DECODED CCD SCANNER

User's Manual

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Section 1
INTRODUCTION

Description

The decoded CCD scanner can be connected to a host computer via a keyboard or RS-232 input port. It can also be configured to output scanned data in a Wand Emulation mode, thereby allowing it to be connected to another decoder or portable terminal.

When connected to the host as a keyboard wedge, the scanner is completely compatible with the host's software. The decoded data appears to the host computer as if it were entered manually by the operator through the keyboard.

The scanner can be configured using the bar code menus contained in this guide. (See Section 3 for details.) However, a different interface cable is required for each of the host connection modes.

Each set of configurable parameters can be reviewed by scanning the REVIEW SETTINGS code. This transmits the information to the host computer for display on the screen. Power, when the scanner is configured as a keyboard wedge or is in the wand emulation mode, is obtained from the host. When the scanner is connected as an RS-232 device, a separate power module must be used.

Section 2
INSTALLATION

Host Connections

The decoded CCD scanner can be connected to a host computer as a keyboard wedge, an RS-232 input, or as a wand emulation device. The scanner is capable of being configured for any of these three connections, but each requires a different cable.

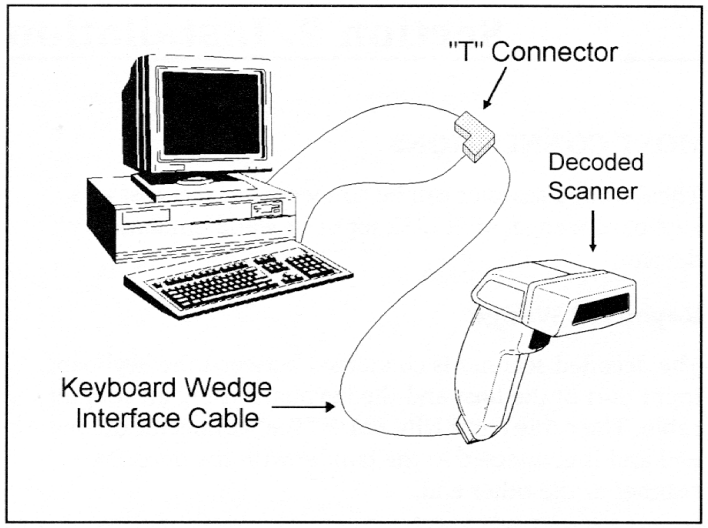


Figure 1. Keyboard Wedge Installation

Keyboard Wedge

The scanner is connected between the keyboard input port of the host computer and the keyboard itself using a "Y" adapter cable. The cable has either a DIN-5M/F or a Mini-DIN-6 M/F connector at one end, and is connected to the handle of the scanner at the other end.

To connect the scanner to the host, disconect the keyboard from the computer. Insert the male end of the "Y" cable into the keyboard port. Then connect the keyboard to the female end of the "Y" connector. This "wedges" the scanner in between the host and the keyboard.

Manually-entered data from the keyboard passes through the unit to the host, leaving the keyboard fully functional at all times. Scanned data is transmitted to the host keyboard port, where it appears to the host as coming directly from the keyboard. This makes the scanner as a data source completely transparent to the host's application software. In other words, if it is expecting data from the keyboard, that same data can be input via bar code through the scanner and make no difference to the host.

Since the host computer's application software is expecting data to be input in a particular order and format, the scanner's output can be configured to simulate the keyboard-entered data stream by adding terminating characters and special preamble and/or postamble character strings to scanned data.

Power for the scanner in keyboard wedge mode is obtained from the host computer's keyboard port.

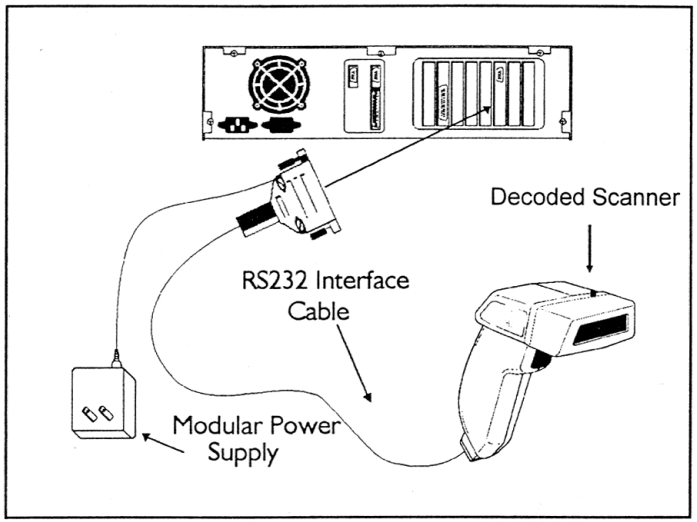


Figure 2. RS-232 Installation

RS-232 Interface

This type of interface can be used when the distance between the scanning station and the host computer is greater than allowable for the keyboard wedge configuration.

The scanner is connected to the host's RS-232 communications port using a Serial I/F cable assembly. The cable has a DB-25P connector at one end, and is connected to the handle of the scanner at the other end. (An adapter can be used to connect to a DB-9P RS-232 port.)

Scanned data is transmitted to the host in a serial ASCII data format. As with the keyboard wedge configuration, the scanner's output can be formatted with terminating characters and special preamble and/or postamble character strings to match the data format expected by the terminal.

The terminal must be configured to accept the scanned data and to perform the appropriate processing. Care must be taken to ensure that the RS-232 parameters (baud rate, data bits, Start/Stop characters, parity, and handshaking method) match those expected by the terminal.

Just transmitting the data to the serial port does not necessarily mean it will appear on the screen as if it were entered manually. If the terminal is of the programmable type that can run DOS programs (i.e. a PC operating in terminal mode), then a TSR (Terminate and Stay Resident) program can be run in the background to take the data from the serial port and insert it into the host's keyboard buffer. In this way, data from a serial port appears to the host computer as if it had been manually entered via the keyboard, in a manner similar to keyboard wedge operation.

There is insufficient power available on a standard RS-232 serial port to power a decoded scanner, so an external wall-mounted power module must be used. Connect the power cable from this unit to the power receptacle located on the side of the DB-25S connector.

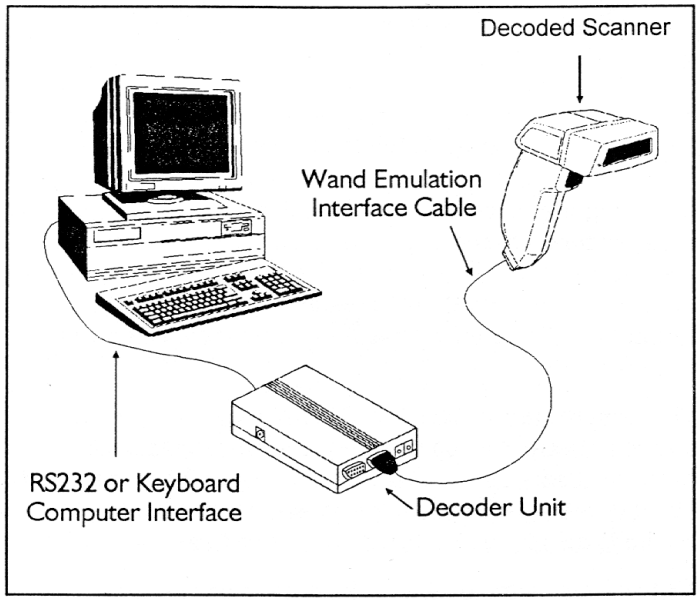


Figure 3. Wand Emulation Installation

Wand Emulation

The Wand Emulation mode is used when a connection needs to be made to a portable terminal or decoder that is expecting input from a wand scanner. The output of the decoded scanner in this mode is an undecoded TTL (0 to +5V) signal that represents the bar-space pattern of the bar code being read.

When the unit is configured in the Wand Emulation mode, it must also be programmed to output the data in the code format that the decoder or terminal is expecting. Because many external decoders are not capable of accepting high scan rates via the wand input port, the output data rate is slowed to simulate a 10 inch per-second scan rate.

