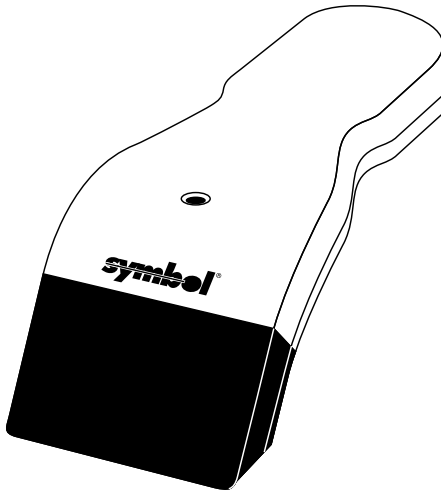


# *LT 1804 (RS-232/Synapse)*

## *Product Reference Guide*

Click on **red text** at any location in the manual to jump to the specified chapter, topic, or reference.



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*70-32537-01*

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***symbol***<sup>®</sup>



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Symbol Technologies, Inc.  
One Symbol Plaza  
Holtsville, N.Y. 11742-1300  
<http://www.symbol.com>

#### FCC Information

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

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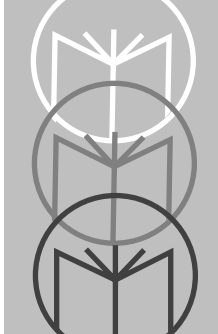
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## *About This Manual*

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The *LT 1804 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**

- *LT 1810/1804 Quick Reference Guide*                      70-31612-XX

### **Service Information**

If you have a problem with your equipment, contact the Symbol Support Center. 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 Center

In the U.S.A, for service information, warranty information or technical assistance, call:

SYMBOL SUPPORT CENTER  
**1-800-653-5350**

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

### Canada

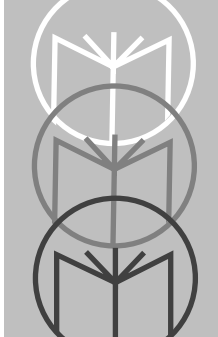
Mississauga, Ontario  
Canadian Headquarters  
(905) 629-7226

### Europe

Wokingham, England  
European Headquarters  
0734-771-222 (Inside UK)  
+441-734-771222 (Outside UK)

### Asia

Singapore  
Symbol Technologies Asia, Inc.  
337-6588 (Inside Singapore)  
+65-337-6588 (Outside Singapore)



# Chapter 1

## Setting Up the LT 1804

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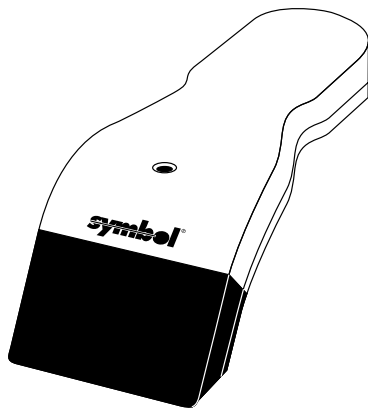
### Overview

LT 1804 provides the best all-around close range scanning performance, reliability, and value available. Its physical design, which combines a lightweight yet solid feel with excellent ergonomics for scanning, ensures comfortable use.

The LT 1804 hand-held scanner is based on the Visible Laser Diode (VLD) as a light source. Combined with our surface mount technology and patented resonating harmonic scan element, this state-of-the-art scanner provides solid state dependability. When you add this scanner to your system, you add efficient, reliable bar code reading capability.

Laser performance gives you accuracy and faster read rates on virtually any bar code substrate, including colors.

When operated by battery, the LT 1804 is ideal for portable data collection.



The LT 1804 weighs 6.0 ounces (170 gm) without the cable and is made from a durable, flame retardant plastic.



## Unpacking

Remove the LT 1804 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 ii](#). **KEEP THE PACKING**. It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

## Connecting Your LT 1804

LT 1804 scanners can be battery operated, or you can use an external power supply. The scanner contains on-board discrete RS-232C communications for connecting to RS-232C asynchronous terminals and host systems. It can also accommodate any of the Synapse™ “Smart Cables” which allows you to connect to a wide variety of host systems.

**Note:** The model number of the adapter cable depends on the host device. See [page 3-3](#).

## RS-232 Power Supply Operation

1. Make sure that the host device is powered down before you connect the scanner.
2. Plug the connector at the end of the scanner's straight cable into the appropriate RS-232C receiving port on your host device.
3. Plug one end of the power supply cable into the power supply port on the side of the LT 1804 connector.
4. Connect the power supply to an AC receptacle supplying voltage of the appropriate level.

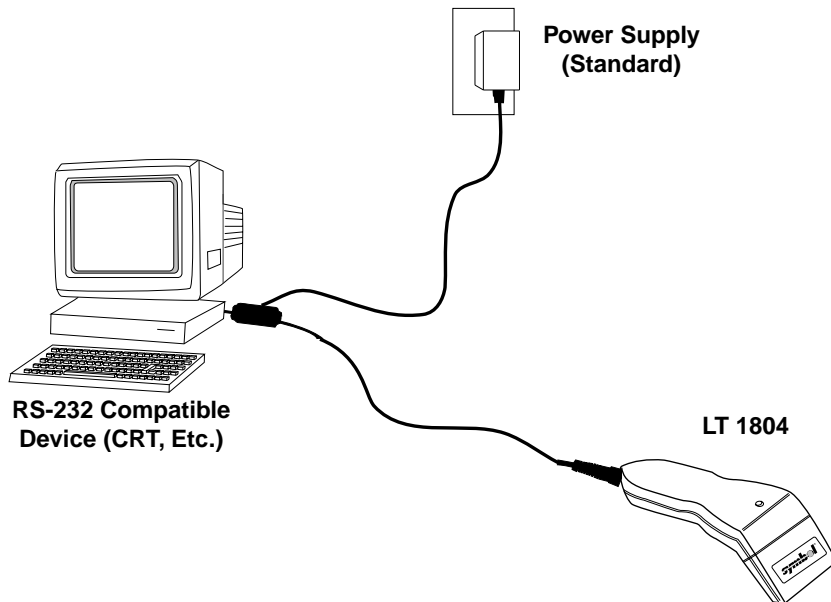


Figure 1-1. RS-232 Power Supply Operation

## RS-232 Battery Operation

1. Insert a 9-volt battery into the battery pack.
2. Plug the 9-pin connector at the end of the scanner's cable into one end of the battery pack.
3. Use the adapter cable to connect the LT 1804 to the host device. Connect one end of this cable to the battery pack and the other to the appropriate port on the host device (either a stationary or portable terminal).
4. If desired, plug one end of the power supply connector into the receptacle on the side of the battery pack. Plug the other end of the connector into an AC outlet.

The LT 1804 scanner uses either an alkaline battery or a nickel-cadmium rechargeable battery. Low battery power is signaled by four short, high tone beeps, as well as scanning interruptions. If this occurs, change or recharge the battery as soon as possible.

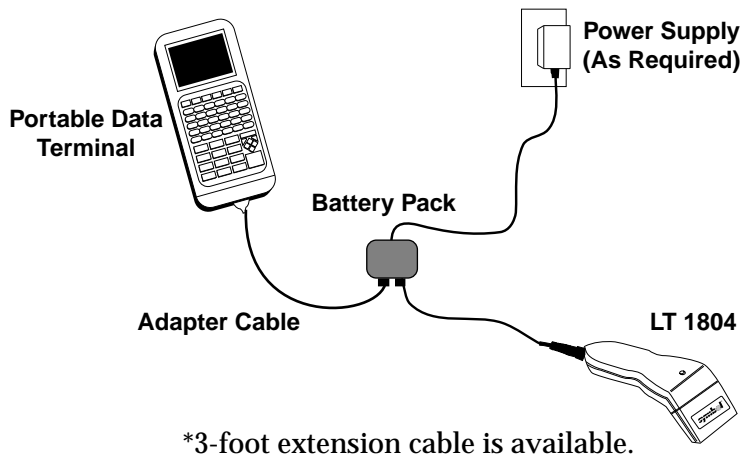


Figure 1-2. RS-232 Battery Operation

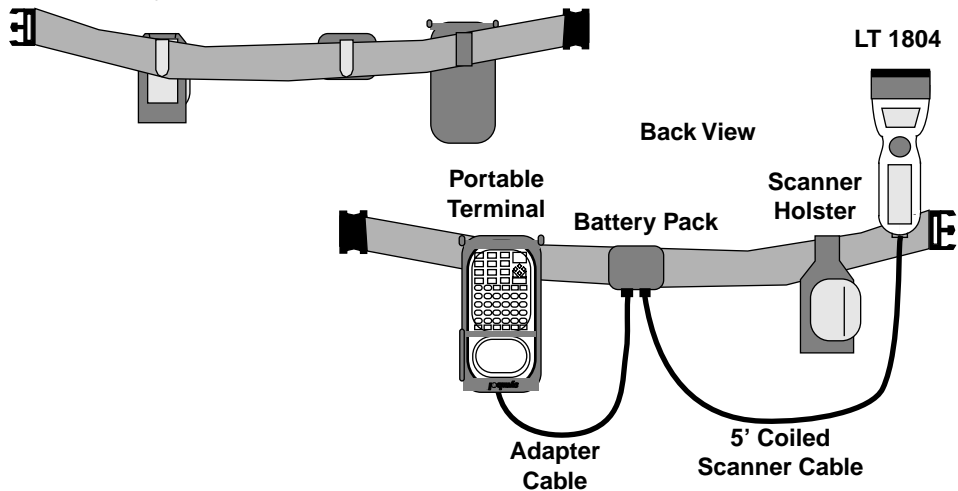
## Changing the Battery

1. Disconnect the battery pack.
2. To open the battery pack, push up on the flanges at one end of the pack.
3. Remove the old battery.
4. Insert the new or recharged 9-volt battery into the battery pack. Match the positive (+) and negative (-) terminals on the battery with the corresponding terminals in the battery pack.

## Recharging a Nickel-Cadmium Battery

1. Remove the battery from the battery pack and place it in the recharging unit.
2. To recharge the battery, follow the instructions supplied with the recharging unit.

**Front View: Belt Goes through Loop on Back of Holster, Battery Pack, and Portable Terminal Holster**



**Figure 1-3. Portable Operation with Scanner Holster, Battery Pack and Terminal Holster**

## Synapse Configuration

See the *Synapse Interface Guide* provided with your Synapse cable for setup instructions.

