Chapter 5 Parameter Menus

Operational Parameters

The LS 400X is shipped with the settings shown in the *Default Table* beginning
on page 5-2. These default values are stored in non-volatile memory and are
preserved even when the scanner is powered down. You can change these
default values by scanning the appropriate bar codes included in this manual.
These new values replace the standard default values in memory. The default
parameter values can be recalled by scanning the *SET ALL DEFAULTS* bar code
on page 5-7.

Even if the default parameters suit your needs, you must still select a terminal
type. The scanner automatically identifies the host type on power-up. It makes
this determination provided the host is powered-up before the scanner is
attached to it. You must then select the appropriate terminal type for that host.
For example, if the scanner is connected to an IBM 4683, after you hear the
power-up beeps, select the proper port from the choices on page 5-8. The same
applies to all other host types.

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

Table 5-1. Default Table

Parameter	Default	Page Number
Set Default Parameter	All Defaults	5-7
Host Type	See page 5-1	5-8
Beeper Tone	High Frequency	5-12
Beeper Volume	High	5-13
Laser On Time	3.0 seconds	5-14
Power Mode	Low Power	5-15
ScanStand Time-out	30 minutes	5-16
Beep After Good Decode	Enable	5-17
Transmit "No Read" Message	Disable	5-18
Linear Code Type Security Levels	1	5-19
Bi-directional Redundancy	Disable	5-22
UPC/EAN		
UPC-A	Enable	5-23
UPC-E	Enable	5-23
EAN-8	Enable	5-24
EAN-13	Enable	5-24
Bookland EAN	Disable	5-25
Decode UPC/EAN Supplementals	Ignore	5-26
Decode UPC/EAN Supplemental Redundancy	7	5-27
Transmit UPC-A Check Digit	Enable	5-28
Transmit UPC-E Check Digit	Enable	5-28
UPC-A Preamble	System Character	5-29
UPC-E Preamble	System Character	5-30

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

Parameter	Default	Page Number
Convert UPC-E to A	Disable	5-31
EAN-8 Zero Extend	Disable	5-32
UPC/EAN Security Levels	0	5-33
UPC/EAN Coupon Code	Disable	5-35
Code 128		
Code 128	Enable	5-36
UCC/EAN-128	Disable	5-37
Code 39		
Code 39	Enable	5-39
Trioptic Code 39	Disable	5-40
Set Length(s) for Code 39	2 to 55	5-42
Code 39 Check Digit Verification	Disable	5-43
Transmit Code 39 Check Digit	Disable	5-44
Code 39 Full ASCII Conversion	Disable	5-45
Buffer Code 39	Disable	5-46

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

Parameter	Default	Page Number
Code 93		
Code 93	Disable	5-49
Set Length(s) for Code 93	4-55	5-50
Interleaved 2 of 5		
Interleaved 2 of 5	Enable	5-52
Set Length(s) for I 2 of 5	14	5-53
I 2 of 5 Check Digit Verification	Disable	5-55
Transmit I 2 of 5 Check Digit	Disable	5-56
Convert I 2 of 5 to EAN 13	Disable	5-57
Discrete 2 of 5		
Discrete 2 of 5	Disable	5-58
Set Length(s) for D 2 of 5	12	5-59
Codabar		
Codabar	Disable	5-61
Set Lengths for Codabar	5-55	5-63
CLSI Editing	Disable	5-64
NOTIS Editing	Disable	5-65

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

Parameter	Default	Page Number
MSI Plessey		
MSI Plessey	Disable	5-66
Set Length(s) for MSI Plessey	Any Length	5-68
MSI Plessey Check Digits	One	5-69
Transmit MSI Plessey Check Digit	Disable	5-70
MSI Plessey Check Digit Algorithm	Mod 10/Mod 10	5-71
Data Options		
Transmit Code ID Character	None	5-73
Pause Duration	0	5-74
Prefix/Suffix Values	7013 (<CR/LF> for serial)	5-75
Scan Data Transmission Format	Data as is	5-76

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

Parameter	Default	Page Number
RS-232C		
RS-232 Host Type	Standard	5-11
Baud Rate	9600	5-79
Parity	None	5-81
Check Receive Errors	Do Not Check	5-82
Hardware Handshaking	None	5-84
Software Handshaking	None	5-86
Host Serial Response Time-out	2 Sec.	5-89
RTS Line State	Low	5-90
Stop Bit Select	1	5-91
ASCII Format	8-Bit	5-92
Beep on <BEL>	Disable	5-93
Intercharacter Delay	0	5-94

Set Default Parameter

Scanning this bar code returns all parameters to the default values listed in Table 5-1 beginning on page 5-2.
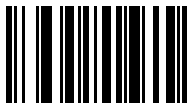
SET ALL DEFAULTS

