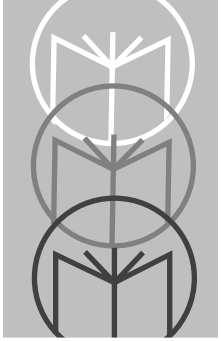


Chapter 2 Programmer's Guide

Overview

Before programming, follow the instructions in the *Set Up* section of the *User's Guide.*

Programming is accomplished through the use of bar code menus. You can select decode options and RS-232C parameters that are compatible with your host system requirements.

Consult the *Parameter Descriptions* section beginning on page 2-3 for explanations of parameter types.

If the default values suit your requirements, all you need to do is scan the **SET DEFAULTS** 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.

Scanning Sequence Examples

In most cases you need only scan one bar code to set a specific parameter. For example, if you want to set the baud rate to 9600, simply scan the **9600** bar code listed under **Baud Rate**. If your LS 1220 is equipped with an optional beeper, it will issue a warble tone, signifying a successful parameter entry.

If you want to add or change prefixes and suffixes or customize the data transmission format, 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.

For a listing of corresponding bar codes, see page 3-1 .

Parameter Descriptions

• Set Parameter Defaults

Scanning the **SET DEFAULT** bar code returns all parameters to the values listed in the *Default Table*. (See page 2-19.)

• Code Types

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

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

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

• Code Lengths

Code lengths for I 2 of 5 and D 2 of 5 only may be set for one or two discrete lengths. The length of a code refers to the number of characters (i.e., human readable characters) the code contains.

One Discrete Length - This option will allow 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 codes decoded will be those containing 14 characters

Two Discrete Lengths - This option will allow 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 codes decoded will be those containing 2 or 14 characters.

• 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 on page 2-33.

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 1220 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.

Xmit "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 (Cont'd)

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. Decode of symbols containing 2 or 5 supplementals is enabled separately. For example, if "2 supplementals" is enabled, only those symbols with 2 supplementals will be decoded. To decode symbols containing 2 supplementals and 5 supplementals, both must be enabled. 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 1220 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.)**

Decode UPC Only

When selected, this option limits the LS 1220 UPC/EAN decode capability to UPC versions only. It disables EAN decode capability.

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 (Cont'd)

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.

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 page 2-17 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.

Beep After Good Decode (only with optional beeper)

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* are on page 2-16.

CLSI Editing

Use this parameter to insert a space after the 1st, 5th, and 10th characters of a 14-character Codabar symbol. The symbol length includes start and stop characters. This option may be enabled even with NOTIS Editing enabled.

NOTIS Editing

This option strips the start and stop characters from decoded Codabar symbols. This option may be enabled even with CLSI Editing enabled.

• 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.

• Prefix/Suffix Values

Up to 1 prefix and 2 suffixes may be appended to scan data, for use in data editing, as shown below. These values are set by scanning a three digit number (i.e., three bar codes) that correspond to ASCII keycodes. An *ASCII Table* begins on page 2-33.

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

<data as is> = scanned bar code data

<PREFIX> and <SUFFIX> as selected by the user. If ASCII value "128" is selected for either prefix or suffix, that function will be disabled.

• Security Options

UPC/EAN Security Level

The LS 1220 offers two 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.

- *None* - 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.
- *Check Ambiguous Characters* - 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.
- *Check All Characters* - 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 Security Zone

This parameter is valid only after **UPC/EAN Security Level** options **Check Ambiguous Characters**, or **Check all Characters**, are enabled. If you are still experiencing mis-decodes, this parameter will enhance the security level. The range is from two to ten times. The higher the number, the greater the level of security. The higher the number, however, the more the aggressiveness of the scanner will be compromised. Conversely, any level below four will, in effect, nullify the Security Level parameter.

