



SE 1022 Integrated VLD Scanner
USER'S GUIDE

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Section 1

General Information

SE 1022 Integrated VLD Scanner Overview

Your SE 1022 Integrated VLD Scanner is a miniature, visible-laser based scanner with an integrated decoder. The SE 1022 contains an inboard microcontroller that scans and processes bar codes into ASCII data.

The SE 1022 contains a miniature scan engine, on board voltage monitor, a watchdog timer, two serial I/O lines, two hardware handshaking lines, and an EEPROM for storing decoder parameters. It also provides over-temperature protection that turns the laser off if the temperature rises above acceptable limits (50_C).

Definition of Terms

This section defines terms used in this User's Guide. These terms include general computer jargon, scanner descriptions, and brief descriptions of common bar code symbologies.

ASCII

American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks, and control characters. It is a standard data transmission code in the U.S.

BIT

Binary Digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Byte

On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory can be used to store one ASCII character.

CDRH

Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

Check Digit

A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is interpreted.

CLSI Editing

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

Codabar

A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (- \$: / , +).

Code 3 of 9 (Code 39)

A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9, and seven special characters (- . / + % \$ and space). The code name is derived from the fact that 3 of the 9 elements representing a character are wide, while the remaining six are narrow.

Code 93

An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Code 128

A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.

Continuous Code

A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.

Decode

To recognize a bar code symbology such as UPC/EAN and then analyze the content of the specific bar code scanned.

Decode Algorithm

A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.

Discrete Code

A bar code or symbol in which the spaces between characters (inter-character gaps) are not part of the code.

Discrete 2 of 5

A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.

EAN

European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

Host Computer

A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs, and network control.

IEC

International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC Class I (IEC 825 Class I)

This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

Intercharacter Gap

The space between two adjacent bar code characters in a discrete code.

Interleaved Bar Code

A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.

Interleaved 2 of 5

A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Laser

An acronym for Light Amplification by Stimulated Emission of Radiation. The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode

A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

Laser Scan Engine

The total deflection of this beam is 46°, and the scan frequency is 36 scans per second.

Notis Editing

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

Parameter

A variable that can have different values assigned to it.

Programming Mode

The state in which a scanner is configured for parameter values.

Quiet Zone

A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

Scanner

An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are:

1. Light source (laser or photoelectric cell)-illuminates a bar code.
2. Photodetector-registers the difference in reflected light (more light reflected from spaces).
3. Signal conditioning circuit-transforms optical detector output into a digitized bar pattern.

Scanning Mode

The scanner is energized, programmed, and ready to read a bar code.

Scanning Sequence

A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

Self-Checking Code

A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.

Start/Stop Character

A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

Symbol

A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters, and check characters.

Symbology

The structural rules and conventions for representing data within a particular bar code type such as UPC/EAN, Code 39, etc.

UPC

Universal Product Code is a relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which can be any of four widths. The standard symbology for retail food packages in the United States.

Laser Hazard Classifications

B CAUTION: *Standard range and VIN scanners are Class II laser products. These products emit less than one milliwatt of laser light from the output window. The visible laser beam from a class II scanner by its very bright nature will be too dazzling to stare into. Momentary viewing is not considered hazardous since the upper radiant power limit on this type of device is 1 mW which corresponds to the total beam power entering the eye for a momentary exposure of 0.25 second that is just safe (i.e. the Maximum Permissible Exposures (MPE) for a 0.25 second exposure). No special safety measures are required to keep these products in compliance with Department of Health and Human Services (DHHS) regulations 21M Subchapter J. Do not stare into beam if protective cover is removed.*

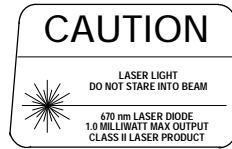


WARNING:

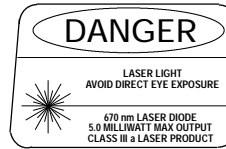
Long range scanners are Class IIIa laser products. These products emit a 5.0 milliwatt beam of laser light from the output window. A class IIIa laser or laser system can emit any wavelength, but it cannot produce a hazardous diffuse reflection unless focused or viewed for extended periods at close range. It is also not considered a fire hazard or a serious skin hazard. Any continuous wave laser that is not class I or class II is a class III device if its output power is 0.5 W or less. Since the output beam of such a laser is definitely hazardous for intrabeam viewing, control measures center on eliminating this possibility. No maintenance is required to keep these products in compliance with Department of Health and Human Services (DHHS) regulations 21M Subchapter J. No controls are provided for operation or maintenance. Safety training is desirable for those using class III systems. Eyeware may be necessary if intrabeam viewing cannot be precluded. Do not stare into beam if protective cover is removed.

The following labels are those contained on your scanner. They are shown in actual size. Become familiar with their content and the warning statements before using your scanner.

Class II Label



Class IIIa Label



TL1-978-011

Section 2

Scanner Parameters

Introduction

This SE 1022 Scanner is programmed to operate by scanning appropriate bar codes based on your needs. This section contains the bar codes necessary to program the scanner for each parameter selection. The default settings for your SE 1022 scanner are shown on page 2-2.

This section contains both the bar code to reset your scanner to the defaults, and to cancel the default settings.

- To reset the parameters use the Reset to Default Settings bar code on page 2-2.
- To cancel the setting before the last bar code is scanned, use the Cancel Setting Changes bar code on page 2-4.

Scanning Sequence

You set the parameter bar codes by scanning bar codes. In most cases you need only to scan one bar code to set a specific parameter.

EXAMPLE:

For example, the default for Code 39 is to have it enabled, if you want to disable Code 39, simply scan the DISABLE Code 39 bar code on page 2-17. Your scanner beeps to indicate a successful parameter setting only if you change the parameter setting from its prior value.

In some cases you need to scan more than one bar code.

EXAMPLE:

For example, if you want to add or change the length of the preamble or postamble, you scan several bar codes. Multiple bar code parameter sequences beep to indicate acceptance, if you changed the setting's value after you scan the last bar code.

The scanner uses a power conservation method that causes it to power down after 1/2 to 1 second. Because of this, bar codes in a multiple bar code parameter sequence must be scanned within 1/2 second of each other.

" **NOTE:**

Tip: After reading a bar code, aim the scanner away from the bar codes and press the SCAN key within 1/2 second, to get the laser beam back on. While the laser beam is on, you have five seconds to find and scan the next bar code.

Errors While Scanning

Should you make an error during a scanning sequence, no problem, simply rescan the correct sequence.

Reset to Default Settings

RESET ALL PARAMETERS
TO DEFAULT



Table 2-1
Scanner Default Settings

Parameter Name	Page Number	Default Setting
Send No-Decode Characters	Page 2-5	Disabled
Bi-directional Redundancy	Page 2-5	Disabled
Decode Attempt Time	Page 2-6	3.0 Seconds
Preamble Character	Page 2-8	Disabled
Postamble Character 1	Page 2-8	HEX 0D
Postamble Character 2	Page 2-8	HEX 0A
Code Identification Options	Page 2-9	No Code ID

Table 2-1 (continued)
Scanner Default Settings

Parameter Name	Page Number	Default Setting
Symbology Types		
UPC		
UPC/EAN	Page 2-10	Enabled
UPC/EAN Security Level	Page 2-11	No Security Check
UPC/EAN Security Zone	Page 2-12	Zone 0x04
UPC/EAN Supplement Auto-D	Page 2-14	Disabled
UPC/EAN 2 and 5 Digit Supplement	Page 2-15	2-Digit-Disabled 5-Digit-Disabled
UPC-E and UPC-A Check Digits	Page 2-16	UPC-E Check Digit-Disabled UPC-A Check Digit-Disabled
UPC Prefix	Page 2-17	System & Country Code
Code 39	Page 2-17	Enabled
Codabar	Page 2-18	Enabled
Code 128		
Code 128	Page 2-18	Enabled
Transmit Function Characters	Page 2-19	Disabled
Interleaved 2 of 5		
Interleaved 2 of 5	Page 2-20	Enabled
Set Length 1 and 2	Page 2-20	Length 1=14 Length 2=0 (Disabled)
MSI Plessey		
MSI Plessey	Page 2-22	Enabled

