symbol®

LS 2106

Product Reference Guide

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70-32821-01
Revision D — September 2000

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symbol®

Symbol Technologies, Inc.

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Holtsville, N.Y. 11742-1300
http://www.symbol.com

FCC Information

This device complies with Part 15 of the FCC rules, and Canadian RSS:210. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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About This Guide

The *LS 2106 Product Reference Guide* provides general instructions for setup, programming, operation, troubleshooting, and maintenance of the LS 2106 scanner.

Notational Conventions

The following conventions are used in this document:

- ♦ Bullets (•) indicate:
  - ⬩ action items
  - ⬩ lists of alternatives
  - ⬩ lists of required steps that are not necessarily sequential
- ♦ Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

Related Publications

- ♦ *LS 2100 Series Quick Reference Guide*   p/n 70-32817-xx
- ♦ *LS 2100 Product Reference Guide*   p/n 70-32818-xx
- ♦ *LS 2104 Product Reference Guide*   p/n 70-32820-xx

Service Information

If you have a problem with your equipment, contact the *Symbol Support Centers*. Before calling, have the model number, serial number, and several of your bar code symbols at hand.

Call the Support Center from a phone near the scanning equipment so that the service person can try to talk you through your problem. If the equipment is found to be working properly
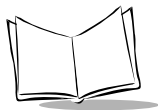
and the problem is symbol readability, the Support Center will request samples of your bar codes for analysis at our plant.

If your problem cannot be solved over the phone, you may need to return your equipment for servicing. If that is necessary, you will be given specific directions.

Note: *Symbol Technologies is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty. If the original shipping container was not kept, contact Symbol to have another sent to you.*

Symbol Support Centers

For service information, warranty information or technical assistance contact or call the Symbol Support Center in:

United States

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300
1-800-653-5350

Canada

Symbol Technologies Canada, Inc.
2540 Matheson Boulevard East
Mississauga, Ontario, Canada L4W 4Z2
905-629-7226

United Kingdom

Symbol Technologies
Symbol Place
Winnersh Triangle, Berkshire RG41 5TP
United Kingdom
0800 328 2424 (Inside UK)
+44 208 945 7529 (Outside UK)

Asia/Pacific

Symbol Technologies Asia, Inc.
230 Victoria Street #04-05
Bugis Junction Office Tower
Singapore 188024
337-6588 (Inside Singapore)
+65-337-6588 (Outside Singapore)

Australia

Symbol Technologies Pty. Ltd.
432 St. Kilda Road
Melbourne, Victoria 3004
1-800-672-906 (Inside Australia)
+61-3-9866-6044 (Outside Australia)

Austria

Symbol Technologies Austria GmbH
Prinz-Eugen Strasse 70
Suite 3
2.Haus, 5.Stock
1040 Vienna, Austria
1-505-5794 (Inside Austria)
+43-1-505-5794 (Outside Austria)

Denmark

Symbol Technologies AS

Gydevang 2,

DK-3450 Allerod, Denmark

7020-1718 (Inside Denmark)

+45-7020-1718 (Outside Denmark)

Europe/Mid-East Distributor Operations

Contact your local distributor or call

+44 208 945 7360

Finland

Oy Symbol Technologies

Kaupintie 8 A 6

FIN-00440 Helsinki, Finland

9 5407 580 (Inside Finland)

+358 9 5407 580 (Outside Finland)

France

Symbol Technologies France

Centre d'Affaire d'Antony

3 Rue de la Renaissance

92184 Antony Cedex, France

01-40-96-52-21 (Inside France)

+33-1-40-96-52-50 (Outside France)

Germany

Symbol Technologies GmbH

Waldstrasse 68

D-63128 Dietzenbach, Germany

6074-49020 (Inside Germany)

+49-6074-49020 (Outside Germany)

Italy

Symbol Technologies Italia S.R.L.

Via Cristoforo Columbo, 49

20090 Trezzano S/N Navigilo

Milano, Italy

2-484441 (Inside Italy)

+39-02-484441 (Outside Italy)

Latin America Sales Support

7900 Glades Road

Suite 340

Boca Raton, Florida 33434 USA

1-800-347-0178 (Inside United States)

+1-561-483-1275 (Outside United States)

Mexico

Symbol Technologies Mexico Ltd.

Torre Picasso

Boulevard Manuel Avila Camacho No 88

Lomas de Chapultepec CP 11000

Mexico City, DF, Mexico

5-520-1835 (Inside Mexico)

+52-5-520-1835 (Outside Mexico)

Netherlands

Symbol Technologies

Kerkplein 2, 7051 CX

Postbus 24 7050 AA

Varsseveld, Netherlands

315-271700 (Inside Netherlands)

+31-315-271700 (Outside Netherlands)

Norway

Symbol Technologies

Trollasveien 36

Postboks 72

1414 Trollasen, Norway

66810600 (Inside Norway)

+47-66810600 (Outside Norway)
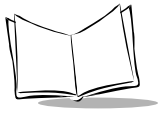
South Africa	Spain
Symbol Technologies Africa Inc.	Symbol Technologies S.A.
Block B2	Edificioi la Piovera Azul
Rutherford Estate	C. Peonias, No. 2 - Sexta Planta
1 Scott Street	28042 Madrid, Spain
Waverly 2090 Johannesburg	9-1-320-39-09 (Inside Spain)
Republic of South Africa	+34-9-1-320-39-09 (Outside Spain)
11-4405668 (Inside South Africa)	
+27-11-4405668 (Outside South Africa)	

Sweden

Symbol Technologies AB
Albygatan 109D
Solna
Sweden
84452900 (Inside Sweden)
+46 84452900 (Outside Sweden)

If you purchased your Symbol product from a Symbol Business Partner, contact that Business Partner for service.

Warranty

Symbol Technologies, Inc. ("Symbol") manufactures its hardware products in accordance with industry-standard practices. Symbol warrants that the HotShot LS2100 series (the "Product") will be free from defects in materials and workmanship for a period of sixty months (60 months) from date of shipment and for the life of the product with regard to the Mylar Scan Element (consisting of a Mylar Strip, mirror assembly and magnet) embedded in the Product.

This warranty is provided to the original owner only and is not transferable to any third party. It shall not apply to any product (i) which has been repaired or altered unless done or approved by Symbol, (ii) which has not been maintained in accordance with any operating or handling instructions supplied by Symbol, (iii) which has been subjected to unusual physical or electrical stress, misuse, abuse, power shortage, negligence or accident or (iv) which has been used other than in accordance with the product operating and handling instructions. Preventive maintenance is the responsibility of customer and is not covered under this warranty.

Wear items and accessories having a Symbol serial number, will carry a 90-day limited warranty. Non-serialized items will carry a 30-day limited warranty.

Warranty Coverage and Procedure

During the warranty period, Symbol will repair or replace defective products returned to Symbol's manufacturing plant in the US. For warranty service in North America, call the Symbol Support Center at 1-800-653-5350. International customers should contact the local Symbol office or support center. If warranty service is required, Symbol will issue a Return Material Authorization Number. Products must be shipped in the original or comparable packaging, shipping and insurance charges prepaid. Symbol will ship the repaired or replacement product freight and insurance prepaid in North America. Shipments from the US or other locations will be made F.O.B. Symbol's manufacturing plant.

Symbol will use new or refurbished parts at its discretion and will own all parts removed from repaired products. Customer will pay for the replacement product in case it does not return the replaced product to Symbol within 3 days of receipt of the replacement product. The process for return and customer's charges will be in accordance with Symbol's Exchange Policy in effect at the time of the exchange.

Customer accepts full responsibility for its software and data including the appropriate backup thereof.

Repair or replacement of a product during warranty will not extend the original warranty term.

Symbol's Customer Service organization offers an array of service plans, such as on-site, depot, or phone support, that can be implemented to meet customer's special operational requirements and are available at a substantial discount during warranty period.

General

Except for the warranties stated above, Symbol disclaims all warranties, express or implied, on products furnished hereunder, including without limitation implied warranties of merchantability and fitness for a particular purpose. The stated express warranties are in lieu of all obligations or liabilities on part of Symbol for damages, including without limitation, special, indirect, or consequential damages arising out of or in connection with the use or performance of the product.

Seller's liability for damages to buyer or others resulting from the use of any product, shall in no way exceed the purchase price of said product, except in instances of injury to persons or property.

Some states (or jurisdictions) do not allow the exclusion or limitation of incidental or consequential damages, so the proceeding exclusion or limitation may not apply to you.
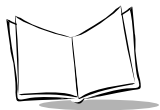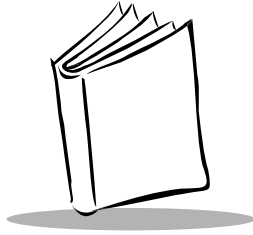
Chapter 1
Setting Up the LS 2106

Introduction

The LS 2106 hand-held laser scanner offers excellent performance in retail and light industrial applications. Advanced ergonomic design ensures comfortable use for extended periods of time.

