symbol®

LS 3603

Product Reference Guide

LS 3063 Product Reference Guide

70-13584-01
Revision C — June 1999

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

LS 3603
Product Reference Guide

symbol®

Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, New York 11742-1300
http://www.symbol.com

Patents
This product is covered by one or more of the following U.S. and foreign Patents:
U.S. Patent No.4,360,798; 4,369,361; 4,387,297; 4,460,120; 4,496,831; 4,593,186; 4,603,262; 4,607,156; 4,652,750; 4,673,805; 4,736,095; 4,758,717; 4,816,660; 4,845,350; 4,896,026; 4,897,532; 4,923,281; 4,933,538; 4,992,717; 5,015,833; 5,017,765; 5,021,641; 5,029,183; 5,047,617; 5,103,461; 5,113,445; 5,130,520 5,140,144; 5,142,550; 5,149,950; 5,157,687; 5,168,148; 5,168,149; 5,180,904; 5,229,591; 5,230,088; 5,235,167; 5,243,655; 5,247,162; 5,250,791; 5,250,792; 5,262,627; 5,262,628; 5,266,787; 5,278,398; 5,280,162; 5,280,163; 5,280,164; 5,280,498; 5,304,786; 5,304,788; 5,306,900; 5,321,246; 5,324,924; 5,337,361; 5,367,151; 5,373,148; 5,378,882; 5,396,053; 5,396,055; 5,399,846; 5,408,081; 5,410,139; 5,410,140; 5,412,198; 5,418,812; 5,420,411; 5,436,440; 5,444,231; 5,449,891; 5,449,893; 5,468,949; 5,471,042; 5,478,998; 5,479,000; 5,479,002; 5,479,441; 5,504,322; 5,519,577; 5,528,621; 5,532,469; 5,543,610; 5,545,889; 5,552,592; 5,578,810; 5,581,070; 5,589,679; 5,589,680; 5,608,202; 5,612,531; 5,619,028; 5,664,229; 5,668,803; 5,675,139; 5,693,929; 5,698,835; 5,705,800; 5,714,746; 5,723,851; 5,734,152; 5,734,153; 5,745,794; 5,754,587; 5,762,516; 5,763,863; 5,767,500; 5,789,728; 5,808,287; 5,811,785; 5,811,787; 5,815,811; 5,821,519; 5,821,520; 5,823,812; 5,828,050; 5,850,078; 5,861,615; 5,874,720; 5,875,415; D305,885; D341,584; D344,501; D359,483; D362,453; D363,700; D363,918; D370,478; D383,124; D391,250; D405,077; D406,581.
Invention No. 55,358; 62,539; 69,060; 69,187 (Taiwan); No. 1,601,796; 1,907,875; 1,955,269 (Japan).
European Patent 367,299; 414,281; 367,300; 367,298; UK 2,072,832; France 81/03938; Italy 1,138,713.
rev. 4/99

Contents

Chapter 1. User's Guide

Chapter 2. Programming

Chapter 3. Parameter Menus

Chapter 4. Glossary

Chapter 1 User's Guide

Scanning Made Easy

The LS 3603 features Symbol Technologies' patented "fuzzy logic" technology. This innovation provides artificial intelligence that compensates for poor quality bar codes and gives the LS 3603 the best first-time read rate anywhere.

This scanner successfully reads most code symbologies, densities, and colors, produced by a wide range of printing techniques. See the ***LS 3603 Decode Zone*** on .

With a simple cable change, the LS 3603 is compatible with:

- RS-232C asynchronous terminals.
- Wand based systems and most Batch and RF portable data collection terminals that support a digital wand input.
- Synapse™ "Smart Cables" which allow you to connect to:
    - IBM 4683/4, 4693/4 series of terminals.
    - All leading OCIA terminals, including NCR, Nixdorf, and ICL.
    - Terminals using an XT, AT or PS/2-style keyboard. (When used as a keyboard wedge, all scanned data is entered into your terminal in the form of keystrokes. No software changes to your host system are necessary.)
    - Popular OCR terminals, such as Fujitsu and ICL.

The LS 3603 scans automatically at the rate of 36 scans per second. For decode capability, see ***Technical Specifications*** beginning on

Set Up

Unpacking

Remove the scanner from its packing and inspect it for damage. If the scanner was damaged in transit, call the Symbol Support Center at one of the telephone numbers listed on page 1-15. KEEP THE PACKING. It is the approved shipping container and should be used if you ever need to return your equipment for servicing.

Switching Cables

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

- Slide collar down over cable
- Plug in modular connector
- Slide collar up into keys
- Twist to snap in place

Power Options

Three power options are available:

- External power supply
- Battery Box
- Direct Host Power

Available power options are host dependent.

Connecting Your Scanner

With some terminal types, the LS 3603 is unable to answer host terminal polls until the appropriate host type is selected. This may result in an error message generated by the host. To correct this situation, select the proper parameter set and initialize the host terminal. See Chapter 2 for more information.

RS-232C

For external power operation with single-piece cable

- Plug the scanner into the appropriate port on the host device.
- Connect the power supply to the input receptacle located near the host end of the cable.*
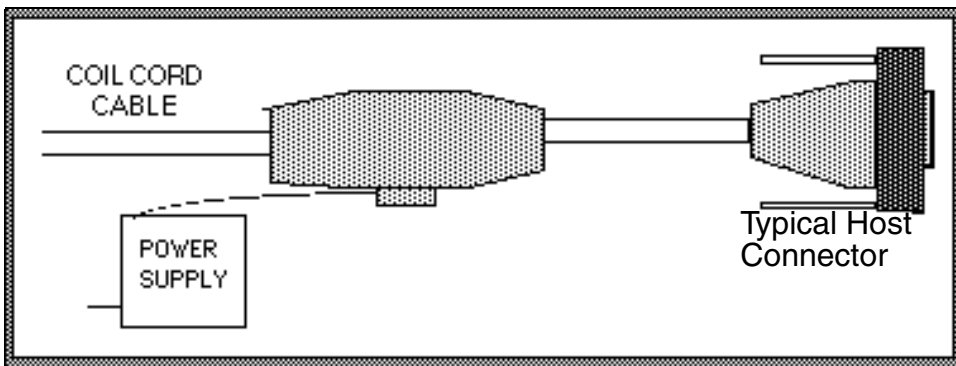
Figure 1-1. RS-232C External Power Connection

For direct host power operation:

- Plug the scanner directly into the scanner input port of the host device.

*Coil cables that terminate in a 25-pin D-type connector have a power receptacle on the side of the connector assembly.

RS-232C (Contd)

For battery operation:

- Insert a 9-volt battery into the battery box. See the ***Battery Box Operation*** section on .

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

- An output cable from the battery box connects the LS 3603 to the RS-232C input device. Connect one end of this cable to the battery box and the other to the appropriate port on the host device.
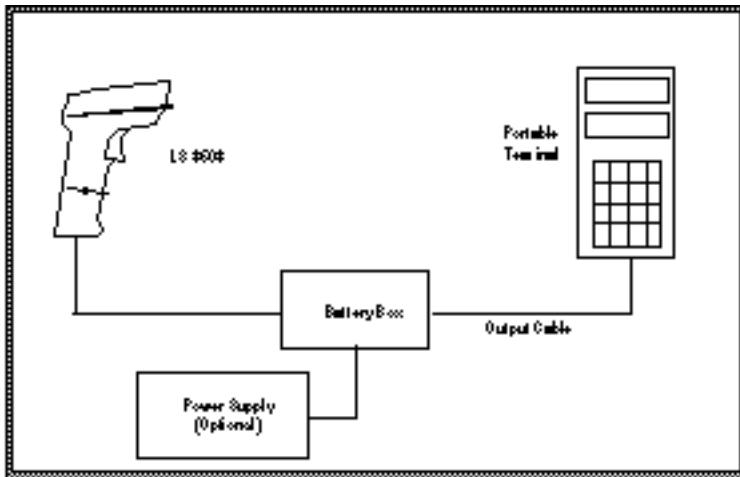
Figure 1-2. RS-232C Operation

Wand Emulation

For external power operation:

- Plug the 9-pin connector at the end of the scanner's coil cord into one end of the battery box.
- Use the appropriate output cable from the battery box to connect the LS 3603 to the host device.
- Connect one end of this cable to the battery box and the other to the appropriate port on the host device.
- Plug the power supply connector into the receptacle on the side of the battery box. Connect the power supply plug into an AC outlet.

