MK-5000
High Density 2D Imager

Configuration Guide

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1 Getting Started

About This Manual

This User's Guide provides demonstration, installation, and programming instructions for the engine. Product specifications, dimensions, warranty, and customer support information are also included.

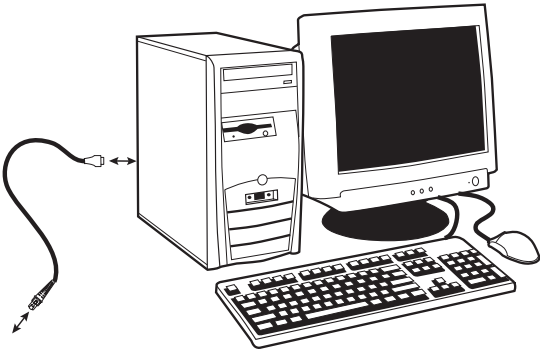
Hand Held Products' bar code engines are factory programmed for the most common terminal and communications settings. If you need to change these settings, programming is accomplished by scanning the bar codes in this guide.

An asterisk (*) next to an option indicates the default setting.

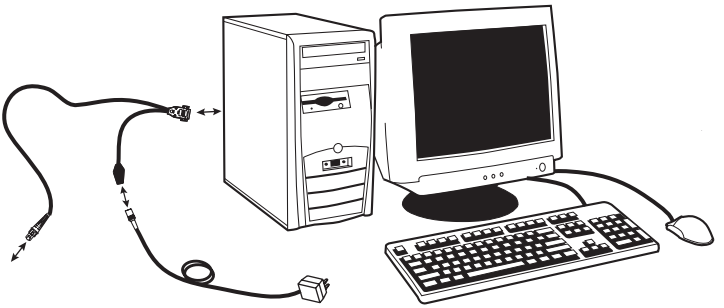
Connecting the Scanner to the PC

The development can connect to a PC for evaluation.

1. Turn off power to the terminal/computer.
2. If using a USB connection, connect the included interface cable to the engine and to the matching USB port on the back of the computer. Skip to step 5.



3. If using an RS-232 connection, connect the serial interface cable to the engine and to the matching port on the back of the computer.



4. Connect the power supply connector to the serial interface cable. Plug in the power supply.

5. Turn the terminal/computer power back on. The engine beeps.

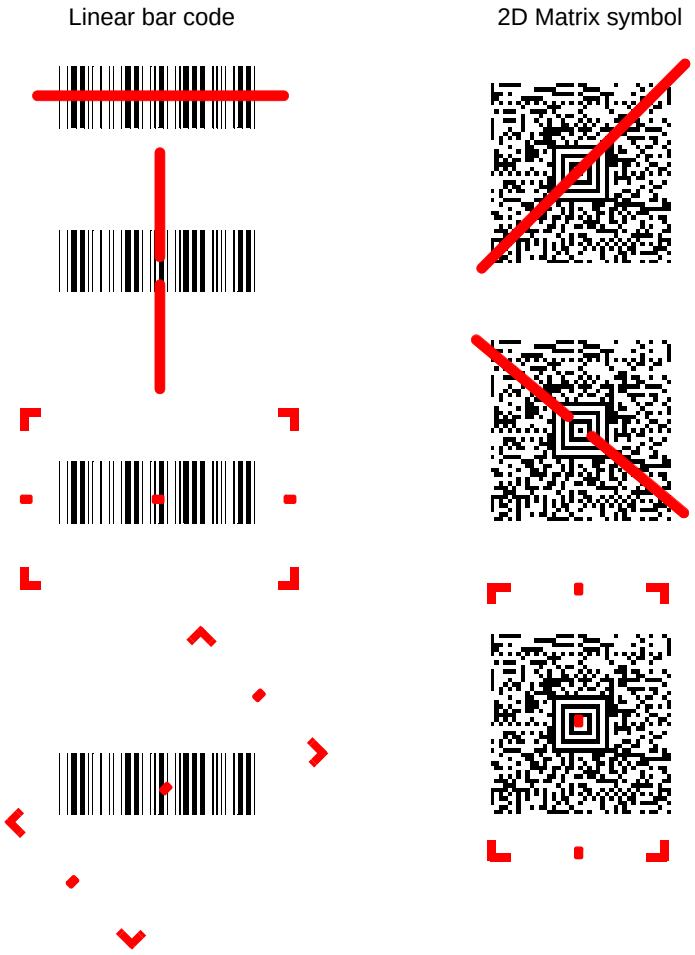
6. If connecting the Development Engine using an RS-232 interface, all communication parameters between the imager and terminal must match for correct data transfer through the serial port using RS-232 protocol. Scan the RS-232 interface bar code below. This programs the Development Engine for an RS-232 interface at 115,200 baud, parity–none, 8 data bits, 1 stop bit, and adds a suffix of a CR LF.

RS-232 Interface

7. Verify the engine operation by scanning a bar code from the Sample Symbols in the back of this manual. The engine beeps once when a bar code is successfully decoded.

Reading Techniques

The engine has a view finder that projects a bright red or green aiming beam that corresponds to the engine's horizontal field of view. The aiming beam should be centered over the bar code, but it can be positioned in any direction for a good read.



The aiming beam is smaller when the engine is closer to the code and larger when it is farther from the code. Symbologies with smaller bars or elements (mil size) should be read closer to the unit. Symbologies with larger bars or elements (mil size) should be read farther from the unit. To read single or multiple symbols (on a page or on an object), hold the engine at an appropriate distance from the target, send a trigger command, and center the aiming beam on the symbol. If the code being scanned is highly reflective (e.g., laminated), it may be necessary to tilt the code ±5° to prevent unwanted reflection.

2 Getting Connected

Plug and Play

Plug and Play bar codes provide instant engine set up for commonly used interfaces.

Note: After you scan one of the codes, power cycle the host terminal to have the interface in effect.

RS-232

The **RS-232** Interface bar code is used when connecting to the serial port of a PC or terminal. The following RS-232 Interface bar code also programs a carriage return (CR) and a line feed (LF) suffix, baud rate, and data format as indicated below:

Option	Setting
Baud Rate	115200 bps
Data Format	8 data bits, no parity bit, 1 stop bit

RS-232 Interface

IBM SurePos

Scan one of the following "Plug and Play" codes to program the MK-5000 for IBM SurePos (USB Handheld imager) or IBM SurePos (USB Tabletop imager).

Note: After scanning one of these codes, you must power cycle the cash register.

IBM SurePos
(USB Handheld Imager)
Interface

IBM SurePos
(USB Tabletop Imager)
Interface

Each bar code above also programs the following suffixes for each symbology:

Symbology	**Suffix**
EAN-8	0C
EAN-13	16
UPC-A	0D
UPC-E	0A
Code 39	00 0A 0B
Interleaved 2 of 5	00 0D 0B
Code 128	00 18 0B

Note: The following USB "Plug and Play" codes (USB Keyboard - PC, USB Keyboard - Mac, and USB HID) are supported on specific MK-5000 models. Refer to OEM Engine Models on page 1-2 to determine if this interface applies to your engine.

USB HID

Scan the following code to program the MK-5000 for USB HID bar code imagers. Scanning this code changes the terminal ID to 131.

USB HID Bar Code Imager

USB COM Port Emulation

Scan the following code to program the MK-5000 to emulate a regular RS-232-based COM port. If you are using a Microsoft® Windows® PC, you will need a driver from the CD-ROM
The driver will use the next available COM port number. Apple® Macintosh computers recognize the engine as a USB CDC class device and automatically use a class driver. Scanning the code below changes the terminal ID to 130.

USB COM Port Emulation

Note: No extra configuration (e.g., baud rate) is necessary.

USB Japanese Keyboard

USB Japanese Keyboard (PC)

CTS/RTS Emulation

On

* Off

ACK/NAK Mode

On

* Off

3 Terminal Interfaces

Terminal ID

If you want to change the pre-programmed interface of your image engine, refer to Supported Terminals, below.

For example, a USB HID POS device has a Terminal ID of 131. You would scan the **Terminal ID** bar code, then **1**, **3**, **1** from the Programming Chart inside the back cover of this manual, then **Save**. If you make an error while scanning the digits (before scanning Save), scan the **Discard** code on the Programming Chart, scan the **Terminal ID** bar code, scan the digits, and the **Save** code again.

Terminal ID

Save

Note: After scanning one of these codes, you must power cycle your computer.

Supported Terminals

Terminal	Model(s)	Terminal ID
IBM SurePOS	USB Handheld Imager	128
IBM SurePOS	USB Tabletop Imager	129
RS-232 True		000
RS-232 TTL		000
USB COM Port Emulation		130
USB PC Keyboard		124
USB Mac Keyboard		125
USB HID POS		131

RS-232 Baud Rate

Baud Rate sends the data from the imager to the terminal at the specified rate. The host terminal must be set for the same baud rate as the imager.
Default = 115,200.

232BAD0.
300

232BAD1.
600

232BAD2.
1200

232BAD3.
2400

232BAD4.
4800

232BAD5.
9600

232BAD6.
19200

232BAD7.
38400

232BAD8.
57,600

232BAD9.
* 115,200

RS-232 Word Length: Data Bits, Stop Bits, and Parity

Data Bits sets the word length at 7 or 8 bits of data per character. If an application requires only ASCII Hex characters 0 through 7F decimal (text, digits, and punctuation), select 7 data bits. For applications which require use of the full ASCII set, select 8 data bits per character. *Default = 8.*

Stop Bits sets the stop bits at 1 or 2. *Default = 1.*

Parity provides a means of checking character bit patterns for validity. *Default = None.*

7 Data, 1 Stop, Parity Even

7 Data, 1 Stop, Parity Odd

7 Data, 2 Stop Parity None

8 Data, 1 Stop, Parity Even

8 Data, 1 Stop, Parity Odd

7 Data, 1 Stop, Parity None

7 Data, 2 Stop, Parity Even

7 Data, 2 Stop, Parity Odd

* 8 Data, 1 Stop, Parity None

RS-232 Receiver Time-Out

The unit stays awake to receive data until the RS-232 Receiver Time-Out expires. A trigger command resets the time-out. When an RS-232 receiver is sleeping, a character may be sent to wake up the receiver and reset the time-out. A transaction on the CTS line will also wake up the receiver. The receiver takes 300 milliseconds to completely come up. Change the RS-232 receiver time-out by scanning the bar code below, then scanning digits from the inside back cover of this manual, then scanning ***Save***. The range is 0 to 300 seconds. *Default = 0 seconds (no time-out - always on).*

RS-232 Receiver Time-Out

RS-232 Handshaking

RS-232 handshaking is a set of rules concerning the exchange of data between serially communicating devices.

If using RTS/CTS handshaking, the imager issues an active RTS signal to the receiving device. The imager waits to send its data until it detects an active CTS signal from the receiving device. The imager then sends its data while checking the CTS signal before the transmission of each data character. If an inactive

CTS signal is detected at any time, the imager halts transmission until it detects another active CTS signal. When the imager has finished transmitting data, it issues an inactive RTS signal to the receiving device. *Default = RTS/CTS Off, XON/XOFF Off, and ACK/NAK Off*.

RTS/CTS On

* RTS/CTS Off

XON/XOFF On

* XON/OFF Off

ACK/NAK On

* ACK/NAK Off

TTL Level 232 Interface

The KD-1000 provides a TTL level serial232 communication link. TTL Level 232 Inverted is the “normal” mode that allows direct communication from the MK-5000 to a standard PC RS-232 serial port with the use of cable (part number 42206139-04).

Non-Inverted serial TTL communication is provided to allow direct connection to a TTL UART port, or to an RS-232 driver integrated circuit. Note that if theTTL Level 232 Non-Inverted bar code is scanned, the 5X80 will no longer communicate with a standard PC RS-232 port.

TTL Level 232 Inverted with Polarity Override allows direct communication from the MK-5000 to a standard PC RS-232 serial port with the use of cable (part number 42206139-04). This setting also allows you to override the polarity externally.

Note: For further information on the TTL Level 232 Interface, refer to the MK-5000 80 Integration Manual.

Default = TTL Level 232 Inverted with Polarity Override.

TTL Level 232 Inverted

* TTL Level 232 Inverted with Polarity Override

TTL Level 232 Non-Inverted

Image VGA

You can set the image size to a VGA resolution, if necessary, to accommodate older applications that require a smaller image size. When Image VGA is set to On, the resultant image is 640x480 pixels. When Image VGA is Off, your image is 752x480 pixels. *Default = On.*

Off

* On

Good Read Indicators

Beeper – Good Read

The beeper may be programmed ***On*** or ***Off*** in response to a good read. Turning this option off, only turns off the beeper response to a good read indication. All error and menu beeps are still audible. *Default = On.*

Note: Changes to Beep Polarity (see page 4-5) also affect the Beeper-Good Read signal.

* On

Off

Beeper Volume – Good Read

The beeper volume codes modify the volume of the beep the imager emits on a good read. *Default = High for the MK-5000*

Low

Medium

High

Off

Beeper Pitch – Good Read

The beeper pitch codes modify the pitch (frequency) of the beep the imager emits on a good read. *Default = Medium.*

Low (1600 Hz)

* Medium (3250 Hz)

High (4200 Hz)

Beeper Duration – Good Read

The beeper duration codes modify the length of the beep the imager emits on a good read. *Default = Normal.*

* Normal Beep

Short Beep

LED – Good Read

The LED indicator can be programmed ***On*** or ***Off*** in response to a good read. *Default = On.*

Note: Changes to LED Good Read Polarity (see page 4-3) also affect the LED Good Read signal.

* On

Off

LED Good Read Polarity

LED Good Read Polarity sets the idle and active states of the LED signal. When set to ***Active High***, the LEDs turn on when the signal shifts from low to high. When set to ***Active Low***, the LEDs turn on when the signal shifts from high to low.

If the LED is enabled for a good read (see LED – Good Read on page 4-3), the polarity change takes effect after the next successful decode or a power cycle. If the LED is disabled, a polarity change only takes effect after a power cycle. *Default = Active Low.*

Note: LED Good Read Polarity sets the LED signal voltage level to either high (Active Low) or low (Active High). This will affect LED-Good Read setting. If the LED has been disabled, make sure it is not turned on accidentally by a polarity change.

Active High

* Active Low

Number of Beeps – Good Read

The number of beeps of a good read can be programmed from 1 - 9. The same number of beeps will be applied to the beeper and LED in response to a good read. For example, if you program this option to have five beeps, there will be five beeps and five LED flashes in response to a good read. The beeps and LED flashes are in sync with one another. To change the number of beeps, scan the bar code below and then scan a digit (1-9) bar code and the ***Save*** bar code on the Programming Chart inside the back cover of this manual. *Default = One.*

Number of Pulses

Beep Polarity

If the beeper is enabled for a good read (see Beeper – Good Read on page 4-1), the polarity change takes effect after the next successful decode or a power cycle. If the beeper is disabled, a polarity change only takes effect after a power cycle. *Default = Active Low.*

* Active Low

Good Read Delay

This sets the minimum amount of time before the imager can read another bar code. *Default = No Delay.*

***** No Delay

Short Delay (500 ms)

Medium Delay (1,000 ms)

Long Delay (1,500 ms)

User-Specified Good Read Delay

If you want to set your own length for the good read delay, scan the bar code below, then set the delay (from 0-30,000 milliseconds) by scanning digits from the inside back cover, then scanning ***Save***.

User-Specified Good Read Delay

Trigger Modes

Manual/Serial Trigger

You can activate the imager either by providing an external hardware trigger, or using a serial trigger command (see Trigger Commands on page 11-4). When in manual trigger mode, the imager scans until a bar code is read, or until the hardware trigger is released.

When in serial mode, the imager scans until a bar code has been read or until the deactivate command is sent. In serial mode, the imager can also be set to turn itself off after a specified time has elapsed (see Read Time-Out, which follows).

