



# LS 6000 Series

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## Product Reference Guide

*70-33186-01*  
*Revision B*  
*January 1999*



*LS 6000 Series*  
*Product Reference Guide*

70-33186-01

*Revision B*

*January 1999*



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## *LS 6000 Series Product Reference Guide*



## *About This Guide*

The *LS 6000 Series Product Reference Guide* provides general information about connection and operation of the LS 6000 scanner series.

### **Chapter Descriptions**

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Following are brief descriptions of each chapter in this guide.

- ◆ [Chapter 1, \*Introduction\*](#) provides a product overview and a brief description on using the scanner.
- ◆ [Chapter 2, \*Setup\*](#) provides information on connecting the scanner to the host.
- ◆ [Chapter 3, \*Scanning With the LS 6000\*](#) describes how to use the scanner and defines operator feedback.
- ◆ [Chapter 4, \*Maintenance and Specifications\*](#) includes tips on properly maintaining your scanner, and technical specifications of the scanner.
- ◆ [Chapter 5, \*Programming the LS 6000\*](#) provides all the bar codes necessary to program your scanner.
- ◆ [Appendix A, \*Programming Reference\*](#) contains useful reference material such as ASCII tables and AIM code identifiers.



## Notational Conventions

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The following conventions are used in this document:

- ◆ The term “LS 6000” applies to the LS 6000, LS 6004, and LS 6005, except where specifically noted.
- ◆ 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

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The following is a list of documents that you may find useful if you want to know more about the LS 6000 Scanner.

- ◆ *LS 6000 Series Quick Reference Guide*  
p/n 70-33187-XX
- ◆ *Symbol Omnidirectional Scanner Advanced Programmer's Guide*  
p/n 70-15600-XX

## Service Information

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If you have a problem with your equipment, contact the Symbol Support Center. Before calling, have the model number and serial number at hand.

Call the Support Center from a phone near the 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.*

---



## LS 6000 Series Product Reference Guide

### **Symbol Support Center**

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

#### **United States**

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

#### **Canada**

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

#### **Europe, Latin America, Africa**

Symbol Technologies International  
Symbol Place  
Winnersh Triangle, Berkshire  
RG41 5TP  
United Kingdom  
0800 3282424 (Inside UK)  
+44 118 945 7529 (Outside UK)

#### **Asia/Pacific**

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

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

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

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

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

### **General**

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

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

Some states (or jurisdictions) do not allow the exclusion or limitation of incidental or consequential damages, so the preceding exclusion or limitation may not apply to you.



## *LS 6000 Series Product Reference Guide*



# *Chapter 1*

## *Introduction*

### **Overview**

---

Symbol Technologies' LS 6000 scanner combines the benefits of omni-directional scanning with a light-weight, hand-held design. The scanner converts easily to hands-free use with an optional presentation stand.

The LS 6000 successfully reads most code symbologies, densities, and colors, produced by a wide range of printing techniques.

The LS 6000 scanner supports the following interfaces:

- ◆ LS 6004-I000 (RS-232C) - This scanner contains on-board discrete RS-232C communications for connecting to RS-232C asynchronous terminals and host systems. It also accommodates any of the Synapse™ “Smart Cables” which allows you to connect to a wide variety of host systems.
- ◆ LS 6004-I090 (RS-232C with EAS) - This variation of the LS 6004 also supports Checkpoint Electronic Article Surveillance (EAS) modes V and VII.



## LS 6000 Series Product Reference Guide

- ◆ LS 6005-I000 (IBM 468X/469X) - The LS 6005 is fully compatible with the entire line of IBM 468X/469X terminals. It also accommodates the full line of Synapse Smart Cables.
- ◆ LS 6005-I090 (IBM 468X/469X with EAS) - The LS 6005-I090 also provides additional signal lines for EAS deactivation (Checkpoint modes V and VII).

## Using Your Scanner

---

If the scanner is powered by the host, ensure the host is connected to a power outlet. When power is applied to the host, the scanner powers up.

If the scanner is powered by an external power supply, ensure the power supply is connected to a power outlet. When the power supply is connected to the scanner, the scanner powers up.

The green LED on top of the scanner illuminates and 3 power-up beeps sound, indicating the scanner is operational.

The LS 6000's LED and beeper indicate scanning activity. These indications are described in *LED Indications* and *Beeper Indications* on page 3-5.

If the scanner is inactive for more than a pre-programmed length of time, it enters a low power “rest” mode to conserve energy. When you need to scan again, just bring a bar code to the scanner window to “wake up” the scanner.



## *Chapter 2*

### *Setup*

### **Unpacking**

---

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

### **Installing the Scanner Cable**

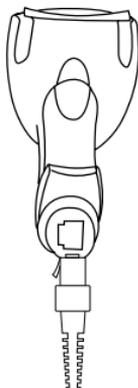
---

To connect the cable to the LS 6000 scanner:

1. Switch off all devices connected to the LS 6000 cable.



2. Plug the modular connector on the cable into the receptacle in the bottom of the LS 6000 handle. Listen for a click.



**Figure 2-1. Plugging Connector into Scanner**

3. Gently tug the cable to ensure the connector is properly secured.

## **Switching Cables**

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

1. Unplug the installed cable's modular connector by depressing the connector clip with a screwdriver or paper clip (through the access hole).
2. Carefully slide out the cable.
3. Follow the steps for *Installing the Scanner Cable* above to connect a new cable.

## **Electronic Article Surveillance (EAS) (Optional)**

---

Because there are several Checkpoint EAS systems available, your local Checkpoint representative must install the EAS cable. To contact your local Checkpoint representative inside the U.S. call 800-257-5540, ext. 4300. Outside the U.S., call (609) 848-1800, ext. 4300.

If you are using an EAS cable, refer to the Universal Cable EAS Installation Sheet (Symbol p/n 70-32824-XX).

## **Connecting to a Host**

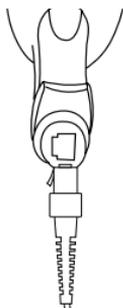
---

Following are detailed instructions for connecting the LS 6000 to your host.

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).
3. If necessary, plug the power supply into the power jack on the interface cable. Depending on the cable, this is located either on the cable's connector itself, or on a "lump" on the cable.
4. Plug the other end of the power supply into an AC outlet.



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



**Figure 2-2. Plugging Connector into Scanner**

6. Set the LS 6000 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, Programming the LS 6000](#), or the *Synapse Interface Guide*.
7. Power up the host terminal. Ensure that the scanner driver port is enabled by following the terminal instructions.
8. Verify that the scanner is successfully reading bar codes and transmitting their content to the host terminal.

See [What If... on page 4-5](#) if you are having problems after completing these steps.



