symbol®

LS 9100

Product Reference Guide

70-19620-02
Revision B — December 2001

Symbol Technologies, Inc. One Symbol Plaza, Holtsville N.Y. 11742

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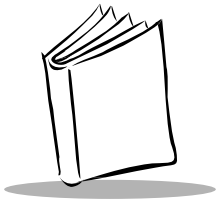

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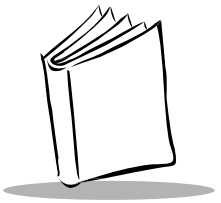
Tell Us What You Think...



About This Guide

The *LS 9100 Product Reference Guide* provides general instructions for setup, operation, troubleshooting, maintenance, and programming.

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 9100 Quick Reference Guide* 70-12495-0X or 70-19797-0X
- *Symbol Omnidirectional Scanners Advanced Programmer's Guide*70-15600-0X

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

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Mississauga, Ontario, Canada L4W 4Z2
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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 for a period of twelve (24) months from date of shipment, products will be free from defects in materials and workmanship.

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 plan 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

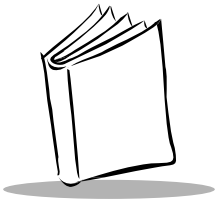
meet customer's special operational requirements and are available at a substantial discount during warranty period.

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 9100

Purpose

This Product Reference Guide provides detailed information about setting up and programming your scanner. For instructions on routine LS 9100 operation, see the *Quick Reference Guide* (Symbol p/n 70-12495-0X or 70-19797-0X) included with the scanner. If you are interested in Advanced Data Formatting, an *Advanced Programmer's Guide* (Symbol p/n 70-15600-0X) may be purchased separately.

Product Description

The LS 9100 projection scanner brings easy, hands-free scanning to your Point-of-Sale (POS) system. The scanner can be easily mounted virtually anywhere, such as to the POS countertop, or to the side of your POS terminal. The LS 9100 provides a number of positional adjustments to optimize its usefulness in a given POS environment or to suit a particular user's scanning preference. The LS 9100 can also be used as a hand-held scanner that can be removed from its cradle and brought to heavy or bulky merchandise. The compact LS 9100

reads all popular retail symbologies, and interfaces to all popular POS terminals.

Set Up

Unpacking

Inspect the LS 9100 shipping carton for damage. If the carton is torn or crushed, carefully inspect the contents to ensure that no damage has occurred. If the scanner was damaged in transit, call the nearest Symbol Support Center at the telephone number listed on page ix. KEEP THE PACKAGING, it is the approved shipping container and should be used if you ever need to return your equipment for service or upgrade.

Contents

The contents of your scanning system will vary depending on the host POS terminal you are using and the options you have selected. In most cases, your system will include the following:

- Scanner/stand
- Host interface cable(s)
- Quick Reference Guide
- Mounting Plate
- Mounting Hardware Kit (screws, double sided tape etc.)
- Power supply (if necessary)

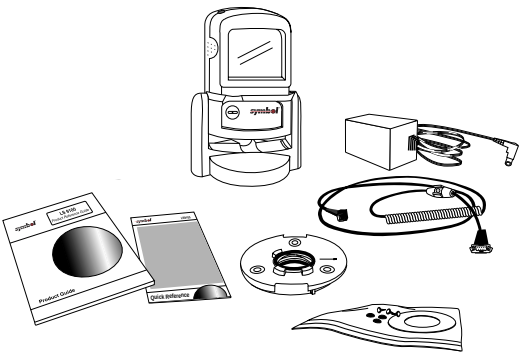
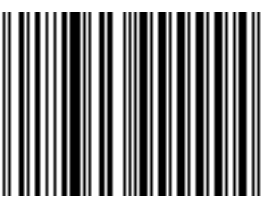


Figure 1-1. Scanning System Contents

Verify Scanner Operation

Before you install your LS 9100, verify that it is scanning properly:

- Connect the interface cable to the connector on the bottom of the scanner.
- If the POS system provides the necessary power, simply power down the host POS terminal and connect the other end of the interface cable into the appropriate port on the POS terminal.
- If a power supply is necessary, plug the AC adapter into an AC outlet, and connect the supply lead into the mating receptacle on the interface cable.
- Power up the terminal.
- When the scanner powers up, it will beep three times, and the green LED will flash three times and then remain lit.
- Present the "test bar code" below to the scanner. If the scanner is functioning properly, it will issue a short beep. **Note:** This bar code will not be transmitted to your host.



If the scanner does not emit any beeps, see *What If...* on page 3-2. Otherwise, power down the host, disconnect the scanner and continue with the installation!

Mounting

The LS 9100 Scanner can be mounted on a counter, on top or on the side of the POS terminal, or on the wall. Both free-standing (movable) and permanent mounting (fixed) options are available.

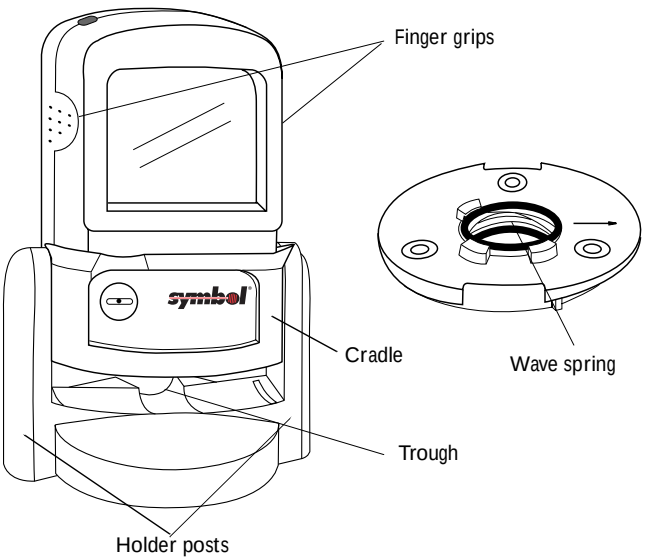


Figure 1-2. Parts of the LS 9100

Adjustment

Once mounted, the scanner's position in the stand may be adjusted. Grasp the finger grips and tip the scanner forward or backward to the desired angle.

Installing the LS 9100 Scanner

Counter Top Installation - Free Standing

1. Remove the protective paper from the three rubber feet and press the feet into the recessed areas on the bottom side of the mounting plate.

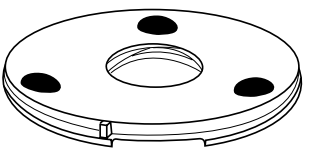


Figure 1-3. Applying Feet

2. Place the mounting plate onto the counter top, top side up.
3. Hold the scanner assembly by the holder posts so the trough is facing left (and the scanner facing right).
4. Place the assembly onto the plate so the cylinder underneath the holder is in contact with the wave spring in the mounting plate.

5. Press the holder downward and rotate clockwise 90° and release to lock the scanner assembly into the mounting plate.

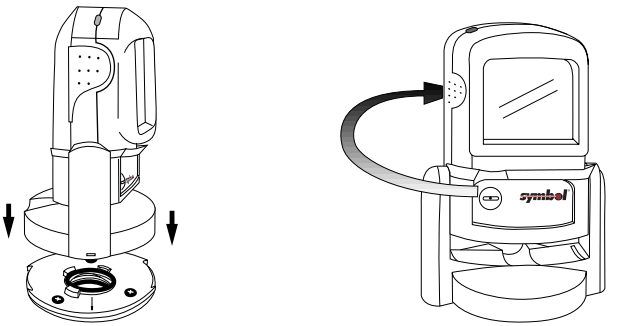


Figure 1-4. Placing Scanner onto Mounting Plate

6. Proceed to *Scanner Configuration* on page 1-11.

Counter Top Installation - Permanent Mounting with Screws

1. **With the arrow pointing in the direction the scanner will face**, place the mounting plate on the counter top.

2. Using the plate as your template, mark the three mounting holes and one cable hole.

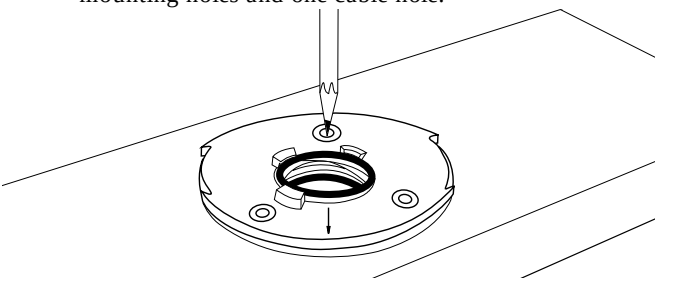


Figure 1-5. Marking Mounting Holes

3. Remove the mounting plate.
4. Drill 3.2 mm (1/8") pilot holes in the center of the three mounting hole marks.
5. **If the interface cable is going to be routed through the counter top only**, drill through the counter top in the center of the cable hole mark using a 25.4 mm (1") drill bit. (Skip this step if the cable will exit the rear of the holder assembly.)
6. Place the mounting plate centered over the cable hole.
7. Using a Phillips screwdriver, secure the plate to the counter with the three screws provided.

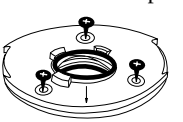


Figure 1-6. Securing Plate to Counter

8. Feed the scanner connector of the interface cable up through the center of the mounting plate (if applicable), and connect to the LS 9100.
9. Hold the scanner assembly by the holder posts so the trough is facing left (and the scanner facing right).
10. Place the assembly onto the plate so the cylinder underneath the holder is in contact with the wave spring in the mounting plate.
11. Press the holder downward and rotate clockwise 90° and release to lock the scanner assembly into the mounting plate.
12. Proceed to *Scanner Configuration* on page 1-11.

Counter Top Installation - Permanent Mounting with Double-Sided Tape

Make sure your counter top is clean and dry before performing these steps.

1. **If the interface cable is going to be routed through the counter top only** (and will not exit the rear of the holder assembly):
   a. Place the mounting plate on the counter top with the arrow pointing in the direction the scanner will face.
   b. Using the plate as your template, mark the center cable hole. Remove the mounting plate.
   c. Drill through the counter top in the center of the cable hole mark using a 25.4 mm (1”) drill bit.

2. Remove the protective paper from one side of the tape, and press the tape to the bottom side of the mounting plate.

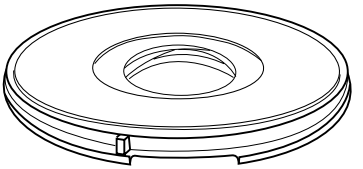


Figure 1-7. Applying Tape to Plate

3. Remove the protective paper from the remaining side of the tape.
4. **With the arrow pointing in the direction the scanner will face**, press the mounting plate onto the counter top.
5. Feed the scanner connector of the interface cable up through the center of the mounting plate (if applicable), and connect to the LS 9100.
6. Hold the scanner assembly by the holder posts so the trough is facing left (and the scanner facing right).
7. Place the assembly onto the plate so the cylinder underneath the holder is in contact with the wave spring in the mounting plate.
8. Press the holder downward and rotate clockwise 90° and release to lock the scanner assembly into the mounting plate.
9. Proceed to *Scanner Configuration* on page 1-11.

Scanner Configuration

Illustrated below are the two possible LS 9100 configurations, one with no power supply, and one using a power supply. The following pages provide detailed instructions for connecting the LS 9100 in each of these configurations.

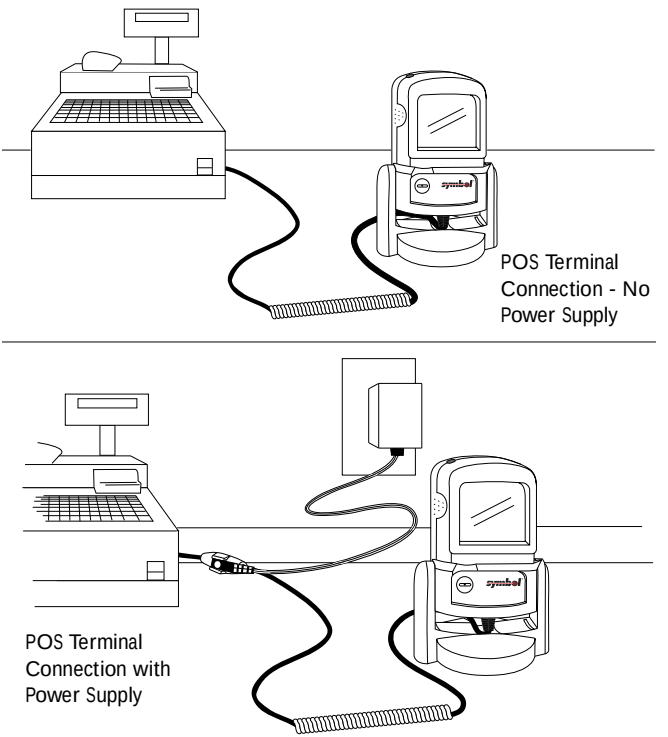


Figure 1-8. Scanner Configurations

Connecting the Scanner

1. Power down the host terminal.
2. Connect the interface cable to the host terminal (refer to your terminal manual to locate the correct port).