Bi-Directional Redundancy

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

• Laser Control

Trigger Mode

In all modes, the only command that can be sent when the laser is on is the Turn Laser Off command. Select one of the following options:

- **Level** - A trigger pull or external switch closure activates the laser and decode processing. The laser remains on, and decode processing occurs until a trigger release, a valid decode, or the Laser On Time-out is reached.
- **Host** - The host sends a Laser On command. The laser remains on and decode processing occurs until a good decode, the Laser On Time-out is reached, or the host sends a Laser Off command. External trigger will act as a Level trigger in this mode.
- **Pulse** - A trigger pull activates the laser and decoding processing. The laser remains on and decode processing occurs until a valid decode or the Laser On Time-out is reached.
- **Constant Scan & Report** - Laser is always on and decoding. This option is not recommended when programming the scanner with bar code menus.
- **Next New Code** - The LS 1220 decodes and transmit information, then waits until a new code is detected before transmitting again.
- **Continuous Level** - The laser is always on. Decode processing begins with a trigger pull and continues until a trigger release, or the Laser On Time-out is reached.
- **Continuous Pulse** - The laser is always on. Decode processing begins with a trigger pull and continues until the Laser On Time-out is reached.

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 4.0 sec.

Laser Off Time-out

The minimum time between decodes of the same symbol when in continuous laser mode. Programmable in .5 sec increments from 0.0 to 3.5 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.

If NONE is selected, no parity bits will be transmitted.

Handshaking

Hardware and software handshaking can be enabled at the same time. When they are, hardware handshaking becomes the outermost layer of the communication. The next layer is the ENQ, followed by the ACK/NAK layer. These protocols are explained on the following pages. A typical communication sequence would look like this:

Scanner:	Assert RTS (assuming CTS is initially negated)
Host:	Assert CTS
Host:	Send ENQ
Scanner:	Send Data
Host:	Send ACK
Scanner:	Negate RTS
Host:	Negate CTS

RS-232C Options (Contd)

Hardware Handshaking

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

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 (LS 1220) reads the CTS line for activity. If CTS is asserted, it will wait up to two seconds for the host to negate the CTS line. If, after two seconds the CTS line is still asserted, the scanner will sound a transmit error (if equipped with optional beeper), and any scanned data will be lost.
- When the CTS line is negated, the scanner asserts the RTS line and waits two seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after two seconds the CTS line is still asserted, the scanner will sound a transmit error (if equipped with optional beeper), and any scanned data will be lost.
- When data transmission is complete, the scanner will negate RTS 10 msec 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.

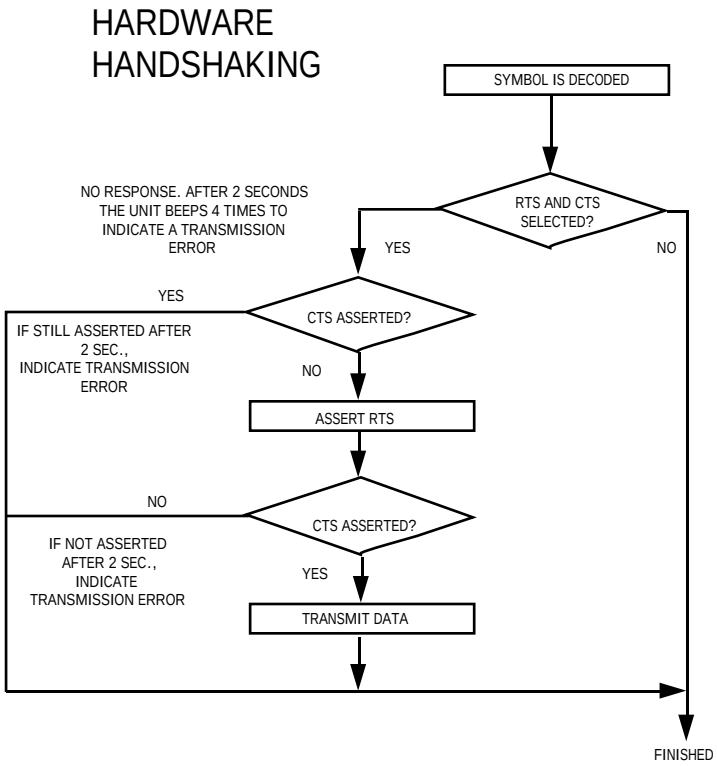
During the transmission of data, the CTS line should be asserted.

- 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.

