LT 1820
Product Reference Guide

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Glossary

About This Manual

The *LT 1820 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 1810/1820 Quick Reference Guide*   70-16223-0X

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)
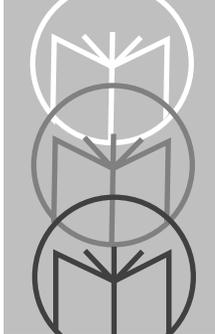
Chapter 1
Setting Up the LT 1820

Overview

LT 1820 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 1820 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 1820 is ideal for portable data collection.
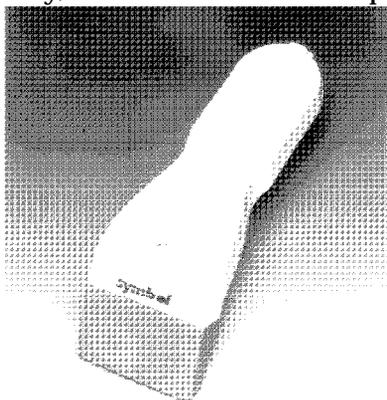
The LT 1820 weighs 6.0 ounces (170 gm) without the cable and is made from a durable, flame retardant plastic.

Set Up

Unpacking

Remove the LT 1820 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 *Symbol Support Center* 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 1820

LT 1820 scanners can be battery operated, or you can use an external power supply.
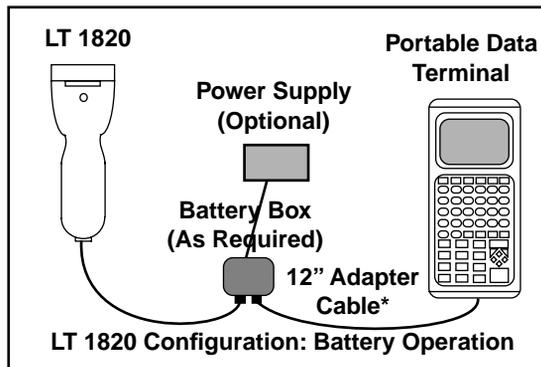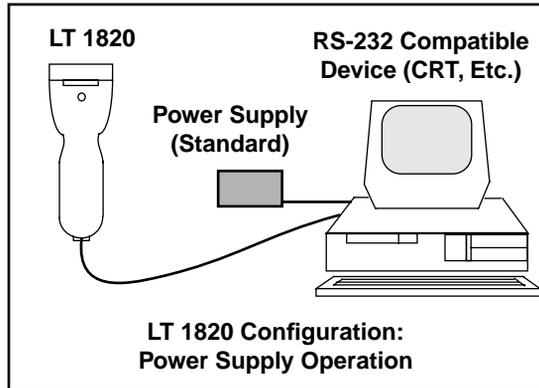
*3-foot extension cable is available.

Note: The model number of the personality cable will depend on the host device. See *Accessories* on page 3-2.

External Power Supply Operation

- Make sure that the host device is powered down before you connect the scanner.
- Plug the connector at the end of the scanner's straight cable into the appropriate RS-232C receiving port on your host device.
- Plug one end of the power supply cable into the power supply port on the side of the LT 1820 connector.
- Connect the power supply to an AC receptacle supplying voltage of the appropriate level.

Battery Operation

- Insert a 9-volt battery into the battery pack.

- Plug the 9-pin connector at the end of the scanner's coil cord into one end of the battery pack.

- Use the adapter cable to connect the LT 1820 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).

- 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.