* Manual/Serial Trigger

Read Time-Out

Use this selection to set a time-out (in milliseconds) of the imager's trigger when using serial commands to trigger the imager, or if the imager is in manual trigger mode. Once the imager has timed out, you can activate the imager either by pressing the trigger or using a serial trigger command. After scanning the ***Read Time-Out*** bar code, set the time-out duration (from 0-300,000 milliseconds) by scanning digits from the inside back cover, then scanning ***Save***. *Default = 0 (infinite, or no time-out).*

Read Time-Out

Manual Trigger, Low Power

Note: For RS-232 and HHLC mode only.

The imager powers down until the trigger is pulled. When the trigger is pulled, the imager powers up and operates until there is no triggering for the time set with the ***Low Power Time-Out*** bar code below. There is a delay of up to one second in operation when the imager is first triggered, but there is no delay when operating in low power time-out mode.

Manual Trigger, Low Power

Low Power Time-Out Timer

Note: For RS-232 and HHLC mode only.

Scan the Low Power Time-Out bar code to change the time-out duration (in seconds). Then scan the time-out duration (from 0-300 seconds) from the inside back cover, and ***Save***. *Default = 120 seconds.*

If the unit remains idle during the low power time-out interval, the unit goes into low power mode. Whenever the trigger is enabled, the low power time-out timer is reset.

Low Power Time-Out

Note: This time-out does not begin until the imager time-out setting has expired.

Snap and Ship

Snap and Ship mode allows you to bypass the decoder and ship an image directly to the host. In this mode, an image is taken and shipped upon each trigger pull, instead of being sent to the decoder. Snap and Ship is useful when you are using your own decoder.

Note: Snap and Ship mode only works if the imager is connected via an RS-232 serial port or via a USB keyboard (see Plug and Play on page 2-1). If you use Snap and Ship when the imager is connected to another interface, it calls the decoder after each image ship, but only to look for menu codes.

Snap and Ship

Host Notify Mode

Note: For RS-232 and USB communications only.

Host Notify Mode bypasses the decoder and notifies the host that there has been a hardware trigger pull. When in Host Notify Mode, it is up to the host to initiate an Image Snap and/or an Image Ship command (see *Imaging Commands* beginning on page 8-1). It is also up to the host to switch to another trigger mode.

Host Notify Mode

Scan Stand Mode

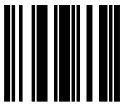
When a unit is in Scan Stand mode, it remains idle as long as it sees the Scan Stand symbol. (See ***Scan Stand Symbol*** that follows.) When a different code is presented, the Imager is triggered to read the new code.

Note:The imager automatically adjusts the illumination LEDs to the lowest light level possible to maintain a good lock on the Scan Stand symbol. When a symbol is presented, the imager's light levels adjust to the saved setting (see *Hands Free Time-Out on page 4-11**).*

Scan Stand Mode

Scan Stand Symbol

When a unit is in Scan Stand mode, the LEDs shine at the Scan Stand symbol on the base of the stand which tells it to remain idle. When the Scan Stand symbol is covered, the imager turns the LEDs on at the configured power level (Default High) and attempts to find and decode bar codes in its field of view. The Scan Stand Symbol is a function code 3 using Code 128 symbology.



FNC3
Scan Stand Symbol

Presentation Mode

This programs the imager to work in Presentation mode. The LEDs are either off or at the lowest power for ambient conditions until a bar code is presented to the imager. Then the LEDs turn on automatically to read the code. Presentation Mode uses ambient light to detect the bar codes. If the light level in the room is not high enough, Presentation Mode may not work properly.

Presentation Mode

Presentation LED Behavior after Decode

When an imager is in presentation mode, the LEDs remain on and continue scanning for a short time after a bar code is decoded. If you wish to turn the LEDs off immediately after a bar code is decoded, scan the **LEDs Off** bar code, below. (If you want the LEDs to remain off for a length of time after the decode, use Presentation LED Time-Out, below.) *Default = LEDs On.*

* LEDs On

LEDs Off

Presentation LED Time-Out

When using Presentation LED Behavior after Decode (above), you may want to set the time the LEDs remain off after a decode. To set the duration of this delay, scan the bar code below, then set the time-out by scanning digits (0 - 9,999 ms) from the Programming Chart on the inside the back cover of this manual, then scanning **Save.** Once the unit has completed this time-out, it will immediately resume scanning.

LED Time-Out Duration

Presentation Sensitivity

Presentation Sensitivity is a numeric range that increases or decreases the imager's reaction time to bar code presentation. To set the sensitivity, scan the ***Sensitivity*** bar code, then scan the degree of sensitivity (from 0-20) from the inside back cover, and ***Save***. 0 is the most sensitive setting, and 20 is the least sensitive. *Default = 1.*

Sensitivity

Hands Free Time-Out

The Scan Stand and Presentation Modes are referred to as “hands free” modes. If a trigger command is sent, or the hardware trigger is pulled when using a hands free mode, the imager changes to manual trigger mode. You can set the time the imager should remain in manual trigger mode by setting the Hands Free Time-Out. Once the time-out value is reached, (if there have been no further trigger pulls) the imager reverts to the original hands free mode.

Scan the ***Hands Free Time-Out*** bar code, then scan the time-out duration (from 0-300,000 milliseconds) from the inside back cover, and ***Save***. *Default = 5,000 ms.*

Hands Free Time-Out

Reread Delay

This sets the time period before the imager can read the *same* bar code a second time. Setting a reread delay protects against accidental rereads of the same bar code. Longer delays are effective in minimizing accidental rereads at POS (point of sale). Use shorter delays in applications where repetitive bar code scanning is required. *Default = Medium.*

Reread Delay only works when in Presentation Mode (see page 4-9).

Short (500 ms)

***** Medium (750 ms)

Long (1000 ms)

Extra Long (2000 ms)

User-Specified Reread Delay

If you want to set your own length for the reread delay, scan the bar code below, then set the delay (from 0-30,000 milliseconds) by scanning digits from the inside back cover, then scanning ***Save***.

User-Specified Reread Delay

LED Power Level

This selection allows you to adjust LED and aimer brightness. ***Off*** is used when no illumination is needed. ***Low*** is used if low illumination is sufficient. ***High*** (the default) is the brightest setting.

If you have an aimer delay programmed (see Aimer Delay on page 4-14), the aimer will be at 100% power during the delay, regardless of the LED Power Level.

*Note: If you scan the **Off** bar code, both the aimer and illumination lights turn off, making it difficult to scan bar codes in low light. To turn the LED Power Level back on, move to a brightly lit area and scan either the **Low** or the **High** bar code below.*

Off

Low (50%)

***** High (100%)

Illumination Lights

If you want the illumination lights on while reading a bar code, scan the **Lights On** bar code, below. However, if you want to turn just the lights off, scan the **Lights Off** bar code.

Note: This setting does not affect the aimer light. The aiming light can be set using Aimer Modes (page 4-14).

* Lights On

Lights Off

Imager Time-Out

Imager Time-Out powers down the imager after the unit has been idle for the specified time. To prevent the imager from powering down, set this time-out to 0. Scan the bar code below, then set the time-out by scanning digits (from 0 - 999,999 ms) from the inside back cover, then scanning ***Save.*** *Default = 1 ms.*

Imager Time-Out

Aimer Delay

The aimer delay allows a delay time for the operator to aim the imager before the picture is taken. Use these codes to set the time between when the trigger is activated and when the picture is taken. During the delay time, the aiming light will appear, but the LEDs won't turn on until the delay time is over.

200 milliseconds

400 milliseconds

***** Off *(no delay)*

User-Specified Aimer Delay

If you want to set your own length for the duration of the delay, scan the bar code below, then set the time-out by scanning digits (0 - 4,000 ms) from the Programming Chart inside the back cover of this manual, then scan **Save**.

Delay Duration

Aimer Modes

Interlaced In interlaced mode, the illumination and aiming timing is automatically synchronized to the imager exposure period by the Image Engine. The engine turns illumination on while the image is being exposed, and it turns the aiming off at all other times. The interlaced mode provides the lowest overall current draw and is recommended for most applications. It also provides the brightest aimer in most applications. The Image Engine software automatically maintains an approximate 25% aimer duty cycle, even when the imager exposure time is at its maximum in dark operating environments.

Concurrent Concurrent mode is provided for backwards compatibility with the 4X00 Image Engine series, and is not recommended for most applications. In concurrent mode, the illumination LEDs are on continuously, while the aimer LEDs turn off during the imager exposure period, and on while the imager is not exposing. Concurrent mode is used to eliminate any flicker of the illumination LEDs that may be objectionable to the user, especially when running the engine at 12 MHz. The illumination LED current is reduced compared to interlaced mode to limit engine peak current. The image engine software automatically maintains an approximate 25% aimer duty cycle, even when the imager exposure time is at its maximum in dark operating environments.

Concurrent mode provides the brightest appearance of the illumination LEDs of any of the imager operating modes. This mode may be useful for applications when an operator is using the illumination LEDs for aiming, such as in fixed mount, kiosk, or auto-trigger applications.

Select ***Off*** if you don't want to use either aimer mode.

SCNAIM0.

Off

SCNAIM1.

Concurrent

SCNAIM2.

* Interlaced

Thermal Considerations

Care must be taken when designing the Image Engine into any system. Internal heating of the Image Engine can occur in high duty cycle scanning applications in several ways. The high visibility aimer dissipates a significant amount of power as heat. The illumination and aiming LEDs also release heat, and are a major contributor to thermal increases in high use or in presentation mode.

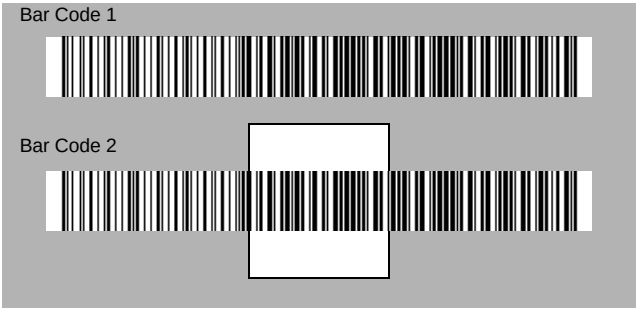
An increase in temperature around an Image Engine can cause noise levels on the imager, degrading image quality. The thermal rise can also affect the laser diode. In a continuous scanning or high use environment, the Image Engine temperature can rise 15° to 20°C. Under high ambient temperature conditions, the laser diode is at risk of thermal breakdown and possible failure. The image quality and decode performance will also degrade.

The Power Control PWM can be used to reduce the effect of the illumination LEDs on thermal rise, however, this also reduces the intensity of the illumination. Reducing the intensity of the illumination reduces total power used but can also reduce the depth of field in low light environments.

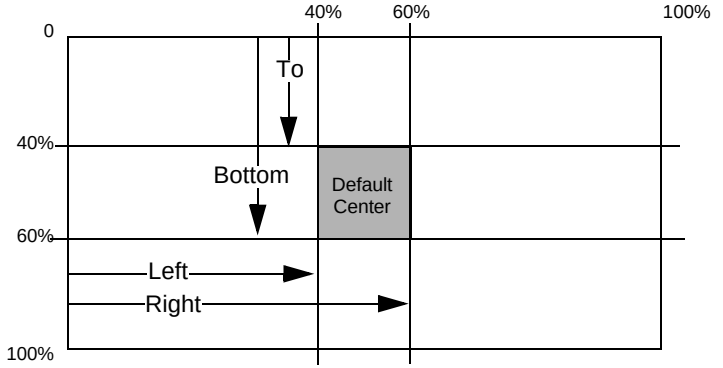
Centering

Use Centering to narrow the imager's field of view to make sure the imager reads only those bar codes intended by the user. For instance, if multiple codes are placed closely together, centering will insure that only the desired codes are read. (Centering can be used in conjunction with Aimer Delay, page 4-14, for the most error-free operation in applications where multiple codes are spaced closely together. Using the Aimer Delay and Centering features, the imager can emulate the operation of older systems, such as linear laser bar code imagers.)

In the example below, the gray area is the full imager field of view and the white area is the centering window. Bar Code 1 will not be read, while Bar Code 2 will be.



The default centering window is a 128x96 pixel area (640x480 default image size) in the center of the imager's field of view. The following diagram illustrates the default top, bottom, left, and right pixel positions, measured from the top and the left side of the imager's field of view.



If a bar code is not within the predefined window, it will not be decoded or output by the imager. If centering is turned on by scanning ***Centering On***, the imager only reads codes that intersect the centering window you specify using the ***Top***, ***Bottom***, ***Left***, or ***Right*** bar codes.

Scan ***Centering On***, then scan one of the following bar codes to change the top, bottom, left, or right of the centering window. Then scan the percent you want to shift the centering window using digits on the inside back cover of this manual. Scan ***Save***. *Default Centering = 40% for Top and Left, 60% for Bottom and Right.*

DECWIN1.

Centering On

DECWIN0.

***** Centering Off

DECTOP.

Top of Centering Window

DECBOT.

Bottom of Centering Window

DECLFT.

Left of Centering Window

DECRGT.

Right of Centering Window

Decode Search Mode

There are three selectable decode (scanning) modes:

Full Omnidirectional - Searches for bar code features beginning at the center of an image, and searches to the image's limits. This mode reads all symbologies (including OCR), in any orientation. The Full Omnidirectional search is very thorough which may slow performance time.

Note: This search mode is the default setting for the 2D OEM Engines.

Full Omnidirectional

Quick Omnidirectional - This is an abbreviated search for bar code features around the center region of an image. This mode quickly reads all symbologies in any orientation. The Quick Omnidirectional mode may miss some off-center symbols, as well as larger Data Matrix and QR Code symbols.

Quick Omnidirectional

Advanced Linear Decoding - Performs quick horizontal linear scans in a center band of the image. This mode is *not* omnidirectional, but does quickly read linear and stacked bar codes. Advanced Linear Decoding cannot read 2D, OCR, or Postal symbols.

Note: This search mode is the default setting for the point-and-shoot PDF OEM Engines.

Advanced Linear Decoding

Output Sequence Overview

Require Output Sequence

When turned off, the bar code data will be output to the host as the Imager decodes it. When turned on, all output data must conform to an edited sequence or the Imager will not transmit the output data to the host device.

Note: This selection is unavailable when the Multiple Symbols Selection is turned on.

Output Sequence Editor

This programming selection allows you to program the Imager to output data (when scanning more than one symbol) in whatever order your application requires, regardless of the order in which the bar codes are scanned. Reading the ***Default Sequence*** symbol programs the Imager to the Universal values, shown below. These are the defaults. Be **certain** you want to delete or clear all formats before you read the ***Default Sequence*** symbol.

Note: To make Output Sequence Editor selections, you'll need to know the code I.D., code length, and character match(es) your application requires. Use the Alphanumeric symbols (inside back cover) to read these options.

Note: You must hold the trigger while reading each bar code in the sequence.

To Add an Output Sequence

1. Scan the ***Enter Sequence*** symbol (see Require Output Sequence, page 4-22).
2. **Code I.D.**
   On the Symbology Chart on page A-1, find the symbology to which you want to apply the output sequence format. Locate the Hex value for that symbology and scan the 2 digit hex value from the Programming Chart (inside back cover).
3. **Length**
   Specify what length (up to 9999 characters) of data output will be acceptable for this symbology. Scan the four digit data length from the Programming Chart. (Note: 50 characters is entered as 0050. 9999 is a universal number, indicating all lengths.) When calculating the length, you must count any programmed prefixes, suffixes, or formatted characters as part of the length (unless using 9999).
4. **Character Match Sequences**
   On the ASCII Conversion Chart (Code Page 1252), page A-4, find the Hex value that represents the character(s) you want to match. Use the Programming Chart to read the alphanumeric combination that represents the ASCII characters. (99 is the Universal number, indicating all characters.)
5. **End Output Sequence Editor**
   Scan ***F F*** to enter an Output Sequence for an additional symbology, or ***Save*** to save your entries.