For direct host power operation:

Plug the scanner directly into the scanner input port of the host device.

For battery operation:

- Insert a 9-volt battery into the battery box. See the *Battery Box Operation* section on .
- Plug the scanner's 9-pin connector at the end of the coil cord into one end of the battery box.
- An output cable from the battery box connects the LS 3603 to the host device. Connect one end of this cable to the battery box and the other to the appropriate port on the host device.

Wand Emulation (Contd)
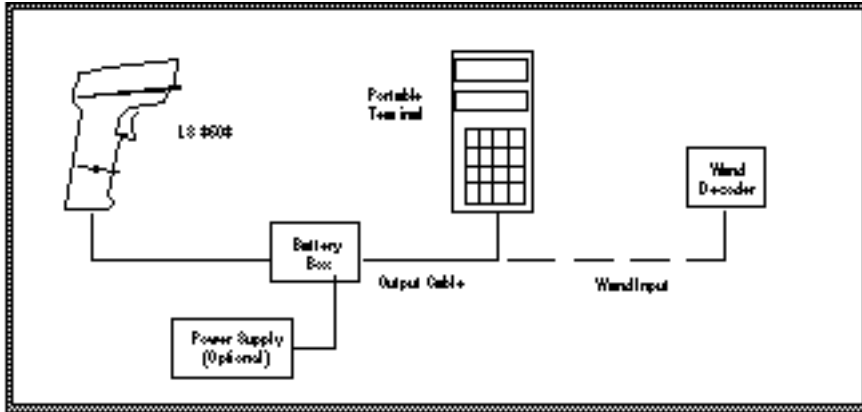
Figure 1-3. Wand Emulation

OCIA, OCR, IBM 4683, Keyboard Wedges

See the instructions packed with the appropriate Synapse cable.

Ready, Test, Scan

1. Ready

    Make sure connections are secure.

2. Test

    Aim the scanner away from you and press the trigger. When you press the trigger, the scanning beam is energized for approximately 3.0 seconds (default).

3. Scan

    Make sure the symbol you want to scan is within the scanning range. See the ***LS 3603 Decode Zone*** diagram on .

Aim and press the trigger.

The scan beam and red SCAN LED will light for about 3.0 seconds, or until a successful decode.

The scanner has read the symbol when:

*   You hear a short, high tone beep (if the beeper is enabled).
*   The green DECODE LED lights.

The DECODE LED stays lit until the next trigger pull, unless Low Power Mode is selected. In this case, the DECODE LED is extinguished following the decode beep.

Aiming

Scan the Entire Symbol

- Your scan beam must cross every bar and space on the symbol.
- The larger the symbol, the farther away you should hold the scanner.
- Hold the scanner closer for symbols with bars that are close together.
- A short, high tone beep indicates a good decode.

RIGHT   **WRONG**

012345   **012345**

Hold at an Angle

Do not hold the scanner directly over the bar code. In this position, light can bounce back into the scanner's exit window and prevent a successful decode.

Problems

See What If... on page 1-13.

Beeper Definitions

The beeper in the unit provides a variety of messages. See ***Beeper Indications*** beginning on

Programming the System

An LS 3603 is programmed by scanning sequences of bar codes; consult Chapter 2.

Hands Free

The LS 3603 can be used as a fixed-mount scanner with the Scanstand Plus or IntelliStand model stands.

Scanstand Plus Operation

The Scanstand Plus may be used for all host interfaces except wand emulation with Norand terminals. Place the LS 3603 in the Scanstand Plus with the nose pointing toward the target bar code, and pull the trigger. The scanner will operate in a continuous-on mode, decoding any bar code placed over the target bar code. The LS 3603 reads the target bar code between decode attempts to prevent accidental double reads.

To enter continuous-on mode, pull the trigger once with the scanner in the Scanstand Plus.

To exit continuous-on mode, pull the trigger once while the scanner is still in the Scanstand Plus.

IntelliStand Operation

The IntelliStand can be used in a number of different mounting arrangements. Place the LS 3603 in the stand, and it automatically turns on in a blinking, hands-free mode. Any symbol passed over the red scan line will be decoded. To conserve power, after a short period of time of non-use, the scanner will operate in a reduced power mode. See the IntelliStand *Quick Reference Guide* for full details.

Battery Box Operation

When using the LS 3603 with a battery box, you can use either an alkaline battery (recommended), or a nickel-cadmium rechargeable battery. 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

*   To open the battery box, 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 box. Match the positive (+) and negative (-) terminals on the battery with the corresponding terminals in the battery box.

Recharging a Nickel-Cadmium Battery

*   Remove the battery from the battery box and place it in the recharging unit (not supplied by Symbol).
*   To recharge the battery, follow the instructions supplied with the recharging unit.

LS 3603 Decode Zone

DISTANCE FROM FRONT OF SCANNER
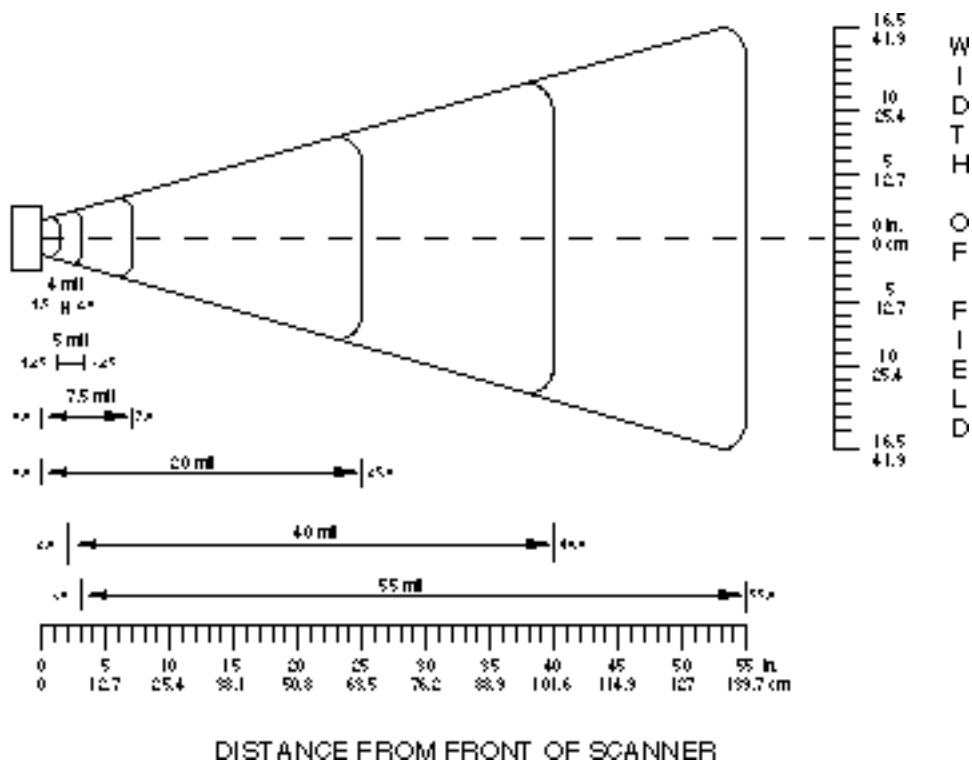
Figure 1-4. LS 3603 Decode Zone

Maintenance

Cleaning the exit window is the only maintenance required.

- Do not allow any abrasive material to touch the window.
- Remove any dirt particles with a damp cloth.
- Wipe the window using a damp cloth, and if necessary, a non-ammonia based detergent.
- Do not spray water or other cleaning liquids directly into the window.