Portable Operation: Using Scanner Holster, Battery Pack, and Terminal Holster

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

LT 1820

Back View

**Portable
Terminal**   **Scanner
Holster**

Battery Box

**12"Adapter
Cable**   **5' Coiled
Scanner Cable**
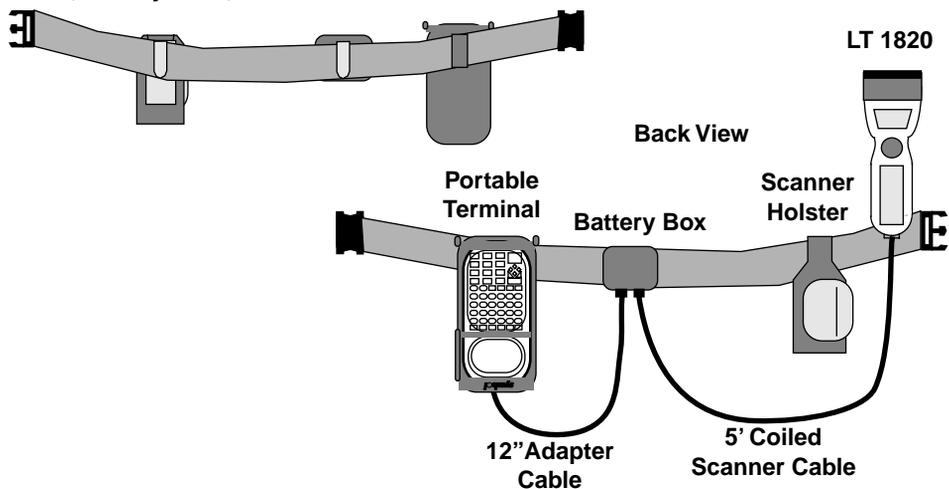
You can use either an alkaline battery, or a nickel-cadmium rechargeable battery, with an LT 1820 scanner. Low battery power is signaled by four short, high tone beeps, coupled with scanning interruptions. If this occurs, change or recharge the battery as soon as possible.

Changing the Battery

- Disconnect the battery pack.
- To open the battery pack, push up on the flanges at one end of the pack.
- Remove the old battery.
- 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

- Remove the battery from the battery pack and place it in the recharging unit.
- To recharge the battery, follow the instructions supplied with the recharging unit.
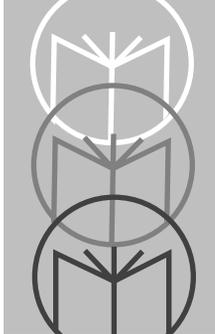
Chapter 2
Scanning with the LT 1820

Scanning

- Make sure the scanner is connected to the controller or portable data terminal before you turn on the system.

- Make sure the symbol you want to scan is within the LT 1820 scanning range. (See *LT 1820 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.

<table>
<tr><td align="center">**RIGHT**</td><td align="center">**WRONG**</td></tr>
<tr><td align="center">012345</td><td align="center">012345</td></tr>
</table>

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

LT 1820 Decode Zone
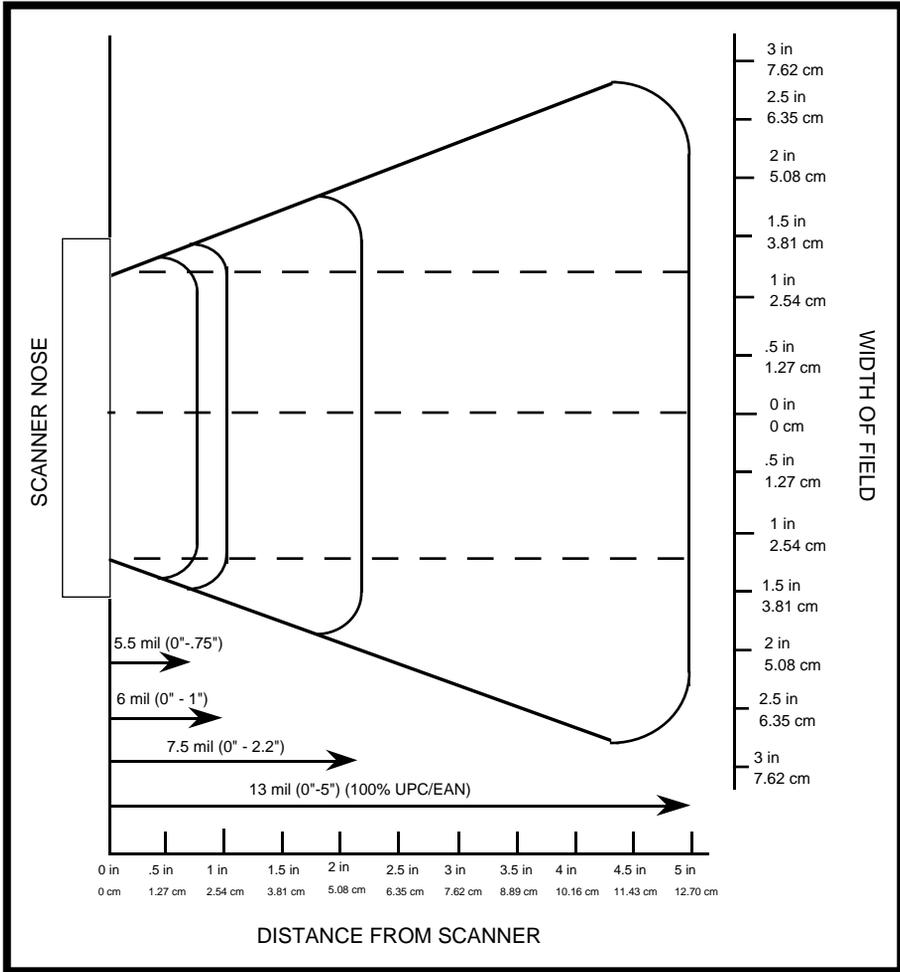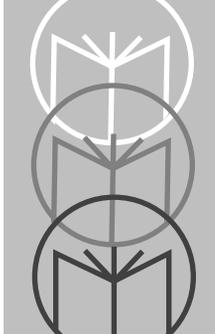
Chapter 3
Maintenance and Specifications