Other Programming Selections

- ***Discard***
  This exits without saving any Output Sequence changes.

Output Sequence Example

In this example, you are scanning Code 93, Code 128, and Code 39 bar codes, but you want the imager to output Code 39 1st, Code 128 2nd, and Code 93 3rd, as shown below.

Note: Code 93 must be enabled to use this example.

A - Code 39

B - Code 128

C - Code 93

You would set up the sequence editor with the following command line:

SEQBLK62999941FF6A999942FF69999943FF

The breakdown of the command line is shown below:

SEQBLKsequence editor start command
62 code identifier for **Code 39**
9999 code length that must match for Code 39, 9999 = all lengths
41 start character match for Code 39, 41h = “A”
FF termination string for first code
6A code identifier for **Code 128**
9999 code length that must match for Code 128, 9999 = all lengths
42 start character match for Code 128, 42h = “B”
FF termination string for second code

69 code identifier for **Code 93**
9999 code length that must match for Code 93, 9999 = all lengths
43 start character match for Code 93, 43h = “C”
FF termination string for third code

To program the previous example using specific lengths, you would have to count any programmed prefixes, suffixes, or formatted characters as part of the length. If you use the example on page 4-20, but assume a <CR> suffix and specific code lengths, you would use the following command line:

SEQBLK62001241FF6A001342FF69001243FF

The breakdown of the command line is shown below:

SEQBLK	sequence editor start command
62	code identifier for **Code 39**
0012	A - Code 39 sample length (11) plus CR suffix (1) = 12
41	start character match for Code 39, 41h = “A”
FF	termination string for first code
6A	code identifier for **Code 128**
0013	B - Code 128 sample length (12) plus CR suffix (1) = 13
42	start character match for Code 128, 42h = “B”
FF	termination string for second code
69	code identifier for **Code 93**
0012	C - Code 93 sample length (11) plus CR suffix (1) = 12
43	start character match for Code 93, 43h = “C”
FF	termination string for third code

Output Sequence Editor

Enter Sequence

Default Sequence

Require Output Sequence

When an output sequence is ***Required***, all output data must conform to an edited sequence or the imager will not transmit the output data to the host device. When it's ***On/Not Required***, the imager will attempt to get the output data to conform to an edited sequence, but if it cannot, the imager transmits all output data to the host device as is.

When the output sequence is ***Off***, the bar code data is output to the host as the imager decodes it.

Note: This selection is unavailable when the Multiple Symbols Selection is turned on.

Required

On/Not Required

*Off

Multiple Symbols

Note: This feature does not work when the Imager is in Low Power mode.

When this programming selection is turned ***On***, it allows you to read multiple symbols when the trigger is activated. If you press and hold the trigger, aiming the Imager at a series of symbols, it reads unique symbols once, beeping (if turned on) for each read. The imager attempts to find and decode new symbols as long as the trigger is activated. When this programming selection is turned ***Off***, the Imager will only read the symbol closest to the aiming beam.

On

***** Off

No Read

With No Read turned ***On***, the Imager notifies you if a code cannot be read. If using a Quick*View Scan Data Window, an “NR” appears when a code cannot be read. If No Read is turned ***Off***, the “NR” will not appear.

On

***** Off

If you want a different notation than “NR,” for example, “Error,” or “Bad Code,” you can edit the output message using the Data Formatter (page 6-5). The hex code for the No Read symbol is 9C.

Print Weight

Print Weight is used to adjust the way the imager reads Matrix symbols. If a imager will be seeing consistently heavily printed matrix symbols, then a print weight of 6 may improve the reading performance. For consistently light printing, a print weight of 2 may help. After scanning the ***Set Print Weight*** bar code, set the print weight (from 1-7) by scanning digits from the inside back cover, then scanning ***Save***. *Default = 4*.

PRTWGT.

Set Print Weight

PRTWGT4.

***** Default

Video Reverse

Video Reverse is used to allow the imager to read bar codes that are inverted. The "Off" bar code below is an example of this type of bar code. If additional menuing is required, Video Reverse must be disabled to read the menu bar codes and then re-enabled after menuing is completed.

Note: Images downloaded from the unit will not be reversed. This is a setting for decoding only.

VIDREV1.

On

VIDREV0REV.

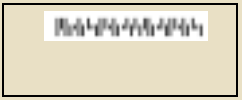
***** Off

Working Orientation

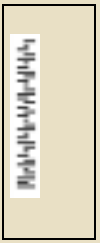
Some bar codes are direction-sensitive. For example, Kix codes and OCR can misread when scanned sideways or upside down. Use the working orientation settings if your direction-sensitive codes will not usually be presented upright to the scanner. *Default = Upright.*

Upright:

Upside Down:



Rotate Clockwise 90°:



Rotate Counterclockwise 90°:

ROTATN0.

* Upright

ROTATN1.

Rotate Clockwise 90°

ROTATN2.

Upside Down

ROTATN3.

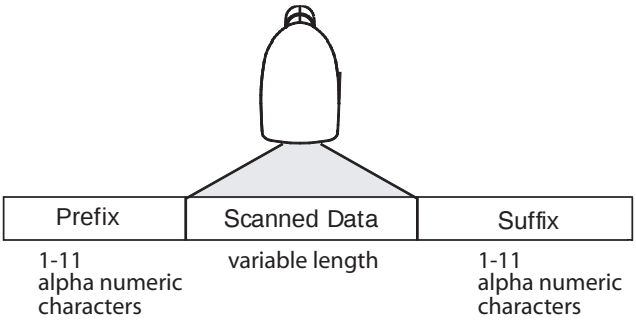
Rotate Counterclockwise 90°

5 Data Editing

Prefix/Suffix Overview

When a bar code is scanned, additional information is sent to the host computer along with the bar code data. This group of bar code data and additional, user-defined data is called a “message string.” The selections in this section are used to build the user-defined data into the message string.

Prefix and Suffix characters are data characters that can be sent before and after scanned data. You can specify if they should be sent with all symbologies, or only with specific symbologies. The following illustration shows the breakdown of a message string:



Points to Keep In Mind

- It is not necessary to build a message string. The selections in this chapter are only used if you wish to alter the default settings. *Default prefix = None. Default suffix = None.*
- A prefix or suffix may be added or cleared from one symbology or all symbologies.
- You can add any prefix or suffix from the ASCII Conversion Chart (Code Page 1252), page A-4, plus Code I.D. and AIM I.D.
- You can string together several entries for several symbologies at one time.
- Enter prefixes and suffixes in the order in which you want them to appear on the output.
- When Setting up for specific symbologies, instead of All Symbologies, the symbology ID value counts as an added prefix or suffix character.

To Add a Prefix or Suffix:

Step 1. Scan the **Add Prefix** or **Add Suffix** symbol (page 5-4).

Step 2. Determine the 2 digit Hex value from the Symbology Chart (included in Appendix A) for the symbology to which you want to apply the prefix or suffix. For example, for Code 128, Code ID is "j" and Hex ID is "6A".

Step 3. Scan the 2 hex digits from the Programming Chart inside the back cover of this manual or scan **9**, **9** for all symbologies.

Step 4. Determine the hex value from the ASCII Conversion Chart (Code Page 1252), page A-4, for the prefix or suffix you wish to enter.

Step 5. Scan the 2 digit hex value from the Programming Chart inside the back cover of this manual.

Step 6. Repeat Steps 4 and 5 for every prefix or suffix character.

Step 7. To add the Code I.D., scan **5**, **C**, **8**, **0**.
To add AIM I.D., scan **5**, **C**, **8**, **1**.
To add a backslash (\), scan **5**, **C**, **5**, **C**.

Note: To add a backslash (\) as in Step 7, you must scan 5C twice – once to create the leading backslash and then to create the backslash itself.

Step 8. Scan **Save** to exit and save, or scan **Discard** to exit without saving.

Repeat Steps 1-6 to add a prefix or suffix for another symbology.

Example: Add a Suffix to a specific symbology

To send a CR (carriage return) Suffix for UPC only:

Step 1. Scan **Add Suffix**.

Step 2. Determine the 2 digit hex value from the Symbology Chart (included in Appendix A) for UPC.

Step 3. Scan **6**, **3** from the Programming Chart inside the back cover of this manual.

Step 4. Determine the hex value from the ASCII Conversion Chart (Code Page 1252), page A-4, for the CR (carriage return).

Step 5. Scan **0**, **D** from the Programming Chart inside the back cover of this manual.

Step 6. Scan **Save**, or scan **Discard** to exit without saving.

To Clear One or All Prefixes or Suffixes:

You can clear a single prefix or suffix, or clear all prefixes/suffixes for a symbology. When you Clear One Prefix (Suffix), the specific character you select is deleted from the symbology you want. When you Clear All Prefixes (Suffixes), all the prefixes or suffixes for a symbology are deleted.

Step 1. Scan the **Clear One Prefix** or **Clear One Suffix** symbol.

Step 2. Determine the 2 digit Hex value from the Symbology Chart (included in Appendix A) for the symbology from which you want to clear the prefix or suffix.

Step 3. Scan the 2 digit hex value from the Programming Chart inside the back cover of this manual or scan **9**, **9** for all symbologies.

Your change is automatically saved.

To Add a Carriage Return Suffix to all Symbologies

Scan the following bar code if you wish to add a carriage return suffix to all symbologies at once. This action first clears all current suffixes, then programs a carriage return suffix for all symbologies.

Add CR Suffix
All Symbologies

Prefix Selections

Add Prefix

Clear One Prefix

Clear All Prefixes

Suffix Selections

Add Suffix

Clear One Suffix

Clear All Suffixes

Function Code Transmit

When this selection is enabled and function codes are contained within the scanned data, the imager transmits the function code to the terminal. *Default = Enable.*

* Enable

Disable

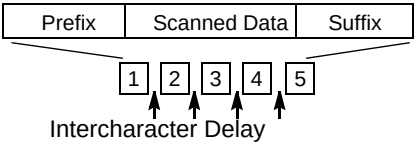
Intercharacter, Interfunction, and Intermessage Delays

Some terminals drop information (characters) if data comes through too quickly. Intercharacter, interfunction, and intermessage delays slow the transmission of data, increasing data integrity.

Each delay is composed of a 5 millisecond step. You can program up to 99 steps (of 5 ms each) for a range of 0-495 ms.

Intercharacter Delay

An intercharacter delay of up to 495 milliseconds may be placed between the transmission of each character of scanned data. Scan the **Intercharacter Delay** bar code below, then scan the number of milliseconds and the **SAVE** bar code using the Programming Chart inside the back cover of this manual.



Intercharacter Delay

To remove this delay, scan the **Intercharacter Delay** bar code, then set the number of steps to 0. Scan the **SAVE** bar code using the Programming Chart inside the back cover of this manual.

Note:Intercharacter delays are not supported in USB serial emulation.

User Specified Intercharacter Delay

An intercharacter delay of up to 495 milliseconds may be placed after the transmission of a particular character of scanned data. Scan the **Delay Length** bar code below, then scan the number of milliseconds and the **SAVE** bar code using the Programming Chart inside the back cover of this manual.

Next, scan the **Character to Trigger Delay** bar code, then the 2-digit hex value for the ASCII character that will trigger the delay ASCII Conversion Chart (Code Page 1252), page A-4.

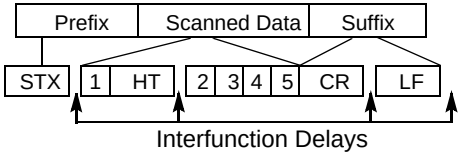
Delay Length

Character to Trigger Delay

To remove this delay, scan the **Delay Length** bar code, and set the number of steps to 0. Scan the **SAVE** bar code using the Programming Chart inside the back cover of this manual.

Interfunction Delay

An interfunction delay of up to 495 milliseconds may be placed between the transmission of each segment of the message string. Scan the **Interfunction Delay** bar code below, then scan the number of milliseconds and the **SAVE** bar code using the Programming Chart inside the back cover of this manual.



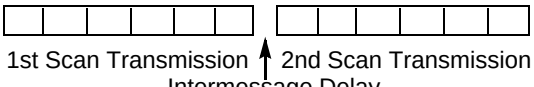
Interfunction Delays

Interfunction Delay

To remove this delay, scan the **Interfunction Delay** bar code, then set the number of steps to 0. Scan the **SAVE** bar code using the Programming Chart inside the back cover of this manual.

Intermessage Delay

An intermessage delay of up to 495 milliseconds may be placed between each scan transmission. Scan the **Intermessage Delay** bar code below, then scan the number of milliseconds and the **SAVE** bar code using the Programming Chart inside the back cover of this manual.



Intermessage Delay

To remove this delay, scan the **Intermessage Delay** bar code, then set the number of steps to 0. Scan the **SAVE** bar code using the Programming Chart inside the back cover of this manual.

6 Data Formatting

Data Format Editor Introduction

You may use the Data Format Editor to change the imager's output. For example, you can use the Data Format Editor to insert characters at certain points in bar code data as it is scanned. The selections in the following pages are used only if you wish to alter the output. *Default Data Format setting = None.*

Normally, when you scan a bar code, it gets outputted automatically; however when you do a format, you must use a "send" command (see Send Commands on page 6-2) within the format program to output data.

Multiple formats may be programmed into the imager. They are stacked in the order in which they are entered. However, the following list presents the order in which formats are applied:

1. Specific Term ID, Actual Code ID, Actual Length
2. Specific Term ID, Actual Code ID, Universal Length
3. Specific Term ID, Universal Code ID, Actual Length
4. Specific Term ID, Universal Code ID, Universal Length
5. Universal Term ID, Actual Code ID, Actual Length
6. Universal Term ID, Actual Code ID, Universal Length
7. Universal Term ID, Universal Code ID, Actual Length
8. Universal Term ID, Universal Code ID, Universal Length

If you have changed data format settings, and wish to clear all formats and return to the factory defaults, scan the **Default Data Format** code on page 6-4.

To Add a Data Format

Step 1. Scan the **Enter Data Format** symbol (page 6-4).

Step 2. Primary/Alternate Format

Determine if this will be your primary data format, or one of 3 alternate formats. (Alternate formats allow you "single shot" capability to scan one bar code using a different data format. After the one bar code has been read, the imager reverts to the primary data format. See page 6-5.) If you are programming the primary format, scan **0** using the Programming Chart inside the back cover of this manual. If you are programming an alternate format, scan **1**, **2**, or **3**, depending on the alternate format you are programming.

Step 3. Terminal Type

Refer to Supported Terminals (page 3-1) and locate the Terminal ID number for your PC. Scan three numeric bar codes on the inside back

cover to program the imager for your terminal ID (you must enter 3 digits). For example, scan **0 0 0** for RS-232.

Note: The wildcard for all terminal types is 099.

Step 4. Code I.D.
In Appendix A, find the symbology to which you want to apply the data format. Locate the Hex value for that symbology and scan the 2 digit hex value from the Programming Chart inside the back cover of this manual.

Step 5. Length
Specify what length (up to 9999 characters) of data will be acceptable for this symbology. Scan the four digit data length from the Programming Chart inside the back cover of this manual. (Note: 50 characters is entered as 0050. 9999 is a universal number, indicating all lengths.)

Step 6. Editor Commands
Refer to Data Format Editor Commands (page 6-2). Scan the symbols that represent the command you want to enter. 94 alphanumeric characters may be entered for each symbology data format.

Step 7. Scan **Save** from the Programming Chart inside the back cover of this manual to save your entries.

Other Programming Selections

- **Clear One Data Format**
  This deletes one data format for one symbology. If you are clearing the primary format, scan **0** from the Programming Chart inside the back cover of this manual. If you are clearing an alternate format, scan **1**, **2**, or **3**, depending on the alternate format you are clearing. Scan the Terminal Type and Code I.D. (see Supported Terminals on page 3-1), and the bar code data length for the specific data format that you want to delete. All other formats remain unaffected.
- **Save** from the Programming Chart inside the back cover of this manual
  This exits, saving any Data Format changes.
- **Discard** from the Programming Chart inside the back cover of this manual
  This exits without saving any Data Format changes.