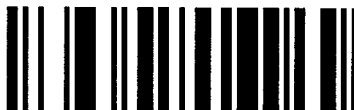
Table 2-1 (continued)
Scanner Default Settings

Parameter Name	Page Number	Default Setting
Setting Number of Check Digits	Page 2-22	1 Check Digit
MSI Plessey Check Digit	Page 2-23	Modulo 10 (for both Check Digits)

Cancel Setting Changes

Scan this bar code to cancel a multi-bar code parameter sequence prior to the last bar code (before the scanner beeps). If your scanner has already beeped to indicate acceptance of the parameter sequence, re-scan the correct sequence.

CANCEL



Send No-Decode Characters

Send No-Decode Characters gives you the option to send "NR" when a symbol does not decode. Preamble and postamble characters are added to this message.

DISABLE



ENABLE



Bi-directional Redundancy

The Bi-directional Redundancy option, when enabled, requires a bar code to decode the same once in each scan direction before a good decode is indicated.

DISABLE











ENABLE



Decode Attempt Time

The Decode Attempt Time option sets the duration that the scanner's laser stays on for a decode session.

0.5 SECOND	
1.0 SECOND	
1.5 SECONDS	
2.0 SECONDS	
2.5 SECONDS	
3.0 SECONDS	
3.5 SECONDS	
4.0 SECONDS	

Preamble Character

To set the preamble character, scan the bar code on page 2-8, then set the decimal ASCII code of the character by scanning three of the Digit 0-9 bar codes also on page 2-8. See the example below for setting characters. To disable the preamble, use the ASCII code 128.

Example for Setting the Preamble Character

This example assumes that the preamble is the character 'A' (0x41 or decimal 65). Your decoder only accepts decimal entries.














1. Scan the Preamble bar code
2. Scan the first digit '0'
3. Scan the second digit '6'
4. Scan the third digit '5'

The character 'A' is now the preamble. Any time between steps 1 and 4, you can abort the entry sequence by scanning the Cancel bar code on page 2-4.

Postamble Characters

To set one of the two postamble characters that your decoder appends to the end of a decode message, scan either the character 1 or character 2 bar code on page 2-8, then set the decimal ASCII code of the character by scanning three of the Digit 0-9 bar codes also on that page. To disable a postamble character, use the ASCII code 128.

Preamble and Postamble Character Bar Codes

PREAMBLE	
POSTAMBLE CHARACTER 1	
POSTAMBLE CHARACTER 2	
DIGIT 0	
DIGIT 1	
DIGIT 2	
DIGIT 3	
DIGIT 4	
DIGIT 5	
DIGIT 6	
DIGIT 7	
DIGIT 8	
DIGIT 9	

Code Identification (Code ID) Options

When the Code Identification (Code ID) option is selected, your decoder adds a code identification byte to the decoded data. These bytes are described in Table 2-2 on page 2-9.

Enabling AIM Code ID causes the scanner to send the AIM code identifier in lieu of the Code Identifiers. The identifier is sent as a three character preamble, in accordance with AIM specifications for symbology identifiers. UPC-E is always converted into UPC-A when the AIM specification ID option is enabled. See AIM^{USA} *Guidelines on Symbology Identifiers* for full details.