The LS 2100 Series hand-held scanner is based on the SE 1200 Series scan engine, mylar® scan element and the Visible Laser Diode (VLD). This state of the art technology gives the scanner a wider decode zone, greater depth of field, and a visible scan beam. This model reads color bar codes and symbols printed on all substrates. See the *LS 2106 Decode Zone* on page 2-4.
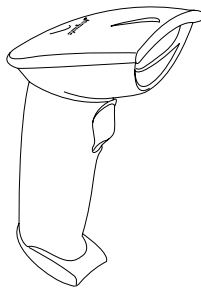
Figure 1-1. LS 2106 Scanner

Here's what each member of the LS 2100 family offers you:

♦ LS 2100 - The aggressiveness of this discrete scanner is typical of the
LS 2100 family's performance. It connects easily to, and is programmed by, the
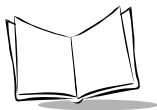
complete line of Symbol Technologies portable terminals and the full range of Symbol and OmniLink^{TM} interface controllers.

♦ LS 2104 - With a simple cable change, this scanner is compatible with:

   • RS 232C asynchronous terminals

   • Synapse^{TM} "Smart Cables", which allow you to connect to:

      • Wand Emulation terminals

      • IBM 4683/4, 4693/4 series of terminals
      All leading OCIA terminals, including NCR, Nixdorf, and ICL terminals.

      • Dual RS-232 Hosts

      • Popular OCR terminals, such as Fujitsu and ICL.

♦ LS 2106 - The LS 2106 scanner is a keyboard "wedge" interface which adds efficient, reliable bar code reading to your PS/2 or AT/XT terminal. Since entered scan data is transmitted as keystrokes, no software changes to the host system are necessary. The scanner contains on-board discrete keyboard wedge communications for connecting to asynchronous terminals and host systems. It can also accommodate any of the Synapse™ "Smart Cables" which allows you to connect to a wide variety of host systems. Some installations require one cable; others require additional adapters between the keyboard, the PC, and the y-cable.

All of the LS 2100 series scan automatically at the rate of 36 scans per second. For decode capability, see *Technical Specifications* on page 3-3.

Audience

The intended audience for this manual is personnel performing installation/setup and programming of LS 2106 scanners.

Unpacking

Remove the LS 2106 from its packing and inspect it for damage. If the scanner was damaged in transit, call the Symbol Support Center at one of the telephone numbers listed on page xx. **KEEP THE PACKING.** It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

Setting Up the LS 2106

Installing the Cable

Insert the cable into the receptable on the bottom of the scanner, as shown below:
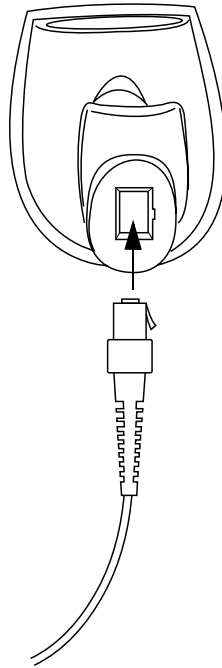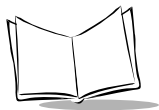
Figure 1-2. Installing the Cable

Switching Cables

Different cables are required for different hosts. To change the scanner cable:

1. Press the tab on the cable with a small screwdriver.
2. Pull the cable out of the receptacle on the bottom of the scanner.
3. Insert a new cable in the receptacle. Press the cable into the receptacle until you hear a click.

Connecting to a Host

Plug the connector at the end of the LS 2106 cable into the appropriate port on the Symbol interface controller or portable terminal. Refer to the controller user documentation for full details.

OCIA via Synapse

IBM via Synapse Adapter Cable

Keyboard Wedge

Keyboard Wedge via Synapse
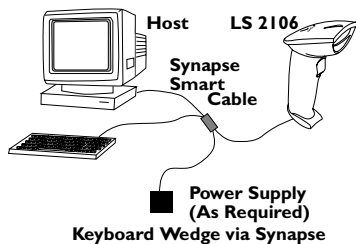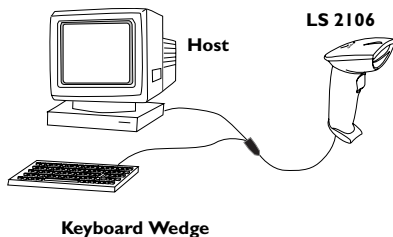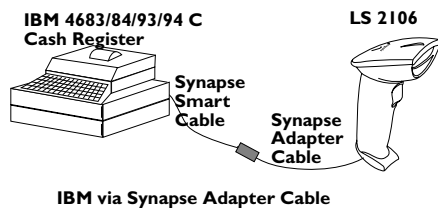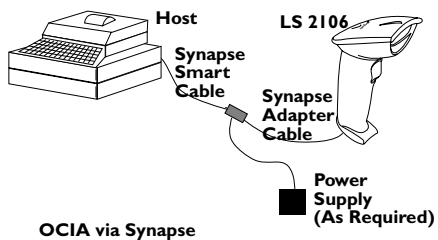
Figure 1-3. Connecting to a Host
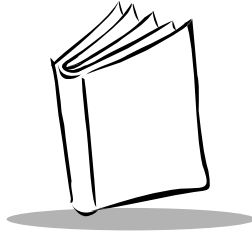
Chapter 2
Scanning with the LS 2106

Introduction

This chapter covers the proper techniques for scanning bar codes and the decode zone for the LS 2106 scanner.

Scanning with the LS 2106

Before you can use the scanner, it should have already been installed and programmed. If not, refer to Chapter 4, *Parameter Menus* for instructions on programming your scanner. If you need assistance, contact your local supplier or Symbol Techologies.

1. Before you use the scanner, make sure all cable connections are secure.
2. Make sure the bar code is in the correct scanning range. Aim and press the trigger; the scan beam lights and an orange light illuminates at the rear of the scanner. The scanner has read the symbol when:
    - You hear a beep.
    - The orange light turns green.
    - The laser turns off.
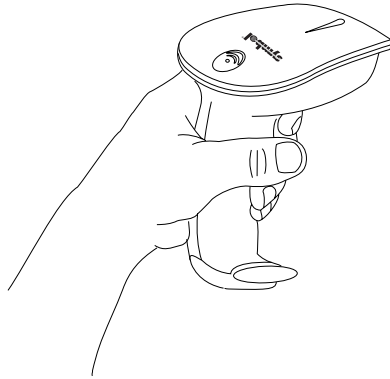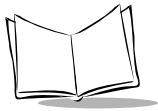
Figure 2-1. Holding the Scanner

Aiming the Scanner

Hold the scanner at an angle. Do not hold the scanner directly over the bar code. Laser light reflecting *directly* back into the scanner from the bar code is known as specular reflection. This strong light can "blind" the scanner and make decoding difficult. The area where specular reflection occurs is known as a "dead zone".

You can tilt the scanner up to 55° forward or back and achieve a successful decode. Simple practice quickly shows what tolerances to work within.
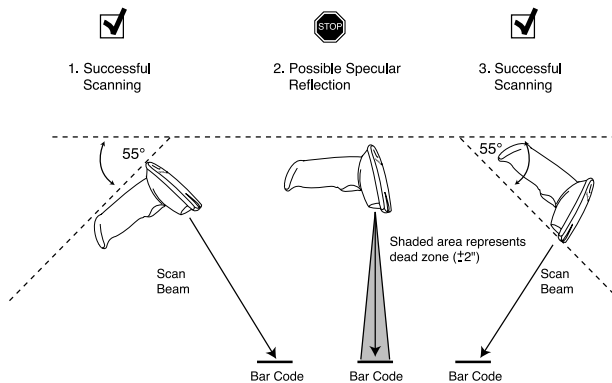
♦ Scan the Entire Symbol
  ⬧ The scan beam must cross every bar and space on the symbol (as in the left bar code below).
  ⬧ The larger the symbol, the farther away you should hold the scanner.
  ⬧ Hold the scanner closer for symbols with bars that are close together.

Right   **Wrong**

12345   12345

What Does The Beep Mean?

When you hear 1 beep (short high tone) it means data has been decoded successfully. If any other beeps are heard, contact the technical person in charge of scanning.

When the symbol has been successfully decoded, you will hear a short, high-tone beep, and the green decode LED will light.

For more specific information on the meanings of the various beeper sounds, refer to *Beeper Indications* on page 3-7.