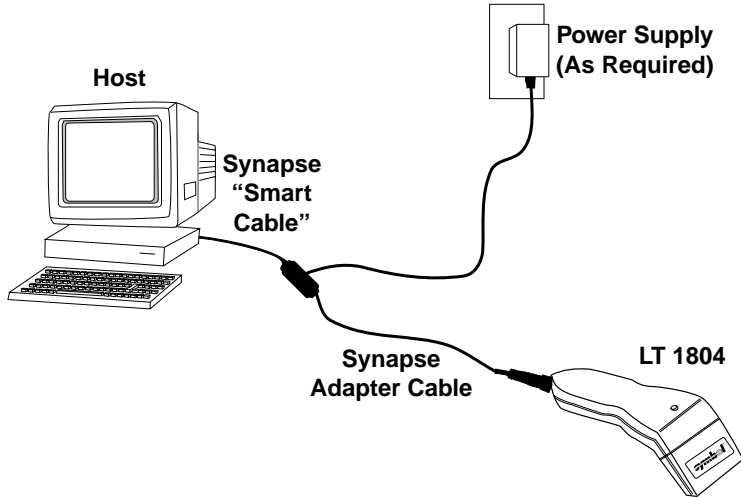
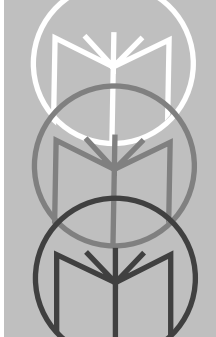


Figure 1-4. Synapse Configuration



## Chapter 2

# Scanning with the LT 1804

---

## Scanning

- Be sure the scanner is connected to the controller or portable data terminal before you turn on the system.
- Be sure the symbol you want to scan is within the LT 1804 scanning range (see *LT 1804 Decode Zone on page 2-2.*)
- If the scanner is in triggerless mode, simply bring the scanner to the bar code. The scan beam is in a constant blinking state which becomes steady when the scanner is decoding a bar code.
- If the scanner is in triggered mode, bring the scanner to the bar code and press the trigger. The scan beam (and red LED on the top of the scanner) illuminates for approximately 1 second, or until a successful decode.
- Your scan beam must cross every bar and space on the symbol.



- When the symbol has been decoded, a short, high-tone beep sounds and the green decode LED lights.

# LT 1804 Decode Zone

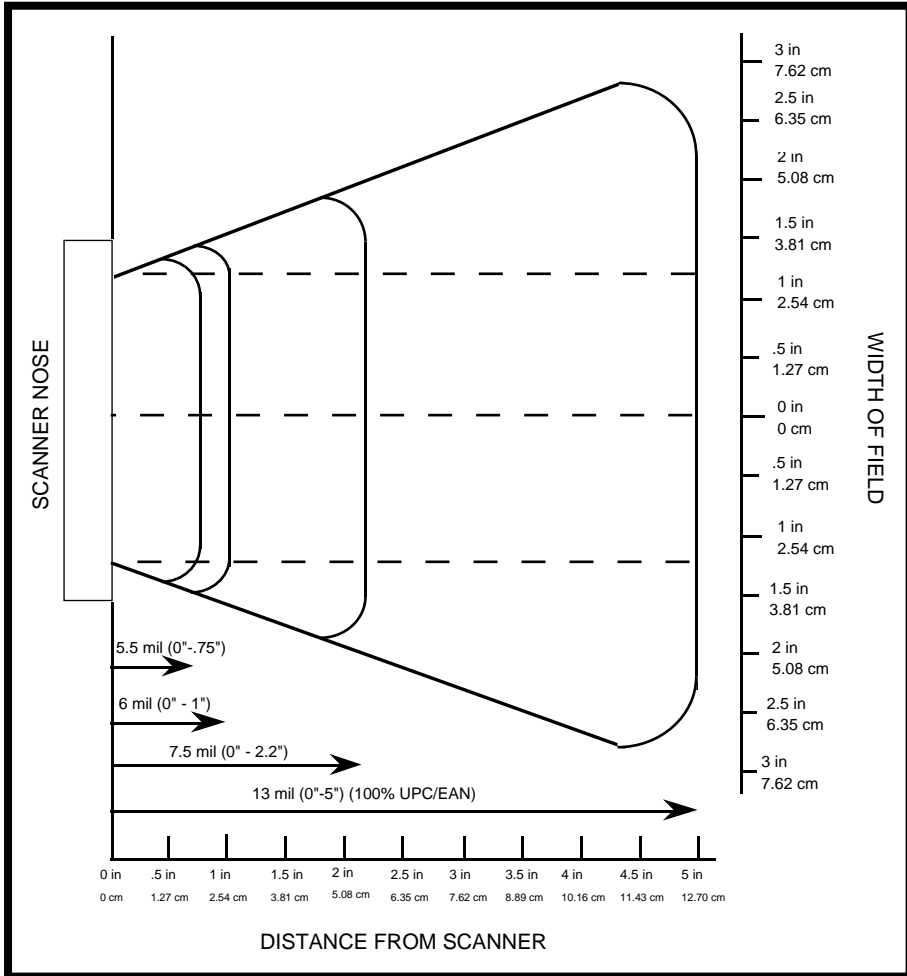
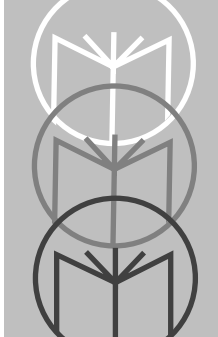


Figure 2-1. LT 1804 Decode Zone



## *Chapter 3*

# *Maintenance and Specifications*

---

## **Maintenance**

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

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

## **What If...**

**Nothing happens when you follow the operating instructions.**

### **You Should**

- Check the system power; check the power supply or battery pack connections.
- Make sure the controller is programmed to decode bar codes of the symbology you are scanning.
- Check for loose cable connections.
- Make sure the symbol is not defaced.
- Try scanning test symbols of the same code type.

**Note:** If after performing these checks the symbol still does not scan, contact your distributor or call the Symbol Support Center. See [page ii](#) for the telephone number.



## Accessories

### Standard Accessories:

Part Number	Description
70-32537-XX	LT 1804 Product Reference Guide
70-31612-XX	LT 1810/1804 Quick Reference Guide
50-11400-007	Shipping Box

### Power Supply Operation:

#### RS-232C Single-Port Straight Cable:

Part Number	Cable
25-17837-02	Female 9-Pin (TxD on pin 2), with power jack

#### RS-232C Cable Adapters:

Part Number	Adapter Type
50-12100-380	9-Pin to Male 25-Pin (TxD on pin 2)
50-12100-379	9-Pin to Male 25-Pin (TxD on pin 3)
50-12100-378	9-Pin to Female 25-Pin (TxD on pin 2)
50-12100-377	9-Pin to Female 25-Pin (TxD on pin 3)

### Power Supplies:

Part Number	Description
50-14000-005	117V Input, 5V Output Power Supply
50-04000-083	220/240V Input, 5V Output Power Supply

## Battery Operation:

Part Number	Description
25-09075-01	Straight Cable
20-10615-01	Battery Box (5V Regulated)

## Adapter Cables:

Part Number	Connector Type
20-03113-02	Male, 25-Pin (TxD on pin 3)
20-03114-02	Male, 25-Pin (TxD on pin 2)
20-03115-02	Female, 25-Pin (TxD on pin 3)
20-03116-02	Female, 25-Pin (TxD on pin 2)

## Coiled Extension Cables:

Part Number	Description
25-08892-01	3-foot Extension Cable

## Synapse Adapter Cables:

Part Number	Description
25-31617-01	6-foot Straight Cable

## Optional Accessories:

LT 1804 optional accessories, supplied at extra cost, include additional units of any item list of Standard Accessories, and the following items.

Part Number	Description
20-12769-01	Hands-Free Stand - Desk Mount (non-adjustable)
20-08414-01	Hands-Free Stand - Free Standing (adjustable)
20-08415-01	Hands-Free Stand - ECR Mount (adjustable)
21-08288-02	Desk-Mount Stand
23-08253-01	Wall-Mount Stand
20-08416-01	Holster/Belt Clip

Host interface cable pinouts begin on [page 3-7](#).

# Technical Specifications

**Table 3-1. Technical Specifications**

ITEM	DESCRIPTION
<b>Power Requirements</b>	5 VDC $\pm$ 10%; 120 mA average current (160 mA peak)
<b>Off Current Stand-By Mode</b>	10 $\mu$ A
<b>Decode Capability</b>	The LT 1804 scanner can be programmed to decode the following code types: UPC/EAN, UCC/EAN 128, Code 39, Code 39 Full ASCII, Codabar, Interleaved 2 of 5, Code 128, Discrete 2 of 5, and Code 93. Set code length(s) for any 2 of 5 code type. Full autodiscrimination as required.
<b>Beeper Operation</b>	User-selectable: Enable, Disable
<b>Beeper Volume</b>	User-selectable: Full Volume, Low Volume
<b>Decode Depth of Field</b>	Maximum typical working distance is 5.0 in. (12.70 cm) (100% UPC/EAN); minimum element width resolution is 5.5 mils
<b>Scan Repetition Rate</b>	40 ( $\pm$ 3) scans/sec. (bidirectional)
<b>Skew Tolerance</b>	$\pm$ 35° min. (from normal)
<b>Pitch Tolerance</b>	-20° to +60° (from normal)
<b>Print Contrast Minimum</b>	25% minimum reflectance differential, measured at 675 nm.
<b>Ambient Light Immunity</b>	Immune to direct exposure to normal office and factory lighting conditions, as well as direct exposure to sunlight.
<b>Durability</b>	5 ft (152 cm) drops to concrete
<b>Operating Temperature</b>	32° to 104° F (0° to 40° C)
<b>Storage Temperature</b>	-40° to 140° F (-40° to 60° C)
<b>Straight Cable Length</b>	6 ft (183 cm)
<b>Weight (without cable)</b>	6.0 oz. (170 gm)