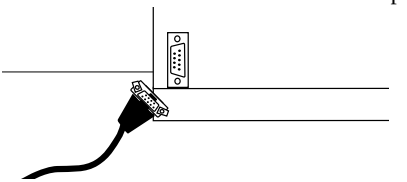


Figure 1-9. Connecting Cable to the Terminal

3. If necessary, plug the power supply into the power jack on the interface cable. Plug the other end of the power supply into an AC outlet.

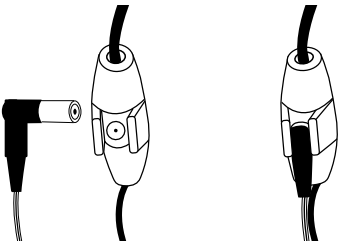


Figure 1-10. Inserting Power Supply

4. Connect the other end of the interface cable to the scanner.

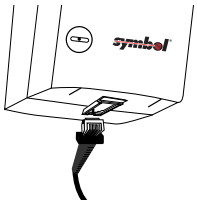
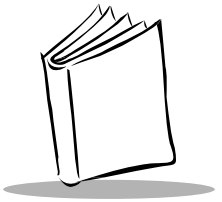


Figure 1-11. Connecting Cable to Scanner

5. Set the LS 9100 to communicate with your particular POS terminal by scanning the appropriate bar code(s). Depending on your terminal, these are located either in *Chapter 5 Parameters*, or the *Synapse Interface Guide*.
6. Power up the host terminal. Ensure that the scanner driver port is enabled by following the terminal instructions.
7. Verify that the scanner is successfully reading bar codes and transmitting their content to the host terminal.

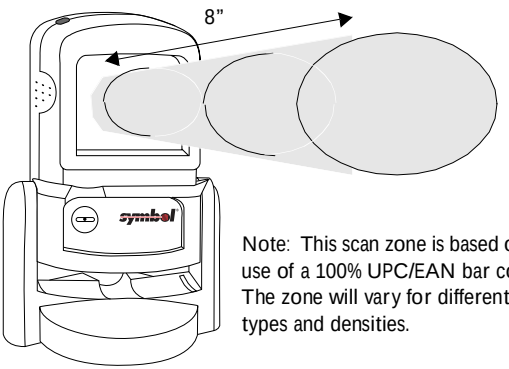
Note: *See What If... on page 3-2 if you are having problems after completing these steps.*



Chapter 2
Using the LS 9100

Scan Zone

The LS 9100 is an omni-directional scanner which emits a 20-line scan pattern designed to allow you to read bar codes, even very long and narrow ones, easily from almost any angle. The scan pattern is projected directly out of the scan window creating the three dimensional "scan zone" shown below.



Note: This scan zone is based on the use of a 100% UPC/EAN bar code. The zone will vary for different code types and densities.

To read a bar code, present or swipe the bar code within the pattern.

Figure 2-1. LS 9100 Scan Zone

Scanning in “Hands Free” Mode

Just bring the bar code anywhere in the “scan zone” for a successful decode. The LS 9100 can read bar codes within 8" (20.3 cm) from the face of the scanner. Bar codes can either be directed in toward the nose of the scanner (“presentation” scanning) or from side to side in a sweeping motion (“swipe” scanning).

Scanning In “Hand Held” Mode

To use the scanner in hand-held mode, lift it out of its holding cradle and bring it within 8" (20.3 cm) of the bar code.

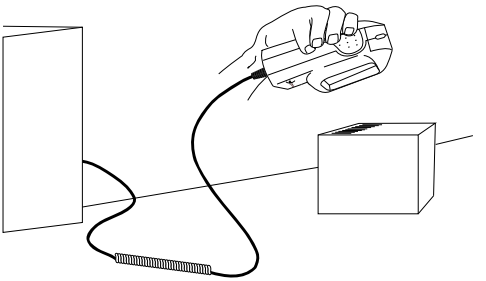


Figure 2-2. Scanning in Hand-Held Mode

Controls & Indicators

Controls

The LS 9100 has been designed to operate in a constant on fashion, eliminating the need for an "On/Off" switch.

Selecting Beeper Volume

The LS 9100 emits a short beep when it successfully reads a bar code. There are three volume settings for this decode beep. To change the setting, hold down the volume button located on the top of the scanner. The scanner cycles through three settings, emitting a 2-beep tone at each setting. To select a particular setting, release the button after the desired 2-beep tone.

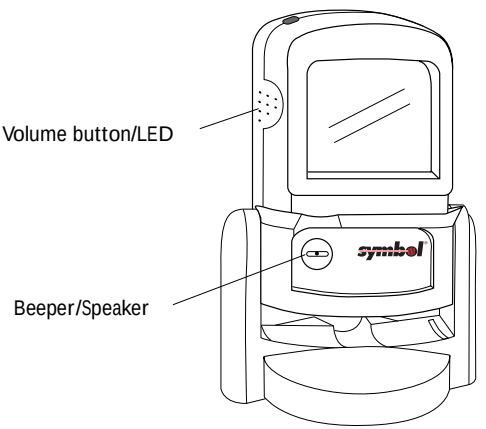


Figure 2-3. Beeper Volume Button

LED Indications

The green LED located on the top of the scanner indicates the operational status of the scanner. These LED indications are defined below:

Table 2-1. LED Indications

LED Activity	Indication
Off	No power is applied to the scanner.
On steady	The scanner is on and "ready to scan".
Momentary Flash **Off**	A bar code has been successfully decoded.
Slow Continuous Flashing	The scanner is in a programming sequence.
Fast Sequential Flashing	A scanner malfunction has occurred.

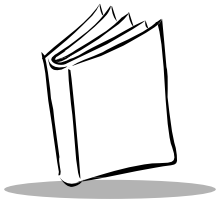
Beeper Indications

The beeper indicates the scanner's status as follows:

Table 2-1. Beeper Indications

Beeper	Indication
3 Beeps	Power up (or reset) has occurred.
1 Beep	A bar code has been successfully decoded.
4 Beeps	A transmission error has occurred. The content of the decoded bar code will not be sent to the host terminal.

Note: *There are a number of other beep sequences the scanner can emit during a programming sequence. See Audible Feedback on page 4-7 for these indications.*



Chapter 3
Maintenance and Specifications

Maintaining Your Scanner

The only maintenance your LS 9100 scanner requires is an occasional cleaning of the scan window to remove fingerprints or other debris. Since the LS 9100 scan window is a high performance optical element, care should be given during cleaning.

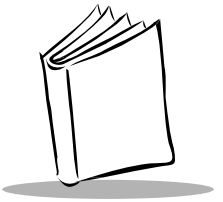
Use only a mild soap and water solution applied to a soft, clean cloth (NOT directly to the scan window). Buff the scan window gently with the cloth to remove any streaking.

Table 3-1. What If...

What if...	Then...
The scanner is not decoding and the green LED is not lit?	Refer to page *Connecting the Scanner* on page 1-12 to verify that your scanner is properly connected.
The scanner is not decoding and the green LED is lit?	Check the bar code to make sure it is not defaced. Verify that the code type you are scanning is enabled. Verify that the symbol length for that code type is correct. Try scanning similar bar codes of the same code type. Make sure the Beep After Good Decode parameter is enabled. If you're using RS-232, make sure a flash download cable is not being used.
The scanner is not transmitting to the host terminal?	Make sure the scanner is connected to the terminal. Make sure the host terminal is properly configured. Be sure that you've scanned the proper host type.

Table 3-2. Technical Specifications

Item	Description
Power Requirements	5.2 volts @ 500 mA nominal (2.6 watts)
Scan Pattern	20-line, 5-direction dynamic cross pattern
Decode Depth of Field	Maximum working distance is 8 in. (20.3 cm) on 100% UPC/EAN symbol
Decode Capability	UPC/EAN (with and without supplementals), Code 128, Code 39, Interleaved 2 of 5, Codabar, EAN/UCC 128
Durability	4 ft. (1.2 meter) drops to concrete
Operating Temperature	32° to 104°F (0° to 40°C)
Storage Temperature	-40° to 140°F (-40° to 60°C)
Humidity	5% to 95% non-condensing
Weight	9.75 oz. (277 gm)
Height	6.7 in. (17 cm)
Width	4.7 in. (11.9 cm)
Depth	3.6 in. (9.1 cm)



Chapter 4
Programming

Defaults

The LS 9100 is shipped with the default settings listed on the next few pages. These default values are stored in non-volatile memory (Flash) 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 will replace the standard default values in memory. The default parameter values can be recalled by scanning the **SET DEFAULT** bar code.

The definition of each parameter is provided with the corresponding programming bar code(s) on the page indicated in the following default tables.

Table 4-1. Host Types and Options

Parameter	Default	Page Number
Host Type	No Host	5-2
Baud Rate (RS-232)	9600	5-11
Parity (RS-232)	Even	5-19
Check Parity (RS-232)	Disable	5-24
Hardware Handshaking (RS-232)	None	5-26
Software Handshaking (RS-232)	None	5-32
Host Serial Response Timeout (RS-232)	2.0 seconds	5-37
Host Serial RTS Line State (RS-232)	Low	5-38
Stop Bit Select (RS-232)	1	5-40
ASCII Format (RS-232)	8 bit	5-42
Beep on <BEL> (RS-232)	Disable	5-44

Table 4-2. Code Types and Options

Parameter	Default	Page
UPC-A	Enable	5-46
UPC-E	Enable	5-48
EAN-8	Enable	5-50
EAN-13	Enable	5-52
Decode UPC/EAN Supplementals	Ignore	5-54
UCC/EAN Coupon Code	Disable	5-57
Code 128	Enable	5-59
Lengths for Code 128	Any Length	5-61
UCC/EAN-128	Enable	5-62
Code 39	Enable	5-64
Set Length(s) for Code 39	1 to 55	5-66
Code 39 Check Digit Verification	Disable	5-70
Code 39 Full ASCII Conversion	Disable	5-72
Interleaved 2 of 5	Disable	5-75
Set Length(s) for I 2 of 5	14	5-77
Codabar	Disable	5-81
Set Lengths for Codabar	5-55	5-83

Table 4-2. Code Types and Options

Parameter	Default	Page
CLSI Editing	Disable	5-87
NOTIS Editing	Disable	5-89

Table 4-3. Custom Tailoring

Parameter	Default	Page Number
Beeper Tone	High Frequency	5-91
Host Laser Off Delay	0.2 seconds	5-94
Time out between reads, same symbol	0.6 seconds	5-95
Time out between reads, different symbols	0.2 seconds	5-96
Decode Buffering	Disable	5-97
Decode Attempt Duration	2.0 seconds	5-99
Time Delay to Low Power Mode	30 minutes	5-100

Table 4-4. Decode Options

Parameter	Default	Page Number
UPC/EAN Predecode block	Reject	5-104
UPC/EAN Security Levels 0-3	0	5-106
Linear UPC/EAN Decode	Disable	5-110
Decode UPC/EAN Redundancy (only when autodiscrimination is enabled)	20	5-112
Linear Code Type Security Levels 1-4	2	5-113
Code 128 Decode Performance (Levels 1-3)	Enable, Level 3	5-117
Code 39 Decode Performance (Levels 1-3) (for fixed length only)	Enable, Level 3	5-122

Table 4-5. Data Transmission Formats

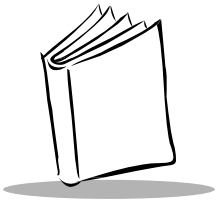
Parameter	Default	Page
Transmit UPC-A Check Digit	Enable	5-127
Transmit UPC-E Check Digit	Enable	5-129
UPC-A Preamble	System Character	5-131
UPC-E Preamble	System Character	5-134
Convert UPC-E to A	Disable	5-137
EAN-8 Zero Extend	Disable	5-139
Convert EAN-8 to EAN-13 Type	EAN-13 Type	5-141
Beep After Good Decode	Enable	5-143
Intercharacter Delay	0	5-145
Transmit Code ID Character (Symbol/AIM/None)	None	5-146
Prefix/Suffix Values	7013 (<CR/LF> for serial)	5-149
Data Transmission Formats	Data as is	5-151
Ignore Unknown Characters	Enable	5-158

Audible Feedback

During the programming process the LS 9100 scanner will emit a series of beep tones and sequences to help you determine if you are proceeding correctly. The chart below defines all possible tones and sequences.

Table 4-6. Beeper Definitions

Beeper Tone/Sequence	Indication
1 Beep - Lo/Hi tone	Input error, incorrect bar code or **CANCEL** scanned, incorrect sequence followed.
1 Beep - Hi/Lo tone	Keyboard parameter selected. Enter value using bar code keypad.
1 Beep - Hi/Lo/Hi/Lo tone	Successful program exit with change in parameter setting.