What If...

Nothing happens when you follow the operating instructions?

You Should

- Check the system power; is there a battery in the battery box?
- Be sure the scanner is programmed for the terminal in use.
- Make sure the scanner is programmed to read the type of bar code you are scanning.
- Check for loose cable connections.
- Check the symbol to make sure it is not defaced.
- Try scanning test symbols of the same code type.

Symbol is decoded, but not transmitted to the host terminal?

You Should

- Be sure the proper host type is selected (See Chapter 2).
- Make sure the appropriate parameter set (RS-232, Wand, Synapse) is selected.

Scanned data is incorrectly displayed on the terminal?

You Should

- Make sure the system is programmed for the correct keyboard type.
- Make sure the CAPS LOCK key is off.
- Be sure the proper host is selected.
- Be sure editing options (e.g. UPC-E to UPC-A Conversion) are properly programmed.

  Note: If after performing these checks the symbol still does not scan, contact your distributor or call the Symbol Support Center. See page 1-15 for the telephone number.

Factory Service

If you have a problem, contact the Symbol Support Center at the telephone number on .

Before calling, have the model 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, Support 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
01734-771-222 (Inside UK)
+44-1734-771222 (Outside UK)

Asia

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

Accessories

Required Accessories

LS 3603 scanners are sent as a package with required accessories, listed in the ***Product Ordering Guide***. Optional accessories are available at extra cost.

Optional Accessories

Optional accessories, listed in the ***Product Ordering Guide***, include various stands and holders, which are supplied at extra cost. Additional units of standard accessories may also be purchased at extra cost.

Technical Specifictions

Table 1-1.   Technical Specifications

ITEM	DESCRIPTION

Power Requirements*
   Wand
   RS-232C
   Synapse
	4.8 (min) to 14.0 VDC (max)
	 150 mA @ 5V typical
	 150 mA @ 5V typical
	 150 mA @ 5V typical

Decode Capability	The LS 3603 can be programmed to decode the following code types: UPC∕EAN, Code 39, Code 39 Full ASCII, Codabar, Interleaved 2 of 5, Code 128, EAN 128, Discrete 2 of 5, Code 93, and MSI∕Plessey. Set code length(s) for any 2 of 5 code type. The LS 3603 can autodiscriminate between all of the above code types except for Code 39 and Code 39 Full ASCII. Transmission of decoded information will depend on the capabilities of the attached terminal.
Beeper Operation	User-selectable: Enabled, Disabled.
Scan Repetition Rate	36 (± 3) scans∕sec (bidirectional)
Roll (Skew) Tolerance	± 10° from normal
Pitch	± 50° from normal
Yaw	± 60° from normal
Decode Depth of Field	See Decode Zone
Print Contrast Minimum	25% absolute dark∕light differential, measured at 675 nm.

Ambient Light Immunity
   Artificial Lighting
   Sunlight
	200 ft. candles 2153 lux
	 8000 ft. candles 86112 lux
	 (@8 in. (20 cm) on low density bar codes)

Table 1-1. (Continued) Technical Specifications

ITEM	DESCRIPTION	
Operating Temperature	-22° to 122°F	-30° to 50°C
Storage Temperature	-40° to 140°F	-40° to 60°C
Humidity	5% to 95% (non-condensing)	
Coil Cable Length	9-12 ft.	274-365 cm (depending on host)
Durability	6-ft. drop to concrete	1.8 m

Dimensions
  Height
  Length
  Width
	
	6.3 in.
	5 in.
	2.8 in.
		
		16 cm
		12.7 cm
		7.1 cm

Laser Classifications	CDRH Class II IEC 825 Class 2	
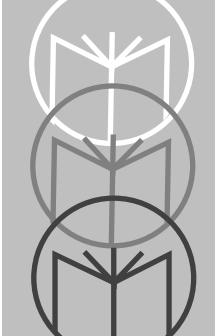
*For direct host power connection, make sure the host terminal supplies sufficient power for the specified operation. Symbol is not responsible for damage to host equipment or system mis-operation due to an insufficient power condition.

Pin-outs

Table 1-2. Pin-outs

PIN	RS-232	Wand	Synapse
1	Not Used	Not Used	Not Used
2	V_{BAT} 4.8-14.0V	V_{BAT} 4.8-14.0V	V_{BAT} 4.8-14.0V
3	Ground	Ground	Ground
4	RTS Output	RTS Output	Not Used
5	RxD Input	Not Used	Not Used
6	Not Used	Not Used	ZIF_CLOCK
7	DTR Output	Not Used	Not Used
8	TxD Output	DBP Output	Not Used
9	CTS Input	CTS Input	Not Used
10	Not Used	Not Used	ZIF_DATA

Chapter 2 Programming

Overview

Before programming, follow the instructions beginning on

The LS 3603 is programmed by scanning appropriate bar codes. The bar codes are arranged in **RS-232C**, **Wand** and **Synapse** sections. Not all of the available parameters necessarily apply to your specific host systems. If, for example, the selected host is a wand emulator, and you enable **Baud Rate**, the parameter will be ignored until such time as a host recognizing that parameter is selected.

You can program any parameter, regardless of the mode you're in. For example, if you are in the **Wand** mode, you can still program **Synapse** and **RS-232C** parameters. When you switch from one mode to another, stored parameters remain unchanged. That means you can switch back and forth between **RS-232C**, **Wand** and **Synapse** modes without having to re-program the scanner.

Consult the **Parameter Descriptions** section beginning on for explanations of parameter types. A table of features supported by each host type begins on .

There are separate defaults for each mode, and one for **All Defaults**. If the default values suit your requirements, all you need to do is scan the appropriate **Set Default** bar code. Parameters other than default values can be set by scanning sequences of bar codes. **Parameter Menus** contain all the bar codes necessary to program the scanner for each parameter selection. *Regardless of whether or not you change defaults, if you select RS-232C or Wand mode, you must then select a host type.* If you are using a Synapse Smart Cable, the host type will automatically be selected for you when you plug in the cable.

Remember to look at the top of the page to see whether the bar codes apply to **RS-232C**, **Wand** or **Synapse** parameters.

Scanning Sequence Examples

In most cases you need only scan one bar code to set a specific parameter. For example, if you want to add Code 39 to the **Wand** parameters, simply scan the **Add Code 39** bar code in the **Wand Code Types** section. The LS 3603 will issue a warble tone, signifying a successful parameter entry.

If you want to add or change prefixes and suffixes you will have to scan several bar codes. This procedure is described in ***Parameter Descriptions***.

Errors While Scanning

Don't worry if you make an error during a scanning sequence. Merely reenter the correct parameter.

Parameter Descriptions

• Set Parameter Defaults

Scanning the **SET ALL DEFAULTS** bar code on returns all parameters to the values listed in the *Default Table*. (See .)

• Host Interface Code

Scan the bar code corresponding to your host type. You must select a host type when you first set up the scanner and whenever you change host types.

• 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)
- Codabar
- Code 39
- Code 39 Full ASCII
- Discrete 2 of 5
- Interleaved 2 of 5
- Code 128
- MSI Plessey
- EAN 128
- Code 93

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

• Code Lengths

Select one or two lengths for the Interleaved or Discrete 2 of 5 codes. Determine the number of characters represented in the Discrete 2 of 5 or Interleaved 2 of 5 bar codes by counting the number of printed (i.e., human readable) digits beneath the bar code. Set one or both lengths, one per scanning sequence. For D 2 of 5, LENGTH 1 may range from 02-55 and LENGTH 2 from 00-55. For I 2 of 5, LENGTH 1 may range from 02-54 and LENGTH 2 from 00-54.

• Code 39 Full ASCII

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

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

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

The LS 3603 will not autodiscriminate between Code 39 and Code 39 Full ASCII.

• Decode Options

Transmit UPC-E/UPC-A Check Digit

Select if decoded UPC symbols are transmitted with or without a check digit.

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-A programming selections (e.g., Preamble, Check Digit).