## LT 1804 Dimensions

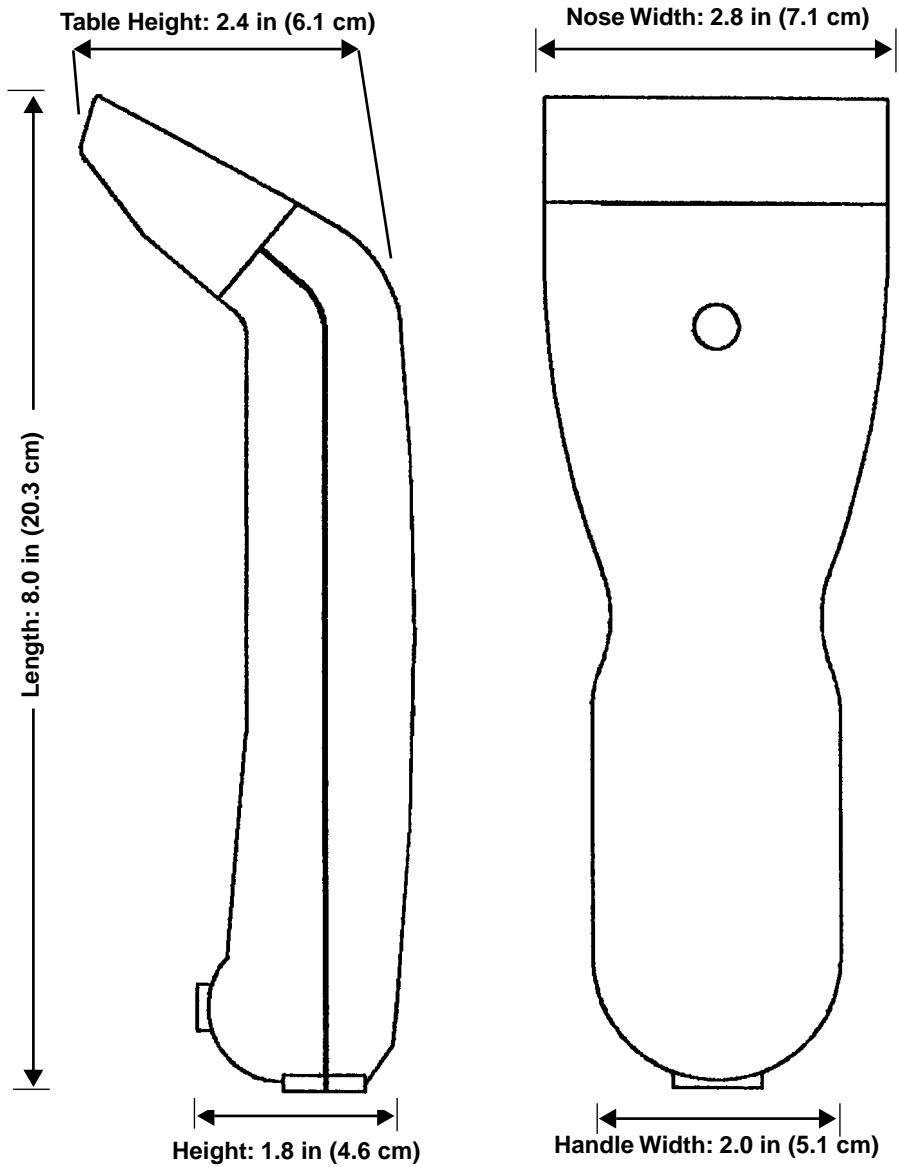


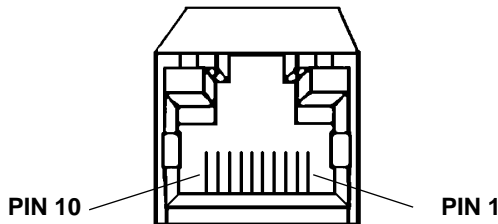
Figure 3-1. LT 1804 Dimensions

# LT 1804 Signal Descriptions

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

**Table 3-2. Scanner Cable Pinouts**

PIN	SIGNAL NAME	FUNCTION
1	DTR	Data Terminal Ready. This signal is hardwired active.
2	VBATT	Input power.
3	GROUND	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
4	RxD	Serial data receive input. It is driven by the serial data transmit output on the device communicating with the scanner.
5	RTS	Request-to-send handshaking output line. It may be optionally used by the scanner to signal another device that data is available to send. It can only be used in conjunction with the CTS line.
6	Synapse Data	Data line for Synapse communication.
7	Synapse Clock	Clock line for Synapse communication.
8	CTS	Clear-to-send handshaking input line. It may be optionally used by another device to signal the scanner that it may commence transmitting data. It can be used only in conjunction with the RTS line.
10	TxD	Serial data transmit output. It drives the serial data receive input on the device communicating with the scanner.



## Interface Cable Pinouts

**Table 3-3. 25-Pin Male D-Type Connector**  
**25-06753-01 for power supply version**  
**20-03113-01 for battery pack version**

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>FUNCTION</b>
<b>2</b>	<b>RxD</b>	Serial data receive input. It is driven by the serial data transmit output on the device communicating with the scanner.
<b>3</b>	<b>TxD</b>	Serial data transmit output. It drives the serial data receive input on the device communicating with the scanner.
<b>4</b>	<b>CTS</b>	Clear-to-send handshaking input line. It may be optionally used by another device to signal the scanner that it may commence transmitting data. It can be used only in conjunction with the RTS line.
<b>5</b>	<b>RTS</b>	Request-to-send handshaking output line. It may be optionally used by the scanner to signal another device that data is available to send. It can only be used in conjunction with the CTS line.
<b>6</b>	<b>DTR</b>	Data Terminal Ready. This signal is hardwired active.
<b>7</b>	<b>GROUND</b>	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.

**Table 3-4. 25-Pin Male D-Type Connector  
25-06862-01 for power supply version  
20-03114-01 for battery pack version**

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>FUNCTION</b>
<b>2</b>	<b>TxD</b>	Serial data transmit output. It drives the serial data receive input on the device communicating with the scanner.
<b>3</b>	<b>RxD</b>	Serial data receive input. It is driven by the serial data transmit output on the device communicating with the scanner.
<b>4</b>	<b>RTS</b>	Request-to-send handshaking output line. It may be optionally used by the scanner to signal another device that data is available to send. It can only be used in conjunction with the CTS line.
<b>5</b>	<b>CTS</b>	Clear-to-send handshaking input line. It may be optionally used by another device to signal the scanner that it may commence transmitting data. It can be used only in conjunction with the RTS line.
<b>7</b>	<b>GROUND</b>	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
<b>20</b>	<b>DTR</b>	Data Terminal Ready. This signal is hardwired active.

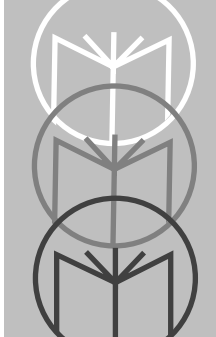
**Table 3-5. 25-Pin Female D-Type Connector  
25-06860-01 for power supply version  
20-03115-01 for battery pack version**

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>FUNCTION</b>
<b>2</b>	<b>RxD</b>	Serial data receive input. It is driven by the serial data transmit output on the device communicating with the scanner.
<b>3</b>	<b>TxD</b>	Serial data transmit output. It drives the serial data receive input on the device communicating with the scanner.
<b>4</b>	<b>CTS</b>	Clear-to-send handshaking input line. It may be optionally used by another device to signal the scanner that it may commence transmitting data. It can be used only in conjunction with the RTS line.
<b>5</b>	<b>RTS</b>	Request-to-send handshaking output line. It may be optionally used by the scanner to signal another device that data is available to send. It can only be used in conjunction with the CTS line.
<b>6</b>	<b>DTR</b>	Data Terminal Ready. This signal is hardwired active.
<b>7</b>	<b>GROUND</b>	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.



**Table 3-6. 25-Pin Female D-Type Connector  
25-06858-01 for power supply version  
20-03116-01 for battery pack version**

<b>PIN</b>	<b>SIGNAL NAME</b>	<b>FUNCTION</b>
<b>2</b>	<b>TxD</b>	Serial data transmit output. It drives the serial data receive input on the device communicating with the scanner.
<b>3</b>	<b>RxD</b>	Serial data receive input. It is driven by the serial data transmit output on the device communicating with the scanner.
<b>4</b>	<b>RTS</b>	Request-to-send handshaking output line. It may be optionally used by the scanner to signal another device that data is available to send. It can only be used in conjunction with the CTS line.
<b>5</b>	<b>CTS</b>	Clear-to-send handshaking input line. It may be optionally used by another device to signal the scanner that it may commence transmitting data. It can be used only in conjunction with the RTS line.
<b>7</b>	<b>GROUND</b>	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
<b>20</b>	<b>DTR</b>	Data Terminal Ready. This signal is hardwired active.



## Chapter 4

# Programming the LT 1804

---

Before programming the scanner, follow the instructions in *Chapter 1: Setting Up the LT 1804*.

If the default values suit your requirements, just scan the **SET DEFAULT** bar code. An LT 1804 is programmed for parameters other than default values by scanning sequences of bar codes. *Chapter 5: Parameter Menus* contains all the bar codes necessary to program the scanner for each parameter selection.

## Scanning Sequences

A scanning sequence establishes a value for one parameter type. During a scanning sequence, scan bar codes for a parameter type, a parameter value, and **ENTER**. The *Scanning Sequence Flowchart on page 4-3* illustrates this process.

### Scanning Sequence Examples

To program the scanner for all default settings except for two parameters, **DECODE UPC ONLY** and **INTERCHARACTER DELAY**, first scan the **SET DEFAULT** bar code. The default for **DECODE UPC ONLY** is **DISABLED**; to enable this, scan the three bar codes in the order listed below:

SCAN	YOU WILL HEAR . . .
1. <b>DECODE UPC ONLY</b>	Short high tone
2. <b>ENABLED</b>	Short high tone
3. <b>ENTER</b>	Hi/Lo/Hi/Lo warble

After the last scan in a successful scanning sequence (**ENTER**), the warble sound (i.e., hi/lo/hi/lo) indicates that the scanner has been successfully programmed for the selected parameter. See *Beeper Definitions on page 4-17* for other beeper indications.

The **INTERCHARACTER DELAY** default is 00 ms; in this example you want to set it to 2 ms. To program the scanner for a 2 ms **INTERCHARACTER DELAY**, scan the four bar codes listed below. There are four bar codes because this sequence includes a two digit entry; note that single digit entries must have a leading zero.

SCAN	YOU WILL HEAR . . .
1. <b>INTERCHARACTER DELAY</b>	Short high tone
2. <b>0</b>	Short high tone
3. <b>2</b>	Short high tone
4. <b>ENTER</b>	Hi/Lo/Hi/Lo warble

## Errors While Scanning

Don't worry if you make an error during a scanning sequence. There are two special-purpose bar codes, **BACKSPACE** and **CANCEL**, to help you.

Scanning the **BACKSPACE** bar code erases the value of the previous bar code scanned but keeps you within the scanning sequence for a parameter type.

Scanning **CANCEL** removes you from the current sequence so that you can start again.

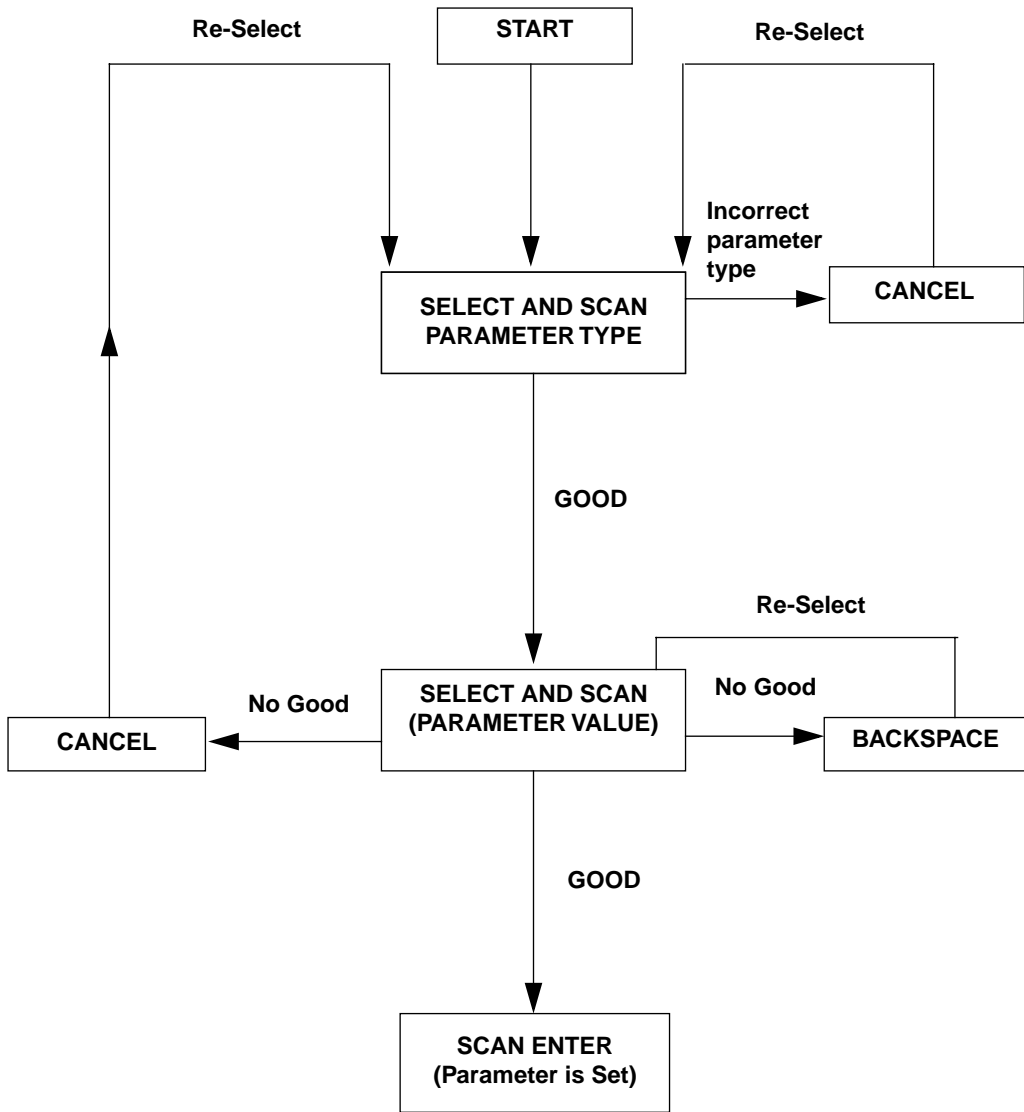


Figure 4-1. Scanning Sequence Flowchart

## Parameter Descriptions

See [Table 4-1 on page 4-13](#) for the range of values and default settings for each parameter type.