LS 2106 Decode Zone

5 mil
(.5 - 2.5 in)

7.5 mil
(0 - 5.0 in)

10 mil
(0 - 7.0 in)

100x UPC
(0 - 11.0 in)

15 mil
(0 - 12.0 in)

20 mil
(0 - 14.0 in)

40 mil
(0 - 18.0 in)

55 mil
(0 - 23.0 in)

45°

| 15 in (38.1 cm) | 10 in (25.4 cm) | 5 in (12.7 cm) | 0 in (0 cm) | 5 in (12.7 cm) | 10 in (25.4 cm) | 15 in (38.1 cm) |

| 0 in (0 cm) | 5 in (12.7 cm) | 10 in (25.4 cm) | 15 in (38.1 cm) | 20 in (50.8 cm) | 25 in (63.5 cm) |
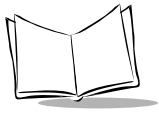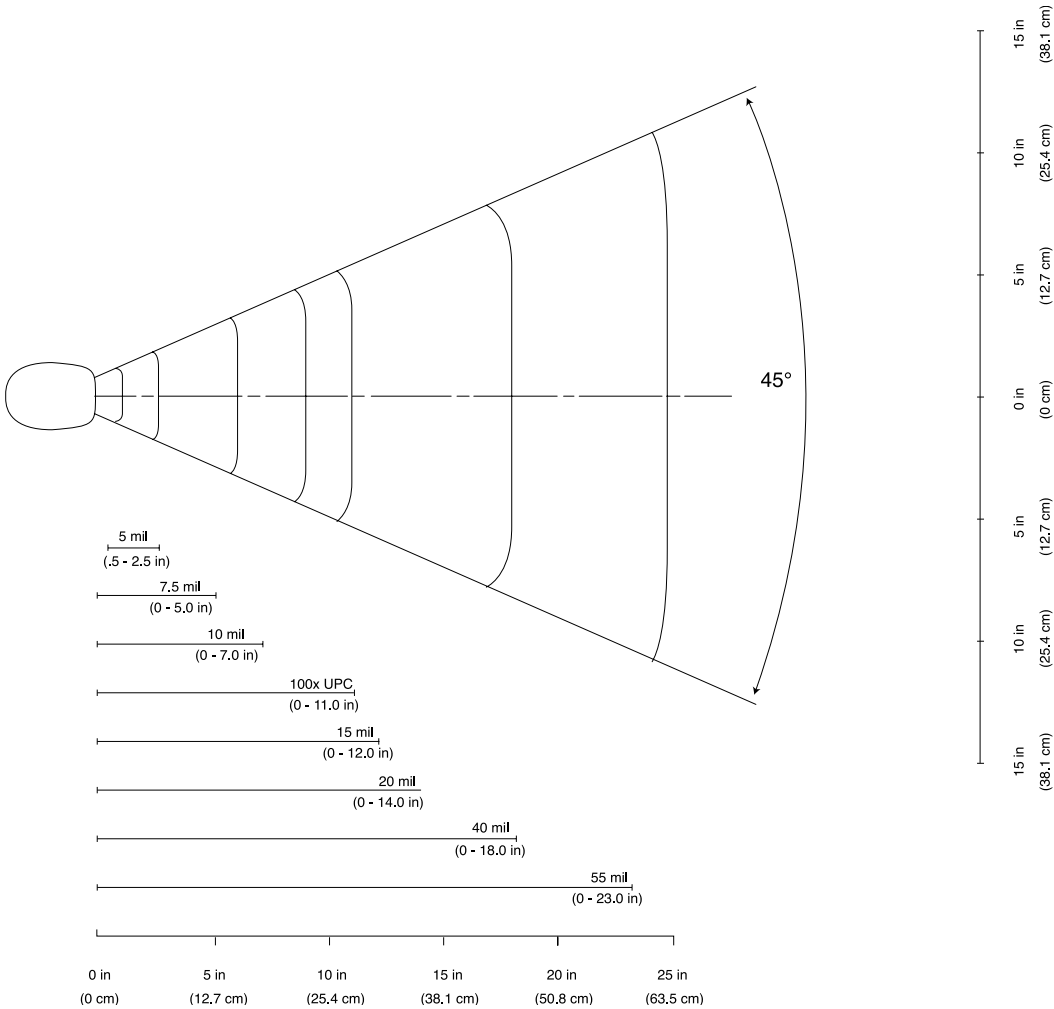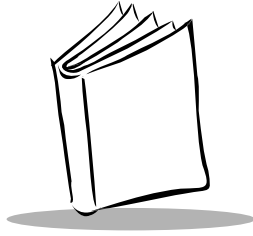
Chapter 3
Maintenance and Specifications

Introduction

This chapter covers the appropriate methods for maintaining and the technical specifications for the scanner.

Maintenance

Cleaning the exit window is the only maintenance required. A dirty window may affect scanning accuracy.

- ♦ Do not allow any abrasive material to touch the window.
- ♦ Remove any dirt particles with a damp cloth.
- ♦ Wipe the window using a tissue moistened with ammonia/water.
- ♦ Do not spray water or other cleaning liquids directly into the window.
- ♦ Do not remove the nose of the scanner.

Troubleshooting

If, after following the operating instructions, the scanner does not work:

- ♦ Check the system power.
- ♦ Make sure the controller is programmed to decode bar codes of the symbology you are scanning.
- ♦ Check for loose cable connections.
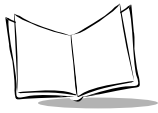
♦ Make sure the symbol is not defaced.

♦ Try scanning test symbols of the same code type.

If after performing these checks the symbol still does not scan, contact your distributor or call the Symbol Support Center. See page viii for the telephone number.

Accessories

Standard Accessories:

Description	Part Number
LS 2100 Series Quick Reference Guide	70-32817-xx
LS 2106 Product Reference Guide	70-32821-xx
Shipping Box	50-01400-184

Cables

Description	Part Number
PS/2 "Y" Scanner Cable	25-31828-01
PS/2 to AT/XT Adapter Connectors	KT-32903-01(Set)
IBM SureOne PS2 Cable	25-17359-01
Synapse Adapter Cable	25-31617-01
110V Power Supply	50-14000-008
220/240V Power Supply	50-14000-009

Optional Accessories

Optional accessories, supplied at extra cost, include additional units of any item listed above and the following items:

Description	Part Number
Hands-Free Stand-free standing	21-33324-01
Desk-Mount Stand	21-33323-01

Technical Specifications

Item	Description
Power Requirements	4.75 to 5.25 VDC; 180 mA @ 5 VDC Typical Low Power: 20µ maximum
Decode Capability	UPC/EAN,UPC/EAN with supplementals, UCC/EAN 128, Code 39 Full ASCII, Code 128, Codabar, Interleaved 2 of 5, Discrete 2 of 5, Code 93, MSI/Plessey.
Decode Depth of Field	Maximum typical working distance is 11.0 in. (100% UPC/EAN); minimum element width resolution is 5.5 mils
Scan Repetition Rate	Approximately 36 scans/sec (bidirectional)
Skew Tolerance	± 55° min. (from normal)
Pitch Tolerance	± 50° (from normal)
Yaw	± 35° at 6 in. on 100% UPC/EAN
Print Contrast Minimum	20% minimum reflectance differential, measured at 675 nm.
Ambient Light Immunity	Immune to direct exposure to normal office and factory lighting conditions, as well as direct exposure to sunlight.
Durability	5 ft (152 cm) drops to concrete
Operating Temperature	32° to 104°F (0° to 40°C)
Storage Temperature	-40° to 140° (-40° to 60°C)
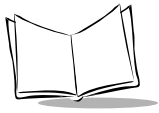
Item	Description
Straight Cable Length	6 ft (183 cm)
Weight (without cable)	5.5 oz. (170 gm)
Dimensions:	
Height	6.7 in (167 mm)
Width	2.8 in (70 mm)
Depth	3.4 in (85 mm)

LS 2106 Signal Descriptions

The following signal descriptions apply to the connection between the scanner and the cable, and are for reference only.