EAN Zero Extend

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

Transmit "No Decode" Message

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

• Decode Options (Continued)

Decode UPC/EAN Supplemental

Select whether UPC/EAN is decoded with or without supplemental characters. Supplementals are additionally appended characters (2 or 5) according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+2). 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 LS 3603 will, after additional processing to ensure a good decode, transmit either. **(NOTE: In order to minimize the risk of invalid data transmission, it is recommended that you select whether to read or ignore supplemental characters.)**

Code 39 Check Digit

When enabled, this parameter checks the integrity of a Code 39 symbol to ensure it complies with the modulo 43 check digit algorithm.

ITF-14/EAN-13 Conversion

If your terminal supports EAN-13, this feature 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 (either LENGTH 1 or LENGTH 2) must be set to 14, the code must have a leading zero and a valid EAN-13 check digit.

MSI Plessey Check Digit

One or two digits at the end of the bar code that check the integrity of the data. At least one check digit (default) is always required. Check digits are not transmitted with the data.

MSI/Plessey 2 Check Digit Algorithm

When the two MSI/Plessey check digits option is selected, an additional verification is required to ensure integrity. Either of two algorithms may be selected; Mod10 - Mod10 (default), or Mod11 - Mod10.

• Decode Options (Continued)

Code 39 Buffering (Scan & Store)

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

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

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. Beeper indications begin on .

CLSI Editing

This parameter strips the start and stop characters, then inserts a space after the 1st, 5th, and 10th characters of a 14-character Codabar symbol. Symbol length does not include start and stop characters.

NOTIS Editing

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

• Decode Options (Continued)

UPC/EAN Security Level

The LS 3603 offers four levels of decode security for UPC/EAN bar codes. Increasing levels of security are provided for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so be sure to choose only that level of security necessary for any given application.

- *Security Level 0* - This is the default setting which allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding "in spec" UPC/EAN bar codes.
- *Security Level 1* - As bar code quality levels diminish, certain characters become prone to mis-decodes before others (i.e., 1, 2, 7, 8). If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are limited to these characters, select this security level.
- *Security Level 2* - If you are experiencing mis-decodes of poorly printed bar codes, and the mis-decodes are not limited to characters 1, 2, 7 and 8, select this security level.
- *Security Level 3* - If you have tried Security Level 2, and are still experiencing mis-decodes, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. **Selection of this level will significantly impair the decoding aggressiveness of the scanner.**

Decode Redundancy for Codabar

When enabled, a Codabar symbol must be decoded in both directions before being accepted as a successful decode.

• UPC A and E Preamble

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 Transmission Formats

Select the desired scan data format from one of the following:

    <data>
    <PREFIX> <data>
    <PREFIX> <data> <SUFFIX>
     <data> <SUFFIX>

    <data> = Scanned bar code data
    <PREFIX> <SUFFIX> as selected by the user

• Prefix/Suffix Values

A prefix/suffix may be appended to scan data for use in data editing. These values are set by scanning a four digit number (i.e., four bar codes) that correspond to keycodes for various terminals. An ASCII table begins on page 2-23.

• Laser On Time-out

The maximum time the laser will remain on or decode processing will continue during a trigger pull. Programmable in .5 sec increments from 0.5 to 5.0 sec.

•RS-232C Options

Baud Rate

Baud rate is the number of bits of data transmitted per second. The scanner's baud rate setting must match the data rate setting of the host device. If not, data will 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.

Beep on BEL

When this parameter is enabled, the scanner will issue a beep when a <BEL> character is detected on the RS-232C serial line. <BEL> is issued to gain a user's attention to indicate an illegal entry or other important event. When the scanner is configured for low power operation, it will not respond to BEL characters in between decode attempts.

Hardware Handshaking

Hardware handshaking checks 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. Hardware handshaking may **not** be used in conjunction with software hand-shaking. Refer to the flow chart on the following page.

RS-232C communications are designed to operate either with or without hardware handshaking lines, RTS, *Request to Send*, and CTS, *Clear to Send*.

RS-232C Options (Continued)

Hardware Handshaking

If RTS/CTS handshaking is selected, scan data is transmitted with the following sequence: (Note that the DTR signal is hard wired active.)

- The scanner reads the CTS line for activity. If CTS is asserted, the scanner will wait up to two seconds for the host to negate the CTS line. If, after one second the CTS line is still asserted, the scanner will sound a transmit error and any scanned data will be lost.

- When the CTS line is negated, the scanner asserts the RTS line and waits for two seconds for the host to assert CTS. When the host asserts CTS, data is transmitted.

- When data transmission is complete, the scanner will negate RTS after sending the last character.

- The host should respond by negating CTS. The scanner will check for a negated CTS upon the next transmission of data.

During the transmission of data, the CTS line should be asserted.

- If the above communications sequence should fail, the scanner will issue a transmit error. In this case, the data is lost and must be rescanned.

RS-232C Options (Continued)

Figure 2-1. Hardware Handshaking

RS-232C Options (Continued)

Software Handshaking

This parameter controls the data transmission process. It may be used instead of, but not in conjunction with, hardware handshaking.

The scanner provides five software handshaking options, listed below. Refer to the flow chart on the following page.

1. None

2. ACK/NAK Only

    The ACK/NAK option checks the result of a 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 short 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 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 short 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.

RS-232C Options (Continued)

Software Handshaking

5. XON/XOFF

    When enabled, the scanner assumes an XON for the first transmission, and
    transmits scanned data until an XOFF is received. Transmission continues
    when an XON character is received. This option is automatically disabled
    when the unit is in Low Power mode.

SOFTWARE HANDSHAKING
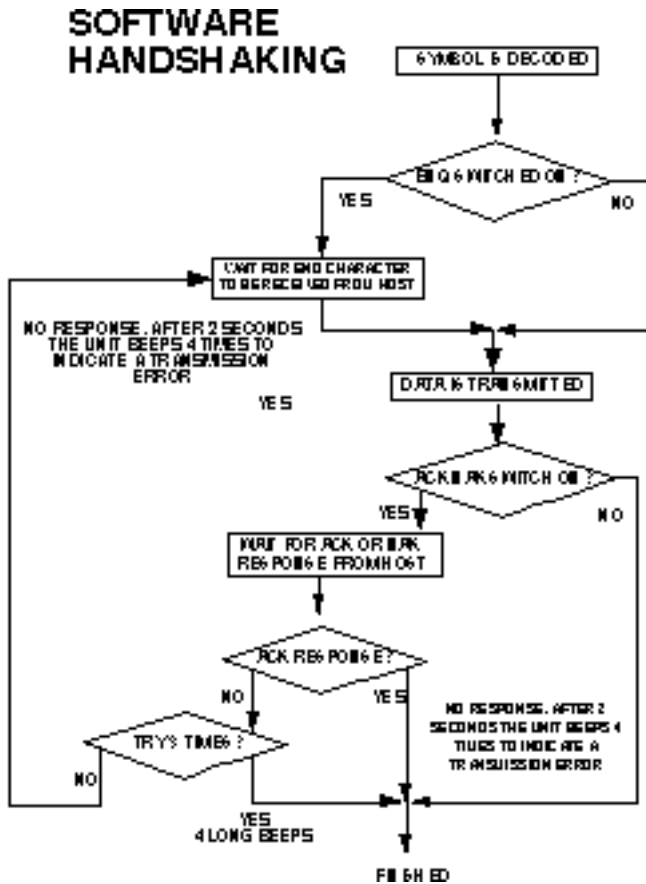
Figure 2-2. Software Handshaking

RS-232C Options (Continued)

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.

ASCII Format

When enabled, this parameter transmits data in an 8-bit ASCII format. This allows the scanner to interface with devices requiring that protocol. The default is 7-bit ASCII.

• 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 msec delay between the transmission of each character.

• 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. If a prefix is selected, the code ID character is sent after the prefix. 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; K = EAN 128; J = MSI Plessey.