Data Format Editor Commands

Send Commands

F1 Send all characters followed by “xx” key or function code, starting from current cursor position. ***Syntax = F1xx*** (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4.)

F2 Send “nn” characters followed by “xx” key or function code, starting from current cursor position. ***Syntax = F2nnxx*** (nn stands for the numeric value

(00-99) for the number of characters and xx stands for the hex value for an ASCII code. See ASCII Conversion Chart (Code Page 1252), page A-4.)

F3 Send up to but not including “ss” character (Search and Send) starting from current cursor position, leaving cursor pointing to “ss” character followed by “xx” key or function code. ***Syntax = F3ssxx*** (ss and xx both stand for the hex values for ASCII codes, see ASCII Conversion Chart (Code Page 1252), page A-4.)

F4 Send “xx” character “nn” times (Insert) leaving cursor in current cursor position. ***Syntax = F4xxnn*** (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4, and nn is the numeric value (00-99) for the number of times it should be sent.)

E9 Send all but the last “nn” characters, starting from the current cursor position. ***Syntax = E9nn*** (nn is the numeric value (00-99) for the number of characters that will not be sent at the end of the message.)

Move Commands

F5 Move the cursor ahead “nn” characters from current cursor position. ***Syntax = F5nn*** (nn stands for the numeric value (00-99) for the number of characters the cursor should be moved ahead.)

F6 Move the cursor back “nn” characters from current cursor position. ***Syntax = F6nn*** (nn stands for the numeric value (00-99) for the number of characters the cursor should be moved back.)

F7 Move the cursor to the beginning of the data string. ***Syntax = F7.***

EA Move the cursor to the end of the data string. ***Syntax = EA***

Search Commands

F8 Search ahead for “xx” character from current cursor position, leaving cursor pointing to “xx” character. ***Syntax = F8xx*** (xx stands for the hex value for an ASCII code, see see ASCII Conversion Chart (Code Page 1252), page A-4.)

F9 Search back for “xx” character from current cursor position, leaving cursor pointing to “xx” character. ***Syntax = F9xx*** (xx stands for the hex value for an ASCII code, see see ASCII Conversion Chart (Code Page 1252), page A-4.)

E6 Search ahead for the first non “xx” character from the current cursor position, leaving cursor pointing to non “xx” character. ***Syntax = E6xx*** (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4.

E7 Search back for the first non “xx” character from the current cursor position, leaving cursor pointing to non “xx” character. ***Syntax = E7xx*** (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4.)

Miscellaneous Commands

FB Suppress all occurrences of up to 15 different characters, starting at the current cursor position, as the cursor is advanced by other commands. When the FC command is encountered, the suppress function is terminated. The cursor is not moved by the FB command. **Syntax = FBnnxxyy . .zz** where nn is a count of the number of suppressed characters in the list and xxyy ..

zz is the list of characters to be suppressed. (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4.)

FC Disables suppress filter and clear all suppressed characters. ***Syntax = FC***.

E4 Replaces up to 15 characters in the data string with user specified characters. Replacement continues until the E5 command is encountered. ***Syntax = E4nnxx$_1$xx$_2$yy$_1$yy$_2$...zz$_1$zz$_2$*** where nn is the total count of both characters to be replaced plus replacement characters; xx$_1$ defines characters to be replaced and xx$_2$ defines replacement characters, continuing through zz$_1$ and zz$_2$.

E5 Terminates character replacement. ***Syntax = E5***.

FE Compare character in current cursor position to the character "xx." If characters are equal, increment cursor. If characters are not equal, no format match. ***Syntax = FExx*** (xx stands for the hex value for an ASCII code, see ASCII Conversion Chart (Code Page 1252), page A-4.)

EC Check to make sure there is an ASCII number at the current cursor position. If character is not numeric, format is aborted. ***Syntax = EC***.

ED Check to make sure there is a non-numeric ASCII character at the current cursor position. If character is numeric, format is aborted. ***Syntax = ED***.

Data Format Editor

Enter Data Format

Clear One Data Format

Save

* Default Data Format

Clear All Data Formats

Discard

Data Formatter

When Data Formatter is turned off, the bar code data is output to the host as read (including prefixes and suffixes). Choose one of the following options. *Default = Data Formatter On, but Not Required.*

* Data Formatter On, but Not Required

Data Formatter Off

When Data Formatter is required, all input data must conform to an edited format or the imager does not transmit the input data to the host device.

Data Format On, Format Required

Alternate Data Formats

Alternate formats allow you “single shot” capability to scan one bar code using a different data format than your primary format. When data formats are programmed (see page 6-1), you must input whether you are programming the primary format, or an alternate format numbered 1, 2, or 3.

An alternate format is initiated by scanning one of the 3 alternate format bar codes below. The imager will scan the next bar code, formatting the data with the selected alternate format, then revert immediately to the primary format.

Alternate Data Format 1

Alternate Data Format 2

Alternate Data Format 3

7 Symbologies

This programming section contains the following menu selections. Refer to Chapter 11 for settings and defaults.

- All Symbologies
- Australian Post
- Aztec Code
- British Post
- Canadian Post
- China Post
- Codabar
- Codablock F
- Code 11
- Code 128
- Code 16K
- Straight 2 of 5 Industrial
- Code 39
- Code 49
- Code 93
- Data Matrix
- EAN/JAN-13
- EAN/JAN-8
- EAN•UCC Composite Codes
- Straight 2 of 5 IATA
- Interleaved 2 of 5
- Japanese Post
- Kix (Netherlands) Post
- Korea Post
- Matrix 2 of 5
- MaxiCode
- MicroPDF417
- MSI
- PDF417
- Planet Code
- Plessey Code
- PosiCode A and B
- Postnet
- QR Code
- RSS Expanded
- RSS Limited
- RSS-14
- TCIF Linked Code 39 (TLC39)
- Telepen
- UPC-A
- UPC-A/EAN-13 with Extended Coupon Code

Linear Symbologies

All Symbologies

If you want to decode all the symbologies allowable for your imager, scan the ***All Symbologies On*** code. If on the other hand, you want to decode only a particular symbology, scan All Symbologies Off followed by the On symbol for that particular symbology.

All Symbologies On

All Symbologies Off

Message Length Description

You are able to set the valid reading length of some of the bar code symbologies. If the data length of the scanned bar code doesn't match the valid reading length, the imager will issue an error beep. You may wish to set the same value for minimum and maximum length to force the imager to read fixed length bar code data. This helps reduce the chances of a misread.

EXAMPLE: Decode only those bar codes with a count of 9-20 characters.
Min. length = 09 Max. length = 20

EXAMPLE: Decode only those bar codes with a count of 15 characters.
Min. length = 15 Max. length = 15

For a value other than the minimum and maximum message length defaults, scan the bar codes included in the explanation of the symbology, then scan the digit value of the message length and **Save** bar codes on the Programming Chart inside the back cover of this manual. The minimum and maximum lengths and the defaults are included with the respective symbologies.

Codabar

<Default All Codabar Settings>

Codabar

* On

Off

Codabar Start/Stop Characters

Start/Stop characters identify the leading and trailing ends of the bar code. You may either transmit, or not transmit Start/Stop characters.
Default = Don't Transmit.

Transmit

* Don't Transmit

Codabar Check Character

Codabar check characters are created using different "modulos." You can program the imager to read only Codabar bar codes with Modulo 16 check characters. *Default = No Check Character.*

No Check Character indicates that the imager reads and transmits bar code data with or without a check character.

When Check Character is set to ***Validate and Transmit***, the imager will only read Codabar bar codes printed with a check character, and will transmit this character at the end of the scanned data.

Linear Symbologies

When Check Character is set to ***Validate, but Don't Transmit***, the unit will only read Codabar bar codes printed ***with*** a check character, but will not transmit the check character with the scanned data.

CBRCK20.

* No Check Character

CBRCK21.

Validate Modulo 16, but Don't Transmit

CBRCK22.

Validate Modulo 16 and Transmit

Codabar Concatenation

Codabar supports symbol concatenation. When you enable concatenation, the imager looks for a Codabar symbol having a "D" start character, adjacent to a symbol having a "D" stop character. In this case the two messages are concatenated into one with the "D" characters omitted. *Default = On.*

Select Require to prevent the imager from decoding a single "D" Codabar symbol without its companion. This selection has no effect on Codabar symbols without Stop/Start D characters.

CBRCCT1.

* On

CBRCCT0.

Off

CBRCCT2.

Require

Linear Symbologies

Codabar Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 2-60. Minimum Default = 4, Maximum Default = 60.

Minimum Message Length

Maximum Message Length

Linear Symbologies

Code 39

< Default All Code 39 Settings >

Code 39

* On

Off

Code 39 Start/Stop Characters

Start/Stop characters identify the leading and trailing ends of the bar code. You may either transmit, or not transmit Start/Stop characters. *Default = Don't Transmit.*

Transmit

* Don't Transmit

Code 39 Check Character

No Check Character indicates that the imager reads and transmits bar code data with or without a check character.

When Check Character is set to **Validate, but Don't Transmit**, the unit only reads Code 39 bar codes printed with a check character, but will not transmit the check character with the scanned data.

When Check Character is set to **Validate and Transmit**, the imager only reads Code 39 bar codes printed with a check character, and will transmit this character at the end of the scanned data. *Default = No Check Character.*

* No Check Character

Validate, but Don't Transmit

Validate and Transmit

Code 39 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 0-48. Minimum Default = 0, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

Linear Symbologies

Code 39 Append

This function allows the imager to append the data from several Code 39 bar codes together before transmitting them to the host computer. When this function is enabled, the imager stores those Code 39 bar codes that start with a space (excluding the start and stop symbols), and does not immediately transmit the data. The imager stores the data in the order in which the bar codes are read, deleting the first space from each. The imager transmits the appended data when it reads a Code 39 bar code that starts with a character other than a space. *Default = Off.*

On

* Off

Code 32 Pharmaceutical (PARAF)

Code 32 Pharmaceutical is a form of the Code 39 symbology used by Italian pharmacies. This symbology is also known as PARAF.

Note: Trioptic Code (page 7-39) must be turned off while scanning Code 32 Pharmaceutical codes.

On

* Off

Linear Symbologies

Full ASCII

If Full ASCII Code 39 decoding is enabled, certain character pairs within the bar code symbol will be interpreted as a single character. For example: $V will be decoded as the ASCII character SYN, and /C will be decoded as the ASCII character #. *Default = On.*

NUL	%U	DLE	$P	SP	SPACE	0	0	@	%V	P	P	‘	%W	p	+P
SOH	$A	DC1	$Q	!	/A	1	1	A	A	Q	Q	a	+A	q	+Q
STX	$B	DC2	$R	“	/B	2	2	B	B	R	R	b	+B	r	+R
ETX	$C	DC3	$S	#	/C	3	3	C	C	S	S	c	+C	s	+S
EOT	$D	DC4	$T	$	/D	4	4	D	D	T	T	d	+D	t	+T
ENQ	$E	NAK	$U	%	/E	5	5	E	E	U	U	e	+E	u	+U
ACK	$F	SYN	$V	&	/F	6	6	F	F	V	V	f	+F	v	+V
BEL	$G	ETB	$W	‘	/G	7	7	G	G	W	W	g	+G	w	+W
BS	$H	CAN	$X	(	/H	8	8	H	H	X	X	h	+H	x	+X
HT	$I	EM	$Y	)	/I	9	9	I	I	Y	Y	i	+I	y	+Y
LF	$J	SUB	$Z	*	/J	:	/Z	J	J	Z	Z	j	+J	z	+Z
VT	$K	ESC	%A	+	/K	;	%F	K	K	[	%K	k	+K	{	%P
FF	$L	FS	%B	,	/L	<	%G	L	L	\	%L	l	+L	|	%Q
CR	$M	GS	%C	-	-	=	%H	M	M	]	%M	m	+M	}	%R
SO	$N	RS	%D	.	.	>	%I	N	N	^	%N	n	+N	~	%S
SI	$O	US	%E	/	/O	?	%J	O	O	_	%O	o	+O	DEL	%T

Character pairs /M and /N decode as a minus sign and period respectively. Character pairs /P through /Y decode as 0 through 9.

Full ASCII On

* Full ASCII Off

Linear Symbologies

Code 39 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see Code Page Mapping of Printed Bar Codes on page A-6), and scan the value and the **Save** bar code from the Programming Chart on the inside the back cover of this manual. The data characters should then appear properly.

Code 39 Code Page

Interleaved 2 of 5

< Default All Interleaved 2 of 5 Settings >

Interleaved 2 of 5

* On

Off

Check Digit

No Check Digit indicates that the imager reads and transmits bar code data with or without a check digit.

When Check Digit is set to **Validate, but Don't Transmit**, the unit only reads Interleaved 2 of 5 bar codes printed with a check digit, but will not transmit the check digit with the scanned data.

Linear Symbologies

When Check Digit is set to **Validate and Transmit**, the imager only reads Interleaved 2 of 5 bar codes printed with a check digit, and will transmit this digit at the end of the scanned data. *Default = No Check Digit.*

* No Check Digit

Validate, but Don't Transmit

Validate and Transmit

Interleaved 2 of 5 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

Code 93

< Default All Code 93 Settings >

Code 93

* On

Off

Code 93 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 0-80. Minimum Default = 0, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

Code 93 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see Code Page Mapping of Printed Bar Codes on page A-6), and scan the value and the **Save** bar code from the Programming Chart on the inside the back cover of this manual. The data characters should then appear properly.

Code 93 Code Page

Linear Symbologies

Straight 2 of 5 Industrial (three-bar start/stop)

<Default All Straight 2 of 5 Industrial Settings>

Straight 2 of 5 Industrial

On

* Off

Straight 2 of 5 Industrial Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

Straight 2 of 5 IATA (two-bar start/stop)

<Default All Straight 2 of 5 IATA Settings>

A25DFT.

Straight 2 of 5 IATA

A25ENA1.

On

A25ENA0.

* Off

Straight 2 of 5 IATA Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-48. Minimum Default = 4, Maximum Default = 48.

A25MIN.

Minimum Message Length

A25MAX.

Maximum Message Length

Matrix 2 of 5

<Default All Matrix 2 of 5 Settings>

X25DFT.

Matrix 2 of 5

X25ENA1.

On

X25ENA0.

* Off

Matrix 2 of 5 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-80. Minimum Default = 4, Maximum Default = 80.

X25MIN.

Minimum Message Length

X25MAX.

Maximum Message Length

Code 11

<Default All Code 11 Settings>

Code 11

On

* Off

Check Digits Required

This option sets whether 1 or 2 check digits are required with Code 11 bar codes. *Default = Two Check Digits.*

One Check Digit

* Two Check Digits

Code 11 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

Linear Symbologies

Code 128

<Default All Code 128 Settings>

Code 128

* On

Off

ISBT 128 Concatenation

In 1994 the International Society of Blood Transfusion (ISBT) ratified a standard for communicating critical blood information in a uniform manner. The use of ISBT formats requires a paid license. The ISBT 128 Application Specification describes 1) the critical data elements for labeling blood products, 2) the current recommendation to use Code 128 due to its high degree of security and its space-efficient design, 3) a variation of Code 128 that supports concatenation of neighboring symbols, and 4) the standard layout for bar codes on a blood product label. Use the bar codes below to turn concatenation on or off. *Default =Off.*

On

* Off

Linear Symbologies

Code 128 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 0-80. Minimum Default = 0, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

Code 128 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see Code Page Mapping of Printed Bar Codes on page A-6), and scan the value and the **Save** bar code from the Programming Chart on the inside the back cover of this manual. The data characters should then appear properly. *Default = 2.*

Code 128 Code Page

Telepen

<Default All Telepen Settings>

Telepen

TELENA1.

On

TELENA0.