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 *Symbol Support Center* on page ii for the telephone number.

Accessories

Standard Accessories:

Part Number	Description
70-08043-0X	LT 1820 Product Reference Guide
70-16223-0X	LT 1810/1820 Quick Reference Guide
50-01400-184	Shipping Box

Power Supply Operation:

RS-232C Single Port Straight Cables:

Part Number	Connector Type
25-06862-01	Male, 25-Pin (TxD on pin 2)
25-06753-01	Male, 25-Pin (TxD on pin 3)
25-06858-01	Female, 25-Pin (TxD on pin 2)
25-06860-01	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

Optional Accessories:

LT 1820 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 *Interface Cable Pinouts* on page 3-7.

Technical Specifications

ITEM	DESCRIPTION
Power Requirements	5 VDC ±10%; 120 mA average current (160 mA peak)
Off Current Stand-By Mode	10 µA
Decode Capability	The LT 1820 scanner can be programmed to decode the following code types: UPC/EAN, 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.
Beeper Operation	User-selectable: Enable, Disable
Beeper Volume	User-selectable: Full Volume, Low Volume
Decode Depth of Field	Maximum typical working distance is 5.0 in. (12.70 cm) (100% UPC/EAN); minimum element width resolution is 5.5 mils
Scan Repetition Rate	40 (± 3) scans/sec. (bidirectional)
Skew Tolerance	± 35˚ min. (from normal)
Pitch Tolerance	-20° to +60˚ (from normal)
Print Contrast Minimum	25% minimum reflectance differential, measured at 675 nm.
Ambient Light Immunity	Immune to direct exposure to normal office and factory lighting conditions, as well as direct exposure to sunlight.
Durability	5 ft (152 cm) drops to concrete
Operating Temperature	32˚ to 104˚ F (0˚ to 40˚ C)
Storage Temperature	-40˚ to 140˚ F (-40˚ to 60˚ C)
Straight Cable Length	6 ft (183 cm)
Weight (without cable)	6.0 oz. (170 gm)

LT 1820 Dimensions

Table Height: 2.4 in (6.1 cm)

Nose Width: 2.8 in (7.1 cm)

Length: 8.0 in (20.3 cm)

Height: 1.8 in (4.6 cm)