• Transmit AIM ID Character

Enabling this parameter, with the Transmit Code ID Character parameter enabled allows you to send the AIM code identifier in lieu of the Symbol identifiers listed above. The identifier will be sent as a three character prefix, in accordance with AIM specifications for symbology identifiers. See *AIM's Guidelines on Symbology Identifiers* for full details.

• Power Mode

This parameter determines whether or not power remains on after a decode attempt. When in low power mode, the scanner powers down after each decode attempt. When in continuous power mode, power remains on after each decode attempt. To ensure the integrity and proper operation of this product, it is recommended that the low power mode be set for RS-232C and Wand modes, and continuous power mode for Synapse mode.

• Scanstand/IntelliStand Time-out

Scanstand/IntelliStand operation can be programmed to shut down if no bar code is detected within the specified time. Duration is programmable in 15 minute increments from 15 minutes to 90 minutes.

•Wand Emulator Options

Wand Emulator Bar Output

The polarity of the wand emulator output is set automatically when the Wand Host type is selected. This parameter can be used to change the default polarity setting to match the type of signal (bar = logic high, or bar = logic low) expected by the receiving system

Variable Leading Margin

This parameter allows the selection of a variable leading margin, ranging from 80 msec to 200 msec, in 10 msec increments.

Convert All to Code 39

This parameter converts the output of all data to Code 39 format. Any coded character not in the Code 39 character set is replaced by a Code 39 blank.

Supported Features By Host Type

Table 2-1. Supported Features by Host Type

DECODE PARAMETERS	RS-232C	Wand	Synapse
Add Codes to be Decoded	X	X	X
ASCII Format	X		
Bar High/ Bar Low		X	
Baud Rate	X		
Beep After Good Decode	X	X	X
Beep on BEL	X		
Code 39 Buffering	X		X
Code 39 Check Digit	X		X
Convert All to Code 39		X	
Convert UPC-E to A	X		X
D 2 of 5 Lengths	X	X	X
Data Transmission Formats	X		X
Decode Redundancy for Codabar	X	X	X
EAN Zero Extend	X		X
Hardware Handshaking	X		
Host Interface Select	X	X	X
Intercharacter Delay	X		
I 2 of 5 Lengths	X	X	X
ITF-14/EAN-13 Conversion	X		X
Laser On Time-out	X	X	X
MSI Plessey 2 Check Digit Alg.	X	X	X
Number of Stop Bits	X		
Parity	X		
Prefix/Suffix	X		X
Power Mode	X	X	X

Table 2-1. (Continued) Supported Features by Host Type

DECODE PARAMETERS	RS-232C	Wand	Synapse
Scanstand/Intellistand	X	X	X
Software Handshaking	X		
Transmit AIM ID Character	X		X
Transmit Code ID Character	X		X
Transmit MSI Check Digit	X		X
Transmit No Decode Message	X		X
Transmit UPC-A Check Digit	X		X
Transmit UPC-E Check Digit	X		X
UPC/EAN Security Level	X	X	X
UPC/EAN Supplemental	X	X	X
UPC-E/UPC-A Preamble	X		X
Wand Bar Output		X	
Wand Leading Margin		X	

Beeper Indications

Table 2-2.   Beeper Indications

Standard Use Beeper Sequence	Indication
1 Beep - **short high tone**	A bar code symbol was decoded (if decode beeper is enabled).
4 Beeps - **short high tone**	Low battery power.
4 Beeps - **long low tone**	A format or transmission error has been detected in a scanned symbol. The data is ignored. This will occur if a unit is not properly configured. Check option settings.
Parameter Menu Scanning	
1 Beep - **short high tone**	Correct entry scanned or correct menu sequence performed.
1 Beep - **lo/hi tone**	Input error, incorrect bar code or "Cancel" scanned, wrong entry, incorrect bar code programming sequence; remain in program mode.
1 Beep - **hi/lo tone**	Keyboard parameter selected. Enter value using bar code keypad.
1 Beep - **hi/lo/hi/lo tone**	Successful program exit with change in the parameter setting.

Table 2-2. (Continued) Beeper Indications

Code 39 Buffering Beeper Sequence	Indication
1 Beep - **hi/lo tone**	New Code 39 data was entered into the buffer.
3 Beeps - **long high tone**	Code 39 buffer is full.
1 Beep - **lo/hi/lo tone**	The buffer was erased, or there was an attempt to transmit an empty buffer. When the Code 39 buffer was empty, the scanner read a command to clear or to transmit a Code 39 buffer.
2 Beeps - **long high tone**	Error in data transmission.
1Beep - **lo/hi tone**	A successful transmission of buffered data.

Code 39 Buffering

While there is data in the transmission buffer, deleting Code 39 buffering capability via the parameter menu is not allowed. The buffer will hold 250 bytes of information.

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.

• 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 BUFFER

Transmit Buffer

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

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

• The unit signals that the transmission buffer has been sent (a hi/lo beep).

• Unit sends the buffer.

• Unit clears the buffer.

TRANSMIT BUFFER

2. A Code 39 bar code with leading character other than a space.

• The unit signals a good decode and buffering of that decode has occurred by giving a hi/lo beep.

• Unit transmits the buffer.

• Unit signals that the buffer has been transmitted with a lo/hi beep.

Overfilling Transmission Buffer

If the symbol just read 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. Data in buffer is not affected.

Attempt to Transmit an Empty Buffer

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

• A short lo/hi/lo beep signals that the buffer is empty.

• No transmission occurs.

• The buffer remains empty.

ASCII Character Set

Table 2-3. ASCII Character Set

ASCII Value	Full ASCII Code 39 Encode Char.	Keystroke	ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1000	%U	CTRL 2	1024	$X	CTRL X
1001	$A	CTRL A	1025	$Y	CTRL Y
1002	$B	CTRL B	1026	$Z	CTRL Z
1003	$C	CTRL C	1027	%A	CTRL [
1004	$D	CTRL D	1028	%B	CTRL \
1005	$E	CTRL E	1029	%C	CTRL]
1006	$F	CTRL F	1030	%D	CTRL 6
1007	$G	CTRL G	1031	%E	CTRL -
1008	$H	CTRL H	1032	Space	Space
1009	$I	CTRL I	1033	/A	!
1010	$J	CTRL J	1034	/B	'
1011	$K	CTRL K	1035	/C	#
1012	$L	CTRL L	1036	/D	$
1013	$M	CTRL M	1037	/E	%
1014	$N	CTRL N	1038	/F	&
1015	$O	CTRL O	1039	/G	'
1016	$P	CTRL P	1040	/H	(
1017	$Q	CTRL Q	1041	/I	)
1018	$R	CTRL R	1042	/J	*
1019	$S	CTRL S	1043	/K	+
1020	$T	CTRL T	1044	/L	,
1021	$U	CTRL U	1045	-	-
1022	$V	CTRL V	1046	.	.
1023	$W	CTRL W	1047	/	/

Table 2-3. (Continued) ASCII Character Set

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 2-3. (Continued) ASCII Character Set

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

Table 2-3. (Continued) ASCII Character Set

ALT Keys	Keystroke	ALT Keys	Keystroke	ALT Keys	Keystroke
2064	ALT 2	2075	ALT K	2086	ALT V
2065	ALT A	2076	ALT L	2087	ALT W
2066	ALT B	2077	ALT M	2088	ALT X
2067	ALT C	2078	ALT N	2089	ALT Y
2068	ALT D	2079	ALT O	2090	ALT Z
2069	ALT E	2080	ALT P	2091	ALT [
2070	ALT F	2081	ALT Q	2092	ALT \
2071	ALT G	2082	ALT R	2093	ALT]
2072	ALT H	2083	ALT S	2094	ALT 6
2073	ALT I	2084	ALT T	2095	ALT -
2074	ALT J	2085	ALT U		