Chapter 5
Parameters

Set Default Parameter

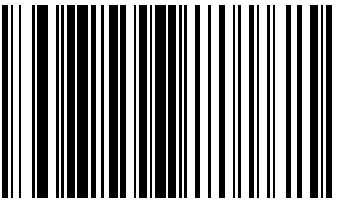
Scanning this bar code returns all parameters to the values listed in *Defaults* on page 4-1.

SET ALL DEFAULTS

Host Types and Options

No Host

When this bar code is scanned, the scanner decodes a bar code but does not transmit the data to the host.

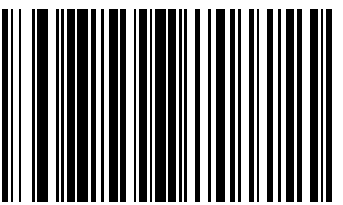


NO HOST

IBM 46XX Host Types

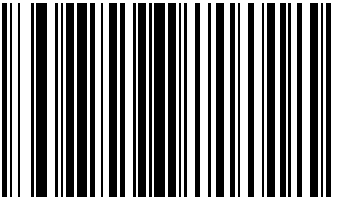
To select one of the following as a POS Interface, scan one of the following bar codes.

Note: *To properly communicate with 468X/ 9X terminals, the driver corresponding to the port being used must be loaded and enabled when you are configuring your terminal system. See your terminal's operating manual for details.*



NON-IBM SCANNER EMULATION

IBM 46XX Host Types (Continued)



HAND-HELD SCANNER EMULATION

IBM 46XX Host Types (Continued)

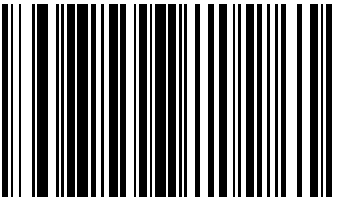
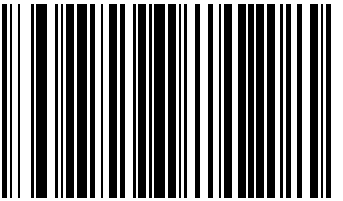


TABLE-TOP SCANNER EMULATION

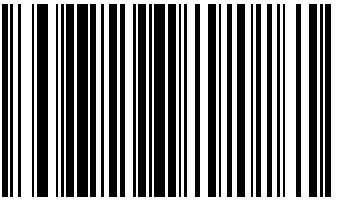
RS-232C Host Types

To select an RS-232C Host Interface option, scan one of the following bar codes.



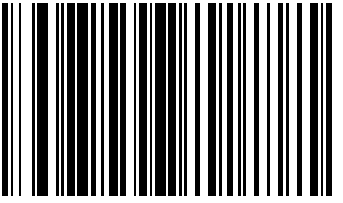
STANDARD RS-232C

RS-232C Host Types (Continued)



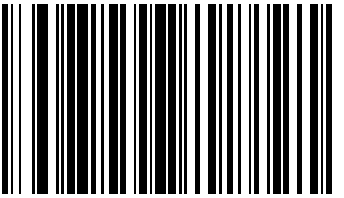
ICL RS-232C

RS-232C Host Types (Continued)



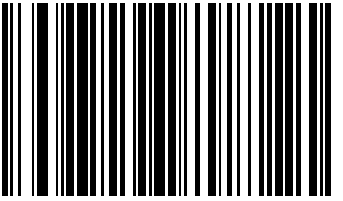
NIXDORF RS-232C

RS-232C Host Types (Continued)



FUJITSU RS-232C

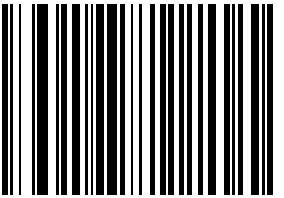
RS-232C Host Types (Continued)



BEETLE RS-232C

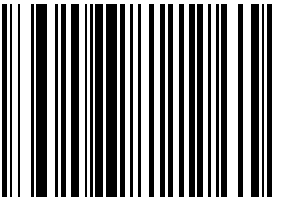
Baud Rate (RS-232)

Baud rate is the number of bits of data transmitted per second. The scanner's baud rate setting should match the data rate setting of the host device. If not, data may not reach the host device or may reach it in distorted form. To select a baud rate, scan one of the following bar codes.



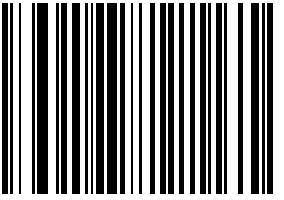
BAUD RATE 110

Baud Rate (RS-232) (Continued)



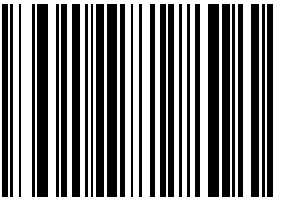
BAUD RATE 300

Baud Rate (RS-232) (Continued)



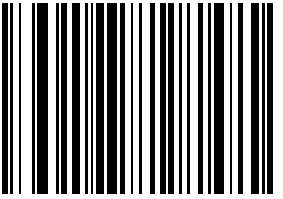
BAUD RATE 600

Baud Rate (RS-232) (Continued)



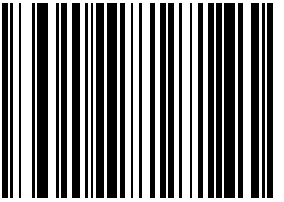
BAUD RATE 1200

Baud Rate (RS-232) (Continued)



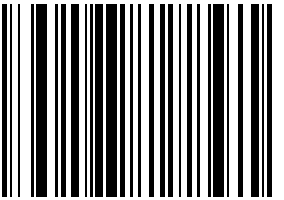
BAUD RATE 2400

Baud Rate (RS-232) (Continued)



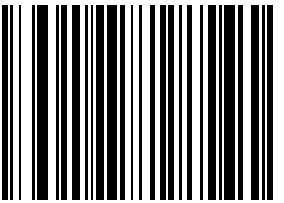
BAUD RATE 4800

Baud Rate (RS-232) (Continued)



BAUD RATE 9600

Baud Rate (RS-232) (Continued)

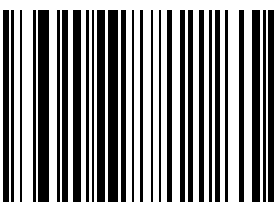


BAUD RATE 19,200

Parity (RS-232)

A parity check bit is the most significant bit of each ASCII coded character. Select the parity type according to host device requirements.

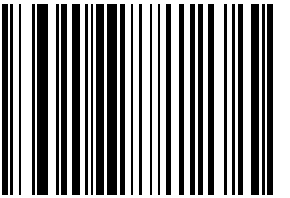
If you select **ODD** parity, the parity bit has a value 0 or 1, based on data, to ensure than an odd number of 1 bits are contained in the coded character.



ODD

Parity (RS-232) (Continued)

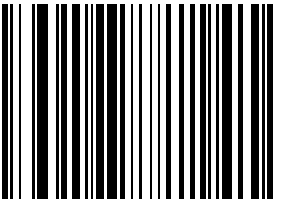
If you select **EVEN** parity, the parity bit has a value 0 or 1, based on data, to ensure than an even number of 1 bits are contained in the coded character.



EVEN

Parity (RS-232) (Continued)

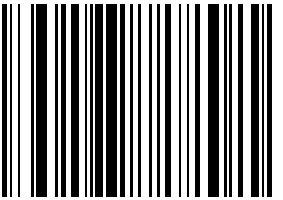
Select **MARK** parity and the parity bit is always 1.



MARK

Parity (RS-232) (Continued)

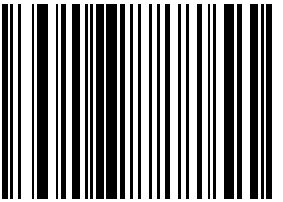
Select **SPACE** parity and the parity bit is always 0.



SPACE

Parity (RS-232) (Continued)

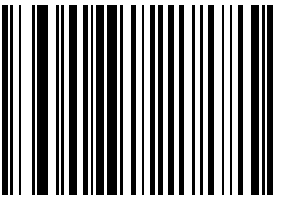
If no parity is required, select **NONE**.



NONE

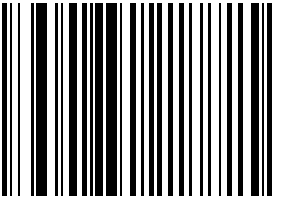
Check Parity (RS-232)

Select whether or not the parity of received characters is checked. The type of parity used is selectable through the **PARITY** parameter.



CHECK PARITY

Check Parity (RS-232) (Continued)



DO NOT CHECK PARITY

Hardware Handshaking (RS-232)

The data interface consists of an RS-232C port. The port has been designed to operate either with or without the hardware handshaking lines, RTS, *Request to Send*, and CTS, *Clear to Send*.

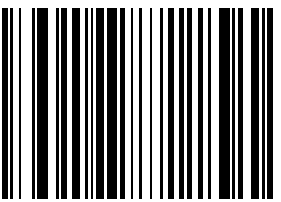
If Standard RTS/CTS handshaking is selected, scan data is transmitted according to the following sequence:

- The controller reads the CTS line for activity. If CTS is asserted, the controller waits up to two seconds for the host to negate the CTS line. If, after two seconds the CTS line is still asserted, the scanner sounds a transmit error and any scanned data is lost.
- When the CTS line is negated, the controller asserts the RTS line and waits up to two seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after two seconds, the CTS line is not asserted, the scanner sounds a transmit error and discards the data.
- When data transmission is complete, the controller negates RTS 10 msec after sending the last character.
- The host should respond by negating CTS. The controller checks for a negated CTS upon the next transmission of data.

During the transmission of data, the CTS line should be asserted. If CTS is deasserted for more than 50 ms between characters, the transmission is aborted, the scanner sounds a transmission error, and the data is discarded.

- If this communications sequence fails, the scanner issues an error indication. In this case, the data is lost and must be rescanned.

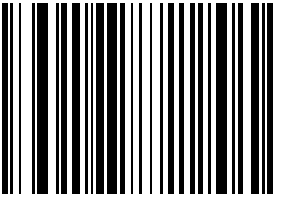
Note: *The DTR signal is jumpered active.*



NONE

Hardware Handshaking (RS-232) (Continued)

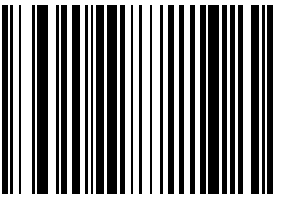
Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.



STANDARD RTS/CTS

Hardware Handshaking (RS-232) (Continued)

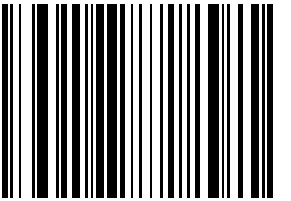
When RTS/CTS Option 1 is selected, the scanner asserts RTS before transmitting and ignores the state of CTS. The scanner deasserts RTS when the transmission is complete.



RTS/CTS OPTION 1

Hardware Handshaking (RS-232) (Continued)

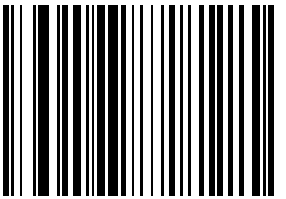
When Option 2 is selected, RTS is always high or low (user-programmed logic level). However, the scanner waits for CTS to be asserted before transmitting data. If CTS is not asserted within two seconds, the scanner issues an error indication and discards the data.



RTS/CTS OPTION 2

Hardware Handshaking (RS-232) (Continued)

When Option 3 is selected, the scanner asserts RTS prior to any data transmission, regardless of the state of CTS. The scanner waits up to two seconds for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error indication and discards the data. The scanner deasserts RTS when transmission is complete.



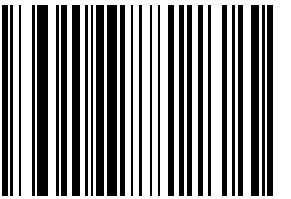
RTS/CTS OPTION 3

Software Handshaking (RS-232)

This parameter offers control of the data transmission process in addition to, or instead of, that offered by hardware handshaking. There are five options.

None

When this option is selected, data is transmitted immediately.

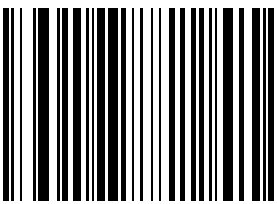


NONE

ACK/NAK

When this option is selected, after transmitting data, the scanner expects either an ACK or NAK response from the host. Whenever a NAK is received, the scanner transmits the same data again and waits for either an ACK or NAK. After three unsuccessful attempts to send data when NAKs are received, the scanner issues an error indication and discards the data.