In the Wand Emulation mode, power is obtained directly from the wand input port of the decoder or terminal.

Section 3
CONFIGURATION

The decoded CCD scanner must be appropriately configured to your application. Configuration settings enable the scanner to work with the host system. They also set RS-232 port parameters (if used) and specify the bar code symbology to be read (along with the appropriate reading restrictions).

These settings are programmed into the scanner by scanning bar codes from the menus included in this section. Once selected, these configuration settings are stored in the scanner in non-volatile memory (so they are not affected by the cycling of power).

Bar codes to be used for the configuration process are grouped into menus of related settings. Each setting must be programmed independently.

Default Settings

The decoded CCD scanner is shipped from the factory with the default settings already programmed. In the following feature descriptions and configuration menus, these settings are shown in **boldface**. The scanner can be reset to the default settings at any time by entering SETUP mode and then scanning the RESET TO DEFAULT symbol from the GENERAL SELECTIONS menu. Alternately, each individual group of settings can be reset to the group's default settings, without affecting the settings of other groups, by scanning the RESET TO DEFAULT symbol for that group.

Terminal Type Selections

The decoded CCD scanner can be programmed to interface to a number of different terminal types. The terminal types supported are:

IBM PC/AT Keyboard
IBM PC/XT Keyboard
IBM PS/2 models 50, 60 and 80 Keyboard
IBM PS/2 models 30 and 25 Keyboard
IBM PS/2 model 70 Keyboard
IBM 3151 Keyboard
Macintosh, with ADB Keyboard
RS232 Serial Port
Wand Emulation
Notebook Computer (IBM Thinkpad/TI travelmate)
Other (See Appendix C for a complete list)

General Selections

This group of configuration settings define the basic operating parameters of the scanner.

1. Trigger Mode (**Manual** or Triggerless): Since CCD technology is low-power and has no internal moving parts, it can sustain constant running. In the MANUAL mode, the scanner is activated only when the trigger is depressed, and remains on until the trigger is released or a good read is completed. In the TRIGGERLESS mode, the scanner is activated when powered-up

and remains on constantly. For protection against repeated scans, the scanner, in TRIGGERLESS mode, requires two seconds between scans of the same bar code to prevent unwanted double-reads.

2. Beep Volume (Off, Low, or **High**): The beep volume can be adjusted to two different levels, or turned off entirely.

3. Caps Lock (On, **Off**, or Auto): This feature offers control over the case outputted to an IBM PC/AT or compatible keyboard. OFF sends upper or lower case characters exactly as found in the bar code, and the PC reverses them only if the keyboard "Caps Lock" function is on. ON reserves the upper-case characters as found in the bar code and converts the lower-case characters to upper case. (The PC re-reverses them only if keyboard "Caps Lock" is on. AUTO senses the "Caps Lock" setting of the keyboard and outputs characters exactly as found in the bar code, if the keyboard "Caps Lock" is off, and reverses them if the keyboard "Caps Lock" is on.

4. Intercharacter Delay (2, **5**, 10, 20, 50, or 100 milliseconds): This is the time period the scanner will wait before sending the next successive character. Certain terminals and computers require an intercharacter delay to simulate their keyboard's intercharacter delay.

5. Interblock Delay (**0**, 10, 30, 100, 300, or 1000 milliseconds): This is the time period the scanner will wait before transmitting the next successive data block. Some host systems need additional time between data blocks to process the information.

6. Language (**U.S.**, U.K., Swiss, Swedish, Spanish, Norwegian, Italian, German, French, or Japanese): This selection defines the scan code sent to the host for each character.

7. Code ID (On or **Off**): Each bar code symbology can be assigned a CODE ID character. This character is added to the beginning of the scanned data. The host can use this character to ensure that the data received came from the appropriate type of symbol.

8. Automatic Verification Mode Option (**Default = 01**): This option scans the same bar code a specified number of times and then compares the information. This is done with a single activation of the trigger. If the data matches, it is outputted to the host computer.

9. Scan Verification (On or **Off**): In order to ensure the accuracy of scanned data from marginal or poorly-printed bar code labels, a second confirmation scan can be required before the scanner will accept the data. When this option is enabled, the scanner must be triggered a second time and both scans are then compared. If they match, the scanned data is considered good.

10. Function Code (On or **Off**): The standard computer keyboard contains more keys than are supported by the ASCII code table (such as the F1-F12 function keys). The decoded CCD scanner allows the key codes for these functions to be used in message formatting. When this feature is set to ON, key codes can be scanned from the Function Code Table in Appendix A and included in the data stream as part of the message string.

Message Formatting

These settings can arrange scanned data into a formatted message block. Such a block would be arranged like this:

{Preamble} {Code ID} {Data} {Terminator} {Postamble}

1. Terminator Character (**Enter(CRLF)**, Return (CR), Field Exit (LF), or None): For some applications, it may be convenient to end a string of scanned data with a terminator character. With keyboard entry, for example, it is common to have the operator signify the end of input data by hitting the ENTER key on the keyboard. The terminator character serves this same function.

2. Preamble (**0** to 16 ASCII Characters): A preamble is a string of characters that can be inserted in front of the scanned data. Special characters can be used to identify a specific scanning station or to format a message header expected by the host computer. Any character string from the Full ASCII Table or the Function Code Table in Appendix A may be used.

3. Postamble (**0** to 16 ASCII Characters): The postamble serves the same purpose as the preamble, except it is a string of characters added to the end of scanned data (and after any terminator characters).

RS-232 Interface Parameters

This group of settings contains the parameters used for RS-232 communication.

1. Baud Rate (300, 600, 1200, 2400, 4800, **9600**, or 19.2K bps): The data rate for receiving and transmitting RS-232 data is specified here.

2. Data Bits (7 or **8**): The number of data bits used to define the character. Seven data bits can define 128 individual characters, eight bits can define 256 individual characters.

3. Parity (Even, Odd, Mark, Space, or **None**): RS-232 communications can define a parity "check bit" to be added to each character as it is transmitted. This check bit can be true for an odd number of "1" bits or an even number of "1" bits in the data character. The user may also choose to always define the parity bit as a mark (true) or a space (false). Selecting NONE results in no parity bit.

Note: The decoded CCD scanner must use a total of 10 or 11 bits to define a character frame. You cannot select "7" data bits with the NONE parity option. If you do, the scanner will format the character frame as 8 data bits with no parity.

4. Handshaking (**X-On/X-Off**, RTS/CTS): Some type of

"handshaking" or "flow control" must be used between any two communicating RS-232 devices to prevent data from being transmitted before the receiving device can accept it. The handshake signal interrupts the flow of data until the receiving device is ready to accept it.

5. Stop Bit (**One** or Two bits): The stop bit defines the number of bits used to end the data frame. Some older equipment needs extra time after receiving a character in order to process it, and therefore requires two stop bits.

6. X-On Character (**DC1**, DC2, or any one ASCII Character): The normal selections are DC1 or DC2. If another character is specified, make sure it will not occur in the normal data transmission.

7. X-Off Character (**DC3**, DC4, or any one ASCII Character): The normal selections are DC3 or DC4. If another character is specified, make sure it will not occur in the normal data transmission.

Wand Emulation

1. Scan Rate (5, **10**, 15, 20, 30, 50, or 70 ips): This sets the speed at which the output signal is transmitted. It should be set to the highest setting that the external decoder can reliably accept.

2. Output Code (**Same** or Code 39): The SAME option will output the scan pattern in the same code format of the scanned symbol. If CODE 39 is selected, the output will always be in Code 39 format.

3. Bar Code Polarity (**Black High** or White High): This selects the polarity of the output signal. If BLACK HIGH is selected, a high voltage will represent a black bar. If WHITE HIGH is selected, a high voltage will represent a space.

4. Wide to Narrow Ratio (2.0:1, **2.5:1**, or 3.0:1) This sets the ratio of the scanned bar code signal transmitted to the host computer.

Bar Code Selections

Bar code selections are separated into two groups: Industrial and Retail. Industrial bar codes may contain a variable number of characters. Retail bar codes always contain a specific number of characters.

Industrial Bar Codes - Code 39

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the data from the symbology will be disregarded.