## Chapter 3

# Scanning With the LS 6000

### Scanning In Hand-Held Mode

---

The LS 6000 may be placed on the counter-top or in the Desk Mount Stand (optional). The scanner operates in one of the following three trigger modes, programmable by the bar codes in [Trigger Mode on page 5-16](#):

- ◆ **Triggered Omnidirectional Mode (Default)**  
An omnidirectional scan pattern activates upon trigger pull.
- ◆ **Triggered Single Scan Line Mode**  
A single scan line appears upon trigger pull.
- ◆ **Combination Mode**  
The omnidirectional scan pattern is always on and ready to decode. When the trigger is pulled, the scanner emits a single scan line to decode, then reverts back to omnidirectional constant-on. This mode is only for hand-held use.



To scan in hand-held mode, pick up the scanner and hold it within the scanning range for the bar code. If the scanner is in the constant-on mode, it decodes the bar code automatically. If the scanner is in a triggered mode, pull the trigger to activate the scan pattern and decode the bar code.

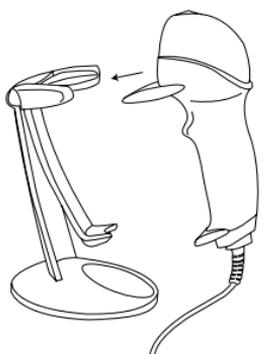


**Figure 3-1. Holding the Scanner**

## Scanning in Hands-Free (Presentation) Mode

---

To place the LS 6000 scanner in the optional Hands-Free Presentation Stand, slide the rubber “chin” support on the scanner into the notch in the stand until the scanner is firmly seated. The scanner emits a constant-on omnidirectional pattern. To scan a bar code, bring the bar code anywhere within 10 in. (25.4 cm) of the scanner window for a successful decode. 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).



Inserting LS 6000 into Stand



Scanning in the Stand

**Figure 3-2. Inserting the Scanner into Stand and Scanning**

When the LS 6000 is removed from the Presentation Stand, the laser shuts off and the scanner operates in the programmed trigger mode (see [Scanning In Hand-Held Mode on page 3-1](#) for trigger mode descriptions).



## Selecting Beeper Volume

---

The LS 6000 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 trigger for five seconds. The scanner cycles through three settings, emitting a 2-beep tone at each setting. To select a particular setting, release the trigger after the desired 2-beep tone.

---

**Note:** *Beeper volume can also be set by scanning the programming bar codes for [Beeper Volume on page 5-19](#).*

---

To adjust the frequency (tone) of the scanner's beeper, see [Beeper Frequency on page 5-21](#).

## **Beeper Indications**

---

The beeper indicates the scanner's status as follows:

**Table 3-1. Beeper Indications**

<b>Beeper</b>	<b>Indication</b>
3 Beeps	Power up (or reset) has occurred.
1 Beep	A bar code has been successfully decoded.
4 Beeps	A transmission error has occurred. Bar code data was not received by the host.
Fast warble	A programming parameter was entered successfully.



## LED Indications

---

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

**Table 3-2. LED Indications**

LED	Indication
Off	No power is applied to the scanner.
On steady	The scanner is on and “ready to scan,” or a flash download cable is attached.
Momentary flash off	A bar code has been successfully decoded.
Fast double-blinking	The scanner is in a programming sequence.
Fast sequential flashing	A scanner malfunction has occurred.
Slow steady blinking	The scanner is in flash program mode.



## *Chapter 4*

# *Maintenance and Specifications*

### **Maintaining Your Scanner**

---

The only maintenance your LS 6000 scanner requires is an occasional cleaning of the scan window to remove fingerprints or other debris. Since the LS 6000 scan window is a high performance optical element, care should be given during cleaning.

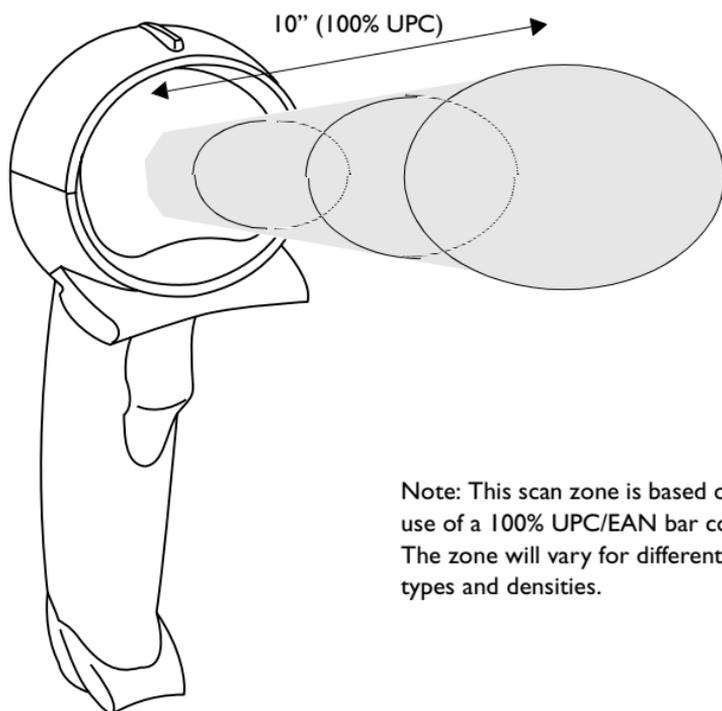
Use only a mild soap and water solution applied to a soft, clean cloth (NOT directly to the scan window). Buff the scan window gently with the cloth to remove any streaking.



## Scan Zone

---

When an omnidirectional mode is selected, the LS 6000 scanner 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. To read a bar code, present the bar code within this pattern.



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.

**Figure 4-1. LS 6000 Scan Zone**

## Technical Specifications

---

**Table 4-1. Technical Specifications**

ITEM	DESCRIPTION
Power Requirements	5.2 VDC +/- 5% @400mA
Omnidirectional Scan Pattern	20-line, 5-direction dynamic cross pattern; 1200 scans per second
Single-Line Scan Pattern	60 scans per second
Decode Depth of Field	Maximum working distance is 10 in. (25.4 cm) on 100% UPC/EAN symbol
Decode Capability	UPC/EAN/JAN (with and without supplementals), Code 128, Code 39, Interleaved 2 of 5, Codabar, UCC/EAN 128, Bookland EAN
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
Ambient Light	Immune to normal artificial indoor and natural outdoor (direct sunlight) lighting conditions Flourescent, incandescent, mercury vapor, sodium vapor: 450 ft.-candles Sunlight: 9000 ft.-candles
Weight	7.4 oz. (210 gm)



**Table 4-1. Technical Specifications (cont'd)**

ITEM	DESCRIPTION
Height	7.64 in. (194 mm)
Width	2.72 in. (69 mm)
Depth	3.19 in. (81 mm)