If no Hardware Handshaking is selected, data is transmitted based on the Software Handshaking options which follow.

RS-232C Options (Contd)

Hardware Handshaking



RS-232C Options (Contd)

Software Handshaking

This parameter offers control of the data transmission process. It may be used in conjunction with, hardware handshaking. However, hardware handshaking will take precedence. That is, it will take place before, and end after software handshaking. Any references to beepers presuppose a beeper is present.

The scanner provides four software handshaking options; NONE, ENQ, ACK/NAK, and ACK/NAK with ENQ. Refer to the flow chart on the following page.

1. None

   No handshaking is selected and data is transmitted immediately.

2. ACK/NAK Only

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

   <ACK> - Acknowledges a valid and successful transmission.

   <NAK> - Indicates a problem with the transmission.

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

3. ENQ ONLY

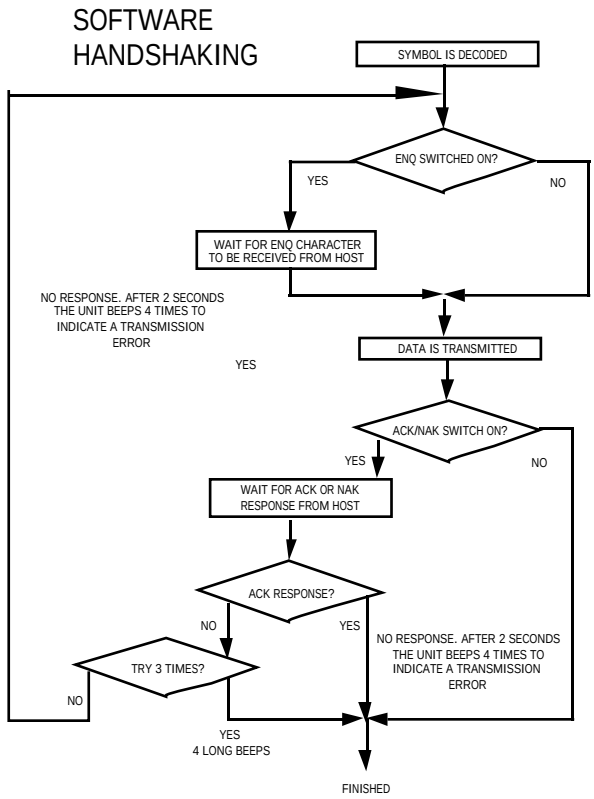
   The ENQ option needs the host to request data before it is transmitted to the host. This ensures that data transmission occurs only when the host is ready to receive.

RS-232C Options (Contd)

When you select the wait for ENQ option, the scanner waits for an ENQ, Enquire character, from the host before it transmits data; otherwise the unit transmits data without waiting for an ENQ character from the host. With ENQ enabled, the scanner must receive an ENQ from the host within 2 seconds after the last activity or the scanner sounds 4 long beeps 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 (Contd)

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

The number of data bits transmitted, may be 7 or 8. This is set to match the host system's requirements. 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.

• 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. There are three options:

- **Symbol ID** - The identifier is sent as a one character prefix. Symbol Code ID characters are: A = UPC-A, UPC-E, EAN-13, or EAN-8; B - Code 39; C = Codabar; D = Code 128; F = Interleaved 2 of 5; G = Discrete 2 of 5.
- **Aim ID** - The identifier is sent as a three character prefix, in accordance with AIM specifications for symbology identifiers. See *AIM's Guidelines on Symbology Identifiers* for full details.
- **None** - No Code ID character is sent.

With optional beeper

Table 2-1. 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 - 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.
Code 39 Buffering	
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.

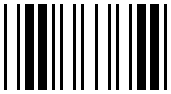
- Unit issues a short hi / lo / hi beep to signal that the transmission buffer has been erased, and no transmission has occurred.
- Unit erases the transmission buffer.
- No transmission will occur.

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.