Host Type

IBM 46XX Host Types

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

> **Note:** To properly communicate with 468X/9X terminals, the driver corresponding to the port being used must be loaded and enabled when you are configuring your terminal system. See your terminal's operating manual for details.
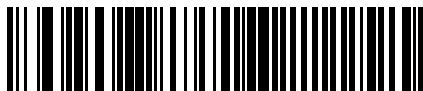
Port 5B

Port 9B
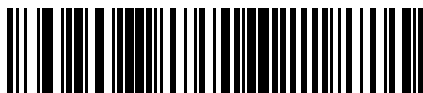
Port 17

RS-232C Host Types

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

Table 5-2. Terminal Specific RS-232C

Parameter	Standard	ICL	FUJITSU	NIXDORF Mode A/ Mode B
Transmit Code ID	No	Yes	Yes	Yes
Data Transmission Format	Data as is	Data/Suffix	Data/Suffix	Data/Suffix
Suffix	CR/LF (7013)	CR (1013)	CR (1013)	CR (1013)
Baud Rate	9600	9600	9600	9600
Parity	None	Even	None	Odd
Hardware Handshaking	None	RTS/CTS Option 3	None	RTS/CTS Option 3
Software Handshaking	None	None	None	None
Serial Response Time-out	2 Sec.	9.9 Sec.	2 Sec.	9.9 Sec.
Stop Bit Select	One	One	One	One
ASCII Format	8-Bit	8-Bit	8-Bit	8-Bit
Beep On <BEL>	Disabled	Disabled	Disabled	Disabled
RTS Line State	Low	High	Low	*Low = No data to send

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

RS-232C Host Types (cont'd)

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

Table 5-3. Terminal Specific Code ID Characters

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

RS-232C Host Types (cont'd)

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

STANDARD RS-232C

ICL RS-232C
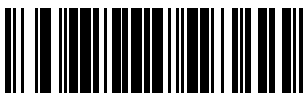
NIXDORF RS-232C Mode A

NIXDORF RS-232C Mode B
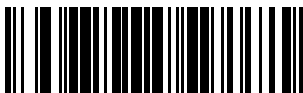
FUJITSU RS-232C

Beeper Tone

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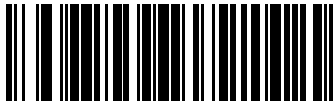
LOW FREQUENCY

MEDIUM FREQUENCY
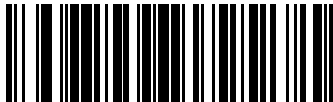
HIGH FREQUENCY

Beeper Volume

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

LOW VOLUME

MEDIUM VOLUME
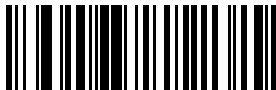
HIGH VOLUME

Laser On Time

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

To set a Laser On Time, scan the bar code below. Next scan two numeric bar codes beginning on page 5-95 that correspond to the desired time on. Single digit numbers must have a leading zero. For example, to set a Time On of .5 seconds, scan the bar code below, then scan the "0" and "5" bar codes. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-97.

LASER ON TIME

Power Mode

This parameter determines whether or not power remains on after a decode attempt. When in low power mode, the scanner enters into a low power consumption mode to preserve battery life after each decode attempt. When in continuous power mode, power remains on after each decode attempt.

CONTINUOUS ON

LOW POWER

ScanStand Time-out

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

15 MINUTES

30 MINUTES
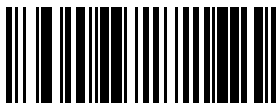
60 MINUTES
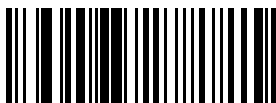
90 MINUTES

Beep After Good Decode

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

BEEP AFTER GOOD DECODE

Do Not Beep After Good Decode

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

DO NOT BEEP AFTER GOOD DECODE

Transmit "No Read" Message

When enabled, if a symbol does not decode, "NR" is transmitted. Any prefixes or suffixes which have been enabled are appended around this message.

ENABLE NO READ

Do Not Transmit "No Read" Message

When disabled, if a symbol does not read, nothing is sent to the host.

DISABLE NO READ

Linear Code Type Security Level

(Does not apply to Code 128)

The LS 400X offers four levels of decode security for linear code types (e.g. Code 39, Interleaved 2 of 5). Higher security levels are selected for decreasing levels of bar code quality. As security levels increase, the scanner's aggressiveness decreases.

Select the security level appropriate for your bar code quality.