**What If...****Table 4-2. Troubleshooting**

What if...	Then...
The scanner is not decoding and the green LED is not lit?	Refer to <a href="#">Chapter 2, Setup</a> to verify that your scanner is properly connected.
The scanner is not decoding and the green LED is lit?	<p>Check the bar code to make sure it is not defaced.</p> <p>Verify that the code type you are scanning is enabled.</p> <p>Verify that the symbol length for that code type is correct.</p> <p>Try scanning similar bar codes of the same code type.</p> <p>Make sure the Beep After Good Decode parameter is enabled.</p> <p>Make sure a flash download cable is not being used.</p>
The scanner is not transmitting to the host terminal?	<p>Make sure the scanner is connected to the terminal.</p> <p>Make sure the host terminal is properly configured.</p> <p>Be sure that you've scanned the proper host type.</p> <p>If you're using RS-232, be sure all RS-232 parameters (e.g., baud rate, data bits, handshaking) are set properly to communicate with the host.</p>



## *LS 6000 Series Product Reference Guide*



## Chapter 5

# Programming the LS 6000

### Operational Parameters

---

The LS 6000 is shipped with the settings shown in the [Table 5-1 beginning on page 5-2](#). These default values are stored in non-volatile memory and are preserved even when the scanner is powered down. You can change these default values by scanning the appropriate bar codes included in this manual. These new values replace the standard default values in memory. The default parameter values can be recalled by scanning the [SET ALL DEFAULTS bar code on page 5-7](#).

If you are using a Synapse cable, your host is autodetected, so no host bar codes need to be scanned. If not, you must select a terminal type even if the default parameters suit your needs. The scanner automatically identifies the host type on power-up. It makes this determination provided the host is powered-up before the scanner is attached to it. You must then select the appropriate terminal type for that host. For example, if the scanner is connected to an IBM 4683, after you hear the power-up beeps, select the proper port from the choices in [IBM 46XX Host Types on page 5-8](#).



## Defaults

The following table lists the defaults for all parameters. If you wish to change any option, scan the appropriate bar code(s).

**Table 5-1. Default Table**

Parameter	Default	Page Number
Set Default Parameter	All Defaults	5-7
Host Type	See page 5-8	5-8
Trigger Mode	Triggered Omnidirectional	5-16
Time to Return to Continuous Omnidirectional	0.5 seconds	5-18
Beeper Volume	High	5-19
Beeper Frequency	High Frequency	5-21
Time-out Between Decodes, Same Symbol	Triggered: 200 msec; Constant- On: 2 sec	5-23
Time-out Between Decodes, Different Symbols	600 msec	5-24
Laser On Time	2.0 seconds	5-25
Rest Mode Timeout	30 minutes	5-26
Beep After Good Decode	Enable	5-28
Linear Code Type Security Levels	2	5-29

**Table 5-1. Default Table (cont'd)**

Parameter	Default	Page Number
<b>UPC/EAN</b>		
UPC-A	Enable	5-32
UPC-E	Enable	5-32
EAN-8	Enable	5-34
EAN-13	Enable	5-34
Bookland EAN	Disable	5-36
Decode UPC/EAN Supplementals	Ignore	5-37
Decode UPC/EAN Supplemental Redundancy	20	5-39
Transmit UPC-A Check Digit	Enable	5-40
Transmit UPC-E Check Digit	Enable	5-41
Random Weight Check Digit	Disable	5-42
UPC-A Preamble	System Character	5-43
UPC-E Preamble	System Character	5-45
Convert UPC-E to A	Disable	5-47
EAN-8 Zero Extend	Disable	5-48
UPC/EAN Predecode Block	Reject	5-49



**Table 5-1. Default Table (cont'd)**

Parameter	Default	Page Number
UPC/EAN Security Levels	0	5-51
Linear UPC/EAN Decode	Disable	5-54
Linear Supplemental Decode	Disable	5-55
UPC/EAN Decode Performance	Enable, Level 3	5-56
UPC/EAN Coupon Code	Disable	5-58
<b>Code 128</b>		
Code 128	Enable	5-59
Code 128 Decode Performance	Enable, Level 3	5-60
UCC/EAN-128	Enable	5-62
<b>Code 39</b>		
Code 39	Enable	5-63
Set Length(s) for Code 39	1 to 55	5-64
Code 39 Check Digit Verification	Disable	5-67
Transmit Code 39 Check Digit	Disable	5-68
Code 39 Decode Performance	Enable, Level 3	5-69
Code 39 Full ASCII Conversion	Disable	5-71

**Table 5-1. Default Table (cont'd)**

Parameter	Default	Page Number
<b>Interleaved 2 of 5</b>		
Interleaved 2 of 5	Disable	5-73
Set Length(s) for I 2 of 5	14	5-74
I 2 of 5 Check Digit Verification	Disable	5-77
Transmit I 2 of 5 Check Digit	Disable	5-79
Convert I 2 of 5 to EAN 13	Disable	5-80
<b>Codabar</b>		
Codabar	Disable	5-81
Set Lengths for Codabar	5-55	5-82
CLSI Editing	Disable	5-85
NOTIS Editing	Disable	5-86
<b>Data Options</b>		
Transmit Code ID Character	None	5-87
Pause Duration	0	5-89
Prefix/Suffix Values	7013 (<CR/LF> for serial)	5-90



**Table 5-1. Default Table (cont'd)**

Parameter	Default	Page Number
Scan Data Transmission Format	Data as is	5-91
<b>RS-232C</b>		
RS-232 Host Type	Standard	5-10
Baud Rate	9600	5-95
Parity	Even	5-99
Check Receive Errors	Check	5-102
Hardware Handshaking	None	5-103
Software Handshaking	None	5-107
Host Serial Response Time-out	2 Sec.	5-111
RTS Line State	Low	5-112
Stop Bit Select	1	5-113
ASCII Format	8-Bit	5-114
Beep on <BEL>	Disable	5-115
Intercharacter Delay	0	5-116
Numeric Bar Codes		5-117

## **Set Default Parameter**

---

Scanning this bar code returns all parameters to the default values listed in [Table 5-1 beginning on page 5-2](#).



**SET ALL DEFAULTS**



## Host Type

---

If you're using a Synapse cable, your host is autodetected, so no host bar codes need to be scanned. If not, select an IBM 46XX or RS-232 host from the following bar code menus.

### **IBM 46XX Host Types**

To select one of the following as a POS Interface, scan the appropriate bar code below.