### Set Parameter Defaults

Scanning the **SET DEFAULT** bar code returns all parameters to the default values listed in [Table 4-1 on page 4-13](#).

### RS-232 Host Type

This menu allows you to select one of the following RS-232 host types: Standard RS-232, ICL, Fujitsu, Nixdorf Mode A or Nixdorf Mode B.

### Code Types

The bar code menu selections enable the scanner to decode any or all of the following symbologies:

- UPC Versions A and E (EAN 8 and 13)
- Code 39
- Interleaved 2 of 5
- Code 93
- Code 128
- UCC/EAN 128
- Codabar
- Discrete 2 of 5
- Code 39 Full ASCII

The scanner will autodiscriminate between all of the above symbologies, except for Code 39 and Code 39 Full ASCII.

If UPC/EAN with supplemental characters is selected, UPC/EAN without supplemental characters is ignored. See [Decode UPC/EAN Supplemental on page 4-6](#) for details.

If you want to add Discrete 2 of 5 or Interleaved 2 of 5, check the previously enabled lengths. To set lengths for these codes, see [Fixed Lengths For Code 2 of 5 on page 5-7](#).

## Fixed Lengths for Code 2 of 5

Select one or two lengths for the Interleaved or Discrete 2 of 5 codes. Determine the number of characters represented in each code type by counting the number of printed (i.e., human readable) digits that represent a bar code label. One length (Length 1) or two lengths (Length 2) for either code type may be set, as needed.

If any default setting is in effect and is an appropriate length, it need not be reset. Set one or both lengths, one per scanning sequence. **LENGTH 1** may range from 01-31 and **LENGTH 2** may range from 00-31.

## Decode Options

### Transmit UPC-E/UPC-A Check Digit

Select if decoded UPC-E or UPC-A symbols are transmitted with or without the check digit.

### Decode UPC Only (Not EAN)

If selected, this option limits LT 1804 UPC/EAN decode capability to UPC versions only. It disables EAN decode capability.

### Convert UPC-E to UPC-A

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

### 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 appended as a prefix to the decode. Code ID characters are: A = UPC-A, UPC-E, EAN-13, or EAN-8; 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; K = UCC/EAN128.

**Note:** This option should not be enabled for ICL, Fujitsu, or Nixdorf RS-232 terminals. See [Table 4-3 on page 4-16](#) for terminal-specific code ID characters for these hosts.

## **EAN Zero Extend**

This parameter adds five leading zeros to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.

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

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.

## **CLSI Editing**

Use this parameter to insert a space after the 1st, 5th, and 10th characters of a 14-character Codabar symbol. The symbol length includes start and stop characters.

## **NOTIS Editing**

This option strips the start and stop characters from decoded Codabar symbols.

## **Decode UPC/EAN Supplemental**

Select whether UPC/EAN is decoded with or without supplemental characters, or whether the unit will autodiscriminate between the two. Supplementals are additionally appended characters, according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+5).

If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters won't be decoded. If UPC/EAN without supplemental characters is selected and the scanner is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN will be decoded and the supplemental characters ignored. If autodiscrimination is chosen, the LT 1804 will, after additional processing to ensure a good decode, transmit either.

## Beep After Good Decode

Determine if the unit beeper will sound during normal scanning. Usually it is desirable to operate the unit with the beeper enabled. In all cases, the beeper operates during parameter menu scanning and indicates error conditions. See *Beeper Definitions on page 4-17*.

## Beeper Volume

Use this parameter to program the beeper for Full or Low volume.

## Trigger Mode (for triggered models only)

Select whether you would like to use the scanner with the trigger (Triggered Mode) for low power consumption, or if you'd like the laser to be in a constant blinking state (Triggerless Mode) using continuous power. The Triggered Mode has been designed for battery operation and is recommended for use with portable terminals.

## Decode Redundancy

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

## Scan and Store (Code 39 Buffering)

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

Decode of a valid Code 39 symbol with no leading space causes transmission in sequence of all buffered data in a first-in first-out format, plus transmission of the "triggering" symbol. See *Code 39 Buffering (Scan and Store) beginning on page 4-19* for further details.

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



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

## Baud Rate

Baud rate is the number of bits of data transmitted per second. The unit'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.

## Parity

A parity check bit is the most significant bit of each ASCII coded character. If you select ODD parity, the parity bit will have a value 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.

If you select EVEN parity, the parity bit will have a value, 0 or 1, to ensure that an even number of 1 bits are contained in the coded character. Select MARK parity and the parity bit will always be 1. Select SPACE parity and the parity bit will always be 0. Select the parity type according to host device requirements.

## Hardware Handshaking

Hardware handshaking allows you to check the readiness of the receiving device before data is transmitted. If the receiving device is periodically occupied with other tasks, hardware handshaking is needed to prevent loss of transmitted data.

Select whether the scan data is to be transmitted as soon as it is available or whether transmission follows the RTS/CTS procedure. See *Communication Protocols* on page 4-21 for more details.

## Software Handshaking

This parameter offers control of the data transmission process in addition to, or instead of, that offered by hardware handshaking. These options may be combined, for example ACK/NAK with ENQ.

### 1. No Software Handshaking

## 2. **ACK/NAK Only**

The ACK/NAK option checks the success or failure of transmission. The scanner expects one of the following host responses after a data transmission:

<ACK> - Acknowledges a valid and successful transmission.

<NAK> - Indicates a problem with the transmission.

Whenever a <NAK> is received, the unit retransmits the same data and awaits an ACK/NAK response. After three unsuccessful attempts to transmit the same data, the scanner aborts any further communication attempts on that message. Transmission error is indicated by the unit sounding 4 long beeps.

## 3. **ENQ ONLY**

The ENQ option needs the host to request data before it is transmitted to the host. This ensures that data transmission occurs only when the host is ready to receive.

When you select the wait for ENQ option, the scanner waits for an ENQ, Enquire, character from the host before it transmits data; otherwise, the unit transmits data without waiting for an ENQ character from the host. With ENQ enabled, the scanner must receive an ENQ from the host within a 2 second period after the last activity or 4 long beeps are sounded to indicate a transmission error; the unit is now ready to scan again.

## 4. **ACK/NAK with ENQ**

This combines both handshaking options.

## **RTS Line State**

This parameter is used to set the idle state of the Serial Host RTS line.

## **Host Serial Response Time-out**

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 an ACK/NAK Software Handshaking mode or RTS/CTS Hardware Handshaking option is enabled. The delay period can range from 0.5 to 9.9 seconds in .1-second increments.

## **Transmit “No Decode” Character**

This feature gives you the option to transmit “NR” when a symbol does not decode. Prefixes and suffixes enabled will be appended around this character.

**Note:** This option is available in Triggered Mode only.

## **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 (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.

## **Scan Data Transmission Format (Synapse Hosts Only)**

This parameter formats the data for transmission. Options are:

- None (Data As Is)
- Prefix/Data
- Prefix/Data/Suffix
- Data/Suffix.

## **Prefix (RS-232)**

The scanner will add one of the following start-of-text characters to transmitted data.

- None
- Start-of-text <STX>
- One user-defined prefix (can be any ASCII character).

## **Suffix (RS-232)**

Select one or two end-of-text characters to be added to transmitted data:

- None
- CR (Carriage Return) - Returns the cursor to the same position on the line after each decode.
- LF (Line Feed) - Moves the cursor down a line after each decode.

- CR & LF - Allow you to select where the cursor on a display terminal returns to after it displays each decoded symbol. Selecting both CR & LF, returns the cursor to the same position on successive lines after each decode. If you select no control code, the cursor remains where it stopped after the last transmission.
- End-of-text <ETX>.
- One or two characters, user-defined.

## **Prefix/Suffix (Synapse)**

When using Synapse, the prefix or suffix appended to scan data for data editing is set by scanning a 4-digit number (i.e., 4 bar codes) that corresponds to key codes for various terminals.

## **Communications Delays and Timeouts (Intercharacter Delay)**

Select the intercharacter delay option matching host device requirements. The intercharacter delay gives the host system time to service its receiver and perform other tasks between characters. Select from no delay to a 99 ms delay between the transmission of each character.

## **UPC A and E Preamble(s)**

Three options are given for the lead-in characters of decoded UPC-A or UPC-E symbols transmitted to the host device. Select one preamble for UPC-A decodes and one for UPC-E decodes. These lead-in characters are considered part of the symbol itself. The three options are:

- a system character only
- the country code and system character
- no preamble

The system character is the digit printed to the extreme left of a UPC symbol. The country code for UPC is always zero, and it cannot be transmitted without the system character.

## **Data Format**

This parameter sets the transmit data format. The options are:

- 7 Data Bits (with Parity)
- 8 Data Bits (with Parity)
- 8 Data Bits (without Parity)

The PARITY parameter applies only to the 7 Data Bits (with Parity), and 8 Data Bits (with Parity) options.