Handle Width: 2.0 in (5.1 cm)
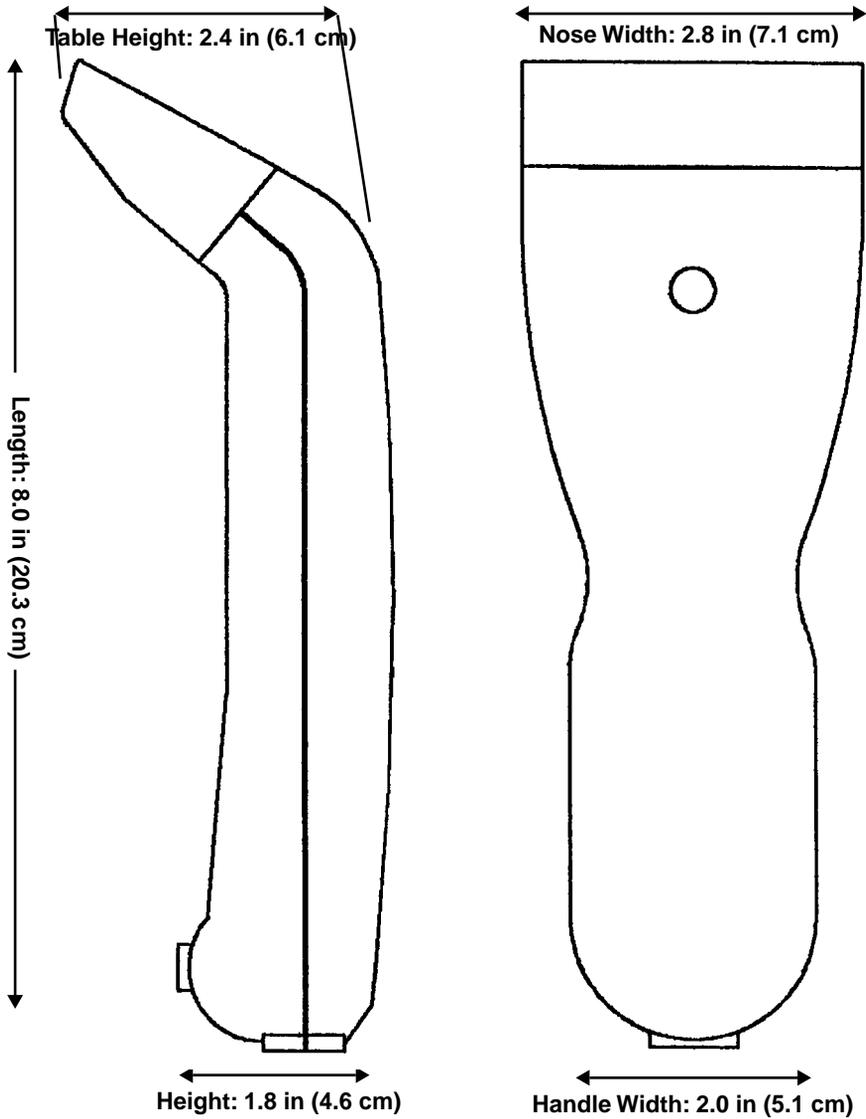
LT 1820 Signal Descriptions

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

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 will be 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 utilized in conjunction with the CTS line.
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 will drive the serial data receive input on the device communicating with the scanner.

PIN 10   **PIN 1**
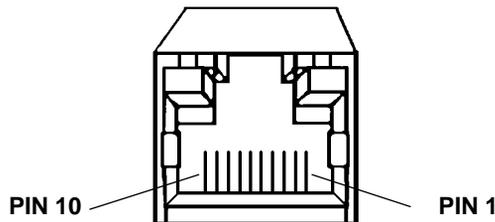
Interface Cable Pinouts

25-Pin, Male, D-Type Connector;
25-06753-01 for power supply version
20-03113-01 for battery pack version

PIN	SIGNAL NAME	FUNCTION
2	**RxD**	Serial data receive input. It will be driven by the serial data transmit output on the device communicating with the scanner.
3	**TxD**	Serial data transmit output. It will drive the serial data receive input on the device communicating with the scanner.
4	**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.
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 utilized in conjunction with the CTS line.
6	**DTR**	Data Terminal Ready. This signal is hardwired active.
7	**GROUND**	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.

25-Pin, Male, D-Type Connector;
25-06862-01 for power supply version
20-03114-01 for battery pack version

PIN	SIGNAL NAME	FUNCTION
2	**TxD**	Serial data transmit output. It will drive the serial data receive input on the device communicating with the scanner.
3	**RxD**	Serial data receive input. It will be driven by the serial data transmit output on the device communicating with the scanner.
4	**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.
5	**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.
7	**GROUND**	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
20	**DTR**	Data Terminal Ready. This signal is hardwired active.

