User's Manual

Handheld CCD
Wedge Interface
25-WEDGE-06
Ver. May 2000

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PART I – CCD Scanning

NOTICE

Opticon has taken every step to ensure that the information included in this manual is accurate, however we reserve the right to change any specification at any time without prior notice.

Part II Bar Code Menu Functions

General Information

CCD (charged coupled device) scanners are, depending on model type, either "contact" or "near contact" scanners. Because CCD's scan automatically when approaching or pointing at a bar code label, their operation is intuitive. CCD's read difficult labels found on curved or irregular surfaces and perform especially well in high ambient light conditions. They are a cost-effective, inexpensive alternatives to other scanning technologies.

Featuring state-of-the-art imaging technology, CCD's use the same sensor found in facsimile machines or video camcorders. The CCD images the bar code label, then converts the digital signals into data the host computer can understand. By capturing the bar code image all at once, the scanner provides a fast, highly accurate read rate.

Miniature surface mount electronics make up the CCD scanner's solid state construction. CCD's have no moving mechanical parts and provide years of trouble-free operation.

Wedge Interface

The HLT/ELT series Wedges have built-in intelligence to connect directly to a personal computer without the need for a separate decoder box. Scanned bar code labels appear to the computer as if the data was typed into the keyboard. Normal operation of the keyboard is unaffected. The WEDGE interface is compatible with virtually any application program accepting keyboard input.

Advantages

- Low cost – no separate decoder box required
- No special software installation or technical support needed
- Same communication signal format as keyboard
- Simple installation
- No external power supply
- Full featured bar code menu offers user flexibility
- Uses existing keyboard type

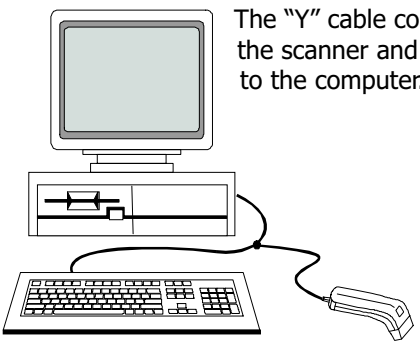
Set Up

Unpacking

Remove the scanner from its packaging and inspect it for damage. If the scanner was damaged in transit, call the Opticon Customer Service Dept. at 800-636-0090.

Installation

A "Y" connection cable is provided for installation. The scanner is installed or "wedged" between the keyboard and the computer's CPU.



The "Y" cable connects both the scanner and the keyboard to the computer.

WARNING!

In order to avoid possibility of damage to the computer, install the CCD scanner and "Y" cable when power to the system is OFF.

Programming the Scanner

This manual provides an easy way of changing certain parameters. A parameter is changed by reading a specific bar code associated to a specific function.

To select menu options:

1. Scan "**Start/End Program Menu**." The scanner will beep continuously to indicate that it is ready to be programmed.

2. Make parameter selection from menu (a beep and a green light indicates that the parameter has been scanned).

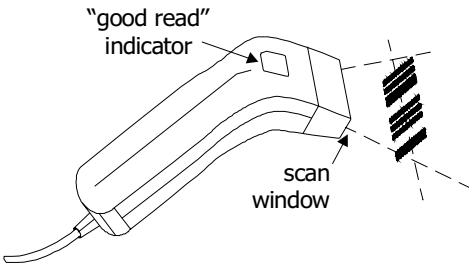
3. Scan " **Start/End Program Menu**." This completes the operation and the new parameter is saved in memory.

The CCD reader is normally programmed as a keyboard wedge for IBM's XT, AT, or PS/2 Models 50, 60, 70 and 80. If the host computer is not one of these models, refer to "Computer Type Selection" on page 18 to make another selection.

NOTE: (☜) A pointing finger indicates scanner default settings.

Scanning

If the scanner has a switch, depress button on underside to turn the scanner on. Red LED illumination will emit from the scan window. If the scanner does not have a trigger switch, then the LED's will automatically remain on as long as the computer system is on.



NOTE: The scanner will not read any bar code label which is wider than the scan window.

1. Approach, point or touch the bar code label with the scan window of the CCD scanner.
2. Scan within a distance of 0 to 1.0" (2.3" window); 0 to 2.5" (3.2" window) from the bar code label.
3. Center the CCD scan window on bar code label for fastest read.
4. The scanner will beep to indicate an audible good read * (if beeper has not been turned off by a menu option).
5. A green LED indicator will visually signal a good read.

