands in the descriptions in this section. Each command code is presented in three formats: ASCII, hexadecimal, and decimal. Choose the format that best suits the programming implementation. The printer interprets the 8-bit bytes it gets through its communication interface; it does not care what format the program lists them in.

**Name:** Name of Command

**ASCII:** The ASCII representation of the command control code followed by its operands.

**Hexadecimal:** The hexadecimal representation of the command control code followed by its operands.

**Decimal:** The decimal representation of the command control code followed by its operands.

**Operand *n*:** A description of the command operand. Other command operands may be m, p1, p2, x, or y.

**Range of *n*:** The upper and lower limits or list of possible values of the command operand. The values are listed as decimal values unless specified otherwise.

**Default of *n*:** The command operand default value after printer reset or startup.

**Description:** A brief description of the use of the command.

**Formulas:** Any formulas used for this command.

**Example:** Coding example of how to send the command in Visual Basic. This code assumes we are doing output to an opened and ready device called "MSCOMM1." The examples use the hexadecimal command code formats; the ASCII or decimal formats could also be used in VB. In commands that use an operand, a specific value is used, and the result of using the selected value for the operand is described.

**Exceptions:** Describes any exceptions to this command, e.g., incompatible commands.

**Related Information:** Describes related information for this command, e.g., bit information.

## Printer Function Commands

The printer function commands control the following basic printer functions and are described in order of their hexadecimal codes:

1. Station Select
2. Platen Control
3. Resetting the printer
4. Cutting the paper
5. Opening the cash drawers

### Clear Printer

**ASCII:** DLE

**Hexadecimal:** 10

**Decimal:** 16

Clears the print line buffer without printing and sets the printer to the following condition:

1. Receipt station is selected
2. Double-Wide command (0x12) is cancelled
3. Line Spacing, Pitch, and User-Defined Character Sets are maintained at current selections (RAM is not affected)
4. Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set
5. Printer is restarted and error status is cleared if a fault condition existed
6. Printing position is set to column one
7. Slip platen is opened
8. Slip print head is homed
9. Knife is homed

Example:

```
MSComm1.Output = Chr$(&H10)
```

Exceptions:

A DLE command followed by a hexadecimal 04 or 05 is interpreted as a "real time command". (See Real Time commands)

**Close Form****ASCII:** DC1**Hexadecimal:** 11**Decimal:** 17

Closes the feed roller and platen and retracts the forms arm stop to the forms stop position. If the printer is reset or the Clear command (0x10) is received, the feed roller and platen are opened.

This command executes if the platen is already closed. This command is processed regardless of which station is selected.

Example:

```
MSComm1.Output = Chr$(&H11)
```

**Open Form****ASCII:** CAN**Hexadecimal:** 18**Decimal:** 24

When the printer is in 7156 Emulation Mode or in non-Page Mode, this command opens the feed roller and platen so that a form may be inserted (default position).

This command has the same code as the Cancel Print Data in Page Mode command, which is only executed in Page Mode.

This command executes if the platen is already open. This command executes (opens the feed roller and platen) regardless of which station is selected.

Example:

```
MSComm1.Output = Chr$(&H18)
```

**Perform Partial Knife Cut**

**ASCII:** EM      or      ESC i

**Hexadecimal:** 19      or      1B 69

**Decimal:** 25      or      27 105

Cuts the receipt, leaving .20 inch (5 mm) of paper. This command is implemented the same as Partial Knife Cut (1A, 1B 6D). There are two codes for this command. Both codes perform the same function.

A Line Feed is executed first if the print buffer is not empty.

This command is executed (cuts the receipt) regardless of which station is selected.

Example:

MSComm1.Output = Chr\$(&H19) or

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H69)

**Perform Partial Knife Cut**

**ASCII:** SUB      or      ESC m

**Hexadecimal:** 1A      or      1B 6D

**Decimal:** 26      or      27 109

Cuts the receipt, leaving .20 inch (5 mm) of paper. This command is implemented the same as Full Knife Cut (19, 1B 69) which results in a partial knife cut. There are two codes for this command and both perform the same function.

This command is processed regardless of which station is selected.

Example:

MSComm1.Output = Chr\$(&H1A) or

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H6D)

Exceptions:

A line Feed is executed first if the printer buffer is not empty.

This command is executed (cuts the receipt) regardless of which station is selected.

**Generate Tone****ASCII:** ESC BEL**Hexadecimal:** 1B 07**Decimal:** 27 7

Generates an audible tone. This allows the application to provide an audible tone to the operator.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H07)

**Return Home****ASCII:** ESC <**Hexadecimal:** 1B 3C**Decimal:** 27 60

Moves the impact print head (unless it is already in the home position) to the home position.

This command is processed regardless of station, either receipt unit or slip unit.

Related Information:

The printer is able to detect carriage motor jams, eliminating the need to home the print head after each slip transaction.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H3C)

**Initialize Printer****ASCII:** ESC @**Hexadecimal:** 1B 40**Decimal:** 27 64

<b>Default:</b>	<b><u>Receipt</u></b>	<b><u>Slip</u></b>
<b>Character Pitch:</b>	15.6 CPI	13.9 CPI
<b>Column Width:</b>	44 characters (80mm) 32 characters (58mm)	45 characters
<b>Extra Dot Rows:</b>	2	3
<b>Character Set:</b>	Code Page 437	Code Page 437
<b>Printing Position:</b>	Column One	Column One

Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings above.)

Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared (Flash Memory is not affected). Tabs are reset to default settings. Receipt selection state is selected.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H40)

**Set Slip Paper Eject Length****ASCII:** ESC C *n***Hexadecimal:** 1B 43 *n***Decimal:** 27 67 *n***Value of *n*:** 0 to 255

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H43) & Chr\$(*n*)

Exception:

This command is ignored.

**Select Receipt or Slip for Printing; Slip for MICR Read****ASCII:** ESC c 0 *n***Hexadecimal:** 1B 63 30 *n***Decimal:** 27 99 48 *n***Value of *n*:** 0 Journal selected

1, 2, 3 Receipt selected

4 Slip selected

**Default of *n*:** 1

Selects the station for printing. When the slip station is selected, the printer waits (based on the slip waiting time setting [ie: 1B 66 m n]) for the paper to be inserted. When the slip station has already been selected and the selection is changed, the form feed roller is opened.

If the station has already been selected and it is re-selected, no action takes place.

Example:

This statement selects the receipt for printing:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H63) & Chr\$(&H30) & Chr\$(&H01)

Exceptions:

Receiving the command discards unprinted data in the buffer, forcing a “beginning of line” state.

When *n* is out of range this command and it's supporting operands are discarded.

**Select Receipt or Slip for Setting Line Spacing****ASCII:** ESC c 1 *n***Hexadecimal:** 1B 63 31 *n***Decimal:** 27 99 49 *n***Value of *n*:** 0 Journal selected

1, 2, 3 Select receipt

4 Select Slip

**Default of *n*:** 1

Selects which station receives the effects of the following commands:

1. Select Default Line Spacing (1B 32)
2. Set Line Spacing (1B 33)
3. Add *n* extra dot rows (16 *n*)

Example:

This statement selects the slip station for line spacing commands:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H63) & Chr\$(&H31) & Chr\$(&H04)

Exceptions:

This *n* is out of range this command it's supporting operands are discarded.



**Select Sensors to Stop Printing****ASCII:** ESC c 4 *n***Hexadecimal:** 1B 63 34 *n***Decimal:** 27 99 52 *n***Value of *n* :**

If this bit of <i>n</i> is 1	Function Performed
Bit 0, or bit 1	Stop Receipt on Receipt Low
Bit 4	Stop Slip if Trailing Edge Uncovered
Bit 5	Stop Slip if Leading Edge Uncovered

**Default:** 0

Determines which sensor causes the printer to stop printing on the respective station. The command does not affect the paper out sensor on the receipt station, which will automatically stop the printer when the paper is depleted.

**Example:**

This statement causes the receipt to stop on paper low and the slip to stop if the leading edge is uncovered (bits 0 and 5 equal to 1 yields hexadecimal 21 - binary 00100001):

```
MSComm1.Output = Chr(&H1B) & Chr(&H63) & Chr(&H34) & Chr(&H21)
```

All other bits are ignored.

**Enable or Disable Panel Buttons****ASCII:** ESC c 5 *n***Hexadecimal:** 1B 63 35 *n***Decimal:** 27 99 53 *n***Value of *n*:** 0 = Enable

1 = Disable

**Default:** 0 (Enable)

Enables or disables the Paper Feed Button. If the last bit is 0, the Paper Feed Button is enabled. If the last bit is 1, the Paper Feed Button is disabled so pressing the paper feed button will result in no response.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H63) & Chr\$(&H35) & Chr\$(n)

**Related Information:**

Functions that require using the Paper Feed Button (except for the Execute Macro [1D 5E] command) cannot be used when it is disabled with this command.

**Set Slip Paper Waiting Time****ASCII:** ESC f *m n***Hexadecimal:** 1B 66 *m n***Decimal:** 27 102 *m n***Value of *m*:** Minutes**Value of *n*:** Tenths of seconds

Sets the time (in *m* minutes) that the printer waits for a slip to be inserted into the slip station. It also sets the time (*n* x 0.1 seconds) that the printer waits to close the platen and start printing once the slip has been inserted. The printer reads that a slip is inserted when the leading edge and trailing edge sensors are covered. The LED on the slip table is lit (green) when both sensors are covered.

If a slip is not inserted in the time specified, the receipt station is selected for the next function. If *m* = 0, the printer waits forever for a slip to be inserted. The times set by this command are used only by the command, Select Receipt or Slip for Printing, Slip for MICR Read (1B 63 30 *n*), with *n* set to 04.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H66) & Chr\$(*m*) & Chr\$(*n*)

**Generate Pulse to Open Cash Drawer****ASCII:** ESC p *n* *p1* *p2***Hexadecimal:** 1B 70 *n* *p1* *p2***Decimal:** 27 112 *n* *p1* *p2***Value of *n*:** 0, 48 = Drawer 1

1, 49 = Drawer 2

**Value of *p1*:** 0 - 255**Value of *p2*:** 0 - 255

Sends a pulse to open the cash drawer.

**Formulas:**

The value for either *p1* or *p2* is the hexadecimal number multiplied by 2 msec to equal the total time.

1. On time = *p1* x 2 msec

2. Off time = *p2* x 2 msec

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H70) & Chr\$(*n*) & Chr\$(*n*)

**Related Information:**

The off-time is the delay before the printer performs the next operation.

The recommend time for NCR cash drawers is 110 msec on time.

Refer to cash drawer specifications for required on and off times.

### Select or Cancel Parallel Printing Mode on Receipt and Journal

**ASCII:** ESC *z n*

**Hexadecimal:** 1B 7A *n*

**Decimal:** 27 122 *n*

Because there is no journal station on the printer this command is not implemented and is ignored if received. The command and its supporting operands will be discarded.

### Select Slip Station

**ASCII:** FS

**Hexadecimal:** 1C

**Decimal:** 28

Selects the Slip Station for all functions. The receipt station is the default setting after the printer is initialized or the Clear Printer (0x10) command is received. The Hex command: 1B 63 30 *n*, where *n* = 4 will also select the slip station.

Example:

MSComm1.Output = Chr\$(&H1C)

Exceptions:

This command is ignored if Asian mode is On by diagnostic setting.

### Select Cut Mode and Cut Paper

**ASCII:** GS *V m* or GS *V m n*

**Hexadecimal:** 1D 56 *m* or 1D 56 *m n*

**Decimal:** 29 86 *m* or 29 86 *m n*

**Value of *m*:** Selects the mode as shown in the table

**Value of *n*:** Determines cutting position only if *m* is 65 or 66.

<i>m</i>	Feed and Cut Mode
0, 48	Full cut (no extra feed). Partial cut on the 7158.
1, 49	Partial cut (no extra feed).
65	Feeds paper to cutting position + ( <i>n</i> times vertical motion unit), and cuts the paper completely.
66	Feeds paper to cutting position + ( <i>n</i> times vertical motion unit), and performs a partial cut.
<b>Range of <i>m</i>:</b>	0, 48; 1, 49  65, 66 (when used with <i>n</i> )
<b>Range of <i>n</i>:</b>	0 - 255
<b>Default of <i>n</i>:</b>	0
<b>Default of <i>m</i>:</b>	0

Selects a mode for cutting paper and cuts the paper. There are two formats for this command, one requiring one parameter *m*, the other requiring two parameters, *m* and *n*. The format is indicated by the parameter *m*.

**Formulas:** *n* times the vertical motion unit is used to determine the cutting position to the distance that the paper is fed.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H56) & Chr\$(m) & Chr\$(n)

**Exceptions:**

If *m* is out of the specified range, the command is ignored.

**Select Receipt Station**

ASCII: RS

Hexadecimal: 1E

Decimal: 30

Selects the Receipt Station for all functions. The receipt station is the default setting after the printer is initialized or the Clear Printer (0x10) command is received. The Hex command: 1B 63 30 n , where n = 1, 2, 3 will also select the receipt station.

Example:

MSComm1.Output = Chr\$(&H1E)

**Print Test Form**

ASCII: US t

Hexadecimal: 1F 74

Decimal: 31 116

Prints the current printer configuration settings on the receipt.

Disabled in page mode.

Example:

MSComm1.Output = Chr\$(&H1F) & Chr\$(&H74)

## Vertical Positioning and Print Commands

The vertical positioning and print commands control the vertical print positions of characters on the receipt and slip.

### Print and Feed Paper One Line

**ASCII:** LF

**Hexadecimal:** 0A

**Decimal:** 10

Prints one line from the buffer and feeds paper one line.

Example:

```
MSComm1.Output = Chr$(&H0A)
```

Related Information:

Carriage Return + Line Feed, prints and feeds only one line.

### Print and Eject Slip

**ASCII:** FF

**Hexadecimal:** 0C

**Decimal:** 12

Prints data from the buffer to the slip station and if the paper sensor is covered, reverses the slip out the front of the printer far enough to be accessible to the operator. The impact station opens the platen in all cases.

This command has the same code as the Print and Return to Standard Mode command, which is executed only when the printer is in Page Mode. When the printer is not in Page Mode this command executes the print and eject slip function.

Example:

```
MSComm1.Output = Chr$(&H0C)
```

Exceptions:

This command is ignored if the receipt station is the current station.



## Print and Carriage Return

**ASCII:** CR

**Hexadecimal:** 0D

**Decimal:** 13

Prints one line from the buffer and feeds paper one line. The printer can be set through the configuration menu to ignore or use this command. Some applications expect the command to be ignored while others use it as print command.

Example:

```
MSComm1.Output = Chr$(&H0D)
```

Related Information:

See Ignoring/Using the Carriage Return in *Diagnostics* for more information.

Carriage Return + Line Feed, prints and feeds only one line.

## Feed *n* Print Lines

**ASCII:** DC4 *n*

**Hexadecimal:** 14 *n*

**Decimal:** 20 *n*

**Value of *n*:** The number of lines to feed at current line height setting.

**Range of *n*:** 0 – 127 7156 Emulation Mode

0 – 255 7158 Native Mode

Feeds paper *n* lines at the current line height without printing.

Ignored on receipt if the current line is not empty.

Example:

```
MSComm1.Output = Chr$(&H14) & Chr$(n)
```

**Feed  $n$  Dot Rows****ASCII:** NAK  $n$ **Hexadecimal:** 15  $n$ **Decimal:** 21  $n$ 

<b>Value of <math>n</math>:</b>	<b><u>Receipt</u></b>	<b><u>Slip</u></b>
	$n/203$ inch	$n/72$ inch

**Range of  $n$ :** 0 – 127 7156 Emulation Mode

0 – 255 7158 Native Mode

Feeds paper  $n$  dot rows without printing. Receipt moves  $n$  rows if the print buffer is empty.

Example:

MSComm1.Output = Chr\$(&H15) & Chr\$( $n$ )**Add  $n$  Extra Dot Rows****ASCII:** SYN  $n$ **Hexadecimal:** 16  $n$ **Decimal:** 22  $n$ 

<b>Value of <math>n</math>:</b>	<b><u>Receipt</u></b>	<b><u>Slip</u></b>
	$n/203$ inch	$n/72$ inch

**Range of  $n$ :** 0 - 12

<b>Default:</b>	<b><u>Receipt</u></b>	<b><u>Slip</u></b>
	3	3

Adds  $n$  extra dot rows to the character height to increase space between print lines or decrease number of lines per inch.

**Formulas:**

The following table shows the relationship between the number of lines per inch and each extra dot row(s) added for both the receipt and slip stations:

Receipt Station			Slip Station		
Extra Rows	Lines Per Inch	Dot Rows	Extra Rows	Lines Per Inch	Dot Rows
0	8.47	24	0	10.29	7
1	8.13	25	1	9.00	8
2	7.81	26	2	8.00	9
3	7.52	27	3	7.20	10
4	7.25	28	4	6.55	11
5	7.00	29	5	6.00	12
6	6.77	30	6	5.54	13
7	6.55	31	7	5.14	14
8	6.35	32	8	4.80	15
9	6.16	33	9	4.50	16
10	5.98	34	10	4.24	17
11	5.81	35	11	4.00	18
12	5.64	36	12	3.79	19

Example:

MSComm1.Output = Chr\$(&H16) & Chr\$(n)

## Print

**ASCII:** ETB

**Hexadecimal:** 17

**Decimal:** 23

Prints one line from the buffer and feeds paper one line. Executes LF on receipt. Executes LF on slip if previous character was not a CR.

Example:

MSComm1.Output = Chr\$(&H17)

**Set Line Spacing to 1/6 Inch****ASCII:** ESC 2**Hexadecimal:** 1B 32**Decimal:** 27 50**Default:** 0.13 Inch (3.33 mm)

Sets the default line spacing to 1/6 of an inch (4.25 mm).

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H32)

**Set Line Spacing****ASCII:** ESC 3 *n***Hexadecimal:** 1B 33 *n***Decimal:** 27 51 *n***Value of *n*:** *n*/406 inches on receipt*n*/144 inches in slip**Range of *n*:** 0 – 255

**Default:** Receipt .13 inch (3.37 mm or 7.52 lines per inch, 3 extra dot rows.).

Slip 14 inch (7.2 lines per inch, 3 extra dot rows.)

Sets the line spacing for the receipt and for the slip. For the receipt the spacing is set to *n*/406 inches. For the slip, the line spacing is set to *n*/144 inches. The line spacing equals the character height when *n* is too small.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Line Spacing) will be interpreted accordingly.

**Related Information:**

For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

**Print and Feed Paper****ASCII:** ESC J *n***Hexadecimal:** 1B 4A *n***Decimal:** 27 74 *n***Value of *n*:** *n*/203 inches receipt*n*/144 inches slip**Range of *n*:** 0 - 255

Prints one line from the buffer and feeds the paper.

On the receipt station, the line height equals the character height when *n* is too small. This does not apply to the slip station. Use *n* = 0 to print a line without feeding the paper. This allows the printer to print on the last line of the slip (at .59 inches from the trailing edge) and still retain the slip in the feed rollers for reverse feeding the paper back out of the slip station.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H4A) & Chr\$(*n*)

Related Information:

For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

**Print and Reverse Feed Paper****ASCII:** ESC K *n***Hexadecimal:** 1B 4B *n***Decimal:** 27 75 *n***Value of *n*:** Slip = *n*/144 of an inch**Range of *n*:** 0 - 255

Prints one line from the buffer and reverse feeds the paper *n*/144 of an inch on the slip station.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H4B) & Chr\$(*n*)

Exceptions:

The receipt station cannot be reverse fed.

**Print and Feed  $n$  Lines****ASCII:** ESC d  $n$ **Hexadecimal:** 1B 64  $n$ **Decimal:** 27 100  $n$ **Value of  $n$ :** Number of lines to be printed and fed.**Range of  $n$ :** 1 – 255

(0 is interpreted as 1 on the receipt station)

Prints one line from the buffer and feeds paper  $n$  lines at the current line height.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H64) & Chr\$( $n$ )

**Print and Reverse Feed  $n$  Lines****ASCII:** ESC e  $n$ **Hexadecimal:** 1B 65  $n$ **Decimal:** 27 101  $n$ **Value of  $n$ :** The number of lines on the slip station to be reverse fed.**Range of  $n$ :** 0 – 255

Prints one line from the buffer and reverse feeds the paper  $n$  lines on the slip station. The receipt station cannot be reverse fed.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H65) & Chr\$( $n$ )

**Reverse Feed *n* Lines****ASCII:** GS DC4 *n***Hexadecimal:** 1D 14 *n***Decimal:** 29 20 *n***Range of *n*:** 0 – 127 7156 Emulation Mode

0 – 255 7158 Native Mode

Reverses the paper feed in the slip station by *n* lines at the current spacing. The next character feed command returns the paper feed back to the normal feed direction. This command is ignored if slip is not the selected station. Current spacing is not a factor.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H14) & Chr\$(*n*)

**Reverse Feed *n* Dots****ASCII:** GS NAK *n***Hexadecimal:** 1D 15 *n***Decimal:** 29 21 *n***Value of *n*:** *n* dots at 1/72 inch**Range of *n*:** 0 – 127 7156 Emulation Mode

0 – 255 7158 Native Mode

Reverses the paper feed in the slip station by *n* dots at 1/72 inch (NCR 7150™ command). This command is ignored if receipt station is selected.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H15) & Chr\$(*n*)

**Set Horizontal and Vertical Minimum Motion Units****ASCII:** GS P  $x y$ **Hexadecimal:** 1D 50  $x y$ **Decimal:** 29 80  $x y$ **Value of  $x$ :** Horizontal**Value of  $y$ :** Vertical**Range of  $x$ :** 0 - 255**Range of  $y$ :** 0 - 255**Default: of  $x$ :** 203**Default: of  $y$ :** 203

Sets the horizontal and vertical motion units to  $1/x$  inch and  $1/y$  inch respectively.

When  $x$  or  $y$  is set to 0, the default setting for that motion unit is used.

The default horizontal motion is  $x = 203$ .

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H50) & Chr\$( $x$ ) & Chr\$( $y$ )

Exceptions:

This command is ignored if slip station is selected.



## Horizontal Positioning Commands

The horizontal positioning commands control the horizontal print positions of characters on the receipt and slip.

### Horizontal Tab

**ASCII:** HT

**Hexadecimal:** 09

**Decimal:** 9

Moves the print position to the next tab position set by the Set Horizontal Tab Positions (1B 44 *n1 n2* ... 00) command. The print position is reset to column one after each line.

Tab treats the left margin as column one, therefore changes to the left margin will move the tab positions.

When there are no tabs defined to the right of the current position, or if the next tab is past the right margin, line feed is executed (both slip and receipt.) HT has no effect in page mode. Printer initialization sets 32 tabs at column 9, 17, 25, ... (Every 8 characters)

Example:

MSComm1.Output = Chr\$(&H09)

### Set Column

**ASCII:** ESC DC4 *n*

**Hexadecimal:** 1B 14 *n*

**Decimal:** 27 20 *n*

**Value of *n*:** Receipt

Slip

1 - 44 (Standard,80 mm)

1 - 45 (Standard)

1 - 56 (Compressed,80 mm)

1 - 55 (Compressed)

1 - 32 (Standard,58mm)

1 - 42 (Compressed, 58mm)

**Default of *n*:** 1

Prints the first character of the next print line in column *n*. It must be sent for each line not printed at column one. The value of *n* is set to one after each line.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H14) & Chr\$(n)

Exceptions:

The command cannot be used with Single- or Double-Density graphics.