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

Table 2-3. (Continued) ASCII Character Set

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

Table 2-3. (Continued) ASCII Character Set

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

Default Table

Table 2-4.   Default Table

Parameter	Default
Host Interface	RS-232C
Code Types	All

Code Length
  I 2 of 5
  D 2 of 5
	
	14
	12

Decode Options
  Transmit UPC-A Check Digit
  Transmit UPC-E Check Digit
  Convert UPC-E to UPC-A
  EAN Zero Extend
  Transmit No Decode Message
  Decode UPC/EAN Supplemental
  ITF-14/EAN-13 Conversion
  Transmit Code 39 Check Digit
  MSI Plessey Check Digit
  MSI Plessey 2 Check Digit Algorithm
  Buffer Code 39
  Beep After Good Decode
  CLSI Editing
  NOTIS Editing
  UPC/EAN Security Level
  Codabar Decode Redundancy
	
	Enabled
	Enabled
	Disabled
	Disabled
	Disabled
	Disabled
	Disabled
	Disabled
	One
	Mod 10 - Mod 10
	Disabled
	Enabled
	Disabled
	Disabled
	0
	Disabled

UPC-A Preamble	System Character
UPC-E Preamble	System Character

Data Transmission Format
  RS-232C
  Wand
  Synapse
	
	Suffix Only
	N/A
	Data As Is

Prefix/Suffix Values	7013 (<Enter> for wedges, <CR/LF> for serial devices)

Table 2-4. (Continued) Default Table

Parameter	Default
Laser On Time-out	3 Sec
Power Mode	Low Power (Continuous for Synapse only)
Scanstand/Intellistand Time-out	60 minutes
RS-232C Options	
Baud Rate	9600
Parity	Even
Beep on BEL	Disabled
Hardware Handshaking	None
Software Handshaking	None
Stop Bit Select	Two
ASCII Data Format	7 Bit
Terminal Specific Defaults	Standard RS-232C Defaults
Intercharacter Delay	0
Transmit Code ID Character	Disabled
Transmit AIM ID Character	Disabled
Wand Emulator Bar Output	Bar High
Variable Leading Margin	80 msec.
Convert All to Code 39	Disabled

Terminal Specific RS-232C

Three RS-232C hosts are set up with their own fixed format options. Selecting the ICL, Fujitsu or Nixdorf RS-232C terminal will set the defaults listed below.

Table 2-5. Terminal Specific Defaults

Parameter	Standard	ICL	FUJITSU	NIXDORF
Transmit Code ID	No	Yes	Yes	Yes
Data Transmission Format	Data as is	Data/Suffix	Data/Suffix	Data/Suffix
Suffix	CR/LF (7013)	CR (1013)	CR (1013)	CR (1013)
Baud Rate	9600	9600	9600	9600
Parity	Even	Even	None	Odd
Hardware Handshaking	None	None	None	None
Software Handshaking	None	None	None	None
Stop Bit Select	Two	One	One	One
ASCII Format	7-Bit	8-Bit	8-Bit	8-Bit
Beep On <BEL>	Disabled	Disabled	Disabled	Disabled
RTS Line State	Low	High	Low	Low
RS-232C UPC-A Code ID	"A"	"A"	"A"	"A"
RS-232C UPC-E Code ID	"A"	"E"	"E"	"C0"
RS-232C EAN-8 Code ID	"A"	"FF"	"FF"	"B"
RS-232C EAN-13 Code ID	"A"	"F"	"F"	"A"
RS-232C Code 39 Code ID	"B"	"C"	None	"M"
RS-232C Codabar Code ID	"C"	"N"	None	"N"
RS-232C Code 128 Code ID	"D"	None	None	"K"
RS-232C I 2 of 5 Code ID	"F"	"I"	None	"I"
RS-232C MSI/Plessey Code ID	"J"	None	None	"O"

Chapter 3 Parameter Menus

Wand Host Parameters

Synapse Parameters

Set Default Parameters

Refer to the Default Table on

To set defaults for any or all host types, scan the appropriate bar code below. Then select a specific host interface on the next page.

SET RS-232C DEFAULTS

SET WAND DEFAULTS

SET SYNAPSE DEFAULTS

SET ALL DEFAULTS

Host Interface Select

To select a host interface, scan the appropriate bar code below.

SET RS-232C HOST

SET WAND HOST

SET SYNAPSE HOST

RS-232 Host

Fixed Format Options

Select fixed format options for the terminals listed below.

**SET NIXDORF
RS-232C FORMATS**

**SET FUJITSU
RS-232C FORMATS**

**SET ICL
RS-232C FORMATS**

RS-232 Host

Code Type

Add or delete specific code types by scanning the appropriate bar code(s).

ADD CODE 39

DELETE CODE 39

ADD UPC-A

DELETE UPC-A

ADD UPC-E

DELETE UPC-E

ADD CODABAR

DELETE CODABAR

RS-232 Host

Code Type

ADD EAN-8

DELETE EAN-8

ADD EAN-13

DELETE EAN-13

ADD I 2 OF 5

DELETE I 2 OF 5

ADD D 2 OF 5

DELETE D 2 OF 5

RS-232 Host

Code Type

||||| |||||||||| |||||
ADD CODE 128

||||| |||||||||| |||||
DELETE CODE 128

||||| |||||||||| |||||
ADD MSI/Plessey

||||| |||||||||| |||||
DELETE MSI/Plessey

||||| |||||||||| |||||
ADD CODE 93

||||| |||||||||| |||||
DELETE CODE

||||| |||||||||| |||||
ADD EAN 128

||||| |||||||||| |||||
DELETE EAN 128

RS-232 Host

Code 2 of 5 Lengths

To set the lengths for each code type:

1. Scan the desired option.
2. Scan two bar codes on for each desired length. For example, for a length of "12", scan "1" then "2". For a length of "3", scan "0", then "3". **You must always scan two bar codes for each length**.
3. If you make an error, or wish to change your selection, scan **CANCEL**.

**D 2 of 5 LENGTH 1
(RANGE 02-55)**

**D 2 of 5 LENGTH 2
(RANGE 00-55)**

**I 2 of 5 LENGTH 1
(RANGE 02-54)**

**I 2 of 5 LENGTH 2
(RANGE 00-54)**

RS-232 Host

Code Lengths

0

1

2

3

4

5

6

7

8

9

CANCEL

RS-232 Host

Decode Options

**TRANSMIT UPC-A
CHECK DIGIT**

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

**TRANSMIT UPC-E
CHECK DIGIT**

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

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

**DO NOT
CONVERT UPC-E TO UPC-A**

RS-232 Host

Decode Options

**DECODE UPC/EAN
WITH SUPPLEMENTALS**

**IGNORE UPC/EAN
WITH SUPPLEMENTALS**
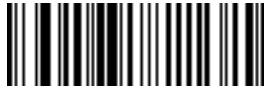
**AUTODISCRIMINATE UPC/EAN
WITH SUPPLEMENTALS**

ENABLE EAN ZERO EXTEND

DISABLE EAN ZERO EXTEND

**TRANSMIT "NO DECODE"
MESSAGE**

**DO NOT TRANSMIT
"NO DECODE" MESSAGE**

RS-232 Host

Decode Options

ENABLE CLSI EDITING

DISABLE CLSI EDITING

ENABLE NOTIS EDITING

DISABLE NOTIS EDITING

**ENABLE CODE 39
FULL ASCII**

**DISABLE CODE 39
FULL ASCII**

**VERIFTY CODE 39
CHECK DIGIT**

**DO NOT VERIFY CODE 39
CHECK DIGIT**

RS-232 Host

Decode Options

**ITF-14/EAN-13 CONVERSION
ENABLED**

**ITF-14/EAN-13 CONVERSION
DISABLED**

BEEP AFTER GOOD DECODE

**DO NOT
BEEP AFTER GOOD DECODE**

BUFFER CODE 39

**DO NOT
BUFFER CODE 39**

RS-232 Host

Decode Options

UPC/EAN SECURITY LEVEL 0

UPC/EAN SECURITY LEVEL 1

UPC/EAN SECURITY LEVEL 2

UPC/EAN SECURITY LEVEL 3

RS-232 Host

Decode Options
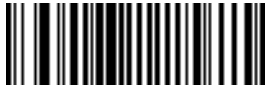
||||||||||||||||||||||||

**ENABLE 1 MSI/Plessey
CHECK DIGIT**

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

**ENABLE 2 MSI/Plessey
CHECK DIGITS**

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

**MSI 2 CHECK DIGITS
MOD 10 - MOD 10**

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

**MSI 2 CHECK DIGITS
MOD 11 - MOD 10**

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

**ENABLE CODABAR
DECODE REDUNDANCY**

||||||||||||||||||||||||
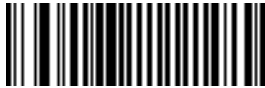
**DISABLE CODABAR
DECODE REDUNDANCY**

RS-232 Host

UPC-A Preamble

Select one option for UPC-A preamble by scanning the appropriate bar code.