2. Full ASCII (**On** or Off): The standard Code 39 symbology supports only 43 characters. The number of characters encoded can be expanded by using character pairs to identify the full ASCII 128 character set. When this feature is ON, the scanner will search for these character pairs and transmit only the full ASCII single character equivalent to the host. If FULL ASCII is enabled and used to read a standard Code 39 symbol, any combination of the defined character pairs will be reported to the host as the single character equivalent. If disabled and a Full ASCII Code 39 symbol is scanned, the scanner will report each of the characters in the full ASCII pair as individual characters. The scanner has no way of telling if the symbol is encoded in standard Code 39 or full ASCII Code 39.

3. Check Digit (Yes or **No**): If enabled, the scanner tests for a check digit by taking the last character in the decoded data stream as a check digit. It then calculates the correct check digit for the remaining data and compares that to the last data character. If it is the same, the scanned data is accepted. If not, the data is rejected. If the check digit option is not enabled, the scanner will assume the last data character read from the symbol is part of the data stream and will not make a comparison test.

4. Send Check Digit (Yes or **No**): If enabled, the scanner can either send the check digit as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

5. Send Start/Stop Characters (Yes or **No**): A unique character is used as the first and last character in a Code 39 symbol. It is printed as an asterisk (*). Some applications require that these characters be transmitted with the scanned data, while others specify they must not be sent.

6. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

7. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

Interleaved 2 of 5

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Fixed Length (On or **Off**): Interleaved 2 of 5 bar codes are commonly printed in a fixed format containing a fixed number of characters. If this option is turned ON, the first Interleaved 2 of 5 bar code scanned after powering up will set the length of all other symbols scanned afterwards. If the succeeding scans do not match the length of the first scan, the scan will be rejected by the scanner. The scanner must be powered down and powered up again before an Interleaved 2 of 5 bar code of a different length will be accepted.

3. Check Digit (Yes or **No**): If enabled, the scanner takes the last character in the decoded data stream as a check digit, then calculates the correct check digit for the remaining data and compares it to the last data character. If it is the same, the data is accepted. If not, the data is rejected. If the check digit option is not enabled, the scanner will assume the last data character read

from the symbol is part of the data stream and not make a comparison test.

4. Send Check Digit (Yes or **No**): If enabled, the scanner can either send the check digit as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

5. Min Length (**4**, 1 to 60): Sets the minimum number of data characters that will be accepted for this symbology. The Interleaved 2 of 5 symbology must encode numbers in pairs, if the minimum length is set to an odd number, the scanner will automatically use the next higher number for this setting. If the minimum length is set higher than the maximum length, all readings will be rejected.

6. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. The Interleaved 2 of 5 symbology must encode numbers in pairs, so if the maximum length is set to an odd number, the scanner will automatically use the next lower number for this setting. If the maximum length is set lower than the minimum length, all readings will be rejected.

Industrial 2 of 5

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Fixed Length (On or **Off**): Industrial 2 of 5 bar codes are commonly printed in a fixed format containing a fixed number of characters. If this option is turned ON, the first Industrial 2 of 5 bar code scanned after powering up will set the length of all other symbols scanned afterwards. If the succeeding scans do not match the length of the first scan, the scan will be rejected by the scanner. The scanner must be powered down and powered up again before an Industrial 2 of 5 bar code of a different length will be accepted.

3. Check Digit (Yes or **No**): If enabled, the scanner takes the last character in the decoded data stream as a check digit, then calculates the correct check digit for the remaining data and compares it to the last data character. If it is the same, the data is accepted. If not, the data is rejected. If the check digit option is not enabled, the scanner will assume the last data character read from the symbol is part of the data stream and not make a comparison test.

4. Send Check Digit (Yes or **No**): If enabled, the scanner can either send the check digit as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

5. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

6. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

Code 128

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. The **Check Digit** feature is manditory for this symbology.

3. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

4. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maxi-

mum length is set lower than the minimum length, all readings will be rejected.

Codabar

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Send Start/Stop Characters (Yes or **No**): Codabar uses the A, B, C, and D characters as Start and Stop characters, giving 16 unique Start/Stop character combinations. Some applications require that these characters be transmitted with the data, while others specify that they must not be sent.

3. Check Digit (Yes or **No**): If enabled, the scanner takes the last character in the decoded data stream as a check digit, then calculates the correct check digit for the remaining data and compares it to the last data character. If it is the same, the data is accepted. If not, the data is rejected. If the check digit option is not enabled, the scanner will assume the last data character read from the symbol is part of the data stream and not make a comparison test.

4. Send Check Digit (Yes or **No**): If enabled, the scanner can either send the check digit as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

5. Min Length (**2**, 1 to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

6. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

MSI/Plessey

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Send Check Digit(s) (Yes or **No**): The MSI/Plessey symbology requires a check digit, and is capable, as an option, of having two check digits. The scanner can either send the check digit(s) as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

3. Single Mod 10 Check Digit (Yes or **No**): If enabled, the scanner takes the last data character decoded and uses it for comparison against the internally-calculated modulo 10 check digit. If they are the same, the scanned data is accepted and transmitted to the host computer. If not, the scan is rejected.

4. Two Mod 10 Check Digits (Yes or **No**): For increased data integrity, the MSI/Plessey symbology can be printed with two modulo 10 check digits. If this option is enabled, the scanner takes the last two data characters decoded and use them for comparison against the internally-calculated check digits using the remaining data. If they are the same, the scanned data is accepted and transmitted to the host computer. If not, the scan is rejected.

5. Mod 10/Mod 11 Check Digits (Yes or **No**): For increased data integrity, the MSI/Plessey symbology can be printed with two check digits, one using a modulo 10 calculation and the other using a modulo 11 calculation. If this option is enabled, the scanner will take the last two data characters and use them for comparison against the internally-calculated check digits using the remaining data. If they are the same, the scanned data is accepted and transmitted to the host computer. If they do not match, the scan is rejected.

6. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the mini-

mum length is set higher than the maximum length, all readings will be rejected.

7. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

Code 93

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

3. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

Code 11

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Two Check Digits (**Yes** or No): This symbology can be printed with two modulo 11 check digits. If this option is enabled, the scanner takes the last two data characters decoded and use them for comparison against the internally-calculated check digits using the remaining data. If they are the same, the scanned data is accepted and transmitted to the host computer. If not, the scan is rejected.

3. Send Check Digit(s) (Yes or **No**): This symbology requires a check digit, and is capable, as an option, of having dual

check digits. The scanner can either send the check digit(s) as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

4. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

5. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

BC412

1. **Enable**/Disable: If enabled, the symbology will be read subject to the reading restrictions specified by this set of options. If disabled, the scanned data will be disregarded.

2. Min Length (**1** to 60): Sets the minimum number of data characters that will be accepted for this symbology. If the minimum length is set higher than the maximum length, all readings will be rejected.

3. Max Length (1 to **60**): Sets the maximum number of data characters that will be accepted for this symbology. If the maximum length is set lower than the minimum length, all readings will be rejected.

4. Send Check Digit (Yes or **No**): This symbology requires a check digit. If enabled, the scanner can either send the check digit as part of the scanned data, or strip it from the scanned data before transmission to the host computer.

Retail Bar Codes - UPC

Retail bar codes are based on the product code encoding algorithms of the Uniform Code Council. These are commonly referred to as the UPC/EAN symbologies.

1. UPC-A **Enable**/Disable: This is a fixed-format symbology, and there are no variations allowed. If disabled, the data from this symbology will be disregarded.

2. UPC-E **Enable**/Disable: The UPC-E symbology is a special version of the UPC-A specification. Again, it is a fixed-format symbology and no variations are allowed. If disabled, the data from this symbology will be disregarded.

3. Send Number System Digit (**Yes** or No): The first encoded digit in the UPC-A symbol is the number system digit. If this feature is enabled, the first digit of the transmitted data stream will be the number system digit, and it will be followed by the manufacturer's number. If this feature is disabled, the first five digits transmitted will be the manufacturer's number.

4. Send Check Digit (**Yes** or No): The check digit is mandatory in the UPC symbology. If this feature is enabled, the scanner can either send the check digit as the last character in the data stream transmitted, or strip it from the scanned data before transmission to the host computer.