Table 3-1. Signal Descriptions

Pin	Signal Name	Function
2	VBATT	Input power.
3	GROUND	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
4	Terminal Clock	Bidirectional clock signal used to communicate between the host terminal and the scanner or keyboard.
6	Synapse Data	Data line for Synapse communication.
7	Synapse Clock	Clock line for Synapse communication.
8	Terminal Data	Bidirectional data signal used to communicate between the host terminal and the scanner or keyboard
9	Keyboard Data Clamp	Active-low output data signal used to communicate from the scanner to the keyboard.
10	Keyboard Clock Clamp	Active-low output clock signal used to communicate from the scanner to the keyboard.
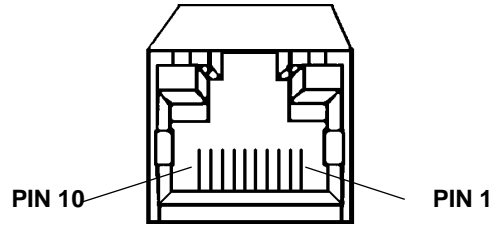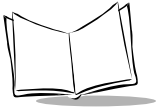
Figure 3-1. 10-pin Connector

Beeper Indications

Standard Use Beeper Sequence	Indication
Short high tone	A bar code symbol was decoded (if decode beeper is enabled).
4 Beeps - long low tone	A transmission error has been detected in a scanned symbol. The data is ignored. This will occur if a unit is not properly configured. Check option settings.
5 Beeps - low tone	Convert or format error
Lo/hi/lo tone	ADF transmit error
Hi/hi/hi/lo tone	RS-232 receive error
Parameter Menu Scanning	
Short high tone	Correct entry scanned or correct menu sequence performed.
Lo/hi tone	Input error, incorrect bar code or "Cancel" scanned, wrong entry, incorrect bar code programming sequence; remain in program mode.
Hi/lo tone	Keyboard parameter selected. Enter value using bar code keypad.
Hi/lo/hi/lo tone	Successful program exit with change in the parameter setting.
Code 39 Buffering	
Hi/lo tone	New Code 39 data was entered into the buffer.
3 Beeps - long high tone	Code 39 buffer is full.
Lo/hi/lo tone	The buffer was erased, or there was an attempt to transmit an empty buffer. When the Code 39 buffer was empty, the scanner read a command to clear or to transmit a Code 39 buffer.
4 Beeps - long low tone	Error in data transmission.
Lo/hi tone	A successful transmission of buffered data.
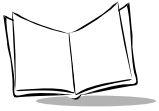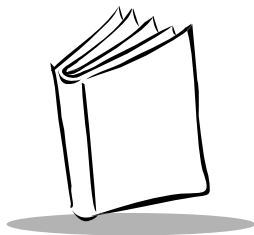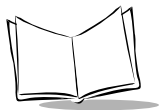
Chapter 4
Parameter Menus

Introduction

The LS 2106 is shipped with the settings shown in the *Default Parameters* beginning on page 4-2. These default values are stored in non-volatile memory and are preserved even when the scanner is powered down. You can change these default values by scanning the appropriate bar codes included in this manual. These new values replace the standard default values in memory. The default parameter values can be recalled by scanning the *SET ALL DEFAULTS* bar code on page 4-7.

The scanner automatically identifies the host type on power-up. It makes this determination provided the host is powered-up before the scanner is attached to it. The following table lists the defaults for all parameters. If you wish to change any option, scan the appropriate bar code(s).

Default Parameters

Table 4-1. Default Parameters

Parameter	Default	Page Number
Set Default Parameter	All Defaults	4-7
Beeper Volume	High	4-8
Laser On Time	3.0 seconds	4-9
Power Mode	Continuous	4-10
Beep After Good Decode	Enable	4-11
Transmit "No Read" Message	Disable	4-12
Decode Redundancy	Level 0	4-13
Autodiscriminate Response Time	1 second	4-14
UPC/EAN		
UPC-A	Enable	4-15
UPC-E	Enable	4-15
EAN-8	Enable	4-16
EAN-13	Enable	4-16
Bookland EAN	Disable	4-17
Decode UPC/EAN Supplementals	Ignore	4-18
Transmit UPC-A Check Digit	Enable	4-19
Transmit UPC-E Check Digit	Enable	4-19
UPC-A Preamble	System Character	4-20
UPC-E Preamble	System Character	4-21

Table 4-1. Default Parameters (Continued)

Parameter	Default	Page Number
Convert UPC-E to A	Disable	4-22
EAN-8 Zero Extend	Disable	4-23
EAN Zero Extend Code Type	EAN13	4-24
Code 128		
Code 128	Enable	4-25
UCC/EAN-128	Enable	4-26
Code 39		
Code 39	Enable	4-27
Code 39 Check Digit Verification	Disable	4-28
Transmit Code 39 Check Digit	Disable	4-29
Code 39 Full ASCII Conversion	Disable	4-30
Buffer Code 39	Disable	4-31
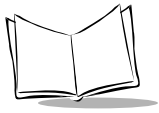
Table 4-1. Default Parameters (Continued)

Parameter	Default	Page Number
Code 93		
Code 93	Disable	4-34
Interleaved 2 of 5		
Interleaved 2 of 5	Enable	4-35
Set Length(s) for I 2 of 5	14	4-36
Convert I 2 of 5 to EAN 13	Disable	4-37
Discrete 2 of 5		
Discrete 2 of 5	Disable	4-38
Set Length(s) for D 2 of 5	12	4-39
Codabar		
Codabar	Disable	4-40
CLSI Editing	Disable	4-41
NOTIS Editing	Disable	4-42

Table 4-1. Default Parameters (Continued)

Parameter	Default	Page Number
MSI Plessey		
MSI Plessey	Disable	4-43
MSI Plessey Check Digits	One	4-44
Transmit MSI Plessey Check Digit	Disable	4-45
MSI Plessey Check Digit Algorithm	Mod 10/Mod 10	4-46
Data Options		
Transmit Code ID Character	None	4-48
Prefix/Suffix Values	7013 (<CR/LF> for serial)	4-49
Scan Data Transmission Format	Data as is	4-51
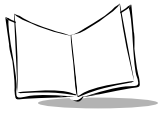
Table 4-1. Default Parameters (Continued)
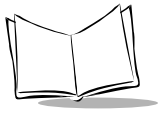
Parameter	Default	Page Number
Keyboard Wedge		
Host Type	IBM PC AT	4-52
National Keyboard Type	North American	4-53
Fast Transmit	Enabled	4-55
Intercharacter Delay	0	4-56

Set Default Parameter

Scanning this bar code returns all parameters to the default values listed in Table 4-1. beginning on page 4-2.
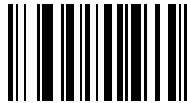
SET ALL DEFAULTS

Beeper Volume

To select a beeper volume, scan the **LOW VOLUME** or **HIGH VOLUME** bar code.

LOW VOLUME

HIGH VOLUME

Laser On Time

This parameter sets the maximum time decode processing continues during a scan attempt. It is programmable in 0.1 second increments from 0.5 to 9.9 seconds.

To set a Laser On Time, scan the bar code below. Next scan two numeric bar codes beginning on page 4-57 that correspond to the desired time on. Single digit numbers must have a leading zero. For example, to set a Time On of .5 seconds, scan the bar code below, then scan the "0" and "5" bar codes. If you make an error, or wish to change your selection, scan the **CANCEL** bar code on page 4-59.

LASER ON TIME

Power Mode

This parameter determines whether or not power remains on after a decode attempt. When in low power mode, the scanner enters into a low power consumption mode to preserve battery life after each decode attempt. When in continuous power mode, power remains on after each decode attempt.

CONTINUOUS ON

LOW POWER

Beep After Good Decode

Scan this symbol if you want the unit to beep after a good decode.

BEEP AFTER GOOD DECODE

Do Not Beep After Good Decode

Scan this symbol if you do not want the unit to beep after a good decode. The beeper still operates during parameter menu scanning and indicates error conditions.

DO NOT BEEP AFTER GOOD DECODE
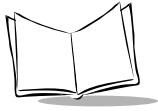
Transmit "No Read" Message

When enabled, if a symbol does not decode, "NR" is transmitted. Any prefixes or suffixes which have been enabled are appended around this message.

ENABLE NO READ

Do Not Transmit "No Read" Message

When disabled, if a symbol does not read, nothing is sent to the host.

DISABLE NO READ

Decode Redundancy

Use this parameter to indicate whether the scanner must read a bar code one time (Level 0), two times (Level 1) or three times (Level 2) before decoding it. A higher level of redundancy ensures the accuracy of a decode in, for example, poor quality symbols.

LEVEL 0

LEVEL I

LEVEL 2
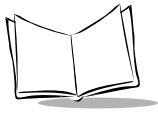
Autodiscriminate Response Time

This parameter extends the length of time during which the scanner tries to detect which host it is connected to on power up.

> **Note:** *When connected to an LS 5700/5800, the 5-second option must be used.*

1 SECOND (default)

5 SECONDS

Enable/Disable UPC-E/UPC-A

To enable or disable UPC-E or UPC-A, scan the appropriate bar code below.