* Off

Telepen Output

Using AIM Telepen Output, the imager reads symbols with start/stop pattern 1 and decodes them as standard full ASCII (start/stop pattern 1). When Original Telepen Output is selected, the imager reads symbols with start/stop pattern 1 and decodes them as compressed numeric with optional full ASCII (start/stop pattern 2). *Default = AIM Telepen Output.*

TELOLD0.

* AIM Telepen Output

TELOLD1.

Original Telepen Output

Telepen Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-60. Minimum Default = 1, Maximum Default = 60.

TELMIN.

Minimum Message Length

TELMAX.

Maximum Message Length

Linear Symbologies

UPC-A

<Default All UPC-A Settings>

UPC-A

* On

Off

UPC-A Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. *Default = On.*

* On

Off

Linear Symbologies

UPC-A Number System

The numeric system digit of a U.P.C. symbol is normally transmitted at the beginning of the scanned data, but the unit can be programmed so it will not transmit it. *Default = On.*

* On

Off

UPC-A Addenda

This selection adds 2 or 5 digits to the end of all scanned UPC-A data.
Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda On

* 2 Digit Addenda Off

5 Digit Addenda On

* 5 Digit Addenda Off

Linear Symbologies

UPC-A Addenda Required

When ***Required*** is scanned, the imager will only read UPC-A bar codes that have addenda. You must then turn on a 2 or 5 digit addenda listed on page 7-23.
Default = Not Required.

Required

* Not Required

UPC-A Addenda Separator

When this feature is on, there is a space between the data from the bar code and the data from the addenda. When turned off, there is no space.
Default = On.

* On

Off

UPC-A/EAN-13 with Extended Coupon Code

Use the following codes to enable or disable UPC-A **and** EAN-13 with Extended Coupon Code. *Default = On.*

* On

Off

UPC-E0

<Default All UPC-E Settings>

UPEDFT.

UPC-E0

Most U.P.C. bar codes lead with the 0 number system. For these codes, use the UPC-E0 selection. If you need to read codes that lead with the 1 number system, use UPC-E1 (page 7-28). *Default = On.*

UPEEN01.

* UPC-E0 On

UPEEN00.

UPC-E0 Off

UPC-E0 Expand

UPC-E Expand expands the UPC-E code to the 12 digit, UPC-A format. *Default = Off.*

UPEEXP1.

On

UPEEXP0.

* Off

UPC-E0 Addenda Required

When Addenda Required is set to on, the imager will only read UPC-E bar codes that have addenda. *Default = Not Required.*

Required

* Not Required

UPC-E0 Addenda Separator

When this feature is on, there is a space between the data from the bar code and the data from the addenda. When turned off, there is no space.
Default = On.

* On

Off

UPC-E0 Check Digit

Check Digit specifies whether the check digit should be transmitted at the end of the scanned data or not. *Default = On.*

* On

Off

Linear Symbologies

UPC-E0 Number System

The numeric system digit of a U.P.C. symbol is normally transmitted at the beginning of the scanned data, but the unit can be programmed so it will not transmit it. *Default = On.*

* On

Off

UPC-E0 Addenda

This selection adds 2 or 5 digits to the end of all scanned UPC-E data.
Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda On

* 2 Digit Addenda Off

5 Digit Addenda On

* 5 Digit Addenda Off

UPC-E1

Most U.P.C. bar codes lead with the 0 number system. For these codes, use UPC-E0 (page 7-25). If you need to read codes that lead with the 1 number system, use the UPC-E1 selection. *Default = Off.*

UPC-E1 On

* UPC-E1 Off

EAN/JAN-13

<Default All EAN/JAN Settings>

EAN/JAN-13

* On

Off

EAN/JAN-13 Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. *Default = On.*

* On

Off

EAN/JAN-13 Addenda

This selection adds 2 or 5 digits to the end of all scanned EAN/JAN-13 data. *Default = Off for both 2 Digit and 5 Digit Addenda.*

2 Digit Addenda On

* 2 Digit Addenda Off

5 Digit Addenda On

* 5 Digit Addenda Off

Linear Symbologies

EAN/JAN-13 Addenda Required

When Addenda Required is set to on, the imager will only read EAN/JAN-13 bar codes that have addenda. *Default = Not Required.*

Required

* Not Required

EAN/JAN-13 Addenda Separator

When this feature is on, there is a space between the data from the bar code and the data from the addenda. When turned off, there is no space.
Default = On.

* On

Off

Note: If you want to enable or disable EAN13 with Extended Coupon Code, refer to UPC-A/EAN-13 with Extended Coupon Code (page 7-24).

ISBN Translate

This selection causes EAN-13 Bookland symbols to be translated into their equivalent ISBN number format. *Default = Off.*

On

* Off

EAN/JAN-8

<Default All EAN/JAN-8 Settings>

EA8DFT.

EAN/JAN-8

EA8ENA1.

* On

EA8ENA0.

Off

EAN/JAN-8 Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. *Default = On.*

EA8CKX1.

* On

EA8CKX0.

Off

Linear Symbologies

EAN/JAN-8 Addenda

This selection adds 2 or 5 digits to the end of all scanned EAN/JAN-8 data.
Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda On

* 2 Digit Addenda Off

5 Digit Addenda On

* 5 Digit Addenda Off

EAN/JAN-8 Addenda Required

When Addenda Required is set to on, the imager will only read EAN/JAN-8 bar codes that have addenda. *Default = Not Required.*

Required

* Not Required

Linear Symbologies

EAN/JAN-8 Addenda Separator

When this feature is on, there is a space between the data from the bar code and the data from the addenda. When turned off, there is no space.
Default = On.

EA8ADS1.

* On

EA8ADS0.

Off

MSI

<Default All MSI Settings>

MSIDFT.

MSI

MSIENA1.

On

MSIENA0.

* Off

MSI Check Character

Different types of check characters are used with MSI bar codes. You can program the imager to read MSI bar codes with Type 10 check characters.
Default = Validate Type 10, but Don't Transmit.

When Check Character is set to ***Validate and Transmit***, the imager will only read MSI bar codes printed with the specified type check character, and will transmit this character at the end of the scanned data.

When Check Character is set to ***Validate, but Don't Transmit***, the unit will only read MSI bar codes printed with the specified type check character, but will not transmit the check character with the scanned data.

* Validate Type 10, but Don't Transmit

Validate Type 10 and Transmit

MSI Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 4-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

Plessey Code

<Default All Plessey Code Settings>

Plessey Code

On

* Off

Plessey Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 4-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

RSS-14

< Default All RSS-14 Settings >

RSS-14

* On

Off

Linear Symbologies

RSS Limited

< Default All RSS Limited Settings >

RSLDFT.

RSS Limited

RSLENA1.

* On

RSLENA0.

Off

RSS Expanded

< Default All RSS Expanded Settings >

RSEDFT.

RSS Expanded

* On

Off

RSS Expanded Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 4-74. Minimum Default = 4, Maximum Default = 74.

Minimum Message Length

Maximum Message Length

Linear Symbologies

PosiCode

<Default All PosiCode Settings>

POSDFT.

PosiCode A and B

POSENA1.

* On

POSENA0.

Off

You have to have PosiCode A and B on to read any of the PosiCode symbologies.

POSLIM0.

A and B On
(No Limited)

POSLIM1.

A and B and Limited A On
(Limited B Off)

POSLIM2.

* A and B and Limited B On
(Limited A Off)

Stacked Symbologies

PosiCode Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

Trioptic Code

Note: If you are going to scan Code 32 Pharmaceutical codes (page 7-8), Trioptic Code must be off.

Trioptic Code is used for labeling magnetic storage media.

On

* Off

Codablock F

<Default All Codablock F Settings>

Stacked Symbologies

Codablock F

On

* Off

Codablock F Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-2048. Minimum Default = 1, Maximum Default = 2048.

Minimum Message Length

Maximum Message Length

Code 16K

<Default All Code 16K Settings>

Stacked Symbologies

Code 16K

16KENA1.

On

16KENA0.

* Off

Code 16K Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 0-160. Minimum Default = 1, Maximum Default = 160.

16KMIN.

Minimum Message Length

16KMAX.

Maximum Message Length

Code 49

<Default All Code 49 Settings>

C49DFT.

Code 49

C49ENA1.

* On

C49ENA0.

Off

Code 49 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-81. Minimum Default = 1, Maximum Default = 81.

C49MIN.

Minimum Message Length

C49MAX.

Maximum Message Length

Stacked Symbologies

PDF417

< Default All PDF417 Settings >

PDF417

***** On

Off

PDF417 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-2750. Minimum Default = 1, Maximum Default = 2750.

Minimum Message Length

Maximum Message Length

MicroPDF417

< Default All MicroPDF417 Settings >

Stacked Symbologies

MicroPDF417

***** On

Off

MicroPDF417 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-366. Minimum Default = 1, Maximum Default = 366.

Minimum Message Length

Maximum Message Length

EAN•UCC Composite Codes

Linear codes are combined with a unique 2D composite component to form a new class called EAN•UCC Composite symbology. EAN•UCC Composite symbologies allow for the co-existence of symbologies already in use.

On

***** Off

Stacked Symbologies

UPC/EAN Version

Scan the ***UPC/EAN Version On*** bar code to decode EAN•UCC Composite symbols that have a UPC or EAN linear component. (This does not affect EAN•UCC Composite symbols with a UCC/EAN-128 or RSS linear component.)

UPC/EAN Version On

* UPC/EAN Version Off

EAN•UCC Composite Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-2435. Minimum Default = 1, Maximum Default = 2435.

Minimum Message Length

Maximum Message Length

Stacked Symbologies

EAN·UCC Emulation

The imager can automatically format the output from any EAN•UCC data carrier to emulate what would be encoded in an equivalent UCC/EAN-128 or RSS and Composite symbol. EAN•UCC data carriers include UPC-A and UPC-E, EAN-13 and EAN-8, ITF-14, UCC/EAN-128, and EAN•UCC RSS and Composites. Data from 2D symbols such as Aztec Code, Data Matrix, or QR Code, which encode a leading FNC1, also invoke EAN•UCC emulation. If UCC/EAN-128 Emulation is selected, the AIM Symbology Identifier is reported as "]C1". If RSS Emulation is selected, the AIM Symbology Identifier is reported as "]e0." Any application that accepts EAN•UCC data can be simplified since it only needs to recognize one data carrier type. *Default = No Emulation.*

EANEMU2.

RSS Emulation

EANEMU1.

128 Emulation

EANEMU0.

* EAN•UCC Emulation Off

TCIF Linked Code 39 (TLC39)

This code is a composite code since it has a Code 39 linear component and a MicroPDF417 stacked code component. All bar code readers are capable of reading the Code 39 linear component. The MicroPDF417 component can only be decoded if **TLC39 On** is selected. The linear component may be decoded as Code 39 even if TLC39 is off.

T39ENA1.

On

T39ENA0.

***** Off

Postal Codes

Note: For best performance when reading a postal symbology, all other postal symbologies should be turned off. The following postal codes can only be read by a 2D OEM Engine.

Postnet

On

***** Off

Postnet Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data.

Transmit Check Digit

***** Don't Transmit Check Digit

Postal Symbologies

Planet Code

On

***** Off

Planet Code Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data.

Transmit Check Digit

***** Don't Transmit Check Digit

Postal Symbologies

British Post

On

* Off

Canadian Post

On

* Off

Kix (Netherlands) Post

Note: Kix code can misread when scanned sideways or upside down. Use Working Orientation, page 4-25, if your Kix codes will not usually be presented upright to the scanner.

On

* Off

Postal Symbologies

Australian Post

On

***** Off

Japanese Post

On

***** Off

China Post

<Default All China Post Settings>

China Post

On

* Off

China Post Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

Korea Post

<Default All Korea Post Settings>

Korea Post

On

* Off

Korea Post Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

QR Code

Note: QR Code can only be read by a 2D OEM Engine.

< Default All QR Code Settings >

QR Code

This selection applies to both QR Code and Micro QR Code.

***** On

Off

QR Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-3500. Minimum Default = 1, Maximum Default = 3500.

Minimum Message Length

Maximum Message Length

Data Matrix

Note: Data Matrix can only be read by a 2D OEM Engine.

< Default All Data Matrix Settings >

Data Matrix

***** On

Off

Data Matrix Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-1500. Minimum Default = 1, Maximum Default = 1500.

Minimum Message Length

Maximum Message Length

MaxiCode

Note: MaxiCode can only be read by a 2D OEM Engine.

< Default All MaxiCode Settings >

MaxiCode

***** On

Off

MaxiCode Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-150. Minimum Default = 1, Maximum Default = 150.

Minimum Message Length

Maximum Message Length

Aztec Code

Note: Aztec Code can only be read by a 2D OEM Engine.

< Default All Aztec Code Settings >

Aztec Code

***** On

Off

Aztec Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description (page 7-2) for additional information. Minimum and Maximum lengths = 1-3750. Minimum Default = 1, Maximum Default = 3750.

Minimum Message Length

Maximum Message Length

Aztec Runes

Select ***Enable Runes*** if you are scanning Aztec runes, which are the smallest type of Aztec Code symbol with the ability to encode a very short license plate message.

Enable Runes

* Disable Runes

8 Imaging Commands

Imaging Commands with their modifiers send imaging commands to the imager on a single-use basis, and take effect for the next subsequent image capture. Once that capture is complete, the imager reverts to its imaging default settings. If you wish to change a default setting, you must use the serial default command (see Imaging Default Commands on page 11-19). When the serial default command is used, that selection becomes the new default setting for the imager.

Image Snap - IMGSNP

An image is taken whenever a trigger command is sent, or when the Image Snap (IMGSNP) command is processed. Image Snap is the command processor for image capture, or taking a picture.

The image snap command has many different modifiers that can be used to change the look of the image in memory. Modifiers always begin with numbers and end with a letter (case insensitive). Any number of modifiers may be appended to the IMGSNP command. For example, you can use the following command to snap an image, increase the gain, and have the beeper sound once the snap is complete:

IMGSNP2G1B

IMGSNP Modifiers

P - Imaging Style: Sets the Image Snap style.

- 0P **Decoding Style**. This is similar to the current format for decoding, however, this processing allows a few frames to be taken until the exposure parameters are met. Then the last frame is available for further use.
- 1P **Photo Style *(default)***. This attempts to mimic a simple digital camera, and results in a visually optimized image.
- 2P **Manual Style**. This is an advanced style, and should not normally be used. It allows you the most freedom to set up the imager, and has no auto-exposure.

B - Beeper: Causes a beep to sound after an image is snapped.

- 0B No beep *(default)*
- 1B Sounds a beep when the image is captured, notifying the user that the imager can be moved.

E - Exposure: This allows you to set the exposure time. Units are 127 microseconds. For example, an exposure setting of 50 x .000127ms = 6.35ms esposure time. Exposure is used in Manual Style only. *(Default = 7874)*

- *n*E Range: 0 - 7874

G - Gain: This modifier boosts the signal and multiplies the pixel value. The range is 1-8.

1G No gain *(default)*

2G Medium gain

4G Heavy gain

8G Maximum gain

D - Delta for Acceptance: This sets the allowable range for the white value setting (see W - Target White Value). Delta is only available when using Photo Style. *(Default = 25)*

*n*D Range: 0 - 255

L - LED State: Determines if the LEDs should be on or off, and when. Ambient illumination (0L) is preferred for taking pictures of color documents, such as ID cards, especially when the imager is in a stand. LED illumination (1L) is preferred when the imager is handheld. LED State is not available when using Decoding Style.

0L LEDs off *(default)*

1L LEDs on

T - Wait for Trigger: Waits for a hardware trigger pull before taking the image.