---

**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.*

---



**Port 5B**

## **Host Type (Cont'd)**

---



**Port 9B**



**Port 17/9E**



## Host Type (Cont'd)

---

### RS-232C Host Types

Three RS-232C hosts are set up with their own parameter default settings (Table 5-2). Selecting the ICL, Fujitsu, or Nixdorf RS-232C terminal sets the defaults listed below. These defaults take precedence over standard defaults. So if you select Fujitsu RS-232C, then select the standard defaults, the Fujitsu defaults still take precedence.

**Table 5-2. Terminal Specific RS-232C**

Parameter	Standard	ICL	FUJITSU	NIXDORF Mode A/ Mode B
Transmit Code ID	No	Yes	Yes	Yes
Data Transmission Format	Data as is	Data/ Suffix	Data/ Suffix	Data/Suffix
Suffix	CR/LF (7013)	CR (1013)	CR (1013)	CR (1013)
Baud Rate	9600	9600	9600	9600
Parity	Even	Even	None	Odd
Hardware Handshaking	None	RTS/CTS Option 3	None	RTS/CTS Option 3
Software Handshaking	None	None	None	None
Serial Response Time-out	2 Sec.	9.9 Sec.	2 Sec.	9.9 Sec.

**Table 5-2. Terminal Specific RS-232C**

Parameter	Standard	ICL	FUJITSU	NIXDORF Mode A/ Mode B
Stop Bit Select	One	One	One	One
ASCII Format	8-Bit	8-Bit	8-Bit	8-Bit
Beep On <BEL>	Disabled	Disabled	Disabled	Disabled
RTS Line State	Low	High	Low	*Low = No data to send

\*In the Nixdorf Mode B, if CTS is Low, scanning is disabled. When CTS is High, the user can scan bar codes.



## RS-232C Host Types (Cont'd)

Selecting the ICL, Fujitsu, or Nixdorf RS-232C terminal enables the transmission of Code ID Characters as listed in [Table 5-3](#), below. These Code ID Characters are not programmable and are separate from the Transmit Code ID feature. The Transmit Code ID feature should not be enabled for these terminals.

**Table 5-3. Terminal Specific Code ID Characters**

	ICL	FUJITSU	NIXDORF
UPC-A	"A"	"A"	"A"
UPC-E	"E"	"E"	"C0"
EAN-8	"FF"	"FF"	"B"
EAN-13	"F"	"F"	"A"
Code 39	"C" <len>	None	"M"
Codabar	"N" <len>	None	"N"
Code 128	"L" <len>	None	"K"
I 2 of 5	"I" <len>	None	"I"
UCC/EAN 128	"L" <len>	None	"P"
Bookland EAN	"F"	"F"	"A"

## **RS-232C Host Types (Cont'd)**

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



**STANDARD RS-232C**



**ICL RS-232C**



## **RS-232C Host Types (Cont'd)**



**NIXDORF RS-232C Mode A**



**NIXDORF RS-232C Mode B**

## **RS-232C Host Types (Cont'd)**



**FUJITSU RS-232C**



## **Trigger Mode**

---

Scan a bar code below to select one of the following trigger modes:

- ◆ In Triggered Omnidirectional Mode, an omnidirectional scan pattern activates upon trigger pull.
- ◆ In Triggered Single Scan Line Mode, a single scan line appears upon trigger pull.
- ◆ If Combination Mode is selected, the omnidirectional scan pattern is always on and ready to decode. When the trigger is pulled, the scanner emits a single scan line to decode, then reverts back to omnidirectional constant-on. This mode is only for hand-held use.



**TRIGGERED OMNIDIRECTIONAL MODE**

## **Trigger Mode (Cont'd)**

---



**TRIGGERED SINGLE SCAN LINE MODE**



**COMBINATION MODE  
(CONSTANT-ON OMNIDIRECTIONAL/  
TRIGGERED SINGLE SCAN LINE)**



## **Time to Return to Continuous Omnidirectional**

---

This parameter sets the time the scanner issues a single scan line on trigger pull before returning to the constant-on omnidirectional pattern. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. If this value is set to 0, the trigger mode will not return to constant-on omnidirectional automatically. In this case, pull the trigger twice quickly to return to the constant-on omnidirectional pattern.

To set this time, scan the bar code. Next scan two numeric bar codes beginning on page [5-117](#), the first representing seconds, the second tenths of seconds. If you make an error, or wish to change your selection, scan **CANCEL** on page [5-122](#).



**TIME TO RETURN TO CONTINUOUS OMNI**

## Beeper Volume

---

To select a decode beep volume, scan the **LOW VOLUME**, **MEDIUM VOLUME**, or **HIGH VOLUME** bar code.

---

**Note:** *Beeper volume can also be set manually using the instructions for [Selecting Beeper Volume on page 3-4](#).*

---



**LOW VOLUME**



## **Beeper Volume (Cont'd)**

---



**MEDIUM VOLUME**



**HIGH VOLUME**

## **Beeper Frequency**

---

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



**LOW FREQUENCY**



## **Beeper Frequency (Cont'd)**

---



**MEDIUM FREQUENCY**



**HIGH FREQUENCY**

## **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 numeric bar codes beginning on page [5-117](#), the first representing seconds, the second tenths of seconds. If you make an error, or wish to change your selection, scan **CANCEL** on page [5-122](#).



**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 numeric bar codes beginning on page [5-117](#), the first representing seconds, the second tenths of seconds. If you make an error, or wish to change your selection, scan CANCEL on page [5-122](#).



**TIME-OUT BETWEEN DIFFERENT SYMBOLS**

## **Laser On Time**

---

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

To set a Laser On Time, scan the bar code below. Next scan two numeric bar codes beginning on page [5-117](#) that correspond to the desired time on. Single digit numbers must have a leading zero. For example, to set a Time On of .5 seconds, scan the bar code below, then scan the “0” and “5” bar codes. If you make an error, or wish to change your selection, scan **CANCEL** on page [5-122](#).



**LASER ON TIME**



## **Rest Mode Time-out**

---

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 “rest” mode 15, 30, 60, or 90 minutes after the last attempted decode. The laser blinks during this rest mode to conserve power. To awaken the scanner, present the bar code you wish to scan to the scan window.



**15 MINUTES**



**30 MINUTES**

## **Rest Mode Timeout (Cont'd)**

---



**60 MINUTES**



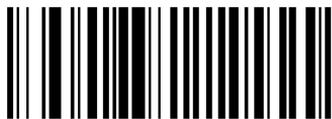
**90 MINUTES**



## **Beep After Good Decode**

---

Scan a bar code below to select whether or not the unit beeps after a good decode. If disabled, the beeper still operates during parameter menu scanning and indicates error conditions.