* The scanner reads all bar code symbologies listed in the menu section of this manual.

User Maintenance

Cleaning the scan window is the only maintenance that is required.

- Do not allow any abrasive material to touch the window.
- Remove any dirt particles with a damp cloth.
- Clean the scan window using a soft cloth or a cotton tipped swab moistened with water.
- Do not remove the nose of the scanner.

Troubleshooting

A. If LED's do not light up when installation instructions are followed:

- Make sure there is power to the system.
- Recycle computer power.
- Verify computer fuses are ok.
- Check for loose cable connections.
- Are adaptors being used?

B. If LED's light up, but good read beep is <u>not</u> heard and no data appears on the computer:

- Make sure the distance between the scanner and bar code label is not greater than the specified depth-of-field when trying to read it.
- Verify the bar code label is readable and meets bar code specification.
- Check to see if the scanner reads other bar code labels (if yes, the non-reading label may be a label which the scanner is not programmed to decode.)
- Verify that the bar code label is not wider than the CCD scan window.

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C. If LED's light up, good read beep is heard but no data appears on the computer:

- Check to see that the "Computer Type Selection" matches the type of computer that you are using.
- Change the "Intercharacter Delay" setting. Depending upon the type of computer that you are using, the intercharacter delay will vary.
- If you are using a file sever, an interrupt conflict may arise. Opticon recommends using an RS232C CCD scanner interface on file servers.

NOTE: If after performing these checks, the scanner is still not functioning, contact your distributor or call Opticon Technical Support at 800-636-0090.

Factory Service

When calling Opticon Technical Support, please have the unit model number and several bar code labels readily at hand. The model number is located near the connector end of the cable.

Technical Specifications

Physical

Case Material	ABS Plastic; Ivory/Grey
Dimensions (LxWxH)	
2.3" window	5.5 x 2.5 x 2 inches
3.2" window	5.5 x 3.2 x 2 inches
Weight	6 oz.
Cable Length	5 ft. nominal

Optical

Photo Detector	2048 Element CCD array
Scan Speed	50 scans/sec.
Light Source	Red LED (λ = 660 nm)
Depth of Field (UPC 15 mil)	
2.3″ window	0 to 1″ (63 mm)
3.2″ window	0 to 2.5″ (25.4 mm)
Field Width	2.3" or 3.2" @ contact (optional)
Min. Element Width	
2.3″ window	.004" (4 mil) @ contact
3.2″ window	.006" (6 mil) @ contact
Print Contrast	0.45 min.

Electrical

Supply Voltage	+5V DC ±10%
Current	60 mA max.

Environmental

Temperature	
Operating	+32° to +105° F
Storage	-15° to +140° F
Humidity RH (non-condensing)	
Operating	Up to 80%
Storage	Up to 90%

Interface

Wedge	Keyboard Input

Ordering Information

Accessories Available

Part Number	Description
28-KYDEX-01	"L-Style" Hands-free Stand
28-00010-01	Rubber Side-Mount Stand
28-UNVSTD-01	Universal Scanner Stand

FCC Information

This equipment has been tested and is found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate RF energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the users authority to operate this equipment.

Warranty

This scanner is guaranteed for a period of five (5) years from date of shipment from Opticon, including all defects in material and workmanship for the first year and electronics only thereafter. Opticon will, at its option, repair or replace products which prove to be defective in material or workmanship under proper use within the warranty period. Opticon will consider any product out-of-warranty if the unit has been subjected to misuse, accident or incorrect installation. No other warranties are expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Opticon is not liable for consequential damages.

If the scanner must be returned, please contact Opticon to obtain an RMA (Return Merchandise Authorization) number prior to returning the product. The Customer Service Dept. may be reached at 800-636-0090.

NOTE: Returned merchandise will NOT be accepted without a RMA number indicated clearly on the outside of the carton.

Glossary

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

Autodiscrimination - The ability of bar code reading equipment to recognize and correctly decode more than one symbology.

Bar Code - An automatic identification technology which encodes information into an array of varying width parallel rectangle bars and spaces.

Bar Code Density - The number of data characters which can be represented in a linear unit of measure. Bar code density is often expressed in characters per inch.