ENABLE UPC-E

DISABLE UPC-E

ENABLE UPC-A

DISABLE UPC-A

Enable/Disable EAN-8/EAN-13

To enable or disable EAN-8 or EAN-13, scan the appropriate bar code below.
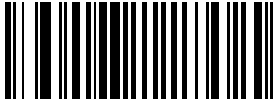
ENABLE EAN-8
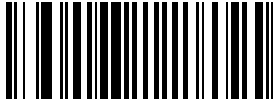
DISABLE EAN-8

ENABLE EAN-13

DISABLE EAN-13

Enable/Disable Bookland EAN

To enable or disable EAN Bookland, scan the appropriate bar code below.

ENABLE BOOKLAND EAN

DISABLE BOOKLAND EAN
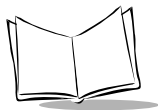
Decode UPC/EAN Supplementals

Supplementals are additionally appended characters (2 or 5) according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+2). Three options are available.

If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters are not decoded.

If UPC/EAN without supplemental characters is selected, and the LS 2106 is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN is decoded and the supplemental characters ignored.

An autodiscriminate option is also available. If this option is selected, choose an appropriate *Transmit UPC-A/UPC-E Check Digit* value from the next page. A value of 5 or more is recommended.

> **Note:** In order to minimize the risk of invalid data transmission, it is recommended that you select whether to read or ignore supplemental characters.

DECODE UPC/EAN WITH SUPPLEMENTALS

IGNORE UPC/EAN WITH SUPPLEMENTALS
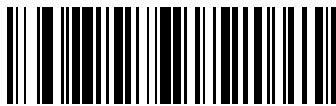
AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS

Transmit UPC-A/UPC-E Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-A or UPC-E check digit.

TRANSMIT UPC-A CHECK DIGIT

DO NOT TRANSMIT UPC-A CHECK DIGIT

TRANSMIT UPC-E CHECK DIGIT

DO NOT TRANSMIT UPC-E CHECK DIGIT
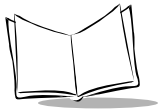
UPC-A Preamble

Three options are given for lead-in characters for UPC-A symbols transmitted to the host device: transmit system character only, transmit system character and country code ("0" for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.
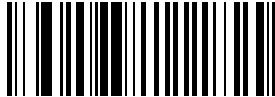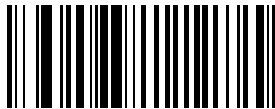
NO PREAMBLE
(<DATA>)

SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

SYSTEM CHARACTER & COUNTRY CODE
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

UPC-E Preamble

Three options are given for lead-in characters for UPC-E symbols transmitted to the host device: transmit system character only, transmit system character and country code ("0" for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.

NO PREAMBLE
(<DATA>)

SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

SYSTEM CHARACTER & COUNTRY CODE
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
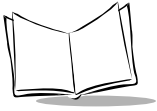
Convert UPC-E to UPC-A

This parameter converts UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, data follows UPC-A format and be affected by UPC-A programming selections (e.g., Preamble, Check Digit).

Scanning **DO NOT CONVERT UPC-E TO UPC-A** allows you to transmit UPC-E (zero suppressed) decoded data.

**CONVERT UPC-E TO UPC-A
(ENABLE)**
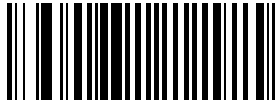
**DO NOT CONVERT UPC-E TO UPC-A
(DISABLE)**

EAN Zero Extend

If this parameter is enabled, five leading zeros are added to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.
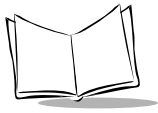
Disabling this parameter returns EAN-8 symbols to their normal format.

ENABLE EAN ZERO EXTEND

DISABLE EAN ZERO EXTEND

EAN Zero Extend Code Type

This parameter allows a decoded EAN-8 symbol that has been converted to EAN-13 to be transmitted with either an EAN-13 code type or an EAN-8 code type.

TYPE IS EAN-13 (Default)

TYPE IS EAN-8

Enable/Disable Code 128

To enable or disable Code 128, scan the appropriate bar code below.
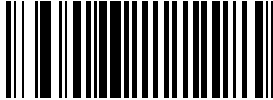
ENABLE CODE 128

DISABLE CODE 128
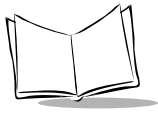
Enable/Disable UCC/EAN-128

To enable or disable UCC/EAN-128, scan the appropriate bar code below.
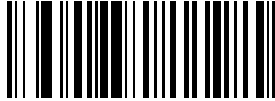
ENABLE UCC/EAN-128

DISABLE UCC/EAN-128

Enable/Disable Code 39
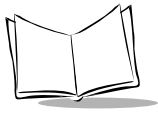
To enable or disable Code 39, scan the appropriate bar code below.

ENABLE CODE 39

DISABLE CODE 39

Code 39 Check Digit Verification

When enabled, this parameter checks the integrity of a Code 39 symbol to ensure it complies with specified algorithms.

Only those code 39 symbols which include a modulo 43 check digit are decoded when this parameter is enabled.
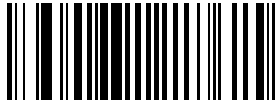
ENABLE CODE 39 CHECK DIGIT
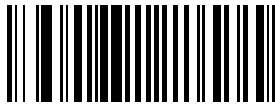
DISABLE CODE 39 CHECK DIGIT

Transmit Code 39 Check Digit

Scan this symbol if you want to transmit the check digit with the data.
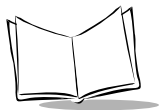
**TRANSMIT CODE 39 CHECK DIGIT
(ENABLE)**

Do Not Transmit Code 39 Check Digit

Scan this symbol if you want to transmit the data without the check digit.

**DO NOT TRANSMIT CODE 39 CHECK DIGIT
(DISABLE)**

Enable/Disable Code 39 Full ASCII

To enable or disable Code 39 Full ASCII, scan the appropriate bar code below.

When enabled, the ASCII character set assigns a code to letters, punctuation marks, numerals, and most control keystrokes on the keyboard.

The first 32 codes are non-printable and are assigned to keyboard control characters such as BACKSPACE and RETURN. The other 96 are called printable codes because all but SPACE and DELETE produce visible characters.

Code 39 Full ASCII interprets the bar code special character ($ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, when Code 39 Full ASCII is enabled and a **+B** is scanned, it is interpreted as **b**, **%J** as **?**, and **$H** emulates the keystroke **BACKSPACE**. Scanning **ABC$M** outputs the keystroke equivalent of **ABC ENTER**.

The scanner does not autodiscriminate between Code 39 and Code 39 Full ASCII.
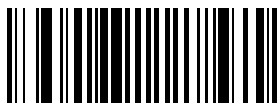
ENABLE CODE 39 FULL ASCII

DISABLE CODE 39 FULL ASCII

Code 39 Buffering (Scan & Store)

When you select the scan and store option, all Code 39 symbols having a leading space as a first character are temporarily buffered in the unit to be transmitted later. The leading space is not buffered.

Decode of a valid Code 39 symbol with no leading space causes transmission in sequence of all buffered data in a first-in first-out format, plus transmission of the "triggering" symbol. See the following pages for further details.

When the scan and transmit option is selected, decoded Code 39 symbols without leading spaces are transmitted without being stored in the buffer.

Scan and Store affects Code 39 decodes only. If you select scan and store, we recommend that you configure the scanner to decode Code 39 symbology only.

**BUFFER CODE 39
(ENABLE)**

**DO NOT BUFFER CODE 39
(DISABLE)**

While there is data in the transmission buffer, deleting Code 39 buffering capability via the parameter menu is not allowed. The buffer holds 200 bytes of information.

To allow disabling of Code 39 buffering, first force the buffer transmission (see *Transmit Buffer*) or clear the buffer. Both the **CLEAR BUFFER** and **TRANSMIT BUFFER** bar codes are length 1. *Be sure Code 39 length is set to include length 1.*

Buffer Data

To buffer data, Code 39 buffering must be enabled, and a symbol must be read with a space immediately following the start pattern.

♦ Unless symbol overflows the transmission buffer, the unit gives a lo/hi beep to indicate successful decode and buffering. See *Overfilling Transmission Buffer*.

♦ Unit adds the message, excluding the leading space to the transmission buffer.

♦ No transmission occurs.

Clear Transmission Buffer

To clear the transmission buffer, read a symbol which contains only a start character, a dash (minus), and a stop character.

♦ Unit issues a short hi/lo/hi beep to signal that the transmission buffer has been erased, and no transmission has occurred.

♦ Unit erases the transmission buffer.

♦ No transmission occurs.

CLEAR BUFFER

Transmit Buffer

To transmit the buffer, read a symbol containing either the first or second condition:

1. Only a start character, a plus (+), and a stop character.
    *   The unit signals that the transmission buffer has been sent (a lo/hi beep).
    *   Unit sends the buffer.
    *   Unit clears the buffer.