Table 2-2. Default Table

Parameter	Options	Default
Code Types & Lengths		
Code 39	Enabled, Disabled	Enabled
Code 39 Full ASCII	Enabled, Disabled	Disabled
UPC/EAN	Enabled, Disabled	Enabled
Discrete 2 of 5	Enabled, Disabled	Enabled
Interleaved 2 of 5	Enabled, Disabled	Enabled
Codabar	Enabled, Disabled	Enabled
Code 128	Enabled, Disabled	Enabled
Code 93	Enabled, Disabled	Enabled
EAN 128	Enabled, Disabled	Disabled
MSI/Plessey	Enabled, Disabled	Enabled
Interleaved 2 of 5 Length 1	2-55	14
Interleaved 2of 5 Length 2	0-55	0
Discrete 2 of 5 Length 1	1-55	12
Discrete 2 of 5 Length 2	0-55	0
Decode Options		
Xmit UPC-A Check Digit	Enabled, Disabled	Enabled
Xmit UPC-E Check Digit	Enabled, Disabled	Enabled
Convert UPC-E to UPC-A	Enabled, Disabled	Disabled
EAN Zero Extend	Enabled, Disabled	Disabled
Xmit No Decode Message	Enabled, Disabled	Disabled
2 Digit UPC Supplementals	Enabled, Disabled	Disabled
5 Digit UPC Supplementals	Enabled, Disabled	Disabled
UPC Supplementals Auto-D	Enabled, Disabled	Disabled

Table 2-2. Default Table

Parameter	Options	Default
Decode UPC Only	Enabled, Disabled	Disabled
MSI Plessey Check Digit	1 Check Digit, 2 Check Digits	1 Check Digit
MSI 2 Check Digit Algorithm	Mod10 - Mod10, Mod11 - Mod10	Mod10 - Mod10
Code 39 Check Digit	Enabled, Disabled	Disabled
Code 39 Buffering	Enabled, Disabled	Disabled
Decode Beep	Enabled, Disabled	Enabled
CLSI Editing	Enabled, Disabled	Disabled
NOTIS Editing	Enabled, Disabled	Disabled
UPC-E Preamble	None, System Character, System Character and Country Code	System Character
UPC-A Preamble	None, System Character, System Character and Country Code	System Character
Prefix	Any ASCII Character (0-128)	None (ASCII 128)
Suffix 1	Any ASCII Character (0-128)	CR (ASCII 013)
Suffix 2	Any ASCII Character (0-128)	LF (ASCII 010)
Security Options		
UPC Security Level	No Security Checking, Check Ambiguous Characters Only, Check All Characters	No Security Checking
UPC Security Zone	2 through 10	4
Bidirectional Redundancy	Enabled, Disabled	Disabled

Table 2-2. Default Table

Parameter	Options	Default
Laser Control		
Trigger Mode	Level Trigger, Host, Pulse, Constant Scan & Report, Next New Code, Continuous Level, Continuous Pulse	Level Trigger
Laser On Time-out	0.5 - 4.0 sec (in .5 sec increments)	1.0 sec
Laser Off Time-out*	0.0 - 3.5 sec (in .5 sec increments)	0.5 sec
RS-232 Options		
Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200	9600
Parity	None, Even, Odd, Mark, Space	Even
Hardware Handshaking	None, RTS / CTS	None
Software Handshaking	None, ACK-NAK, ENQ, ACK-NAK with ENQ	None
Stop Bits	1 Stop Bit, 2 Stops Bit	2 Stop Bit
ASCII Format	7 Bits, 8 Bits	7 Bits
Intercharacter Delay	00-99 mSec (in 1 msec increments)	10 msec
Code ID Character	None, Symbol ID, Aim ID	None

*Only valid if Trigger Mode is Continuous Scan and Report

Programming Protocol

Regardless of whether ACK/NAK is enabled or not, the ACK/NAK protocol will be used for the programming sequences that occur between the host and the scanner.

Except for the turn laser off command, all commands will have the following format:

STX S T I [x] <Data> ETX LRC

where

STX = 02h (Start of Transmission)
S = 53h (ASCII value of S)
T = 54h (ASCII value of T)
I = 49h (ASCII value of I)
[x] = character

D	44h	Identify software
E	45h	Turn laser on
F	46h	Upload all parameters
G	47h	Download all parameters
H	48h	Download specific parameters

<Data> (if required) = 30h+upper nibble of parameter 30h+lower nibble of parameter

ETX = 03h
LRC = Exclusive-or of all characters transmitted except for the STX character.