25-Pin, Female, D-Type Connector;
25-06860-01 for power supply version
20-03115-01 for battery pack version

PIN	SIGNAL NAME	FUNCTION
2	RxD	Serial data receive input. It will be driven by the serial data transmit output on the device communicating with the scanner.
3	TxD	Serial data transmit output. It will drive the serial data receive input on the device communicating with the scanner.
4	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.
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 utilized in conjunction with the CTS line.
6	DTR	Data Terminal Ready. This signal is hardwired active.
7	GROUND	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.

25-Pin, Female, D-Type Connector;
25-06858-01 for power supply version
20-03116-01 for battery pack version

PIN	SIGNAL NAME	FUNCTION
2	**TxD**	Serial data transmit output. It will drive the serial data receive input on the device communicating with the scanner.
3	**RxD**	Serial data receive input. It will be driven by the serial data transmit output on the device communicating with the scanner.
4	**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 utilized in conjunction with the CTS line.
5	**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.
7	**GROUND**	Power supply input ground pin and reference for both output signals. It must be capable of sinking all return current.
20	**DTR**	Data Terminal Ready. This signal is hardwired active.

Chapter 4
Programming the LT 1820

Before programming the scanner, follow the instructions in *Chapter 1: Setting Up the LT 1820*.

If the default values suit your requirements, all you need to do is scan the **SET DEFAULT** bar code. An LT 1820 is programmed for parameters other than default values by scanning sequences of bar codes. *Chapter 5: Parameter Menus* contain 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, you scan bar codes for a parameter type, a parameter value, and **ENTER**. The *Scanning Sequence Flowchart* on page 4-3 illustrates this process.

Chapter 5: Parameter Menus contains all the bar codes needed to program the scanner.

Scanning Sequence Examples

Suppose you want to program the scanner for all default settings except for two parameters, **DECODE UPC ONLY** and **INTERCHARACTER DELAY**.

Since you want to keep most of the default settings, scan the **SET DEFAULT** bar code. The default for **DECODE UPC ONLY** is **DISABLED** - you need it **ENABLED**. Scan the three bar codes in the order listed below:

SCAN	YOU WILL HEAR . . .
1. **DECODE UPC ONLY**	Short high tone
2. **ENABLED**	Short high tone
3. **ENTER**	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. For other beeper indications, see *Beeper Definitions* on page 4-14.

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. **INTERCHARACTER DELAY**	Short high tone
2. **0**	Short high tone
3. **2**	Short high tone
4. **ENTER**	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.

Scanning Sequence Flowchart
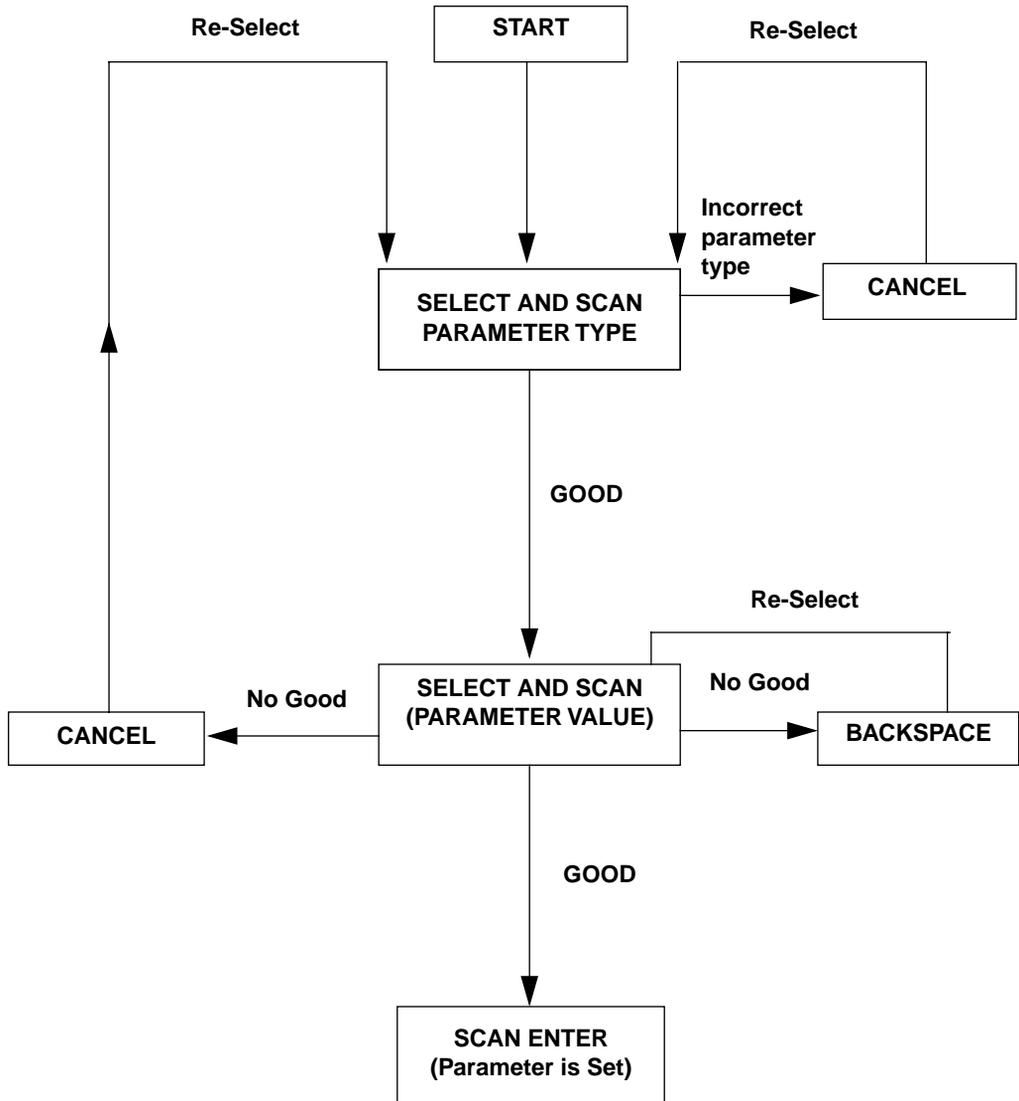
Parameter Descriptions