### Set Absolute Starting Position

**ASCII:** ESC \$ *n1 n2*

**Hexadecimal:** 1B 24 *n1 n2*

**Decimal:** 27 36 *n1 n2*

**Value of *n*:** Number of dots to be moved from the beginning of the line.

**Value of *n1*:** Remainder after dividing *n* by 256.

**Value of *n2*:** Integer after dividing *n* by 256.

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line. The print starting position is reset to the first column after each line.

#### Formulas:

Determine the value of *n* by multiplying the column for the absolute starting position by 10 (slip, or receipt standard pitch) or 8 (receipt compressed pitch). The example shows how to calculate column 29 (10 dots per column) as the absolute starting position.

$28 \times 10 = 280$  dots (beginning of column 29)

$280/256 = 1$ , remainder of 24

$n1 = 24$      $n2 = 1$

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H24) & Chr\$(n1) & Chr\$(n2)

#### Related Information:

This command is also used in the graphics mode on the receipt. See Graphics Commands in this chapter for more information.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Absolute Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

## Set Horizontal Tabs

**ASCII:** ESC D [*n*] *k* NUL

**Hexadecimal:** 1B 44 [*n*] *k* 00

**Decimal:** 27 68 [*n*] *k* 0

**Value of *n*:** Column for tab minus one.

*n* is always less than or equal to the current selected column width.

**Value of *k*:** 0 - 32

**Default:** Every 8 characters from column. 1 (9, 17, 25, etc.) for normal print.

Sets up to 32 horizontal tab positions *n* columns from column one, but does not move the print position. See the Horizontal Tab (09) command.

The tab positions remain unchanged if the character widths are changed after the tabs are set. This command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs. Tabs assumed to be in strictly ascending order. A tab out of order terminates the command string as if it were 00, and remaining tab values are taken as normal data.

### Formulas:

Set the tab positions in ascending order and put Hex 00 at the end.

Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H44) & Chr\$(&H00)

Exceptions:

The tabs cannot be set higher than the column width of the current pitch.

**Set Relative Print Position****ASCII:** ESC \ *n1 n2***Hexadecimal:** 1B 5C *n1 n2***Decimal:** 27 92 *n1 n2***Value of *n*:**

To Move the Relative Starting Position Right of the Current Position by *n* dots:

*n1* =        Remainder after dividing *n* by 256.

*n2* =        Integer after dividing *n* by 256.

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

To Move the Relative Starting Position Left of the Current Position by *n* dots:

*n1* =        Remainder after dividing (65,536-*n*) by 256

*n2* =        Integer after dividing (65,536-*n*) by 256

The values for *n1* and *n2* are two bytes in low byte, high byte word orientation.

Moves the print starting position the specified number of dots either right (up to the right margin) or left (up to the left margin) of the current position. The print starting position is reset to the first column after each line.

**Formulas:**

To move to the left:

Determine the value of *n* by multiplying the number of columns to move left of the current position by 13 (receipt standard pitch) or 10 (slip or receipt compressed pitch). The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the left of the current position.

$2 \times 10 = 20$  dots (two columns to be moved left of the current position)

$65,536 - 20 = 65516$

$65,516 / 256 = 255$ , remainder of 236

*n1* = 236    *n2* = 255

To move to the right:

Determine the value of *n* by multiplying the number of columns to move right of the current position by 10 (slip or receipt standard pitch) or 8 (receipt compressed pitch). The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the right of the current position.

$2 \times 10 = 20$  dots (two columns to be moved right of the current position)

$20 / 256 = 0$ , remainder of 20

*n1* = 20    *n2* = 0

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H5C) & Chr\$(*n1*) & Chr\$(*n2*)

Related Information:

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Relative Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

#### Compatibility Information (7167 receipt vs. 7156 receipt)

There is a difference in the normal behavior of this command in 7158 Native Mode as compared to the original 7156. The difference exists when the command is used to move to the left. The 7156 processes the whole print string prior to putting it in the buffer for the print head. This method of processing allows the 7156 to backup in the print string and replace characters and their associated attributes when a "Set Relative Print Position" command instructs the printer to move the print position to the left.

In order to improve the speed of printing, the 7167 moves the data into a buffer for the print head when it receives it. When the "Set Relative Print Position" command contains a move to the left, this causes the new data to overstrike the previous data. This behavior can be used to an application's advantage to provide the ability to create compound characters on the receipt station.

### Select Justification

**ASCII:** ESC a *n*

**Hexadecimal:** 1B 61 *n*

**Decimal:** 27 97 *n*

**Value of *n*:** 0, 48 = Left Aligned

1, 49 = Center Aligned

2, 50 = Right Aligned

**Range of *n*:** 0 – 2, 48-50

**Default:** 0 (Left aligned)

Specifies the alignment of the characters, graphics, logos, and bar codes on the receipt station.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H61) & Chr$(n)
```

Exceptions:

The command is valid only when input at the beginning of a line.

**Set Left Margin****ASCII:** GS L *nL nH***Hexadecimal:** 1D 4C *nL nH***Decimal:** 29 76 *nL nH***Range of *nL*:** 0 - 255**Range of *nH*:** 0 - 255**Default:** 80 mm width    576 dots (the maximum printable area)

58 mm width    424 dots (the maximum printable area)

Sets the left margin of the printing area. The left margin is set to  $((nH \times 256) + nL)$  times horizontal motion unit) inches. The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50), described in this manual.

The width of the printing area is set by the Set Printing Area Width command (1D 57), which follows this command. See the Set Printing Area Width command (1D 57) in this document for a description of that command.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots. See the illustration.

**Formulas:**

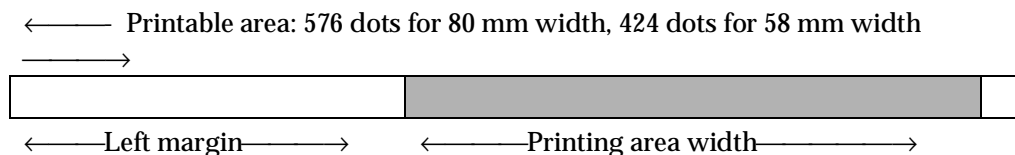
To set the left margin to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS L 203 0

Or, to set the left margin to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS L 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H4C) & Chr$(nL) & Chr$(nH)
```

Exceptions:

The command is effective only at the beginning of a line.

This command is ignored if the line buffer is not empty, and only effects the Receipt interface.

### Set Printing Area Width

**ASCII:** GS W *nL nH*

**Hexadecimal:** 1D 57 *nL nH*

**Decimal:** 29 87 *nL nH*

**Range of *nL*:** 0 – 255

**Range of *nH*:** 0 - 255

**Default:** 80 mm width      576 dots (the maximum printable area)

58 mm width      424 dots (the maximum printable area)

Sets the width of the printing area. If the setting exceeds the printable area, the maximum value of the printable area is used.

The width of the printing area is set to  $((nH \times 256) + nL)$  times horizontal motion unit inches. The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50).

The width of the printing area follows the Set Left Margin command (1D 4C). See the Set Left Margin command (1D 4C...) earlier in this document for a description.

#### Formulas:

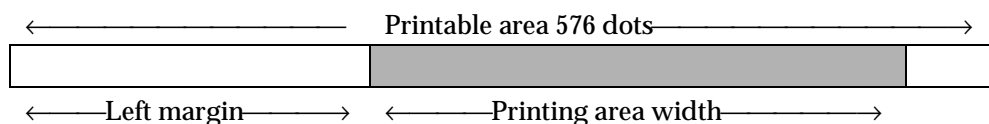
To set the width of the printing area to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS W 203 0

Or, to set the width of the printing area to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS W 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



Example:

MSComm1.Output = Chr(&H1D) & Chr(&H57) & Chr(*nL*) & Chr(*nH*)

Exceptions:

This command is effective only at the beginning of a line.

This command is ignored if the line buffer is not empty, and only effects the Receipt interface.

If the setting exceeds the printable area, the maximum value of the printable area is used. The maximum printable area is 576 dots for 80 mm paper width and 424 dots for 58 mm paper width. See the illustration in the Set Left Margin command (1D 4C).



## Print Characteristic Commands

These commands control what the printed information looks like: selection of character sets, definition of custom-defined characters, and setting of margins. The commands are described in order of their hexadecimal codes

### Select Double-Wide Characters

**ASCII:** DC2

**Hexadecimal:** 12

**Decimal:** 18

Prints double-wide characters. The printer is reset to single-wide mode after a line has been printed or the Clear Printer (0x10) command is received. Double-wide characters may be used in the same line with single-wide characters.

Example:

MSComm1.Output = Chr\$(&H12)

### Select Single-Wide Characters

**ASCII:** DC3

**Hexadecimal:** 13

**Decimal:** 19

Prints single-wide characters. Single-wide characters may be used in the same line with double-wide characters.

Example:

MSComm1.Output = Chr\$(&H13)

**Select 90 Degree Counter-Clockwise Rotated Print**

<b>ASCII:</b>	ESC DC2
<b>Hexadecimal:</b>	1B 12
<b>Decimal:</b>	27 18

Rotates characters 90 degrees counter-clockwise. The command remains in effect until the printer is reset or until a Clear Printer (0x10), Select or Cancel Upside-Down Print (1B 7B), or Select or Cancel Rotated Print (1B 56) command is received.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H12)

Exceptions:

This command is valid only at the beginning of a line.

Rotated print and non-rotated print characters cannot be used together in the same line.

Related Information:

See Summary of Rotated Printing in this chapter.

**Select Pitch (Column Width)**

**ASCII:** ESC SYN *n*

**Hexadecimal:** 1B 16 *n*

**Decimal:** 27 22 *n*

**Value of *n*:** 0 = Standard Pitch

1 = Compressed Pitch

**Default:** 0 (Standard pitch)

Selects the character pitch for a print line.

**Formulas:**

The following table provides the print characteristics for both pitches on the receipt and slip stations.

Pitch	Receipt Columns	Receipt CPI	Slip Columns	Slip CPI
Standard	44 for 80 mm paper 32 for 58 mm paper	15.6	45	13.9
Compressed	56 for 80 mm paper 42 for 58 mm paper	20.3	55	17.1

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H16) & Chr$(n)
```

Related Information:

See “Technical Specifications” for descriptions of character pitches (print modes).

## Set Character Right-Side Spacing

**ASCII:** ESC SP *n*

**Hexadecimal:** 1B 20 *n*

**Decimal:** 27 32 *n*

**Range of *n*:** 0 - 32

**Default:** 0

Sets the right side character spacing to [*n* x horizontal or vertical motion units]. Values for this command are set independently in Standard and Page Mode.

The units of horizontal and vertical motion are specified by the Set Horizontal and Vertical Minimum Motion Units (1D 50...) command. Changes in the horizontal or vertical units do not affect the current right side character spacing. When the horizontal or vertical motion unit is changed by the Set Horizontal and Vertical Minimum Motion Units (1D 50...) command the value must be in even units and not less than the minimum amount of horizontal movement.

In Standard Mode the horizontal motion unit is used.

In Page Mode the horizontal or vertical motion unit differs and depends on the starting position of the printable area. When the starting printing position is the upper left or lower right of the printable area (set by Select Print Direction in Page Mode, 1B 54 *n*) the horizontal motion unit (*x*) is used. When the starting printing position is the upper right or lower left of the printable area (set by Select Print Direction in Page Mode, 1B 54 *n*) the vertical motion unit (*y*) is used.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H20) & Chr$(n)
```

Exception:

This command is ignored in 7156 Emulation Mode and is only valid on the receipt station.

**Select Print Modes****ASCII:** ESC ! *n***Hexadecimal:** 1B 21 *n***Decimal:** 27 33 *n***Value of *n*:** Pitch selection (standard, compressed, double high, or double wide.)

Bit	Function	0	1
Bit 0	Pitch	Standard Pitch <sup>1</sup> 15.6 CPI (Receipt) 44 Col/Line (80 mm) 32 Col/Line (58 mm) 13.9 CPI (Slip) 45 Col/Line	Compressed Pitch 20.3 CPI (Receipt) 56 Col/Line (80 mm) 42 Col/Line (58 mm) 17.1 CPI (Slip) 55 Col/Line
Bit 3	Emphasized Mode	Canceled	Set
Bit 4	Double-high <sup>2</sup>	Canceled	Set
Bit 5	Double-wide	Canceled	Set
Bit 7	Underlined Mode	Canceled	Set

Bits 1, 2, 6 are not used.

<sup>1</sup>Standard and compressed pitch cannot be used together in the same line.<sup>2</sup>Double-high characters cannot be used with normal characters in the same line, nor can they be used on the slip station.**Default:** 0 (for bits 0, 3, 4, 5, 7)

Selects the print mode: standard, compressed, double high, or double wide.

Example:

MSComm1.Output = Chr\$(&amp;H1B) &amp; Chr\$(&amp;H21) &amp; Chr\$(n)

Related Information:

The bits in this command perform the same function as the standalone functions:

1B 16 n	Select Pitch
1B 45 n	Emphasized
12	Double-wide
13	Single-wide
1B 2D n	Underline

### Select or Cancel User-Defined Character Set

**ASCII:** ESC % *n*

**Hexadecimal:** 1B 25 *n*

**Decimal:** 27 37 *n*

**Value of *n*:** 0= Code Page 437

1= User-defined (RAM character set)

2= Code Page 850

**Range:** 0 - 2

**Default:** 0 (Code Page 437)

Selects the character set. When an undefined RAM character is selected, the Code Page 437 character is used. See the *Printing Specification Guide* for the character sets.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H25) & Chr$(n)
```

## Define User-Defined Characters

	Receipt	Slip
<b>ASCII:</b>	ESC & 3 <i>c1 c2 n1 d1 ... m dn</i>	ESC & 0 <i>c1 c2 d1 ... dn</i>
<b>Hexadecimal:</b>	1B 26 3 <i>c1 c2 n1 d1 ... m dn</i>	1B 26 0 <i>c1 c2 d1 ... dn</i>
<b>Decimal:</b>	27 38 3 <i>c1 c2 n1 d1 ... m dn</i>	27 38 0 <i>c1 c2 d1 ... dn</i>

Defines and enters downloaded characters into RAM or Flash. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.

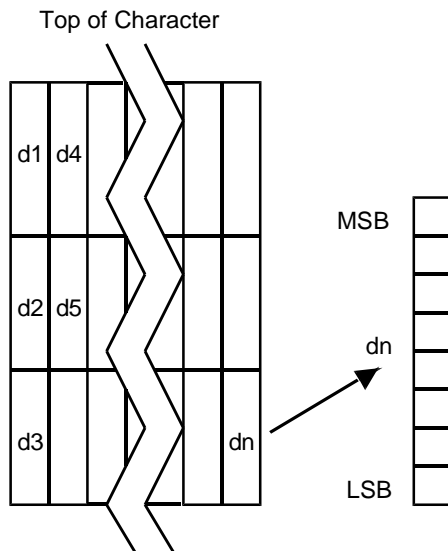
Any invalid byte (*s*, *c1*, *c2*, *n1*) aborts the command.

User-defined character sets for both slip and receipt may be used at the same time. The command clears bit image logo data from RAM. The illustration below provides a sample of a character cell.

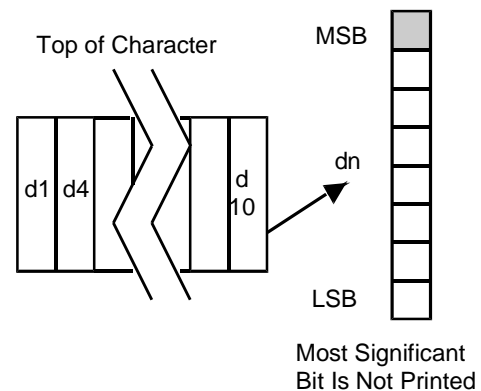
### Defining User-Defined Characters for the Slip and Receipt Station

Defines and enters downloaded characters into RAM.

Receipt Characters (1B 26 3)



Slip Characters (1B 26 0)



**Values and Ranges:****Receipt**

*c* = the ASCII codes of the first (*c1*) and last (*c2*) characters respectively

*c1* = Hex 20-FF (Hex 20 is always printed as a space)

*c2* = Hex 20-FF (Hex 20 is always printed as a space)

To define only one character, use the same code for both *c1* and *c2*.

*n* = the number of dot columns for the *n*th character as specified by *n1* ... *m*

*n* = 1-10 (standard pitch), 12 and less accepted but ignored

*n* = 1-8 (compressed pitch), 12 and less accepted but ignored

*d* = the column data for the *n*th character as specified by *d1* ... *dn*

The number of bytes for a particular character cell is 3 x *n1*.

The bytes are printed down and across each cell.

**Slip**

*c* = the ASCII codes of the first (*c1*) and last (*c2*) characters respectively

*c1* = Hex 20-FF (Hex 20 is always printed as a space)

*c2* = Hex 20-FF (Hex 20 is always printed as a space)

To define only one character, use the same code for both *c1* and *c2*.

*d* = the column data for the *n*th character as specified by *d1* ... *dn*

Each character is defined by 12 bytes (only bytes 2-11 are printed.)

Each byte is one 7-dot high column (full- or half-dot column.)

Overlapped dots are not printed

The data must contain [(*c2* - *c1* + 1) x 12] bytes

**Related Information:**

See 1D 22 *n* (Select Memory Type Where to Save User-Defined Fonts.)



**Select or Cancel Underline Mode****ASCII:** ESC - *n***Hexadecimal:** 1B 2D *n***Decimal:** 27 45 *n***Value of *n*:** 0, 48 = Cancel underline mode

1, 49 = Select underline mode

**Default of *n*:** 0 (Cancels underline mode)

Turns underline mode on or off. Underlines cannot be printed for spaces set by the Horizontal Tab, Set Absolute Start Position, or Set Relative Print Position commands.

This command and the Select Print Mode(s) command (1B 21) turn underline on and off in the same way.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H2D) & Chr$(n)
```

Exceptions:

This command is ignored if *n* is out of the specified range.

This command is only available in 7158 Native Mode.

**Copy Character Set from ROM to RAM****ASCII:** ESC : 0 0 0**Hexadecimal:** 1B 3A 30 30 30**Decimal:** 27 58 48 48 48**Default:** Code Page 437

Copies characters in the active ROM set to RAM. Use this command to re-initialize the User-Defined Character Set. Code Page 437 is copied by default at initialization.

The command is ignored if current font is the user font.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H3A) & Chr$(&H30) & Chr$(&H30)
& Chr$(&H30)
```

Related Information:

To modify characters in one of the character set variations, such as Rotated Print, select one of the Rotated Print commands, copy to RAM, then use the Define User-Defined Character Set command (1B 26).

### Cancel User-Defined Characters

**ASCII:** ESC ? *n*

**Hexadecimal:** 1B 3F *n*

**Decimal:** 27 63 *n*

**Value of *n*:** Specified character code

**Range of *n*:** 32 - 255

Cancels the pattern defined for the character code specified by *n*. After the user-defined character is canceled, the corresponding pattern from Code Page 437 is printed.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H3F) & Chr\$(n)

Exceptions:

This command is ignored if *n* is out of range or if the user-defined character is not defined.

### Select or Cancel Emphasized Mode

**ASCII:** ESC E *n*

**Hexadecimal:** 1B 45 *n*

**Decimal:** 27 69

**Value of *n*:** 0 (bit 0), not selected

1 (bit 0), selected

**Range of *n*:** 0 - 255

**Default:** 0 (bit 0)

Starts or stops emphasized printing on slip and receipt. In Emphasized Mode on the slip, each line is printed twice to improve penetration of multi-part forms and increase print contrast. The second pass is printed the same direction as the first to ensure accuracy of the overprint. Printing speed decreases due to the second printing pass.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H45) & Chr$(n)
```

Exceptions:

Only the lowest bit of *n* is effective.

Emphasized printing cannot be used with bit-images or downloaded bit-images.

Related Information:

This command and the Select Print Mode(s) command (1B 21) function identically.

### Select Double Strike

	7156 Emulation	7158 Native
<b>ASCII:</b>	ESC G	ESC G <i>n</i>
<b>Hexadecimal:</b>	1B 47	1B 47 <i>n</i>
<b>Decimal:</b>	27 71	27 71 <i>n</i>
<b>Value of <i>n</i>:</b>		0 = Off 1 = On

Turns double strike mode on for the slip station. Overprints a second pass of the print line on the slip station to improve penetration of multi-part forms and increase print contrast. The second pass is printed the same direction as the first to ensure accuracy of the overprint. The printer is reset to the standard print mode after a line has been printed or after a Clear Printer (0x10) command is received.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H47) & Chr$(n)
```

Exceptions:

These settings do not apply in Page Mode. However they can be set or cleared in Page Mode.

Double-strike printing cannot be used with bit-images or downloaded bit-images.

This command functions the same as the 7156 when the printer is in 7156 Emulation Mode. In Native Mode, the command takes a parameter to enable and disable it.

Related Information:

Printer output is the same as in Emphasized Mode.

**Cancel Double Strike****ASCII:** ESC H**Hexadecimal:** 1B 48**Decimal:** 27 72

Turns off double strike mode on the slip station in **7156 Emulation** Mode.

This command is ignored in the **7158 Native** Mode.

This command works on both slip and receipt stations.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H48)

**Select or Cancel Italic Print****ASCII:** ESC I *n***Hexadecimal:** 1B 49 *n***Decimal:** 27 73 *n***Value of *n*:** 0 = Off

1 = On

(When 0 and 1 are the Least Significant Bit, LSB)

**Default:** 0 (Off)

Turns Italic print mode on or off. This command is only available in **7158 Native** Mode. Italic print mode is available for built-in, user-defined characters. This command only works on the receipt station.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H49) & Chr\$(*n*)

Exceptions:

Only the lowest bit of *n* is valid. This command is only valid for the receipt station in **7158 Native** Mode.

**Select International Character Set****ASCII:** ESC R *n* or ESC t *n***Hexadecimal:** 1B 52 *n* or 1B 74 *n***Decimal:** 27 82 *n* or 27 116 *n*

	<u>7158 Native Mode</u>	<u>7156 Emulation</u>
<b>Value of <i>n</i>:</b>	0 = Code Page 437 US English	0 = Code Page 437
	1 = Code Page 850 Multilingual	1 = Code Page 850
	2 = Code Page 852 Slavic	
	3 = Code Page 860 Portuguese	
	4 = Code Page 863 French Canadian	
	5 = Code Page 865 Nordic	
	6 = Code Page 858 Multilingual with Euro Symbol	
	7 = Code Page 866 Cyrillic	
	8 = Code Page 1252 Windows Latin I	
	9 = Code Page 862 Hebrew	
	20 = Code Page Katakana	
	21 = Code Page 874 Thailand	
	22 = Code Page 864 Arabic	
<b>Default:</b>	0 (Code Page 437)	

Selects the character set to be used. See *Print Specifications* for the character sets.

There are two codes for this command. Both codes perform the same function.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H52) & Chr$(n)
```

Related Information:

This command may also be known as Select Character Code Table.

## Select Character Code Table

See the previous command, Select International Character Set.