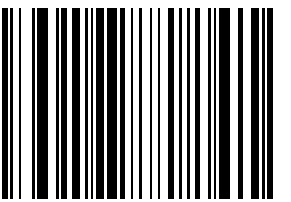
The scanner waits up to the programmable Host Serial Response Timeout to receive an ACK or NAK. If the scanner does not get a response in this time, it issues an error indication and discards the data. There are no retries when a timeout occurs.



ACK/NAK

ENQ

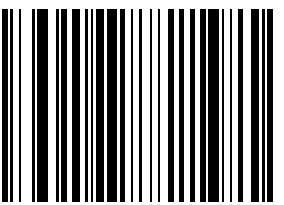
When this option is selected, the scanner waits for an ENQ character from the host before transmitting data. If an ENQ is not received within two seconds, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every two seconds to prevent transmission errors.



ENQ

ACK/NAK with ENQ

This combines the two previous options.

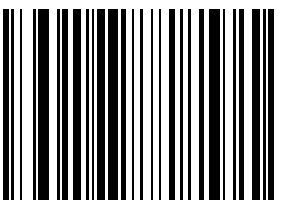


ACK/NAK WITH ENQ

XON/XOFF

An XOFF character turns the scanner transmission off until the scanner receives an XON character. There are two situations for XON/XOFF:

- XOFF is received before the scanner has data to send. When the scanner has data to send, it then waits for an XON character before transmission. The scanner waits up to two seconds to receive the XON. If the XON is not received within this time, the scanner issues an error indication and discards the data.
- XOFF is received during a transmission. Data transmission then stops after sending the current byte. When the scanner receives an XON character, it sends the rest of the data message. The scanner waits indefinitely for the XON.

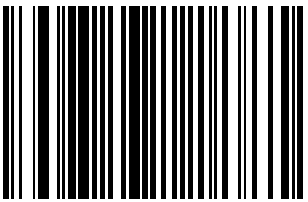


XON/XOFF

Host Serial Response Time-out (RS-232)

This parameter specifies how long the scanner waits for an ACK or NAK before determining that a transmission error has occurred. This only applies when in one of the ACK/NAK Software Handshaking modes.

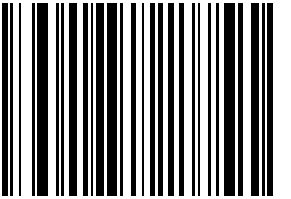
The delay period can range from 0.0 to 9.9 seconds in .1 second increments. After scanning the bar code below, scan two bar codes from *Numeric Bar Codes* beginning on page 5-160 to set the desired time-out.



HOST SERIAL RESPONSE TIME-OUT

Host Serial RTS Line State (RS-232)

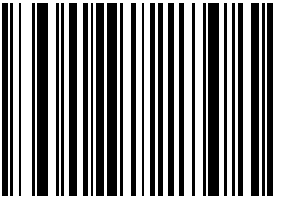
This parameter is used to set the idle state of the Serial Host RTS line. To select **LOW RTS** line state, scan the bar code below.



HOST: LOW RTS

Host Serial RTS Line State (RS-232) (Continued)

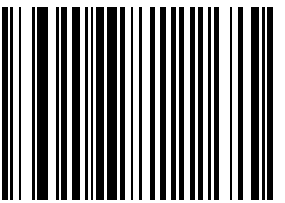
To select **HIGH RTS** line state, scan the bar code below.



HOST: HIGH RTS

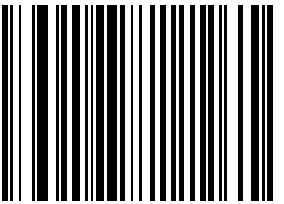
Stop Bit Select (RS-232)

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving device for the next character in the serial data stream. The number of stop bits (one or two) selected depends on the number the receiving terminal is programmed to accommodate. Set the number of stop bits to match host device requirements.



1 STOP BIT

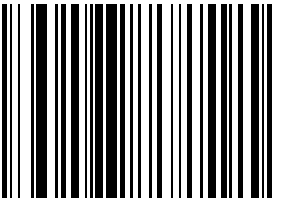
Stop Bit Select (RS-232) (Continued)



2 STOP BIT

ASCII Format (RS-232)

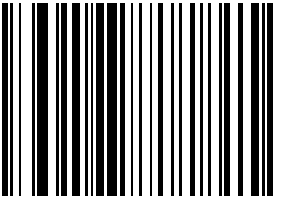
This parameter allows the scanner to interface with devices requiring a 7-bit or 8-bit ASCII protocol.



7-BIT

ASCII Format (RS-232) (Continued)

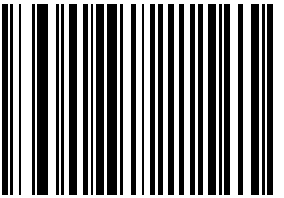
This parameter allows the scanner to interface with devices requiring a 7-bit or 8-bit ASCII protocol.



8-BIT

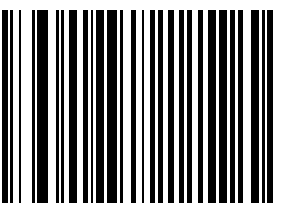
Beep on <BEL> (RS-232)

When this parameter is enabled, the scanner issues a beep when a <BEL> character is detected on the RS-232C serial line. <BEL> is issued to gain a user's attention to indicate an illegal entry or other important event.



BEEP ON <BEL> CHARACTER

Beep on <BEL> (RS-232) (Continued)

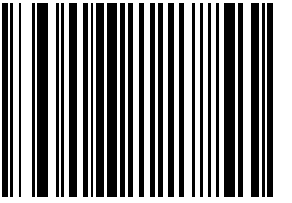


DO NOT BEEP ON <BEL> CHARACTER

Code Types and Options

Enable UPC-A

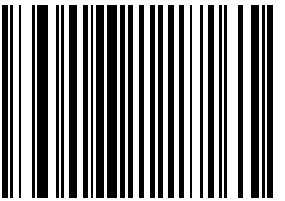
To enable UPC-A scan the bar code below.



ENABLE UPC-A

Disable UPC-A

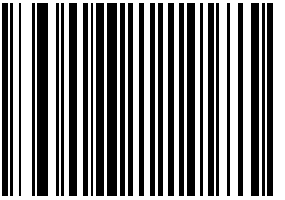
To disable UPC-A scan the bar code below.



DISABLE UPC-A

Enable UPC-E

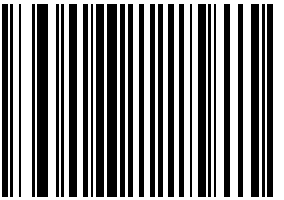
To enable UPC-E scan the bar code below.



ENABLE UPC-E

Disable UPC-E

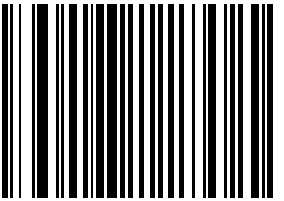
To disable UPC-E scan the bar code below.



DISABLE UPC-E

Enable EAN-8

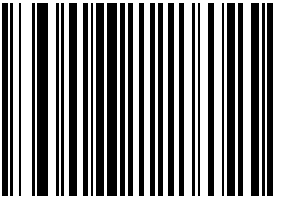
To enable EAN-8 scan the bar code below.



ENABLE EAN-8

Disable EAN-8

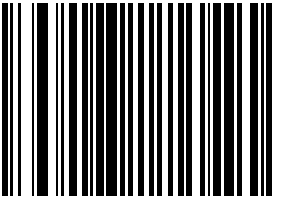
To disable EAN-8 scan the bar code below.



DISABLE EAN-8

Enable EAN-13

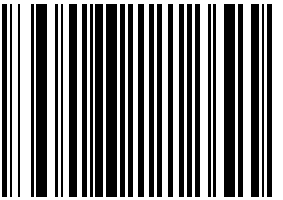
To enable EAN-13 scan the bar code below.



ENABLE EAN-13

Disable EAN-13

To disable EAN-13 scan the bar code below.



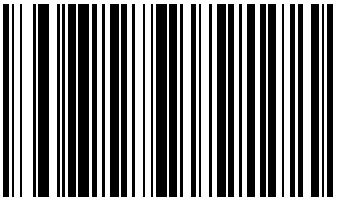
DISABLE EAN-13

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.

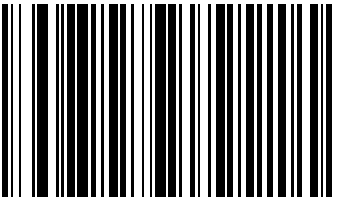
- If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters are not decoded.
- If UPC/EAN without supplemental characters is selected, and the LS 9100 is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN are decoded and the supplemental characters ignored.
- An autodiscriminate option is also available.

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



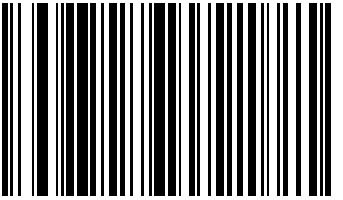
DECODE UPC/EAN WITH SUPPLEMENTALS

UPC/EAN Supplementals (Continued)



IGNORE UPC/EAN WITH SUPPLEMENTALS

UPC/EAN Supplementals (Continued)



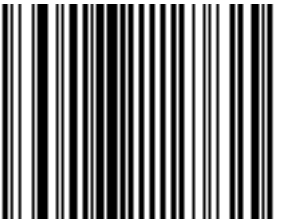
AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS

UCC/EAN Coupon Code

When enabled, this parameter decodes UPC-A, UPC-A with 2 supplemental characters, UPC-A with 5 supplemental characters, and UPC-A/EAN-128 bar codes.

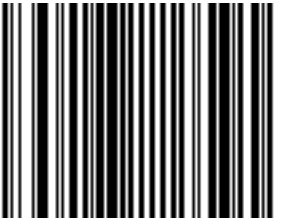
To enable this code type:

1. Scan the bar code below.
2. Scan *AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS* on page 5-56.



ENABLE UPC/EAN COUPON CODE

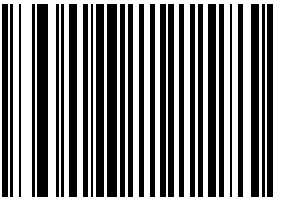
Disable UCC/EAN Coupon Code



DISABLE UPC/EAN COUPON CODE

Enable Code 128

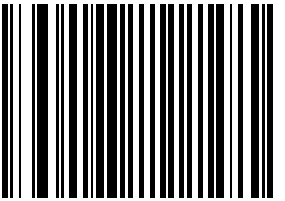
To enable Code 128 scan the bar code below.



ENABLE CODE 128

Disable Code 128

To disable Code 128 scan the bar code below.



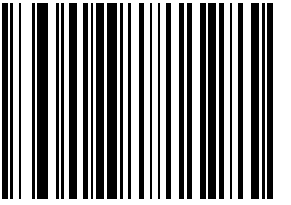
DISABLE CODE 128

Lengths for Code 128

No length setting is required for Code 128. The default setting is Any Length.

Enable UCC/EAN-128

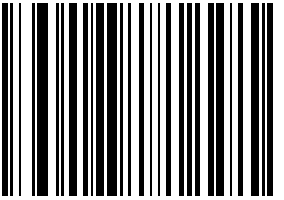
To enable UCC/EAN-128 scan the bar code below. (See *Appendix* for details on UCC/EAN-128.)



ENABLE UCC/EAN-128

Disable UCC/EAN-128

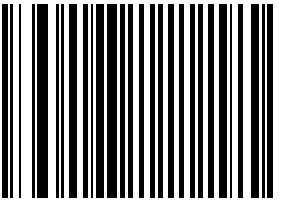
To disable UCC/EAN-128 scan the bar code below. (See *Appendix* for details on UCC/EAN-128.)



DISABLE UCC/EAN-128

Enable Code 39

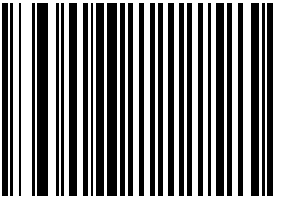
To enable Code 39 scan the bar code below.



ENABLE CODE 39

Disable Code 39

To disable Code 39 scan the bar code below.



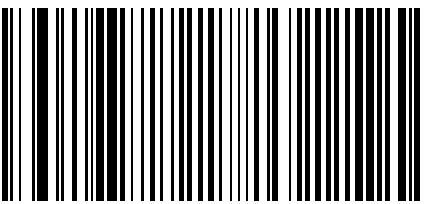
DISABLE CODE 39

Set Lengths for Code 39

Lengths for Code 39 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.

One Discrete Length

This option allows you to decode only those codes containing a selected length. For example, if you select **Code 39 One Discrete Length**, then scan **1**, **4**, only Code 39 symbols containing 14 characters are decoded. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.