NONE

SYSTEM CHARACTER

**SYSTEM CHARACTER
&
COUNTRY CODE**

RS-232 Host

UPC-E Preamble

Select one option for UPC-E preamble by scanning the appropriate bar code.

NONE

SYSTEM CHARACTER

**SYSTEM CHARACTER
&
COUNTRY CODE**

RS-232 Host

Intercharacter Delay

To set a host communications intercharacter delay:

1. Scan the **INTERCHARACTER DELAY** bar code below.

2. Scan two bar codes on the next page which represent the desired delay (from 00 to 99 msec). You must always scan two bar codes.

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

INTERCHARACTER DELAY

RS-232 Host

Intercharacter Delay

0

1

2

3

4

5

6

7

8

9

CANCEL

RS-232 Host

Data Transmission Formats

Scan the option you wish to set.

DATA AS IS

<PREFIX> <DATA>

<DATA> <SUFFIX>

<PREFIX> <DATA> <SUFFIX>

RS-232 Host

Prefix/Suffix Values

To set a **PREFIX/SUFFIX** value:

1. Scan the option bar code you wish to set.

2. Scan four bar codes on the next page which correspond to the ASCII value or keystroke you wish to assign. The **ENTER** key is the default for all options.

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

PREFIX

SUFFIX

RS-232 Host

Prefix/Suffix Values

0

1

2

3

4

5

6

7

8

9

CANCEL

RS-232 Host

Transmit Code ID Character

Select whether to enable or disable this parameter.

TRANSMIT CODE ID CHARACTER

**DO NOT
TRANSMIT CODE ID CHARACTER**

RS-232 Host

Transmit AIM ID Character

Select whether to enable or disable this parameter.

TRANSMIT AIM ID CHARACTER

**DO NOT
TRANSMIT AIM ID CHARACTER**

RS-232 Host

Laser On Time-out

To select a laser on time-out, scan the bar code below or on the next page corresponding to the desired time.

0.5 SECONDS

1.0 SECONDS

1.5 SECONDS

2.0 SECONDS

2.5 SECONDS

3.0 SECONDS

RS-232 Host

Laser On Time-out

3.5 SECONDS

4.0 SECONDS

4.5 SECONDS

5.0 SECONDS

RS-232 Host

Scanstand/IntelliStand Time-out

To select a Scanstand/IntelliStand time-out, scan the bar code below corresponding to the desired time-out.

15 MINUTES

60 MINUTES

30 MINUTES

75 MINUTES
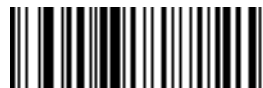
45 MINUTES

90 MINUTES

RS-232 Host

Baud Rate

Set the baud rate for RS-232C transmission.

600

4800

1200

9600

2400

19200

RS-232 Host

Parity

Set the type of parity for RS-232C transmission.

ODD

EVEN

MARK

SPACE

NONE

RS-232 Host

Beep on BEL

Select whether or not enable this parameter.

BEEP ON BEL

DO NOT BEEP ON BEL

RS-232 Host

Hardware Handshaking

Select the type of RS-232C hardware handshaking protocol.

NONE

RTS/CTS

RS-232 Host

Software Handshaking

Select the type of RS-232C software handshaking protocol.

NONE

ACK/NAK

ENQ ONLY

ACK/NAK with ENQ

XON/XOFF

RS-232 Host

Stop Bit Select

Select the desired number of stop bits for RS-232C communications.

1 STOP BIT

2 STOP BITS

RS-232 Host

ASCII Data Format

Select either 7-bit or 8-bit ASCII format for RS-232C communications.

7-BIT

8-BIT

RS-232 Host

Power Mode

Select whether the laser remains on continuously, or turns off after a decode attempt (Low Power).

CONTINUOUS ON

LOW POWER

Wand Host Interface

Select the appropriate host by scanning one of the bar codes below.

SYMBOLLINK CONTROLLER

SYMBOL PORTABLE TERMINAL

NORAND TERMINAL

Wand Host

Code Type

Add or delete specific code types by scanning the appropriate bar code(s).

ADD CODE 39

DELETE CODE 39

ADD UPC-A

DELETE UPC-A

ADD UPC-E

DELETE UPC-E

ADD CODABAR

DELETE CODABAR

Wand Host

Code Type

ADD EAN-8

DELETE EAN-8

ADD EAN-13

DELETE EAN-13

ADD I 2 OF 5

DELETE I 2 OF 5

ADD D 2 OF 5

DELETE D 2 OF 5

Wand Host

Code Type

ADD CODE 128

DELETE CODE 128

ADD MSI/Plessey

DELETE MSI/Plessey

ADD CODE 93

DELETE CODE

ADD EAN 128

DELETE EAN 128

Wand Host

Code 2 of 5 Lengths

To set the lengths for each code type:

1. Scan the desired option.

2. Scan two bar codes on for each desired length. For example, for a length of "12", scan "1" then "2". For a length of "3", scan "0", then "3". **You must always scan two bar codes for each length**.

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

D 2 of 5 LENGTH 1
(RANGE 02-55)

D 2 of 5 LENGTH 2
(RANGE 00-55)

I 2 of 5 LENGTH 1
(RANGE 02-55)

I 2 of 5 LENGTH 2
(RANGE 00-55)

Wand Host

Code Lengths

0

1

2

3

4

5

6

7

8

9

CANCEL

Wand Host

Decode Options

‖‖‖‖‖‖‖‖‖‖‖‖‖

**DECODE UPC/EAN
WITH SUPPLEMENTALS**

‖‖‖‖‖‖‖‖‖‖‖‖‖

**IGNORE UPC/EAN
WITH SUPPLEMENTALS**

‖‖‖‖‖‖‖‖‖‖‖‖‖

**AUTODISCRIMINATE UPC/EAN
WITH SUPPLEMENTALS**

‖‖‖‖‖‖‖‖‖‖‖‖‖

BEEP AFTER GOOD DECODE

‖‖‖‖‖‖‖‖‖‖‖‖‖

**DO NOT
BEEP AFTER GOOD DECODE**

‖‖‖‖‖‖‖‖‖‖‖‖‖

**ENABLE 1 MSI/Plessey
CHECK DIGIT**

‖‖‖‖‖‖‖‖‖‖‖‖‖

**ENABLE 2 MSI/Plessey
CHECK DIGITS**

Wand Host

Decode Options

**MSI 2 CHECK DIGITS
MOD 10 - MOD 10**

**MSI 2 CHECK DIGITS
MOD 11 - MOD 10**

**ENABLE CODABAR
DECODE REDUNDANCY**

**DISABLE CODABAR
DECODE REDUNDANCY**

UPC/EAN SECURITY LEVEL 0

UPC/EAN SECURITY LEVEL 1

UPC/EAN SECURITY LEVEL 2

UPC/EAN SECURITY LEVEL 3

Wand Host

Laser On Time-out

To select a laser on time-out, scan the bar code below or on the next page corresponding to the desired time.

0.5 SECONDS

1.0 SECONDS

1.5 SECONDS

2.0 SECONDS

2.5 SECONDS

3.0 SECONDS

Wand Host

Laser On Time-out

3.5 SECONDS

4.0 SECONDS

4.5 SECONDS

5.0 SECONDS

Wand Host

Scanstand/IntelliStand Time-out

To select a Scanstand/IntelliStand time-out, scan the bar code below corresponding to the desired time-out.