## Select or Cancel Unidirectional Printing Mode

**ASCII:** ESC U *n*

**Hexadecimal:** 1B 55 *n*

**Decimal:** 27 85 *n*

**Value of *n*:** 0 = select bi-directional

1 = select unidirectional

**Default:** 0 (bi-directional)

Toggles between unidirectional and bi-directional printing on the slip station. Unidirectional printing increases column alignment and provides higher quality printing. Printing is normally bi-directional because of the faster speed.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H55) & Chr\$(n)

## Select or Cancel 90 Degrees Clockwise Rotated Print

**ASCII:** ESC V *n*

**Hexadecimal:** 1B 56 *n*

**Decimal:** 27 86 *n*

**Value of *n*:** 0 = Cancel

1 = Set

**Default:** 0 (Cancel)

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is reset or the Clear Printer (0x10) command is received. See Summary of Rotated Printing in this chapter.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H56) & Chr\$(n)

**Select Print Color****ASCII:** ESC r *n***Hexadecimal:** 1B 72 *n***Decimal:** 27 114 *n***Value of *n*:** 0 = Black1 = 2<sup>nd</sup> Color**Default:** 0 (Black)

Selects color printing. Color printing is valid for only character. Graphics, logo, barcode are always printed in black.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H72) & Chr\$(n)

Exceptions:

The command is valid only for receipt station.

**Select or Cancel Upside Down Printing Mode****ASCII:** ESC { *n***Hexadecimal:** 1B 7B *n***Decimal:** 27 123 *n***Value of *n*:** 0 = Cancel

1 = Set

**Default:** 0 (Cancel)

Prints upside-down characters. The character order is inverted in the buffer so text is readable. The command remains in effect until the Rotated Print (1B 12) command is received. Only bit 0 is used. Bits 1-7 are not used. See Summary of Rotated Printing in this document for more information.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H7B) & Chr\$(n)

Exceptions:

The command is valid only at the beginning of a line.

The Rotated Print command (1B 12) cancels this command.

**Select Character Size****ASCII:** GS ! *n***Hexadecimal:** 1D 21 *n***Decimal:** 29 33 *n***Value of *n*:** 1 - 8 = vertical number of times normal font

1 - 8 = horizontal number of times normal font

**Range of *n*:** 00 - 07, 10 - 17, ... 70 - 77**Default of *n*:** 0

Selects the character height using bits 0 to 2 and selects the character width using bits 4 to 7, as follows:

**Character Width Selection**

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (two times width)
20	32	3 (three times width)
30	48	4 (four times width)
40	64	5 (five times width)
50	80	6 (six times width)
60	96	7 (seven times width)
70	112	8 (eight times width)

**Character Height Selection**

Hex	Decimal	Height
00	0	1 (normal)
01	1	2 (two times height)
02	2	3 (three times height)
03	3	4 (four times height)
04	4	5 (five times height)
05	5	6 (six times height)
06	6	7 (seven times height)
07	7	8 (eight times height)

This command is effective for all characters (except for HRI characters).

In Standard Mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90 degree clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.



In Page Mode, vertical and horizontal directions are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

The Select Print Mode (1B 21 *n*) command can also select or cancel double-width and double-height modes. However, the setting of the last received command is effective.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H21) & Chr\$(*n*)

Exceptions:

If *n* is out of the defined range, this command is ignored. This command is only valid for the receipt station.

This is only available in 7158 Native Mode.

## Select or Cancel White/Black Reverse Print Mode

**ASCII:** GS B *n*

**Hexadecimal:** 1D 42 *n*

**Decimal:** 29 66 *n*

**Value of *n*:** 0 = Off

**Range of *n*:** 1 = On(Only the lowest bit is used.)

**Default of *n*:** 0 – 255

0 (Off)

Turns on White/Black reverse printing mode. This command is only available in 7158 Native Mode. In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are formed by printing a black background. When the White/Black reverse printing mode is selected it is also applied to character spacing which is set by Right-Side Character Spacing (1B 20).

This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.

White/Black Reverse Print Mode does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by Horizontal Tab (09), Set Absolute Starting Position (1B 24...), and Set Relative Print Position (1B 5C).

White/Black reverse mode has a higher priority than Underline Mode. When Underline Mode is on and White/Black Reverse Print Mode is selected, Underline Mode is disabled, but not canceled.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H42) & Chr\$(*n*)

Exceptions:

This command is only valid on the receipt station.

This is only available in 7158 Native Mode.

### Select or Cancel Smoothing Mode

**ASCII:** GS b *n*

**Hexadecimal:** 1D 62 *n*

**Decimal:** 29 98 *n*

This command is ignored.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H62) & Chr\$(*n*)

### Select Superscript or Subscript Modes

**ASCII:** US ENQ *n*

**Hexadecimal:** 1F 05 *n*

**Decimal:** 31 05 *n*

**Value of *n*:** 0 = Normal character size

1 = Select subscript size

2 = Select superscript size

**Default:** 0 (normal size)

Turns superscript or subscript modes on or off. This attribute may be combined with other characters size settings commands ( 12, 13, 1B 21 *n*, 1D 21 *n*, ...)

This command is only available on the receipt station in 7158 Native Mode.

Example:

MSComm1.Output = Chr\$(&H1F) & Chr\$(&H05) & Chr\$(*n*)

Exceptions:

This command is ignored if *n* is out of the specified range.

This is only available in 7158 Native Mode.

## Summary of Rotated Printing

The table shows the combinations of Set/Cancel Upside-Down Print, Set/Cancel Rotated Print (clockwise), and Rotated Print (counterclockwise). Rotated CCW is mutually exclusive with the other two commands. Unintended consequences may result when rotated CCW is mixed with other commands.

The samples of the print show only the normal size characters. Double-wide and double-high characters are printed in the same orientation (double-high characters cannot be printed on the slip station). They may also be mixed on the same line.

Upside Down (1B 7B <i>n</i> )	Rotated CW (1B 56 <i>n</i> )	Rotated CCW (1B 12)	Resulting Output
Canceled	Canceled	Cleared	A B C
Canceled	Set	X	A B C
Set	Canceled	X	C B A
Set	Set	X	C B A
X	X	Set	A B C

**Note:** The following print modes cannot be mixed on the same line:

1. Standard and compressed pitch
2. Vertical (normal) and rotated
3. Right-side up and upside down
4. Single high (normal) and double high

## Graphics Commands

These commands are used to enter and print graphics data and are described in order of their hexadecimal codes.

### Print Raster Graphics

**ASCII:** DC1  $n1 \dots nk$

**Hexadecimal:** 11  $n1 \dots nk$

**Decimal:** 17  $n1 \dots n72$

**Value of  $n$ :**  $n1 \dots nk$  = Data bytes

**Range of  $n$ :** 0 - 255

**Value of  $k$ :**  $k = 72 : 80\text{mm}$ ,  $k = 53 : 58\text{mm}$

Prints one row of data.  $N1 \dots nk$  : bytes describing the line to print.

Example:

MSComm1.Output = Chr\$(&H11) & Chr\$(05) & Chr\$(255)

Exceptions:

Raster graphics is not available in Page Mode

This is only available in 7158 Native Mode.

**Download BMP Logo****ASCII:** ESC (+\*.BMP file data)**Hexadecimal:** 1B (+\*.BMP file data)**Decimal:** 27 (+\*.BMP file data)**Value:** Maximum width = 576

Maximum height = 512

Enters a BMP file data into RAM or Flash.

This command is used by sending the file data of a monochrome BMP file preceded by a 0 x 1B. The bit map is stored in the printer in the same manner as a down loaded bit image.

The downloaded BMP file can be printed by using the Print Downloaded Bit Image (1D 2F m) command.

Example:

1. MSComm1.Output = Chr\$(&H1B)
2. Open bitmapfile For Binary As filehandle
3. filecontent = Input(LOF(filehandle), filehandle)
4. MSComm1.Output = filecontent & vbCrLf
5. This last step is to use the print downloaded image command to print

Exceptions:

BMP file images that are not monochrome are ignored. This command is only valid for the receipt station.

This is only available in 7158 Native Mode.

Related Information:

See 1D 22 n (Select Memory Type to save logos.)

For the 7158 native mode of operation, if multiple logos are to be defined and used, this command should be preceded by the Select Current Logo command to define the number by which this downloaded logo is to be referenced.

**Select Bit Image Mode****ASCII:** ESC \* *m n1 n2 d1 ... dn***Hexadecimal:** 1B 2A *m n1 n2 d1 ... dn***Decimal:** 27 42 *m n1 n2 d1 ... dn*

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode.

See the illustration graphic representation of the bit image.

In 7156 Emulation Mode, slip graphics are only 7-bit (MSB not printed.) In 7158 Native Mode, slip graphics are 8-bit.

Values:

**Receipt Station**

Value of <i>m</i>	Mode	No. of Dots (Vertical)	No. of Dots (Horizontal)	Number of Dots/Line
0	8 Dot Single Density	8 (68 DPI)	0-288 (101DPI, 80mm) 0-212 (101DPI, 58mm)	8x288 (80mm) 8x212 (58mm)
1	8 Dot Double Density	8 (68 DPI)	0-576 (101DPI, 80mm) 0-424 (101DPI, 58mm)	8x576 (80mm) 8x424 (58mm)
32	24 Dot Single Density	24 (203 DPI)	0-288 (101DPI, 80mm) 0-212 (101DPI, 58mm)	24x288 (80mm) 24x212 (58mm)
33	24 Dot Double Density	24 (203 DPI)	0-576 (101DPI, 80mm) 0-424 (101DPI, 58mm)	24x576 (80mm) 24x424 (58mm)

<b><u>Slip Station</u></b>				
<b>Value of <math>m</math></b>	<b>Mode</b>	<b>No. of Dots** (Vertical)</b>	<b>No. of Dots (Horizontal)</b>	<b>Number of Dots/Line</b>
0	7 Dot Single Density	7 (72 DPI)	224 (69.5 DPI)	7 x 224
1*	7 Dot Double Density	7 (72 DPI)	448 (139 DPI)	7 x 448
32, 33	Not Available on Slip			

In single density, one byte (7 dots) is printed in each full dot column; in double density, one byte is printed in each half/full dot column.

\*Adjacent horizontal dots (overlapping dots) are not printed on the slip.

\*\*In 7158 Native Mode. There are 8 vertical dots.

<b>Value of <math>n</math> (8-Dot Single-Density Mode)</b>	<b>Value of <math>n</math> (24-Dot Single-Density Mode)</b>	<b>Value of <math>d</math></b>
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data*

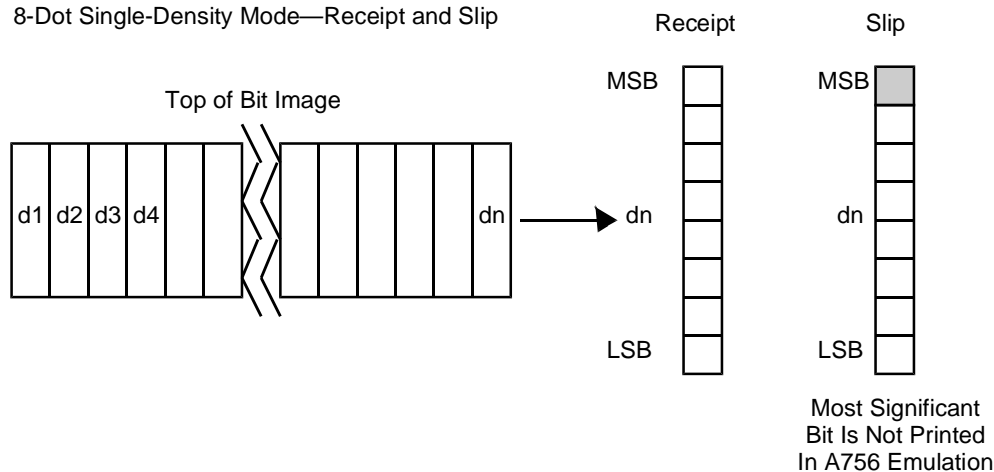
\*Printed left to right (8-dot mode); Printed down then across (24-dot mode).

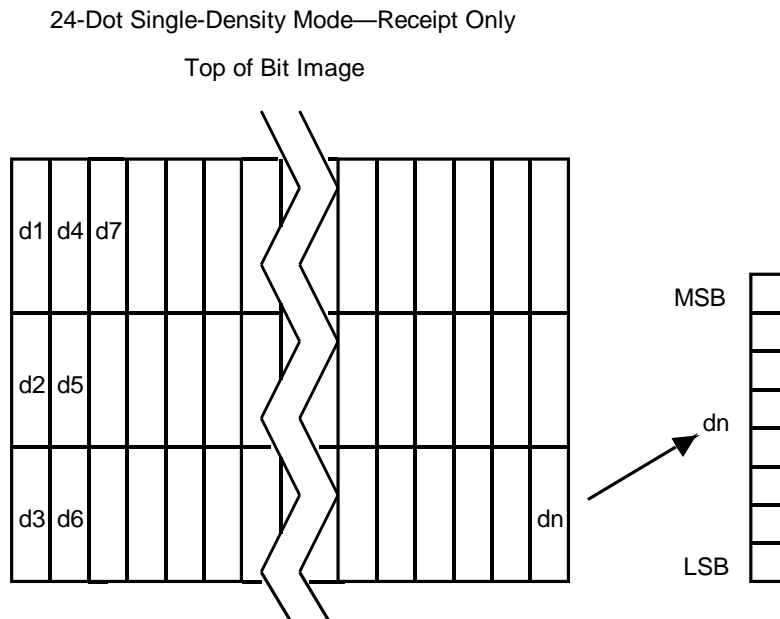
Formulas:

8 Dot Single Density      $n1 + (256 \times n2)$

24 Dot Single Density    $3 \times [n1 + (256 \times n2)]$

8-Dot Single-Density Mode—Receipt and Slip







**Print Advanced Raster Graphics****ASCII:**            *ESC . m n rl rh d1 ... dn***Hexadecimal:**    *1B 2E m n rl rh d1 ... dn***Decimal:**            *27 46 m n rl rh d1 ... dn***Value of *m*:**        Horizontal offset from left margin = 8 x *n* dots**Value of *n*:**        Number of data bytes that compose the raster**Value of *r*:**        Number of times the raster has to be printed = 256 x *rh* +  
*rl***Value of *d*:**        *d1 ... dn* = Data bytes**Range:**            0 • *m*, *n* • 72 (80mm), 0 • *m*, *n* • 53 (58mm)0 • *r* • 655360 • *d1 ... dn* • 255

Prints a horizontal raster of graphics data one or multiple times.

Horizontal offset and number of data bytes are variable and specified by parameters.

Example:

```
MSComm1.Output = Chr(&H1B) & Chr(&H2E) & Chr$(10) & Chr$(100) & Chr$(2) & Chr$(10) &
Chr(&HFF) ... & Chr(&HFF)
```

Exceptions:

Advanced Raster graphics is not available in Page Mode.

### Select Double-Density Graphics

**ASCII:** ESC Y  $n1\ n2\ d1\ \dots\ dn$  or ESC L  $n1\ n2\ d1\ \dots\ dn$   
**Hexadecimal:** 1B 59  $n1\ n2\ d1\ \dots\ dn$  or 1B 4C  $n1\ n2\ d1\ \dots\ dn$   
**Decimal:** 27 89  $n1\ n2\ d1\ \dots\ dn$  or 27 76  $n1\ n2\ d1\ \dots\ dn$

#### Value of $n$ :

Value of $n$ (8-Dot Single Density Mode)	Value of $n$ (24-Dot Single Density Mode)	Value of $d$
$n1 + (256 \times n2)$	$3 \times [n1 + (256 \times n2)]$	Number of Bytes of Data (Printed Down, Then Across)

Enters one line of 7 (slip in 7156 mode) or 8-dot double-density graphics into the print buffer. Any print command is required to print the line, after which the printer returns to normal processing mode. The number of bytes sent is represented by the formulas in the table.

Each bit corresponds to one horizontal dot. Compare to Set Bit Image Mode (1B 2A,  $m=1$ ) earlier in this document.

#### Exception:

1B 4C  $n1\ n2\ d1\ \dots\ dn$  is only valid in 7156 Emulation Mode.

### Select the Current Logo (Downloaded Bit Image)

**ASCII:** GS #  $n$

**Hexadecimal:** 1D 23  $n$

**Decimal:** 29 35  $n$

**Range of  $n$ :** 0 – 255

Selects a logo to be defined or printed. The active logo  $n$  remains in use until this command is sent again with a different logo  $n$ .

When this command precedes a logo definition, that definition is stored in Flash Memory as logo  $n$ . If there is already a different definition in Flash Memory for logo  $n$ , the first is inactivated and the new definition is used. The inactive definition is not erased from Flash and continues to take up space in Flash Memory.

When this command precedes a logo print command and  $n$  is different from the previously active logo selected, the printer retrieves the logo definition for  $n$  from Flash Memory and prints it. If there is no definition for logo  $n$ , then no logo is printed.

In the case of a previously existing application that expects only one possible logo, the printer will not receive the Select Current Logo (1D 23  $n$ ) command. In this case, the printer assigns 0 as the active logo identifier. It automatically stores any new logo definition in Flash Memory as logo 0, inactivating any previous logo 0 definition. If the Flash Memory space available for logos fills up with inactive logo 0 definitions, the

firmware erases the old definitions at the next power cycle. This is the only case in which the printer erases Flash Memory without an application command.

In the case of a new application using multiple logos, the Select Current Logo (1D 23 *n*) command is used. After that, the printer no longer automatically erases the logo definition Flash Memory page when it fills with multiple definitions. A new application using multiple logos, writing a user-defined character set into Flash Memory, or both, is responsible for erasing the logo and user-defined character set Flash Memory page when the logo area is full or before a new character set is defined.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H23) & Chr\$(*n*)

Exceptions:

This command is only valid for the receipt station. However, it will be processed correctly regardless of whether the receipt station is currently selected.

### Define Downloaded Bit Image

**ASCII:** GS \* *n1 n2 d1 ... dn*

**Hexadecimal:** 1D 2A *n1 n2 d1 ... dn*

**Decimal:** 29 42 *n1 n2 d1 ... dn*

**Value of *n1*:** See the following table.

**Value of *n2*:** See the following table.

**Value of *d*:** See the following table.

Value of <i>n1</i>	Value of <i>n2</i>	Value of <i>d</i>
1-72 (8 x <i>n1</i> = Number of Horizontal Dot Columns)	1-64 (Number of Vertical Bytes)*	Bytes of Data (Printed Down Then Across)

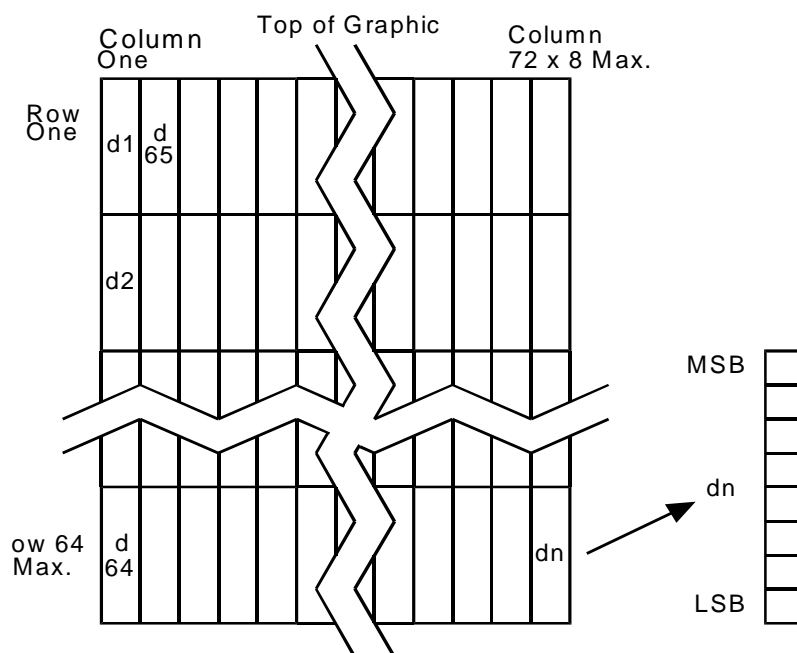
\*The number of bytes sent is represented by the following formula:

$n = 8 \times n1 \times n2$  (*n1* x *n2* must be less than or equal to 4608).

Enters a downloaded bit image (such as a logo) into RAM or Flash with the number of dots specified by *n1* and *n2* in 7156 Emulation, unless loaded into Flash. The downloaded bit image is available until power is turned off, another bit image is defined, or either Initialize Printer (1B 40), or Define User-Defined Character Set (1B 26), command is received.

By default, 7156 Emulation loads downloaded bit image to SRAM, while 7158 Native Mode loads them to Flash.

See the illustration on the following page for a graphic representation of the downloaded bit image.



#### Exceptions:

See the illustration for the Print Downloaded Bit Image command (1D 2F) for a representation of the bit image.

#### Related Information:

See 1D 22 n (Select Memory Type to store logos) and 1D 23 n (Select the Current Logo.)

For the 7158 native mode of operation, if multiple logos are to be defined and used, this command should be preceded by the Select Current Logo command to define the number by which this downloaded logo is to be referenced.

**Print Downloaded Bit Image**

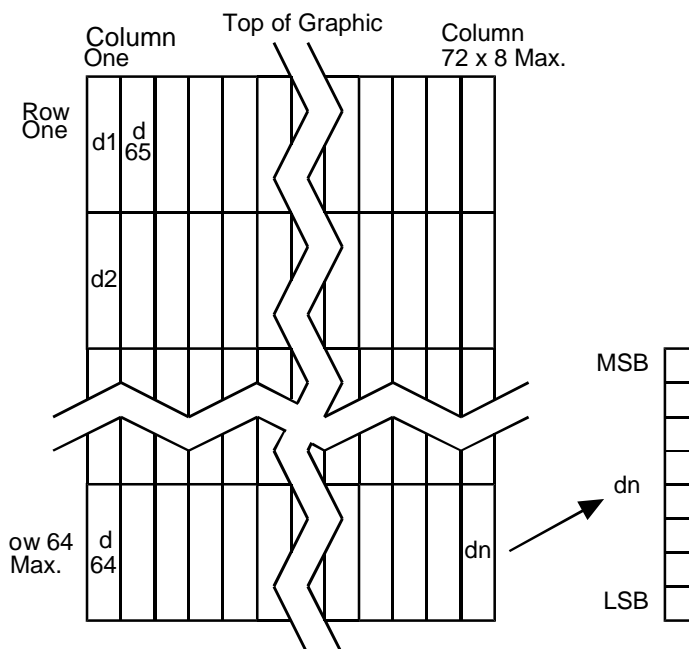
<b>ASCII:</b>	GS / <i>m</i>
<b>Hexadecimal:</b>	1D 2F <i>m</i>
<b>Decimal:</b>	29 47 <i>m</i>
<b>Value and Range of <i>m</i>:</b>	

Value of <i>m</i>	Print Mode	Vertical DPI <sup>1</sup>	Horizontal DPI*
0	Normal	203	203
1	Double Wide	203	101
2	Double High	101	203
3	Quadruple	101	101

<sup>1</sup>Dot density measured in dots per inch

Prints a downloaded bit image in RAM or Flash on the receipt station at a density specified by *m*. It is ignored if any data is in the print buffer, if the downloaded bit image is undefined, or if the data defined exceeds one line.

See the illustration for a representation of the bit image.



Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H2F) & Chr$(m)
```

Related Information:

See 1D 22 n (Select Memory Type to store logos) and 1D 23 n (Select the Current Logo.)

**Convert 6 Dots/mm Bitmap to 8 Dots/mm Bitmap****ASCII:** US EOT *n***Hexadecimal:** 1F 04 *n***Decimal:** 31 04 *n***Value:** 0 = Off

1 = On

**Default:** 0 (Off)

Selects or cancels 6 dot/mm in 7158 Emulation Mode.

When the 6 dot/mm emulation is selected, logos and graphics are expanded horizontally and vertically to emulate their size on a 6 dot/mm printer. The horizontal positioning commands also emulate positioning on a 6 dot/mm printer.

Example:

MSComm1.Output = Chr\$(&H1F) & Chr\$(&H04) & Chr\$(n)

Exception:

This command is available in 7158 Native Mode only.

## Status Commands

### Status Command Introduction

The 7167 has three methods of providing status to the application. These methods are through Batch Status Commands, Real Time Status Commands, and Auto Status Back. An application may use one or more of these methods to understand the current status of the printer. A brief description of each of these methods follows.

**Batch Status Commands** – These commands are sent to the printer and stored in the printer's buffer. Once the printer has processed all the previous commands these commands are processed and the proper status is returned to the application. In the event a condition causes the printer to go BUSY, it stops processing commands from the printer buffer. If a Batch Status Command remained in the buffer during this busy condition, it would not be processed. In fact, no Batch Commands are processed while the printer is in this state.

**Real-Time Commands** – These commands are sent to the printer and are NOT stored in the printer's buffer. Instead, they are acted on immediately (regardless of the printer's BUSY status) and their response (if any) is returned to the application. This gives the application the ability to query the printer when it is in a busy state in order to correct whatever fault has occurred.

**Auto Status Back** – This mechanism allows the application developer to program the printer to automatically respond with a four byte status when certain conditions in the printer change.

Please see the subsequent sections for a more detailed description of these status commands. At the end of this Status Commands section is a page entitled "Recognizing Data from the Printer". This describes how to interpret what command or setting (in the case of Auto Status Back) triggered a response from the printer.

### Batch Mode

For RS-232C printers, these commands enable the printer to communicate with the host computer following the selected handshaking protocol, either DTR/DSR or XON/XOFF. They are stored in the printer's data buffer as they are received, and are handled by the firmware in the order in which they are received.

When a fault occurs, the printer will go busy at the RS-232C interface and not respond to any of the Batch Mode Printer Status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal print head cool down, the printer will resume processing the data in its receive buffer.

**Transmit Peripheral Device Status****ASCII:** ESC u 0**Hexadecimal:** 1B 75 0**Decimal:** 27 117 0

	<u>Bit 0</u>	<u>Bit 1</u>
<b>Return Value:</b>	1 = Drawer 1 closed	1 = Drawer 2 closed
	0 = Drawer 1 open	0 = Drawer 2 open
	(Bits 2-7 are not used)	

Transmits current status of the cash drawers. One byte is sent to the host computer. In DTR/DSR protocol the printer waits for DSR = SPACE. If a drawer is not connected, the status will indicate it is closed.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H75) & Chr\$(&H0)



**Transmit Printer ID**ASCII GS I *n*Hexadecimal 1D 49 *n*Decimal 29 73 *n***Value of *n*** 1, 49 = Printer model ID

2, 50 = Type ID

3, 51 = ROM version ID

4, 52 = Logo definition

**Transmits the printer ID specified by *n* as follows:**

N	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID	NCR <u>7158</u>	0x28 ( <u>7158 Native Mode</u> )
1, 49	Printer model ID	NCR <u>7156</u>	0x26 ( <u>7156 Emulation</u> )
2, 50	Type ID	Installed options	Refer to the table below
3, 51	ROM version ID	ROM version	0x00
4, 52	Logo Definition	Logo Definition	Refer to table below

**Type ID (n=2)**

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No two-byte character code installed.
	On	01	1	Two-byte character code installed.
1	Off	00	0	No knife installed.
	On	02	2	Knife installed.
2	-	-	-	Undefined
3	Off	00	0	No MICR installed.
	On	08	8	MICR installed.
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off.

**Type ID (n=4)**

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No logo definition loaded by application.
	On	01	1	Logo loaded by application.
1	-	-	-	Undefined
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to Off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H49) & Chr\$(n)

**Transmit Printer ID, Remote Diagnostics Extension**

**ASCII:** GS I @ *n*

**Hexadecimal:** 1D 49 40 *n*

**Decimal:** 29 73 64 *n*

**Values of *n*:** Refer to table

**Range of *n*:** 32 – 255

(not all defined but reserved)

Performs the remote diagnostic function specified by *n*.

Eighteen remote diagnostic items are defined: eight printer ID items and ten printer tally items. A group of four remote diagnostic functions is assigned to each diagnostic item. Most of the diagnostic items are maintained in non-volatile memory (NVRAM), but some are maintained in read-only memory (ROM).

The table that follows describes the variables.

The first item group in the table includes an example of data to send and to receive. Data sent from the host to write to NVRAM must contain all digits required by the remote diagnostic item. All data must be ASCII. The printer returns all ASCII data. It is preceded by the parameter *n* to identify the diagnostic item and is followed by a Carriage Return (0D) to signify the end of the data.

The command performs the remote diagnostic function specified by *n* as described in the following table.

Value of <i>n</i>			Remote Diagnostic Item	Function
ASC	Hex	Dec		
Space	20	32	Serial #, 10 digit ASCII	Write to NVRAM Example, send 14 bytes to printer: GS I @ 0x20 1234567890
!	21	33	Serial # , 10 digit ASCII	Write to NVRAM, and print on receipt to verify Example, send 14 bytes to printer: GS I @ ! 1234567890 This will print on receipt: Serial # written: 1234567890
“	22	34	Serial #	Not available, cannot clear Serial # item
#	23	35	Serial #	Return Serial #, preceded by <i>n</i> to identify Printer returns 12 bytes in above example: #1234567890<CR>
\$	24	36	Class/model #, 15 digit ASCII	Write to NVRAM
%	25	37	Class/model #	Write to NVRAM, and print on receipt to verify
‘	27	39	Class/model #	Return Class/model #, returns 17 bytes
+	2B	43	Boot firmware part #, 12 digit ASCII	Return Boot firmware part #, returns 14 bytes
/	2F	47	Boot firmware CRC, 4 digit ASCII	Return Boot firmware CRC, returns 6 bytes
3	33	51	Flash firmware part #, 12 digit ASCII	Return Flash firmware part #, returns 14 bytes
7	37	55	Flash firmware CRC, 4 digit ASCII	Return Flash firmware CRC, returns 6 bytes
Ç	80	128	Receipt lines tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM Example, send 12 bytes to printer: GS I @ Ç00010000 To set receipt lines tally to 10,000
ü	81	129	Receipt lines tally	Write to NVRAM, and print on receipt to verify Example, send 12 bytes to printer: GS I @ ü00010000 This will print on receipt: Receipt tally written: 10,000
é	82	130	Receipt lines tally	Clear receipt lines tally to 0
â	83	131	Receipt lines tally	Return receipt lines tally, preceded by <i>n</i> to identify Printer returns 10 bytes in above example: â00010000<CR>

Value of <i>n</i>			Remote Diagnostic Item	Function
ASC	Hex	Dec		
ä	84	132	Knife cut tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
à	85	133	Knife cut tally	Write to NVRAM, and print on receipt to verify
á	86	134	Knife cut tally	Clear knife cut tally to 0
ç	87	135	Knife cut tally	Return knife cut tally, returns 10 bytes
ê	88	136	Slip character tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
ë	89	137	Slip character tally	Write to NVRAM, and print on receipt to verify
è	8A	138	Slip character tally	Clear slip character tally to 0
ï	8B	139	Slip character tally	Return slip character tally, returns 10 bytes
î	8C	140	MICR read tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
ì	8D	141	MICR read tally	Write to NVRAM, and print on receipt to verify
Ä	8E	142	MICR read tally	Clear MICR read tally to 0
Å	8F	143	MICR read tally	Return MICR read tally, returns 10 bytes
É	90	144	Hours on tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
æ	91	145	Hours on tally	Write to NVRAM, and print on receipt to verify
Æ	92	146	Hours on tally	Clear Hours on tally to 0
ô	93	147	Hours on tally	Return Hours on tally, returns 10 bytes
ù	97	151	Boot firmware version	Return Boot firmware version, returns 6 bytes
ú	A3	163	Flash firmware version	Return Flash firmware version, returns 6 bytes
ñ	A4	164	Flash cycles tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
Ñ	A5	165	Flash cycles tally	Write to NVRAM, and print on receipt to verify
ä	A6	166	Flash cycles tally	Clear Flash cycles cut tally to 0
ö	A7	167	Flash cycles tally	Return Flash cycles cut tally, returns 10 bytes

Value of <i>n</i>			Remote Diagnostic Item	Function
ASC	Hex	Dec		
¿	A8	168	Knife jams tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
ƒ	A9	169	Knife jams tally	Write to NVRAM, and print on receipt to verify
ƒ	AA	170	Knife jams tally	Clear Knife jams tally to 0
½	AB	171	Knife jams tally	Return Knife jams tally, returns 10 bytes
¼	AC	172	Cover openings tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
i	AD	173	Cover openings tally	Write to NVRAM, and print on receipt to verify
«	AE	174	Cover openings tally	Clear Cover openings tally to 0
»	AF	175	Cover openings tally	Return Cover openings tally, returns 10 bytes
■	B2	178	Max Temperature tally	Clear Max temp tally
	B3	179	Max Temperature tally	Return Max Temperature tally, returns 10 bytes
‡	B4	180	Slip lines tally, 8 digit ASCII numeric, max 99,999,999	Write to NVRAM
‡	B5	181	Slip lines tally	Write to NVRAM, and print on receipt to verify
‡	B6	182	Slip lines tally	Clear Slip lines tally to 0
π	B7	183	Slip lines tally	Return Slip Lines tally, returns 10 bytes

Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H49) & Chr$(&H40) & Chr$(n)
```

**Transmit Status****ASCII:** GS r *n***Hexadecimal** 1D 72 *n*

:

**Decimal:** 29 114 *n***Value of *n*:** 1, 49 = printer status

2, 50 = cash drawer status

3, 51 = slip paper status

4, 52 = Flash Memory status

Transmits the status specified by *n*. This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.

When DTR/DSR RS232C communications handshaking control is selected, the printer transmits the one byte response only when the host signal DSR indicates it is ready to receive data.

When XON/XOFF RS232C communications handshaking control is selected, the printer transmits the one byte response regardless of the host signal DSR.

When Auto Status Back (ASB) is enabled using the Enable/Disable Automatic Status Back command (1D 61), the status transmitted by this command (Transmit Status) and the ASB status must be differentiated according to the information found in Recognizing Data from the Printer. This is found in the Real Time Commands section of this document.

The status bytes to be transmitted are described in the following four tables.

**Printer Status ( $n = 1$  or  $n = 49$ )**

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	Off	00	0	Receipt paper adequate.
	On	01	1	Receipt paper low.
1	Off	00	0	Receipt paper adequate.
	On	02	2	Receipt paper low.
2	Off	00	0	Receipt paper present.
	On	04	4	Receipt paper exhausted.
3	Off	00	0	Receipt paper present.
	On	08	8	Receipt paper exhausted.
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	Slip leading edge sensor: paper present
	On	20	32	Slip leading edge sensor: no paper.
6	Off	00	0	Slip trailing edge sensor: paper present
	On	40	64	Slip trailing edge sensor: no paper.
7	Off	00	0	Not used. Fixed to off.

**Cash Drawer Status ( $n = 2$  or  $n = 50$ )**

Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	Off	00	0	One or both cash drawers open.
	On	01	1	Both cash drawers closed.
1	Off	00	0	One or both cash drawers open.
	On	02	2	Both cash drawers closed.
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

**Slip Paper Status ( $n = 3$  or  $n = 51$ )**

Value of Byte Returned	Slip Status
0	There is no more printing space on the current slip, or the slip paper is not selected.
1 to 8	<p>Remaining print area on the current slip, in number of lines, at the currently set line spacing, when the trailing edge sensor has become uncovered.</p> <p>Until the trailing edge sensor becomes uncovered the value reported will be 6, because there are at least 6 lines remaining.</p> <p>There can be 7 or 8 lines remaining when the slip line spacing has been set to less than 7.2 lines per inch.</p>

Flash Memory Status ( $n = 4$ or $n = 52$ )				
Bit	Off/On	Hex	Decimal	Status for Transmit Status
0	Off	00	0	Undefined. Fixed to off.
1	Off	00	0	Undefined. Fixed to off.
2	Off	00	0	User data storage write successful.
	On	04	4	User data storage write failed. Specified area not erased.
3	Off	00	0	Flash logo area adequate. Definition stored.
	On	08	8	Flash logo area not adequate for recent definition.
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	No thermal user-defined characters written to Flash
	On	20	32	Thermal user-defined characters written to Flash.
6	Off	00	0	No impact user-defined characters written to Flash.
	On	04	64	Impact user-defined characters written to Flash.
7	Off	00	0	Not used. Fixed to off.

**Range of  $n$ :**                      1 – 4  
    49 – 52

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H72) & Chr\$(n)

Exceptions:

When  $n$  is out of the specified range, the command is ignored.

## Send Printer Software Version

**ASCII:**                      US V

**Hexadecimal:**    1F 56

**Decimal:**                31 86

The printer returns 8 bytes containing the boot and Flash software version. The first 4 bytes returned are an ASCII string for the boot version. The second 4 bytes are an ASCII string for the boot version. Example: for 1.234.56(8bytes), the boot version is 1.23 and the Flash version is 4.56.

Example:

MSComm1.Output = Chr\$(&H1F) & Chr\$(&H56)



### Recognizing Data from the Printer

An application sending various Real Time and non-Real Time commands to which the printer responds can determine which command a response belongs to by the table below.

Responses to Transmit Peripheral Device Status (1B 75) and Transmit Paper Sensor Status (1B 76) are non-Real Time responses and will arrive in the order in which they were solicited.

Batch Mode Response		Response Recognized By:									
ASCII	HEX										
ESC u 0	1B 75 0	0	0	0	0	0	0	x	x		Binary
ESC v	1B 76	0	0	0	0	0	x	x	x		Binary
GS I n	1D 49 n	0	x	x	0	x	x	x	x		Binary
GS r n	1D 72 n	0	x	x	0	x	x	x	x		Binary

Real-Time Response		Response Recognized By:									
ASCII	HEX										
GS EOT n	1D 04 n	0	x	x	1	x	x	1	0		Binary
DLE EOT n	10 04 n	0	x	x	1	x	x	1	0		Binary
GS ENQ	1D 05	1	x	x	x	x	x	x	x		Binary
XON		0	0	0	1	0	0	0	1		Binary
XOFF		0	0	0	1	0	0	1	1		Binary

Auto Status Back (ASB)		Response Recognized By:									
ASB Byte 1											
ASB Byte 1		0	x	x	1	x	x	0	0		Binary
ASB Bytes 2-4		0	x	x	0	x	x	x	x		Binary

## 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):

1. Real Time Status Transmission (GS Sequence and DLE Sequence)
2. Real Time Request to Printer (GS Sequence and DLE Sequence)
3. Real Time Printer Status Transmission

The Batch Mode Printer Status commands are placed in the printer's data buffer as they are received and handled by the firmware in the order in which they are received. If the paper exhausts while printing data that was in the buffer ahead of the status command, the printer goes busy at the RS-232C interface and suspends processing the data in the buffer until paper is reloaded. This is true for all error conditions: knife home error, slip paper jam, thermal print head overheat, etc.

In addition, there is no way to restart the printer after a paper jam, or to cancel a slip waiting condition when using the Wait for Slip command.

The Real Time commands are implemented in two ways to correct these problems. Both implementations offer the same functionality; which one you choose depends on the current usage of your application.

### Preferred Implementation

For a new application the GS (1D) sequences are recommended to avoid possible misinterpretation of a DLE (0x10) sequence as a Clear Printer (0x10 0, ASCII DLE NUL) command.

An application using these GS (1D) sequences, does not need to distinguish for the printer between the new real time commands and the Clear Printer command. This implementation is ideal for an existing [7156](#) application that already uses the Clear Printer command or for a new application being developed.

### Alternate Implementation

The alternate implementation uses the DLE (0x10) sequences as implemented on other printers. An application using these DLE (0x10) sequences and the original [7156](#) Clear Printer command (0x10) must distinguish for the printer between the new real time commands and the Clear Printer command by adding a NUL (0x00) to the Clear Printer command.

An application using these DLE (0x10) sequences must also send the second byte of the sequence within 100 milliseconds of the first, to prevent the first byte being mistaken for a Clear Printer command.

### Rules for Using Real Time Commands

Three situations must be understood when using real time commands.

First, the printer executes the Real Time command upon receiving it and will transmit status regardless of the condition of the DSR signal.

Second, the printer transmits status whenever it recognizes a Real Time Status Transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data.

In this case the sequence will also be handled correctly as the graphics data it is intended to be when the graphics command is executed from the buffer.

Third, care must be taken not to insert a Real Time command into the data sequence of another command that consists of two or more bytes.

In this case the printer will use the real time command sequence bytes instead of the other command's parameter bytes when finally executing that other command from the buffer; the other command will NOT be executed correctly.

These three situations generally preclude use of standard DOS drivers for the serial communication ports when using real time commands.

### **Moving Data Through the Buffer**

Another consideration is that an application should take care not to let the buffer fill up with real time commands when the printer is busy at the RS-232C interface. A busy condition at the RS-232C interface can be determined by bit 3 of the response to 1D 05 or 1D 04 1 or 10 04 1. The reason for a particular busy condition can be determined by other responses to 1D 04 n or 10 04 n.

Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.

When the printer is busy due to an error condition, then data stops being processed out of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with real time commands.

When the DLE sequences are being used, the last byte stored when the buffer fills up could be the DLE code, with no room for the subsequent EOT or ENQ. When this lone DLE byte is finally processed out of the buffer it will be interpreted as a Clear Printer command.

Similarly, when the GS sequences are being used, the last byte stored when the buffer fills up could be the GS code, with no room for the subsequent EOT or ETX or ENQ. When this lone GS byte is finally processed out of the buffer it will use the next byte, whatever it is, as the second byte in its GS sequence.

To guard against this situation, an application should determine the cause of a busy condition and take appropriate action or pace further real time commands to avoid filling the buffer. There are a minimum of 256 bytes available in the printer's buffer when it goes busy.

**Real Time Status Transmission**

	<u>GS Sequence</u>	<u>DLE Sequence</u>
<b>ASCII:</b>	GS EOT <i>n</i>	DLE EOT <i>n</i>
<b>Hexadecimal:</b>	1D 04 <i>n</i>	10 04 <i>n</i>
<b>Decimal:</b>	29 4 <i>n</i>	16 4 <i>n</i>
<b>Value of <i>n</i>:</b>	GS/DLE Sequence	
	1 = Transmit printer status	
	2 = Transmit RS-232C busy status	
	3 = Transmit error status	
	4 = Transmit receipt paper status	
	5 = Slip paper status	

Transmits the selected one byte printer status specified by *n* in Real Time according to the following parameters. This command includes two sequences: GS and DLE and using either or will produce the same result.

Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H04) & Chr$(n)
```

Exceptions:

The command is ignored if *n* is out of range.

An application using the DLE sequence must send EOT within 100 milliseconds of DLE or the printer will misinterpret the DLE and execute a Clear Printer command. Avoid this possibility by using the 1D 04 *n* sequence, which is handled exactly the same as 10 04 *n*.

## Related Information:

**1 = Transmit Printer Status**

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	One or both cash drawers open
	On	04	4	Both cash drawers closed
3	Off	00	0	Not busy at the RS-232C interface
	On	08	8	Printer is Busy at the RS-232C interface
4	On	10	16	Fixed to On
5				Undefined
6				Undefined
7	Off	00	0	Fixed to Off

**2 = Transmit RS-232C Busy Status**

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Both receipt and cassette doors closed
	On	04	4	Receipt or cassette door open
3	Off	00	0	Paper Feed Button is not pressed
	On	08	8	Paper Feed Button is pressed
4	On	10	16	Fixed to On
5	Off	00	0	Printing not stopped due to paper condition
	On	20	32	Printing stopped due to paper condition
6	Off	00	0	No error condition
	On	40	64	Error condition exists in the printer
7	Off	00	0	Fixed to Off

**3 = Transmit Error Status**

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	No slip motor or flip jam
	On	04	4	Slip motor or flip jam occurred
3	Off	00	0	No knife error
	On	08	8	Knife error occurred
4	On	10	16	Fixed to On
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred
6	Off	00	0	Thermal print head temp./power supply voltage are in range
	On	40	64	Thermal print head temp./power supply voltage are out of range
7	Off	00	0	Fixed to Off

**4 = Transmit Receipt Paper Status**

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Receipt paper adequate
	On	04	4	Receipt paper low
3	Off	00	0	Receipt paper adequate
	On	08	8	Receipt paper low
4	On	10	16	Fixed to On
5	Off	00	0	Receipt paper present
	On	20	32	Receipt paper exhausted
6	Off	00	0	Receipt paper present
	On	40	64	Receipt paper exhausted
7	Off	00	0	Fixed to Off

**5 = Transmit Slip Paper Status**

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Slip paper selected
	On	04	4	Receipt paper selected
3	Off	00	0	Not waiting for slip
	On	08	8	Waiting for slip
4	On	10	16	Fixed to On
5	Off	00	0	Slip leading edge sensor: paper preset
	On	20	32	Slip leading edge sensor: no paper
6	Off	00	0	Slip trailing edge sensor: paper preset
	On	40	64	Slip trailing edge sensor: no paper
7	Off	00	0	Fixed to Off

**Real Time Request to Printer**

	<u>GS Sequence</u>		<u>DLE Sequence</u>
<b>ASCII:</b>	GS ETX <i>n</i>	or	DLE ENQ <i>n</i>
<b>Hexadecimal:</b>	1D 03 <i>n</i>	or	10 05 <i>n</i>
<b>Decimal:</b>	29 3 <i>n</i>	or	16 5 <i>n</i>
<b>Value of <i>n</i>:</b>	1 = Recover and restart		
	2 = Recover and clear buffers		
	3 = Cancel slip waiting		

The printer responds to a request from the host specified by *n*. This command includes two sequences: GS and DLE. The operations performed depend on the value of *n*, according to the following parameters.

***n* = 1:**

Restarts printing from the beginning of the line where an error occurred, after recovering from the error. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command. This sequence is ignored except when the printer is busy due to an error condition.

If the receipt is selected, this command will attempt recovery from a knife error. Other errors associated with the receipt, such as paper out or print head overheating, can be recovered from only by clearing the specific condition, such as loading paper or letting the print head cool down.

If the slip is selected, this command will attempt recovery from a slip motor or flip jam by re-homing the print head and waiting for a slip to be inserted before restarting the print. Other errors associated with the slip, such as cassette door open, can be recovered from only by clearing the specific condition, such as closing the cassette door.

**$n = 2$ :**

Recovers from an error after clearing the receive and print buffers. Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command. This sequence is ignored except when the printer is busy due to an error condition.

If the slip was selected when the error occurred, the receipt becomes selected when the buffers are cleared. When printing on the slip is to continue, the slip must be selected again.

The same error recovery possibilities exist as for  $n = 1$ .

**$n = 3$ :**

Cancels the slip waiting status. This sequence is ignored except when the printer is waiting for a slip to be inserted.

When slip waiting is canceled, the receive and print buffers are cleared and the receipt is selected. When printing on the slip is to continue, the slip must be selected again.

Example using the GS sequence:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H03) & Chr$(n)
```

**Exceptions:**

The command is ignored if  $n$  is out of range

An application using the DLE sequence must send ENQ within 100 milliseconds of DLE or the printer will misinterpret the DLE and execute a Clear Printer command. Avoid this possibility by using the 1D 03 n sequence that is handled exactly the same as 10 05 n.