**BEEP AFTER GOOD DECODE**



**DO NOT BEEP AFTER GOOD DECODE**

## Linear Code Type Security Level

---

---

**Note:** *Does not apply to Code 128.*

---

The LS 6000 offers four 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 I***

The following code types must be successfully read twice before being decoded:

Code Type	Length
Codabar	All
I 2 of 5	8 or less



**LINEAR SECURITY LEVEL I**



## **Linear Security Level 2**

The following code types must be successfully read twice before being decoded:

Code Type	Length
All	All



**LINEAR SECURITY LEVEL 2**

## **Linear Security Level 3**

Code types other than the following must be successfully read twice before being decoded. The following codes must be read three times:

Code Type	Length
I 2 of 5	8 or less
Codabar	8 or less



**LINEAR SECURITY LEVEL 3**

### **Linear Security Level 4**

The following code types must be successfully read three times before being decoded:

Code Type	Length
All	All



**LINEAR SECURITY LEVEL 4**



## **UPC/EAN Options**

---

### ***Enable/Disable UPC-E***

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



**ENABLE UPC-E**



**DISABLE UPC-E**

## ***Enable/Disable UPC-A***

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



**ENABLE UPC-A**



**DISABLE UPC-A**



## **Enable/Disable EAN-8**

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



**ENABLE EAN-8**



**DISABLE EAN-8**

### ***Enable/Disable EAN-13***

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



**ENABLE EAN-13**



**DISABLE EAN-13**



## **Enable/Disable Bookland EAN**

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



**ENABLE BOOKLAND EAN**



**DISABLE BOOKLAND EAN**

## Decode UPC/EAN Supplementals

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

- ◆ If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters are not decoded.
- ◆ If UPC/EAN without supplemental characters is selected, and the LS 6000 is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN is decoded and the supplemental characters ignored.
- ◆ An autodiscriminate option is also available. If this option is selected, choose an appropriate *Decode UPC/EAN Supplemental Redundancy* value from [page 5-39](#). A value of 5 or more is recommended.

---

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

---



## **Decode UPC/EAN Supplementals (Cont'd)**



**DECODE UPC/EAN WITH  
SUPPLEMENTALS**



**IGNORE UPC/EAN WITH  
SUPPLEMENTALS**



**AUTODISCRIMINATE UPC/  
EAN SUPPLEMENTALS**

## **Decode UPC/EAN Supplemental Redundancy**

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

Scan the bar code below to select a decode redundancy value. Next scan two numeric bar codes beginning on page [5-117](#). Single digit numbers must have a leading zero. If you make an error, or wish to change your selection, scan **CANCEL** on page [5-122](#).



**DECODE UPC/EAN  
SUPPLEMENTAL REDUNDANCY**



## **Transmit UPC-A Check Digit**

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



**TRANSMIT UPC-A  
CHECK DIGIT**



**DO NOT TRANSMIT UPC-A  
CHECK DIGIT**

### **Transmit UPC-E Check Digit**

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



**TRANSMIT UPC-E  
CHECK DIGIT**



**DO NOT TRANSMIT UPC-E  
CHECK DIGIT**



## **Random Weight Check Digit**

A 4-digit or 5-digit random weight check digit may be embedded in a UPC-A or EAN-13 bar code for additional price verification. To enable either of these options, or disable the option completely, scan the appropriate bar code below.



**DISABLE RANDOM  
WEIGHT CHECK DIGIT**



**ENABLE 4-DIGIT RANDOM  
WEIGHT CHECK DIGIT**



**ENABLE 5-DIGIT RANDOM  
WEIGHT CHECK DIGIT**

## **UPC-A Preamble**

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



**NO PREAMBLE**  
**(<DATA>)**



## **UPC-A Preamble (Cont'd)**



**SYSTEM CHARACTER  
(<SYSTEM CHARACTER> <DATA>)**



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

### **UPC-E Preamble**

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



**NO PREAMBLE**  
**(<DATA>)**



## **UPC-E Preamble (Cont'd)**



**SYSTEM CHARACTER**  
**(<SYSTEM CHARACTER> <DATA>)**



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

## **Convert UPC-E to UPC-A**

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

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



**CONVERT UPC-E TO UPC-A  
(ENABLE)**



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



## **EAN Zero Extend**

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

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



**ENABLE EAN ZERO EXTEND**



**DISABLE EAN ZERO EXTEND**

### **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 6000 can decode a UPC/EAN symbol by “splicing” together a left block read by one scan line, 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 6000 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 misdecodes 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 misdecodes of poorly printed bar codes, and the misdecodes 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 misdecoding 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**



**DISABLE LINEAR UPC/EAN DECODE**

## ***Linear Supplemental Decode***

This option applies to code types containing two or five character supplementals. When enabled, a bar code is transmitted only when both the supplemental block and its adjacent block are successfully decoded within one laser scan. This option should be enabled when bar codes are in proximity to each other.



**ENABLE LINEAR SUPPLEMENTAL DECODE**



**DISABLE LINEAR SUPPLEMENTAL DECODE**



## **UPC/EAN Decode Performance**

This option offers three levels of decode performance (aggressiveness) for UPC/EAN symbols without supplementals. 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, select a performance level from the next page.



**ENABLE UPC/EAN DECODE PERFORMANCE**



**DISABLE UPC/EAN DECODE PERFORMANCE**

## **UPC/EAN Decode Performance (Cont'd)**

If Decode Performance is enabled, select a level below.



**UPC/EAN DECODE  
PERFORMANCE LEVEL 1**



**UPC/EAN DECODE  
PERFORMANCE LEVEL 2**



**UPC/EAN DECODE  
PERFORMANCE LEVEL 3**



## **UPC/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. *Autodiscriminate UPC/EAN With Supplemental Characters* must be enabled.



**ENABLE UPC/EAN COUPON CODE**



**DISABLE UPC/EAN COUPON CODE**

## **Code 128 Options**

---

### ***Enable/Disable Code 128***

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



**ENABLE CODE 128**



**DISABLE CODE 128**



## **Code 128 Decode Performance**

This option offers three levels of decode performance (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 the next page.



**ENABLE CODE 128 DECODE PERFORMANCE**



**DISABLE CODE 128 DECODE PERFORMANCE**

## **Code 128 Decode Performance (Cont'd)**

If Decode Performance is enabled, select a level below.



**CODE 128 DECODE  
PERFORMANCE LEVEL 1**



**CODE 128 DECODE  
PERFORMANCE LEVEL 2**



**CODE 128 DECODE  
PERFORMANCE LEVEL 3**



## **Enable/Disable UCC/EAN-128**

To enable or disable UCC/EAN-128, scan the appropriate bar code below. (See [Appendix A](#) for details on [UCC/EAN-128](#).)



**ENABLE UCC/EAN-128**



**DISABLE UCC/EAN-128**

## **Code 39 Options**

---

### ***Enable/Disable Code 39***

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



**ENABLE CODE 39**



**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), including check digit(s) the code contains. If Code 39 Full ASCII is enabled, **Length Within a Range** or **Any Length** are the preferred options.