For all of the commands that require a response the response format will be:
STX [x] <Data> ETX LRC

where

STX = 02h (Start of Transmission)

[x] = character

D	44h	Identify software
F	46h	Upload all parameters

<Data> = 30h+upper nibble of parameter 30h+lower nibble of parameter

ETX = 03h

LRC = Exclusive-or of all characters transmitted except for the STX character.

The exception to the above rule, is the turn laser off command. To turn the laser off, the host will send **ESC**

where

ESC = 1bh (Escape Character)

All successful transmissions of commands are responded to by an ACK sent by the receiving unit upon successful receipt of the command. In the cases where a response is required by the receiving unit, the response command shall be considered to be the ACK. In other words, an ACK is sent only if a command response is not required.

For the identify software response, <Data> consists of an ASCII alphabetic string that defines the version of installed software.

For downloading specific parameters, <Data> takes the following format:

<Parameter number> <Parameter value>

where
<Parameter number> = number of the parameter to be changed. See Table 2-3. for assignments.

<Parameter value> = value assigned to a specific parameter. See Table 2-3. for valid values.

These numbers follow the rule set forth for the data, that is, the number consists of two bytes consisting of 30 + high nibble, 30 + low nibble.

For downloading all parameters, <Data> takes the following format:

<Parameter value>

where
<Parameter value> = value assigned to a specific parameter. See Table 2-3. for valid values.

These numbers follow the rule set forth for the data, that is, the number consists of two bytes consisting of 30 + high nibble, 30 + low nibble.

Note: Changing reserved bits will have no adverse effect, but is not recommended to maintain compatibility with future upgrades / enhancements of this product.

Note: For parameters 00 through 07, a value of 1 indicates a bit is set, and enables a parameter. A value of 0 disables that bit, which disables the parameter.

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
00	Bit 0	Enable / Disable Code 39
	Bit 1	Enable / Disable UPC / EAN
	Bit 2	Reserved
	Bit 3	Reserved
	Bit 4	Reserved
	Bit 5	Enable / Disable Discrete 2 of 5
	Bit 6	Enable / Disable Interleaved 2 of 5
	Bit 7	Enable / Disable Codabar
01	Bit 0	Enable / Disable Code 128
	Bit 1	Enable / Disable Code 93
	Bit 2	Reserved
	Bit 3	Enable / Disable EAN 128
	Bit 4	Enable / Disable MSI / Plessey
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
02	Bit 0	Enable / Disable Convert UPC E to UPC A
	Bit 1	Enable / Disable EAN Zero extend
	Bit 2	Enable / Disable Xmit UPC A check digit
	Bit 3	Enable / Disable Xmit UPC E check digit
	Bit 4	Enable / Disable Verify code 39 check digit
	Bit 5	Enable / Disable CLSI editing

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
	Bit 6	Enable / Disable NOTIS editing
	Bit 7	Reserved
03	Bit 0	Enable / Disable Send No Decode
	Bit 1	Enable / Disable Code 39 Full ASCII
	Bit 2	1 or 2 MSI / Plessey check digits
	Bit 3	Reserved
	Bit 4	Reserved
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
04	Bit 0	Reserved
	Bit 1	Enable / Disable Code 39 buffering
	Bit 2	Enable / Disable Beeper
	Bit 3	Reserved
	Bit 4	Reserved
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
05	Bit 0	Enable / Disable 2 digit UPC Supplementals
	Bit 1	Enable / Disable 5 digit UPC Supplementals
	Bit 2	Reserved
	Bit 3	Reserved
	Bit 4	Reserved

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
06	Bit 0	Reserved
	Bit 1	Reserved
	Bit 2	Enable / Disable Bi-Directional Redundancy
	Bit 3	Reserved
	Bit 4	Reserved
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
07	Bit 0	Enable / Disable Polling
	Bit 1	Enable / Disable Decode UPC Only
	Bit 2	Enable / Disable UPC Supplementals Autodiscriminate
	Bit 3	Reserved
	Bit 4	Reserved
	Bit 5	Reserved
	Bit 6	Reserved
	Bit 7	Reserved
08	UPC Security Level	
	No Security	00
	Check Ambiguous Characters	02
	Check All Characters	03