## Standard Defaults

**Table 4-1. Parameter Selections**

PARAMETER	SELECTIONS AVAILABLE	DEFAULT
<b>RS-232 Host Type</b>	Standard RS-232, ICL, Fujitsu, Nixdorf Mode A, Nixdorf Mode B	Standard RS-232
<b>Add Code Types to be Decoded</b>	Code 39, Code 39 Full ASCII, Discrete 2 of 5, Interleaved 2 of 5, Codabar, UPC/EAN, Code 93, Code 128, UCC/EAN128, All Code Types	All Code Types
<b>First Length Discrete 2 of 5</b>	2 digit entry, ranging from 01-31.	12
<b>Second Length Discrete 2 of 5</b>	2 digit entry, ranging from 00-31.	0
<b>First Length Interleaved 2 of 5</b>	2 digit entry, ranging from 01-31.	14
<b>Second Length Interleaved 2 of 5</b>	2 digit entry, ranging from 00-31.	0
<b>Xmit UPC-A Check Digit</b>	Enable, Disable	Enable
<b>Xmit UPC-E Check Digit</b>	Enable, Disable	Enable
<b>Decode UPC Only</b>	Enable, Disable	Disable
<b>Convert UPC-E to A</b>	Enable, Disable	Disable
<b>Xmit Code ID Character</b>	Enable, Disable	Disable
<b>EAN Zero Extend</b>	Enable, Disable	Disable
<b>I 2 of 5 to EAN-13 Conversion</b>	Enable, Disable	Disable
<b>CLSI Editing</b>	Enable, Disable	Disable
<b>NOTIS Editing</b>	Enable, Disable	Disable
<b>UPC/EAN Supplemental</b>	No Supplemental, Supplemental Only, Autodiscriminate	No Supplemental
<b>Beep After Good Decode</b>	Enable, Disable	Enable
<b>Beeper Volume</b>	Low, Full	Full
<b>Trigger Mode (triggered models only)</b>	Triggered, Triggerless	Triggered
<b>Decode Redundancy</b>	Level 0, Level 1, Level 2	Level 0

**Table 4-1. Parameter Selections (Continued)**

<b>PARAMETER</b>	<b>SELECTIONS AVAILABLE</b>	<b>DEFAULT</b>
<b>Buffer Code 39 Symbols (Scan and Store)</b>	Enable, Disable	Disable
<b>Baud Rate</b>	300, 600, 1200, 2400, 4800, 9600, 19,200	9600
<b>Parity</b>	Even, Odd, Mark, Space	Even
<b>Hardware Handshaking</b>	None, RTS/CTS	None
<b>Software Handshaking</b>	None, ENQ, ACK/NAK, ACK/NAK with ENQ	None
<b>RTS Line State</b>	Low, High	Low
<b>Host Serial Response Timeout</b>	0.5 - 9.9 seconds	2.0 seconds
<b>Stop Bit Select</b>	One, Two	Two
<b>Xmit "No Decode" Character</b>	"NR", No Character	No Character
<b>Scan Data Format</b>	None, <Prefix><Data>, <Prefix><Data><Suffix>, <Data><Suffix>	None
<b>Prefix to Decoded Data (RS-232)</b>	None, Start-of-text <STX>, User's Choice (1 selection)	None
<b>Suffix to Decoded Data (RS-232)</b>	None, CR, LF, CR/LF, User's Choice (1 selection), User's Choice (2 selections), End-of-text <ETX>	CR/LF
<b>Prefix (Synapse)</b>	Any ASCII Character	CR/LF
<b>Suffix (Synapse)</b>	Any ASCII Character	CR/LF
<b>Intercharacter Delay</b>	00-99 ms	None
<b>UPC-E Preamble</b>	System Character, System Character & Country Code, None	System Character
<b>UPC-A Preamble</b>	System Character, System Character & Country Code, None	System Character
<b>Data Format</b>	7 Data Bits (with Parity), 8 Data Bits (with Parity), 8 Data Bits (without Parity)	7 Data Bits (with Parity)

## RS-232 Host Type Defaults

Three RS-232C hosts are set up with their own parameter default settings (Table 4-2.). 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 4-2. Terminal-Specific RS-232C Defaults**

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	None	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.
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 Code ID Characters

Selecting the ICL, Fujitsu, or Nixdorf RS-232C terminal enables the transmission of Code ID Characters listed in **Table 4-3**. 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 4-3. Terminal Specific Code ID Characters**

	ICL	FUJITSU	NIXDORF
<b>UPC-A</b>	"A"	"A"	"A"
<b>UPC-E</b>	"E"	"E"	"C0"
<b>EAN-8</b>	"FF"	"FF"	"B"
<b>EAN-13</b>	"F"	"F"	"A"
<b>Code 39</b>	"C" <len>	None	"M"
<b>Codabar</b>	"N" <len>	None	"N"
<b>Code 128</b>	"L" <len>	None	"K"
<b>I 2 of 5</b>	"I" <len>	None	"I"
<b>Code 93</b>	None	None	"L"
<b>D 2 of 5</b>	"H" <len>	None	"H"
<b>UCC/EAN 128</b>	"L" <len>	None	"P"

## Beeper Definitions

### Standard Use

BEEPER SEQUENCE	INDICATION
1 Beep - short high tone	A symbol has been successfully decoded.
2 Beeps - long low tone	Undefined host enabled.
4 Beeps - long low tone	Error in transmission; loss of last data scanned. Scan last data again.
4 Beeps - short high tone	Power Supply: Insufficient power condition.  Battery Pack: Low voltage indicated. No further scanning is possible. Change or recharge battery.

### Parameter Menu Scanning

BEEPER SEQUENCE	INDICATION
1 Beep - short high tone	Appropriate menu within the scanning sequence has been read.
1 Beep - warble sound	Parameter value has been entered successfully.
2 Beeps - long low tone	Parameter not entered or incorrect sequence performed. Scan <b>CANCEL</b> and restart the scanning sequence.

## Code 39 Scan and Store

BEEPER SEQUENCE	INDICATION
1 Beep - hi/low tone	Indicates new data being entered into the buffer.
1 Beep - short lo/hi/lo tone	The buffer has been erased, or there was an attempt to transmit an empty buffer. When the buffer was empty, the LT 1804 read a command to clear or to transmit a Code 39 buffer.
3 Beeps - long high tone	Code 39 buffer is full.
4 Beeps - long low tone	Error in transmitting stored buffer data.
1 Beep - lo/hi tone	Transmission of stored buffer data is good.

## Code 39 Buffering (Scan and Store)

While there is data in the transmission buffer, deleting Code 39 buffering capability via the parameter menu is not allowed.

To allow disabling of Code 39 buffering, first force the buffer transmission (see *Transmit Buffer*) or clear the buffer.

### Buffer Data

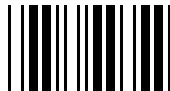
To buffer data, Code 39 buffering must be enabled, and a symbol must be read with a space immediately following the start pattern.

- Unless symbol overflows the transmission buffer, unit gives hi/lo beep to indicate successful decode and buffering. See *Overfilling Transmission Buffer*.
- Unit adds the message, excluding the leading space to the transmission buffer.
- No transmission will occur.

### Clear Transmission Buffer

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

- Unit issues a short hi/lo/hi beep to signal that the transmission buffer has been erased, and no transmission has occurred.
- Unit erases the transmission buffer.
- No transmission will occur.



**CLEAR TRANSMISSION BUFFER**

## Transmit Buffer

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

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



TRANSMIT BUFFER

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

## Overfilling Transmission Buffer

If the symbol just read will result in an overflow of the transmission buffer:

- Unit indicates that the symbol has been rejected by issuing three long, high beeps.
- No transmission will occur.

## Attempt to Transmit an Empty Buffer

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

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

# Communication Protocols

## Hardware Handshaking

The data interface consists of an RS-232C port. See *Interface Cable Pinouts on page 3-7*. The port has been designed to operate either with or without hardware handshaking lines, RTS, Request to Send, and CTS, Clear to Send.

If RTS/CTS handshaking has not been selected, scan data is transmitted as it becomes available. If optional RTS/CTS handshaking has been selected, the DTR signal is hardwired active, and the unit proceeds as follows:

- Examine CTS. If CTS is not asserted by the host, RTS is asserted by the scanner. If CTS is asserted by the host, the scanner waits up to 2 seconds for CTS to be negated.
- When the host asserts CTS in response to and within the programmable response timeout period of the scanner's RTS, data is transmitted.
- The scanner negates RTS after sending the last character.
- The host should respond by negating CTS. The scanner does not wait for this but checks before the next transmission, as above.
- If the above communication attempt fails, the scanner issues an error beep to alert the operator that the data was not successfully transmitted. In this case, the data is lost and must be rescanned.

See *Handshaking Sequence on page 4-23*.

## Software Handshaking

The scanner also provides two software handshaking options, ENQ and ACK/NAK, selected by parameter menus.

These software handshaking options operate in addition to, and are subordinate to, the hardware handshaking. They can be used separately, in conjunction with each other, or not at all. They operate in the following manner:

- When the ENQ is enabled, the scanner waits for an ENQ, Enquire, character from the host before it transmits data. The host must respond within the programmable response timeout period or the scanning unit beeps 4 times, indicating transmission error and loss of the last scanned data.
- When the ACK/NAK is enabled, after the scanning unit has transmitted data, it looks for one of the following responses:  
<ACK> acknowledging a valid accepted transmission, or  
<NAK> indicating a problem with the transmission.

The scanner then retransmits the data. After three unsuccessful transmission attempts, the unit aborts any further communication attempts on the current message. It indicates this by sounding 4 long (1 second) beeps.

See *Handshaking Sequence* on page 4-23.