### 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 [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**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 [5-117](#). If you make an error or wish to change your selection, scan CANCEL on page [5-122](#).



**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 [5-117](#). If you make an error or wish to change your selection, scan CANCEL on page [5-122](#).



**CODE 39 - LENGTH WITHIN RANGE**



## **Any Length**

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



**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**



**DISABLE CODE 39 CHECK DIGIT**



## **Transmit Code 39 Check Digit**

Scan a bar code below to transmit the data with or without the check digit.



**TRANSMIT CODE 39 CHECK DIGIT  
(ENABLE)**



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

## **Code 39 Decode Performance**

This option offers three levels of decode performance (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 the next page.

---

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

---



**ENABLE CODE 39 DECODE PERFORMANCE**



**DISABLE CODE 39 DECODE PERFORMANCE**



## **Code 39 Decode Performance (Cont'd)**

If Decode Performance is enabled, select a level below.



**CODE 39 DECODE  
PERFORMANCE LEVEL 1**



**CODE 39 DECODE  
PERFORMANCE LEVEL 2**



**CODE 39 DECODE  
PERFORMANCE LEVEL 3**

## **Enable/Disable Code 39 Full ASCII**

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

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

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

Code 39 Full ASCII interprets the bar code special character (\$ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, when Code 39 Full ASCII is enabled and a **+B** is scanned, it is interpreted as **b**, **%J** as **?**, and **\$H** emulates the keystroke BACKSPACE. Scanning **ABC\$M** outputs the keystroke equivalent of **ABC ENTER**. Refer to [Table A-4](#) in [Appendix A](#).

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



## **Enable/Disable Code 39 Full ASCII (Cont'd)**



**ENABLE CODE 39 FULL ASCII**



**DISABLE CODE 39 FULL ASCII**

## **Interleaved 2 of 5 Options**

---

### ***Enable/Disable Interleaved 2 of 5***

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



**ENABLE INTERLEAVED 2 OF 5**



**DISABLE INTERLEAVED 2 OF 5**



## **Set Lengths for Interleaved 2 of 5**

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

### **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 [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**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 [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**I 2 of 5 - TWO DISCRETE LENGTHS**

## 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 [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**I 2 of 5 - LENGTH WITHIN RANGE**



## **Any Length**

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

---

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

---



**I 2 of 5 - ANY LENGTH**

## ***I 2 of 5 Check Digit Verification***

When enabled, this parameter checks the integrity of an I 2 of 5 symbol to ensure it complies a specified algorithm, either Uniform Symbology Specification (USS), or Optical Product Code Council (OPCC).



**DISABLE**



## ***1 2 of 5 Check Digit Verification (Cont'd)***



**USS CHECK DIGIT**



**OPCC CHECK DIGIT**

## **Transmit 1 2 of 5 Check Digit**

Scan a bar code below to transmit the data with or without the check digit.



**TRANSMIT 1 2 of 5 CHECK DIGIT  
(ENABLE)**



**DO NOT TRANSMIT 1 2 of 5 CHECK DIGIT  
(DISABLE)**



## **Convert I 2 of 5 to EAN-13**

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



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



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

## **Codabar Options**

---

### ***Enable/Disable Codabar***

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



**ENABLE CODABAR**



**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. It also includes any start or stop characters. Scan the appropriate bar code to select one of the following options.

### **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 [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**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 [5-117](#). If you make an error or wish to change your selection, scan CANCEL on page [5-122](#).



**CODABAR - TWO DISCRETE LENGTHS**

## **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 [5-117](#). If you make an error or wish to change your selection, scan CANCEL on page [5-122](#).



**CODABAR - LENGTH WITHIN RANGE**



## **Any Length**

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



**CODABAR - ANY LENGTH**

## **CLSI Editing**

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

---

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

---



**ENABLE CLSI EDITING**



**DISABLE CLSI EDITING**



## **NOTIS Editing**

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



**ENABLE NOTIS EDITING**



**DISABLE NOTIS EDITING**

## **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 *AIM Code Identifiers* in *Appendix A*.

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

B = Code 39

C = Codabar

D = Code 128

F = Interleaved 2 of 5

K = UCC/EAN-128

L = Bookland EAN



**SYMBOL CODE ID CHARACTER**



## **Transmit Code ID Character (Cont'd)**



**AIM CODE ID CHARACTER**



**NONE**

## **Pause Duration**

---

This parameter allows a pause to be inserted at any point in the data transmission. Pauses are set by scanning a two-digit number (i.e., two bar codes), and are measured in 1/10 second intervals. For example, scanning bar codes “0” and “1” inserts a 1/10 second pause; “0” and “5” gives you a 1/2 second delay. Numeric bar codes begin on page [5-117](#). If you make an error or wish to change your selection, scan **DATA FORMAT CANCEL** on page [5-94](#).



**PAUSE DURATION**



## Prefix/Suffix Values

---

A prefix/suffix may be appended to scan data for use in data editing. These values are set by scanning a four-digit number (i.e., four bar codes) that corresponds to key codes for various terminals. See [Table A-4](#) in [Appendix A](#) for conversion information. Numeric bar codes begin on page [5-117](#). If you make an error or wish to change your selection, scan CANCEL on page [5-122](#).



**SCAN PREFIX**



**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 the **ENTER** bar code on page 5-94. If you make a mistake, scan the **DATA FORMAT CANCEL** bar code on page 5-94.



**SCAN OPTIONS**



## **Scan Data Transmission Format (Cont'd)**

---



**DATA AS IS**



**<DATA> <SUFFIX>**

## **Scan Data Transmission Format (Cont'd)**

---



**<PREFIX> <DATA>**



**<PREFIX> <DATA> <SUFFIX>**



## **Scan Data Transmission Format (Cont'd)**

---



**ENTER**



**DATA FORMAT CANCEL**

## **RS-232C Parameters**

---

### ***Baud Rate***

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.



**BAUD RATE 300**



## **Baud Rate (Cont'd)**



**BAUD RATE 600**



**BAUD RATE 1200**

**Baud Rate (Cont'd)**



**BAUD RATE 2400**



**BAUD RATE 4800**



## **Baud Rate (Cont'd)**



**BAUD RATE 9600**



**BAUD RATE 19,200**

## **Parity**

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

### **Odd**

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



**ODD**



## **Parity (Cont'd)**

### **Even**

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



**EVEN**

### **Mark**

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



**MARK**

## **Parity (Cont'd)**

### **Space**

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



**SPACE**

### **None**

Select **None** if no parity is desired.