TRANSMIT BUFFER

2. A Code 39 bar code with leading character other than a space.
    *   The unit signals a good decode and buffering of that decode has occurred by giving a hi/lo beep.
    *   Unit transmits the buffer.
    *   Unit signals that the buffer has been transmitted with a lo/hi beep.

Overfilling Transmission Buffer
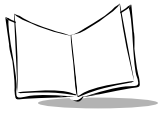
If the symbol just read results in an overflow of the transmission buffer:

♦   Unit indicates that the symbol has been rejected by issuing three long, high beeps.
    *   No transmission occurs. Data in buffer is not affected.

Attempt to Transmit an Empty Buffer

If the symbol just read was the transmit buffer symbol and the Code 39 buffer is empty:

♦   A short lo/hi/lo beep signals that the buffer is empty.
♦   No transmission occurs.
♦   The buffer remains empty.

Enable/Disable Code 93

To enable or disable Code 93, scan the appropriate bar code below.

ENABLE CODE 93

DISABLE CODE 93

Enable/Disable Interleaved 2 of 5

To enable or disable Interleaved 2 of 5, scan the appropriate bar code below.

ENABLE INTERLEAVED 2 OF 5

DISABLE INTERLEAVED 2 OF 5
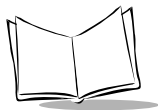
Set Lengths for Interleaved 2 of 5

Lengths for I 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **I 2 of 5 One Discrete Length**, then scan **1, 4**, the only I 2 of 5 symbols decoded are those containing 14 characters. Numeric bar codes begin on page 4-57. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.

I 2 of 5 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **I 2 of 5 Two Discrete Lengths**, then scan **0, 2, 1, 4,** the only I 2 of 5 symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 4-57. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.

I 2 of 5 - TWO DISCRETE LENGTHS

Convert I 2 of 5 to EAN-13

This parameter converts a 14 character I 2 of 5 code into EAN-13, and transmits to the host as EAN-13. In order to accomplish this, the I 2 of 5 code must be enabled, one length must be set to 14, and the code must have a leading zero and a valid EAN-13 check digit.

CONVERT I 2 of 5 to EAN-13
(ENABLE)

DO NOT CONVERT I 2 of 5 to EAN-13
(DISABLE)

Enable/Disable Discrete 2 of 5

To enable or disable Discrete 2 of 5, scan the appropriate bar code below.

ENABLE DISCRETE 2 OF 5

DISABLE DISCRETE 2 OF 5

Set Lengths for Discrete 2 of 5

Lengths for D 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **D 2 of 5 One Discrete Length,** then scan **1, 4,** the only D 2 of 5 symbols decoded are those containing 14 characters. Numeric bar codes begin on page 4-57. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.

D 2 of 5 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **D 2 of 5 Two Discrete Lengths,** then scan **0, 2, 1, 4,** the only D 2 of 5 symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 4-57. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.

D 2 of 5 - TWO DISCRETE LENGTHS

Enable/Disable Codabar

To enable or disable Codabar, scan the appropriate bar code below.
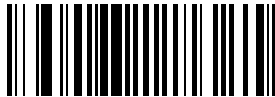
ENABLE CODABAR
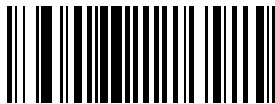
DISABLE CODABAR

CLSI Editing

When enabled, this parameter strips the start and stop characters and inserts a space after the first, fifth, and tenth characters of a 14-character Codabar symbol.

Note: *Symbol length does not include start and stop characters.*
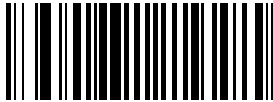
ENABLE CLSI EDITING

DISABLE CLSI EDITING

NOTIS Editing

When enabled, this parameter strips the start and stop characters from decoded Codabar symbol.
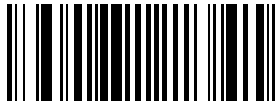
ENABLE NOTIS EDITING
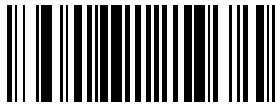
DISABLE NOTIS EDITING

Enable/Disable MSI Plessey

To enable or disable MSI Plessey, scan the appropriate bar code below.

ENABLE MSI PLESSEY

DISABLE MSI PLESSEY

MSI Plessey Check Digits

These check digits, at the end of the bar code verify the integrity of the data. At least one check digit is always required. Check digits are not automatically transmitted with the data.

ONE MSI Plessey CHECK DIGIT

TWO MSI Plessey CHECK DIGIT

Transmit MSI Plessey Check Digit

Scan this symbol if you want to transmit the check digit with the data.

**TRANSMIT MSI Plessey CHECK DIGIT
(ENABLE)**

Do Not Transmit MSI Plessey Check Digit

Scan this symbol if you want to transmit the data without the check digit.

**DO NOT TRANSMIT MSI Plessey CHECK DIGIT
(DISABLE)**
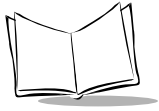
MSI Plessey Check Digit Algorithm

When the two MSI Plessey check digits option is selected, an additional verification is required to ensure integrity. Either of the two following algorithms may be selected.

MOD 11/MOD 10

MOD 10/MOD 10

Transmit Code ID Character

A code ID character identifies the code type of a scanned bar code. This may be useful when the scanner is decoding more than one code type. In addition to any single character prefix already selected, the code ID character is inserted between the prefix and the decoded symbol.

The user may select no code ID character, a Symbol Code ID character, or an AIM Code ID character. The Symbol Code ID characters are listed below.

A = UPC-A, UPC-E, EAN-8, EAN-13

B = Code 39

C = Codabar

D = Code 128

E = Code 93

F = Interleaved 2 of 5

G = Discrete 2 of 5, or Discrete 2 of 5 IATA

J = MSI Plessey

K = UCC/EAN-128

L = Bookland EAN

Transmit Code ID Character

||||| |||| ||| ||||||||||
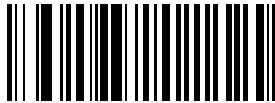
SYMBOL CODE ID CHARACTER

||||| |||||| |||| ||||||

AIM CODE ID CHARACTER

||||| |||||| ||||||||
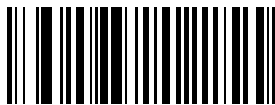
NONE

Prefix/Suffix Values

A prefix/suffix may be appended to scan data for use in data editing. These values are set by scanning a four-digit number (i.e. four bar codes) that corresponds to key codes for various terminals. See Table A-1 on page A-1 for conversion information. Numeric bar codes begin on page 4-57. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.
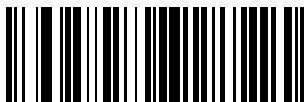
SCAN PREFIX

SCAN SUFFIX

SCAN SUFFIX 2
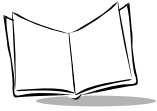
Scan Data Transmission Format

Use this parameter to change the format of the scanned data.

DATA AS IS

<DATA><SUFFIX 1>

<DATA> <SUFFIX 2>

Scan Data Transmission Format (cont'd)

<DATA <SUFFIX 1><SUFFIX 2>

<PREFIX> <DATA>

<PREFIX><DATA><SUFFIX 1>

<PREFIX><DATA><SUFFIX 2>

<PREFIX><DATA><SUFFIX 1><SUFFIX 2>

Host Interfaces

Use these bar codes to select your host interface.

IBM PC/AT IBM PS/2-50, 55SX, 60, 70, 80 (Default)

IBM PS/2-30

IBM PC/XT

NCR 7052

National Keyboard Types

Use these bar codes to select the appropriate national keyboard type.

North American (Default)

French

German

French International

Spanish

Italian

Swedish

British

Fast Transmit

Older systems may require a slower transmission method. If your system still needs additional time to process keyboard dat after setting an Intercharacter Delay, scan the DISABLE FAST TRANSMIT bar code.

ENABLE FAST TRANSMIT

DISABLE FAST TRANSMIT (Default)
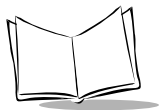
Intercharacter Delay

Select the intercharacter delay option matching host requirements. The intercharacter delay gives the host system time to service its receiver and perform other tasks between characters. The delay period can range from no delay to 99 msec in 1-msec increments. After scanning the bar code below, scan two bar codes beginning on page 4-57 to set the desired time-out. If you make an error or wish to change your selection, scan **CANCEL** on page 4-59.
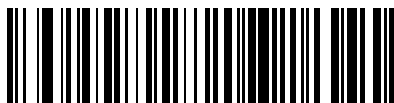
INTERCHARACTER DELAY

Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

0
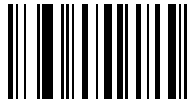
1
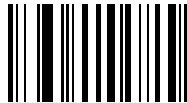
2

3

Numeric Bar Codes (cont'd)

4

5

6
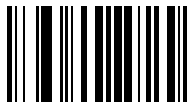
7

8

Numeric Bar Codes (cont'd)

9

Cancel

If you make an error or wish to change your selection, scan the bar code below.