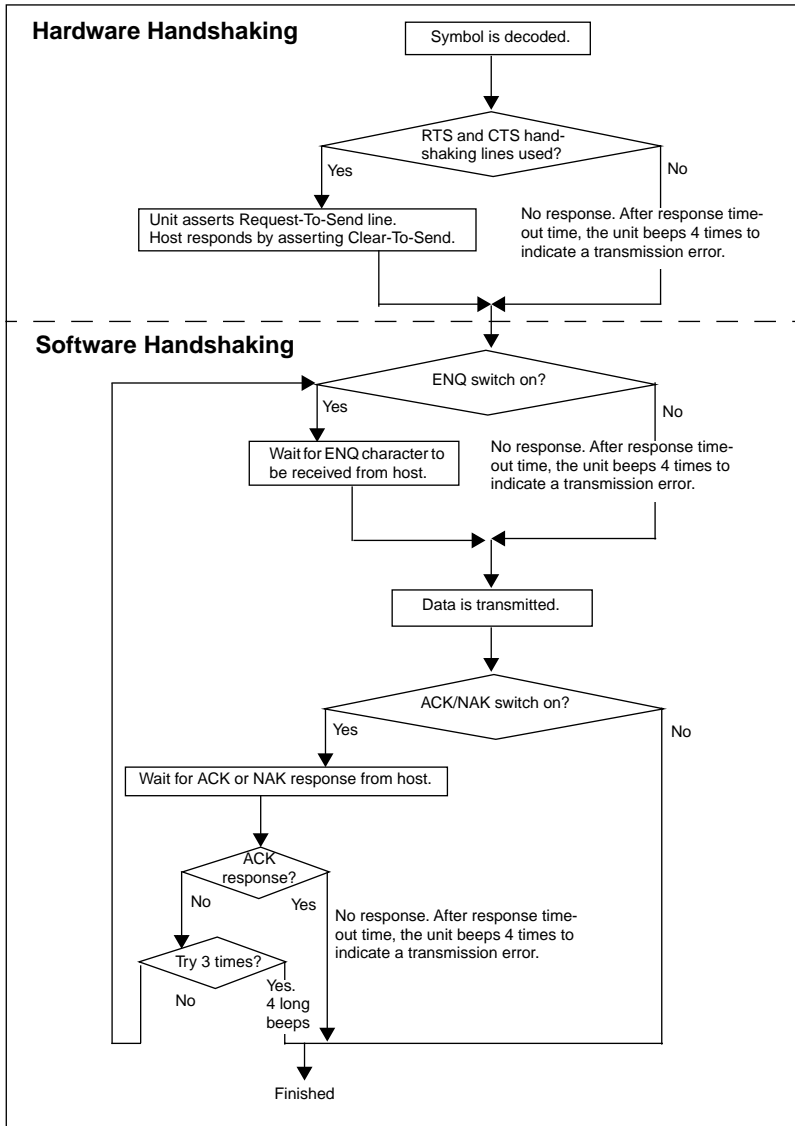


Figure 4-2. Handshaking Sequence



# ASCII Conversion Tables

Table 4-4. RS-232 ASCII Conversion Table

ASCII	Value	ASCII	Value	ASCII	Value	ASCII	Value
NUL	000	SP	032	@	064	'	096
SOH	001	!	033	A	065	a	097
STX	002	"	034	B	066	b	098
ETX	003	#	035	C	067	c	099
EOT	004	\$	036	D	068	d	100
ENQ	005	%	037	E	069	e	101
ACK	006	&	038	F	070	f	102
BELL	007	'	039	G	071	g	103
BACKSPACE	008	(	040	H	072	h	104
HORIZ TAB	009	)	041	I	073	i	105
LF/NEW LINE	010	*	042	J	074	j	106
VT	011	+	043	K	075	k	107
FF	012	,	044	L	076	l	108
CR/ENTER	013	-	045	M	077	m	109
SO	014	.	046	N	078	n	110
SI	015	/	047	O	079	o	111
DLE	016	0	048	P	080	p	112
DC1	017	1	049	Q	081	q	113
DC2	018	2	050	R	082	r	114
DC3	019	3	051	S	083	s	115
DC4	020	4	052	T	084	t	116
NAK	021	5	053	U	085	u	117
SYN	022	6	054	V	086	v	118
ETB	023	7	055	W	087	w	119
CAN	024	8	056	X	088	x	120
EM	025	9	057	Y	089	y	121
SUB	026	:	058	Z	090	z	122
ESC	027	;	059	[	091	{	123
FS	028	<	060	\	092		124
GS	029	=	061	]	093	}	125
RS	030	>	062	^	094	~	126
US	031	?	063	--	095	DEL	127

**Table 4-5. Synapse ASCII Conversion Table**

<b>ASCII Value</b>	<b>Full ASCII Code 39 Encode Char</b>	<b>Keystroke</b>	<b>ASCII Value</b>	<b>Full ASCII Code 39 Encode Char</b>	<b>Keystroke</b>
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 4-5. Synapse ASCII Conversion Table (Continued)**

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 4-5. Synapse ASCII Conversion Table (Continued)**

<b>ASCII Value</b>	<b>Full ASCII Code 39 Encode Char</b>	<b>Keystroke</b>	<b>ASCII Value</b>	<b>Full ASCII Code 39 Encode Char</b>	<b>Keystroke</b>
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 4-5. Synapse ASCII Conversion Table (Continued)**

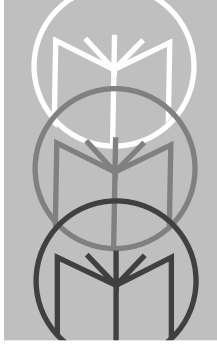
<b>ALT Keys</b>	<b>Keystroke</b>	<b>ALT Keys</b>	<b>Keystroke</b>	<b>ALT Keys</b>	<b>Keystroke</b>
2064	ALT 2	2075	ALT K	2086	ALT V
2065	ALT A	2076	ALT L	2087	ALT W
2066	ALT B	2077	ALT M	2088	ALT X
2067	ALT C	2078	ALT N	2089	ALT Y
2068	ALT D	2079	ALT O	2090	ALT Z
2069	ALT E	2080	ALT P	2091	ALT [
2070	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		
<b>Misc. Key</b>	<b>Keystroke</b>	<b>Misc. Key</b>	<b>Keystroke</b>	<b>Misc. Key</b>	<b>Keystroke</b>
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	¬		

**Table 4-5. Synapse ASCII Conversion Table (Continued)**

<b>PF Keys</b>	<b>Keystroke</b>	<b>PF Keys</b>	<b>Keystroke</b>	<b>PF Keys</b>	<b>Keystroke</b>
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
<b>F Keys</b>	<b>Keystroke</b>	<b>F Keys</b>	<b>Keystroke</b>	<b>F Keys</b>	<b>Keystroke</b>
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 4-5. Synapse ASCII Conversion Table (Continued)**

<b>Numeric Keypad</b>	<b>Keystroke</b>	<b>Numeric Keypad</b>	<b>Keystroke</b>	<b>Numeric Keypad</b>	<b>Keystroke</b>
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		
<b>Extended Keypad</b>	<b>Keystroke</b>	<b>Extended Keypad</b>	<b>Keystroke</b>	<b>Extended Keypad</b>	<b>Keystroke</b>
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		



## *Chapter 5*

# *Parameter Menus*

---

### **Set Default**

To select the Set Default parameter, scan the **SET DEFAULT** bar code. Scanning this automatically reconfigures the value of each parameter to its default value.



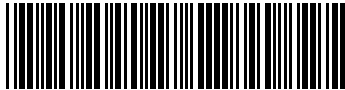
**SET DEFAULT**



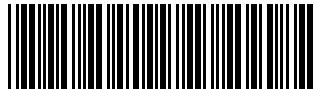
## RS-232 Host Type

Use this option to select an RS-232 host type. **Note:** Synapse hosts are autodetected; no bar codes need to be scanned for hosts using Synapse.

1. Scan the **RS-232 HOST TYPE** bar code.
2. Scan the bar code corresponding to the desired host type.
3. Scan **ENTER**.



**RS-232 HOST TYPE**



**STANDARD RS-232**



**ICL**

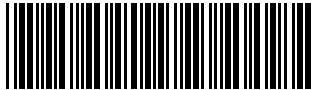


**NIXDORF MODE A**

## RS-232 Host Type (Continued)



**NIXDORF MODE B**



**FUJITSU**

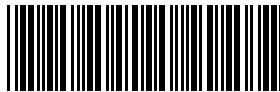
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



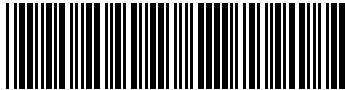
**CANCEL**

## Code Types

These two options either add or delete a code type.

### To add/delete a code:

1. Scan the **ENABLE** or **DISABLE** bar code.
2. Scan the bar code corresponding to the code type to be added or deleted.
3. Scan **ENTER**.



**ENABLE**



**DISABLE**



**CODE 39**



**CODE 39 FULL ASCII**

## Code Types (Continued)



**CODE 93**



**CODE 128**



**UCC/EAN 128**



**UPC/EAN**



**CODABAR**



**INTERLEAVED 2 OF 5**

## Code Types (Continued)



**DISCRETE 2 OF 5**



**ALL CODES**

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Fixed Lengths For Code 2 of 5

To set the fixed length for a Code 2 of 5:

1. Scan the **LENGTH** bar code for the code type and length to be changed.
2. To enter the length, scan two bar codes from the following pages; the first bar code scanned should signify the most significant digit.
3. Scan **ENTER**.



**DISCRETE 2 OF 5 LENGTH 1**  
(Range 01-31)



**DISCRETE 2 OF 5 LENGTH 2**  
(Range 00-31)



**INTERLEAVED 2 OF 5 LENGTH 1**  
(Range 01-31)



**INTERLEAVED 2 OF 5 LENGTH 2**  
(Range 00-31)

## Fixed Lengths For Code 2 of 5 (Continued)



0



1



2



3



4

5-8

## Fixed Lengths For Code 2 of 5 (Continued)



5



6



7



8



9

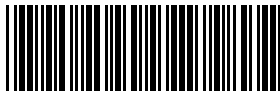


## Fixed Lengths For Code 2 of 5 (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

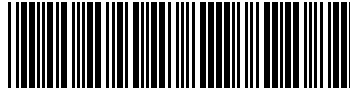


**CANCEL**

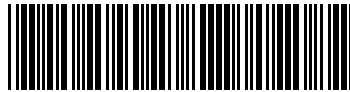
## Decode Options

To select one of the decode options:

1. Scan the bar code corresponding to the desired option.
2. Scan the **ENABLE** or **DISABLE** bar code.
3. Scan **ENTER**.



**TRANSMIT UPC-E CHECK DIGIT**



**TRANSMIT UPC-A CHECK DIGIT**

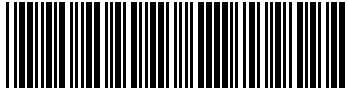


**DECODE UPC ONLY**

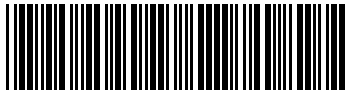


**CONVERT UPC-E TO UPC-A**

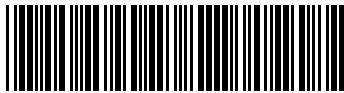
## Decode Options (Continued)



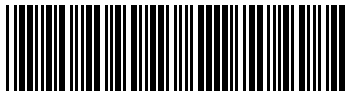
**TRANSMIT CODE IDENTIFIER**



**I 2 OF 5 TO EAN-13 CONVERSION**



**EAN ZERO EXTEND**



**CLSI EDITING**

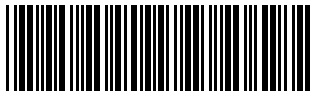


**NOTIS EDITING**

## Decode Options (Continued)



**ENABLE**



**DISABLE**

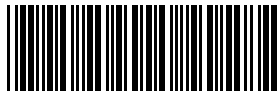
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

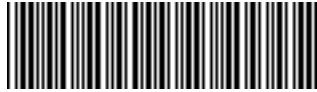
## UPC/EAN Supplementals Option

To select a UPC/EAN supplementals option:

1. Scan the **UPC/EAN SUPPLEMENTALS** bar code.
2. Scan the appropriate option.
3. Scan **ENTER**.



## UPC/EAN Supplementals Option (Continued)



**DECODE SUPPLEMENTALS**

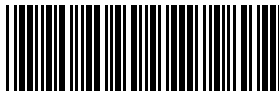


**AUTODISCRIMINATE**

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

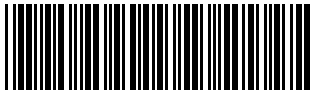
## Beep After Good Decode

To enable or disable this option:

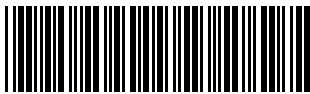
1. Scan the **BEEP AFTER GOOD DECODE** bar code.
2. Scan the **ENABLE** or **DISABLE** option bar code.
3. Scan **ENTER**.



## Beep After Good Decode (Continued)



**ENABLE**

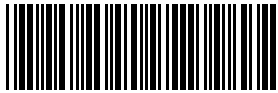


**DISABLE**

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



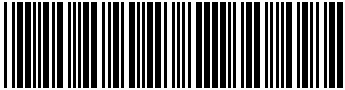
**CANCEL**



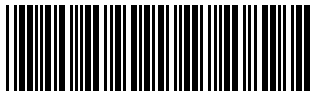
## Beeper Volume

To set the volume of the beeper:

1. Scan the **BEEPER VOLUME** bar code.
2. Scan either the **FULL VOLUME** or **LOW VOLUME** bar code.
3. Scan **ENTER**.