See *Parameter Selections* on page 4-12 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 *Parameter Selections* on page 4-12.

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

- Codabar
- Discrete 2 of 5
- Code 128
- 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 5-5.

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 1820 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 will follow UPC format and be affected by UPC 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.

EAN Zero Extend

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

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 1820 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 4-14.

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 4-16 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 4-18 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.

Xmit "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.

Prefix

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

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.

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), and 8 Data Bits (without Parity). The PARITY parameter applies only to the 7 Data Bits (with Parity), and 8 Data Bits (with Parity) options. The default is 7 Data Bits (with Parity).

Parameter Selections

PARAMETER	SELECTIONS AVAILABLE	DEFAULT
Add Code Types to be Decoded	Code 39, Code 39 Full ASCII, Discrete 2 of 5, Interleaved 2 of 5, Codabar, UPC/EAN, Code 93, Code 128, All Code Types	All Code Types
First Length Discrete 2 of 5	2 digit entry, ranging from 01-31.	12
Second Length Discrete 2 of 5	2 digit entry, ranging from 00-31.	0
First Length Interleaved 2 of 5	2 digit entry, ranging from 01-31.	14
Second Length Interleaved 2 of 5	2 digit entry, ranging from 00-31.	0
Xmit UPC-A Check Digit	Enable, Disable	Enable
Xmit UPC-E Check Digit	Enable, Disable	Enable
Decode UPC Only	Enable, Disable	Disable
Convert UPC-E to A	Enable, Disable	Disable
Xmit Code ID Character	Enable, Disable	Disable
EAN Zero Extend	Enable, Disable	Disable
CLSI Editing	Enable, Disable	Disable
NOTIS Editing	Enable, Disable	Disable
UPC/EAN Supplemental	No Supplemental, Supplemental Only, Autodiscriminate	No Supplemental
Beep After Good Decode	Enable, Disable	Enable
Beeper Volume	Low, Full	Full
Trigger Mode (triggered models only)	Triggered, Triggerless	Triggered
Decode Redundancy	Level 0, Level 1, Level 2	Level 0
Buffer Code 39 Symbols (Scan and Store)	Enable, Disable	Disable
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19,200	9600
Parity	Even, Odd, Mark, Space	Even