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
09	UPC Security Zone	02-10
10	Baud Rate	
	300 Baud	01
	600 Baud	02
	1200 Baud	03
	2400 Baud	04
	4800 Baud	05
	9600 Baud	06
	19,200 Baud	07
11	Parity	
	Odd	00
	Even	01
	Mark	02
	Space	03
	None	04
12	Stop Bits	
	One Stop Bit	01
	Two Stop Bits	02
13	Data Bits	
	Seven Bits	07
	Eight Bits	08

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
14	Hardware Handshaking	
	Disabled	00
	Enabled	01
15	Software Handshaking	
	None	00
	ACK-NAK	01
	ACK-NAK with ENQ	02
	ENQ Only	03
16	Triggering Options	
	Level Trigger	00
	Continuous Trigger	01
	Pulse Trigger	02
	Continuous Pulse	03
	Constant Scan & Report	04
	Host Triggering	05
	Next New Code	06
17	Laser On Time-Out	
	0.5 Seconds	00
	1.0 Seconds	01
	1.5 Seconds	02
	2.0 Seconds	03

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
	2.5 Seconds	04
	3.0 Seconds	05
	3.5 Seconds	06
	4.0 Seconds	07
18	Laser Off Time-Out	
	0.0 Seconds	00
	0.5 Seconds	01
	1.0 Seconds	02
	1.5 Seconds	03
	2.0 Seconds	04
	2.5 Seconds	05
	3.0 Seconds	06
	3.5 Seconds	07
19	Intercharacter Delay	
	00-99 milliseconds	00-99
20	UPC-E Preamble	
	None	00
	System Character	01
	System Character & Country Code	02

Table 2-3. Programming Protocol

Parameter #	Explanation	Definition
21	UPC-A Preamble	
	None	00
	System Character	01
	System Character & Country Code	02
22	Code ID Character	
	None	00
	Symbol ID	01
	AIM ID	02
23	I 2 of 5, Length 1	01-31
24	I 2 of 5, Length 2	00-31
25	D 2 of 5, Length 1	01-31
26	D 2 of 5, Length 1	00-31
27	Prefix, 8 Bit ASCII Value (Hexadecimal)	00-7F, 80=Disabled
28	Suffix 1, 8 Bit ASCII Value (Hexadecimal)	00-7F, 80=Disabled
29	Suffix 1, 8 Bit ASCII Value (Hexadecimal)	00-7F, 80=Disabled

For example:

To put the LS 1220 into Host Triggering mode, the following string would be sent to the unit: (All values are in hexadecimal format)

02 53 54 49 48 31 36 30 35 03 07

To put the LS 1220 into Host Triggering mode and disable all code types except code 39 and UPC/EAN, the following string would be sent to the unit: (All values are in hexadecimal format)

02 53 54 49 48 30 30 30 33 30 31 30 30 31 36 30 35 03 05

To send a turn laser on command, the following string would be sent to the unit: (All values are in hexadecimal format)

02 53 54 49 45 03 08

To put the unit back to the default state, the following string would be sent to the unit: (All values are in hexadecimal format)

02 53 54 49 47 3E 33 31 33 30 3C 30 30 30 34 30 30 30 30 30 30 30 30 30 34 30 36 30 31 30 32 30 37 30 30 30 30 30 30 30 31 30 31 30 3A 30 31 30 31 30 30 30 3E 30 30 30 3C 30 30 38 30 30 3D 30 3A 03 0F