**BEEPER VOLUME**



**FULL VOLUME**



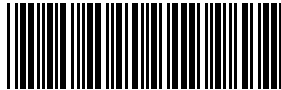
**LOW VOLUME**

## Beeper Volume (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

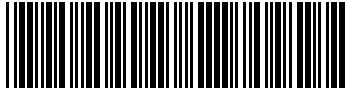


**CANCEL**

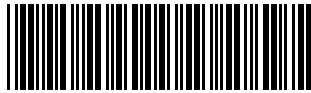
## Trigger Mode (for triggered models only)

To select a trigger mode:

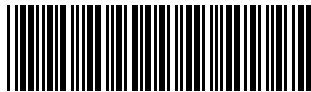
1. Scan the **TRIGGER MODE** bar code.
2. Scan the bar code that corresponds to the option desired.
3. Scan **ENTER**.



**TRIGGER MODE**



**TRIGGERLESS  
(CONTINUOUS POWER)**



**TRIGGERED  
(LOW POWER CONSUMPTION)**

## Trigger Mode (Continued)

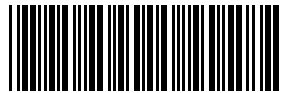
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Decode Redundancy

To set the decode redundancy level:

1. Scan the **DECODE REDUNDANCY** bar code.
2. Scan either **LEVEL 0**, **LEVEL 1** or **LEVEL 2**.
3. Scan **ENTER**.



**DECODE REDUNDANCY**



**LEVEL 0**



**LEVEL 1**



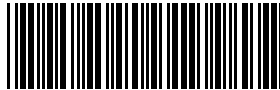
**LEVEL 2**

## Decode Redundancy (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

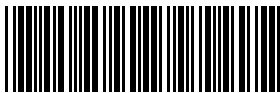
**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

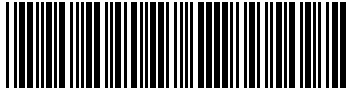


**CANCEL**

## Code 39 Scan and Store

To select a scan and store option:

1. Scan the **SCAN AND STORE** bar code.
2. Scan the **ENABLE** or **DISABLE** bar code to enable or disable the option.
3. Scan **ENTER**.



**SCAN AND STORE**



**ENABLE**



**DISABLE**

## Code 39 Scan and Store (Continued)

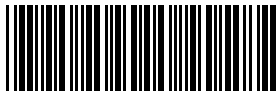
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



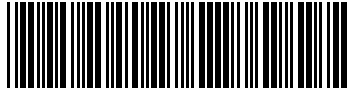
**CANCEL**



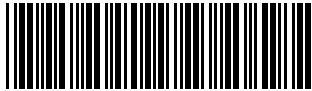
# Baud Rate

To select a baud rate:

1. Scan the **BAUD RATE** bar code.
2. Scan the bar code corresponding to the baud rate desired.
3. Scan **ENTER**.



**BAUD RATE**



**300**



**600**

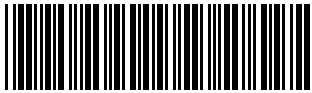
## Baud Rate (Continued)



1200



2400

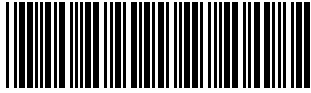


4800



9600

## Baud Rate (Continued)



19,200

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

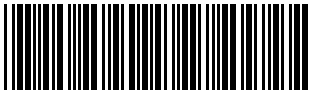
## Parity

To enter parity:

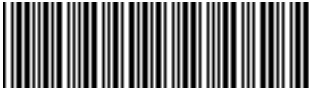
1. Scan the **PARITY** bar code.
2. Scan the option bar code corresponding to the type of parity desired.
3. Scan **ENTER**.



**PARITY**



**ODD**



**EVEN**



**MARK**

## Parity (Continued)



**SPACE**

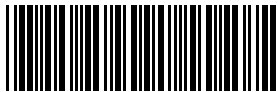
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Hardware Handshaking

To select a hardware handshaking protocol:

1. Scan the **HARDWARE HANDSHAKING** bar code.
2. Scan the bar code corresponding to the option desired.
3. Scan **ENTER**.



**HARDWARE HANDSHAKING**



**NONE**



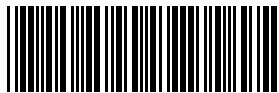
**RTS/CTS**

## Hardware Handshaking (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Software Handshaking

To select a software handshaking protocol:

1. Scan the **SOFTWARE HANDSHAKING** bar code.
2. Scan the bar code corresponding to the option desired.
3. Scan **ENTER**.





## Software Handshaking (Continued)



**ENQ ONLY**

- BACKSPACE** - deletes the last bar code scanned.
- CANCEL** - deletes the entire change and returns the user to the decode mode.
- ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

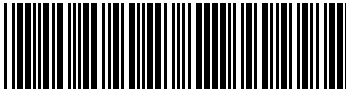


**CANCEL**

## RTS Line State

To select a line state:

1. Scan the **RTS STATE** bar code.
2. Scan either the **LO RTS STATE** or **HIGH RTS STATE** bar code.
3. Scan **ENTER**.



**RTS STATE**



**LOW RTS STATE**



**HIGH RTS STATE**

## RTS Line State (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

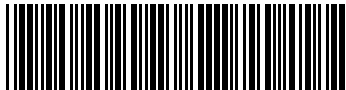


**CANCEL**

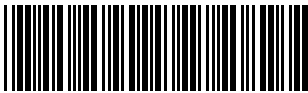
## Host Serial Response Timeout

To set the timeout:

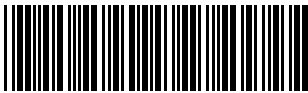
1. Scan the bar code below.
2. Scan two numeric bar codes to select a timeout value.
3. Scan **ENTER**.



**RESPONSE TIMEOUT**



**0**



**1**

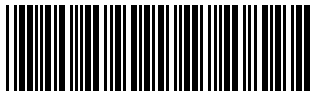


**2**

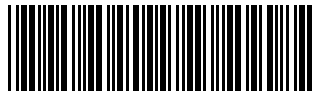
## Host Serial Response Timeout (Continued)



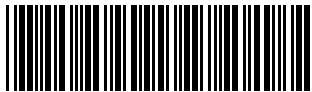
3



4



5

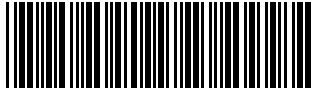


6

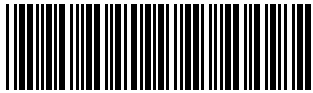


7

## Host Serial Response Timeout (Continued)



8

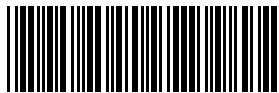


9

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**

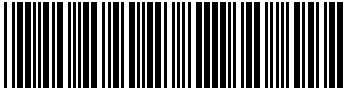


**CANCEL**

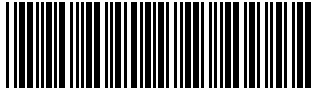
## Transmit “NO DECODE” Character

To enable/disable transmission of the “NR” character while in triggered mode:

1. Scan the **TRANSMIT “NR”** bar code.
2. Scan either the **ENABLE** or **DISABLE** bar code.
3. Scan **ENTER**.



**TRANSMIT “NR”  
(NO DECODE CHARACTER)**



**ENABLE**



**DISABLE**

## Transmit “NO DECODE” Character (Continued)

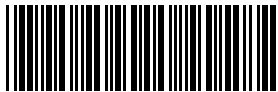
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**



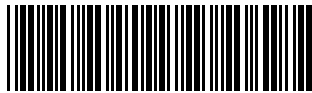
## Stop Bit Select

To select the number of communications stop bits:

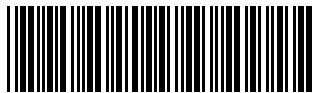
1. Scan the **STOP BIT SELECT** bar code.
2. Scan the bar code corresponding to the required value.
3. Scan **ENTER**.



**STOP BIT SELECT**



**1 STOP BIT**



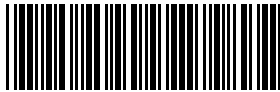
**2 STOP BITS**

## Stop Bit Select (Continued)

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Scan Data Transmission Format

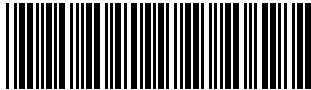
To select a scan data transmission format:

1. Scan the **SCAN DATA FORMAT** bar code.
2. Scan the bar code corresponding to the desired converted data format.
3. Scan **ENTER**.

**Note:** If you select an option using a prefix and/or suffix, see the following Prefix/Suffix parameters to set the prefix and/or suffix value(s).



**SCAN DATA FORMAT**



**NONE**



**<PREFIX><SCAN DATA>**

## Scan Data Transmission Format (Continued)



<PREFIX><SCAN DATA> <SUFFIX>



<SCAN DATA> <SUFFIX>

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

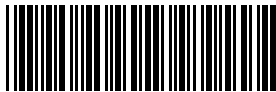
**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Prefix

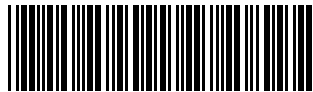
To enter a prefix for RS-232 configurations:

1. Scan the **PREFIX** bar code.
2. Scan the bar code that corresponds to the desired option.
3. Scan **ENTER**.

If **USER'S CHOICE** is scanned, then scan the appropriate 3-digit (leading zeros are required) decimal of the ASCII character(s) to be entered, using the bar codes on the following pages. See [Table 4-4 on page 4-24](#) for the RS-232 ASCII Conversion Table.



**PREFIX**



**USER'S CHOICE  
1 CHARACTER**

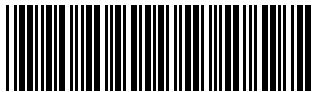
## Prefix (Continued)



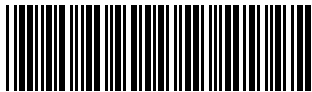
NONE



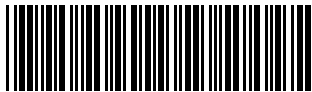
STX



0

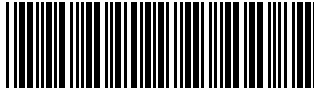


1



2

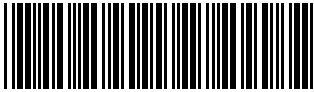
## Prefix (Continued)



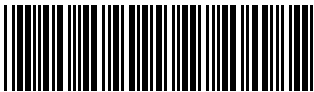
3



4



5

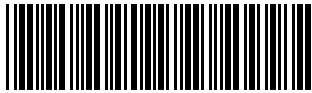


6

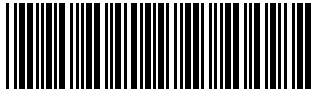


7

## Prefix (Continued)



8

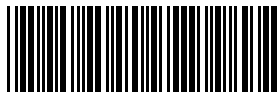


9

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

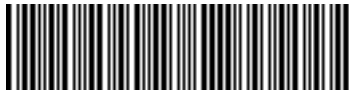


## Suffix

To enter a suffix for RS-232 configurations:

1. Scan the **SUFFIX** bar code.
2. Scan the bar code that corresponds to the desired option.
3. Scan **ENTER**.

If **USER'S CHOICE** is scanned, then scan the appropriate 3-digit decimal (leading zeros are required) equivalent of the ASCII character(s) to be entered, using the bar codes on the following pages. See [Table 4-4 on page 4-24](#) for the RS-232 ASCII Conversion Table.