5. UPC-E Expansion (Yes or **No**): The UPC-E symbology uses a special algorithm to suppress zeros in the encoded data. The suppressed information can be restored by the scanner or the host system. If this feature is enabled, the scanner will restore the data to its original format. If the host computer is set up to do the expansion, this option should not be used.

6. Read Two Digit Addendum (Yes or **No**): If enabled, the scanner will decode the two-digit secondary symbol when it is scanned with the primary symbol, adding the data to the end of the transmission. If not, any two-digit secondary symbol will be ignored.

7. Read Five Digit Addendum (Yes or **No**): This option operates in the same manner as the Read Two Digit Addendum option, except it enables the reading of a five-digit secondary

symbol.

8. Addendum Required (**Yes** or No): If a two or five-digit addendum is enabled, then enabling this feature will require an addendum be present before a good read is registered. If not, then symbols both with and without the addendum will be accepted.

9. Add Separator Space (**Yes** or No): This option is used with the Two and Five-Digit Addendum options. If enabled, an ASCII space character is inserted between the data decoded from the primary UPC symbol and the data decoded from the addendum symbol.

10. Send UPC-A as EAN-13 (Yes or **No**): The EAN-13 symbology contains an additional character encoded in the symbol. In applications that may be reading both symbologies, it is sometimes desirable to send UPC-A symbols in the EAN-13 format. This allows the application to receive the data scanned from both symbologies in the same format.

EAN

1. EAN-13 **Enable**/Disable: EAN-13 is a fixed-format symbology, and there are no variations allowed. If disabled, the data from this symbology will be disregarded.

2. EAN-8 **Enable**/Disable: If enabled, this symbology will read, subject to the reading restrictions specified. If disabled, the data from this symbology will be disregarded.

3. Send Induced Country Code Character (**Yes** or No): The EAN symbology adds an additional digit to the beginning of the data to give a two-digit country code. If enabled, this induced character is the first character transmitted. If disabled, the induced character is not transmitted.

4. Send Check Digit (**Yes** or No): The EAN check digit is mandatory. If enabled, the scanner will send the check digit as

the last character transmitted. If not, the check digit will be suppressed before transmission.

5. Read Two Digit Addendum (Yes or **No**): If enabled, the scanner will decode the two-digit secondary symbol when it is scanned with the primary symbol, adding the data to the end of the tranmission. If not enabled, any two-digit secondary symbolwill be ignored.

6. Read Five-Digit Addendum (yes or **No**): This Feature operates in the same manner as the Read Two Digit Addendum option, except it enables the reading of a five-digit secondary symbol.

7. Addendum Required (**Yes** or No): If enabled, a two or five-digit addendum will be required before a good read is registered. If not enabled, symbols with and without an addendum will be accepted.

8. Add Separator Space (**Yes** or No): This option is used in conjunction with the Two and Five-Digit Addendum options. If enabled, an ASCII space character is inserted between the data decoded from the primary EAN symbol and the data decoded from the addendum symbol.

Code ID Definition

If the CODE ID option is enabled under General Selections, the user can select the character used to identify each symbology. These characters may be read from the Full ASCII Table in Appendix A. It is advisable to use only lower-case alpha characters, since only full ASCII Code 39 and Code 128 can encode these characters, and they are less likely to be mistaken for data.

Default Code IDs are:

UPC-A	a
UPC-E	b
EAN-8	c
EAN-13	d
Code 39	e
2 of 5	f
2 of 5	g
Code 128	h
MSI/Plessey	i
Codabar	j
Code 11	k
Code 93	l
BC412	m

Reviewing Configuration Settings

The settings for each group can be reviewed by first scanning the ENTER SETUP MODE bar code for that specific group, followed by the REVIEW SETTINGS bar code. The decoded CCD scanner will then send a list of the settings to the host computer. The COPY CON command is programmed to precede the listing; it is needed to prevent a BAD COMMAND OR FILE NAME error message.

```
copy con
==========================================================
XXXX Decoder Version 1.X 07/15/95
Industrial Bar code Setting
Code 39 Enabled; Full ASCII Off
Min Length = 01; Max Length = 60; No Check Digit; Stop-Start Send
I 2 0f 5 Enabled; Fixed Length Off
Min Length = 01; Max Length = 60; No Check Digit
S 2 of 5 Enabled; Fixed Length Off
Min Length = 01; Max Length = 60; No Check Digit
Code 128 Enabled
Min Length = 01; Max Length = 60
Codabar Enabled; StopStart Not Send
Min Length = 01; Max Length = 60; No Check Digit
MSI Enabled; Check Digit Not Send
Min Length = 01; Max Length = 60; Check Digit Double Module 10
Code 11 Enabled; Two check digits
Min Length = 01; Max Length = 60; Check Digit no send
Code 93 Enabled
Min Length = 1; Max Length = 60
BC412 = Enabled
```


Resetting To Defaults

There are two ways to reset the decoded CCD scanner to its default settings. The first way is to scan the RESET TO DEFAULT bar code included with the menu for a particular group. This will reset only that specific group to the default settings. If you want to reset all groups to their default settings, first scan the ENTER SETUP MODE bar code under Terminal Type Selections, followed by the RESET ALL bar code.

Setting	*Default*
Terminal Selection	
Type	IBM PC/AT Keyboard
General Selection	
Beep Volume	High
Intercharacter Delay	5 milliseconds
Interblock Delay	0 milliseconds
Language	United States
Code ID	Off
Scan Verification	Off
Automatic Verification	01
Function Code	Off
Message Formatting	
Terminator Character	CRLF
Preamble	None
Postamble	None
RS-232 Port Settings	
Baud Rate	9600
Data Bits	8
Parity	None
Handshaking	X-On/X-Off
Stop Bit(s)	1
X-On	DC1 (\11)
X-Off	DC3 (\13)
Wand Emulation	
Emulation Mode	Code 39
Scan Rate	10 inches per second
Bar Code Polarity	Black = High
Wide/Narrow Ratio	2.5:1

Code 39	
Full ASCII	On
Check Digi	Off
Send Check Digit	No
Send Start/Stop	No
Minimum Length	1
Maximum Length	60
Interleaved 2 of 5	Enabled
Fixed Length	Off
Check Digit	None
Minimum Length	4
Maximum Length	60
Industrial 2 of 5 Enabled	
Fixed Length	Off
Check Digit	None
Minimum Length	1
Maximum Length	60
Code 128	Enabled
Minimum Length	1
Maximum Length	60
Codabar	Enabled
Send Start/Stop	No
Check Digit	None
Minimum Length	2
Maximum Length	60
MSI/Plessy	Enabled
Send Check Digit(s)	No
Check Digits	Modulo 10/Modulo 10
Minimum Length	1
Maximum Length	60
Code 93	Enabled
Minimum Length	1
Maximum Length	60
Code 11	Enabled
Check Digit(s)	2
Send Check Digit(s)	No
Minimum Length	1
Maximum Length	60

BC412	Enabled
Minimum Length	1
Maximum Length	60
Send Check Digit	Yes
UPC-A, -E	Enabled, Enabled
Send Number System Digit	Yes
Send Check Digit	Yes
Expand UPC-E	No
Read 2, 5 Digit Addendum	No, No
Addendum required	Yes
Add Addendum Separator	Yes
Send UPC-A as EAN-13	No
EAN-13, -8	Enabled, Enabled
Send Induced Country Code Digit	Yes
Send Check Digit	Yes
Read 2, 5 Digit Addendum	No, No
Addendum Required	Yes
Add Addendum Separator	Yes
Code ID	
UPC-A	a
UPC-E	b
EAN-8	c
EAN-13	d
Code 39	e
Interleaved 2 of 5	f
Industrial 2 of 5	g
Code 128	h
MSI/Plessey	i
Codabar	j
Code 11	k
Code 93	l
BC412	m
Data Editing	
Edit On/Off	Off
Unmatched Input	Do Not Send

Configuration Via Bar Codes

The decoded CCD scanner can be configured by scanning bar codes from the following menus. The scanner is configured by scanning the desired settings directly into the unit, one parameter at a time. If you have a large number of scanners that have the exact same configuration, please contact the manufacturer for assistance.