0T Takes image immediately *(default)*

1T Waits for a trigger pull, then takes the image

U - Update Tries: The maximum number of frames the imager should take to reach the Delta for Acceptance. Update Tries is only available when using Photo Style. *(Default = 6)*

*n*U Range: 0 - 10

W - Target White Value: Sets the target for the median grayscale value in the captured image. For capturing close-up images of high contrast documents, a lower setting, such as 75, is recommended. Higher settings result in longer exposure times and brighter images, but if the setting is too high, the image may be overexposed. Target White Value is only available when using Photo Style. *(Default = 125)*

*n*W Range: 0 - 255

% - Target Set Point Percentage: Sets the target point for the light and dark values in the captured image. 1 indicates that more pixels at the light end of a range should be used, and 99 indicates that more pixels at the dark end should be used. We do not recommend altering this setting from the default. To alter grayscale values, Target White Value should be used. *(Default = 50)*

n% Range: 1 - 99

Image Ship - IMGSHP

An image is taken whenever the Image Snap (IMGSNP) command is processed. The last image is always stored in memory. You may “ship” the image by using the IMGSHP command.

The image ship command has many different modifiers that can be used to change the look of the image output by the scanner. Modifiers affect the image that is transmitted, but do not affect the image in memory. Modifiers always begin with numbers and end with a letter (case insensitive). Any number of modifiers may be appended to the IMGSHP command. For example, you can use the following command to ship a bitmap image with gamma correction and document image filtering:

IMGSHP8F75K26U

IMGSHP Modifiers

A - Infinity Filter: Enhances pictures taken from very long distances (greater than 10 feet or 3 m).

0A	Infinity filter off *(default)*
1A	Infinity filter on

C - Compensation: Flattens the image to account for variations in illumination across the image.

0C	Compensation disabled *(default)*
1C	Compensation enabled

D - Pixel Depth: Indicates the number of bits per pixel in the transmitted image (KIM or BMP format only).

8D	8 bits per pixel, grayscale image *(default)*
1D	1 bit per pixel, black and white image

E - Edge Sharpen: Causes the transmitted image to be convolved with an edge sharpening filter. Entering a 23E gives the sharpest edges, but also increases noise in the image.

0E	Don't sharpen image *(default)*
14E	Apply edge sharpen for typical image
*n*e	Apply edge sharpen using strength *n* (*n* = 1-24)

F - File Format: Indicates the desired format for the image.

0F	KIM format
1F	TIFF binary
2F	TIFF binary group 4, compressed
3F	TIFF grayscale
4F	Uncompressed binary (upper left to lower right, 1 pixel/bit, 0 padded end of line)
5F	Uncompressed grayscale (upper left to lower right, bitmap format)
6F	JPEG image *(default)*
8F	BMP format (lower right to upper left, uncompressed)

H - Histogram Stretch: Increases the contrast of the transmitted image. Not available with some image formats.

0H	No stretch *(default)*
1H	Histogram stretch

I - Invert Image: Used to rotate the image around the X or Y axis in fixed mount applications where the imager is mounted upside down.

1IX	Invert around the X axis (flips picture upside down)
1IY	Invert around the Y axis (flips picture left to right)

IF - Fly Spec (Noise Reduction): Used to reduce salt and pepper noise in the image.

0IF	No fly spec noise reduction
1IF	Apply fly spec noise reduction

IR - Image Rotate:

1IR	Rotate image 90 degrees to the right
2IR	Rotate image 180 degrees (upside down)
3IR	Rotate image 90 degrees to the left

J - JPEG Image Quality: Sets the desired quality when the JPEG image format is selected. Higher numbers result in higher quality. Smaller numbers result in greater amounts of lossy compression, faster transmission times, and lower quality. *(Default = 50)*

*n*J	Image is compressed as much as possible while preserving quality factor of *n* (*n* = 0 - 100)
0J	worst quality
100J	best quality

K - Gamma Correction: Gamma measures the brightness of midtone values produced by the image. You can brighten or darken an image using gamma correction. A higher gamma correction yields an overall brighter image. The lower the setting, the darker the image. A setting of 100 results in no adjustment to the image. The optimal setting is 50K. (This selection should only be used for text images.)

0K	Gamma correction off *(default)*
60K	Apply gamma correction for brightening typical document image
*n*K	Apply gamma correction factor *n* (*n* = 1-255)

L, R, T, B, M - Image Cropping: Ship a window of the image by specifying the left, right, top, and bottom pixel coordinates. Device columns are numbered 0 through 640 or 752, depending on the Image VGA setting (see Image VGA on page 4-1). Device rows are numbered 0 through 480.

*n*L The left edge of the shipped image corresponds to column *n* of the image in memory. Range: 000 - 640 when Image VGA is On, 000 - 752 when Image VGA is Off. *(Default = 0)*

*n*R The right edge of the shipped image corresponds to column *n* - 1 of the image in memory. Range: 000 - 640 when Image VGA is On, 000 - 752 when Image VGA is Off. *(Default = all columns)*

*n*T The top edge of the shipped image corresponds to row *n* of the image in memory. Range: 000 - 480. *(Default = 0)*

*n*B The bottom edge of the shipped image corresponds to row *n* - 1 of the image in memory. Range: 000 - 480. *(Default = all rows)*

Alternately, specify the number of pixels to cut from the outside margin of the image; thus only the center pixels are transmitted.

*n*M Margin: cut *n* columns from the left, *n* + 1 columns from the right, *n* rows from the top, and *n* + 1 rows from the bottom of the image. Ship the remaining center pixels. Range: 1 - 238. *(Default = 0, or full image)*

P - Protocol: Used for shipping an image. Protocol covers two features of the image data being sent to the host. It addresses the protocol used to send the data (Hmodem, which is an xmodem 1K variant that has additional header information), and the format of the image data that is sent.

0P None (raw data)

2P None *(default for USB)*

3P Hmodem compressed *(default for RS-232)*

4P Hmodem

S - Pixel Ship: Can be used to decimate the image by shipping only certain, regularly spaced pixels. For example, **4S** would transmit every fourth pixel from every fourth line. The smaller number of pixels shipped, the smaller the image. However, after a certain point, the image becomes unusable.

1S ship every pixel *(default)*

2S ship every 2nd pixel, both horizontally and vertically *(default)*

3S ship every 3rd pixel, both horizontally and vertically

U - Document Image Filter: Sharpens the edges and smoothes the area between the edges of the transmitted text image. The Document Image Filter enhances images of documents such as ID cards and prescriptions. This filter should be used with gamma correction (see page 8-4), with the imager in a stand, and the image captured using the command:

IMGSNP1P0L168W90%32D

This filter typically provides better JPEG compression than the standard E - Edge Sharpen command (see page 8-6). This filter also works well when shipping pure black and white images (1 bit per pixel). The optimal setting is 26U.

0U	Document image filter off *(default)*
26U	Apply document image filter for typical document image
*n*U	Apply document image filter using grayscale threshold n. Use lower numbers when the image contrast is lower. 1U will have a similar effect to 22e. Range: 0-255.

V - Blur Image: Smoothes transitions by averaging the pixels next to the hard edges of defined lines and shaded areas in an image.

0V	Don't blur *(default)*
1V	Blur

W - Histogram Ship: A histogram gives a quick picture of the tonal range of an image, or key type. A low-key image has detail concentrated in the shadows; a high-key image has detail concentrated in the highlights; and an average-key image has detail concentrated in the midtones. This modifier ships the histogram for an image.

0W	Don't ship histogram *(default)*
1W	Ship histogram

Intelligent Signature Capture - IMGBOX

IMGBOX commands can only be used with PDF417, Code 39, Code 128, Aztec, Codabar, and Interleaved 2 of 5 symbologies.

Intelligent signature capture ships only part of an image to the host application. This method reduces transfer time and file size, while simplifying signature capture.

Below is an example of an intelligent signature capture application. In this example, the operator reads the bar code, which is then transmitted to the host application. Upon the receipt of the bar code data, the host application sends the IMGBOX command, which tells the scanner to output only the area of the image corresponding to the signature capture box. The scanner also automatically adjusts for aspect ratio and distortion, issues that arise due to scanner skew with respect to the bar code.

Align the aimers with the signature area (not with the bar code), then activate the trigger. Send the IMGBOX command string after the trigger command.

An important aspect of intelligent signature capture is that all dimensions used in the application are measured as multiples of the minimum element size of the bar code. Using this method, intelligent signature capture always outputs the correct image size and resolution, no matter the distance at which the scanner is held from the bar code, assuming that the entire signature capture area is within the scanner's field of view.

The intelligent signature capture command string for this application is:

IMGBOX40S0X70Y190W100H1R0F

IMGBOX Modifiers

D - Pixel Depth: Indicates the number of bits per pixel in the transmitted image.

8D	8 bits per pixel, grayscale image
1D	1 bit per pixel, black and white image

F - File Format: Indicates the type of file format in which to save the image.

0F	KIM format
1F	TIFF binary
2F	TIFF binary group 4, compressed
3F	TIFF grayscale
4F	Uncompressed Binary
5F	Uncompressed grayscale
6F	JPEG image *(default)*
7F	Outlined image
8F	BMP format

H - Height of Signature Capture Area: In the example, the height of the area to be captured is 1 inch, resulting in a value of H = 1/0.01 = 100. The value for H is slightly larger, to accommodate some extra image capture area outside of the signature capture box.

K - Gamma Correction: Gamma measures the brightness of midtone values produced by the image. You can brighten or darken an image using gamma correction. A higher gamma correction yields an overall brighter image. The lower the setting, the darker the image. A setting of 100 results in no adjustment to the image. *(Default = 50K)*

0K	Gamma correction off
50K	Apply gamma correction for brightening typical document image
*n*K	Apply gamma correction factor *n* (*n* = 1-255)

R - Resolution of Signature Capture Area: The number of pixels that the imager outputs per each minimum bar width. The higher the value for R, the higher the quality of the image, but also the larger the file size.

S - Bar Code Aspect Ratio: The ratio of the bar code height to the narrow element width. In the example, the narrow element width is .010 inches and the bar code height is 0.400 inches, resulting in a value of S = 0.4/0.01 = 40.

W - Width of Signature Capture Area: In the example, the width of the area to be captured is 1.90 inches, resulting in a value of W = 1.9/0.01 = 190. The value for W is slightly larger, to accommodate some extra image capture area outside of the signature capture box.

X - Horizontal Bar Code Offset: The horizontal ratio offset of the center of the signature capture area, in multiples of the minimum bar width. In the example, the horizontal offset is 0.

Y - Vertical Bar Code Offset: The vertical offset of the center of the signature capture area, in multiples of the minimum bar width. Negative numbers indicate that the signature capture is above the bar code, and positive numbers indicate that the area is below the bar code. In the example, the horizontal offset is 0.70 inches, resulting in a value for Y = 0.7/0.01 = 70.

9 OCR Programming

Use this section to program the Imager for optical character recognition (OCR). The 2D OEM Engine reads 6 to 60 point OCR typeface.

Note: OCR is not as secure as bar codes. To enhance security in OCR applications, create an OCR template to match the data, and print an OCR check character.

The 2D OEM Engine will read OCR-A, OCR-B, U.S. Currency Serial Number (Money), MICR E-13B, and SEMI fonts.

You can either select an OCR default, or create your own custom template for the type of OCR format you intend to read. See "OCR" on page 9-1 for programming codes that will enable your imager to read OCR-A, OCR-B, U.S. Currency, MICR E-13B, or SEMI fonts. See "OCR Templates" on page 9-3 if you want to create a custom “template,” or character string that defines the length and content of OCR strings that will be read with your imager.

Note: Setting the template and check character options are essential for OCR reading.

OCR Fonts

Default All OCR Settings turns off all OCR capability in the imager, so the imager will be able to scan linear, stacked, matrix, and composite bar codes, but not OCR fonts. In addition, any OCR templates you have created are erased. The eight digit default templates are reinstated for any future use of the ***OCR On*** codes listed below.

< Default All OCR Settings >

OCR

Note: OCR symbols can misread when scanned sideways or upside down. Use Working Orientation, page 4-25, if your OCR symbols will not usually be presented upright to the scanner.

Only one OCR symbology can be read at a time.

OCR-A On allows you to scan characters in the OCR-A font. The default setting allows you to scan any eight digit combination. If you have created an OCR template, character combinations that fit the template can be scanned (see Creating an OCR Template, page 9-4).

OCR-A On

OCR-B On allows you to scan characters in the OCR-B font. The default setting allows you to scan any eight digit combination. If you have created an OCR template, character combinations that fit the template can be scanned (see Creating an OCR Template, page 9-4).

OCR-B On

U.S. Currency Font

U.S. Currency On allows you to scan characters in the font used on U.S. currency. The default setting allows you to scan any eight digit combination. If you have created an OCR template, character combinations that fit the template can be scanned (see Creating an OCR Template, page 9-4).

U.S. Currency On

MICR E-13B Font

MICR E-13B On allows you to scan MICR characters on a bank check. The default setting allows you to scan any eight digit combination. If you have created an OCR template, character combinations that fit the template can be scanned (see Creating an OCR Template, page 9-4).

MICR E-13B On

Note: TOAD characters (Transit, On Us, Amount and Dash) are output in the following manner:

- the transit character is output as **T**
- the amount character is output as **A**
- the on us character is output as **O**
- the dash character is output as **D**

SEMI Font

SEMI Font On allows you to scan the SEMI font used in the semiconductor industry.

SEMI Font On

All OCR Off turns off all OCR capability in the imager, so the imager will be able to scan linear, stacked, matrix, and composite bar codes, but not OCR fonts. However, any OCR templates you have created will be retained in memory.

***** All OCR Off

OCR Templates

You can create a custom “template,” or character string that defines the length and content of OCR strings that will be read with your imager. There are several choices when creating a custom template for your application. You can create a template for a single format, you can string together several formats, and you can create a template for a user-defined variable. These choices are described in detail below.

Creating an OCR Template

A single template allows you to program the imager to read any combination of characters in the order you specify. Refer to examples that follow the Template Characters table below.

Template Characters

a	represents any alphanumeric character (digit or letter)
c	represents a check character position
d	represents any digit
e	represents any available OCR character
g	represents character from user-defined variable “g”
h	represents character from user-defined variable “h”
l	represents any uppercase letter
t	marks the start of a new template
r	multi row indicator
All other characters represent themselves. Spaces can be used. Note: In MICR E-13B templates, TOAD characters (capital letters T, O, A, and D), represent Transit, On Us, Amount, and Dash.	

Note: OCR templates default to eight digits, no check character.

To Add an OCR Template

1. Turn on the OCR font you want to read (page 9-2).
2. Begin building the template.
   Scan the ***Enter OCR Template*** symbol (page 9-13).
3. Scan the characters for the string.
   Use the Template Characters chart above to determine what characters you need to create your format. Use the OCR Programming Chart (after the Sample Codes in the back of this manual) to scan the characters for your template.

Example: You need to read any combination of eight digits. The template would be:

dddddddd

To create this template, you would enable the OCR-A font. Scan the ***Enter OCR Template*** symbol (page 9-13), then scan the ***d*** from the OCR Programming Chart in the back of this manual eight times. Scan ***Save OCR Template*** (page 9-14). This would let you read any string of eight digits, for example:

37680981

Character Match Sequences
On the ASCII Conversion Chart (Code Page 1252), page A-4, find the Hex value that represents the character(s) you want to match. Use the Programming Chart (inside the back cover) to scan the numbers that represent these characters.

Example: You need to read three digits, three specific characters (ABC), three digits. The template would be:

ddd414243ddd
hex codes for
letters A, B, and C

To create this template, you would enable the OCR-A font. Scan the ***Enter OCR Template*** symbol (page 9-13). Scan the ***d*** from the OCR Programming Chart in the back of this manual three times. Then scan ***414243*** from the inside back cover (the hex characters for "A," "B," and "C"), and scan the ***d*** three more times. Scan ***Save OCR Template,*** page 9-14. This would let you read any string of three digits, "ABC," then any string of three digits, for example:

551ABC983

Adding Spaces
You may also need to put spaces in your template.