**Real Time Printer Status Transmission****ASCII:** GS ENQ**Hexadecimal:** 1D 05**Decimal:** 29 5

Transmits one byte status of the printer in real time.

Value of Byte:

Bit	Status	Hex	Decimal	Function
0	Off	00	0	Receipt paper adequate
	On	01	1	Receipt paper low
1	Off	00	0	Receipt paper adequate
	On	02	2	Receipt paper low
2	Off	00	0	Both receipt and cassette doors closed
	On	04	4	Receipt or cassette door open
3	Off	00	0	Not busy at the RS-232C interface
	On	08	8	Printer is busy at the RS-232C interface
4	Off	00	0	One or both cash drawers open
	On	1	16	Both cash drawers closed
5	Off	00	0	Paper present at both slip sensors
	On	20	32	Paper not present at one or both slip sensors
6	Off	00	0	No error condition
	On	40	64	Error condition exists in the printer
7	On	00	0	Fixed to On

Example:

```
MSComm1.Output = Chr(&H1D) & Chr(&H05)
```

## Auto Status Back Commands

### Select or Cancel Automatic Status Back

**ASCII:** GS a *n*

**Hexadecimal:** 1D 61 *n*

**Decimal:** 29 97 *n*

**Value of *n*:** Status of ASB

Enables or disables automatic status back (ASB) and specifies the status items. This command is a batch mode command; that is, it is processed after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and changing the ASB response, depending on the receive buffer status.

If any of the status items listed are selected, ASB is enabled and the printer automatically transmits 4 status bytes whenever the selected status changes. If no status is selected, ASB is disabled. All four status bytes are transmitted without checking DSR.

If the error status is enabled, a change in the following conditions will trigger the ASB:

1. Cash Drawer
2. Receipt Cover
3. Knife Error
4. Out-of-Range Print head Temperature
5. Out-of-Range Voltage
6. Paper Exhaust Status
7. Slip Paper

The bits of *n* are defined in the table.

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Cash drawer status disabled.
	On	01	1	Cash drawer status enabled.
1	Off	00	0	RS-232C Busy status disabled.
	On	02	2	RS-232C Busy status enabled.
2	Off	00	0	Error status disabled.
	On	04	4	Error status enabled.
3	Off	00	0	Receipt paper roll status disabled.
	On	08	8	Receipt paper roll status enabled.
4	-	-	-	Undefined
5	Off	00	0	Slip detector, slip paper status disabled.
	On	20	32	Slip detector, slip paper status enabled.
6	-	-	-	Undefined
7	-	-	-	Undefined

**Default:** 0 (ASB disabled)

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H61) & Chr\$(n)

Exceptions

If  $n = 0$ , ASB is disabled.

Related Information

When Auto Status Back (ASB) is enabled using this command, the status transmitted by other commands and the ASB status are differentiated according to the information found in Recognizing Data from the printer, (in the Real Time Commands section in this chapter). The status bytes to be transmitted are described in the following four tables.

*Byte 1* = printer information

*Byte 2* = error information

*Byte 3* = paper sensor information

*Byte 4* = paper sensor information

First Byte (Printer Information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to off.
1	Off	00	0	Not used. Fixed to off.
2	Off	00	0	One or both cash drawers open.
	On	04	4	Both cash drawers closed.
3	Off	00	0	Not Busy at the RS232C interface.
	On	08	8	Printer is Busy at the RS232C interface.
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Receipt cover closed.
	On	20	32	Receipt cover open.
6	Off	00	0	Paper Feed Button is not pressed.
	On	40	64	Paper Feed Button is pressed.
7	Off	00	0	Not used. Fixed to off.

**Second Byte (Error information)**

Bit	Off/On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined
1	-	-	-	Undefined
2	Off	00	0	No Mechanical Error
	On	04	4	Mechanical Error Occurred
3	Off	00	0	No knife error.
	On	08	8	Knife error occurred.
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	No unrecoverable error.
	On	20	32	Unrecoverable error occurred.
6	Off	00	0	No recoverable error occurred
	On	40	64	Recoverable error occurred: Receipt cover open Cassette cover open Receipt paper exhausted Thermal print head temp out of range. Power supply voltage out of range.
7	Off	00	0	Not used. Fixed to off.

**Third Byte (Paper Sensor Information)**

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Receipt paper adequate
	On	01	1	Receipt paper low
1	Off	00	0	Receipt paper adequate
	On	02	2	Receipt paper low
2	Off	00	0	Receipt paper present.
	On	04	4	Receipt paper exhausted.
3	Off	00	0	Receipt paper present
	On	08	8	Receipt paper exhausted
4	Off	00	0	Not used. Fixed to off.
5	Off	00	0	Slip leading edge sensor: paper present
	On	20	32	Slip leading edge sensor: no paper
6	Off	00	0	Slip trailing edge sensor: paper preset
	On	40	64	Slip trailing edge sensor: no paper.
7	Off	00	0	Not used. Fixed to off.

Fourth Byte (Paper Sensor Information)				
Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Slip paper selected
	On	01	1	Receipt paper selected
1	Off	00	0	Possible to print in slip
	On	02	2	Not possible to print on slip because no form has been inserted
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

## Bar Code Commands

These following describes the commands for the printing of bar codes and described in the order of their hexadecimal codes.

**Note:** 7156 firmware can be set for module widths in bar codes ranging from 2 dots to 4 dots per module (DPM) for the narrow modules. The default is 3 DPM. 7158 firmware ranges from 1 dot per module to 5 dots per module (DPM) printed on the receipt. The default is 2 DPM.

### Select Printing Position for HRI Characters

**ASCII:** GS H *n*

**Hexadecimal:** 1D 48 *n*

**Decimal:** 29 72 *n*

**Value of *n*:** Printing position

0 = Not printed

1 = Above the bar code

2 = Below the bar code

3 = Both above and below the bar code

**Default:** 0 (Not printed)

Prints HRI (Human Readable Interface) characters above or below the bar code.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H48) & Chr\$(n)

### Select Pitch for HRI Characters

**ASCII:** GS f *n*

**Hexadecimal:** 1D 66 *n*

**Decimal:** 29 102 *n*

**Value of *n*:** Pitch

0 = Standard Pitch at 15.2 CPI on receipt

1 = Compressed Pitch at 19 CPI on receipt

**Default:** 0 (Standard Pitch at 15.2 CPI)

Selects standard or compressed font for printing Bar Code characters.

When slip is selected as the interface, HRI is always compressed.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H66) & Chr\$(*n*)

### Select Bar Code Height

**ASCII:** GS h *n*

**Hexadecimal:** 1D 68 *n*

**Decimal:** 29 104 *n*

**Value of *n*:** Number of dots

**Range of *n*:** 1 - 255

**Default:** 162

Sets the bar code height to *n* dots or *n*/8 mm (*n*/203 inch) for receipt or *n*/8.5 mm (*n*/216 inch) for slip.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H68) & Chr\$(*n*)

**Print Bar Code**

	<u>First Variation</u>		<u>Second Variation</u>
<b>ASCII:</b>	GS k <i>m d1...dk</i> NUL	or	GS k <i>m n d1...dn</i>
<b>Hexadecimal:</b>	1D 6B <i>m d1...dk</i> 00	or	1D 6B <i>m n d1...dn</i>
<b>Decimal:</b>	29 107 <i>m d1...dk</i> 0	or	29 107 <i>m n d1...dn</i>

0 = End of command.

**Values:**

First Variation: String terminated with NUL Character

*m* = 0 - 6, 10

*d* = 32 - 126 (see the table)

*n* = 1 - 255 (see the table)

Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the barcode is not printed.

There are two variations to this command. The first variation uses a NUL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 bar code, which can accept a NUL character as part of the data. With the second variation the length of byte is specified at the beginning of the string.

Fixed-length codes can be aligned left, center, or right using the Align Positions command (1B 61). Variable-length codes are always center aligned in [7156 Emulation](#).

The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/Stop characters are added for Code 39 if they are not included.



m	Bar Code	D	n, Length
0	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
1	UPC-E	48- 57	Fixed Length: 11, 12
2	JAN13 (EAN13)	48- 57	Fixed Length: 12, 13
3	JAN8 (EAN8)	48- 57	Fixed Length: 7, 8
4	Code 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) $d1 = dk = 42$ (start/stop code is supplied by printer if necessary)	Variable Length
5	Interleaved 2 of 5 (ITF)	48- 57	Variable Length (Even Number)
6	CODABAR (NW-7)	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable Length
10	PDF 417 (7158 Native Mode)	1-255	Variable Length <u>7158 Native Mode</u>

Second Variation: Length of Byte Specified at Beginning of String

$m =$  65 - 73, 75 (see the table)

$d =$  0 - 127 (see the table)

$n =$  1 - 255 (see the table)

The value of  $m$  selects the bar code system as described in the table. When data is present in the print buffer, the printer processes the data following  $m$  as normal data.

The variable  $d$  indicates the character code to be encoded into the specified bar code system. See the table. If character code  $d$  cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

m	Bar Code	D	n, Length
65	UPC-A	48- 57 (ASCII numerals)	Fixed Length: 11, 12
66	UPC-E	48- 57	Fixed Length: 11, 12
67	JAN13 (EAN13)	48- 57	Fixed Length: 12, 13
68	JAN8 (EAN8)	48- 57	Fixed Length: 7, 8
69	CODE 39	48- 57, 65- 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) <i>d1 = dn = 42</i> (start/stop code is supplied by printer if necessary)	Variable
70	Interleaved 2 of 5 (ITF)	48- 57	Variable (Even Number)
71	CODABAR (NW-7)	65- 68, start code 48- 57, 36, 43, 45, 46, 47, 58	Variable
72	Code 93	0 - 127	Variable (7158 Native Mode only)
73	Code 128	0-105 <i>d1 = 103-105</i> (must be a Start code) <i>d2 = 0-102</i> (data bytes) (Stop code is provided by the printer)	Variable
75	PDF417	0 – 255	Variable Length (7158 Native Mode only)

Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H6B) & Chr$(m) & "123456789012" & Chr$(0)
```

The above command will print the number above or below the bar code, depending on which parameter for m that specify.

**Exceptions:**

Illegal data cancels this command.

The command is valid only at the beginning of a line.

PDF 417 format cannot be printed on the slip.

Barcodes on the Slip are always right justified.

PDF417 and Code 93 are only available in 7158 Native Mode.

**Select Bar Code Width****ASCII:** GS w *n***Hexadecimal:** 1D 77 *n***Decimal:** 29 119 *n***Value of *n*:** 1, 2, 3, 4, 5**Default:** 3 for receipt; 2 for slip

Sets the bar code width to *n* dots.

**Formulas:**

$n + 1/8$  mm ( $n + 1/203$  inch) for receipt,  $n + 1/5.7$  mm ( $n + 1/144$  inch) for slip.

Slip module sizing: *n* must be even (it is rounded up if odd) and the size of modules is  $n + 1/5.7$  mm ( $n + 1/144$  inch).

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H77) & Chr\$(*n*)

## Page Mode Commands

Page Mode is one of two modes, which the 7158 printer uses to operate. Standard Mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page Mode is different in that it processes or prepares the data as a “page” in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. Once the printer receives the (0x0C) command, it prints the page and returns the printer to Standard Mode.

The Select Page Mode command (1B 4C) puts the printer into Page Mode. Any commands that are received are interpreted as Page Mode commands. Several commands react differently when in Standard Mode and Page Mode. The descriptions of these individual commands in this chapter indicate the differences in how they operate in the two modes.

### Limitations

Page mode is only implemented on the receipt station in 7158 Native Mode only.

### Print and Return to Standard Mode

**ASCII:** FF

**Hexadecimal:** 0C

**Decimal:** 12

The processed data is printed and the printer returns to Standard Mode. The developed data is deleted after being printed. This command has the same code as the Print and Eject Slip command, which is executed when the printer is not in Page Mode.

Example:

```
MSComm1.Output = Chr$(&H0C)
```

Exceptions:

This command is enabled only in Page Mode.

**Cancel Print Data in Page Mode****ASCII:** CAN**Hexadecimal:** 18**Decimal:** 24

Deletes all the data to be printed in the “page” area. Any data from the previously selected “page” area that is also part of the current data to be printed is deleted.

This command has the same code as the Open Form command, which is performed when the printer is not in Page Mode.

Example:

```
MSComm1.Output = Chr$(&H18)
```

Exceptions:

This command is only used in Page Mode.

**Print Data in Page Mode****ASCII:** ESC FF**Hexadecimal:** 1B 0C**Decimal:** 27 12

Collectively prints all buffered data in the printing area.

After printing, the printer does not clear the buffered data and sets values for Select Print Direction in Page Mode (1B 54 n) and Set Print Area in Page Mode (1B 57...), and sets the position for buffering character data.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H0C)
```

Exceptions:

This command enabled only in Page Mode.

**Select Page Mode****ASCII:** ESC L**Hexadecimal:** 1B 4C**Decimal:** 27 76

Switches from Standard Mode to Page Mode. After printing has been completed either by the Print and Return to Standard Mode (FF) command or Select Standard Mode (1B 53) the printer returns to Standard Mode. The developed data is deleted after being printed.

This command sets the position where data is buffered to the position specified by Select Print Direction in Page Mode (1B 54) within the printing area defined by Set Print Area in Page Mode (1B 57).

This command switches the settings for the following commands (which values can be set independently in Standard Mode and Page Mode) to those for Page Mode.

1. Set Right-Side Character Spacing (1B 20)
2. Select 1/6-Inch Line Spacing (1B 32)
3. Set Line Spacing (1B 33)
4. It is possible only to set values for the following commands in Page Mode. These commands are not executed.
5. Select or Cancel 90 Degree Clockwise Rotation (1B 56)
6. Select Justification (1B 61)
7. Select or Cancel Upside Down Printing (1B 7B).
8. Set Left Margin (1D 4C)
9. Set Print Area Width (1D 57)

Example:

```
MSComm1.Output = Chr(&H1B) & Chr(&H4C)
```

Exceptions:

The command is enabled only when input at the beginning of a line.

The command is available only when the receipt is selected by Select Paper (1B 63 30).

The command has no effect if Page Mode has previously been selected.

The Select Paper (1B 63 30) command can not be used in Page Mode.

In 7156 Emulation Mode, (1B 4C...) is used for double density graphics.

**Select Standard Mode****ASCII:** ESC S**Hexadecimal:** 1B 53**Decimal:** 27 83

Switches from Page Mode to Standard Mode. In switching from Page Mode to Standard Mode, data buffered in Page Mode is cleared, the printing area set by Set Print Area in Page Mode (1B 57) is initialized and the print position is set to the beginning of the line.

This command switches the settings for the following commands (the values for these commands can be set independently in Standard Mode and Page Mode) to those for Standard Mode:

1. Set Right-Side Character Spacing (1B 20)
2. Select 1/6 Inch Line Spacing (1B 32)
3. Set Line Spacing (1B 33)

Standard Mode is automatically selected when power is turned on, the printer is reset, or the Initialize Printer command (1B 40) is used.

Example:

```
MSComm1.Output = Chr(&H1B) & Chr(&H53)
```

Exceptions:

This command is effective only in Page Mode.

## Select Print Direction in Page Mode

**ASCII:** ESC T *n*

**Hexadecimal:** 1B 54 *n*

**Decimal:** 27 84 *n*

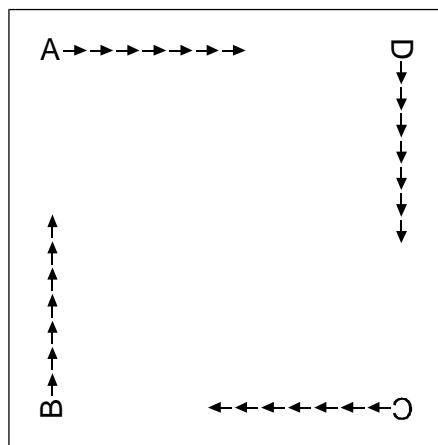
**Value of *n*:** Start position

- 0 Upper left corner proceeding across page to the right (A)
- 1 Lower left corner proceeding up the page (B)
- 2 Lower right corner proceeding across page to the left (upside down) (C)
- 3 Upper right corner proceeding down page (D)

A, B, C and D note the direction of of print. See illustration.

Selects the printing direction and start position in Page Mode. See the illustration.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed by the Eject Slip command (0C).



**Default:** 0 (Upper left corner proceeding across page to the right)

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H54) & Chr\$(n)

Exceptions:

This command is valid only in Page Mode.

This command is ignored if the value of *n* is out of the specified range.



**Set Printing Area in Page Mode****ASCII:** ESC W *n1, n2 ...n8.*]**Hexadecimal:** 1B 57 *n1, n2 ...n8]***Decimal:** 27 87 *n1,n2 ...n8]***Range:** 0 - 255**Default:** *n1-4 = 0**n5 = 64**n6 = 2**n7 = 64**n8 = 2*

Sets the position and size of the printing area in Page Mode.

The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed by the Eject Slip command (0C).

Defaults equal an origin of 0,0 and a size of 576x576. This command is allowed in any mode.

**Formulas:**

The starting position of the print area is the upper left of the area to be printed (x0, y0). The length of the area to be printed in the y direction is set to dy inches. The length of the area to be printed in the x direction is set to dx inches. Use the equations to determine the Value of x0, y0, dx, and dy.

See the illustration for a graphic representation of the printing area. For more information about the fundamental calculation pitch, see the Set Fundamental Calculation Pitch command (1D 50).

1.  $x0 = [(n1 + n2 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$
2.  $y0 = [(n3 + n4 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$
3.  $dx = [(n5 + n6 \times 256) \times (\text{horizontal direction of the fundamental calculation pitch})]$
4.  $dy = [(n7 + n8 \times 256) \times (\text{vertical direction of the fundamental calculation pitch})]$
5. Keep the following notes in mind for this command.
6. The fundamental calculation pitch depends on the vertical or horizontal direction.
7. The maximum printable area in the x direction is 576/203 inches.
8. The maximum printable area in the y direction is 2000/203 inches.

First the printer must be set to page mode, then the following command should be sent.

Example:

```
MSComm1.Output = Chr$(&H1B) & Chr$(&H57) & Chr$(&H40) & Chr$(&H0) & Chr$(&H40) &
Chr$(&H0) & Chr$(&H40) & Chr$(&H1) & Chr$(&H40) & Chr$(&H1)
```

Exception:

This command is effective only in Page Mode.

## Set Absolute Vertical Print Position in Page Mode

**ASCII:** GS \$ *nL nH*

**Hexadecimal:** 1D 24 *nL nH*

**Decimal:** 29 36 *nL nH*

**Formulas:**

$[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$  inches.

Sets the absolute vertical print starting position for buffer character data in Page Mode.

The vertical or horizontal motion unit for the paper roll is used and the horizontal starting buffer position does not move.

The reference starting position is set by Select Print Direction in Page Mode (1B 54). This sets the absolute position in the vertical direction when the starting position is set to the upper left or lower right; and sets the absolute position in the horizontal direction when the starting position is set to the upper right or lower left. The horizontal and vertical motion unit are specified by the Set Horizontal and Vertical Minimum Motion Units (1D 50) command.