Table 2-2
Code Identifications

Code ID	Symbology
A	UPC-A, UPC-E, EAN-8, EAN-13 with or without 2 or 5 supplements
B	Code 39
C	Codabar
D	Code 128
F	Interleaved 2 of 5
J	MSI
K	Code 128 in UCC/EAN-128 format. Code 128 bar code with Function 1 as the first or second character

NO CODE ID



CODE ID



AIM CODE ID



Symbology Types

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

- " UPC Versions A and E (EAN 8 and 13)
- " Codabar
- " Code 39
- " Interleaved 2 of 5
- " Code 128, UCC/EAN-128
- " MSI Plessey

The scanner autodiscriminates between all of the above symbologies.

UPC/EAN

Use this to enable or disable UPC-A, UPC-E, EAN-8, and EAN-13.

DISABLE



ENABLE



UPC/EAN Security Checks

Your scanner provides three levels of security checking with nine security zones. Security checking may be enabled when UPC/EAN bar codes decode incorrectly. The security zone controls the level of decode security applied to the bar code.

No Security Check

This is the default security level which allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding "in spec" UPC/EAN bar codes. The security zone setting does not matter when security checking is disabled.

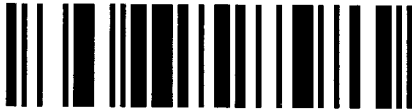
Check Ambiguous Characters Only

As bar code quality level decreases, the characters 1, 2, 7, and 8 are more prone to decoding errors over other characters. If you are experiencing decoding errors because of poorly printed bar codes, and the errors are limited to these characters, enable this security level and select a security zone..

Check All Characters

If you are experiencing decoding errors of poorly printed bar codes, and the errors are not limited to characters 1, 2, 7, and 8, enable this security level and select a security zone.

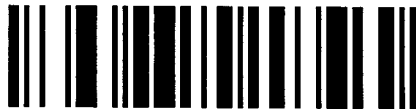
NO SECURITY
CHECK



CHECK
AMBIGUOUS
CHARACTERS
ONLY



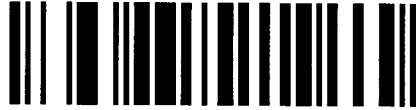
CHECK ALL
CHARACTERS



UPC/EAN Security Zone

After enabling one of the security levels, select a security zone value that eliminates character misreads. There is an inverse relationship between the security zone and scanner aggressiveness (how quickly the scanner decodes). Choose only that level of security zone necessary for the quality of bar codes being scanned. Start with the default of 0x04 and decrease the zone if the bar codes misread and increase the zone if the bar codes do not read. Depending on the quality of the bar codes, there may not be a setting that allows the bar codes to decode without misreading.

ZONE 0x02
(most secure
least aggressive)



ZONE 0x03



ZONE 0x04



ZONE 0x05



ZONE 0x06



ZONE 0x07



ZONE 0x08



ZONE 0x09



ZONE 0x0A
(least secure
most aggressive)



UPC/EAN Supplement Auto-D

The UPC/EAN Supplement Auto-D option selects whether to auto-discriminate between UPC/EAN symbols with or without the supplement. When this option is enabled, your scanner ignores the Decode 2 and 5 Digit Supplement setting.

DISABLE



ENABLE



UPC/EAN 2 and 5 Digit Supplement

Select whether UPC/EAN is decoded with or without supplemental characters. Supplementals are additionally added characters (2 or 5) according to specific code format conventions such as UPC-A+2, UPC-E+2, EAN 8+2.

If UPC/EAN with supplemental characters is selected, UPC/EAN symbols without supplemental characters won't be decoded. If UPC/EAN without supplemental characters is selected and the scanner is presented with a UPC/EAN plus supplemental symbol, the UPC/EAN decodes and ignores the supplemental characters. Choosing autodiscriminating, your scanner, after additional processing to ensure a good decode, transmits either.