Linear Security Level 1

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

Table 5-4

Code Type	Length
Codabar	All
MSI Plessey	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less
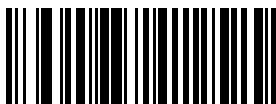
LINEAR SECURITY LEVEL 1

Linear Security Level 2

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

Table 5-5

Code Type	Length
All	All

LINEAR SECURITY LEVEL 2

Linear Security Level 3

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

Table 5-6

Code Type	Length
MSI Plessey	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less
Codabar	8 or less

LINEAR SECURITY LEVEL 3

Linear Security Level 4

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

Table 5-7

Code Type	Length
All	All
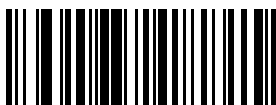
LINEAR SECURITY LEVEL 4

Bi-directional Redundancy

This parameter is only valid when a *Linear Code Type Security Level* has been enabled. When this parameter is enabled, a bar code must be successfully scanned in both directions (forward and reverse) before being decoded.
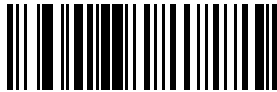
ENABLE BI-DIRECTIONAL REDUNDANCY
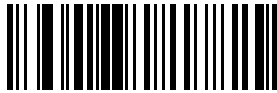
DISABLE BI-DIRECTIONAL REDUNDANCY

Enable/Disable UPC-E/UPC-A

To enable or disable UPC-E or UPC-A, scan the appropriate bar code below.
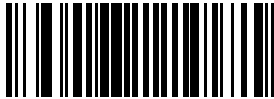
ENABLE UPC-E
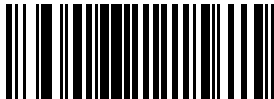
DISABLE UPC-E
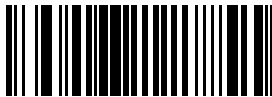
ENABLE UPC-A
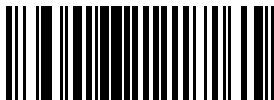
DISABLE UPC-A

Enable/Disable EAN-8/EAN-13

To enable or disable EAN-8 or EAN-13, scan the appropriate bar code below.
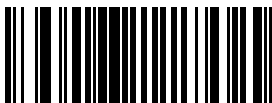
ENABLE EAN-8

DISABLE EAN-8
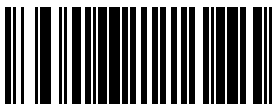
ENABLE EAN-13
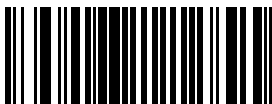
DISABLE EAN-13

Enable/Disable Bookland EAN

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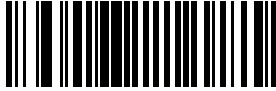
ENABLE BOOKLAND EAN
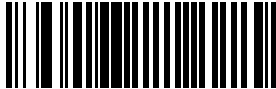
DISABLE BOOKLAND EAN

Decode UPC/EAN Supplementals

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

- If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters are not decoded.

- If UPC/EAN without supplemental characters is selected, and the LS 400X is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN is decoded and the supplemental characters ignored.

- An autodiscriminate option is also available. If this option is selected, choose an appropriate *Decode UPC/EAN Supplemental Redundancy* value from the next page. A value of 5 or more is recommended.

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

DECODE UPC/EAN WITH SUPPLEMENTALS

IGNORE UPC/EAN WITH SUPPLEMENTALS
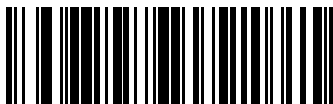
AUTODISCRIMINATE UPC/EAN SUPPLEMENTALS

Decode UPC/EAN Supplemental Redundancy

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

Scan the bar code below to select a decode redundancy value. Next scan two numeric bar codes beginning on page 5-95. Single digit numbers must have a leading zero. If you make an error, or wish to change your selection, scan **CANCEL** on page 5-97.
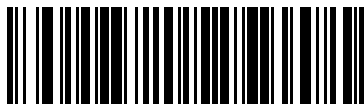
**DECODE UPC/EAN
SUPPLEMENTAL REDUNDANCY**

Transmit UPC-A/UPC-E Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-A or UPC-E check digit.
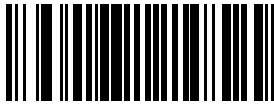
TRANSMIT UPC-A CHECK DIGIT
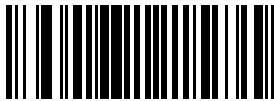
DO NOT TRANSMIT UPC-A CHECK DIGIT
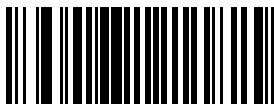

TRANSMIT UPC-E CHECK DIGIT
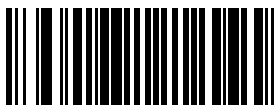
DO NOT TRANSMIT UPC-E CHECK DIGIT

UPC-A Preamble

Three options are given for lead-in characters for UPC-A symbols transmitted to the host device: transmit system character only, transmit system character and country code ("0" for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.
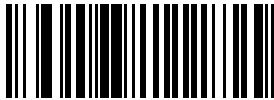
NO PREAMBLE
(<DATA>)
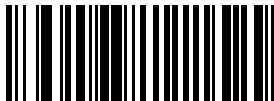
SYSTEM CHARACTER
**(<SYSTEM CHARACTER> <DATA>)**