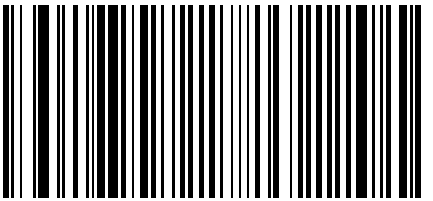


CODE 39 - ONE DISCRETE LENGTH

Two Discrete Lengths

This option allows you to decode only those codes containing two selected lengths. For example, if you select **Code 39 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, only Code 39 symbols containing 2 or 14 characters are decoded. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.

Note: *Selecting this option disables Code 39 Decode Performance.*

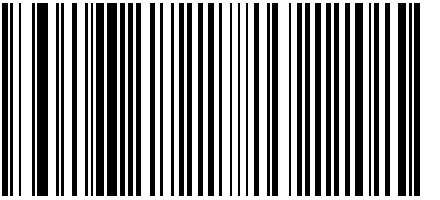


CODE 39 - TWO DISCRETE LENGTHS

Length Within Range

This option allows you to decode a code type within a specified range. For example to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.

Note: *Selecting this option disables Code 39 Decode Performance.*

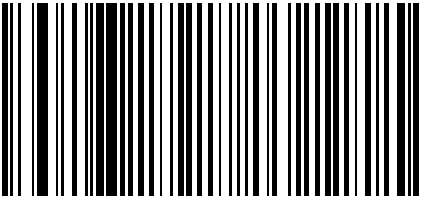


CODE 39 - LENGTH WITHIN RANGE

Any Length

Scanning this option allows you to decode Code 39 symbols containing any number of characters.

Note: *Selecting this option disables Code 39 Decode Performance.*

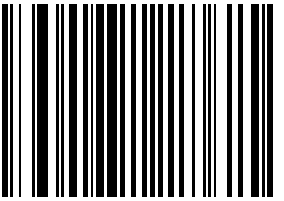


CODE 39 - ANY LENGTH

Code 39 Check Digit Verification

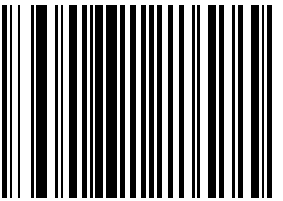
When enabled, this parameter checks the integrity of a Code 39 symbol to ensure it complies with specified algorithms.

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



ENABLE CODE 39 CHECK DIGIT

Code 39 Check Digit Verification (Continued)



DISABLE CODE 39 CHECK DIGIT

Code 39 Full ASCII

To enable or disable Code 39 Full ASCII, scan one of the following bar codes.

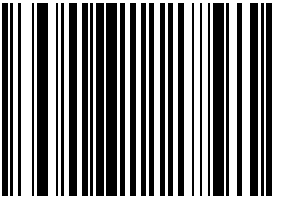
When enabled, the ASCII character set assigns a code to letters, punctuation marks, numerals, and most control keystrokes on the keyboard.

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**. Refer to the *ASCII Equivalent Tables* on page A-8.

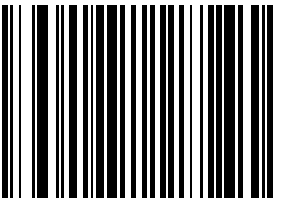
The scanner does not autodiscriminate between Code 39 and Code 39 Full ASCII.

Code 39 Full ASCII (Continued)



ENABLE CODE 39 FULL ASCII

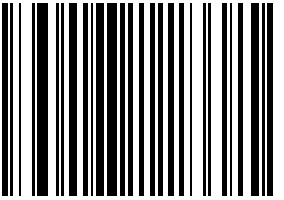
Code 39 Full ASCII (Continued)



DISABLE CODE 39 FULL

Enable Interleaved 2 of 5

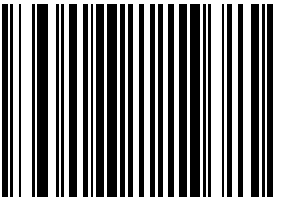
To enable Interleaved 2 of 5 scan the bar code below.



ENABLE I 2 OF 5

Disable Interleaved 2 of 5

To disable Interleaved 2 of 5 scan the bar code below.



DISABLE I 2 OF 5

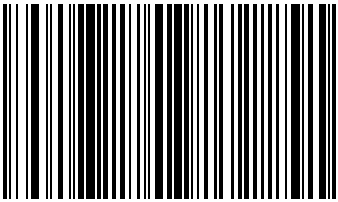
Set Lengths for Interleaved 2 of 5

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.

Any Length

Scanning this option allows you to decode I 2 of 5 symbols containing any number of characters.

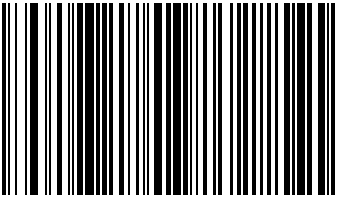
Note: *Selecting this option may lead to misdecodes for I 2 of 5 codes.*



I 2 of 5 - ANY LENGTH

Length Within Range

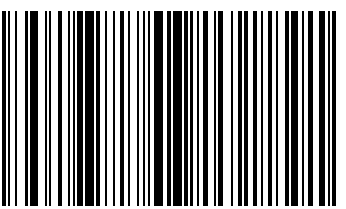
This option allows you to decode a code type within a specified range. For example to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



I 2 of 5 - LENGTH WITHIN RANGE

One Discrete Length

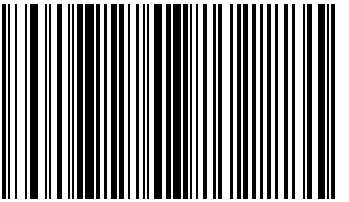
This option allows you to decode only those codes containing a selected length. For example, if you select **I 2 of 5 One Discrete Length**, then scan **1**, **4**, the only I 2 of 5 symbols decoded are those containing 14 characters. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



I 2 of 5 - ONE DISCRETE LENGTH

Two Discrete Lengths

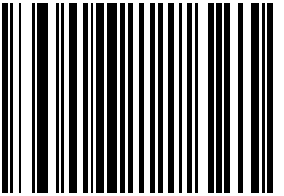
This option allows you to decode only those codes containing two selected lengths. For example, if you select **I 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only I 2 of 5 symbols decoded are those containing 2 or 14 characters. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



I 2 of 5 - TWO DISCRETE LENGTHS

Enable Codabar

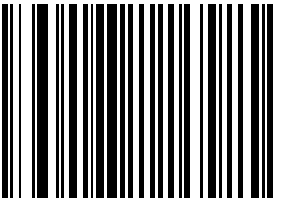
To enable Codabar scan the bar code below.



ENABLE CODABAR

Disable Codabar

To disable Codabar scan the bar code below.



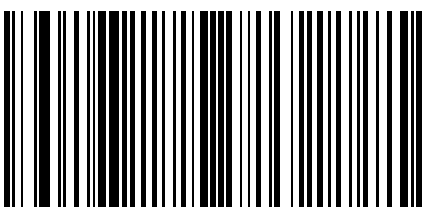
DISABLE CODABAR

Set Lengths for Codabar

Lengths for Codabar 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.

Any Length

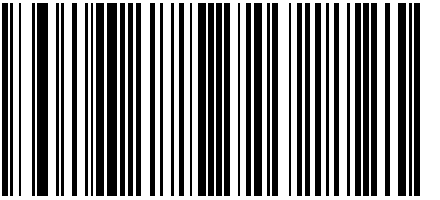
Scanning this option allows you to decode Codabar symbols containing any number of characters.



CODABAR - ANY LENGTH

Length Within Range

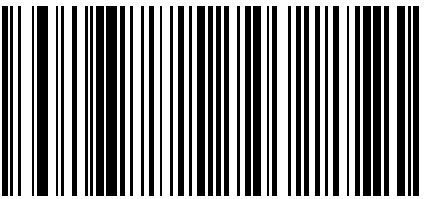
This option allows you to decode a code type within a specified range. For example to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar Length Within Range**. Then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



CODABAR - LENGTH WITHIN RANGE

One Discrete Length

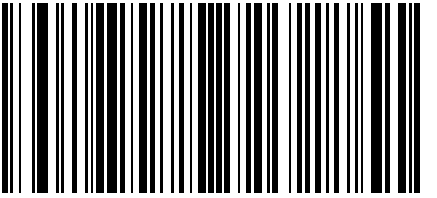
This option allows you to decode only those codes containing a selected length. For example, if you select **Codabar One Discrete Length**, then scan **1**, **4**, the only Codabar symbols decoded are those containing 14 characters. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



CODABAR - ONE DISCRETE LENGTH

Two Discrete Lengths

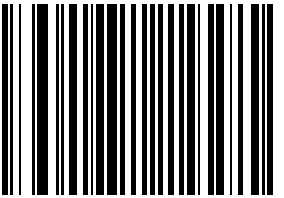
This option allows you to decode only those codes containing two selected lengths. For example, if you select **Codabar Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only Codabar symbols decoded are those containing 2 or 14 characters. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **CANCEL** on page 5-170.



CODABAR - TWO DISCRETE LENGTHS

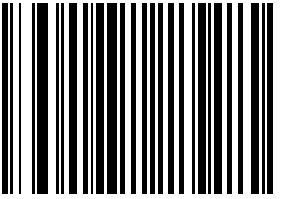
CLSI Editing

If 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 that symbol length does not include start and stop characters.



ENABLE CLSI EDITING

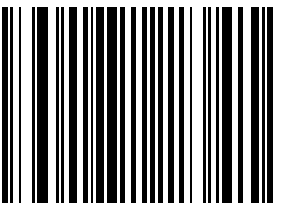
CLSI Editing (Continued)



DISABLE CLSI EDITING

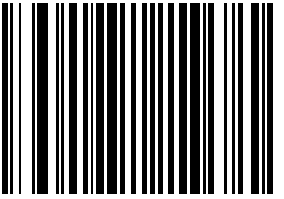
NOTIS Editing

If enabled, this parameter strips the start and stop characters from decoded Codabar symbol.



ENABLE NOTIS EDITING

NOTIS Editing (Continued)

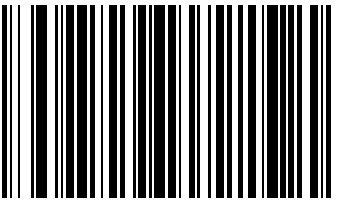


DISABLE NOTIS EDITING

Custom Tailoring

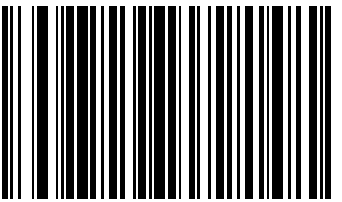
Beeper Tone

To select a decode beep frequency (tone), scan the **LOW FREQUENCY, MEDIUM FREQUENCY**, or **HIGH FREQUENCY** bar code.



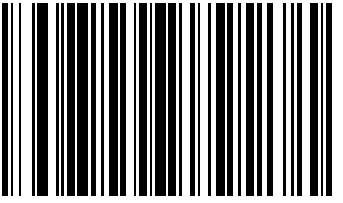
LOW FREQUENCY

Beeper Tone (Continued)



MEDIUM FREQUENCY

Beeper Tone (Continued)



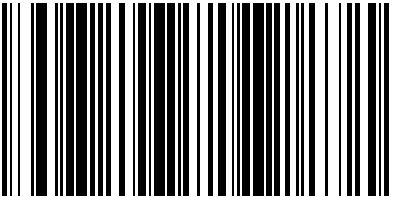
HIGH FREQUENCY

Host Laser Off Delay

This parameter sets the minimum time between decodes. For example, if this parameter is programmed for a one second time-out, the unit does not decode again until one second after a successful decode. It is programmable in 0.1 sec increments from 0.0 to 9.9 sec.

Scan the bar code below to select a host laser off delay. Next scan two bar codes from *Numeric Bar Codes* beginning on page 5-160.

Note: *If you occasionally hear four error beeps while using your scanner, try increasing the Host Laser Off Delay.*

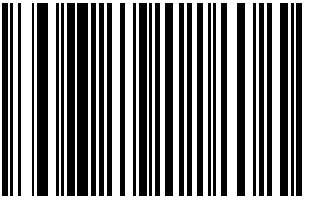


HOST LASER OFF DELAY

Time-out Between Decodes, Same Symbol

This parameter sets the minimum time between decodes of the same symbol. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. (Setting this above 0.4 seconds is recommended.)

Scan the bar code below to select a new time-out. Next scan two bar codes from *Numeric Bar Codes* beginning on page 5-160, the first representing seconds, the second tenths of seconds. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-170.

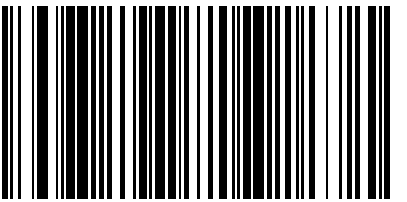


TIME-OUT BETWEEN SAME SYMBOL

Time-out Between Decodes, Different Symbols

This parameter sets the minimum time between decodes of different symbols. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds.