PARAMETER	SELECTIONS AVAILABLE	DEFAULT
Hardware Handshaking	None, RTS/CTS	None
Software Handshaking	None, ENQ, ACK/NAK, ACK/NAK with ENQ	None
Stop Bit Select	One, Two	Two
Xmit "No Decode" Character	"NR", No Character	No Character
Prefix to Decoded Data	None, Start-of-text <STX>, User's Choice (1 selection)	None
Suffix to Decoded Data	None, CR, LF, CR/LF, User's Choice (1 selection), User's Choice (2 selections), End-of-text <ETX>	CR/LF
Intercharacter Delay	00-99 ms	None
UPC-E Preamble	System Character, System Character & Country Code, None	System Character
UPC-A Preamble	System Character, System Character & Country Code, None	System Character
Data Format	7 Data Bits (with Parity), 8 Data Bits (with Parity), 8 Data Bits (without Parity)	7 Data Bits (with Parity)

Beeper Definitions

Standard Use

BEEPER SEQUENCE	INDICATION
1 Beep - **short high tone**	A symbol has been successfully decoded.
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 **CANCEL** 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 1820 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* on page 4-17) 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* on page 4-17.
- 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.

- 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.

Transmit Buffer

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

1. Only a start character, a plus (+), and a stop character.

    *   The unit signals that the transmission buffer has been sent (a lo/hi beep).
    *   Unit sends the buffer.
    *   Unit clears the buffer.

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.
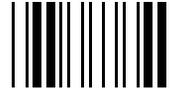
Overfilling Transmission Buffer

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* beginning 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 will be 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 will be asserted by the scanner. If CTS is asserted by the host, the scanner will wait up to 2 seconds for CTS to be negated.

- When the host asserts CTS in response to, and within 2 seconds of, the scanner's RTS, data will be transmitted.

- The scanner will negate RTS after sending the last character.

- The host should respond by negating CTS. The scanner will not wait for this negation, but rather will check before the next transmission, as above.

- If the above communication attempt should fail for any reason, the scanner will issue 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.

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 in approximately 2 seconds or the scanning unit will beep 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 will retransmit the data. After three unsuccessful transmission attempts, the unit will abort any further communication attempts on the current message. It indicates this by sounding 4 long (1 second) beeps.

LT 1820 Hardware and Software Handshaking Sequence

```
┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
  HARDWARE HANDSHAKING      ┌─────────────────────┐
                            │  SYMBOL IS DECODED   │
                            └─────────────────────┘
                                      │
                                      ▼
                               ╱─────────────╲
                              ╱ RTS AND CTS    ╲
                        YES  ╱ HANDSHAKING LINES ╲  NO
                        ◄───╱      USED?          ╲───►
                            ╲                     ╱
                             ╲───────────────────╱
           ┌──────────────────────────────┐   NO RESPONSE. AFTER 2 SECONDS
           │ UNIT ASSERTS REQUEST-TO-SEND  │   THE UNIT BEEPS 4 TIMES TO
           │ LINE. HOST RESPONDS BY        │   INDICATE A TRANSMISSION ERROR.
           │ ASSERTING CLEAR-TO-SEND LINE. │
           └──────────────────────────────┘
└ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
  SOFTWARE HANDSHAKING
                               ╱─────────────╲
                         YES  ╱ ENQ SWITCH ON? ╲  NO
                        ◄───╱                   ╲───►
                            ╲                   ╱
                             ╲─────────────────╱
           ┌──────────────────────┐   NO RESPONSE. AFTER 2 SECONDS
           │ WAIT FOR ENQ CHARACTER│   THE UNIT BEEPS 4 TIMES TO
           │ TO BE RECEIVED FROM   │   INDICATE A TRANSMISSION ERROR.
           │ HOST.                 │
           └──────────────────────┘
                      │
                      ▼
              ┌──────────────────────┐
              │ DATA IS TRANSMITTED.  │
              └──────────────────────┘
                      │
                      ▼
               ╱─────────────╲
          YES ╱ ACK/NAK        ╲  NO
         ◄───╱  SWITCH ON?      ╲───►
             ╲                  ╱
              ╲────────────────╱
    ┌───────────────────────────────────┐
    │ WAIT FOR ACK OR NAK RESPONSE FROM  │
    │ HOST.                              │
    └───────────────────────────────────┘
              │
              ▼
          ╱────────╲
     NO  ╱   ACK    ╲  YES
    ◄───╱ RESPONSE?  ╲───►  NO RESPONSE. AFTER 2 SECONDS
        ╲            ╱      THE UNIT BEEPS 4 TIMES TO
         ╲──────────╱       INDICATE A TRANSMISSION ERROR.
          ╱────────╲
     NO  ╱ TRY 3    ╲  YES,
    ◄───╱  TIMES?    ╲───► 4 LONG
        ╲            ╱      BEEPS
         ╲──────────╱
                      │
                      ▼
                  FINISHED
└ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
```