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

UPC-E Preamble

Three options are given for lead-in characters for UPC-E symbols transmitted to the host device: transmit system character only, transmit system character and country code ("0" for USA), and no preamble transmitted. The lead-in characters are considered part of the symbol.
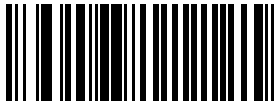
NO PREAMBLE
(<DATA>)
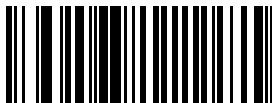
SYSTEM CHARACTER
(<SYSTEM CHARACTER> <DATA>)

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

Convert UPC-E to UPC-A

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

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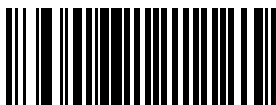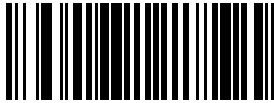

**CONVERT UPC-E TO UPC-A
(ENABLE)**
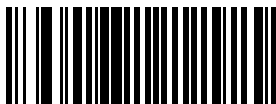
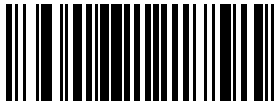**DO NOT CONVERT UPC-E TO UPC-A
(DISABLE)**

EAN Zero Extend

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

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

ENABLE EAN ZERO EXTEND

DISABLE EAN ZERO EXTEND

UPC/EAN Security Level

The LS 400X offers four levels of decode security for UPC/EAN bar codes. Increasing levels of security are provided for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so be sure to choose only that level of security necessary for any given application.

UPC/EAN Security Level 0

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

UPC/EAN SECURITY LEVEL 0

UPC/EAN Security Level 1

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

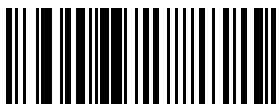**UPC/EAN SECURITY LEVEL 1**

UPC/EAN Security Level 2

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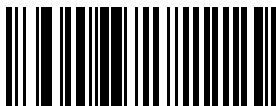
**UPC/EAN SECURITY LEVEL 2**

UPC/EAN Security Level 3

If you have tried Security Level 2, and are still experiencing misdecodes, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selection of this level of security significantly impairs the decoding ability of the scanner. If this level of security is necessary, you should try to improve the quality of your bar codes.
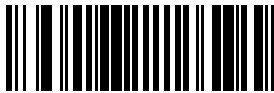
UPC/EAN SECURITY LEVEL 3

UPC/EAN Coupon Code

When enabled, this parameter decodes UPC-A, UPC-A with 2 supplemental characters, UPC-A with 5 supplemental characters, and UPC-A/EAN 128 bar codes. *Autodiscriminate UPC/EAN With Supplemental Characters* must be enabled.
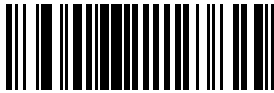
ENABLE UPC/EAN COUPON CODE

DISABLE UPC/EAN COUPON CODE

Enable/Disable Code 128

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

ENABLE CODE 128

DISABLE CODE 128

Enable/Disable UCC/EAN-128

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

ENABLE UCC/EAN-128
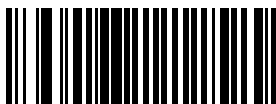

DISABLE UCC/EAN-128

Lengths for Code 128

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

Enable/Disable Code 39

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

ENABLE CODE 39

DISABLE CODE 39

Enable/Disable Trioptic Code 39

Trioptic Code 39 symbols always contain six characters. To enable or disable Trioptic Code 39, scan the appropriate bar code below.

ENABLE TRIOPTIC CODE 39

DISABLE TRIOPTIC CODE 39

Note: Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously. If you get an error beep when enabling Trioptic Code 39, disable Code 39 Full ASCII and try again.

Set Lengths for Code 39

Lengths for Code 39 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. If Code 39 Full ASCII is enabled, **Length Within a Range** or **Any Length** are the preferred options.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **Code 39 One Discrete Length**, then scan **1**, **4**, only Code 39 symbols containing 14 characters are decoded. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 39 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **Code 39 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, only Code 39 symbols containing 2 or 14 characters are decoded. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 39 - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 39 - LENGTH WITHIN RANGE

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

CODE 39 - ANY LENGTH

Code 39 Check Digit Verification

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

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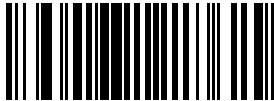
ENABLE CODE 39 CHECK DIGIT
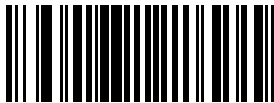
DISABLE CODE 39 CHECK DIGIT

Transmit Code 39 Check Digit

Scan this symbol if you want to transmit the check digit with the data.

TRANSMIT CODE 39 CHECK DIGIT
(ENABLE)

Do Not Transmit Code 39 Check Digit

Scan this symbol if you want to transmit the data without the check digit.