Example: You need to read three digits, space, three specific characters (ABC), space, three digits. The template would be:

ddd2041424320ddd
hex code for a space

To create this template, you would enable the OCR-A font. Scan the ***Enter OCR Template*** symbol (page 9-13). Scan the ***d*** from the OCR Programming Chart in the back of this manual three times, then scan ***2041424320*** from the Programming Chart on the inside back cover (the hex characters for "space," "A," "B," "C," "space"). Scan the ***d*** three more times, then scan ***Save OCR Template*** (page 9-14). This would let you read any string of three digits, space, "ABC," space, then any string of three digits. For example:

551 ABC 983

*Note: If using Quick*View to program, use the space bar to designate a space and not the hex value of 20.*

4. Exit OCR Template Editor
Scan ***Save OCR Template*** to save your entries. ***Discard OCR Template*** exits without saving any OCR Template changes.

Stringing Together Multiple Formats (Creating "Or" Statements)

You may want to program the imager to accept many OCR formats. To do this, you would string together each format with a "t." This tells the imager to read optical characters that match any one of the formats in the template.

Example: You need to read any combination of eight digits, *or* a combination of four digits, two uppercase letters, and two digits. The template would be:

ddddddddtddddlldd

To create this template, you would enable the OCR-A font. Scan the ***Enter OCR Template*** symbol (page 9-13). Scan the ***d*** from the OCR Programming Chart in the back of this manual eight times, then scan the ***t*** to create the "or" statement. Then you would scan the characters for the second template. Scan ***d*** four times, scan ***l*** two times, then scan ***d*** two more times. Scan ***Save OCR Template*** (page 9-14). This would let you read either type of format, for example:

99028650

or

9902XZ50

You can string together as many templates as you need.

OCR User-Defined Variables

You can create up to two of your own user variables for an OCR template. These variables will represent any OCR readable characters. The user-defined variables are stored under the letters "g" and "h." Creating a user variable follows the same steps as creating a template, but instead of scanning the ***Enter OCR Template*** symbol, you scan the ***Enter User-Defined Variable*** symbol (page 9-13). The letters g and h can then be used in an OCR template to define the variable you specified.

Example: You need a variable to represent the letters "A," "B," or "C." The template for this variable would be:

414243

To create this template, you would enable the OCR-A font. Scan the ***Enter User-Defined Variable g*** symbol (page 9-13). Scan ***414243*** from the Programming Chart (the hex characters for "A," "B," and "C"). Scan ***Save OCR Template*** (page 9-14). This will let you read either A or B or C in any position where you place the g. For example, you could create the following template:

ddddddggg

This template would then let you read data that began with six digits, and had an A, B, or C trailing. So you would be able to read:

654321ABC

or

654321BAC

or

654321CCC

Reading Multi-Row OCR

The IT5X80 is capable of decoding multi-row OCR text.

Note: Reading rows longer than sixteen characters is not recommended.

Consider the following example. This example shows serial commands as they would be entered using Quick*View.

Example: You need to read multiple rows of OCR-A data as shown below:

12345678

ABCDEFGH

First, enable the OCR-A font. To read the first row of OCR data, you would program the following template:

OCRTMP"dddddddd".

This template is the default OCR template. If you wanted to read the second line of data, you would use the following template:

OCRTMP"llllllll".

To read both lines of OCR at one time, use the variable ***r*** to indicate the start of a new row. All the other templating variables for the individual rows work the same as previously described. For instance, in the above example, you would use the following template to read both rows:

OCRTMP"ddddddddrllllllll".

To read the three rows below, you would use the template command "OCRTMP"ddddddddrllllllllrllllllddd".

12345678

ABCDEFGH

ABCD1234.

OCR Check Character

You may want to print and verify a check character in order to enhance the security of your OCR application. The IT5X80 can be programmed for almost any type of check character. A number of presets are provided for common check character uses (e.g., modulo 10 and modulo 36).

Scan the ***OCR Modulo 10*** or ***OCR Modulo 36 Check Character*** bar code to specify the type of check character used in the OCR strings you're scanning. The imager will then only read OCR character strings with a valid check character. The IT5X80 transmits the OCR data without the check character data. You must specify the location of the check character in the template with a ***c***.

Example: You need to read any combination of seven digits, with a modulo 10 check character in the eighth position. The template would be:

ddddddc

To create this template, you would enable the OCR-A font. Scan the ***Modulo 10 Check Character*** symbol. Then scan the ***Enter OCR Template*** symbol, and scan the ***d*** from the OCR Programming Chart seven times, and scan the ***c*** once. Scan ***Save OCR Template*** (page 9-14). This template will let you read any combination of six digits with a correct check character after. (If the check character is invalid, the imager will issue an error beep.) For example, the following string could be scanned:

0123456

and the output would be: 0123456

OCR Modulo 10 Check Character

Scan this symbol to program the OCR template for a simple modulo 10 checksum of the digits 0 through 9.

OCR Modulo 10 Check Character

OCR Modulo 36 Check Character

Scan this symbol to program the OCR template for a simple modulo 36 checksum of the digits 0 through 9 and the letters A through Z.

OCR Modulo 36 Check Character

OCR User-Defined Check Character

You can customize the check character calculation to suit your application. Each character of the check character alphabet can be programmed in its proper order. The number of characters you enter determines the modulo value for the calculation. By default, the check character computation is unweighted, but the imager also supports two weighted modulo 10 checking schemes.

Example: To program a modulo 11 check character, you would enter the following 11 characters in order:

0123456789X

Also enter the OCR template:

ddddddddc

Enable the OCR-A font, then scan the following string:

6512351X

The imager performs the following check character computation:

(6 + 5 + 1 + 2 +3 + 5 + 1 + X) modulo 11 = 0

Since the result is zero, the message is considered to be valid, so the reader outputs the message: 6512351

Programming a User-Defined Check Character

1. Scan the **Enter OCR Check Character** bar code, below.

Enter OCR Check Character

2. Enter the characters in order. For each character, look up the corresponding hex value from the ASCII Conversion Chart (Code Page 1252), page A-4. Use the Programming Chart on the inside the back cover of this manual to scan the two symbols for each hex value.

3. Scan the **Save** bar code on the inside back cover.

Example: To program the modulo 11 check character from example #8 on page 9-9, enable the OCR-A font. Scan the **Enter OCR Check Character** bar code on page 9-9, then scan the following hex values in order:

303132333435363738 3958

After you enter all the desired hex values, scan the **Save** bar code on the inside back cover of this manual.

Weighting Options

By default, the check character computation is unweighted. It is possible to use one of two weighted modulo 10 schemes. Weighting is often used to detect if two neighboring characters are transposed, a common error when an operator keys in data.

3-1-3-1 Weighted Modulo 10 Check Character

Starting with the check character and working backward through the message, the imager applies a multiplier of 1, then 3, then 1, then 3, and so on. This is the checking scheme used in many EAN•UCC symbologies, including U.P.C. and Interleaved 2 of 5 (when a check digit is invoked). To apply this weighting scheme, set the OCR check character to **"0123456789x3x1"** or scan the following symbol:

3-1-3-1 Weighted Modulo 10
Check Character

Example: Scan the 3-1-3-1 Weighted Modulo 10 Check Character symbol. Also enter the OCR template:

ddddddddc

Then scan the string below:

01234565

The reader performs the check character computation below:

(0 x 3 + 1 x 1 + 2 x 3 + 3 x 1 + 4 x 3 + 5 x 1 + 6 x 3 + 5 x 1) modulo 10 = 0

Since the result is zero, the message is considered to be valid, so the reader outputs the message: 0123456

2-1-2-1 Weighted Modulo 10 Check Character

Starting with the check character and working backward through the message, the imager applies a multiplier of 1, then 2, then 1, then 2, and so on. When the result of the multiplication is greater than 9, add both digits to the running sum. This is often referred to as the LUHN formula. One common application of the LUHN formula is validate credit card numbers. This is the modulo 10 checking scheme used in MSI Code and in Code 32 Pharmaceutical (PARAF). To apply this weighting scheme, set the OCR check character to **"0123456789x2x1"** or scan the following symbol:

2-1-2-1 Weighted Modulo 10
Check Character

Example: Scan the 2-1-2-1 Weighted Modulo 10 Check Character symbol. Also enter the OCR template:

ddddddc

Then scan the string below:

0128454

The reader performs the check character computation below:

(0 x 1 + 1 x 2 + 2 x 1 + 8 x 2 + 4 x 1 + 5 x 2 + 4 x 1) modulo 10

= (0 + 2 + 2 + (1 + 6) + 4 + (1 + 0) + 4) modulo 10

= 0

Since the result is zero, the message is considered to be valid, so the reader outputs the message: 012845

OCR ISBN Application Example

One application of OCR is to read the ISBN characters typically encoded using the OCR-A or OCR-B font. This is especially useful when the ISBN number is not encoded in an EAN-13 bar code. The following example shows how to configure the imager to read the ISBN strings on books in Japan. After you have followed the steps below, you will be able to scan the following ISBN number or the additional data below it, depending on the line of text at which the imager is aimed.

ISBN4-594-03019-X

C0097 ¥838E

1. Scan the OCR-B On bar code on page 9-2.
2. Program the user-defined variable “g” to comprise the ten digits plus the dash:

   0123456789-

3. In Japan, it is common for two fields to follow the ISBN number, the three digit price field, and the four digit price field. The first field typically starts with a “C” (uppercase c), followed by four digits. The second field typically starts with a “P” or a yen symbol, followed by three or four digits, followed by an “E.” Program the user-defined variable “h” to comprise the “P” and the yen symbol (represented by a backslash).

   P\

4. Scan the symbol below to set up three templates to handle the ISBN number, the three digit price field, and the four digit price field.

5. Finally, set up the ISBN check digit, which is a special position-weighted modulo 11 checksum. The imager automatically invokes the ISBN checksum for template rows that are:
   1.) at least fourteen characters long,
   2.) whose first four characters are the letters “ISBN,”
   3.) whose last character is a check character, and
   4.) when the modulo 11 check character “0123456789X” is programmed.

Please note that all these commands can be combined into a single serial programming command:

OCRENA2,TMP”ISBNgggggggggggctCdddd hdddEtCdddd hddddE”,GPG”0123456789-”,GPH”P\”,CHK”0123456789X”.

These commands can be encoded into the following Aztec Code symbol:

OCR Template Codes

Note: Reading more than three rows of OCR is not recommended. Contact the factory if you have an application that requires reading four or more rows of OCR.

OCRTMP.

OCRGPG.
Enter User-Defined Variable “g”†

OCRGPH.
Enter User-Defined Variable “h”†

† One or more two-digit numbers and ***Save*** are required after reading this programming symbol. Refer to the Programming Chart on the inside the back cover of this manual.

Exit Selections

Save OCR Template

Discard OCR Template

To Add a Test Code I.D. Prefix to All Symbologies

This selection allows you to turn on transmission of a Code I.D. before the decoded symbology. (See the Symbology Chart, included in the Appendix A, page A-1) for the single character code that identifies each symbology.) This action first clears all current prefixes, then programs a Code I.D. prefix for all symbologies. This is a temporary setting that will be removed when the unit is power cycled.

Add Code I.D. Prefix to
All Symbologies (Temporary)

Show Software Revision

Scan the bar code below to output the current software revision, unit serial number, and other product information.

Show Revision

Show Data Format

Scan the bar code below to show current data format settings.

Data Format Settings

Resetting the Standard Product Defaults

If you aren't sure what programming options are in your imager, or you've changed some options and want the standard product default settings restored, scan the ***Standard Product Default Settings*** bar code below.

Standard Product Default Settings

The Menu Commands starting on page 11-5 lists the standard product default settings for each of the commands (indicated by an asterisk (*) on the programming pages).

Test Menu

When you scan the Test Menu ***On*** code, then scan a programming code in this manual, the imager displays the content of a programming code. The programming function will still occur, but in addition, the content of that programming code is output to the terminal.

Note: This feature should not be used during normal imager operation.

On

***** Off

2D PQA (Print Quality Assessment)

Two-dimensional Print Quality Assessment (2D PQA) is a feature of Hand Held Products' image readers where the data from the successful read of a 2D bar code symbol is augmented with lines of text that both identify the symbol, and also report graded measurement parameters obtained from it.

To see displayed results, Microsoft® Notepad, a word processor/editing program, or Quick*View (page 10-4) is recommended. For additional information on interpreting your read results, please refer to Hand Held Products' Quick Check 2D Print Assessment User's Guide.

11 Serial Programming Commands

The serial programming commands can be used in place of the programming bar codes. Both the serial commands and the programming bar codes will program the OEM Engine. For complete descriptions and examples of each serial programming command, refer to the corresponding programming bar code in this manual.

The device must be set to an RS-232 interface (see page 2-1). The following commands can be sent via a PC COM port using terminal emulation software.

Conventions

The following conventions are used for menu and query command descriptions:

parameter	A label representing the actual value you should send as part of a command.
[*option*]	An optional part of a command.
{Data}	Alternatives in a command.
bold	Names of menus, menu commands, buttons, dialog boxes, and windows that appear on the screen.

Menu Command Syntax

Menu commands have the following syntax (spaces have been used for clarity only):

Prefix Tag SubTag {Data} [, SubTag {Data}] [; Tag SubTag {Data}] […] Storage

Prefix	Three ASCII characters: **SYN M CR** (ASCII 22,77,13).
Tag	A 3 character case-insensitive field that identifies the desired menu command group. For example, all RS-232 configuration settings are identified with a Tag of **232**.
SubTag	A 3 character case-insensitive field that identifies the desired menu command within the tag group. For example, the SubTag for the RS-232 baud rate is **BAD**.
Data	The new value for a menu setting, identified by the Tag and Sub-Tag.
Storage	A single character that specifies the storage table to which the command is applied. An exclamation point (**!**) performs the command's operation on the device's volatile menu configuration table. A period (**.**) performs the command's operation on the device's non-volatile menu configuration table. Use the non-volatile table only for semi-permanent changes you want saved through a power cycle.

Query Commands

Several special characters can be used to query the device about its settings.

- **^** What is the default value for the setting(s).
- **?** What is the device's current value for the setting(s).
- ***** What is the range of possible values for the setting(s). (The device's response uses a dash (**-**) to indicate a continuous range of values. A pipe (**|**) separates items in a list of non-continuous values.)

Tag Field Usage

When a query is used in place of a Tag field, the query applies to the *entire* set of commands available for the particular storage table indicated by the Storage field of the command. In this case, the SubTag and Data fields should not be used because they are ignored by the device.

SubTag Field Usage

When a query is used in place of a SubTag field, the query applies only to the subset of commands available that match the Tag field. In this case, the Data field should not be used because it is ignored by the device.

Data Field Usage

When a query is used in place of the Data field, the query applies only to the specific command identified by the Tag and SubTag fields.

Concatenation of Multiple Commands

Multiple commands can be issued within one Prefix/Storage sequence. Only the Tag, SubTag, and Data fields must be repeated for each command in the sequence. If additional commands are to be applied to the same Tag, then the new command sequence is separated with a comma (**,**) and only the SubTag and Data fields of the additional command are issued. If the additional command requires a different Tag field, the command is separated from previous commands by a semicolon (**;**).

Responses

The device responds to serial commands with one of three responses:

ACK Indicates a good command which has been processed.

ENQ Indicates an invalid Tag or SubTag command.

NAK Indicates the command was good, but the Data field entry was out of the allowable range for this Tag and SubTag combination, e.g., an entry for a minimum message length of 100 when the field will only accept 2 characters.

When responding, the device echoes back the command sequence with the status character inserted directly before each of the punctuation marks (the period, exclamation point, comma, or semicolon) in the command.

Examples of Query Commands

In the following examples, a bracketed notation [ ] depicts a non-displayable response.

Example: Example #1:What is the range of possible values for Codabar Coding Enable?

Enter: **cbrena*.**

Response: **CBRENA0-1[ACK]**

This response indicates that Codabar Coding Enable (CBRENA) has a range of values from 0 to 1 (off and on).