" NOTE:

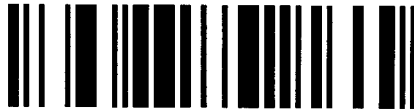
In order to minimize the risk of invalid data transmission, it is recommended that you select whether to read or ignore supplemental characters.

2-Digit

DISABLE



ENABLE

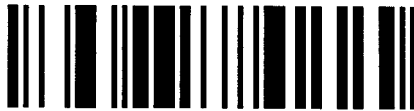


5-Digit

DISABLE



ENABLE



UPC-E and UPC-A Check Digits

The UPC-E check digit and UPC-A check digit parameters select whether decoded UPC-E or UPC-A symbols are transmitted with or without the check digit.

UPC-E Check Digit

DISABLE



ENABLE



UPC-A Check Digit

DISABLE



ENABLE



UPC Prefix

The UPC Prefix applies to both UPC-A and UPC-E symbols. Three options are given for the lead-in characters of decoded UPC-A or UPC-E symbols. These lead-in characters are considered part of the symbol itself. 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 characters. If no prefix is selected, neither character is sent with the data.

SYSTEM &
COUNTRY CODE



SYSTEM
CHARACTER
ONLY



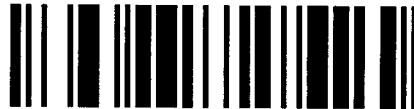
NO PREFIX

**Code 39**

DISABLE



ENABLE



Codabar

DISABLE



ENABLE



Code 128

DISABLE



ENABLE



Code 128 Transmit Function Characters

When the transmit Code 128 Function Character option is enabled, Code 128 function characters are sent as

- FN 1 = 0x1D
- FN 2 = 0x81
- FN 3 = Not Sent
- FN 4 = 0x83

Any bar code message with FN 3 as the first character is not sent; it is reserved for the scanner setup bar codes.

Table 2-3

Code 128 Transmit Function Characters

Function Character	Enabled	Disabled
FN 1 in first or second position (UCC/EAN-128 format)	Scanner sends 0x1D for FN1	Scanner sends NOTHING for FN 1
FN 1 in any other position	Scanner sends 0x1D for FN1	Scanner sends 0x1D for FN 1
FN 2 or FN 4 in any position	Scanner sends 0x81, 0x83 respectively	Scanner sends NOTHING for FN 2 or FN 4

DISABLE



ENABLE



Interleaved 2 of 5

DISABLE



ENABLE



Interleaved 2 of 5 Set Fixed Length 1 and 2

Your scanner requires the actual fixed bar code length to be programmed for Interleaved 2 of 5 bar codes. Determine the number of characters by counting the number of printed (human readable) digits beneath the bar code. Set Length 1 to this value and set Length 2 to 0 to disable it. If you have two different length bar codes, then set Length 2 to the second bar code's length.

To set a fixed length, scan either the Fixed Length 1 or Fixed Length 2 bar code and then scan two of the Digit 0-9 bar codes on page 2-21.

Fixed Length 1 may be from 02 through 30, and Fixed Length 2 from 00 through 30.

**Interleaved 2 of 5 Set Fixed Length and
Digit Bar Codes**

FIXED LENGTH 1	
FIXED LENGTH 2	
DIGIT 0	
DIGIT 1	
DIGIT 2	
DIGIT 3	
DIGIT 4	
DIGIT 5	
DIGIT 6	
DIGIT 7	
DIGIT 8	
DIGIT 9	

MSI Plessey

DISABLE



ENABLE



MSI Setting Number of Check Digits

MSI Plessey bar codes contain 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. Select whether one or two check digits should be validated

1 DIGIT



2 DIGITS



MSI Plessey Check Digit

The MSI Plessey Check Digit scheme applies if 2 check digits are enabled. The scheme determines whether the check digit is calculated using Modulo 10 for both check digits, or Modulo 11 for the first check digit and Modulo 10 for the second digit.

MODULO 10
(both digits)



MODULO 11 (first digit)
MODULO 10 (second)