DO NOT TRANSMIT CODE 39 CHECK DIGIT
(DISABLE)

Enable/Disable Code 39 Full ASCII

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

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

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

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

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

ENABLE CODE 39 FULL ASCII

DISABLE CODE 39 FULL ASCII

> **Note:** Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously. If you get an error beep when enabling Trioptic Code 39, disable Code 39 Full ASCII and try again.

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 the following pages 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, we recommend that you configure the scanner to decode Code 39 symbology only.

**BUFFER CODE 39
(ENABLE)**

**DO NOT BUFFER CODE 39
(DISABLE)**

While there is data in the transmission buffer, deleting Code 39 buffering capability via the parameter menu is not allowed. The buffer holds 200 bytes of information.

To allow disabling of Code 39 buffering, first force the buffer transmission (see *Transmit Buffer*) or clear the buffer. Both the **CLEAR BUFFER** and **TRANSMIT BUFFER** bar codes are length 1. *Be sure Code 39 length is set to include length 1.*

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, the unit gives a lo/hi 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 occurs.

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 occurs.
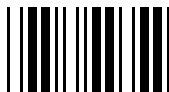
CLEAR BUFFER

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 lo/hi beep).
- Unit sends the buffer.
- Unit clears the buffer.
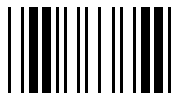
TRANSMIT BUFFER

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

- The unit signals 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 results in an overflow of the transmission buffer:

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

Enable/Disable Code 93

To enable or disable Code 93, scan the appropriate bar code below.

ENABLE CODE 93


DISABLE CODE 93

Set Lengths for Code 93

Lengths for Code 93 may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **Code 93 One Discrete Length**, then scan **1**, **4**, only Code 93 symbols containing 14 characters are decoded. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 93 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **Code 93 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, only Code 93 symbols containing 2 or 14 characters are decoded. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 93 - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan **Code 93 Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODE 93 - LENGTH WITHIN RANGE

**Any Length** - Scanning this option allows you to decode Code 93 symbols containing any number of characters.

CODE 93 - ANY LENGTH

Enable/Disable Interleaved 2 of 5

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

ENABLE INTERLEAVED 2 OF 5
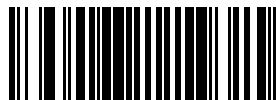
DISABLE INTERLEAVED 2 OF 5

Set Lengths for Interleaved 2 of 5

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

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **I 2 of 5 One Discrete Length**, then scan **1**, **4**, the only I 2 of 5 symbols decoded are those containing 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
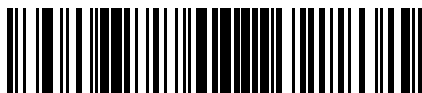
I 2 of 5 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **I 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only I 2 of 5 symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
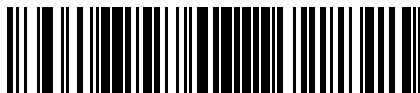
I 2 of 5 - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 Length Within Range**. Then scan **0**, **4**, **1**, and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
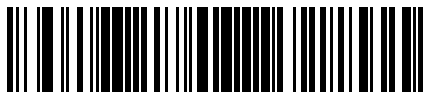
I 2 of 5 - LENGTH WITHIN RANGE

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

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

I 2 of 5 - ANY LENGTH

I 2 of 5 Check Digit Verification

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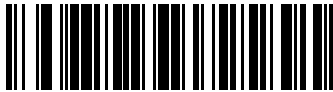
DISABLE
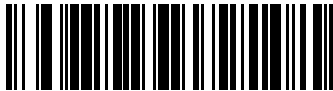
USS CHECK DIGIT
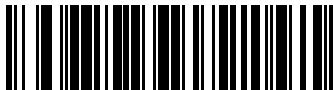
OPCC CHECK DIGIT

Transmit I 2 of 5 Check Digit

Scan this symbol if you want to transmit the check digit with the data.
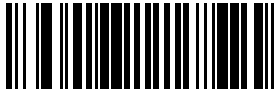
TRANSMIT I 2 of 5 CHECK DIGIT
(ENABLE)

Do Not Transmit I 2 of 5 Check Digit

Scan this symbol if you want to transmit the data without the check digit.

DO NOT TRANSMIT I 2 of 5 CHECK DIGIT
(DISABLE)

Convert I 2 of 5 to EAN-13

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

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

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

Enable/Disable Discrete 2 of 5

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

ENABLE DISCRETE 2 OF 5

DISABLE DISCRETE 2 OF 5

Set Lengths for Discrete 2 of 5

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

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **D 2 of 5 One Discrete Length**, then scan **1**, **4**, the only D 2 of 5 symbols decoded are those containing 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

D 2 of 5 - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **D 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only D 2 of 5 symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

D 2 of 5 - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

D 2 of 5 - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode D 2 of 5 symbols containing any number of characters.