CANCEL

Keyboard Maps

The keyboard maps on the following pages are provided for prefix/suffix keystroke parameters, and are used only with scanners that support data formatting. To program the prefix/suffix values, see the bar codes on page 4-49.
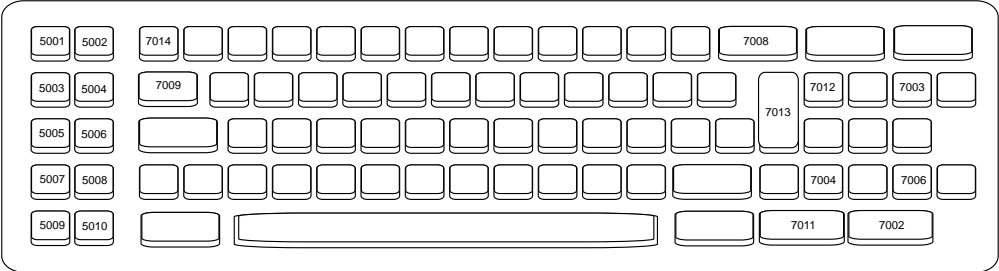
Figure 4-1. IBM PC/XT Keyboard
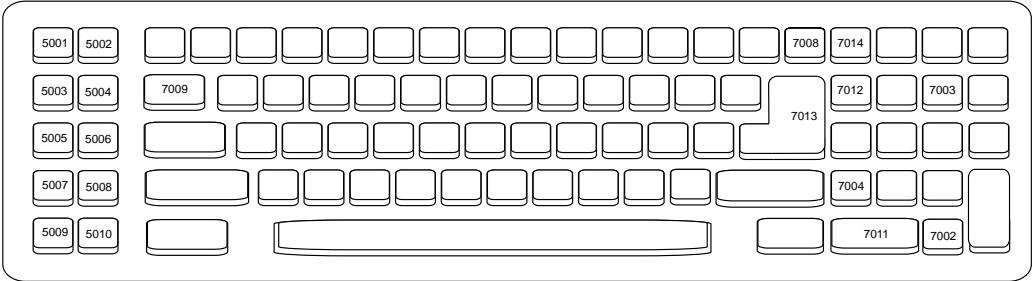
Figure 4-2. IBM PC/AT Keyboard
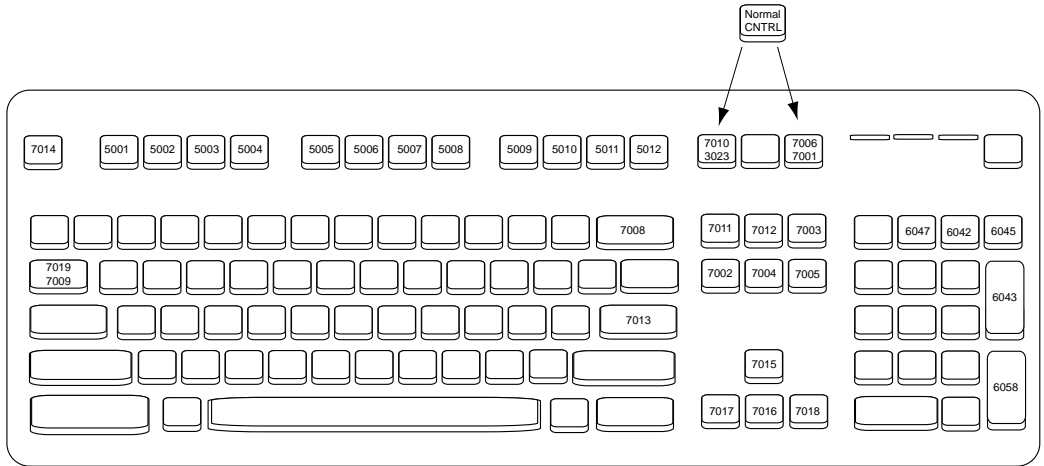
Figure 4-3. IBM PS2 Keyboard
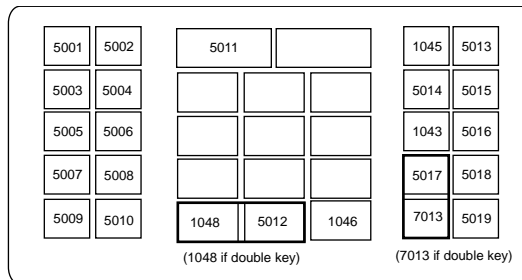
Figure 4-4. NCR 7052 32-Key Keyboard

1065	1066	1067		1068		1069	1070	1071
1072	1073	1074		1075		1076	1077	1078
1079	1080	1081		1082		1083	1084	1085
5001	5002	5011				1045	5013	1086
5003	5004					5014	5015	1087
5005	5006					1043	5016	1088
5007	5008					5017	5018	1089
5009	5010	1048	5012	1046		7013	5019	1090

(1048 if double key)   (1043 if double key)
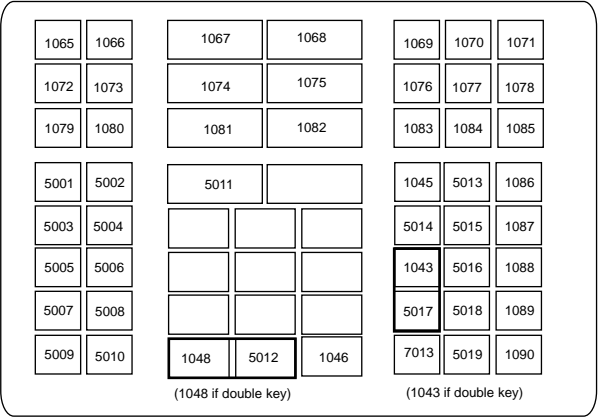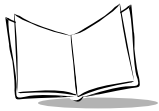
Figure 4-5. NCR 7052 58-Key Keyboard
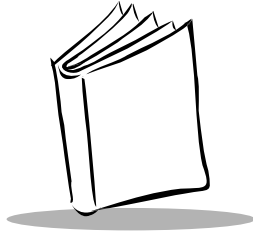
Appendix A
ASCII Character Set

Table A-1. ASCII Character Set

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke
1000	%U	CTRL 2
1001	$A	CTRL A
1002	$B	CTRL B
1003	$C	CTRL C
1004	$D	CTRL D
1005	$E	CTRL E
1006	$F	CTRL F
1007	$G	CTRL G
1008	$H	CTRL H
1009	$I	CTRL I
1010	$J	CTRL J
1011	$K	CTRL K
1012	$L	CTRL L
1013	$M	CTRL M
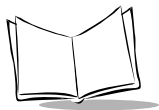
Table A-1. ASCII Character Set (Continued)

1014	$N	CTRL N
1015	$O	CTRL O
1016	$P	CTRL P
1017	$Q	CTRL Q
1018	$R	CTRL R
1019	$S	CTRL S
1020	$T	CTRL T
1021	$U	CTRL U
1022	$V	CTRL V
1023	$W	CTRL W
1024	$X	CTRL X
1025	$Y	CTRL Y
1026	$Z	CTRL Z
1027	%A	CTRL [
1028	%B	CTRL \
1029	%C	CTRL]
1030	%D	CTRL 6
1031	%E	CTRL -
1032	Space	Space
1033	/A	!
1034	/B	'
1035	/C	#
1036	/D	E
1037	/E	%
1038	/F	&
1039	/G	'
1040	/H	(

Table A-1. ASCII Character Set (Continued)

1041	/I	)
1042	/J	*
1043	/K	+
1044	/L	,
1045	-	-
1046	.	.
1047	/	/
1048	0	0
1047	1	1
1050	2	2
1051	3	3
1052	4	4
1053	5	5
1054	6	6
1055	7	7
1056	8	8
1057	9	9
1058	/Z	:
1059	%F	;
1060	%G	<
1061	%H	=
1062	%I	>
1063	%J	?
1064	%V	@
1065	A	A
1066	B	B
1067	C	C
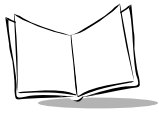
Table A-1. ASCII Character Set (Continued)

1068	D	D
1069	E	E
1070	F	F
1071	G	G
1072	H	H
1073	I	I
1074	J	J
1075	K	K
1076	L	L
1077	M	M
1078	N	N
1079	O	O
1080	P	P
1081	Q	Q
1082	R	R
1083	S	S
1084	T	T
1085	U	U
1086	V	V
1087	W	W
1088	X	X
1089	Y	Y
1090	Z	Z
1091	%K	[
1092	%L	\
1093	%M	]
1094	%N	^