Using the Bar Code Menus

1. Scan the ENTER SETUP MODE bar code from the appropriate menu. The decoded scanner will indicate it is in setup mode by emitting two beeps.

2. Scan the bar code for the setting (such as BEEP VOLUME) you wish to change.

3. Scan the bar code for the new setting (such as LOW) or scan the desired sequence of characters from the ASCII Chart in Appendix A.

4. When finished, scan the EXIT SETUP MODE bar code. The unit will emit four beeps to indicate it has saved the new settings and exited the setup mode.

Terminal Type Selections*

Enter Setup Mode

Exit Setup Mode

Review Settings

Reset to Default

Reset All

*See Appendix D. for specific terminal type selections.

General Selections

Enter Setup Mode

Exit Setup Mode

Review Settings

Reset to Default

CCD Trigger Mode Selection

Trigger Mode Select

Manual

Triggerless

Beep Volume

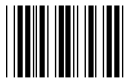
Beep Volume

Off

Low

High

Caps Lock Mode Selection



Caps Lock Select

Off

On

Review Settings

Auto

Intercharacter Delay

Intercharacter Delay

5ms

20ms

2ms

10ms

50ms

100ms

Code ID

Code ID

On

Off

Scan Verification

Scan Verification

On

Off

Function Code

Function Code

On

Off

Interblock Delay

Interblock Delay

0ms

10ms

30ms

100ms

300ms

Language Select

Language Select

U.S.

U.K.

Swiss

Swedish

Spanish

Norwegian

Italian

German

French

Japanese

Message Formatting

/E/D/FC

Enter Setup Mode

CZ

Exit Setup Mode

CY

Review Settings

CX

Reset to Default

Terminal Character

C1

Terminator Character

A

CRLF

B

CR

C

LF

D

None

Preamble and Postamble

C2

Preamble

C3

Postamble

1. Scan Preamble or Postamble symbol to enable either feature.
2. Scan up to 16 characters from Appendix A for the contents of the preamble or postamble.

RS-232 Parameters

/E/D/FE

Enter Setup Mode

EZ

Exit Setup Mode

EY

Review Settings

EX

Reset to Default

Baud Rate

E1

Baud Rate

A

300

B

600

C

1200

D

2400

E

4800

9600

19.2K

Data Bits

Data Bits

7 bits

8 bits

Parity

Parity

Even

Odd

Mark

Space

None

Handshaking

Handshaking

X-On/X-Off

RTS/CTS

DTR/DSR

Stop Bits

Stop Bits

1 bit

2 bits

X-On Character

X-Off Character

1. Scan X-ON symbol or scan X-OFF symbol.
2. Scan one character from ASCII chart. ***DC1*** *or DC2 are typical for the X-ON character, and* ***DC3*** *or DC4 are typical for the X-OFF character.*

Wand Emulation

Enter Setup Mode

Exit Setup Mode

Review Settings

Reset to Default

Scan Rate

Scan Rate

5

10

15

20

30

50

70

Output Code

Emulation Mode

Same Code

Code 39

Bar Code Polarity

Bar Code Polarity

Black High

White High

Wide/Narrow Ratio

Wide/Narrow Ratio

2.0:1

2.5:1

3.0:1

Industrial Bar Codes

Enter Setup Mode

Exit Setup Mode

Review Settings

Reset to Default

Minimum Length

Maximum Length

1. Scan the bar code symbol for the selected symbology (such as Code 39).
2. Scan the symbol for MINIMUM LENGTH or MAXIMUM LENGTH.
3. Scan two digits from the ASCII chart (RANGE = 01 to 60).
NOTE: You cannot set a minimum or maximum length for a retail bar code.

Code 39

CODE 39

Enable

Disable

Full ASCII

On

Full ASCII Off

No Check Digit

Send Check Digit

Do Not Send Check Digit

Send Start/Stop

Do Not Send Start/Stop

Code 128

CODE 128

Enable

Disable

Interleaved 2 of 5

Interleaved 2 Of 5

Enable

Disable

Fixed Length On

Fixed Length Off

No Check Digit

Send Check Digit

Do Not Send Check Digit

Industrial 2 of 5

Industrial 2 Of 5

Enable

Disable

Fixed Length On

Fixed Length Off

No Check Digit

Send Check Digit

Do Not Send Check Digit

Codabar

Codabar

Enable

Disable

Send Start/Stop

Do Not Send St/Sp

No Check Digit

Send Check Digit

Do Not Send Check Digit

MSI/Plessy

MSI/Plessey

Enable

Disable *B*

Send Check Digit

Do Not Send Check Digit

Single Mod 10 Check Digit

Mod 10/Mod 10 Check Digits

Mod 10/Mod 11 Check Digits

Code 93

Code 93

Enable

Disable

Code 11

Code 11

Enable

Disable

One Check Digit

Two Check Digits

Send Check Digit(s)

Do Not Send Check Digit(s)

BC412

BC412

Enable

Disable

Send Check Digit

Do Not Send Check Digit

Retail Bar Codes

Enter Setup Mode

Exit Setup Mode

Review Settings

Reset to Default

EAN Setup

ENTER EAN SETUP

EAN-13

Enable

Disable

EAN-8

Enable

Disable

Induced Country Code Digit

Send

Do Not Send

Check Digit

Send

Do Not Send

Two-Digit Addendum

Read

Do Not Read

Five-Digit Addendum

Read

Do Not Read

Addendum Required

Required

Not Required

Addendum Separator

Add

Do Not Add

UPC Setup

ENTER UPC SETUP

UPC-A

Enable

Disable

UPC-E

Enable

Disable

Number System Digit

Send

Do Not Send

Check Digit

Send

Do Not Send

UPC-E Expansion

Expand

Do Not Expand

Two-Digit Addendum

Read

Do Not Read

Five-Digit Addendum

Read

Do Not Read

Addendum Required

Required

Not Required

Addendum Separator

Add

Do Not Add

UPC-A to EAN-13

Convert

Do Not Convert

Code ID Definition

Enter Setup Mode

Exit Setup Mode

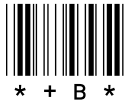
Review Settings

Reset to Default

Code ID Selection

1. Scan the bar code in the left column to select the desired symbology.
2. Scan one character from Appendix A for the new ID.

UPC-A Default = a



UPC-E Default = b

EAN-8 Default = c

EAN-13 Default = d

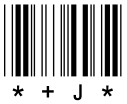
Code 39 Default = e

Interleaved 2 of 5 Default = f

Industrial 2 of 5 Default = g

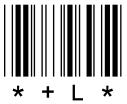
Code 128 Default = h

MSI/Plessey Default = i



Codabar Default = j

Code 11 Default = k



Code 93 Default = l

BC412 Default = m

Data Editing

The decoded CCD scanner has a data editing feature incorporated into its firmware. This feature allows scanned information to be in the exact format expected by the host software, eliminating the need for modifications to the application software.

The scanned data (the input record from a single bar code) can be divided up into a number of separate fields. The data in each of these fields can then be edited, and new fields can be defined using the Data Edit commands. The edited data fields are then transmitted to the host in any order desired, regardless of their position in the original bar code.

The following editing functions can be performed on the data retained in the scanner's memory:

1. Validation of the Input Data: The input data can be checked for length, matched to a preset value, or restricted to a certain type of input (i.e., Code 39, Code 128, etc.).

2. Parse the Data: The data can be divided into separate fields.

3. Rearrange the Data: The fields created by the Data Editing function can be transmitted to the host computer in any order desired, regardless of the order in which they occurred in the bar code.

4. Insert Character Strings into the Output Data Record: Character strings can be defined and inserted at any place in the data output record before it is transmitted to the host.

5. Delete a Character String from a Record: You can delete a pre-defined string of characters, or characters from specified positions of the data input record, before it is transmitted to the host.

6. Search for a Character String: You can search the data input record for a specified string of characters. These characters can then be deleted, moved, or modified using the other Data Editing commands.