**NONE**



## **Check Receive Errors**

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



**CHECK FOR RECEIVED ERRORS**



**DO NOT CHECK FOR RECEIVED ERRORS**

## Hardware Handshaking

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

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 2 seconds for the host to negate the CTS line. If, after 2 seconds (default), 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 2 seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after 2 seconds (default), 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 the above communications sequence fails, the scanner issues an error indication. In this case, the data is lost and must be rescanned.



## **Hardware Handshaking (Cont'd)**

If Hardware Handshaking and Software Handshaking are both enabled, Hardware Handshaking takes precedence.

---

*Note: The DTR signal is jumpered active.*

---

Scan one of the following bar codes to select an option below.

### **No Hardware Handshaking**



**NONE**

### **Standard RTS/CTS Hardware Handshaking**



**STANDARD RTS/CTS**

## **Hardware Handshaking (Cont'd)**

### **RTS/CTS Option 1**

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**

### **RTS/CTS Option 2**

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 2 seconds (default), the scanner issues an error indication and discards the data.



**RTS/CTS OPTION 2**



## **Hardware Handshaking (Cont'd)**

### **RTS/CTS Option 3**

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 2 seconds (default) 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**

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

If Software Handshaking and Hardware Handshaking are both enabled, Hardware Handshaking takes precedence.

Scan the appropriate bar code to select one of the following options.

### **None**

When this option is selected, data is transmitted immediately.



**NONE**



## **Software Handshaking (Cont'd)**

### **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 Time-out 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 time-out occurs.



**ACK/NAK**

## **Software Handshaking (Cont'd)**

### **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 2 seconds, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every 2 seconds to prevent transmission errors.



**ENQ**

### **ACK/NAK with ENQ**

This combines the two previous options.



**ACK/NAK with ENQ**



## **Software Handshaking (Cont'd)**

### **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 2 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 Timeout**

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

The delay period can range from 0.0 to 9.9 seconds in .1-second increments. After scanning the bar code below, scan two numeric bar codes beginning on page [5-117](#). If you make an error or wish to change your selection, scan **CANCEL** on page [5-122](#).



**HOST SERIAL RESPONSE TIME-OUT**



## **RTS Line State**

This parameter is used to set the idle state of the Serial Host RTS line. Scan a bar code below to select **LOW RTS** line state or **HIGH RTS** line state.



**HOST: LOW RTS**



**HOST: HIGH RTS**

## **Stop Bit Select**

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 selected (one or two) 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**



**2 STOP BITS**



## **ASCII Format**

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



**7-BIT**



**8-BIT**

**Beep on <BEL>**

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  
(ENABLE)**



**DO NOT BEEP ON <BEL> CHARACTER  
(DISABLE)**



## **Intercharacter Delay**

Select the intercharacter delay option matching host requirements. The intercharacter delay gives the host system time to service its receiver and perform other tasks between characters. The delay period can range from no delay to 99 msec in 1-msec increments. After scanning the bar code below, scan two bar codes beginning on page 5-117 to set the desired time-out. If you make an error or wish to change your selection, scan CANCEL on page 5-122.



**INTERCHARACTER DELAY**

## **Numeric Bar Codes**

---

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



**0**



**1**



## **Numeric Bar Codes (Cont'd)**

---



2



3

## **Numeric Bar Codes (Cont'd)**

---



4



5



## **Numeric Bar Codes (Cont'd)**

---



**6**



**7**

## **Numeric Bar Codes (Cont'd)**

---



**8**



**9**



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### **Cancel**

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



**CANCEL**



## *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. For example, ]c1 indicates a UCC/EAN-128 symbol with a leading FNC1 character.

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 6000 autodiscriminates



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between these symbols, and can enable or disable one or both code types via bar code menus. [Table A-1](#) indicates the behavior of the LS 6000 in each of the four possible parameter settings.

**Table A-1. Reading Standard 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: FNC1ABCD <sup>FNC1</sup> E are read as ABCD <sup>29</sup> E A <sup>FNC1</sup> BCD <sup>FNC1</sup> E are read as ABCD <sup>29</sup> E FNC1FNC1ABCD <sup>FNC1</sup> E are read as ABCD <sup>29</sup> E ABCD <sup>FNC1</sup> E cannot be read ABCDE cannot be read
Enable	Disable	Read only symbols without leading FNC 1. Examples: FNC1ABCD <sup>FNC1</sup> E cannot be read A <sup>FNC1</sup> BCD <sup>FNC1</sup> E cannot be read FNC1FNC1ABCD <sup>FNC1</sup> E cannot be read ABCD <sup>FNC1</sup> E is read as ABCD <sup>29</sup> E ABCDE is read as ABCDE

**Table A-I. Reading Standard Code 128 & UCC/EAN 128**

Standard Code 128	UCC/ EAN-128	Effect and Example
Enable	Enable	<p>Read both types of symbols.</p> <p>Examples:</p> <p><math>\text{FNC1} \text{ABCD} \text{FNC1} \text{E}</math> are read as <math>\text{ABCD}^{29}\text{E}</math></p> <p><math>\text{A} \text{FNC1} \text{BCD} \text{FNC1} \text{E}</math> are read as <math>\text{ABCD}^{29}\text{E}</math></p> <p><math>\text{FNC1} \text{FNC1} \text{ABCD} \text{FNC1} \text{E}</math> are read as <math>\text{ABCD}^{29}\text{E}</math></p> <p><math>\text{ABCD} \text{FNC1} \text{E}</math> is read as <math>\text{ABCD}^{29}\text{E}</math></p> <p>ABCDE is read as ABCDE</p>



## AIM Code Identifiers

---

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

- ] = Flag Character (ASCII 93)
- c = Code Character (see [Table A-2](#))
- m = Modifier Character (see [Table A-3](#))

**Table A-2. Code Characters**

Code Character	Code Type
A	Code 39
C	Code 128
E	UPC/EAN
F	Codabar
I	Interleaved 2 of 5
X	Bookland EAN

## Modifier Characters

The modifier character is the sum of the applicable option values based on [Table A-3](#).

**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.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, A+I+MI+DW, is transmitted as JA7AimId where $7 = (3+4)$ .	



**Table A-3. Modifier Characters (cont'd)**

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, <sup>FNC1</sup> Aim Id is transmitted as ]C1AimId	
I 2 of 5	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example:An I 2 of 5 bar code without check digit, 4123, is transmitted as ]I04123	
Codabar	0	No check digit processing.
	1	Reader has checked check digit.
	3	Reader has stripped check digit before transmission.
	Example:A Codabar bar code without check digit, 4123, is transmitted as ]F04123	

**Table A-3. Modifier Characters (cont'd)**

Code Type	Option Value	Option
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 ]E00012345678905	
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example:A Bookland EAN bar code 123456789X is transmitted as ]X0123456789X	

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

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

In the LS 6000, 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, ]E00012345678905]E110.



## ASCII Character Set

---

Refer to the table below for ASCII values.