Table A-1. ASCII Character Set (Continued)

1095	%O	_
1096	%W	'
1097	+A	a
1098	+B	b
1099	+C	c
1100	+D	d
1101	+E	e
1102	+F	f
1103	+G	g
1104	+H	h
1105	+I	i
1106	+J	j
1107	+K	k
1108	+L	l
1109	+M	m
1110	+N	n
1111	+O	o
1112	+P	p
1113	+Q	q
1114	+R	r
1115	+S	s
1116	+T	t
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x
1121	+Y	y

Table A-1. ASCII Character Set (Continued)

1122	+Z	z
1123	%P	{
1124	%Q	|
1125	%R	}
1126	%S	~
1127		Undefined
1128		
ALT Keys	**Keystroke**	
2064	ALT 2	
2065	ALT A	
2066	ALT B	
2067	ALT C	
2068	ALT D	
2069	ALT E	
2070	ALT F	
2071	ALT G	
2072	ALT H	
2073	ALT I	
2074	ALT J	
2075	ALT K	
2076	ALT L	
2077	ALT M	
2078	ALT N	
2079	ALT O	
2080	ALT P	
2081	ALT Q	
2082	ALT R	

Table A-1. ASCII Character Set (Continued)

2083	ALT S
2084	ALT T
2085	ALT U
2086	ALT V
2087	ALT W
2088	ALT X
2089	ALT Y
2090	ALT Z
2091	ALT [
2092	ALT \
2093	ALT]
2094	ALT 6
2095	ALT -
Misc. Key	**Keystroke**
3001	PA 1
3002	PA 2
3003	CMD 1
3004	CMD 2
3005	CMD 3
3006	CMD 4
3007	CMD 5
3008	CMD 6
3009	CMD 7
3010	CMD 8
3011	CMD 9
3012	CMD 10
3013	¥
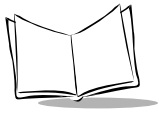
Table A-1. ASCII Character Set (Continued)

3014	£
3015	¤
3016	¬
3017	°
3018	1/2
3019	¶
3020	§
3021	|
3022	0/00
PF Keys	**Keystrokes**
4001	PF 1
4002	PF 2
4003	PF 3
4004	PF 4
4005	PF 5
4006	PF 6
4007	PF 7
4008	PF 8
4009	PF 9
4010	PF 10
4011	PF 11
4012	PF 12
4013	PF 13
4014	PF 14
4015	PF 15
4016	PF 16
4017	PF 17

Table A-1. ASCII Character Set (Continued)

4018	PF 18	
4019	PF 19	
4020	PF 20	
4021	PF 21	
4022	PF 22	
4023	PF 23	
4024	PF 24	
F Keys	**Keystroke**	
5001	F1	
5002	F2	
5003	F3	
5004	F4	
5005	F5	
5006	F6	
5007	F7	
5008	F8	
5009	F9	
5010	F10	
5011	F11	
5012	F12	
5013	F13	
5014	F14	
5015	F15	
5016	F16	
5017	F17	
5018	F18	
5019	F19	

Table A-1. ASCII Character Set (Continued)

5020	F20	
5021	F21	
5022	F22	
5023	F23	
5024	F24	
5025	F25	
5026	F26	
5027	F27	
5028	F28	
5029	F29	
5030	F30	
5031	F31	
5032	F32	
5033	F33	
5034	F34	
5035	F35	
5036	F36	
5037	F37	
5038	F38	
5039	F39	
5040	F40	
Numeric Keypad	**Keystroke**	
6042	*	
6043	+	
6044	undefined	
6045	-	

Table A-1. ASCII Character Set (Continued)

6046	.
6047	/
6048	0
6049	1
6050	2
6051	3
6052	4
6053	5
6054	6
6055	7
6056	8
6057	9
6058	Enter
6059	Num Lock
6060	00
Extended Keypad	**Keystroke**
7001	Break
7002	Delete
7003	Pg Up
7004	End
7005	Pg Dn
7006	Pause
7007	Scroll Lock
7008	Backspace
7009	Tab
7010	Print Screen
7011	Insert

Table A-1. ASCII Character Set (Continued)

7012	Home
7013	Enter
7014	Escape
7015	Up Arrow
7016	Dn Arrow
7017	Left Arrow
7018	Right Arrow
7019	Back Tab

Glossary

Aperture   The opening in an optical system defined by a lens or baffle that establishes the field of view.

 ASCII   American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks, and control characters. It is a standard data transmission code in the U.S.

Autodiscrimination   The ability of an interface controller to determine the code type of a scanned bar code. After this determination is made, the information content can be decoded.

Bar   The dark element in a printed bar code symbol.

Bar Code Density   The number of characters represented per unit of measurement (e.g., characters per inch).

Bar Height   The dimension of a bar measured perpendicular to the bar width.

Bar Width   Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Baud Rate   A measure of the data flow or number of signaling events occurring per second. When one bit is the standard "event," this is a measure of bits per second (bps). For example, a baud rate of 50 means transmission of 50 bits of data per second.

Bit   Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Byte	On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory can be used to store one ASCII character.
CDRH	Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.
CDRH Class 1	This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.
CDRH Class 2	No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.
Character	A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.
Character Set	Those characters available for encodation in a particular bar code symbology.
Check Digit	A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.
Codabar	A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (- $: / , +).
Code 128	A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.
Code 3 of 9 (Code 39)	A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9, and 7 special characters (- . / + % $ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.
Code 93	An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Code Length	Number of data characters in a bar code between the start and stop characters, not including those characters.
Continuous Code	A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.
Dead Zone	An area within a scanner's field of view, in which specular reflection may prevent a successful decode.
Decode	To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.
Decode Algorithm	A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.
Depth of Field	The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.
Discrete Code	A bar code or symbol in which the spaces between characters (intercharacter gaps) are not part of the code.
Discrete 2 of 5	A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.
EAN	European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.
Element	Generic term for a bar or space.
Encoded Area	Total linear dimension occupied by all characters of a code pattern, including start/stop characters and data.
Host Computer	A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs, and network control.
IEC	International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC (825) Class 1	This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.
Intercharacter Gap	The space between two adjacent bar code characters in a discrete code.
Interleaved Bar Code	A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.
Interleaved 2 of 5	A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.
LASER - Light Amplification by Stimulated Emission of Radiation	The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.
Laser Diode	A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.
LED Indicator	A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.
MIL	1 mil = 1 thousandth of an inch.
Misread (Misdecode)	A condition which occurs when the data output of a reader or interface controller does not agree with the data encoded within a bar code symbol.
Nominal	The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.
Nominal Size	Standard size for a bar code symbol. Most UPC/EAN codes can be used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).
Parameter	A variable that can have different values assigned to it.

Percent Decode   The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

Print Contrast Signal (PCS)   Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. PCS = (RL - RD) ⁄ RL, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.

Programming Mode   The state in which a scanner is configured for parameter values. See SCANNING MODE.

Quiet Zone   A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

Reflectance   Amount of light returned from an illuminated surface.

Resolution   The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

Scan Area   Area intended to contain a symbol.

Scanner   An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are:

1. Light source (laser or photoelectric cell) - illuminates a bar code.

2. Photodetector - registers the difference in reflected light (more light reflected from spaces).

3. Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

Scanning Mode   The scanner is energized, programmed, and ready to read a bar code.

Scanning Sequence   A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

Self-Checking Code   A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.

Space   The lighter element of a bar code formed by the background between bars.

Specular Reflection   The mirror-like reflection of light from a surface, which can "blind" a scanner.
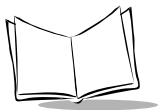
Start/Stop Character   A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

Substrate   A foundation material on which a substance or image is placed.

Symbol   A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters, and check characters.

Symbol Aspect Ratio   The ratio of symbol height to symbol width.

Symbol Height   The distance between the outside edges of the quiet zones of the first row and the last row.

Symbol Length   Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.

Symbology   The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39).

Tolerance   Allowable deviation from the nominal bar or space width.

UPC   Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which can be any of four widths. The standard symbology for retail food packages in the United States.

Visible Laser Diode (VLD)   A solid state device which produces visible laser light. Laser light emitted from the diode has a wavelength of 670 to 680 nanometers.

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We'd like to know what you think about this manual. Please take a moment to fill out this questionnaire and fax this form to: (516) 738-3318, or mail to:

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How familiar were you with this product before using this manual?

      Very familiar   Slightly familiar   Not at all familiar

Did this manual meet your needs? If not, please explain. _____

_____

_____

What topics need to be added to the index, if applicable?_____

_____

What topics do you feel need to be better discussed? Please be specific. _____

_____

_____

What can we do to further improve our manuals? _____

_____

_____

        Thank you for your input—We value your comments.