ASCII Character Set

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
BACK SPACE	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
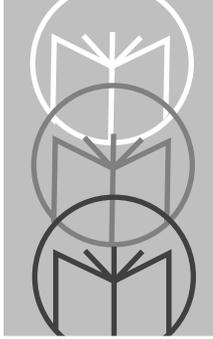
Chapter 5
Parameter Menus

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

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 93

CODE 128

UPC/EAN

CODABAR

INTERLEAVED 2 OF 5

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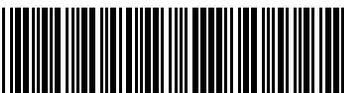
INTERLEAVED 2 OF 5 LENGTH 2
(Range 00-31)

||||||||||||||||||||||||||||||||
0

||||||||||||||||||||||||||||||||
1

||||||||||||||||||||||||||||||||
2

||||||||||||||||||||||||||||||||
3

||||||||||||||||||||||||||||||||
4

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

5

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

6

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

7

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

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

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
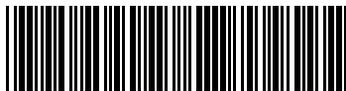
TRANSMIT CODE IDENTIFIER

EAN ZERO EXTEND

CLSI EDITING
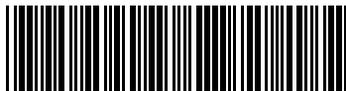
NOTIS EDITING

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

NO SUPPLEMENTALS

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

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

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)**

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

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

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

1200

2400

4800

9600

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

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

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

NONE

ACK/NAK WITH ENQ

ACK/NAK ONLY

```
║█║║█║║█║█║║█║║█║║█║
```
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

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

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

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:

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.

PREFIX

**USER'S CHOICE
1 CHARACTER**

NONE

STX

0

1

2

||||||||||||||||||||||||||
3

||||||||||||||||||||||||||
4

||||||||||||||||||||||||||
5

||||||||||||||||||||||||||
6

||||||||||||||||||||||||||
7

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:

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.

SUFFIX

CR

LF

CR,LF

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

ETX

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

NONE

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

**USER'S CHOICE
2 CHARACTERS**

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

**USER'S CHOICE
1 CHARACTER**

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

0

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

1

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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

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**.

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INTERCHARACTER DELAY
(Range = 00-99 ms)

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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

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**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.

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BACKSPACE

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ENTER

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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)

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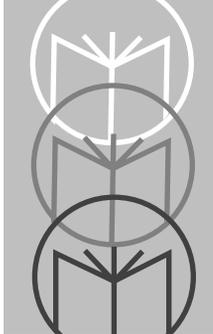**ENTER** - stores and enters the new change.

BACKSPACE

ENTER

CANCEL

Glossary

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

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

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

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

Print Contrast Signal (PCS)	Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. PCS = (RL - RD) ∕ RL, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.
Programming Mode	The state in which a scanner is configured for parameter values. See *Scanning Mode*.
Quiet Zone	A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.
Reflectance	Amount of light returned from an illuminated surface.
Resolution	The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.
Scan Area	Area intended to contain a symbol.
Scanner	An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are:
	1.Light source (laser or photoelectric cell) - illuminates a bar code.
	2.Photodetector - registers the difference in reflected light (more light reflected from spaces).
	3.Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.
Scanning Mode	The scanner is energized, programmed, and ready to read a bar code.
Scanning Sequence	A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.
Self-Checking Code	A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.
Space	The lighter element of a bar code formed by the background between bars.
Specular Reflection	The mirror-like reflection of light from a surface, which can "blind" a scanner.
Start/Stop Character	A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.
Substrate	A foundation material on which a substance or image is placed.

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

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

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

_____

What can we do to further improve our manuals? _____

_____

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