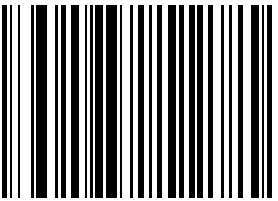
Scan the bar code below, then scan two bar codes from *Numeric Bar Codes* beginning on page 5-160, the first representing seconds, the second tenths of seconds. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-170.



TIME-OUT BETWEEN DIFFERENT SYMBOLS

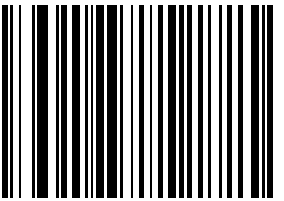
Decode Buffering

When this parameter is enabled, successive decodes are buffered by the scanner. This is useful when the host takes a long time to receive and/or process a symbol. When disabled, the scanner waits until a decoded symbol is transmitted to the host before processing another symbol.



ENABLE DECODE BUFFERING

Decode Buffering (Continued)

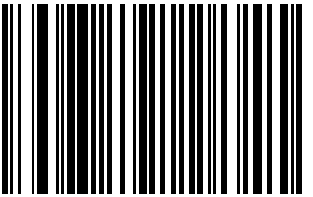


DISABLE DECODE BUFFERING

Decode Attempt Duration

This parameter sets the maximum time decode processing continues during a scan attempt. It is programmable in 0.1 second increments from 0.1 to 9.9 seconds. (Setting this between 1.0 and 3.0 seconds is recommended.)

Scan the bar code below to select a new time-on. Next scan two bar codes from *Numeric Bar Codes* beginning on page 5-160. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-170.

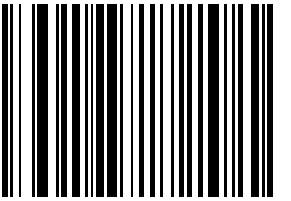


DECODE ATTEMPT DURATION

Time Delay to Low Power Mode

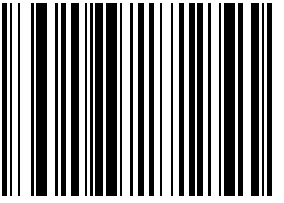
This parameter sets the time the scanner remains active after any scanning activity. Scan one of the four options. Depending on the selection, the scanner enters a low power mode 15, 30, 60 or 90 minutes after the last attempted decode. To awaken the scanner, present the bar code you wish to scan to the scan window.

If you make a mistake, scan **CANCEL** on page 5-170.



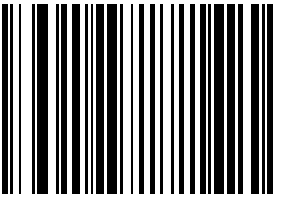
15 MINUTES

Time Delay to Low Power Mode (Continued)



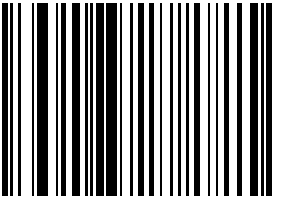
30 MINUTES

Time Delay to Low Power Mode (Continued)



60 MINUTES

Time Delay to Low Power Mode (Continued)



90 MINUTES

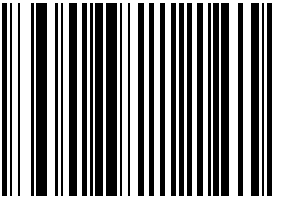
Decode Options

UPC/EAN Predecode Block

UPC/EAN bar codes are made up of two blocks representing "left" and "right" halves. For example, bar code 1234567890 is divided into left block "12345", and right block "67890". To maximize its aggressiveness, the LS 9100 is capable of decoding a UPC/EAN symbol by "splicing" together a left block read by one of the 20 scan lines, and a right block read by another.

Reject Predecode Block

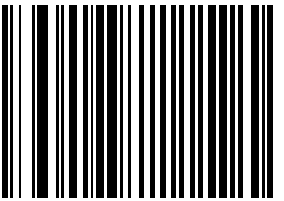
This option provides additional protection (beyond the embedded check digit) against mis-splicing a UPC/EAN block from a symbol that has just been decoded (but has not completely exited the scanner's field of view), with a block from a new symbol that has just been presented to the scanner. This option requires the scanner to compare the new symbol against the symbol just decoded to see if there are common blocks. If either the left or right blocks match between symbols, the scanner rejects the common block for the programmed Decode Time-Off interval.



REJECT PREDECODE BLOCK

Accept Predecode Block

This option allows immediate decode of a new UPC/EAN bar code regardless of the previously decoded UPC/EAN bar code's block content.



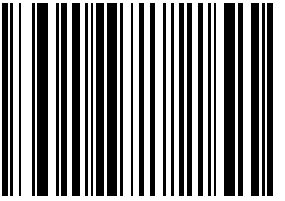
ACCEPT PREDECODE BLOCK

UPC/EAN Security Level

The LS 9100 offers four levels of decode security for UPC/EAN bar codes. Increasing levels of security are provided for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so be sure to choose only that level of security necessary for any given application.

UPC/EAN Security Level 0

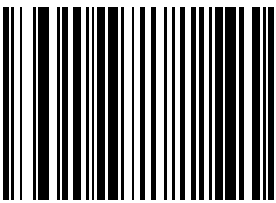
This is the default setting which allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding “in-spec” UPC/EAN bar codes.



UPC/EAN SECURITY LEVEL 0

UPC/EAN Security Level 1

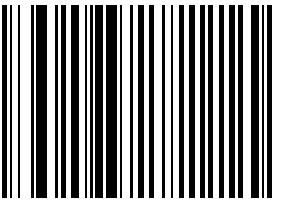
As bar code quality levels diminish, certain characters become prone to mis-decodes before others (i.e., 1, 2, 7, 8). If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are limited to these characters, select this security level.



UPC/EAN SECURITY LEVEL 1

UPC/EAN Security Level 2

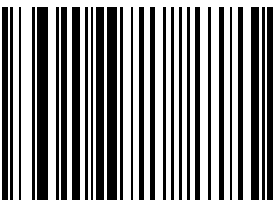
If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are not limited to characters 1, 2, 7, and 8, select this security level.



UPC/EAN SECURITY LEVEL 2

UPC/EAN Security Level 3

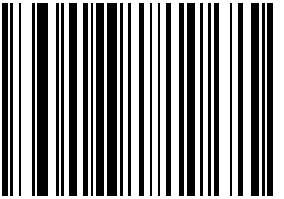
If you have tried Security Level 2, and are still experiencing misdecodes, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selection of this level of security significantly impairs the decoding ability of the scanner. If this level of security is necessary, you should try to improve the quality of your bar codes.



UPC/EAN SECURITY LEVEL 3

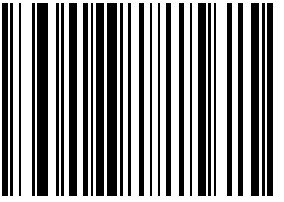
Linear UPC/EAN Decode

This option applies to code types containing two adjacent blocks (e.g. UPC-A, EAN-8, EAN-13). When enabled, a bar code is transmitted only when both the left and right blocks are successfully decoded within one laser scan. This option should be enabled when bar codes are in proximity to each other.



ENABLE LINEAR UPC/EAN DECODE

Linear UPC/EAN Decode (Continued)

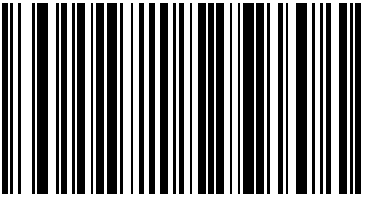


DISABLE LINEAR UPC/EAN DECODE

Decode Redundancy for UPC/EAN without Supplementals

With Autodiscriminate UPC/EAN Supplementals selected, this option adjusts the number of times a symbol is decoded before transmission. The range is from two to 30 times. Ten or above is recommended when decoding a mix of UPC/EAN symbols with and without supplementals.

Scan the bar code below to select a a decode redundancy value. Next scan two bar codes from *Numeric Bar Codes* beginning on page 5-160 that represent the desired number of times. For single digit numbers, include a leading zero. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-170.

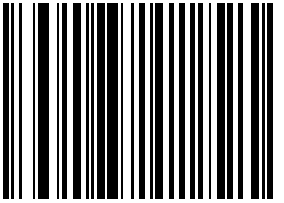


DECODE REDUNDANCY for UPC/EAN without SUPPLEMENTALS

Linear Code Type Security Level

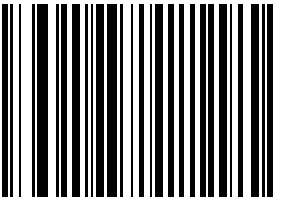
The LS 9100 offers five levels of decode security for linear code types (e.g. Code 39, Interleaved 2 of 5). Higher security levels are selected for decreasing levels of bar code quality. As security levels increase, the scanner's aggressiveness decreases.

Select the security level appropriate for your bar code quality.



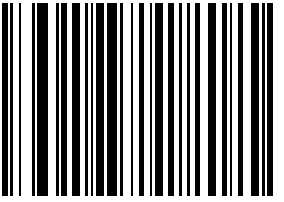
LINEAR SECURITY LEVEL 1

Linear Code Type Security Level (Continued)



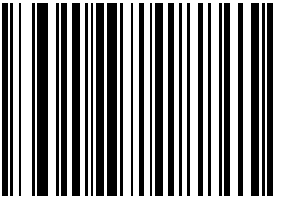
LINEAR SECURITY LEVEL 2

Linear Code Type Security Level (Continued)



LINEAR SECURITY LEVEL 3

Linear Code Type Security Level (Continued)

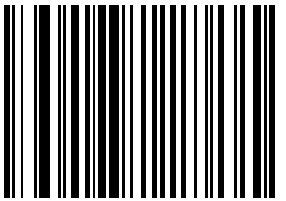


LINEAR SECURITY LEVEL 4

Code 128 Decode Performance

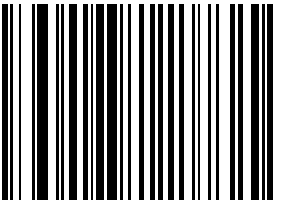
This option offers three levels of decode performance or "aggressiveness" for Code 128 symbols. Increasing the performance level reduces the amount of required bar code orientation, which is useful if you are scanning very long and/or truncated bar codes. Increased levels reduce decode security.

If you enable this option, you may select a Decode Performance level from *Code 128 Decode Performance* beginning on page 5-117 to suit your performance needs.



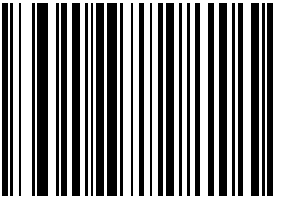
ENABLE CODE 128 DECODE PERFORMANCE

Code 128 Decode Performance (Continued)



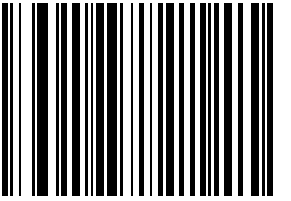
DISABLE CODE 128 DECODE PERFORMANCE

Code 128 Decode Performance (Continued)



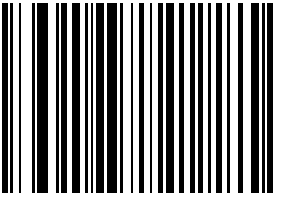
CODE 128 DECODE PERFORMANCE LEVEL 1

Code 128 Decode Performance (Continued)



CODE 128 DECODE PERFORMANCE LEVEL 2

Code 128 Decode Performance (Continued)



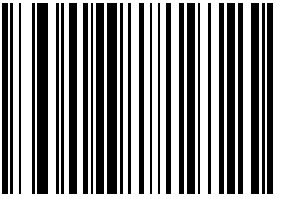
CODE 128 DECODE PERFORMANCE LEVEL 3

Code 39 Decode Performance

This option offers three levels of decode performance or "aggressiveness" for Code 39 symbols. Increasing the performance level reduces the amount of required bar code orientation, which is useful if you are scanning very long and/or truncated bar codes. Increased levels reduce decode security.

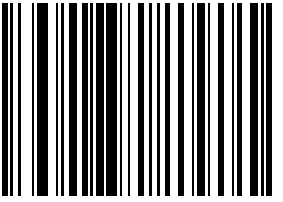
If you enable this option, you may select a Decode Performance level from *Code 128 Decode Performance* beginning on page 5-117 to suit your performance needs.