7. Duplicate Fields: A field can be transmitted to the host as many times as desired, and in any order desired.

8. Insert Time Delay: Time delays can be inserted between fields to allow the host to complete an operation.

Fields

By separating the input data record into smaller blocks (called "fields"), each block can be edited separately. Additional fields can also be added to the record, allowing specific functions, such as carriage returns or keyboard function keys, to be inserted at any point.

Fields are identified by a one-character ID starting with the character "A," up to and including "Z," in the order they were created, allowing as many as 26 fields to be defined. These fields are then sent to the host in the order which the user specifies. For example, if the input data record is:

12345ABC

and your application software is looking for the data to be in the following format:

ABC<CR>

12345<CR>

then we must break the input data record up into two fields, reverse the order they are sent to the host, and insert a <CR> after each field. We do this by defining the following fields:

Field A = 1234

Field B = ABC

Field C = <CR>

and sending the data as

{Field B}{Field C}{Field A}{Field C}

Formulas

The set of instructions programmed into the decoded CCD scanner to edit scanned data is referred to as the data editing "formula." More than one formula can be resident in the scanner at one time. If more than one formula resides in memory, the decoded scanner will apply the first formula to the input data. If the scanned data matches the criteria of the first formula, then it

will apply the data editing functions and output the reformatted data to the host.

If the scanned data does not match the criteria spelled out in the first formula, then the criteria of the second formula is applied. This process continues for each of the successive formulas until a match is found. If no matches are found to any of the formulas programmed into the decoded scanner, then nothing is transmitted to the host unless the "Send Unmatched" mode is enabled. In such a case, the scanned data will be transmitted in its original format to the host.

The number of formulas that can be entered into the scanner is limited by the amount of memory available. Caution should be used when entering a number of long formulas, as the amount of non-volatile memory available for formula storage is very limited.

The last programmed formula(s) will be valid until the unit is powered off and then it will be lost.

Formula Sequence

The sequence of a data editing formula always follows the following format:

CODE_IDS[LENGTH][MATCH]DIVIDE[ADD]SEND

The components enclosed in brackets are optional. Multiple conditions may be programmed for each major group (i.e., several code IDs can be used following the CODE_ID command group), but all like commands must be grouped together. For example, several ADD FIELD commands can be programmed, but all of them must be grouped together and placed prior to the SEND FIELD SEQUENCE command.

Note: If Function Codes are to be used with any of the commands, the Function Code capability must be enabled by scanning the FUNCTION CODE ENABLED bar codes from the General Selections menu before entering the DATA EDITING SETUP mode.

Command Descriptions

The following commands are invoked by scanning the appropriate EDIT bar code from the Data Editing menu. Spaces shown in the command string are for clarity of illustration and should not be included as part of the command string unless represented by an underline space.

ID CODEID 1 [....IDn]

This command identifies the symbologies that will be accepted as valid. Scan the CODE IDs bar code from the DATA EDITING menu, then scan the default Code ID character from Appendix A for each symbology that will be used for data input. If you have changed the Code ID character, you still must use the default character. The decoded scanner will then limit data input to those symbologies specified.

LENGTH [LEN nn mm]

This command sets the upper and lower limits on the number of characters that will be accepted as valid data. The value of nn (first two digits) sets the minimum length and the value of mm sets the maximum length. Two digits must be entered for nn and mm so that the decoded scanner can correctly parse the command (for example, if you want the minimum length to be two characters, you must enter a value of "02" for nn). This command is optional.

MATCH [MATCH nn string] . .[MATCH nn string]

This command allows you to match any subset of characters (up to a maximum of 60) contained in the scanned input data. The value of nn (first two digits) specifies the position in the input data record that the match is to start. The value of "string" can be any combination of characters (including control and function codes) that can be entered from the ASCII menu tables in Appendix A, up to a maximum of 60 characters.

Note: Two digits must be entered for nn so that the decoded scanner can correctly parse the command (if you want the match to begin at position 2, for example, you must

enter a value of "02" for nn). If you need to match more than one character string, simply add another MATCH command to the formula. This command is optional.

DIVIDE [C nn] [S string]. . .[C nn] [S string]

The DIVIDE commands are used to divide the scanned data record into separate fields for processing by the Data Editing program. A DIVIDE command is required in each formula.

There are three methods that can be used to divide the record:

1. [C nn] If you scan the COUNT command from the Data Editing Menu, followed by two numeric digits, you will create one output field—starting at the first position in the input field—that is nn digits long, and the dividing pointer will be moved to position nn+1 in the input record. Two digits must be entered for nn so that the decoded scanner can correctly parse the command. (For instance, if you want the move the dividing pointer two positions to the right, you must enter a value of "02" for nn).

2. [S string] If you scan the SEARCH command from the Data Editing Menu, followed by any character string, the Data Editing program will search the input data record for a matching string. If a successful match is found, two output fields will be created. The first output field starts at the current position of the dividing pointer and ends at the beginning of the character string. The second field consists of the "matched string" and the divide pointer is moved to the end of the matched string.

3. "Wild Card" Instead of an ASCII search string, a "Wild Card" search can be used. For example, scanning the Search String code from the Data Editing menu, followed by the \01 Alpha, Upper Case Only code from the Wild Card Search Menu, will cause the program to search for the next occurrence of a capital alpha character, and to divide the data record at that point. Only one "Wild Card" can be contained in a string, but multiple strings can be used.

ADD A string ...[A string]

This command allows you to add a character string to the output record. After scanning the ADD FIELD bar code from the Data Editing menu, enter, in sequence, the characters you wish to include in the output record. Any character (or characters) from the ASCII table in Appendix A or the Function Code table in Appendix B can be used. An output field is created containing the character string. This command is optional.

SEND SEND [DLY nn] FIELD_i . . . [DLYnn][FIELD_i]

This command specifies the order in which the defined output fields that have been created will be transmitted. Each output field is assigned an upper case alpha character in the order it is created (for example, the first output field created is assigned the identification character "A," the second "B," and so forth). By scanning the SEND FIELD SEQUENCE bar code from the Data Editing menu, followed by the identification characters of the fields in the order in which you wish to have them transmitted, the output record will contain those fields in the order specified.

In addition to indicating the output field order, you can also add time delays between fields...

DLY nn: By scanning the DELAY X 100MS bar code from the Data Editing menu, followed by scanning two numeric digits (nn), you can add a time delay between records to accommodate processing time required by the host. The amount of time delay added is equal to the value of "nn," multiplied by 100 milliseconds. Therefore, a value of "04" would give a delay of 400 milliseconds.

Data Editing Setup Commands

The following commands are used to set the operating parameters of the decoded CCD scanner's data editing feature.

DATA EDITING ENABLED/DISABLED

Scanning the DATA EDITING bar code from the Data Editing menu, followed by the ENABLED or DISABLED bar code, will enable or disable the Data Editing Feature. When disabled, the data edit formula will be inactive, but will still be retained in the scanner's memory. When enabled, the data edit formula will be used to format the scanned data output record.

SEND/SUPPRESS UNMATCHED

Scanning the UNMATCHED INPUT bar code from the Data Editing menu, followed by SEND or DO NOT SEND, will enable or disable the transmission of data that does not match the restrictions of a data editing formula. When SEND is selected, unmatched data will be transmitted along with any preamble or postamble settings. When DO NOT SEND is selected, no unmatched data will be transmitted. If no MATCH commands are included in a data editing formula, this setting is meaningless.

DEL LINE n

This allows you to delete the nth command in a data editing formula. In this case, "n" is a numeric digit representing the formula to be removed.

CLEAR

Scanning the CLEAR bar code from the Data Editing menu will remove the data editing formula from the decoded scanner memory, disable the Data Editing feature, and set the UNMATCHED INPUT option to DO NOT SEND.

REVIEW

Scanning the REVIEW CONFIGURATION bar code from the Data Editing menu will send the resident data editing formulas—and all other data editing—to the host computer, which will allow you to review the formula settings. The decoded CCD scanner must be connected as a keyboard wedge, or be connected to an RS-232 port running software that takes RS-232 input and places it in the keyboard buffer, for the information to be displayed on the screen.

EXIT

After a data editing formula has been created and reviewed, scanning the EXIT bar code from the Data Editing menu will terminate the DATA EDITING SETUP mode and return the scanner to normal operation.