CCD (Charged Coupled Device) - A technology in which scanning is accomplished with an array of LED's flooding the bar code with light.

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

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

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

Glossary (cont.)

Code 3 of 9 (Code 39) - A versatile and widely used alphanumeric bar code symbology with a set of 43 characters types, including all upper case letters, numerals from 0 to 9 , and 7 special characters (- / . + % $ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Decode - To recognize a bar code symbology and then analyze the content of the specific bar code scanned.

Default - A standard setting assigned to a parameter type unless a different setting is assigned to that parameter.

Depth of field - The distance between the maximum and minimum plane in which bar code reader is capable of reading symbols.

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.

Encode - To translate data into machine readable form using the format and conventions of a specific bar code symbology.

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

Glossary (cont.)

Interleaved 2 of 5 - A binary 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 (bars/spaces) within each group determines which characters are encoded. This continuous code type uses no Inter-character spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Parameter - A setting that can have a different function assigned to it.

Programming mode - The state in which a scanner is configured for parameter settings.

Quiet Zone - A clear space, containing no machine readable marks, which precedes the start character of a bar code symbol and follows the stop characters.

Read Rate - The ratio of the number of successful reads on the first attempt to scan to the total number of attempts.

Resolution - In a bar code system, the narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

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.

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

Glossary (cont.)

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.

Symbology - The structural rules and conventions for representing data within a particular bar code type.

UPC (Universal Product Code) - A relatively complex numeric symbology. Each character consists of two bar codes and two spaces, each of which can be any of four widths. The standard symbology for retail food packages in the United States.

Wedge - A device that plugs in between a keyboard and a PC. Includes a scanner allowing data to be entered either by a keyboard or scanner.

Part II
Bar Code Menu Functions

Reset All Defaults

Please note that our scanners are shipped set to the U1 default. This programs the scanner to the settings most commonly used by our customers. Our scanners will work, in most applications, right out of the box.

The following options reset all previously programmed options and return the unit to factory default settings.

Z9	**Start/End Program Menu**	
U1	Reset all defaults	 

NOTE: (☜) A pointing finger indicates default settingS.

Computer Type Selection

The Wedge interface program is designed to operate on IBM personal computers and compatibles along with a Apple Macintosh PC's. Select the host computer type from the menu below. ***NOTE***: If the scanner has not been set to the correct host computer, the scanner will display random characters on the screen after reading a bar code label.

Z9	**Start/End Program Menu**	
K0	IBM PC/XT	
K1	IBM AT & compatibles (PS-2/50, 60. 70. 80)	
K2	IB M PS-2/ 25, 30	
K3	HP Vectra	
K4	Macintosh (Ranger only)	
KC	Laptop*/ SureOne mode (Ranger only)	

* With laptop mode, computer must be turned off and rebooted.

Symbology Selection

The scanner autodiscriminates many bar code symbologies. However, if only one symbology is required, programming the scanner to read only that symbology will speed operation and eliminate read errors.

Z9	**Start/End Program Menu**	
A0	Read all codes	
A1	UPC & all variants only	
A2	Code 39 only	
A3	Codabar only	
A4	2 of 5 only	
A5	Code 93 only	

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Symbology Selection

Z9	**Start/End Program Menu**	
A6	Code 128 only	
A7	MSI/Plessey only	
A8	Code 4 and Code 5	

Symbology Additions

Use this menu to add a second, third, fourth, etc. symbology to be read if scanner is not programmed to read all symbologies. To speed operation and eliminate read errors, add only the symbologies that are required.

Z9	**Start/End Program Menu**	
B0	Enable Code 4 & Code 5	
B1	Enable UPC & all variants	
B2	Enable Code 39	
B3	Enable Codabar	
B4	Enable 2 of 5	
B5	Enable Code 93	
B6	Enable Code 128	
B7	Enable MSI/Plessey	

UPC Settings

Options for UPC-A and UPC-E bar codes.
NOTE: Abbreviations: Xmit = transmit; NSC = Number System Character; CD = Check digit

Z9	**Start/End Program Menu**		
C8	EAN-13 as UPC-A off		☜
C9	EAN-13 as UPC-A on		
L0	Enable add-on code		
L1	Disable add-on code		☜
M0	UPC-E CD Xmit off		☜
M1	UPC -E CD Xmit on		
M2	UPC-A CD Xmit off		
M3	UPC-A CD Xmit on		☜