Note: *This option only works with Code 39 One Discrete Length.*



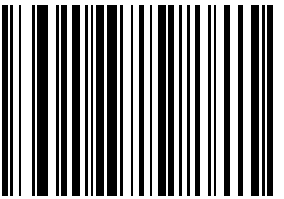
ENABLE CODE 39 DECODE PERFORMANCE

Code 39 Decode Performance (Continued)



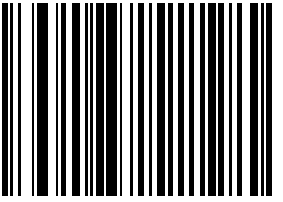
DISABLE CODE 39 DECODE PERFORMANCE

Code 39 Decode Performance (Continued)



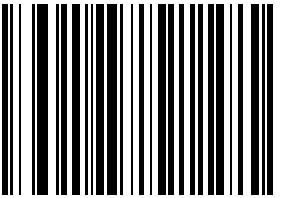
CODE 39 DECODE PERFORMANCE LEVEL 1

Code 39 Decode Performance (Continued)



CODE 39 DECODE PERFORMANCE LEVEL 2

Code 39 Decode Performance (Continued)

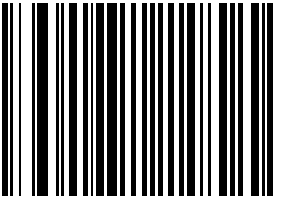


CODE 39 DECODE PERFORMANCE LEVEL 3

Data Transmission Formats

Transmit UPC-A Check Digit

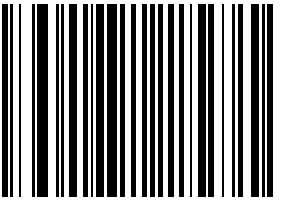
Scan the bar code below to transmit the symbol with the UPC-A check digit.



TRANSMIT
UPC-A CHECK DIGIT

Transmit UPC-A Check Digit (Continued)

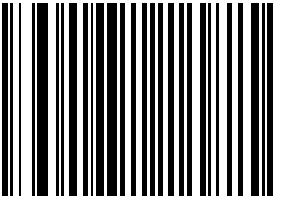
Scan the bar code below to transmit the symbol without the UPC-A check digit.



DO NOT TRANSMIT
UPC-A CHECK DIGIT

Transmit UPC-E Check Digit

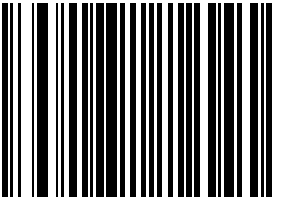
Scan the bar code below to transmit the symbol with the UPC-E check digit.



TRANSMIT
UPC-E CHECK DIGIT

Transmit UPC-E Check Digit (Continued)

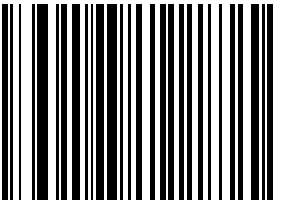
Scan the bar code below to transmit the symbol without the UPC-E check digit.



DO NOT TRANSMIT
UPC-E CHECK DIGIT

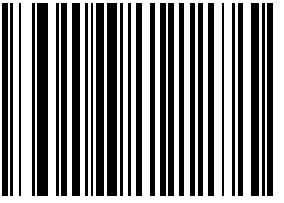
UPC-A Preamble

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 (“O” for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.



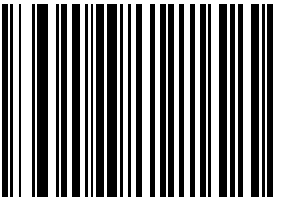
NO PREAMBLE
(<DATA>)

UPC-A Preamble (Continued)



SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

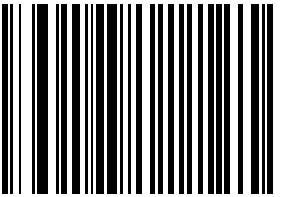
UPC-A Preamble (Continued)



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

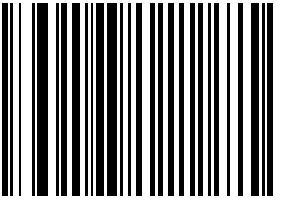
UPC-E Preamble

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 ("O" for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.



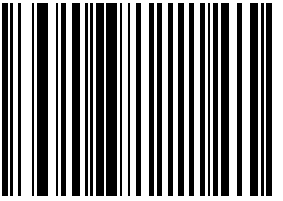
NO PREAMBLE
(<DATA>)

UPC-E Preamble (Continued)



SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

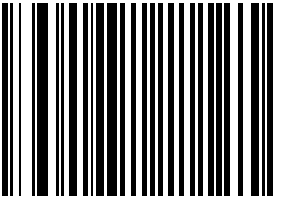
UPC-E Preamble (Continued)



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

Convert UPC-E to UPC-A

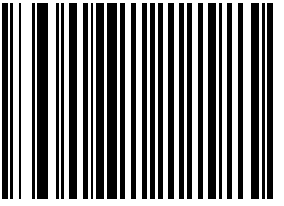
This parameter converts UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).



CONVERT UPC-E TO UPC-A

Convert UPC-E to UPC-A (Continued)

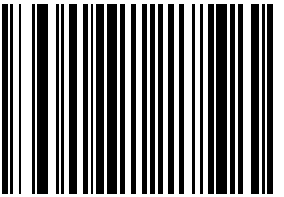
Scanning **DO NOT CONVERT UPC-E TO UPC-A** allows you to transmit UPC-E (zero suppressed) decoded data.



DO NOT CONVERT UPC-E TO UPC-A

EAN Zero Extend

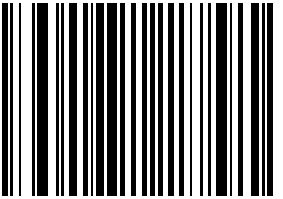
If this parameter is enabled, five leading zeros are added to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.



ENABLE EAN ZERO EXTEND

EAN Zero Extend (Continued)

Disabling this parameter returns EAN-8 symbols to their normal format.

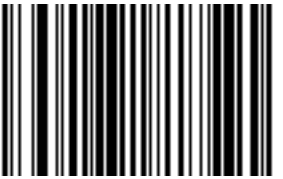


DISABLE EAN ZERO EXTEND

Convert EAN-8 to EAN-13 Type

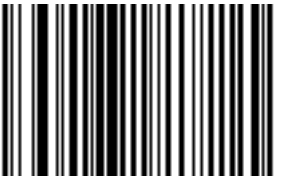
When EAN Zero Extend is enabled, this parameter allows you to label the extended symbol as either an EAN-13 or EAN-8 bar code.

If EAN Zero Extend is disabled, this parameter does not effect bar code data.



EAN-13 TYPE

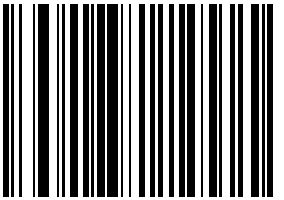
Convert EAN-8 to EAN-13 Type (Continued)



EAN-8 TYPE

Beep After Good Decode

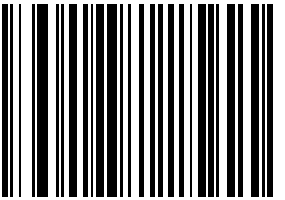
Scan this bar code if you want the unit to beep after a good decode.



BEEP AFTER GOOD DECODE

Do Not Beep After Good Decode

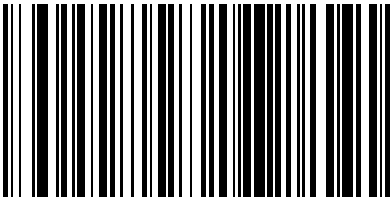
Scan this bar code if you want the unit not to beep after a good decode. The beeper still operates during parameter menu scanning and indicates error conditions.



DO NOT BEEP AFTER GOOD DECODE

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 ms in 1 ms increments. After scanning the bar code below, scan two bar codes from *Numeric Bar Codes* beginning on page 5-160 to set the desired time-out.



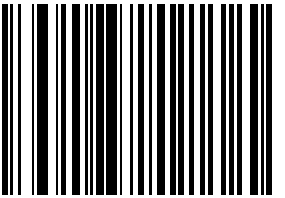
INTERCHARACTER DELAY

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.

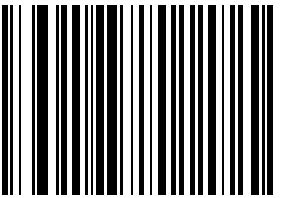
The user may select no code ID character, a Symbol Code ID character, or an AIM Code ID character. The Symbol Code ID characters are listed below; see *Appendix* for AIM Identifiers.

A = UPC-A, UPC-E, UPC-E1, EAN-8 or 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
H = Code 11
I = Code 49
J = MSI/Plessey
K = UCC/EAN-128
L = Bookland
M = Trioptic Code 39
N = Coupon Code
O = NW7



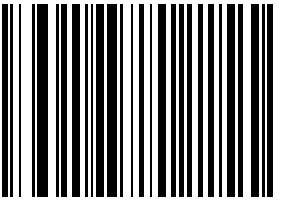
SYMBOL
CODE ID CHARACTER

Transmit Code ID Character (Continued)



AIM
CODE ID CHARACTER

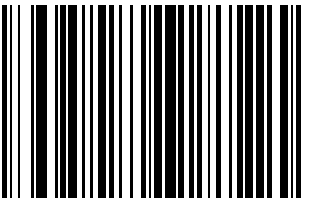
Transmit Code ID Character (Continued)



NONE

Prefix Values

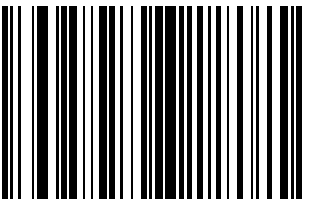
A prefix may be appended to scan data for use in data editing. This value is set by scanning a four digit number (i.e. four bar codes) that corresponds to key codes for various terminals. See *ASCII Equivalent Tables* on page A-8. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **DATA FORMAT CANCEL** on page 5-157.



SCAN PREFIX

Suffix Values

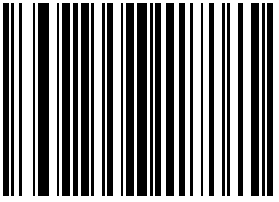
A suffix may be appended to scan data for use in data editing. This value is set by scanning a four digit number (i.e. four bar codes) that corresponds to key codes for various terminals. See *ASCII Equivalent Tables* on page A-8. *Numeric Bar Codes* begin on page 5-160. If you make a mistake, scan **DATA FORMAT CANCEL** on page 5-157.



SCAN SUFFIX

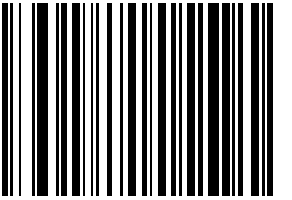
Scan Data Transmission Format

To change the Scan Data Transmission Format, scan the **SCAN OPTIONS** bar code below. Then select one of four options. When you have made your selection, scan **ENTER** on page 5-156. If you make a mistake, scan **DATA FORMAT CANCEL** on page 5-157.



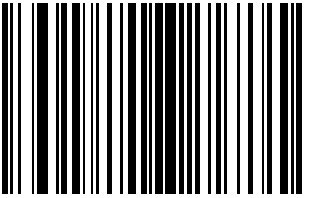
SCAN OPTIONS

Scan Data Transmission Format (Continued)



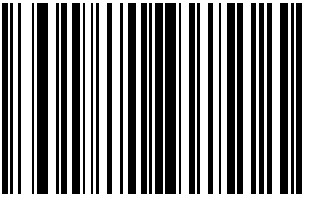
DATA AS IS

Scan Data Transmission Format (Continued)



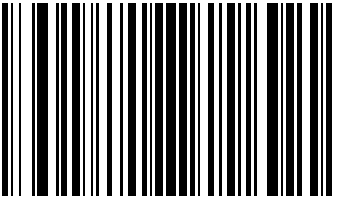
<DATA> <SUFFIX>

Scan Data Transmission Format (Continued)



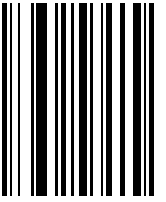
<PREFIX> <DATA>

Scan Data Transmission Format (Continued)



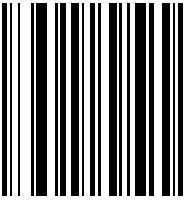
<PREFIX> <DATA> <SUFFIX>

Scan Data Transmission Format (Continued)



ENTER

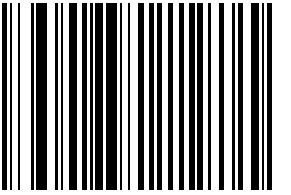
Scan Data Transmission Format (Continued)



DATA FORMAT CANCEL

Ignore Unknown Characters

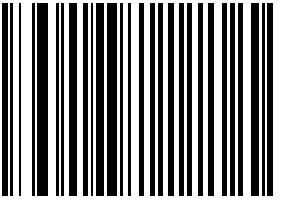
When enabled, all data is sent except for unknown characters, and no error beeps are sounded. Unknown characters are those characters the selected terminal does not recognize.