The Set Horizontal and Vertical Minimum Motion Units (1D 50) command can be used to change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H24) & Chr$(nL) & Chr$(nH)
```

Exceptions:

This command is effective only in Page Mode. If the  $[(nL + nH \times 256) \times (\text{vertical or horizontal motion unit})]$  exceeds the specified printing area, this command is ignored.

## Set Relative Vertical Print Position in Page Mode

**ASCII:** GS \ *nL nH*

**Hexadecimal:** 1D 5C *nL nH*

**Decimal:** 29 92 *nL nH*

Sets the relative vertical print starting position from the current position. This command can also change the horizontal and vertical motion unit. The unit of horizontal and vertical motion is specified by this command.

This command functions as follows, depending on the print starting position set by Select Print Direction in Page Mode (1B 54):

When the starting position is set to the upper left or lower left of the printing area, the vertical motion unit (*y*) is used.

When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit (*x*) is used.

**Value:**

The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement amount, and must be in even units of the minimum horizontal movement amount.

**Formulas:**

The distance from the current position is set to [(*nL* + *nH* x 256) x vertical or horizontal motion unit] inches. The amount of movement is calculated only for the receipt.

When pitch *n* is specified to the movement downward:

$$nL + nH \times 256 = n$$

When pitch *n* is specified to the movement upward (the negative direction), use the complement of 65536.

When pitch *n* is specified to the movement upward:

$$nL + nH \times 256 - 65536 = N$$

**Exceptions:**

This command is used only in Page Mode, otherwise it is ignored.

Any setting that exceeds the specified printing area is ignored.

**Example:**

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H5C) & Chr\$(*nL*) & Chr\$(*nH*)

## Macro Commands

These commands are used to select and perform a user-defined sequence of printer operations.

### Start or End Macro Definition

**ASCII:** GS :

**Hexadecimal:** 1D 3A

**Decimal:** 29 58

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition. The macro definition is cleared, during definition of the macro, when the Execute Macro (1D 5E) command is received.

Normal printing occurs while the macro is defined. When the power is turned on the macro is not defined.

The defined contents of the macro are not cleared by the Initialize Printer (1B 40), thus, the Initialize Printer (1B 40) command may be used as part of the macro definition.

If the printer receives a second Select or Cancel Macro Definition (1D 3A) command immediately after previously receiving a Select or Cancel Macro Definition (1D 3A) the printer remains in the macro undefined state.

#### **Formulas:**

The contents of the macro can be defined up to 2048 bytes.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H3A)

Exceptions:

If the macro definition exceeds 2048 bytes, excess data is not stored.

This command is available in 7158 Native Mode only.

**Execute Macro****ASCII:** GS ^ *r t m***Hexadecimal:** 1D 5E *r t m***Decimal:** 29 94 *r t m***Value of *r*:** The number of times to execute the macro.**Value of *t*:** The waiting time for executing the macro.**Value of *m*:** Macro executing mode

0 (Bit0): The Macro executes *r* times continuously with waiting time specified by *t*.

1 (Bit0): The printer waits for feed button to be pressed after waiting for the period specified by *t*. If the button is pressed, the printer executes the macro once. The printer repeats the operation *r* times.

Executes a macro. After waiting for a specified period the LED indicators blink and the printer waits for the Paper Feed Button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation the number of specified times.

When the macro is executed by pressing the Paper Feed Button (*m* = 1), paper cannot be fed by using the Paper Feed Button.

**Formulas:**

The waiting time is  $t \times 100$  msec for every macro execution.

*m* specifies macro executing mode when the LSB (Least significant bit) *m* = 0

The macro executes *r* times continuously at the interval specified by *t* when the LSB (Least significant bit) of *m* = 1.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H5E) & Chr\$(*r*) & Chr\$(*t*) & Chr\$(*m*)

Exceptions:

If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.

If the macro is not defined or if *r* is 0, nothing is executed.

This command is available in 7158 Native Mode only.

## MICR Commands

### MICR Reading

These commands control the Magnetic Ink Character Recognition (MICR) check reader, including how it parses the character strings on checks.

The section, MICR Parsing, describes how to create a parsing format and how to create and maintain an Exceptions table.

### Read MICR Data and Transmit

**ASCII:** ESC w 1

**Hexadecimal:** 1B 77 01

**Decimal:** 27 119 1

**Default:** All data returned

Reads and transmits the MICR data and adds a Carriage Return (0x0D). If no parsing format is selected with either of the Define Parsing Format commands (see below), all data will be returned, which is the default.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H77) & Chr\$(&H01)

### Reread MICR Data

**ASCII:** ESC w R

**Hexadecimal:** 1B 77 52

**Decimal:** 27 119 82

Resends the previously decoded MICR data to the host.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H77) & Chr\$(&H52)

## MICR Parsing

This section describes MICR parsing in detail and includes several examples of useful parsing variations. It also describes how to create a parsing format and how to create and maintain an exception table.

### Define Parsing Format, Save in NVRAM

**ASCII:** ESC w P *d1 d2 ... dn CR*

**Hexadecimal:** 1B 77 50 *d1 d2 ... dn 0D*

**Decimal:** 27 119 80 *d1 d2 ... dn 13*

Defines and saves parsing format. See Parsing Parameter String Options in this document. Send with this command the parse data that is to be the default parse string at printer power-up. If no parameters are selected, parsing is not performed.

*d1* through *dn* are the parse string. The string must be CR terminated. If the string has invalid characters in it or is too long, the printer will store a null string, and raw MICR data will be returned.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H77) & Chr\$(&H70) ??????

### Define Parsing Format, Do Not Save Permanently

**ASCII:** ESC w p *d1 d2 ... dn CR*

**Hexadecimal:** 1B 77 70 *d1 d2 ... dn CR*

**Decimal:** 27 119 112 *d1 d2 ... dn CR*

Defines, but does not save parsing format. See Parsing Parameter String Options in this document. Send this command as often as desired to change the previous parse format string. The data sent with 1B 77 50 will be restored at power-up.

*d1* through *dn* are the parse string. The string must be CR terminated. If the string has invalid characters in it or is too long, the printer will store a null string, and raw MICR data will be returned.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H77) & Chr\$(&H70) ??????

Exceptions:

If no parameters are selected, parsing is not performed.

## Parsing Parameter String Options

### Variable Length Fields

Variable Length Field Name	Selector	Comments
Transit Number	T	Full 9 digit routing/transit number
Bank Number	B	Digits 4-8 of transit number
Check Digit	D	Digit 9 of transit number
Account Number	A	
Check Serial Number	C	Separate from account number
Amount	\$	This field may not be present or readable

### Variable Length Field Optional Modifiers

Variable Length Field Optional Modifiers	Selector	Comments
Zero fill to length	0	ASCII zero preceding maximum length
Maximum length	nn	1- or 2-digit ASCII number
Remove space/dash	X	
Replace space/dash with 0	x	

### Examples of Variable Length Field Format Specifications

Account #, all characters in the field, keep spaces and dashes	A
Account #, all characters in the field, replace spaces and dashes	xA
Account #, maximum 12 characters, keep spaces and dashes	12A
Account #, always 12 characters zero filled, remove spaces and dashes	012XA

### Other Parameters

Error Number	E	One Digit Returned
	0	Read OK
	1	Read error: bad character, empty field invalid length, check digit invalid
Status	S	Two Digits Returned
	00	No error
	01	No MICR data
	09	Mexican check
	08	Canadian check
	05	Error in transit number
	07	Error in account number
	04	Error in check serial number
	10	Business or commercial check
	11	Amount field present



Field Separator 'x'		
Field separator preceded by a single quote, so a field separator of the letter A would be sent as 'A (0x27 0x41).		
If a Carriage Return is specified as a separator (0x27 0x0D), a final Carriage Return must still terminate the parsing parameter string.		
Country Code	Un	One Digit Returned
	N	returned if US check
	Nothing	returned if not US check
Country Code	Km	One Digit Returned
	M	returned if Canadian check
	Nothing	returned if not Canadian check
Check Type	L	One Digit Returned
	1	Personal check
	2	Business or commercial check

Ten parameters are more than enough to specify all variable length fields with a field separator each and other status information that may be helpful to an application. More than 10 parameters are not recommended because they use up space in non-volatile memory (NVRAM) available for the exception table.

The parsing parameter string is stored packed in NVRAM starting at word 10, with the total byte length stored in the high order byte of word 10. While most parameters take two bytes of NVRAM, the following parameters take only one byte: B, D, E, S, L. None of the parsing examples in the following section take more than 14 bytes (seven words) of NVRAM.

The exception table starts at word 20. If the parsing parameter string extends into word 20, then the first exception table entry is unavailable.

## Sample Parsing Formats

The following strings show various sample formats that you can use assuming they meet your parsing format needs. Included with the sample format is a description of the data that is returned to the application.

### **ESC w p 18 A <CR>**

Maximum 18 characters in the account number

Final Carriage Return

### **ESC w p 18 X A <CR>**

Maximum 18 characters in the account number with spaces and dashes removed

Final Carriage Return

### **ESC w p 18 x A <CR>**

Maximum 18 characters in the account number with spaces and dashes replaced with 0

Final Carriage Return

### **ESC w p 018 A <CR>**

Always 18 characters in the account number (high order zero-filled if necessary)

Final Carriage Return

### **ESC w p 018 X A <CR>**

Always 18 characters in the account number with spaces and dashes removed

Final Carriage Return

### **ESC w p 018 x A <CR>**

Always 18 characters in the account number with spaces and dashes replaced with 0

Final Carriage Return

### **ESC w p T 18 X A 04C <CR>**

All characters in the transit number

All characters in the account number (up to 18) with spaces and dashes removed

Always four characters in the check number (zero-filled if check number is only three characters long)

Final Carriage Return

### **ESC w p K9 X T 18 X A 04C <CR>**

Canadian check: dash in transit number removed; "9" inserted at beginning, resulting in a fully numeric nine character transit number

All nine characters in the transit number (because there are no dashes)

All characters in the account number (up to 18) with spaces and dashes removed

Always four characters in the check number (zero-filled if check number is only three characters long)

Final Carriage Return

**ESC w p T ' A ' C ' S <CR>**

All characters in the transit number

Field separator: /

All characters in the account number

Field separator: /

All characters in the check number

Field separator: /

Two-digit status

Final Carriage Return

**Notes**

All parameters are ASCII characters, i.e. greater than or equal to 0x20, with the exception of a non-ASCII character enclosed in single quotes as a field separator. This applies both to parameter specifications sent from application to printer, and to MICR data returned from printer to application.

Parameters are positional; their order in the parameter string is the order in which the parsed MICR data will be returned. Unrecognized parameters will be ignored, and processing of the parsing parameters will stop. Any data remaining after the unrecognized parameter will be treated as normal input data.

If parameters are not defined (for example, 1B 77 50 <CR> or 1B 77 70 <CR>) parsing is not selected. One status byte followed by all decoded MICR characters will be returned. This is the default parsing format if no other is selected:

Status	Status Byte Value
Good read, data follows	0x00
Bad read, data follows	0x01
No check present, no data	0x02
Paper jam, no data	0x03
No MICR characters, no data	0x04

MICR Characters	ASCII	Hexadecimal
Numerics	0...9	0x30...0x39
Unrecognized Character	?	0x3F
Space		0x20
Amount symbol	&	0x26
Dash symbol	'	0x27
"on us" symbol	(	0x28
Transit symbol	)	0x29

Once a parsing format is specified, the following values are returned:

MICR Characters	ASCII	Hexadecimal
Numerics	0...9	0x30...0x39
Space		0x20
Dash	-	0x2D
Field separator*		
Country code*		

\*As specified in the parsing parameter string

## Check Serial Number

### Parsing the Check Serial Number

Most banks print the check serial number in three easily recognizable spots. The printer firmware will look for the number in these spots, using the following ordered algorithm. The examples use letters to represent symbols on the check:

- t Transit symbol
- o “on us” symbol
- \$ Amount symbol
- Dash
- c Check serial number
- x Any other number

A number bracketed by “on us” symbols in the auxiliary “on us” field is the check serial number.

```
oooooooo txxxxxxxxxt xxxxxxxxo
```

Otherwise, a three or more digit number to the right of the rightmost “on us” symbol, and to the left of the leftmost amount symbol if an amount field is present, is the check serial number.

```
txxxxxxxxxt xxxxxxxxo cccc
txxxxxxxxxt xxxxxxxxo cccc $xxxxxx$
```

If both of these searches fail to produce the check serial number, extract the whole account number field from between the rightmost transit symbol and the rightmost “on us” symbol. A three, four, or five-digit number to the right of the rightmost transit symbol, separated by a space or a dash from the rest of the account number is the check serial number.

```
txxxxxxxxxt cccc xxxxxxxxo
txxxxxxxxxt cccc-xxxxxxxo
txxxxxxxxxt cccc xxxxxxxxo xx
```

If all of these searches fail to produce the distinct check serial number, and the check serial number field has been specified in the parsing parameter string options, no check serial number will be returned. If it is imbedded within the account number field, it will be returned as part of that variable length field.

## Exceptions

Some banks print the check serial number in a location that cannot be electronically distinguished without specific exception information, although it can be visually distinguished because it is repeated in the upper right corner of the check. For these cases, the printer can hold up to nine exceptions for specific banks in its non-volatile memory (NVRAM), which is accessed by the read and write NVRAM commands. The specific bank is picked out by its transit number, and the firmware will look in the exception table for a transit number match before looking in the normal check serial number locations.

In this example, without an exception table entry, the firmware would always pick the rightmost four-digit number as the check serial number following rule two above. The bank with the three digit check serial number and the four digit extension after the “on us” symbol would need to be exceptionally recognized:

```
txxxxxxxxxt ccc-xxxxxxxxxxxxxx
txxxxxxxxxt xxx-xxxxxxxxxxxxccc
```

In this example, without an exception table entry, the firmware would not be able to pick out the check serial number because it is not separated from the rest of the account number:

```
txxxxxxxxxt cccccccccccccxo
```

In this example, without an exception table entry, the firmware would not be able to pick out the check serial number correctly, because it is imbedded within the rest of the account number:

```
txxxxxxxxxt xxx-ccc-xxxxxxxxxxxo
```

## Loading the Exception Table

The exception table begins at word 20 in NVRAM. Each entry takes five words. There is room for eight exceptions with a sumcheck written in the last word. An application can load local exceptions into the printer using the write NVRAM command:

```
0x1B 0x73 n1 n2 k
```

which writes the two byte word n1:n2 to word k in NVRAM.

## Exception Table Entry Format

Each exception table entry consists of five words. The first two words contain the first eight characters of the transit number by packing the low order nibble of the numeric transit number characters. For Canadian checks, eliminate the dash and store the eight numerics.

The next three words are used as six individual bytes to tell the firmware how to interpret the MICR characters that fall to the right of the rightmost transit symbol. Each of the six bytes is positional and consists of two parts: character type and number.

The three high order bits of each byte mark the character type. The characters can be marked in three ways: check serial # character, account # character, or “skip this character or symbol.”

The five low order bits of each byte contain the number of characters of that type to extract. Most exceptions will not need to use all six bytes; in that case clear the unused bytes to zero.

Bits within Byte	7	6	5	4	3	2	1	0
check serial # character string	0	0	1	n	n	n	n	n
account # character string	0	1	0	n	n	n	n	n
character string to ignore	1	0	0	n	n	n	n	n

**Example 1**

t123456780t12349876543210o      1234 is the check serial #  
    9876543210 is the account #

To load the second table entry, which starts at word 25, the transit number 123456780 would be stored in the first two words of its table entry using this string of commands:

0x1B 0x73 0x12 0x34 25  
 0x1B 0x73 0x56 0x78 26

After the right transit symbol are immediately the four characters of the check serial #, followed immediately by the ten characters of the account number. These would be bitwise encoded as:

0 0 1 0 0 1 0 0 (check #, four characters)  
 and                      0 1 0 0 1 0 1 0 (account #, 10 characters)

then stored in the other three words of the table entry using:

0x1B 0x73 0x24 0x4A 27  
 0x1B 0x73 0x00 0x00 28  
 0x1B 0x73 0x00 0x00 29

**Example 2**

t22137-632t001 6042202o927540      2754 is the check serial #  
    6042202 is the account #

To load the third table entry, which starts at word 30, the transit number 2137-632 would be stored in the first two words of its table entry using this string of commands:

0x1B 0x73 0x22 0x13 30  
 0x1B 0x73 0x76 0x32 31

After the right transit symbol are four characters to skip, a seven digit account number, two characters to skip, and finally a four digit check serial #. The final character to skip need not be encoded. These would be bitwise encoded as:

1 0 0 0 0 1 0 0 (skip four characters)  
 0 1 0 0 0 1 1 1 (account #, seven characters)  
 1 0 0 0 0 0 1 0 (skip two characters)  
 0 0 1 0 0 1 0 0 (check #, four characters)

then stored in the other three words of the table entry using:

0x1B 0x73 0x84 0x47 32  
 0x1B 0x73 0x82 0x24 33  
 0x1B 0x73 0x00 0x00 34.

**Maintaining the Exception Table**

Present contents of the exception table can be examined using the read NVRAM command:

0x1B 0x6A k

which reads and returns word *k* in NVRAM. When the exception table is full, a new entry can replace an older, less frequently used entry, by merely rewriting the words for that table entry.

## Check Flip Command

### Check Flip Command

**ASCII:** ESC w F

**Hexadecimal:** 1B 77 46

**Decimal:** 27 119 70

Causes a check on the slip table to be fed into the printer, flipped and left with the trailing edge of the check in the slip feed rollers. Prior to the flip, the check is measured to see that it is of an appropriate size (see Chapter 4: Media and Supplies, Forms Specification) to be flipped. If not, the check is fed back to the user.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H77) & Chr\$(&H46)

Exception:

This command is available only in 7158 Native Mode.

## User Data Storage Commands

### Write to User Data Storage

**ASCII:** ESC ' m a0 a1 a2 d1 ... dm

**Hexadecimal:** 1B 27 m a0 a1 a2 d1 ... dm

**Decimal:** 27 39 m a0 a1 a2 d1 ... dm

**Value of m:** 0 – 255

Writes *m* bytes of data to the User Data Storage Flash Page at the address specified. The printer waits for *m* bytes of data following the 3-byte address, *addr*.

If any of the memory locations addressed by this command are not currently erased, the command is not executed.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H27) & Chr\$(&H5) & Chr\$(&H0) & Chr\$(&H0) & Chr\$(&H0) & "Hello"

The above command writes the word 'Hello' to the User Data Storage Flash Page.

**Read from User Data Storage****ASCII:** ESC 4 *m a0 a1 a2***Hexadecimal:** 1B 34 *m a0 a1 a2***Decimal:** 27 52 *m a0 a1 a2***Value of *m*:** 0 – 255

Reads *m* bytes of data from the User Data Storage Flash Page at the address specified.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H34) & Chr\$(&H5) & Chr\$(&H0) & Chr\$(&H0) & Chr\$(&H0)



**Read from Non-Volatile Memory****ASCII:** ESC j *k***Hexadecimal** 1B 6A *k*  
:**Decimal:** 27 106 *k***Range of *k*:** 20 – 63 (decimal)

Reads a two-byte word from location *k* in the history EEROM. The printer returns the word at the next available opportunity.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H6A) & Chr\$(*k*)

**Write to Non-Volatile Memory (NVRAM)****ASCII:** ESC s *n1 n2 k***Hexadecimal:** 1B 73 *n1 n2 k***Decimal:** 27 115 *n1 n2 k***Value of *n1*:** 1<sup>st</sup> Byte**Value of *n2*:** 2<sup>nd</sup> Byte**Range of *k*:** 20 - 63 (decimal)

Writes the two-byte word, *n1 n2*, to location *k* in history EEROM.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H73) & Chr\$(*n1*) & Chr\$(&H*n2k*)

## Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts

**ASCII:** GS " *n*

**Hexadecimal:** 1D 22 *n*

**Decimal:** 29 34 *n*

**Value of *n*:** 48 - 51

Specifies whether to load the logos or user-defined characters to Flash Memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles.

*n* = 48 (ASCII *n* = 0)

Loads active logo to RAM only. This is used to print a special logo but not have it take up Flash Memory. A logo defined following this command is not preserved over a power cycle.

*n* = 49 (ASCII *n* = 1)

Loads active logo to Flash Memory. This is the default condition for logo Flash storage. A logo defined following this command is stored in Flash Memory.

*n* = 50 (ASCII *n* = 2)

Loads user-defined characters to RAM only. This is the default condition for user-defined character storage. Any user-defined characters defined following this command are not preserved over a power cycle.

*n* = 51 (ASCII *n* = 3) Loads user-defined characters to Flash Memory. An application must use this command to store user-defined characters in Flash Memory. Any user-defined characters defined following this command are stored in Flash Memory. A user-defined character cannot be redefined in Flash Memory. The Flash Memory page must be erased by an application before redefining user-defined characters. For more information, see the Erase User Flash Sector (1D 40 *n*) command.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H22) & Chr\$(*n*)

**Flash Allocation****ASCII:** GS " U *n1 n***Hexadecimal:** 1D 22 55 *n1 n2***Decimal:** 29 34 85 *n1 n2***Default Value** 1 (see below)  
**of *n1*:****Default Value** 1 (see below)  
**of *n2*:**

*n1* is the number of 64k sectors used for logos and user-defined characters.

*n2* is the number of 64k sectors used for user data storage.

This command sets the allocation of Flash sectors between user data storage and logos/user-defined characters. This allocation is saved in the EEPROM of the printer and is therefore saved across power cycles.

$n1 + n2 \leq 6$  (3M)

The 7158 has been configured at the factory with 512K, 1M or 2M of Flash memory. If *n1* + *n2* is greater than the maximum number of sectors available, the command is ignored. Reissuing this command with different parameters will erase all sectors.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H22) & Chr\$(&H55) & Chr\$(&Hn1) & Chr\$(Hn2)

Exception:

This command is available only in 7158 Native Mode

## Erase User Flash Sector

**ASCII:** GS @ *n*  
**Hexadecimal:** 1D 40 *n*  
**Decimal:** 29 64 *n*  
**Value of *n*:** 49 - 50

Erases a page of Flash Memory and sends a carriage return when the operation is complete.

*n* = 49 (ASCII *n* = 1)

This command erases all sectors available for user-defined characters and multiple logos. The page should be erased in two situations: when the logo definition area is full and an application is attempting to define new logos, and when an application wants to replace one user-defined character set with another. In both cases, all logos and character set definitions are erased and must be redefined.

*n* = 50 (ASCII *n* = 2)

This command erases all sectors available for user data storage.

**Important:** While erasing Flash Memory, the printer disables all interrupts, including communications. To provide feedback to the application, the printer responds to the application when the erase is complete. After sending the Erase User Flash Sector (1D 40 *n*) command, an application should wait for the response from the printer before sending data. Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of five seconds after sending the Erase User Flash Sector (1D 40 *n*) command before sending data.

Example:

```
MSComm1.Output = Chr$(&H1D) & Chr$(&H40) & Chr$(n)
```

## Printer Setting Change

**ASCII:** US DC1 [*m n*], [*m n*], ... [*m n*] 0FFH

**Hexadecimal:** 1F 11 [*m n*], [*m n*], ... [*m n*] 0FFH

**Decimal:** 31 17 [*m n*], [*m n*], ... [*m n*] 0FFH

### Value of *m, n*:

<i>m</i> (Hex)	Function	<i>n</i> (Hex)	Function
10	Interface type	00	USB/RS232C
		01	RS232C
		02	USB
11	Baud rate	00	115200 bps
		01	57600 bps
		02	38400 bps
		03	19200 bps
		04	9600 bps
		05	4800 bps
		06	2400 bps
12	Number of data bit	00	8 data bits
		01	7data bits
13	Number of stop bit	00	1 stop bits
		01	2 stop bits
14	Parity	00	No parity
		01	Even parity
			Odd parity
15	Flow control	00	Software (XON/XOFF)
		01	Hardware (DTR/DSR)
16	Data reception errors option	00	Ignore errors
		01	Print “?”
20	Emulation	00	7158 Native mode
		01	7156 mode
		02	7150 mode
21	Default lines per inch	00	8.13 lines per inch
		01	7.52 lines per inch
		02	6 lines per inch
22	Carriage return usage	00	Ignore CR
		01	Use CR as Print cmd.
23	Asian mode	00	Asian mode on

		01	Asian mode off
30	Print density	00	100%
		01	110%
		02	120%
31	Paper Low sensor option	00	Paper low sensor enable
		01	Paper low sensor disable
32	Paper width	00	80 mm
		01	58 mm
33	Knife option	00	Enable knife
		01	Disable knife
34	MICR option	00	Enable MICR
		01	Disable MICR
35	Check Flip option	00	Enable check flip
		01	Disable check flip
36	Max Power	00	55 W
		01	75 W
37	Color Paper Option	00	One color paper
		01	Two color paper
40	Default Code page	00	437
		01	850
		02	852
		03	858
		04	860
		05	862
		06	863
		07	864
		08	865
		09	866
		0A	874
		0B	1252
		0C	Katakana
		0D	932 (or 936, 949, 950)
50	EEPROM default setting	00	EEPROM default setting

Set the printer configuration specified by m and n. The printer is reset after receiving this command to activate the configuration setting. If m or n is out of range, this command is ignored. But the printer waits the data until terminator code "0FFH".

Example:

```
MSComm1.Output = Chr$(&H1F) & Chr$(&H06)
```

## Asian Character Commands

### Select print modes for Kanji characters

**ASCII:** FS ! *n*

**Hexadecimal:** 1C 21 *n*

**Decimal:** 28 33 *n*

**Value of *n*:** The character attribute for Asian character

Bit	Off/On	Hex	Decimal	Function
0	-	-	-	Select font
1	Off	00	0	Undefined
2	Off	00	0	Double width mode is not selected
	On	01	1	Double width mode is selected
3	Off	00	0	Double height mode is not selected
	On	01	1	Double height mode is selected
4	-	-	-	Undefined
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Underline mode is not selected
	On	01	1	Underline mode is selected

**Default of *n*:** 0

Selects character attribute for Asian character.

The underline mode can be turned on or off by using FS – or ESC – also.

The thickness of underline is defined by FS – or ESC -, it does not relate to character size.

Example:

MSComm1.Output = Chr\$(&H1C) & Chr\$(&H21) & Chr\$(n)

**FS – Turn underline mode ON/OFF for Kanji****ASCII:** FS - *n***Hexadecimal:** 1C 2D *n***Decimal:** 28 45 *n***Value of *n*:** 0 = Cancel

1 = 1 dot height underline

2 = 2 dot height underline

**Default *n*:** 0 (Cancel)

Turn underline mode on or off for Asian character.

All characters could be underlined, including character right side spacing.

Underline can be selected by FS ! and ESC – also, the last received command is effective.

Example:

MSComm1.Output = Chr\$(&H1C) & Chr\$(&H2D) & Chr\$(n)

**Define user-defined Kanji characters****ASCII:** FS 2 *c1 c2 d1 ... dn***Hexadecimal:** 1C 32 *c1 c2 d1 ... dn***Decimal:** 28 50 *c1 c2 d1 ... dn***Value of *c1*:** Specified the beginning Asian character code**Value of *c2*:** Specified the end Asian character code**Value of *d*:** Image data



<b>Range of <i>c1,c2</i>:</b>	Japanese (CP932)	F0 • c1 • F9, 40 • c2 • 7E and 80 • c2 • FC
	Simplified Chinese (CP936)	A1 • c1 • A7, 40 • c2 • 7E and 80 • c2 • A0, AA • c1 • AF, A1 • c2 • FE, F8 • c1 • FE, A1 • c2 • FE
	Korean (CP949)	c1 = C9 and c1 = FE, A1 • c2 • FE
	Traditional Chinese (CP950)	81 • c1 • A0 and FA • c1 • FE, 40 • c2 • 7E and 80 • c2 • FE C7 • c1 • C8, A1 • c2 • FE

Defines and enters downloaded characters into RAM. The user-defined character will be cleared by ESC @ or power off of printer. Each character requires 72 bytes for character definition.

The maximum number of user-defined character is 100.

Example:

MSComm1.Output = Chr\$(&H1C) & Chr\$(&H32) & Chr\$(&HF0) & Chr\$(&H40) & Chr\$(d1) & Chr\$(dn)

## Set Kanji character spacing

**ASCII:** FS S *n1 n2*

**Hexadecimal:** 1C 53 *n1 n2*

**Decimal:** 28 83 *n1 n2*

**Value of *n1*:** Ignored (0)

**Value of *n2*:** Character right side spacing dots (1/203 inch)

**Default of *n2*:** 1 for 1 byte character, 2 for 2 bytes character

Sets the character right side spacing for characters in Asian character.

The underline is valid on the space set by this command. ESC SP command is not valid for Asian character code pages. Therefore, this command is used to set the character right side spacing for characters in Asian code page.

Example:

MSComm1.Output = Chr\$(&H1C) & Chr\$(&H53) & Chr\$(0) & Chr\$(100)

**FS W (Set quadruple mode ON/OFF for Kanji)****ASCII:** FS W *n***Hexadecimal:** 1C 57 *n***Decimal:** 28 87 *n***Value of *n*:** The quadruple mode for Asian characters.

0 (Bit 0) = Quadruple mode off

1 (Bit 0) = Quadruple mode on

**Default of *n*:** 0 (Quadruple mode off)

Selects or cancels the quadruple mode for Asian characters.

FS ! and GS ! also have control over character size. This, latest received command is effective.

Example:

MSComm1.Output = Chr\$(&amp;H1C) &amp; Chr\$(&amp;H57) &amp; Chr\$(n)

## Flash Download Commands

These commands are used to load firmware into the printer.

The commands are listed in numerical order according to their hexadecimal codes. Each command is described and the hexadecimal, decimal, and ASCII codes are listed.

There are three ways to enter the Download Mode.

1. Powering the printer up with DIP Switch 1 up.
2. While the printer is running normally, use the command Switch to Flash Download Mode, to leave normal operation and enter the Download Mode.
3. If the Flash is found corrupted during Level 0 diagnostics the Download Mode is automatically entered after the printer has reset.

The printer never goes directly from the Download Mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel Download Mode and reboot.

### Switch to Flash Download Mode

**ASCII:** ESC [ }

**Hexadecimal:** 1B 5B 7D

**Decimal:** 27 91 125

Puts the printer in Flash Download Mode in preparation to receive commands controlling the downloading of objects into Flash Memory. When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.

This command does not affect the current communication parameters. Once the printer is in Flash Download Mode, this command is no longer available.

Example:

MSComm1.Output = Chr\$(&H1B) & Chr\$(&H5B) & Chr\$(&H7D)

### Request Printer ID

**ASCII:** GS NUL

**Hexadecimal:** 1D 00

**Decimal:** 29 0

Returns ACK (06 hex) + 12 bytes ASCII string describing the Flash Memory Boot Sector Firmware part number. Ex : 189-1234567A

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H00)

**Return Segment Number Status of Flash Memory****ASCII:** GS SOH**Hexadecimal:** 1D 01**Decimal:** 29 1

Returns the size of the Flash used. There may be 8, 16, or 32 sectors (64K each) in Flash Memory. This command assures that the firmware to be downloaded is the appropriate size for Flash Memory. The value returned is the maximum sector number that can be accepted by the Select Sector to Download (1D 02 *n*) command.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H01)

Exceptions:

Available only in Download Mode.

**Select Flash Memory Sector to Download****ASCII:** GS STX *n***Hexadecimal:** 1D 02 *n***Decimal:** 29 2 *n*

**Value of *n*:** The Flash sector to which the next download operation applies

**Range of *n*:** 0 – 7 (512K)

0 – 15 (1 mB)

0 – 31 (2 mB)

Selects the Flash sector (*nn*) for which the next download operation applies. The values of the possible sector are restricted, depending upon the Flash part type. The printer transmits an ACK if the sector number is acceptable or an NAK if the sector number is not acceptable. Sector numbers start at 0.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H02) & Chr\$(*n*)

Exceptions:

Available only in Download Mode.

**Get Firmware CRC****ASCII:** GS ACK**Hexadecimal:** 1D 06**Decimal:** 29 6

Causes the printer to calculate the CRC for the currently selected sector and transmits the result. This is performed normally after downloading a sector to verify that the downloaded firmware is correct. The printer also calculates the CRC for each sector during power up and halts the program if any sector is erroneous.

The printer transmits ACK if the calculated CRC is correct for the selected sector; NAK if the CRC is incorrect or if no sector is selected.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H06)

**Return Microprocessor CRC****ASCII:** GS BEL**Hexadecimal:** 1D 07**Decimal:** 29 7

Returns the CRC calculated over the boot sector code space.

**Formulas:** ACK <low byte> <high byte>

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H07)

**Erase the Flash Memory****ASCII:** GS SO**Hexadecimal:** 1D 0E**Decimal:** 29 14

Causes the entire Flash Memory (except the boot) to be erased.

The printer returns ACK if the command is successful; NAK if it is unsuccessful.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H0E)

Exceptions:

Available only in Download Mode.

**Return Main Program Flash CRC****ASCII:** GS SI**Hexadecimal:** 1D 0F**Decimal:** 29 15

Returns the CRC calculated over the Flash firmware code space. The format of the response is ACK <low byte> <high byte>.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H0F)

**Erase Selected Flash Sector****ASCII:** GS DLE *n***Hexadecimal:** 1D 10 *n***Decimal:** 29 16 *n*

**Value and Range of *n***    0 – 7 = 512K bytes Flash

0 – 15 = 1M bytes Flash

0 – 31 = 2M bytes Flash

Erases the previously selected sector. The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

Example:

MSComm1.Output = Chr\$(&H1D) & Chr\$(&H10) & Chr\$(*n*)

Exceptions:

Available only in Download Mode.

**Download to Active Flash Sector****ASCII:** GS DC1 *al ah cl ch d1...dn***Hexadecimal:** 1D 11 *al ah cl ch d1...dn***Decimal:** 29 17 *al ah cl ch d1...dn***Value of *al*:** low byte of the address**Value of *ah*:** high byte of the address**Value of *cl*:** low byte of the count**Value of *ch*:** high byte of the count**Value of *d*:** data bytes, from 1 to *n*

Contains a start address ( $ah * 256 + al$ ) and count ( $ch * 256 + cl$ ) of binary bytes to load into the selected sector, followed by that many bytes. The start address is relative to the start of the sector. Addresses run from 0 to 64K.

The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block. NAK means that, for some reason, the data was not written correctly. This could mean that communications failed or that the write to Flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

Value of <i>n</i> (for number of data bytes)	Range of Address ( <i>al ah</i> )	Range of Count ( <i>cl ch</i> )
$((ch * 256) + cl)$	2000-FFFF (hexadecimal)	0001-0400 (hexadecimal)

**Range:** Addresses run from 0 to 64K.**Related Information:**

Available only in Download Mode.

**Reboot the Printer****ASCII:** GS (SPACE)**Hexadecimal:** 1D FF**Decimal:** 29 255

Ends the load process and reboots the printer. Before executing this command, the printer should have firmware loaded and external switches set to the runtime settings.

Application software for downloading should prompt the user to set the external switches and confirm before sending this command. If the downloading was started from a diagnostic, the reboot will cause the printer to reenter download state unless the external switches are changed.

Example:

```
MSComm1.Output = Chr(&H1D) & Chr(&HFF)
```



## Appendix A: Specifications

### Printing Specifications

	Thermal Receipt Station	Impact Slip Station
Speed	3019 Lines/Minute (44 Columns), Depends on Line Spacing	240, 202, 164, 142 Lines/Minute (40 Columns), Depends on Column Width
Noise Level	50 dBA Sound Pressure (ISO 7779)	68 dBA Sound Pressure (ISO 7779)
Print head	Direct Thermal, Fixed Head	Impact, Bi-directional
Columns (Maximum)	For 80 mm paper: 44 Columns (Standard) 56 Columns (Compressed) For 58 mm paper: 32 Columns (Standard) 42 Columns (Compressed)	45 Columns (Standard) 55 Columns (Compressed)
Line Spacing	7.52 Lines/Inch ( default ) 8.47, 8.13, 7.81, 7.25, 7.00, 5.98 Lines /Inch and variable lines per inch.	7.2 Lines/Inch ( default ) 10.3, 9.0, 8.0, 6.5, 6.0 Lines /Inch and variable lines per inch.
Character Pitch	15.6 Characters/Inch (Standard) 20.3 Characters/Inch (Compressed)	13.9 Characters/Inch (Standard) 17.1 Characters/Inch (Compressed)
Character Cell	13 x 24 Dots (Standard) 10 x 24 Dots (Compressed)	10 Half Dots x 7 Dots (ANK)
Print Modes	Standard, Compressed, Double High, Double Wide, Upside Down, Rotated, Underline, Scalable, Bold, Superscript, Italic, Subscript	Standard, Compressed, Double Wide, Double Strike, Upside Down, Rotated
Character Sets	Code Page 437, 850, 852, 860, 863, 865, 858, 866, 1252, Katakana, 874, 862, 864, and Space page	Code Page 437, 850, 852, 860, 863, 865, 858, 866, 1252, Katakana, 874, 862, 864, and Space page

	Thermal Receipt Station	Impact Slip Station
Paper Diameter	80 mm Max.	Not Applicable
Paper Length	83 Meters (273 feet)	Side Insertion: 2.0 Inches (Min.) Front Insertion: 2.75 Inches (Min.)
Paper Width	80 mm $\pm$ 1mm (3.15 Inches $\pm$ .02 Inches)	Side Insertion: 8.0 Inches (Min.) Front Insertion: 2.0 Inches (Min.)
Paper Thickness	Not Applicable	.406 mm (.016 Inch)
Printable Area	2.83 Inches (Max.)	3.22 Inches (Max.)

## Power Requirements

The 7167 printer receives power from a separate power supply. Here are the voltage requirements for the power supply.

Voltage	Station	Maximum Current	
		Short Term	Long Term
24.0 V $\pm$ 10%	Slip	4.6 Amps	3.15 Amps
	Receipt	6.5 Amps	3.15 Amps

## Environmental Conditions

Operating Temperature	5°C to 45°C (40°F to 112°F), models with knife
	5°C to 50°C (40°F to 120°F), models with no knife
Operating Humidity	5% to 90%

Condensation may occur when equipment is transferred from cold to warm areas after shipment. The printer's design permits operation after drying out and stabilizing at room temperature.

## Reliability

The numbers in the table refer to the Mean Cycle Between Failure (MCBF) for the items indicated.

Thermal Receipt Printer	45 Million Lines
Impact Slip Printer	15 Million Lines
Impact Print head	200 Million Characters
Electronics	347,000 On time Hours
Communications Card	2,000,000 On Time Hours
Control Panel	2,100,000 On Time Hours
Knife	1 Million Cuts
MICR Check Reader	200,000 Reads
Flip	200,000 Flips
Power Supply	200,000 On-time Hours
Flip Mechanism	200,000 Cycles

## Dimensions and Weight

Height	174 mm (6.9 Inches)
Height with Cover Open	296 mm (11.7 Inches)
Width	190 mm (7.5 Inches)
Depth	262 mm (10.3 Inches)
Depth with Extended Slip Table	316 mm (12.5 Inches)
Weight	4.50 Kg (10.0 Pounds), Flip Model 4.25 Kg (9.4 Pounds), Non-Flip Model

## Density of Receipt Print Lines

When the receipt station prints high density print lines (graphics), it automatically slows down to a rate slower than 902 lines per minute. High density print lines are defined as lines with over 50% of the dots printing on the line (there are 576 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 print head 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 approaches the limits shown in the table, the receipt print head will heat up and shut down. This may damage the print head.

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.

Amount of Solid Coverage	Ambient Temperature		
	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: Print Characteristics

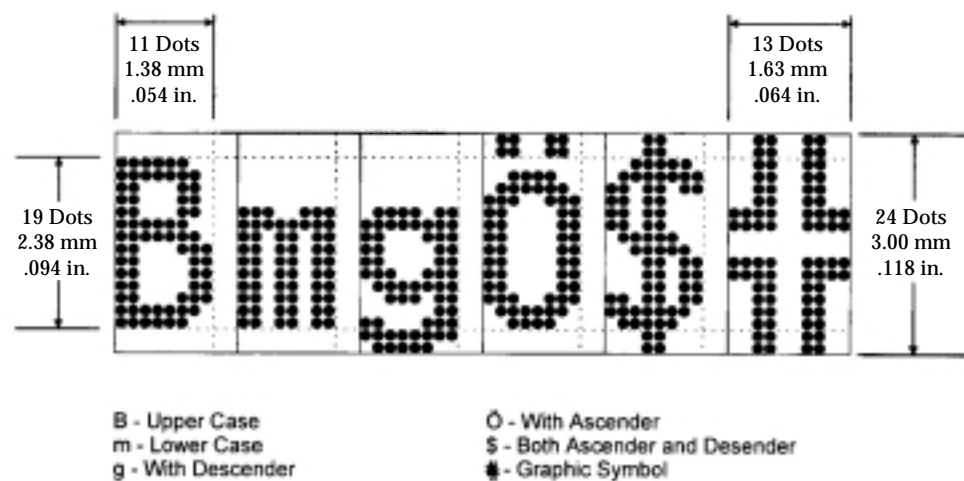
### Character Size

This section shows the dot pattern for characters printed on the receipt and slip stations.

#### Receipt Station

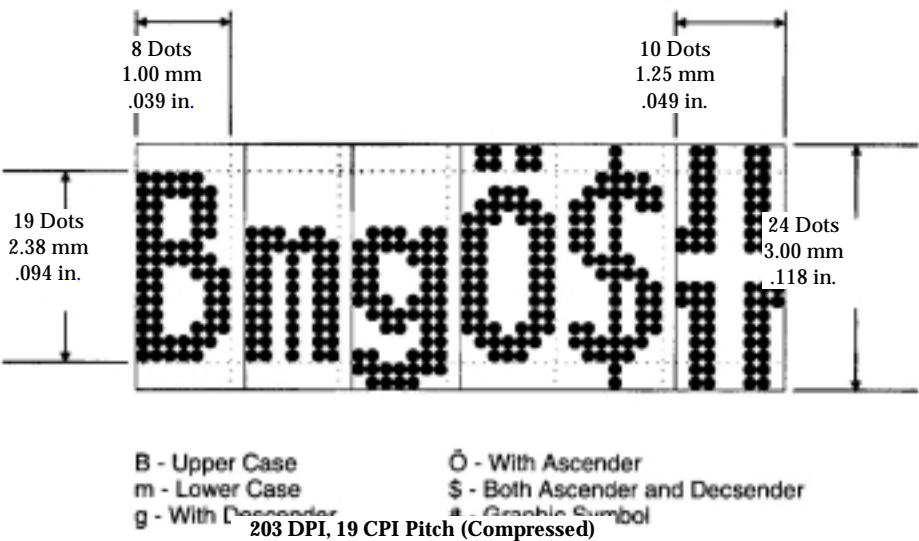
The following two illustrations show the dot patterns of sample characters for standard pitch (15.6 CPI) and compressed pitch (20.3 CPI). Note that compressed pitch uses fewer dots horizontally than standard pitch.

##### Standard Pitch



203 DPI, 15.6 CPI Pitch (Standard)

Compressed Pitch

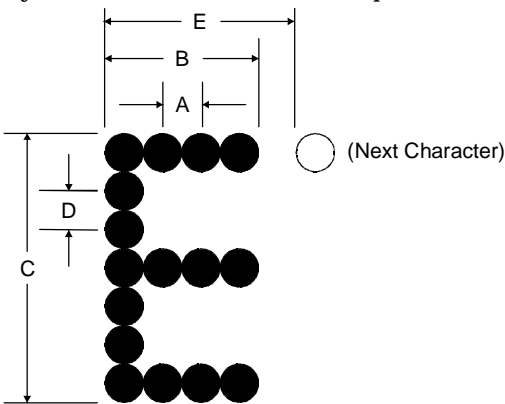


Slip Station

The following illustrations show the dot patterns of sample characters for standard pitch (13.9 CPI), double-wide characters, and rotated characters (counterclockwise).

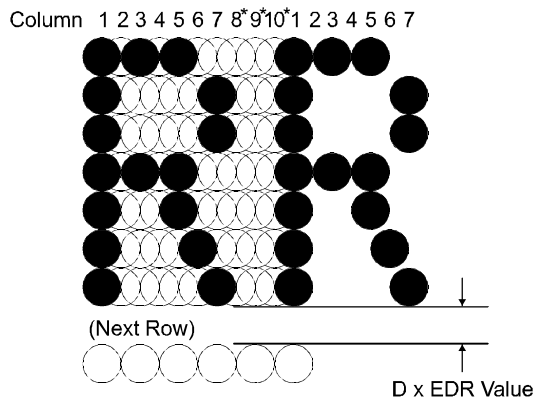
Standard Pitch

The first illustration shows a single character with the dimensions listed in the table that follows (including dimensions for compressed pitch). The second illustration shows the layout of columns for standard pitch characters.



Row spacing is fixed and column spacing depends upon the character pitch as indicated in the table.

Dimension	Standard Pitch (13.9 CPI, 45 Columns)	Compressed Pitch (17.1 CPI, 55 Columns)
A	.366 mm (.0144 inches)	.30 mm (.0117 inches)
B	1.45 mm (.057 inches)	1.24 mm (.049 inches)
C	2.46 mm (.097 inches)	
D	.353 mm (.0139 inches)	
E	1.83 mm (.072 inches)	1.49 mm (.0585 inches)

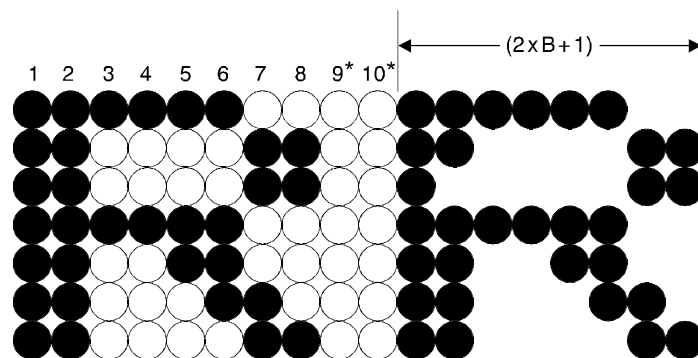


\* Columns 8, 9, and 10 are for graphics or for certain special characters

**Note:** Columns overlap within the format for each print row in half-dot increments (depending upon pitch), but the printer cannot print overlapping dots on a single print row. No ASCII character contains overlapping dots on a print row.

### Double-Wide Characters

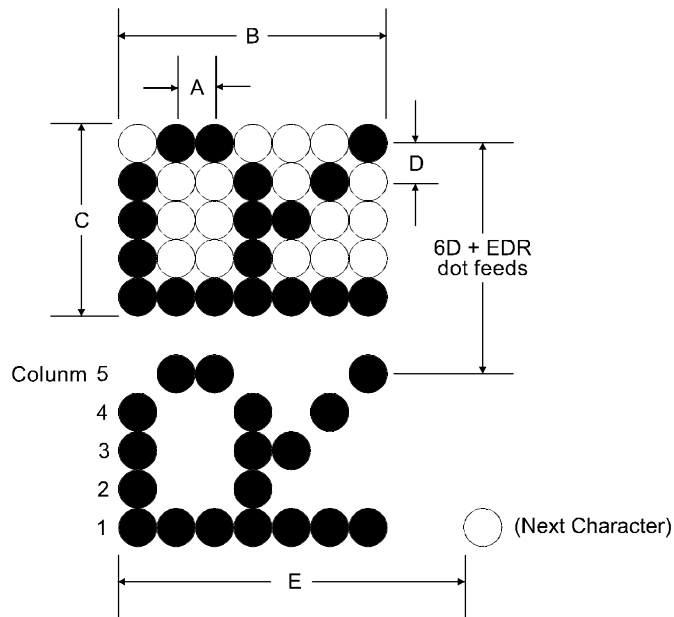
Double-wide characters are upright characters in an 8x7 dot format with twice the column (horizontal) spacing between printed dots as for standard characters.



\* Columns 9 and 10 for certain special characters

## Rotated Characters

Rotated characters are alternate characters in a 5x7 dot format printed 90 degrees counterclockwise (as shown in the illustration) or clockwise. Only one horizontal pitch is available: 6.95 CPI, 33 columns maximum.



Dimension	Horizontal Pitch (6.95 CPI, 33 Columns)
A	.366 mm (.0144 inches)
B	2.56 mm (.100 inches)
C	1.75 mm (.069 inches)
D	.353 mm (.0139 inches)
E	3.66 mm (.144 inches)



## Print Zones

This section shows the printable area for the slip station and the receipt station.

### Receipt Station

#### For 80 mm Paper

The receipt station centers characters (standard pitch and compressed pitch) and graphics on an 80 mm wide (3.15 inches) receipt.

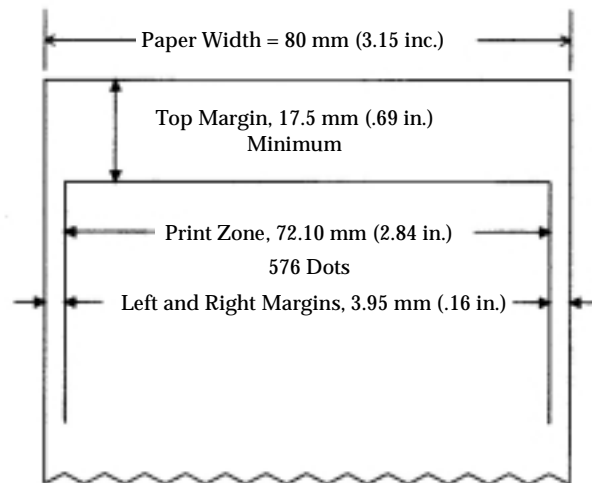
Standard pitch: 13 x 24 dots in character cell, 44 characters (columns) per line

Compressed pitch: 10 x 24 dots in character cell, 56 characters (columns) per line

Double byte character: 24 x 24 dots in character cell, 24 characters (columns) per line

Graphics: 576 addressable bits

The minimum print line height is 24 dots for characters and 24 dots for graphics. The standard print line height is 27 dots (3.38 mm, .133 inches) for characters (with three extra dot rows). See the following illustration (not to scale).



#### For 58 mm Paper

The receipt station centers characters (standard pitch and compressed pitch) and graphics on an 58 mm wide (2.28 inches) receipt.

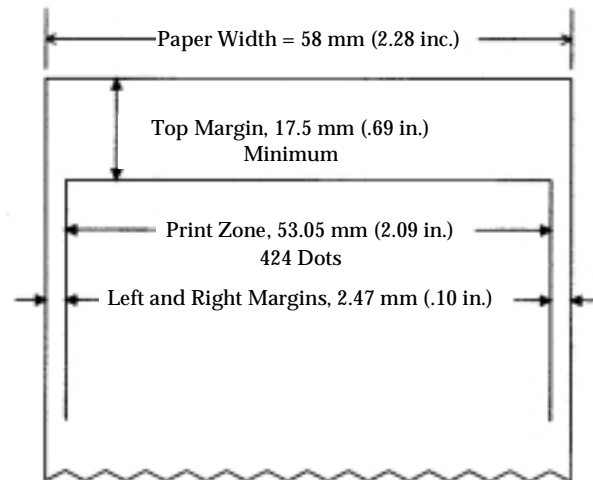
Standard pitch: 13 x 24 dots in character cell, 32 characters (columns) per line

Compressed pitch: 10 x 24 dots in character cell, 42 characters (columns) per line

Double byte character: 24 x 24 dots in character cell, 17 characters (columns) per line

Graphics: 424 addressable bits

The minimum print line height is 24 dots for characters and 24 dots for graphics. The standard print line height is 27 dots (3.38 mm, .133 inches) for characters (with three extra dot rows). See the following illustration (not to scale).



## Slip Station

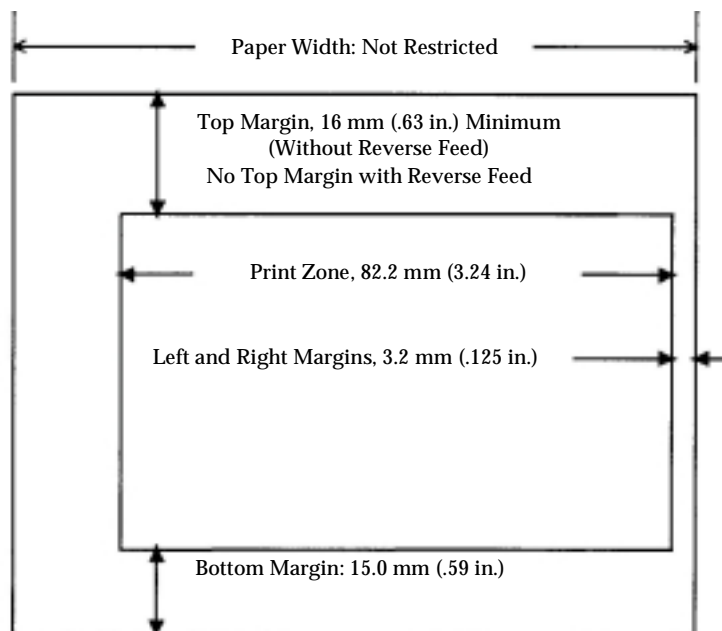
The slip station prints characters (standard pitch and compressed pitch) and graphics in a print zone of 82.2 mm (3.24 inches) wide on a slip or form.

Standard pitch: 45 characters (columns) per line

Compressed pitch: 55 characters (columns) per line

Double byte character: 27 characters (columns) per line

The print line height of 10 half dot x 7 dot characters is 2.46 mm (.097 in). With three-dot spacing, the print line height is 3.53 mm (.139 inches). See the following illustration (not to scale). To print as close to the bottom of the slip as possible without the slip leaving the feed rollers, use the **Print and Feed *n* Lines (1B 64 *n*)**, with  $n = 0$ .



## Character Sets

The following pages show the character sets.

- PC Code Page 437 (USEnglish)
- PC Code Page 850 (Multilingual)
- PC Code Page 852 (Slavic)
- PC Code Page 860 (Portuguese)
- PC Code Page 862 (Hebrew)
- PC Code Page 863 (French-Canadian)
- PC Code Page 864 (Arabic)
- PC Code Page 865 (Nordic)
- PC Code Page 866 (Cyrillic)
- PC Code Page 1252 (Windows Latin #1)
- PC Code Page Katakana
- PC Code Page 874 (Thai)
- Space Page

Code Page 437.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	0	@	P		p	Ç	É	á	...	L	α	≡		
01	!	1	A	Q	a	q	û	æ	í	...	±			
02	"	2	B	R	b	r	é	Æ	ó	...	≥			
03	#	3	C	S	c	s	à	ô	ü	...	≤			
04	\$	4	D	T	d	t	ä	ö	ñ	...	Σ			
05	%	5	E	U	e	u	à	ò	Ñ	...	σ			
06	&	6	F	V	f	v	â	û	ª	...	μ			
07	'	7	G	W	g	w	ç	ù	º	...	τ			
08	(	8	H	X	h	x	ê	ý	¿	...	Φ			
09	)	9	I	Y	i	y	ë	ö	...	θ				
0A	*	:	J	Z	j	z	è	Ü	...	Ω				
0B	+	;	K	[	k	{	í	ø	...	δ				
0C	,	<	L	\	l		ï	£	...	ω				
0D	-	=	M	]	m	}	í	¥	...	φ				
0E	.	>	N	^	n	~	Ä	ƒ	...	ε				
0F	/	?	O		o	ó	À	ƒ	...	π				

Code Page 850.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	0	@	P		p	Ç	É	á	...	L	ø	Ó	-	
01	!	1	A	Q	a	q	û	æ	í	...	±			
02	"	2	B	R	b	r	é	Æ	ó	...	±			
03	#	3	C	S	c	s	à	ô	ü	...	±			
04	\$	4	D	T	d	t	ä	ö	ñ	...	±			
05	%	5	E	U	e	u	à	ò	Ñ	...	±			
06	&	6	F	V	f	v	â	û	ª	...	±			
07	'	7	G	W	g	w	ç	ù	º	...	±			
08	(	8	H	X	h	x	ê	ý	¿	...	±			
09	)	9	I	Y	i	y	ë	ö	...	±				
0A	*	:	J	Z	j	z	è	Ü	...	±				
0B	+	;	K	[	k	{	í	ø	...	±				
0C	,	<	L	\	l		ï	£	...	±				
0D	-	=	M	]	m	}	í	ø	...	±				
0E	.	>	N	^	n	~	Ä	ƒ	...	±				
0F	/	?	O		o	ó	À	ƒ	...	±				

Code Page 852.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	0	@	P		p	Ç	É	á	...	L	ø	Ó	-	
01	!	1	A	Q	a	q	û	æ	í	...	±			
02	"	2	B	R	b	r	é	Æ	ó	...	±			
03	#	3	C	S	c	s	à	ô	ü	...	±			
04	\$	4	D	T	d	t	ä	ö	ñ	...	±			
05	%	5	E	U	e	u	à	ò	Ñ	...	±			
06	&	6	F	V	f	v	â	û	ª	...	±			
07	'	7	G	W	g	w	ç	ù	º	...	±			
08	(	8	H	X	h	x	ê	ý	¿	...	±			
09	)	9	I	Y	i	y	ë	ö	...	±				
0A	*	:	J	Z	j	z	è	Ü	...	±				
0B	+	;	K	[	k	{	í	ø	...	±				
0C	,	<	L	\	l		ï	£	...	±				
0D	-	=	M	]	m	}	í	ø	...	±				
0E	.	>	N	^	n	~	Ä	ƒ	...	±				
0F	/	?	O		o	ó	À	ƒ	...	±				

Code Page 858.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	0	@	P		p	Ç	É	á	...	L	ø	Ó	-	
01	!	1	A	Q	a	q	û	æ	í	...	±			
02	"	2	B	R	b	r	é	Æ	ó	...	±			
03	#	3	C	S	c	s	à	ô	ü	...	±			
04	\$	4	D	T	d	t	ä	ö	ñ	...	±			
05	%	5	E	U	e	u	à	ò	Ñ	...	±			
06	&	6	F	V	f	v	â	û	ª	...	±			
07	'	7	G	W	g	w	ç	ù	º	...	±			
08	(	8	H	X	h	x	ê	ý	¿	...	±			
09	)	9	I	Y	i	y	ë	ö	...	±				
0A	*	:	J	Z	j	z	è	Ü	...	±				
0B	+	;	K	[	k	{	í	ø	...	±				
0C	,	<	L	\	l		ï	£	...	±				
0D	-	=	M	]	m	}	í	ø	...	±				
0E	.	>	N	^	n	~	Ä	ƒ	...	±				
0F	/	?	O		o	ó	À	ƒ	...	±				

Code Page 860.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	Ç	É	á	...	L	Ш	α	≡
01	!	1	A	Q	a	q	Ü	Æ	í	...	Ł	т	Β	±
02	"	2	B	R	b	r	é	È	ó	...	Т	π	Γ	≥
03	#	3	C	S	c	s	â	ô	û	...	т	Π	π	≤
04	\$	4	D	T	d	t	ä	ö	ñ	...	—	Е	Σ	∫
05	%	5	E	U	e	u	à	õ	ñ	...	+	Ф	ο	∫
06	&	6	F	V	f	v	Å	Ü	ª	...	†	т	μ	+
07	'	7	G	W	g	w	ç	ù	º	...	‡	т	τ	≈
08	(	8	H	X	h	x	ê	ï	¿	...	£	Φ	θ	°
09	)	9	I	Y	i	y	ë	ö	¿	...	℥	ϕ	•	
0A	*	:	J	Z	j	z	è	ü	¬	...	℥	Ω	·	
0B	+	;	K	[	k	{	í	ø	½	...	т	■	δ	√
0C	,	<	L	\	l		ï	£	¼	...	т	■	ø	n
0D	-	=	M	]	m	}	ï	Ü	¼	...	т	■	φ	2
0E	.	>	N	^	n	~	Ä	Π	«	...	т	■	ε	■
0F	/	?	O	_	o	~	Å	Ó	»	...	т	■	η	■

Code Page 863.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	Ç	É	á	...	L	Ш	α	≡
01	!	1	A	Q	a	q	Ü	Æ	í	...	Ł	т	Β	±
02	"	2	B	R	b	r	é	È	ó	...	Т	π	Γ	≥
03	#	3	C	S	c	s	â	ô	û	...	т	Π	π	≤
04	\$	4	D	T	d	t	Ä	Ö	Ñ	...	—	Е	Σ	∫
05	%	5	E	U	e	u	À	Û	ª	...	+	Ф	ο	∫
06	&	6	F	V	f	v	Ŧ	Ü	ª	...	†	т	μ	+
07	'	7	G	W	g	w	ç	ù	º	...	‡	т	τ	≈
08	(	8	H	X	h	x	ê	ï	¿	...	£	Φ	θ	°
09	)	9	I	Y	i	y	ë	ö	¿	...	℥	ϕ	•	
0A	*	:	J	Z	j	z	è	ü	¬	...	℥	Ω	·	
0B	+	;	K	[	k	{	í	ø	½	...	т	■	δ	√
0C	,	<	L	\	l		ï	£	¼	...	т	■	ø	n
0D	-	=	M	]	m	}	ï	Ü	¼	...	т	■	φ	2
0E	.	>	N	^	n	~	Ä	Π	«	...	т	■	ε	■
0F	/	?	O	_	o	~	Å	Ó	»	...	т	■	η	■

Code Page 865.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	Ç	É	á	...	L	Ш	α	≡
01	!	1	A	Q	a	q	Ü	Æ	í	...	Ł	т	Β	±
02	"	2	B	R	b	r	é	È	ó	...	Т	π	Γ	≥
03	#	3	C	S	c	s	â	ô	û	...	т	Π	π	≤
04	\$	4	D	T	d	t	ä	ö	ñ	...	—	Е	Σ	∫
05	%	5	E	U	e	u	à	õ	ñ	...	+	Ф	ο	∫
06	&	6	F	V	f	v	Å	Ü	ª	...	†	т	μ	+
07	'	7	G	W	g	w	ç	ù	º	...	‡	т	τ	≈
08	(	8	H	X	h	x	ê	ÿ	¿	...	£	Φ	•	
09	)	9	I	Y	i	y	ë	ö	¬	...	℥	ϕ	•	
0A	*	:	J	Z	j	z	è	ü	¬	...	℥	Ω	·	
0B	+	;	K	[	k	{	í	ø	½	...	т	■	δ	√
0C	,	<	L	\	l		ï	£	¼	...	т	■	ø	n
0D	-	=	M	]	m	}	ï	Ü	¼	...	т	■	φ	2
0E	.	>	N	^	n	~	Ä	Π	«	...	т	■	ε	■
0F	/	?	O	_	o	~	Å	Ó	»	...	т	■	η	■

Code Page 866.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	A	P	a	...	L	Ш	p	È
01	!	1	A	Q	a	q	Б	С	б	...	Ł	т	с	ё
02	"	2	B	R	b	r	В	Т	в	...	Т	π	т	ε
03	#	3	C	S	c	s	Г	У	г	...	т	Π	у	е
04	\$	4	D	T	d	t	Д	Ф	д	...	—	Е	φ	İ
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# Index

---

## —7—

7167 printer  
 clearance, 11  
 dimensions, 11, 213  
 environmental conditions, 212  
 features, 1  
 location, 11  
 ordering supplies, 5  
 power requirements, 212  
 power supply, ordering, 7  
 printer specifications, 211  
 reliability, 213  
 sending in for repair, 11  
 turning on, 36

---

## —A—

Accessories. *See* Supplies  
 Asian mode  
   setting, 65

---

## —B—

Bar code commands, 174  
 Bar codes  
   commands, 174  
 BASIC  
   sending commands, 73

---

## —C—

Cabinet  
   cleaning, 8  
**Cables**  
   **cash drawer**, 9  
   **communication**, 9  
   connecting, 14  
 Carriage return usage  
   setting, 65  
 Cash drawer  
   ordering, 7  
 Cash drawer cables  
   connecting, 14  
 Changing paper, 37  
 Character sets, 221  
 Characters, receipt station  
   dot patterns, 215  
 Characters, slip station  
   dot patterns, 216  
 Check flip

  commands, 199  
   setting, 67  
 Check flip commands, 199  
 Check flip test modes  
   setting, 62  
 Checks  
   printing, 43  
   validating, 45  
   verifying, 45  
 Cleaning the printer, 8  
 Clearance around printer, 11  
 Code page 437  
   character set, 221  
 Code page 850  
   character set, 221  
 Color paper  
   setting, 68  
**Commands**  
   bar code, 174  
   check flip, 199  
   flash download, 211  
   graphics, 140  
   horizontal positioning, 113  
   listing, 73  
   macro, 188  
   MICR, 190, 207  
   page mode, 180  
   print, 104  
   print characteristics, 121  
   printer function, 90  
   printer status, 151  
   real time, 162  
   real time, rules for using, 162  
   realtime, moving data through the buffer, 163  
   sending, 72  
   user data storage, 199  
   vertical positioning, 104  
 Commands, printer function  
   set horizontal and vertical minimum motion  
     units, 112  
 Commands, real time  
   alternate implementation, 162  
   first implementation, 162  
   real time request to printer, GS sequence, 168  
   recognizing data from the printer, 161  
 Commands, sending  
   using BASIC, 73  
   using DOS, 72  
 Communication, 72  
 Communication cables, 9



connecting, 14  
 ordering, 7  
 Communication interface. *See* RS-232C interface  
 Communication interface modes, 58  
 Configuring the printer, 56  
 Connecting cables  
   cash drawer, 14  
   communication, 14  
   power, 14  
 Connector  
   cash drawer, 77  
   RS-232C communication, 75  
 Consumables. *See* Paper  
 Contacting a service representative, 52

## —D—

Data  
   moving through buffer, 163  
 Datascope modes  
   setting, 60  
 Default code page, 68  
 Default lines per inch  
   setting, 64  
 Density, of print, 213  
 Diagnostic modes, 60  
 Diagnostics, 53  
   knife failure, 48  
   level 0, 53  
   level 1, 54  
   level 2, 70  
   level 3, 71  
   paper jam, 48  
   paper out, 48  
   printhead over/under temperature, 49  
   startup, 53  
 Dimensions, of printer, 11, 213  
 DIP switches. *See* Switch settings  
 Documentation  
   ordering, 7  
 DOS  
   sending commands, 72  
 Dot patterns, of characters, 215, 216  
 Double-wide characters  
   dot patterns, 217  
 DTR/DSR protocol, 74  
**Duty cycle**  
   **limitations, 213**

## —E—

Emulation/software options, 64  
 Environmental conditions, 212  
 Errors. *See* Problems

## —F—

Features, 1  
 Flash download  
   commands, 211  
 Flash download commands, 211  
 Forms  
   ordering, 6  
   printing, 43

## —G—

Graphics  
   commands, 140  
 Graphics commands, 140

## —H—

Hardware options, 65  
 Horizontal positioning commands, 113

## —I—

Installation  
   choosing location, 11  
   connecting cables, 14  
   loading paper, 37  
   removing packing material, 10  
   setting switches, 12  
   turning on the printer, 36  
 Interface. *See* RS-232C interface

## —K—

Knife  
   failure of, 48  
   setting, 66

## —L—

LED (green) blinking (fast)  
   what to do, 48  
 LED (green) blinking (slow)  
   what to do, 48  
 LED (green) does not come on  
   what to do, 47  
 LED (slip table) does not come on  
   what to do, 50  
 Level 0 diagnostics, 53  
 Level 1 diagnostics, 54  
   asian mode, 65  
   carriage return usage, 65  
   check flip option, 67  
   check flip test modes, 62  
   color paper option, 68  
   communication interface modes, 58

- configuring the printer, 56
- datascope modes, 60
- default code page, 68
- default lines per inch, 64
- diagnostic modes, 60
- emulation/software options, 64
- hardware options, 65
- knife option, 66
- maximum power option, 67
- MICR option, 67
- MICR test modes, 61
- paper low sensor, 66
- paper width, 66
- print density, 65
- print head gap adjustment test modes, 63
- printer configuration, 54
- printer emulations, 64
- receipt test modes, 61
- RS 232 interface, 58
- set extra RS-232C options, 78
- slip test modes, 61
- Level 2 diagnostics, 70
- Level 3 diagnostics, 71
- Location
  - choosing, 11
  - clearance, 11

---

## —M—

- Macro
  - commands, 188
- Macro commands, 188
- Maintenance
  - cleaning the printer, 8
- Maximum power
  - setting, 67
- MICR
  - commands, 190, 207
  - setting, 67
- MICR check reader
  - operating environment, 11
- MICR check reader commands, 190, 207
- MICR parsing, 191
  - check serial number, parsing, 196
  - exception table entry format, 197
  - exception table, loading, 197
  - exception table, maintaining, 198
  - parameter string options, 192
  - sample parsing formats, 194
- MICR test modes
  - setting, 61
- Modes
  - check flip test, 62
  - datascope, 60

- MICR test, 61
- print head gap adjustment test, 63
- receipt test, 61
- slip test, 61

---

## —O—

- Operator panel, 70
- Options
  - asian mode, 65
  - carriage return usage, 65
  - check flip, 67
  - color paper, 68
  - default lines per inch, 64
  - knife, 66
  - maximum power, 67
  - MICR, 67
  - paper low sensor, 66
  - paper width, 66
  - print density, 65
  - printer emulations, 64
- Ordering
  - cash drawer, 7
  - communication cables, 7
  - documentation, 7
  - paper, 5
  - power supply, 7
  - supplies, 5

---

## —P—

- Packing material
  - removing, 10
  - repacking printer, 11
- Page mode
  - commands, 180
- Page mode commands, 180
- Paper
  - advancing, 40
  - changing, 37
  - low, 37, 48
  - ordering, 5
  - out, 37
  - putting in the paper roll, 39
  - removing, 38
  - requirements, 5
  - suppliers, 5
- Paper jam, 48
- Paper low sensor
  - setting, 66
- Paper out, 48
- Paper width
  - setting, 66
- Parsing. *See* MICR parsing
- Power

- turning on the printer, 36
- Power cables
  - connecting, 14
- Power requirements, 212
- Power supply
  - ordering, 7
- Print characteristics commands, 121
- Print characteristics
  - commands, 121
- Print commands, 104
- Print density
  - receipt, 213
  - setting, 65
- Print head gap adjustment test modes
  - setting, 63
- Print problems, 50
  - too light, 49
- Print speed, 73
- Print timing, 73
- Print zones
  - receipt station, 219
  - slip station, 220
- Printer
  - configuration, 54
- Printer configuration
  - setting, 54
- Printer emulations
  - setting, 64
- Printer function commands, 90
- Printer status
  - commands, 151
- Printer status commands, 151
- Printhead
  - impact, 4
  - thermal, 4
- Printhead, thermal
  - cleaning, 8
  - over/under temperature, 49
- Printing, continuous**
  - limitations of**, 213
- Problems, 47
  - contacting a service representative, 52
  - forms skew or catch, 50
  - knife failure, 48
  - paper jam, 48
  - paper out, 48
  - print is light or spotty, 50
  - printhead over/under temperature, 49
- Protocol, RS-232C
  - DTR/DSR, 74
  - XON/XOFF, 74

---

## —R—

- Real time
  - commands, 162
- Real time commands, 162
  - alternate implementation, 162
  - preferred implementation, 162
  - using, 162
- Receipt station
  - character dot patterns, 215
  - print zones, 219
- Receipt test modes
  - setting, 61
- Reliability, 213
- Removing packing material, 10
- Repacking printer, 11
- Ribbon cassette
  - changing, 41
  - ordering, 6
- Rotated characters
  - dot patterns, 218
- Rotated printing
  - summary, 139
- RS 232 interface
  - setting, 58
- RS 232 interface settings, 58
- RS-232C interface, 73
  - cash drawer connector, 77
  - communication connector, 75
  - DTR/DSR protocol, 74
  - parameters, 78
  - setting extra options, 78
  - technical specifications, 74
  - XON/XOFF protocol, 74

---

## —S—

- Setting switches, 12
  - RS-232C parameters, 78
- Setup mode. *See* Level 1 diagnostics
- Slip station
  - character dot patterns, 216
  - print zones, 220
- Slip test modes
  - setting, 61
- Specifications, 211
  - RS-232C interface, 74
- Speed, 73
- Standard pitch
  - dot patterns, 216
- Supplies
  - cash drawer, 7
  - communication cables, 7
  - forms, 6
  - paper, 5

power cord, 7  
 power supply, 7  
 ribbon cassette, 6  
**shipped separately**, 9  
 Switch settings, 12  
 Switch Settings  
   RS-232C parameters, 78

---

## —T—

Technical specifications  
   RS-232C interface, 74  
 Thermal paper  
   ordering, 5  
   requirements, 5  
   suppliers, 5  
 Thermal printhead. *See* Printhead  
   cleaning, 8  
   print density, 213  
 Timing, 73  
 Troubleshooting. *See* Problems

Turning on the printer, 36

---

## —U—

User data storage  
   commands, 199  
 User data storage commands, 199  
 Using real time commands, 162

---

## —V—

Vertical Positioning Commands, 104

---

## —W—

Weight, of printer, 213

---

## —X—

XON/XOFF protocol, 74



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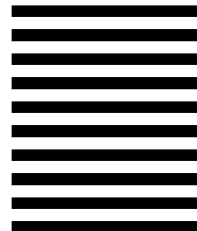


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