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UPC Settings

Z9	**Start/End Program Menu**	
M4	UPC-E; NSC = 1 off	
M5	UPC-E; NSC = 1 on	
M6	Xmit ISBN as EAN-13	
M7	Xmit ISBN as UPC-A	
M8	Xmit ISBN w/out CD	
M9	Xmit ISBN with CD	
N0	Xmit UPC-A w/out NSC	
N1	Xmit UPC-A with NSC	
N2	Xmit UPC-E w/out leading "0"	

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UPC Settings

Z9	**Start/End Program Menu**		
N3	Xmit UPC-E with leading "0"		
N4	UPC-E expansion off		☜
N5	UPC-E expansion on		
N6	Xmit UPC-A as EAN-13 off		☜
N7	Xmit UPC-A as EAN-13 on		
N8	Xmit EAN-13 as ISBN off		☜
N9	Xmit EAN-13 as ISBN on		

Code 39 Settings

Z9	**Start/End Program Menu**	
C0	Code 39 CD computation off	
C1	Code 39 CD computation on	
C2	Code 39 CD Xmit off	
C3	Code 39 CD Xmit on	
C4	Code 39 full ASCII off	
C5	Code 39 full ASCII on	
D0	Code 39 Xmit start/stop off	
D1	Code 39 Xmit start/stop on	

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Code 39 Settings

Z9	**Start/End Program Menu**	
D2	Code 39 single digit on	
D3	Code 39 single digit off	
D4	Code 39 start/stop as '$' off	
D5	Code 39 start/stop as '$' on	

Codabar Settings

Options for Codabar (also known as NW-7).

Z9	**Start/End Program Menu**	
E0	Codabar CD computation off	
E1	Codabar CD computation on	
E2	Codabar CD Xmit off	
E3	Codabar CD Xmit on	
E4	Codabar start/stop match off	
E5	Codabar start/stop match on	
F0	Codabar start/stop xmit off	
F1	Codabar start/stop as ABCD/TN*E	

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Codabar Settings

Z9	**Start/End Program Menu**	
F2	Codabar start/stop as abcd/tn*e	
F3	Codabar start/stop as ABCD/ABCD	
F4	Codabar start/stop as abcd/abcd	
F5	Codabar single digit off	
F6	Codabar single digit on	

2 of 5 Settings

Options for I 2 of 5 (Interleaved 2 of 5) and D 2 of 5 (Industrial 2 of 5).

Z9	**Start/End Program Menu**	
G0	I 2 of 5 CD computation off	
G1	I 2 of 5 CD computation on	
G2	I 2 of 5 CD Xmit off	
G3	I 2 of 5 CD Xmit on	
G4	I 2 of 5 leading "0" Xmit off	
G5	I 2 of 5 leading "0" Xmit on	

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2 of 5 Settings

Z9	**Start/End Program Menu**		
G6	D 2 of 5 CD computation off		☜
G7	D 2 of 5 CD computation on		
G8	D 2 of 5 CD Xmit off		
G9	D 2 of 5 CD Xmit on		☜

Code 128 & MSI/Plessey Settings

Z9	**Start/End Program Menu**	
C6	Code 128 CD computation off	
C7	Code 128 CD computation on	
J0	MSI/Plessey CD Xmit on	
J1	MSI/Plessey 1 CD Xmit off	
J2	MSI/Plessey 2 CD Xmit off	
J3	MSI/Plessey with 1 CD	
J4	MSI/Plessey with mod 10/mod 10	
J5	MSI/Plessey with mod 11/mod 11	

Intercharacter Delay

For some application programs and IBM compatibles, the scanner may send data faster than the computer or application program can accept. this is called "keyboard buffer overrun". If data appears to be missing, random read errors occur or the scanner locks up and will not scan, experiment with the various keyboard timing options listed in the menu to follow.

Z9	**Start/End Program Menu**	
I0	10 ms delay	
I1	20 ms delay	
I2	30 ms delay	
I3	40 ms delay	
I4	50 ms delay	

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Intercharacter Delay

Z9	**Start/End Program Menu**	
I5	60 ms delay	
I6	70 ms delay	
I7	80 ms delay	

Scan Code Delay

The timing of he keyboard house-keeping codes are set by these commands.