ENABLE
IGNORE UNKNOWN CHARACTERS

Ignore Unknown Characters (Continued)

When disabled, bar codes with unknown characters are decoded, but not transmitted to the host. A decode beep is followed by a communications error beep indication.

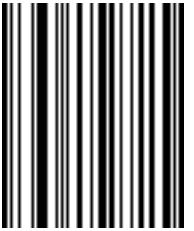


DISABLE
IGNORE UNKNOWN CHARACTERS

Programming Utilities

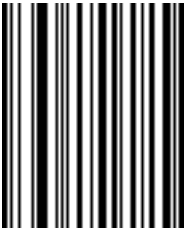
Numeric Bar Codes

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



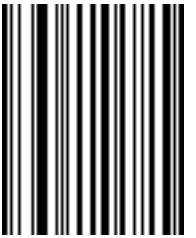
0

Numeric Bar Codes (Continued)



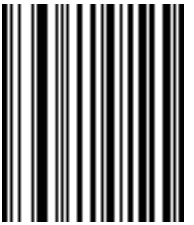
1

Numeric Bar Codes (Continued)



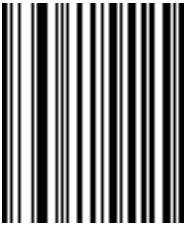
2

Numeric Bar Codes (Continued)



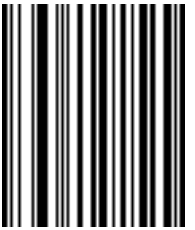
3

Numeric Bar Codes (Continued)



4

Numeric Bar Codes (Continued)



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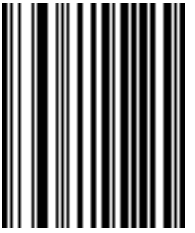
Numeric Bar Codes (Continued)



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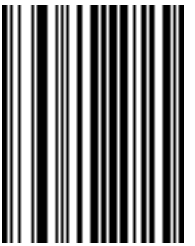
Numeric Bar Codes (Continued)



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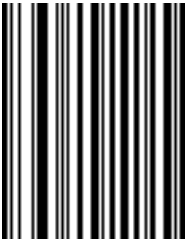
Numeric Bar Codes (Continued)



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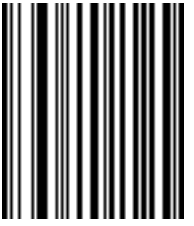
Numeric Bar Codes (Continued)



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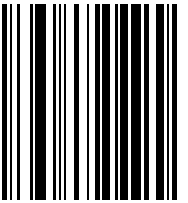
Cancel

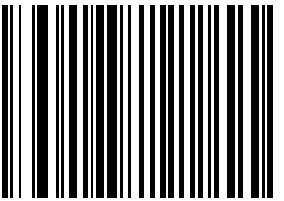
If you make an error, or wish to change your selection, scan **CANCEL**, below.



CANCEL

Applications Items

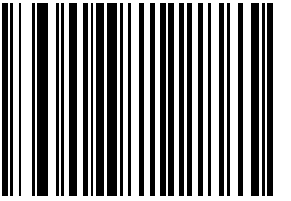
Reserved for future use.



APPLICATIONS ITEM 1 ENABLE

Applications Items (Continued)

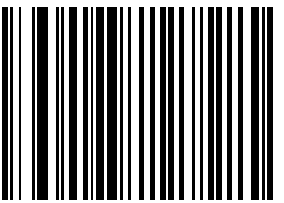
Reserved for future use.



APPLICATIONS ITEM 1
DISABLE

Applications Items (Continued)

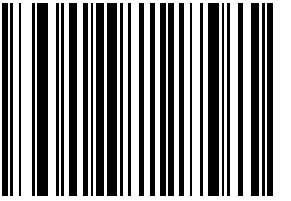
Reserved for future use.



APPLICATIONS ITEM 2 ENABLE

Applications Items (Continued)

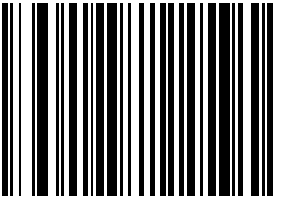
Reserved for future use.



APPLICATIONS ITEM 2
DISABLE

Applications Items (Continued)

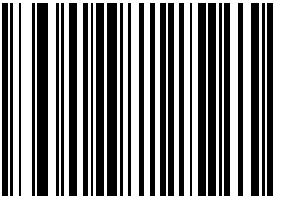
Reserved for future use.



APPLICATIONSITEM3 ENABLE

Applications Items (Continued)

Reserved for future use.

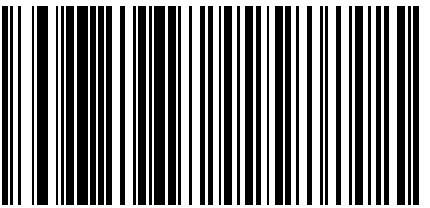


APPLICATIONS ITEM 3
DISABLE

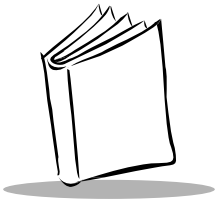
Applications Items (Continued)

Reserved for future use.

Enter a 3 digit value from 0 to 255.



APPLICATIONS VALUE



Appendix A
Programming Reference

UCC/EAN-128

UCC/EAN-128 is a convention for printing data fields with standard Code 128 bar code symbols. UCC/EAN-128 symbols are distinguished by a leading FNC 1 character as the first or second character in the symbol. Other FNC 1 characters are used to delineate fields.

When EAN-128 symbols are read, they are transmitted after special formatting strips off the leading FNC 1 character, and replaces other FNC 1 characters with the ASCII 29 GS control character.

When AIM symbology identifiers are transmitted, the modifier character indicates the position of the leading FNC 1 character according to AIM guidelines.

Standard Code 128 bar codes which do not have a leading FNC 1 may still be used, but are not encoded according to the EAN-128 convention. Standard Code 128 and UCC/EAN-128 may be mixed in an application. The LS 9100 autodiscriminates between these symbols, and can enable or disable one or both

code types via bar code menus. The following table indicates the behavior of the LS 9100 in each of the four possible parameter settings.

Table A-1. Code 128 - UCC/EAN 128

Standard Code 128	UCC/ EAN-128	Effect and Example
Disable	Disable	No Code 128 symbols can be read.
Disable	Enable	Read only symbols with leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E is read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E is read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E is read as ABCD^{29}E ABCD^{FNC1}E can not be read ABCDE can not be read

Table A-1. Code 128 - UCC/EAN 128 (Continued)

Standard Code 128	UCC/ EAN-128	Effect and Example
Enable	Disable	Read only symbols without leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E can not be read A^{FNC1}BCD^{FNC1}E can not be read ^{FNC1FNC1}ABCD^{FNC1}E can not be read ABCD^{FNC1}E is read as ABCD^{29}E ABCDE is read as ABCDE
Enable	Enable	Read both types of symbols. Examples: ^{FNC1}ABCD^{FNC1}E is read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E is read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E is read as ABCD^{29}E ABCD^{FNC1}E is read as ABCD^{29}E ABCDE is read as ABCDE

AIM Code Identifiers

Each AIM Code Identifier contains the three-character string **]cm** where:

] = Flag Character (ASCII 93)
c = Code Character (see Table 1)
m = Modifier Character (see Table 2)

Table A-2. Code Characters

Code Character	Code Type
A	Code 39
C	Code 128/EAN-128
E	UPC/EAN
I	Interleaved 2 of 5
F	Codabar
S	Discrete 2 of 5, IATA
G	Code 93
H	Code 11
T	Code 49
M	MSI/Plessey
X	Bookland, Trioptic Code 39, Coupon, NW7

AIM Modifier Identifiers

The modifier character is the sum of the applicable option values based on the following table.

Table A-3. Modifier Characters

Code Type	Option Value	Option
Code 39	0	No Check Character or Full ASCII processing
	1	Reader has checked one check character
	2	Reader has stripped check character
	4	Reader has performed Full ASCII character conversion
Example:	A Full ASCII bar code with check character W, **A+I+MI+DW**, can be transmitted as **]A7**AimId where 7 = (1+2+4).	

Table A-3. Modifier Characters (Continued)

Code Type	Option Value	Option
Code 128	0	Standard data packet. No Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
Example:	A Code (EAN) 128 bar code with Function 1 character in the first position, **Fcnt1**AimId is transmitted as **]C1**AimId.	
UPC/ EAN	0	Standard packet in full EAN country code format, which is 13 digits for UPC-A and UPC-E (not including supplemental data).
	1	Two digit supplement data only.
	2	Five digit supplement data only.
	4	EAN-8 data packet.
Example:	A UPC-A bar code 012345678905 is transmitted as **]E0**0012345678905.	

Table A-3. Modifier Characters (Continued)

Code Type	Option Value	Option
I 2 of 5	0	No check digit processing.
	1	Reader has checked check digit.
	2	Reader has stripped check digit before transmission.
Example:	An I 2 of 5 bar code without check digit, 4123, is transmitted as **]I0**4123.	

According to AIM standards, a UPC with supplemental bar code is transmitted in one of the following formats:

]E0 (UPC chars) (terminator) **]E2** (supplemental) (terminator) or

]E2 (supplemental) (terminator) **]E0** (UPC chars) (terminator)

In the LS 9100, however, the format is changed to:

]E0 (UPC chars) **]E2** (supplemental)

Therefore, a UPC with two supplemental characters, 01234567890510, is transmitted to the host as a 21-character string, **]E0**0012345678905**]E1**10.

ASCII Equivalent Tables

The following values can be assigned as prefixes or suffixes for data transmission. Not all options are available on every keyboard. Refer to your own keyboard for pertinent keystrokes.

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
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

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke
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	$
1037	/E	%
1038	/F	&
1039	/G	‘
1040	/H	(
1041	/I	)
1042	/J	*
1043	/K	+
1044	/L	,
1045	-	-
1046	.	.
1047	/	/
1048	0	0
1049	1	1

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke
1050	2	2
1051	3	3
1052	4	4
1053	5	5
1054	6	6
1057	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
1068	D	D
1069	E	E
1070	F	F
1071	G	G
1072	H	H
1073	I	I
1074	J	J
1075	K	K

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke
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	^
1095	%O	_
1096	%W	`
1097	+A	a
1098	+B	b
1099	+C	c
1100	+D	d

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke
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
1122	+Z	z
1123	%P	{
1124	%Q	|
1125	%R	}
1126	%S	~
1127		Undefined

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
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 -

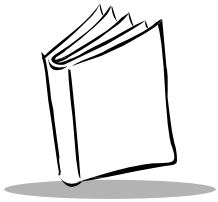
Misc. Key	Keystroke
3001	PA 1
3002	PA 2
3003	CMD 1
3004	CMD 2
3005	CMD 3
3006	CMD 4
3007	CMD 5
3008	CMD 6
3009	CMD 7
3010	CMD 8
3011	CMD 9
3012	CMD 10
3013	¥
3014	£
3015	¤
3016	¬
3017	°
3018	1/2
3019	¶
3020	§
3021	|
3022	0/00

PF Keys	Keystroke
4001	PF 1
4002	PF 2
4003	PF 3
4004	PF 4
4005	PF 5
4006	PF 6

PF Keys	Keystroke
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
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	F 1
5002	F 2
5003	F 3
5004	F 4
5005	F 5
5006	F 6
5007	F 7
5008	F 8
5009	F 9
5010	F 10
5011	F 11
5012	F 12
5013	F 13
5014	F 14
5015	F 15
5016	F 16
5017	F 17
5018	F 18
5019	F 19
5020	F 20
5021	F 21
5022	F 22
5023	F 23
5024	F 24
5025	F 25
5026	F 26
5027	F 27
5028	F 28
5029	F 29
5030	F 30
5031	F 31
5032	F 32
5033	F 33
5034	F 34
5035	F 35
5036	F 36
5037	F 37
5038	F 38
5039	F 39

Numeric Keypad	**Keystroke**	**Extended Keypad**	**Keystroke**
6042	*	7001	Break
6043	+	7002	Delete
6044	Undefined	7003	Pg Up
6045	-	7004	End
6046	.	7005	Pg Dn
6047	/	7006	Pause
6048	0	7007	Scroll Lock
6049	1	7008	Backspace
6050	2	7009	Tab
6051	3	7010	Prnt Screen
6052	4	7011	Insert
6053	5	7012	Home
6054	6	7013	Enter
6055	7	7014	Escape
6056	8	7015	Up Arrow
6057	9	7016	Dn Arrow
6058	Enter	7017	Left Arrow
6059	Num Lock	7018	Right Arrow
6060	00	7019	Back Tab



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

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