**Table A-4. ASCII Character Set**

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1000	%U	CTRL 2	1024	\$X	CTRL X
1001	\$A	CTRL A	1025	\$Y	CTRL Y
1002	\$B	CTRL B	1026	\$Z	CTRL Z
1003	\$C	CTRL C	1027	%A	CTRL [
1004	\$D	CTRL D	1028	%B	CTRL \
1005	\$E	CTRL E	1029	%C	CTRL ]
1006	\$F	CTRL F	1030	%D	CTRL 6
1007	\$G	CTRL G	1031	%E	CTRL -
1008	\$H	CTRL H	1032	Space	Space
1009	\$I	CTRL I	1033	/A	!
1010	\$J	CTRL J	1034	/B	‘
1011	\$K	CTRL K	1035	/C	#
1012	\$L	CTRL L	1036	/D	\$
1013	\$M	CTRL M	1037	/E	%
1014	\$N	CTRL N	1038	/F	&
1015	\$O	CTRL O	1039	/G	‘
1016	\$P	CTRL P	1040	/H	(
1017	\$Q	CTRL Q	1041	/I	)
1018	\$R	CTRL R	1042	/J	*
1019	\$S	CTRL S	1043	/K	+
1020	\$T	CTRL T	1044	/L	,
1021	\$U	CTRL U	1045	-	-
1022	\$V	CTRL V	1046	.	.
1023	\$W	CTRL W	1047	/	/

**Table A-4. ASCII Character Set (cont'd)**

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1048	0	0	1073	I	I
1049	1	1	1074	J	J
1050	2	2	1075	K	K
1051	3	3	1076	L	L
1052	4	4	1077	M	M
1053	5	5	1078	N	N
1054	6	6	1079	O	O
1055	7	7	1080	P	P
1056	8	8	1081	Q	Q
1057	9	9	1082	R	R
1058	/Z	:	1083	S	S
1059	%F	;	1084	T	T
1060	%G	<	1085	U	U
1061	%H	=	1086	V	V
1062	%I	>	1087	W	W
1063	%J	?	1088	X	X
1064	%V	@	1089	Y	Y
1065	A	A	1090	Z	Z
1066	B	B	1091	%K	[
1067	C	C	1092	%L	\
1068	D	D	1093	%M	]
1069	E	E	1094	%N	^
1070	F	F	1095	%O	_
1071	G	G	1096	%W	‘
1072	H	H	1097	+A	a



**Table A-4. ASCII Character Set (cont'd)**

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1098	+B	b	1113	+Q	q
1099	+C	c	1114	+R	r
1100	+D	d	1115	+S	s
1101	+E	e	1116	+T	t
1102	+F	f	1117	+U	u
1103	+G	g	1118	+V	v
1104	+H	h	1119	+W	w
1105	+I	i	1120	+X	x
1106	+J	j	1121	+Y	y
1107	+K	k	1122	+Z	z
1108	+L	l	1123	%P	{
1109	+M	m	1124	%Q	
1110	+N	n	1125	%R	}
1111	+O	o	1126	%S	~
1112	+P	p	1127		Undefined

**Table A-4. ASCII Character Set (cont'd)**

ALT Keys	Keystroke	ALT Keys	Keystroke	ALT Keys	Keystroke
2064	ALT 2	2075	ALT K	2086	ALT V
2065	ALT A	2076	ALT L	2087	ALT W
2066	ALT B	2077	ALT M	2088	ALT X
2067	ALT C	2078	ALT N	2089	ALT Y
2068	ALT D	2079	ALT O	2090	ALT Z
2069	ALT E	2080	ALT P	2091	ALT [
2070	ALT F	2081	ALT Q	2092	ALT \
2071	ALT G	2082	ALT R	2093	ALT ]
2072	ALT H	2083	ALT S	2094	ALT 6
2073	ALT I	2084	ALT T	2095	ALT -
2074	ALT J	2085	ALT U		
Misc. Key	Keystroke	Misc. Key	Keystroke	Misc. Key	Keystroke
3001	PA 1	3009	CMD 7	3017	°
3002	PA 2	3010	CMD 8	3018	1/2
3003	CMD 1	3011	CMD 9	3019	¶
3004	CMD 2	3012	CMD 10	3020	§
3005	CMD 3	3013	¥	3021	
3006	CMD 4	3014	£	3022	0/00
3007	CMD 5	3015	□		
3008	CMD 6	3016	¬		



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**Table A-4. ASCII Character Set (cont'd)**

PF Keys	Keystroke	PF Keys	Keystroke	PF Keys	Keystroke
4001	PF 1	4009	PF 9	4017	PF 17
4002	PF 2	4010	PF 10	4018	PF 18
4003	PF 3	4011	PF 11	4019	PF 19
4004	PF 4	4012	PF 12	4020	PF 20
4005	PF 5	4013	PF 13	4021	PF 21
4006	PF 6	4014	PF 14	4022	PF 22
4007	PF 7	4015	PF 15	4023	PF 23
4008	PF 8	4016	PF 16	4024	PF 24
F Keys	Keystroke	F Keys	Keystroke	F Keys	Keystroke
5001	F 1	5014	F 14	5027	F 27
5002	F 2	5015	F 15	5028	F 28
5003	F 3	5016	F 16	5029	F 29
5004	F 4	5017	F 17	5030	F 30
5005	F 5	5018	F 18	5031	F 31
5006	F 6	5019	F 19	5032	F 32
5007	F 7	5020	F 20	5033	F 33
5008	F 8	5021	F 21	5034	F 34
5009	F 9	5022	F 22	5035	F 35
5010	F 10	5023	F 23	5036	F 36
5011	F 11	5024	F 24	5037	F 37
5012	F 12	5025	F 25	5038	F 38
5013	F 13	5026	F 26	5039	F 39

**Table A-4. ASCII Character Set (cont'd)**

Numeric Keypad	Keystroke	Numeric Keypad	Keystroke	Numeric Keypad	Keystroke
6042	*	6049	1	6056	8
6043	+	6050	2	6057	9
6044	Undefined	6051	3	6058	Enter
6045	-	6062	4	6059	Num Lock
6046	.	6063	5	6060	00
6047	/	6064	6		
6048	0	6065	7		
Extended Keypad	Keystroke	Extended Keypad	Keystroke	Extended Keypad	Keystroke
7001	Break	7008	Backspace	7015	Up Arrow
7002	Delete	7009	Tab	7016	Dn Arrow
7003	Pg Up	7010	Print Screen	7017	Left Arrow
7004	End	7011	Insert	7018	Right Arrow
7005	Pg Dn	7012	Home	7019	Back Tab
7006	Pause	7013	Enter		
7007	Scroll Lock	7014	Escape		



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

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