15 MINUTES

60 MINUTES

30 MINUTES

75 MINUTES

45 MINUTES

90 MINUTES

Wand Host

Power Mode

Select whether the laser remains on continuously, or turns off after a decode attempt (Low Power).

CONTINUOUS ON

LOW POWER

Wand Host

Wand Emulator Bar Output

Select the option that matches your host system.

BAR HIGH

BAR LOW

Wand Host

Variable Leading Margin

Select a variable leading margin.

||| ||| ||||| |||||||| |||| |||
80 msec

||| || |||||| |||||||||| ||| |||
110 msec

||| || |||||| ||||||||| | ||||
90 msec

||| || |||||| |||||| ||| || |||
120 msec

||| || |||||| ||||||| ||| | |||
100 msec

||| || |||||| |||||||| |||| |||
130 msec

Wand Host

Variable Leading Margin

140 msec

170 msec

180 msec

150 msec

190 msec

160 msec

200 msec

Wand Host

Convert All to Code 39

Select whether or not to convert the decoded output to Code 39.

CONVERT ALL TO CODE 39

DO NOT CONVERT ALL TO CODE 39

Synapse

Code Type

Add or delete specific code types by scanning the appropriate bar code(s).

ADD CODE 39

DELETE CODE 39

ADD UPC-A

DELETE UPC-A

ADD UPC-E

DELETE UPC-E

ADD CODABAR

DELETE CODABAR

Synapse

Code Type

ADD EAN-8

DELETE EAN-8

ADD EAN-13

DELETE EAN-13

ADD I 2 OF 5

DELETE I 2 OF 5

ADD D 2 OF 5

DELETE D 2 OF 5

Synapse

Code Type

ADD CODE 128

DELETE CODE 128

ADD MSI/Plessey

DELETE MSI/Plessey

ADD CODE 93

DELETE CODE

ADD EAN 128

DELETE EAN 128

Synapse

Code 2 of 5 Lengths

To set the lengths for each code type:

1. Scan the desired option.

2. Scan two bar codes on for each desired length. For example, for a length of "12", scan "1" then "2". For a length of "3", scan "0", then "3". **You must always scan two bar codes for each length**.

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

D 2 of 5 LENGTH 1
(RANGE 02-55)

D 2 of 5 LENGTH 2
(RANGE 00-55)

I 2 of 5 LENGTH 1
(RANGE 02-55)

I 2 of 5 LENGTH 2
(RANGE 00-55)

Synapse

Code Lengths

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

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

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

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

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

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

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

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

||||||||||||||||
8

||||||||||||||||
9

||||||||||||||||
CANCEL

Synapse

Decode Options

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

**TRANSMIT UPC-A
CHECK DIGIT**

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

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

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

**TRANSMIT UPC-E
CHECK DIGIT**

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

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

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

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

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

**DO NOT
CONVERT UPC-E TO UPC-A**

Synapse

Decode Options

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

**DECODE UPC/EAN
WITH SUPPLEMENTALS**

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

**IGNORE UPC/EAN
WITH SUPPLEMENTALS**

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

**AUTODISCRIMINATE UPC/EAN
WITH SUPPLEMENTALS**

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

ENABLE EAN ZERO EXTEND

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

DISABLE EAN ZERO EXTEND

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

**TRANSMIT "NO DECODE"
MESSAGE**

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

**DO NOT TRANSMIT
"NO DECODE" MESSAGE**

Synapse

Decode Options

ENABLE CLSI EDITING

DISABLE CLSI EDITING

ENABLE NOTIS EDITING

DISABLE NOTIS EDITING

**ENABLE CODE 39
FULL ASCII**

**DISABLE CODE 39
FULL ASCII**

**VERIFTY CODE 39
CHECK DIGIT**

**DO NOT VERIFY CODE 39
CHECK DIGIT**

Synapse

Decode Options

**ITF-14/EAN-13 CONVERSION
ENABLED**

**ITF-14/EAN-13 CONVERSION
DISABLED**

BEEP AFTER GOOD DECODE

**DO NOT
BEEP AFTER GOOD DECODE**

BUFFER CODE 39

**DO NOT
BUFFER CODE 39**

Synapse

Decode Options

UPC/EAN SECURITY LEVEL 0

UPC/EAN SECURITY LEVEL 1

UPC/EAN SECURITY LEVEL 2

UPC/EAN SECURITY LEVEL 3

Synapse

Decode Options

ENABLE 1 MSI/Plessey
CHECK DIGIT

ENABLE 2 MSI/Plessey
CHECK DIGITS

MSI 2 CHECK DIGITS
MOD 10 - MOD 10

MSI 2 CHECK DIGITS
MOD 11 - MOD 10

ENABLE CODABAR
DECODE REDUNDANCY

DISABLE CODABAR
DECODE REDUNDANCY

Synapse

UPC-A Preamble

Select one option for UPC-A preamble by scanning the appropriate bar code.

NONE

SYSTEM CHARACTER

**SYSTEM CHARACTER
&
COUNTRY CODE**

Synaps

UPC-E Preamble

Select one option for UPC-E preamble by scanning the appropriate bar code.

NONE

SYSTEM CHARACTER

**SYSTEM CHARACTER
&
COUNTRY CODE**

Synapse

Data Transmission Formats

Scan the option you wish to set.

DATA AS IS

<PREFIX> <DATA>

<DATA> <SUFFIX>

<PREFIX> <DATA> <SUFFIX>

Synapse

Prefix/Suffix Values

To set a **PREFIX/SUFFIX** value:

1. Scan the option bar code you wish to set.
2. Scan four bar codes on the next page which correspond to the ASCII value or keystroke you wish to assign. The **ENTER** key is the default for all options.
3. If you make an error, or wish to change your selection, scan **CANCEL**

PREFIX

SUFFIX

Synapse

Prefix/Suffix Values

0

1

2

3

4

5

6

7

8

9

CANCEL

Synapse

Transmit Code ID Character

Select whether to enable or disable this parameter.

TRANSMIT CODE ID CHARACTER

**DO NOT
TRANSMIT CODE ID CHARACTER**

Synapse

Transmit AIM ID Character

Select whether to enable or disable this parameter.

TRANSMIT AIM ID CHARACTER

**DO NOT
TRANSMIT AIM ID CHARACTER**

Synapse

Laser On Time-out

To select a laser on time-out, scan the bar code below or on the next page corresponding to the desired time.

0.5 SECONDS

1.0 SECONDS

1.5 SECONDS

2.0 SECONDS

2.5 SECONDS

3.0 SECONDS

Synapse

Laser On Time-out

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

3.5 SECONDS

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

4.0 SECONDS

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

4.5 SECONDS

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

5.0 SECONDS

Synapse

Scanstand/IntelliStand Time-out

To select a Scanstand/IntelliStand time-out, scan the bar code below corresponding to the desired time-out.

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

15 MINUTES

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

60 MINUTES

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

30 MINUTES

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

75 MINUTES

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

45 MINUTES

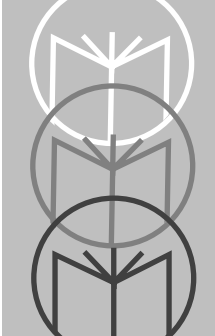||| || ||||| || |||| ||||

90 MINUTES

Synapse

Power Mode

Select whether the laser remains on continuously, or turns off after a decode attempt (Low Power).

CONTINUOUS ON

LOW POWER

Chapter 4 Glossary

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.

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 I - This is the lowest power CDRH laser class. Class 1 lasers are safe when used in accordance with the user instructions. They are inherently safe (so that the maximum possible exposure level cannot be exceeded under any condition), or are safe by virtue of their engineering design.

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.

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.

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.

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.

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 CLASS I (IEC 825 Class I) - 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 represents 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 - An acronym for 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.

PARAMETER - A variable that can have different values assigned to it.

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.

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.

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.

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.

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

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.