Data Flow

The decoded CCD scanner processes input data in the following order:

1. Scanned data is first decoded and placed, in an ASCII character format, in the memory of the decoded scanner.

2. Next, the symbology tests (max/min length, check digit, etc.) are applied to the scanned data in memory.

3. Following the successful completion of these tests, the data is processed through the data editing formula (if enabled).

4. If the data matches one of the resident data editing formulas, it is then processed and sent to the output port. If the data does not match one of the data editing formulas, and the UNMATCHED INPUT function is set to DO NOT SEND, the data will be discarded.

5. If, however, UNMATCHED INPUT is set to SEND, the unmatched data will be passed to the Message Processing section of the scanner, where any previously-defined postamble, preamble, and terminator characters will be added before transmission. *Note: No port processing (i.e., postamble, preamble or terminator added) is done when Data Editing is applied to the data output record.*

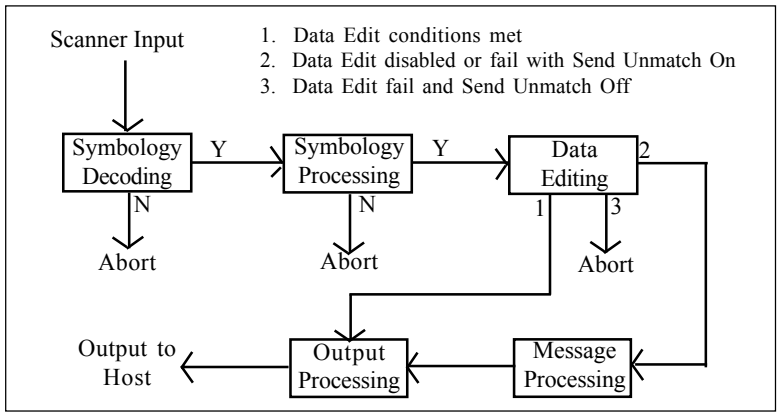


Figure 6. Data Processing Flow Diagram

Example 1

Symbology: Code 128

Scanned Input Data: 76440057320712

Desired Output: Divide the input data record into two fields with one consisting of the first six digits and the second containing the remaining data. The output should have a <<CR>> inserted after each field.

Formula: **ID** h **C** 06 **A** <CR> **SEND** ACBC

Field List:	Field A	764400
	Field B	57320712
	Field C	<<CR>>

Scanning Sequence:

Scan ENTER SETUP MODE in the Data Editing menu
Scan DATA EDITING and ENABLED
Scan CODE IDS and h
Scan COUNT and 06
Scan ADD FIELD and <CR> character
Scan SEND FIELD SEQUENCE and ACBC
Scan EXIT DATA EDITING

Output Data: 764400<<CR>>
57320712<<CR>>

Example 2

Symbology: Code 39

Desired Output: The input record must be Code 39 and exactly seven characters in length, with the seventh character being an "X." It is divided into three fields: the first three characters, the next three characters, and the last character. The output should reverse the order of the first two fields, delete the last character, and add an F1 function code at the end of each field. In addition, a time delay of 900 milliseconds should be added between the fields(after the F1), and another delay of 2000 milliseconds added to the end of the record.

Formula: **ID** e **LEN** 07 07 **M** 07 X **C** 03 **C** 03 **A** <F1> **SEND** BD **DLY** 09 AD **DLY** 20

Field List:		
	Field A	AST
	Field B	798
	Field C	X
	Field D	<F1>

Scanning Sequence (prior to data editing, enable function codes in general selection):

Scan ENTER SETUP MODE in the Data Editing menu
Scan DATA EDITING and ENABLED
Scan CODE IDS and e
Scan LENGTH and 0707
Scan MATCH and 07X
Scan COUNT and 03
Scan COUNT and 03
Scan ADD FIELD and <F1> character
Scan SEND FIELD SEQUENCE and BD
Scan DELAY X 100MS and 09
Scan B and C characters
Scan DELAY X 100MS and 20
Scan EXIT DATA EDITING
Output Data: 798<<F1>>.9s delay AST<<F1>>2s delay

Example 3

%B012^FISH^96124379F%
Symbology: Code 128

Desired Output: Divide it up into seven fields in the following manner. First field is the first two characters. Second field is all characters from the first field to the first "^" character. Third field is the first "^" character. Fourth field is the data between "^" marks. Fifth field is the next "^" character. Sixth field is the next four characters. Seventh field is the remaining characters. In addition, a <CR> is inserted between fields in the data output record. The fourth, second, and sixth fields only are outputted.

Formula: **ID** h **C** 02 **S** ^ **S** ^ **C**04 **A**<CR> **SEND** DHBHFH

Field List:		
	Field A	%B
	Field B	0123774965
	Field C	^
	Field D	FISH/MARY
	Field E	^
	Field F	9612
	Field G	4379F%
	Field H	<CR>

Scanning Sequence:

Scan ENTER SETUP MODE in the Data Editing menu
Scan DATA EDITING and ENABLED
Scan CODE IDS and h
Scan COUNT and 02
Scan SEARCH STRING and the ^ character
Scan SEARCH STRING and the ^ character
Scan COUNT and 04
Scan ADD FIELD and the <CR> character
Scan SEND FIELD SEQUENCE and DHBHFH
Scan EXIT DATA EDITING

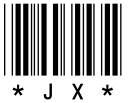
Output Data:
FISH/MARY<CR>0123774965<CR>9612<CR>

Data Editing Bar Code Menu

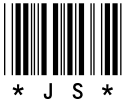
Enter Setup Mode

Exit Data Editing

Review Configuration



Clear



Delete Line

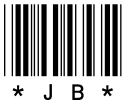
Data Editing

Data Editing

Enabled

Disabled

Unmatched Input



Unmatched Input

Send

Do Not Send

Code IDs

Code IDs

1. Scan CODE IDS
2. Scan default Code ID(s) from Appendix A

Set Length

Set Length

1. Scan two digits from Appendix A for minimum
2. Scan two digits from Appendix A for maximum

Match String

Match String

1. Enter two digits from Appendix A for start position.
2. Enter the string to match for Appendix A (maximum 60 characters).

Count

Count

1. Enter two digits from Appendix A to indicate the next end of field.

Search String

Search String

*1. Enter characters for the search criteria from Appendix A or the following Wild Card Search Men*u.

Add Field

Add Field

1. Scan sequentially the characters to be included in the new field from Appendix A.

Send Field Sequence

Send Field Sequence

1. Scan the field ID characters in the order to be sent (Uppercase Alphabetic A-Z).

Delay x 100ms

Delay x 100ms

1. Enter two digits from Appendix A. Each unit equals 100 milliseconds (i.e. 03=300ms).

Wild Card Search

\00 Alpha, upper and lower case

\01 Alpha, upper case only

\02 Alpha, lower case only

\03 Numeric only

\04 Alpha-numeric

\05 Non-alphanumeric

Section 4
OPERATION

The decoded CCD scanner is easy to operate. Just follow these simple steps:

1. Make sure the scanner is properly cabled and is receiving sufficient power. (See Section 5, Troubleshooting, if there is a cabeling or power problem.)

2. Grip the scanner so the trigger button can be comfortably depressed with the index finger.

3. For contact model CCD scanners, bring the rubber boot into direct contact with the printed surface of the bar code. The bar code can be no wider than the width of the scanning head in order to achieve a successful read.

4. For LR model scanners, the unit will scan best when not in direct contact with the bar code, but slightly elevated. Optimum scanning will occur at a distance of ½ inch to 3 inches. Depending on the width of the bar code, the scanner can scan effectively at a distance of up to 4 inches. (The briefer the bar code, the greater the scanning distance.)

5. Depress the trigger button. The scanner should scan well at angles of up to 45º from the printed surface of the bar code. The LED indicator will light up as red, then change to green to signal a "good read." If a good read is not obtained, the LED indicator will remain red. A beep will also sound to indicate a good read.

6. After a successful read, the scanner's light source will power down to conserve energy. To scan another bar code, aim the unit and depress the trigger button again. (The scanner may be set in "triggerless" mode as well. See page XX for details.)