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

D 2 of 5 - ANY LENGTH

Enable/Disable Codabar

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

**ENABLE CODABAR**

DISABLE CODABAR

Set Lengths for Codabar

Lengths for Codabar may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains. It also includes any start or stop characters.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **Codabar One Discrete Length**, then scan **1**, **4**, the only Codabar symbols decoded are those containing 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODABAR - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **Codabar Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only Codabar symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODABAR - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar Length Within Range**. Then scan **0**, **4**, **1**, and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.

CODABAR - LENGTH WITHIN RANGE

**Any Length** - Scanning this option allows you to decode Codabar symbols containing any number of characters.

CODABAR - ANY LENGTH

CLSI Editing

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

> **Note:** Symbol length does not include start and stop characters.
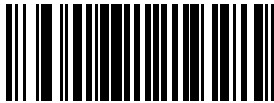
ENABLE CLSI EDITING
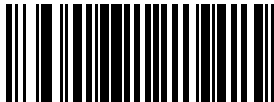
DISABLE CLSI EDITING

NOTIS Editing

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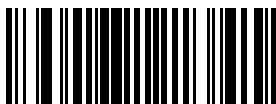
ENABLE NOTIS EDITING

DISABLE NOTIS EDITING

Enable/Disable MSI Plessey

To enable or disable MSI Plessey, scan the appropriate bar code below.
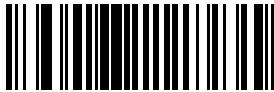
ENABLE MSI PLESSEY
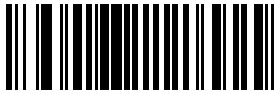
DISABLE MSI PLESSEY

Set Lengths for MSI Plessey

Lengths for MSI Plessey may be set for any length, one or two discrete lengths, or lengths within a specific range. The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits.

One Discrete Length - This option allows you to decode only those codes containing a selected length. For example, if you select **MSI Plessey One Discrete Length**, then scan **1**, **4**, the only MSI Plessey symbols decoded are those containing 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
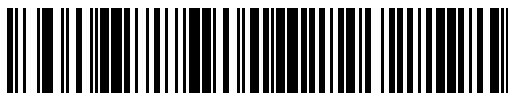
MSI Plessey - ONE DISCRETE LENGTH

Two Discrete Lengths - This option allows you to decode only those codes containing two selected lengths. For example, if you select **MSI Plessey Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, the only MSI Plessey symbols decoded are those containing 2 or 14 characters. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
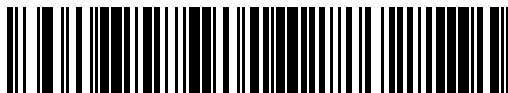
MSI Plessey - TWO DISCRETE LENGTHS

Length Within Range - This option allows you to decode a code type within a specified range. For example, to decode MSI Plessey symbols containing between 4 and 12 characters, first scan **MSI Plessey Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
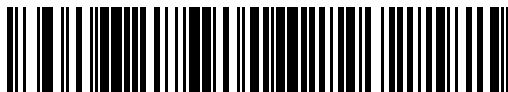
MSI Plessey - LENGTH WITHIN RANGE

Any Length - Scanning this option allows you to decode MSI Plessey symbols containing any number of characters.

> **Note:** Selecting this option may lead to misdecodes for MSI Plessey codes.
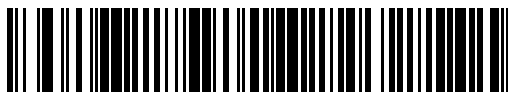
MSI Plessey - ANY LENGTH

MSI Plessey Check Digits

These check digits, at the end of the bar code verify the integrity of the data. At least one check digit is always required. Check digits are not automatically transmitted with the data.
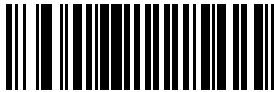
ONE MSI Plessey CHECK DIGIT
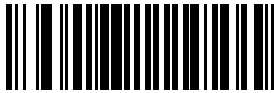
TWO MSI Plessey CHECK DIGIT

Transmit MSI Plessey Check Digit

Scan this symbol if you want to transmit the check digit with the data.

**TRANSMIT MSI Plessey CHECK DIGIT
(ENABLE)**

Do Not Transmit MSI Plessey Check Digit

Scan this symbol if you want to transmit the data without the check digit.

**DO NOT TRANSMIT MSI Plessey CHECK DIGIT
(DISABLE)**

MSI Plessey Check Digit Algorithm

When the two MSI Plessey check digits option is selected, an additional verification is required to ensure integrity. Either of the two following algorithms may be selected.
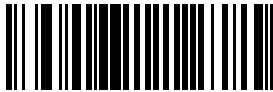
MOD 10/MOD 11
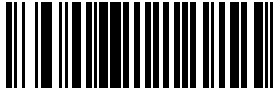
MOD 10/MOD 10

Transmit Code ID Character

A code ID character identifies the code type of a scanned bar code. This may be useful when the scanner is decoding more than one code type. In addition to any single character prefix already selected, the code ID character is inserted between the prefix and the decoded symbol.