Z9	**Start/End Program Menu**	
L2	2 ms delay	
L3	4 ms delay	
L4	6 ms delay	
L5	8 ms delay	
L6	10 ms delay	
L7	12 ms delay	

Bar Code Length Options

One or two lengths may be selected for free format bar codes. Only free format bar codes of the selected length(s) will be accepted.

Z9	**Start/End Program Menu**	
H0	Fixed length mode	
H1	Free 2 of 5 length	
H2	Free Codabar length	
H3	Free MSI/Plessey length	
H4	Free Code 39 length	
H5	Free all lengths	

Global Suffix Options *

* Adds to all symbologies. The suffix menu enables the user to transmit a carriage return ("CR"), line feed ("LF"), tabs, etc. after transmission of the bar code data. NOTE: Only one suffix selection can be programmed at a given time.

Z9	**Start/End Program Menu**	
O0	No suffix	
O1	Carriage return	
O2	Line feed	
O3	Carriage return + line feed	
O4	Tab	
O5	Shift+Tab	
OA	Arrow down	

Keyboard Emulation Options

Keyboard emulation options allow the user to emulate the function, arrow and other keys on the computer keyboard. Also, the user has the option of transmitting all upper case or all lower case characters. To begin Keyboard emulation mode, first scan "**Start**", then "**Keyboard Emulation On**", then "**End**". To emulate one of the function or arrow keys, do not scan "**Start**" before scanning the keyboard emulation bar code. ***NOTE***: Function key emulation cannot be performed while "Full ASCII Code 39" is enabled.

Z9	**Start/End Program Menu**	
D6	Keyboard emulation mode off	
D7	Keyboard emulation mode on	
O6	Xmit all upper case	
O7	Xmit all lower case	
O8	Reverse upper & lower case	
O9	Xmit normal	

Keystroke Emulation Options

List of all keystroke emulated bar code that are only functional when Keyboard Emulation is on. Scanning "Start" is not required to read these codes.

/-1	F1	
/-2	F2	
/-3	F3	
/-4	F4	
/-5	F5	
/-6	F6	
/-7	F7	
/-8	F8	
/-9	F9	

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Keystroke Emulation Options

/-A	F10	
/-B	F11	
/-C	F12	
/-D	Page up	
/-E	Page down	
/-F	Home	
/-G	End	
/-H	Arrow up	
/-I	Arrow down	

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Keystroke Emulation Options

/-J	Arrow left	
/-K	Arrow right	
/-L	Enter	

Trigger Options

Select the appropriate bar code to enable or disable the trigger. By disabling the trigger, the scanner LED's remain on as long as the computer power is on.

Z9	**Start/End Program Menu**	
Y0	Enable trigger	
Y1	Disable trigger	

Beeper Settings

Z9	**Start/End Program Menu**	
W0	Disable beeper	
W1	Beep before Xmit	
W2	Beep after Xmit	
W3	Disable good read light	
W4	Good Read with beep	
W5	Good Read after beep	

Transmit Current Settings

These codes transmit the current settings (check digit transmission, for example) for the symbologies listed.

Z9	**Start/End Program Menu**	
Q0	Send software switches	
Q1	Send Code 39 info	
Q2	Send Codabar info	
Q3	Send I 2 of 5 Info	
Q4	Send D 2 of 5 info	
Q5	Send Code 128 & 93 info	
Q6	Send MSI/Plessey info	
Q7	Send UPC-A info	

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Transmit Current Settings

Z9	**Start/End Program Menu**	
Q8	Send UPC-E info	
Q9	Send EAN-13 & EAN-8 info	
QA	Send Code 4 & Code 5 info	
QB	Send system info	

Read Mode

Select decoding and transmission options from the Read Mode menu. The options "Read X Times" process the bar code data through the decode algorithm X times before transmitting the data to the keyboard port (the default setting is "Read 2 Times"). The "Single Read" option turns off the scanner LED's immediately after transmission. By selecting the "Multi-Read" option, the scanner LED's remain on for a brief period after transmission of the data.

Z9	**Start/End Program Menu**	
X0	Read once	
X1	Read 2 times	
X2	Read 3 times	
X3	Read 4 times	
X4	Single Read	
X5	Multi Read