Section 5
TROUBLESHOOTING

The decoded CCD scanner is easy to install and use. Most problems encountered can be attributed to:

- Incorrect Interface Cabling
- Incorrect Configuration Setup
- Bad Symbol Quality

General Procedures

The troubleshooting process can be simplified by following these simple diagnostic procedures.

1. The unit should emit one long beep when power is first applied. If it does not, then the unit is not receiving power. When the trigger button is depressed, a red scan beam should be visible.

2. Once it has been confirmed that the unit is correctly powered, try scanning the test bar code symbologies in Figure 7. If the unit has been set to the default conditions, scanning each one should result in a "Good Read" (one long) beep from the unit, and the appropriate LED should illuminate.

If scanning results in a "Bad Read" (the "Good Read" LED does not illuminate), then there was a problem with either the scanning technique or the port configuration setting (make sure it is set for the Default conditions). Either way, the unit is operational.

3. Once the symbols can be scanned with "Good Read" results, then proceed to check the interface cabling connections.

Keyboard Problems

Installation of the decoded CCD scanner as a keyboard wedge is generally trouble free, but there are some things to watch for if you are experiencing problems.

Do you have the proper cable?

Most modern computers and terminals use a PC/XT/AT-compatible keyboard. However, the cable connecting it to the keyboard port may have variations in either the signal pins or the connector itself. Make sure that you have the proper cable for the computer/terminal with which you are interfacing.

Does the keyboard work?

Since the data from the keyboard must pass through the scanner, the cabling connections are correct if the keyboard is operational.

Can the host computer accept the data fast enough?

Some computers and terminals are expecting the data rate from the keyboard port to come in at a keystroke rate, and might not be able to accept it as fast as the decoded CCD scanner is transmitting. Try adjusting the intercharacter delay to simulate the effects of keystroke delays.

Does the keyboard port supply enough power?

Most computers supply enough power to the keyboard port to operate the scanner. Occasionally, you will find keyboard ports that supply only a very limited amount of power. The symptom is most commonly visible by a reduced scan width, since there is not enough power to properly operate the beam scanning mechanism.

Interface Problems

Are you using the wand emulation mode with a Code 39 output and the host computer is not set up to accept Code 39 data?

Check the configuration setting of the decoded scanner and make sure the decoder/terminal setup can accept the code format.

The cables seem to be connected properly, but the unit still will not scan bar codes.

There are no industry standards for scanner interface cables, even though they look alike and have a similar connector. The decoded scanner must see the correct signals on the correct pins to operate properly. Make sure the cable you are using is correctly wired to the mating connector. (See Appendix C for the correct pinout information.)

Figure 7. Test Bar Codes

Scanning Configurations

One of the most common problems is an incorrect configuration setup. For example, you may be trying to read a bar code with the check digit enabled, but the bar code was printed without a check digit.

The default settings for the decoded scanner are the most frequently-used parameters. If these will work for you, by all means use them. That way, when someone inadvertently changes the settings, they can be easily reset by scanning the Default codes.

If you must use different settings, it is advisable to make a master configuration sheet with only the desired configuration code symbols in the proper order. The operator can then scan the symbols in sequential order to return to the original configuration.

Is the proper bar code symbology enabled?

Each bar code symbology can be individually enabled or disabled, as desired. It is sometimes desirable to enable only those that will be used, thereby eliminating any errors due to the operator scanning the wrong bar code.

Do the selected symbology format options match the symbol?

The scanned data from each bar code symbology can be restricted to eliminate the scanning of unwanted symbols. The restrictions are individually set for each symbology (see Section 3, Configuration).

Breakage

The CCD scanner is subject to damage that can affect scanning capabilities.

1. Protect the front window of the scanner from dirt, scratches, or damage that can affect visibility. Scratches can cause bad scans or impair scanning altogether.

2. Don't drop the scanner. Dropping can loosen critical elements, such as the front window, the LED light source, or the mirror.

Bar Code Quality

The third problem area has nothing to do with the unit, but rather with the quality of the bar code symbol or the scanning technique. A low-quality bar code that gives low "first read" rates can most often be read with a scanner that is scanning the symbol many times a second until it gets a "Good Read."

The operator will be unaware that the beam has to scan a number of times before a "Good Read" is obtained. The scanner cannot do anything to improve the quality of the symbol or the scanning technique. A bar code verifier should be used to check the quality of suspect symbols.

NUL

SOH

STX

ETX

EOT

ENQ

ACK

DC1

DC2

DC3

DC4

NAK

SYN

ETB

BEL

BS

HT

LF

VT

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CR

CAN

EM

SUB

ESC

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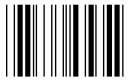

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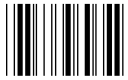

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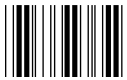

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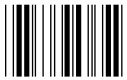

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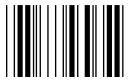

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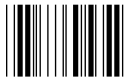

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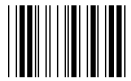

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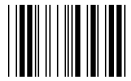

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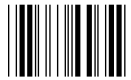

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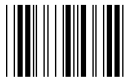

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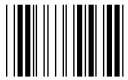

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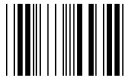

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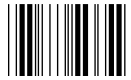


DEL

F1

F2

F3

F4

F5

F6

F7

F8

F9

F10

F11

F12

Home

End

Right

Left

Up

Down

PgUp

PgDn

Tab

Back Tab

Esc

Enter

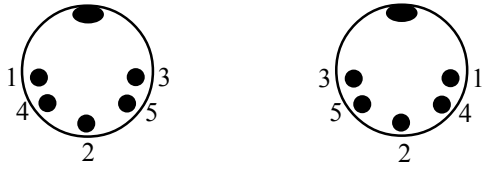
Ins

Appendix C. Connector Pin-outs

All decoded scanners are connected to the host with a special interface cable. The cable type depends upon the interface used.

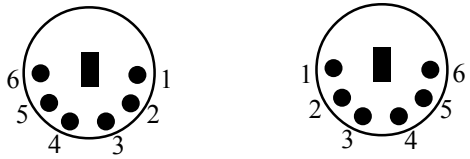
Keyboard Interface

Connector: IBM AT/XT (Male) DIN-5 (Female)



Connector Pin	Direction	Signal
1	Both	Clock
2	Both	Data
3	Not Used	
4	Reference	Signal Ground
5	To decoded scanner	+Vcc

Connector: IBM PS/2 (Male) Mini DIN-6 (Female)



Connector Pin	Direction	Signal
1	Not Used	
2	To decoded scanner	+Vcc
3	Not Used	
4	Both	Data
5	Reference	Signal Ground
6	Both	Clock

Connector: Mac ADB (Male) Mini-Din-4 (Female)

Connector Pin	Direction	Signal
1	Reference	Signal Ground
2	To decoded scanner	+Vcc
3	Not Used	
4	Both	Data

Wand Emulation Interface

Connector: DB-9S "Squeeze-to-Release"

Connector Pin	Direction	Signal
2	To Decoder	Data
7	Reference	Signal Ground
9	To decoded scanner	+Vcc

All other pins unused.

RS232 Interface

Connector: DB-25S RS232

Connector Pin	Direction	Signal
2	To decoded scanner	Receive Data (RxD)
3	From decoded scanner	Transmit Data (TxD)
4	To decoded scanner	Clear-to-Send (CTS)
5	From decoded scanner	Request-to-Send (RTS)
7	Reference	Signal Ground

All other pins unused.

Appendix D. Terminal Type Selections

Terminal Type	Scan Each Digit Sequentially From Chart
IBM PC/XT	00
IBM PC/AT	***01***
IBM PS/2, models 25,30	02
IBM PS/2, models 50, 60, 80	03
IBM PS/2 model 70	04
Macintosh with ADB	08
IBM 3151	17
RS-232	21
Wand Emulation	25
Notebook PC	26

Appendix E. Code 32

Code 32 On

Code 32 Off

Code 32 Add “A”

Code 32 Without “A”

ID TECH, Inc.
1047 South Placentia Avenue
Fullerton, California 92831
(714) 680-5868
www.idt-net.com

80007501-001 R5/02 #418