**SUFFIX**



**CR**



**LF**

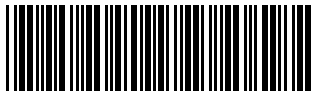


**CR,LF**

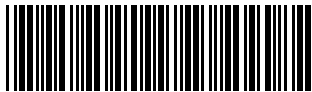
## Suffix (Continued)



**ETX**



**NONE**



**USER'S CHOICE  
2 CHARACTERS**



**USER'S CHOICE  
1 CHARACTER**

## Suffix (Continued)



0



1



2



3

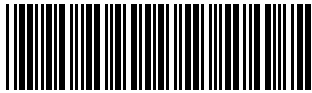
## Suffix (Continued)



4



5

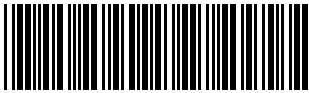


6



7

## Suffix (Continued)



8



9

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



ENTER



BACKSPACE



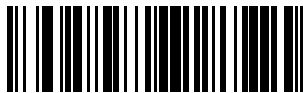
CANCEL

## Prefix/Suffix (Synapse)

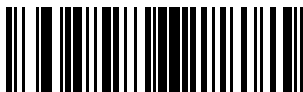
To append a prefix or suffix to scan data in a Synapse configuration:

1. Scan the **PREFIX** or **SUFFIX** bar code below.
2. Scan four numeric bar codes from the following pages representing the desired terminal's key code. See **Table 4-5 on page 4-25** for the Synapse ASCII Conversion Table.

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



**PREFIX**

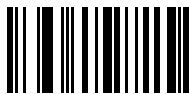


**SUFFIX**



**DATA FORMAT CANCEL**

## Prefix/Suffix (Synapse) (Continued)



0



1



2



3

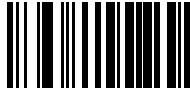


4

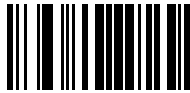
## Prefix/Suffix (Synapse) (Continued)



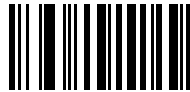
5



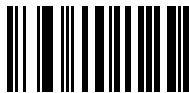
6



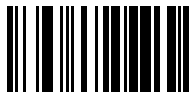
7



8



9



CANCEL



## Communications Delays and Timeouts

To enter a new delay or timeout value:

1. Scan the **INTERCHARACTER DELAY** bar code.
2. Enter the new value by scanning two bar codes. The first bar code scanned corresponds to the most significant digit; the second bar code corresponds to the least significant digit. The value entered must be within the 00-99 ms range.
3. Scan **ENTER**.



**INTERCHARACTER DELAY**  
(Range = 00-99 ms)



0

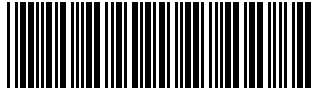


1

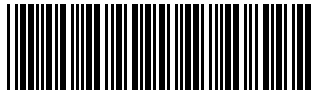


2

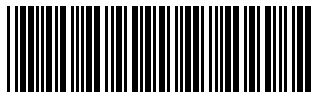
## Communications Delays and Timeouts (Continued)



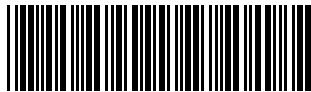
3



4



5



6

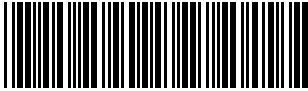


7

## Communications Delays and Timeouts (Continued)



8



9

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

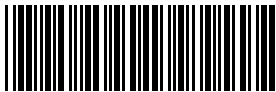
**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## UPC-E/UPC-A Preamble

To select one of the preamble options:

1. Scan the bar code corresponding to the desired **Preamble** option.
2. Scan the bar code to enable or disable the option.
3. Scan **ENTER**.



UPC-E PREAMBLE



UPC-A PREAMBLE

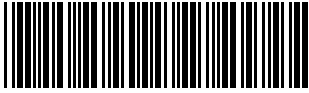


NONE



SYSTEM CHARACTER

## UPC-E/UPC-A Preamble (Continued)

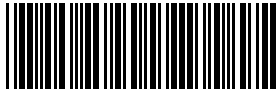


**SYSTEM CHARACTER  
AND COUNTRY CODE**

**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



**BACKSPACE**



**ENTER**



**CANCEL**

## Data Format

To select an RS-232C transmission protocol:

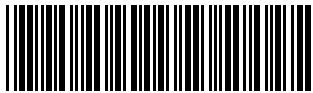
1. Scan the **DATA FORMAT** bar code.
2. Scan the bar code that corresponds to the option desired.
3. Scan **ENTER**.



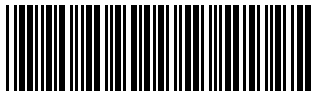
**DATA FORMAT**



**7 DATA BITS (WITH PARITY)**



**8 DATA BITS (WITHOUT PARITY)**



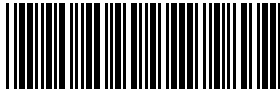
**8 DATA BITS (WITH PARITY)**

## Data Format (Continued)

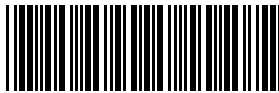
**BACKSPACE** - deletes the last bar code scanned.

**CANCEL** - deletes the entire change and returns the user to the decode mode.

**ENTER** - stores and enters the new change.



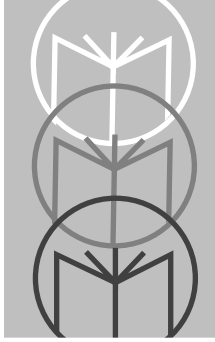
**BACKSPACE**



**ENTER**



**CANCEL**



# Glossary

---

<b>Aperture</b>	The opening in an optical system defined by a lens or baffle that establishes the field of view.
<b>ASCII</b>	American Standard Code for Information Interchange. A 7 bit-parity code representing 128 letters, numerals, punctuation marks, and control characters. It is a standard data transmission code in the U.S.
<b>Autodiscrimination</b>	The ability of an interface controller to determine the code type of a scanned bar code. After this determination is made, the information content can be decoded.
<b>Bar</b>	The dark element in a printed bar code symbol.
<b>Bar Code Density</b>	The number of characters represented per unit of measurement (e.g., characters per inch).
<b>Bar Height</b>	The dimension of a bar measured perpendicular to the bar width.
<b>Bar Width</b>	Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.
<b>Baud Rate</b>	A measure of the data flow or number of signaling events occurring per second. When one bit is the standard "event," this is a measure of bits per second (bps). For example, a baud rate of 50 means transmission of 50 bits of data per second.
<b>Bit</b>	Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.
<b>Byte</b>	On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory can be used to store one ASCII character.



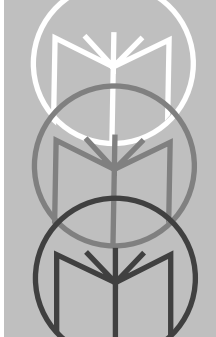
<b>CDRH</b>	Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.
<b>CDRH Class 1</b>	This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.
<b>CDRH Class 2</b>	No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.
<b>Character</b>	A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.
<b>Character Set</b>	Those characters available for encodation in a particular bar code symbology.
<b>Check Digit</b>	A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.
<b>Codabar</b>	A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (- \$ : / , +).
<b>Code 128</b>	A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.
<b>Code 3 of 9 (Code 39)</b>	A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9, and 7 special characters (- . / + % \$ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.
<b>Code 93</b>	An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.
<b>Code Length</b>	Number of data characters in a bar code between the start and stop characters, not including those characters.
<b>Continuous Code</b>	A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.

<b>Dead Zone</b>	An area within a scanner's field of view, in which specular reflection may prevent a successful decode.
<b>Decode</b>	To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.
<b>Decode Algorithm</b>	A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.
<b>Depth of Field</b>	The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.
<b>Discrete Code</b>	A bar code or symbol in which the spaces between characters (intercharacter gaps) are not part of the code.
<b>Discrete 2 of 5</b>	A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.
<b>EAN</b>	European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.
<b>Element</b>	Generic term for a bar or space.
<b>Encoded Area</b>	Total linear dimension occupied by all characters of a code pattern, including start/stop characters and data.
<b>Host Computer</b>	A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs, and network control.
<b>IEC</b>	International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.
<b>IEC (825) Class 1</b>	This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.
<b>Intercharacter Gap</b>	The space between two adjacent bar code characters in a discrete code.

<b>Interleaved Bar Code</b>	A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.
<b>Interleaved 2 of 5</b>	A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.
<b>LASER - Light Amplification by Stimulated Emission of Radiation</b>	The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.
<b>Laser Diode</b>	A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.
<b>LED Indicator</b>	A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.
<b>MIL</b>	1 mil = 1 thousandth of an inch.
<b>Misread (Misdecode)</b>	A condition which occurs when the data output of a reader or interface controller does not agree with the data encoded within a bar code symbol.
<b>Nominal</b>	The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.
<b>Nominal Size</b>	Standard size for a bar code symbol. Most UPC/EAN codes can be used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).
<b>Parameter</b>	A variable that can have different values assigned to it.
<b>Percent Decode</b>	The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

<b>Print Contrast Signal (PCS)</b>	Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. $PCS = (RL - RD) / RL$ , where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.
<b>Programming Mode</b>	The state in which a scanner is configured for parameter values. See SCANNING MODE.
<b>Quiet Zone</b>	A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.
<b>Reflectance</b>	Amount of light returned from an illuminated surface.
<b>Resolution</b>	The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.
<b>Scan Area</b>	Area intended to contain a symbol.
<b>Scanner</b>	An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are: <ol style="list-style-type: none"><li>1. Light source (laser or photoelectric cell) - illuminates a bar code.</li><li>2. Photodetector - registers the difference in reflected light (more light reflected from spaces).</li><li>3. Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.</li></ol>
<b>Scanning Mode</b>	The scanner is energized, programmed, and ready to read a bar code.
<b>Scanning Sequence</b>	A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.
<b>Self-Checking Code</b>	A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.
<b>Space</b>	The lighter element of a bar code formed by the background between bars.
<b>Specular Reflection</b>	The mirror-like reflection of light from a surface, which can "blind" a scanner.
<b>Start/Stop Character</b>	A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.
<b>Substrate</b>	A foundation material on which a substance or image is placed.

<b>Symbol</b>	A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters, and check characters.
<b>Symbol Aspect Ratio</b>	The ratio of symbol height to symbol width.
<b>Symbol Height</b>	The distance between the outside edges of the quiet zones of the first row and the last row.
<b>Symbol Length</b>	Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.
<b>Symbology</b>	The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39).
<b>Tolerance</b>	Allowable deviation from the nominal bar or space width.
<b>UPC</b>	Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which can be any of four widths. The standard symbology for retail food packages in the United States.
<b>Visible Laser Diode (VLD)</b>	A solid state device which produces visible laser light. Laser light emitted from the diode has a wavelength of 670 to 680 nanometers.



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