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

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

B = Code 39

C = Codabar

D = Code 128

E = Code 93

F = Interleaved 2 of 5

G = Discrete 2 of 5, or Discrete 2 of 5 IATA

J = MSI Plessey

K = UCC/EAN-128

L = Bookland EAN

M = Trioptic Code 39

Transmit Code ID Character

SYMBOL CODE ID CHARACTER

AIM CODE ID CHARACTER
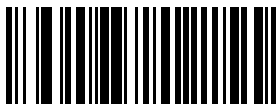
NONE

Pause Duration

This parameter allows a pause to be inserted at any point in the data transmission. Pauses are set by scanning a two-digit number (i.e. two bar codes), and are measured in 1/10 second intervals. For example, scanning bar codes "0" and "1" inserts a 1/10 second pause; "0" and "5" gives you a 1/2 second delay. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **DATA FORMAT CANCEL** on page 5-75.

PAUSE DURATION

Prefix/Suffix Values

A prefix/suffix may be appended to scan data for use in data editing. These values are set by scanning a four-digit number (i.e. four bar codes) that corresponds to key codes for various terminals. See Table A-4. in *Appendix A* for conversion information. Numeric bar codes begin on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
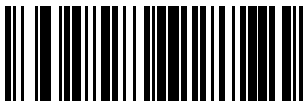
SCAN PREFIX
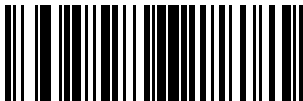
SCAN SUFFIX

DATA FORMAT CANCEL

Scan Data Transmission Format

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

SCAN OPTIONS
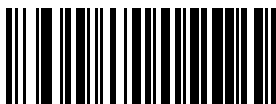
DATA AS IS

<DATA> <SUFFIX>
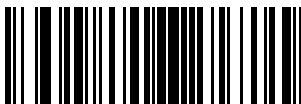
Scan Data Transmission Format (cont'd)

<PREFIX> <DATA>

<PREFIX> <DATA> <SUFFIX>
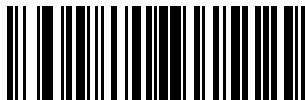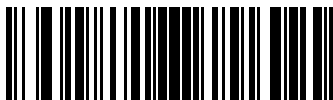
ENTER

DATA FORMAT CANCEL

RS-232C Parameters

Baud Rate

Baud rate is the number of bits of data transmitted per second. The scanner's baud rate setting should match the data rate setting of the host device. If not, data may not reach the host device or may reach it in distorted form.
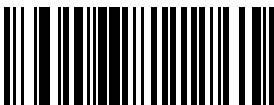
BAUD RATE 300
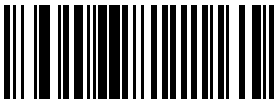
BAUD RATE 600
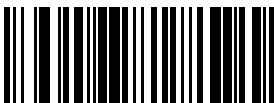
BAUD RATE 1200
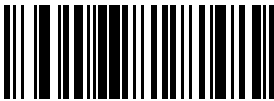
BAUD RATE 2400

Baud Rate (cont'd)
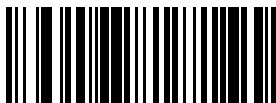
BAUD RATE 4800
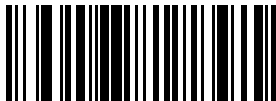
BAUD RATE 9600
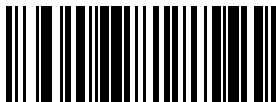
BAUD RATE 19,200

Parity

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

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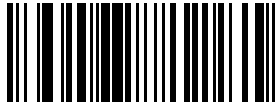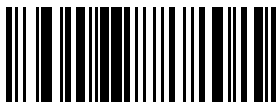
ODD

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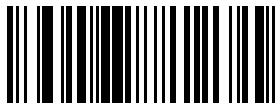
EVEN

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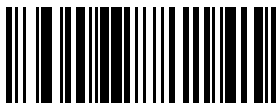
MARK

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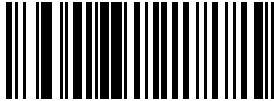

SPACE
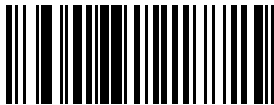
If no parity is required, select **NONE**.
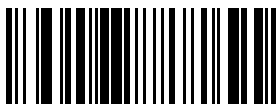
NONE

Check Receive Errors

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

CHECK FOR RECEIVED ERRORS

DO NOT CHECK FOR RECEIVED ERRORS

Hardware Handshaking

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

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

- The controller reads the CTS line for activity. If CTS is asserted, the controller waits up to 2 seconds for the host to negate the CTS line. If, after 2 seconds (default), the CTS line is still asserted, the scanner sounds a transmit error and any scanned data is lost.