Table 2-4. ASCII Table

Character	Hexadecimal	Decimal	Character	Hexadecimal	Decimal
NUL	00	00 0	EM	19	025
SOH	01	00 1	SUB	1A	026
STX	02	00 2	ESC	1B	027
ETX	03	00 3	FS	1C	028
EOT	04	00 4	GS	1D	029
ENQ	05	00 5	RS	1E	030
ACK	06	00 6	US	1F	031
BEL	07	00 7	'	27	039
BS	08	00 8	(	28	040
HT	09	00 9	)	29	041
LF	0A	010	*	2A	042
VT	0B	011	+	2B	043
FF	0C	012	,	2C	044
CR	0D	013	-	2D	045
SO	0E	014	.	2E	046
SI	0F	015	/	2F	047
DLE	10	016	0	30	048
DC1	11	017	1	31	049
DC2	12	018	2	32	050
DC3	13	019	3	33	051
DC4	14	020	4	34	052
NAK	15	021	5	35	053
SYN	16	022	6	36	054
ETB	17	023	7	37	055
CAN	18	024	8	38	056

Table 2-4. ASCII Table

Character	Hexadecimal	Decimal	Character	Hexadecimal	Decimal
9	39	057	S	53	083
:	3A	058	T	54	084
;	3B	059	U	55	085
<	3C	060	V	56	086
=	3D	061	W	57	087
>	3E	062	X	58	088
?	3F	063	Y	59	089
@	40	064	Z	5A	090
A	41	065	[	5B	091
B	42	066	\	5C	092
C	43	067	]	5D	093
D	44	068	^	5E	094
E	45	069	-	5F	095
F	46	070	‘	60	096
G	47	071	a	61	097
H	48	072	b	62	098
I	49	073	c	63	099
J	4A	074	d	64	100
K	4B	075	e	65	101
L	4C	076	f	66	102
M	4D	077	g	67	103
N	4E	078	h	68	104
O	4F	079	i	69	105
P	50	080	j	6A	106
Q	51	081	k	6B	107
R	52	082	l	6C	108

Table 2-4. ASCII Table

Character	Hexadecimal	Decimal	Character	Hexadecimal	Decimal
m	6D	109	w	77	119
n	6E	110	x	78	120
o	6F	111	y	79	121
p	70	112	z	7A	122
q	71	113	{	7B	123
r	72	114	|	7C	124
s	73	115	}	7D	125
t	74	116		7E	126
u	75	117	DEL	7F	127
v	76	118			

Replacing an LS 6X20

Converting an LS 6X20 Application to an LS1220 Application

- Set up the LS 1220 following the directions in this manual. Then,
- Scan the LS1220 **SET DEFAULTS** bar code.
- Change the **LASER OFF TIME-OUT** to 0.5 seconds (default). This parameter, known as the *Programmable Time-Out* parameter in the LS 6X20, is now programmable in 0.5 second increments from 0.0 to 3.5 seconds. In the LS 6X20, it was programmable from 0.0 to 2.5 seconds in 0.1 second increments.
- If the LS 1220 is replacing an IR model (LS 6320 or LS 6820), scan the LS 1220 **CONSTANT SCAN AND REPORT** bar code.

The *Programmable Time-On* parameter in the LS 6X20 was programmable in 0.1 second increments from 0.0 seconds to 2.5 seconds. This parameter is known as **LASER ON TIME OUT** in the LS1220, and is programmable from 0.5 seconds to 4.0 seconds in 0.5 second increments.

The LS1220 now emulates an LS 6X20 in the default state.

If the host system is transmitting information down to the scanner refer to the following paragraphs.

Downloading Specific Parameters

LS 1220 parameter addresses are different from the LS 6X20.

- Change the command for downloading specific parameters from "C" to "H".
- Determine the parameter to be changed, and send the new address, together with the new value.
- If the specific parameters are stored in an array, re-arrange the array to match the LS 1220 addresses, change the desired parameters and send the array.
- Parameter addresses are received in a decimal format by the LS 1220. See the *Programmer's Guide* for more details.

Downloading All Parameters

LS 1220 parameter addresses are different from the LS 6X20.

- Change the command for downloading specific parameters from "B" to "G".
- Re-arrange the array to match the LS 1220 addresses, change the desired parameters and send the array.

In the LS 6X20, If STX is selected as the prefix, and ETX is selected as the suffix, the scanner will append an LRC to the decoded data. See page 2-22 for definition of LRC. This feature IS NOT SUPPORTED in the LS1220.