- When the CTS line is negated, the controller asserts the RTS line and waits up to 2 seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after 2 seconds (default), the CTS line is not asserted, the scanner sounds a transmit error and discards the data.

- When data transmission is complete, the controller negates RTS 10 msec after sending the last character.

- The host should respond by negating CTS. The controller checks for a negated CTS upon the next transmission of data.

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

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

If Hardware Handshaking and Software Handshaking are both enabled, Hardware Handshaking takes precedence.
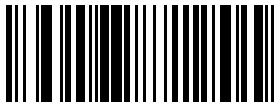
> **Note:** The DTR signal is jumpered active.

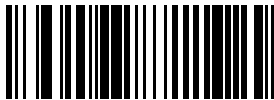Scan the bar code below if no Hardware Handshaking is desired.
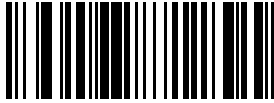
NONE

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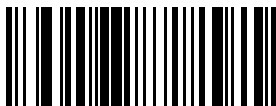

STANDARD RTS/CTS

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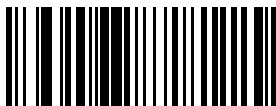

RTS/CTS OPTION 1

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

RTS/CTS OPTION 2

When Option 3 is selected, the scanner asserts RTS prior to any data transmission, regardless of the state of CTS. The scanner waits up to 2 seconds (default) for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error indication and discards the data. The scanner de-asserts RTS when transmission is complete.


RTS/CTS OPTION 3

Software Handshaking

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

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

None

When this option is selected, data is transmitted immediately.
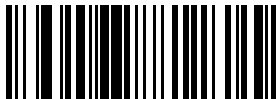
NONE

ACK/NAK

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

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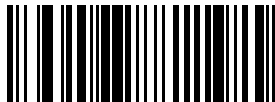
ACK/NAK

ENQ

When this option is selected, the scanner waits for an ENQ character from the host before transmitting data. If an ENQ is not received within 2 seconds, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every 2 seconds to prevent transmission errors.
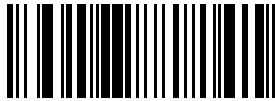
ENQ

ACK/NAK with ENQ

This combines the two previous options.

ACK/NAK with ENQ

XON/XOFF

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

- XOFF is received before the scanner has data to send. When the scanner has data to send, it then waits for an XON character before transmission. The scanner waits up to 2 seconds to receive the XON. If the XON is not received within this time, the scanner issues an error indication and discards the data.

- XOFF is received during a transmission. Data transmission then stops after sending the current byte. When the scanner receives an XON character, it sends the rest of the data message. The scanner waits indefinitely for the XON.
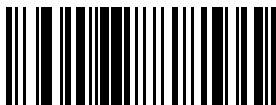
XON/XOFF

Host Serial Response Time-out

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

The delay period can range from 0.0 to 9.9 seconds in .1-second increments. After scanning the bar code below, scan two numeric bar codes beginning on page 5-95. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
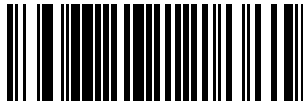
HOST SERIAL RESPONSE TIME-OUT

RTS Line State

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


HOST: LOW RTS

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

HOST: HIGH RTS

Stop Bit Select

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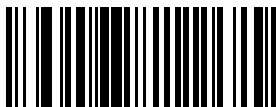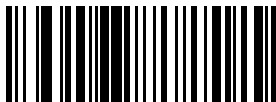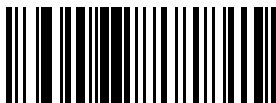

1 STOP BIT
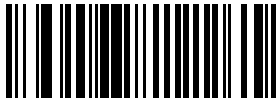
2 STOP BITS

ASCII Format

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

7-BIT

8-BIT

Beep on <BEL>

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

**BEEP ON <BEL> CHARACTER
(ENABLE)**

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

Intercharacter Delay

Select the intercharacter delay option matching host requirements. The intercharacter delay gives the host system time to service its receiver and perform other tasks between characters. The delay period can range from no delay to 99 msec in 1-msec increments. After scanning the bar code below, scan two bar codes beginning on page 5-95 to set the desired time-out. If you make an error or wish to change your selection, scan **CANCEL** on page 5-97.
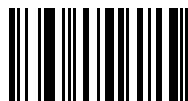

IINTERCHARACTER DELAY

Numeric Bar Codes

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

0

1

2

3

Numeric Bar Codes (cont'd)

4

5

6

7

8

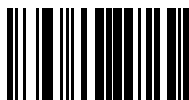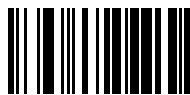## Numeric Bar Codes (cont'd)

9

Cancel

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

CANCEL