Example: Example #2: What is the default value for Codabar Coding Enable?

Enter: **cbrena^.**

Response: **CBRENA1[ACK]**

This response indicates that the default setting for Codabar Coding Enable (CBRENA) is 1, or on.

Example: Example #3: What is the device's current setting for Codabar Coding Enable?

Enter: **cbrena?.**

Response: **CBRENA1[ACK]**

This response indicates that the device's Codabar Coding Enable (CBRENA) is set to 1, or on.

Example: Example #4: What are the device's settings for all Codabar selections?

Enter: **cbr?.**

Response: **CBRENA1[ACK],**
SSX0[ACK],
CK20[ACK],
CCT1[ACK],
MIN2[ACK],
MAX60[ACK],
DFT[ACK].

This response indicates that the device's Codabar Coding Enable (CBRENA) is set to 1, or on;
the Start/Stop Character (SSX) is set to 0, or Don't Transmit;
the Check Character (CK2) is set to 0, or Not Required;
concatenation (CCT) is set to 1, or Enabled;
the Minimum Message Length (MIN) is set to 2 characters;
the Maximum Message Length (MAX) is set to 60 characters;
and the Default setting (DFT) has no value.

Trigger Commands

You can activate and deactivate the imager with serial trigger commands. First, the imager must be put in Manual/Serial Trigger Mode either by scanning the Manual/Serial Trigger Mode bar code (page 4-7), or by sending the Manual/Serial Menu Command (page 11-7). Once the imager is in serial trigger mode, the trigger is activated and deactivated by sending the following commands:

Activate: **SYN T CR**

Deactivate: **SYN U CR**

The imager scans until a bar code has been read, until the deactivate command is sent, or until the serial time-out has been reached (see "Read Time-Out" on page 4-7 for a description, and the serial command on page 11-7).

Resetting the Standard Product Defaults

If you aren't sure what programming options are in your imager, or you've changed some options and want the factory settings restored, scan the ***Standard Product Default Settings*** bar code below.

Standard Product Default Settings

The chart on the following pages lists the factory default settings for each of the menu commands (indicated by an asterisk (*) on the programming pages).

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Factory Default Settings	Default	DEFALT	11-4
Terminal Interfaces			
Terminal ID		TERMID###	3-1
Baud Rate	300 BPS	232BAD0	3-2
	600 BPS	232BAD1	3-2
	1200 BPS	232BAD2	3-2
	2400 BPS	232BAD3	3-2
	4800 BPS	232BAD4	3-2
	9600 BPS	232BAD5	3-2
	19200 BPS	232BAD6	3-2
	38400 BPS	232BAD7	3-2
	57600 BPS	232BAD8	3-2
	*115200 BPS	232BAD9	3-2
Word Length: Data Bits, Stop Bits, and Parity	7 Data, 1 Stop, Parity Even	232WRD3	3-3
	7 Data, 1 Stop, Parity None	232WRD0	3-3
	7 Data, 1 Stop, Parity Odd	232WRD6	3-3
	7 Data, 2 Stop, Parity Even	232WRD4	3-3
	7 Data, 2 Stop, Parity None	232WRD1	3-3
	7 Data, 2 Stop, Parity Odd	232WRD7	3-3
	8 Data, 1 Stop, Parity Even	232WRD5	3-3
	*8 Data, 1 Stop, Parity None	232WRD2	3-3
	8 Data, 1 Stop, Parity Odd	232WRD8	3-3
RS-232 Receiver Time-Out	Range 0 - 300 seconds	232LPT###	3-4
RS-232 Handshaking	*RTS/CTS Off	232CTS0	3-5
	RTS/CTS On	232CTS1	3-5
	*XON/XOFF Off	232XON0	3-5
	XON/XOFF On	232XON1	3-5
	*ACK/NAK Off	232ACK0	3-5
	ACK/NAK On	232ACK1	3-5

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
TTL Level 232 Interface	TTL Level 232 Inverted	232INV0	3-6
	TTL Level 232 Non-Inverted	232INV1	3-6
	*TTL Level 232 Inverted with Polarity Override	232INV2	3-6
Output Selections			
Image VGA	Off	IMGVGA0	4-1
	*On	IMGVGA1	4-1
Beeper - Good Read	Off	BEPBEP0	4-2
	*On	BEPBEP1	4-1
Beeper Volume - Good Read	Off	BEPLVL0	4-1
	Low	BEPLVL1	4-2
	*Medium (default for 5X10)	BEPLVL2	4-2
	*High (default for 5X80)	BEPLVL3	4-2
Beeper Pitch - Good Read (Frequency)	Low (1600) (min 400Hz)	BEPFQ11600	4-2
	*Medium (3250)	BEPFQ13250	4-2
	High (4200) (max 9000Hz)	BEPFQ14200	4-2
Beeper Duration - Good Read	*Normal Beep	BEPBIP0	4-3
	Short Beep	BEPBIP1	4-3
LED - Good Read	Off	BEPLED0	4-3
	*On	BEPLED1	4-3
LED Good Read Polarity	Active High	GRDINV1	4-5
	*Active Low	GRDINV0	4-4
Number of Beeps - Good Read	Range 1 - 9	BEPRPT#	4-4
	*1	BEPRPT1	4-4
Beep Polarity	Active High	BEPINV1	4-5
	*Active Low	BEPINV0	4-5
User-Specified Good Read Delay	Range 0 - 30,000 ms	DLYGRD#####	4-6
Good Read Delay	*No Delay	DLYGRD0	4-6
	Short Delay (500 ms)	DLYGRD500	4-6
	Medium Delay (1000 ms)	DLYGRD1000	4-6
	Long Delay (1500 ms)	DLYGRD1500	4-6

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Trigger Mode	*Manual/Serial Trigger	TRGMOD0	4-7
	Read Time-Out (0 - 300,000 ms) *0	TRGSTO####	4-7
	Manual Trigger, Low Power	TRGMOD2	4-7
	Low Power Time-Out Timer (0 - 300 seconds) *120	TRGLPT###	4-8
	Snap and Ship	TRGMOD6	4-8
	Host Notify	TRGMOD5	4-8
Scan Stand	Scan Stand Mode	TRGMOD4	4-9
	Scan Stand Symbol	FNC3	4-9
Presentation	Presentation Mode	TRGMOD3	4-9
Presentation LED Behavior after Decode	*LEDs On	TRGPCK1	4-10
	LEDs Off	TRGPCK0	4-10
Presentation LED Time-Out	LED Time-Out Duration	TRGOTO	4-10
Presentation Sensitivity	Range 0-20 (*1)	TRGPMS##	4-10
Hands Free Time-Out	Range 0 - 300,000 ms	TRGPTO######	4-11
User-Specified Reread Delay	Range 0 - 30,000 ms	DLYRRD#####	4-12
Reread Delay	Short (500 ms)	DLYRRD500	4-11
	*Medium (750 ms)	DLYRR750	4-11
	Long (1000 ms)	DLYRRD1000	4-11
	Extra Long (2000 ms)	DLYRRD2000	4-11
LED Power Level	Off	PWRLDC0	4-12
	Low (50%)	PWRLDC50	4-12
	*High (100%)	PWRLDC100	4-12
Illumination Lights	*Lights On	SCNLED1	4-13
	Lights Off	SCNLED0	4-13
Imager Time-Out	Range 0 - 999,999 ms (*1 ms)	SDRTIM######	4-13
Aimer Delay	200 milliseconds	SCNDLY200	4-14
	400 milliseconds	SCNDLY400	4-14
	*Off (no delay)	SCNDLY0	4-14
User-Specified Aimer Delay	Range 0 - 4,000 ms	SCNDLY####	4-14

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Aimer Mode	Off	SCNAIM0	4-15
	Concurrent	SCNAIM1	4-15
	*Interlaced	SCNAIM2	4-15
Centering Window	Centering On	DECWIN1	4-17
	*Centering Off	DECWIN0	4-17
	Left of Centering Window (*40%)	DECLFT	4-17
	Right of Centering Window (*60%)	DECRGT	4-17
	Top of Centering Window (*40%)	DECTOP	4-17
	Bottom of Centering Window (*60%)	DECBOT	4-17
Decode Search Mode	Full Omnidirectional (Default for 2D imagers)	DECMOD0	4-18
	Quick Omnidirectional	DECMOD1	4-18
	Advanced Linear Decoding (Default for PDF imagers)	DECMOD2	4-18
Output Sequence Editor	Enter Sequence	SEQBLK	4-22
	Default Sequence	SEQDFT	4-22
Require Output Sequence	Required	SEQ_EN2	4-22
	On/Not Required	SEQ_EN1	4-22
	*Off	SEQ_EN0	4-22
Multiple Symbols	On	SHOTGN1	4-23
	*Off	SHOTGN0	4-23
No Read	On	SHWNRD1	4-23
	*Off	SHWNRD0	4-23
Print Weight	Set Print Weight (1-7)	PRTWGT	4-24
	*Default (4)	PRTWGT4	4-24
Video Reverse	On	VIDREV1	4-24
	*Off	VIDREV0	4-24
Working Orientation	*Upright	ROTATN0	4-25
	Rotate Clockwise 90°	ROTATN1	4-25
	Upside Down	ROTATN2	4-25
	Rotate Counterclockwise 90°	ROTATN3	4-25

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Prefix/Suffix Selections			
Add CR Suffix to All Symbologies		VSUFCR	5-3
Prefix	Add Prefix	PREBK2##	5-4
	Clear One Prefix	PRECL2	5-4
	Clear All Prefixes	PRECA2	5-4
Suffix	Add Suffix	SUFBK2##	5-4
	Clear One Suffix	SUFCL2	5-4
	Clear All Suffixes	SUFCA2	5-4
Function Code Transmit	*Enable	RMVFNC0	5-4
	Disable	RMVFNC1	5-4
Intercharacter Delay	Range 0 - 495 ms	DLYCHR##	5-5
User Specified Intercharacter Delay	Delay Length (0 - 495 ms)	DLYCRX##	5-6
	Character to Trigger Delay	DLY_XX###	5-6
Interfunction Delay	Range 0 - 495 ms	DLYFNC##	5-6
Intermessage Delay	Range 0 - 495 ms	DLYMSG##	5-7
Data Formatter Selections			
Data Format Editor	*Default Data Format (None)	DFMDF3	6-4
	Enter Data Format	DFMBK3##	6-4
	Clear One Data Format	DFMCL3	6-4
	Clear All Data Formats	DFMCA3	6-4
Data Formatter	Off	DFM_EN0	6-5
	*On, but Not Required	DFM_EN1	6-5
	On, Required	DFM_EN2	6-5
Alternate Data Formats	1	VSAF_1	6-5
	2	VSAF_2	6-5
	3	VSAF_3	6-5
Symbologies			
All Symbologies	All Symbologies Off	ALLENA0	7-2
	All Symbologies On	ALLENA1	7-2
Codabar	Default All Codabar Settings	CBRDFT	7-3

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Codabar	Off	CBRENA0	7-3
	*****On	CBRENA1	7-3
Codabar Start/Stop Char.	*****Don't Transmit	CBRSSX0	7-3
	Transmit	CBRSSX1	7-3
Codabar Check Char.	*****No Check Char.	CBRCK20	7-4
	Validate, But Don't Transmit	CBRCK21	7-4
	Validate, and Transmit	CBRCK22	7-4
Codabar Concatenation	Off	CBRCCT0	7-4
	*On	CBRCCT1	7-4
	Require	CBRCCT2	7-4
Codabar Message Length	Minimum (2 - 60) *4	CBRMIN##	7-5
	Maximum (2 - 60) *60	CBRMAX##	7-5
Code 39	Default All Code 39 Settings	C39DFT	7-6
Code 39	Off	C39ENA0	7-6
	*On	C39ENA1	7-6
Code 39 Start/Stop Char.	*****Don't Transmit	C39SSX0	7-6
	Transmit	C39SSX1	7-6
Code 39 Check Char.	*****No Check Char.	C39CK20	7-7
	Validate, But Don't Transmit	C39CK21	7-7
	Validate, and Transmit	C39CK22	7-7
Code 39 Message Length	Minimum (0 - 48) *0	C39MIN##	7-7
	Maximum (0 - 48) *48	C39MAX##	7-7
Code 39 Append	*Off	C39APP0	7-8
	On	C39APP1	7-8
Code 32 Pharmaceutical (PARAF)	*Off	C39B320	7-8
	On	C39B321	7-8
Code 39 Full ASCII	*Off	C39ASC0	7-9
	On	C39ASC1	7-9
	Code 39 Code Page	C39DCP	7-10
Interleaved 2 of 5	Default All Interleaved 2 of 5 Settings	I25DFT	7-10

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Interleaved 2 of 5	Off	I25ENA0	7-10
	*On	I25ENA1	7-10
Interleaved 2 of 5 Check Digit	*****No Check Char.	I25CK20	7-11
	Validate, But Don't Transmit	I25CK21	7-11
	Validate, and Transmit	I25CK22	7-11
Interleaved 2 of 5 Message Length	Minimum (2 - 80) *4	I25MIN##	7-11
	Maximum (2 - 80) *80	I25MAX##	7-11
Code 93	Default All Code 93 Settings	C93DFT	7-12
Code 93	Off	C93ENA0	7-12
	*On	C93ENA1	7-14
Code 93 Message Length	Minimum (0 - 80) *0	C93MIN##	7-12
	Maximum (0 - 80) *80	C93MAX##	7-12
	Code 93 Code Page	C93DCP	7-13
Straight 2 of 5 Industrial	Default All Straight 2 of 5 Industrial Settings	R25DFT	7-14
Straight 2 of 5 Industrial	*Off	R25ENA0	7-14
	On	R25ENA1	7-14
Straight 2 of 5 Industrial Message Length	Minimum (1 - 48) *4	R25MIN##	7-14
	Maximum (1 - 48) *48	R25MAX##	7-14
Straight 2 of 5 IATA	Default All Straight 2 of 5 IATA Settings	A25DFT	7-15
Straight 2 of 5 IATA	*Off	A25ENA0	7-15
	On	A25ENA1	7-15
Straight 2 of 5 IATA Message Length	Minimum (1 - 48) *4	A25MIN##	7-15
	Maximum (1 - 48) *48	A25MAX##	7-15
Matrix 2 of 5	Default All Matrix 2 of 5 Settings	X25DFT	7-16
Matrix 2 of 5	*Off	X25ENA0	7-16
	On	X25ENA1	7-16
Matrix 2 of 5 Message Length	Minimum (1 - 80) *4	X25MIN##	7-16
	Maximum (1 - 80) *80	X25MAX##	7-16
Code 11	Default All Code 11 Settings	C11DFT	7-17

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Code 11	*Off	C11ENA0	7-17
	On	C11ENA1	7-17
Code 11 Check Digits Required	1 Check Digit	C11CK20	7-17
	*2 Check Digits	C11CK21	7-17
Code 11 Message Length	Minimum (1 - 80) *4	C11MIN##	7-18
	Maximum (1 - 80) *80	C11MAX##	7-18
Code 128	Default All Code 128 Settings	128DFT	7-19
Code 128	Off	128ENA0	7-19
	*On	128ENA1	7-19
ISBT Concatenation	*Off	ISBENA0	7-19
	On	ISBENA1	7-19
Code 128 Message Length	Minimum (0 - 80) *0	128MIN##	7-20
	Maximum (0 - 80) *80	128MAX##	7-20
Code 128 Code Page	Code 128 Code Page (*2)	128DCP##	7-20
Telepen	Default All Telepen Settings	TELDFT	7-20
Telepen	*Off	TELENA0	7-21
	On	TELENA1	7-21
Telepen Output	*AIM Telepen Output	TELOLD0	7-21
	Original Telepen Output	TELOLD1	7-21
Telepen Message Length	Minimum (1 - 60) *1	TELMIN##	7-21
	Maximum (1 - 60) *60	TELMAX##	7-21
UPC-A	Default All UPC-A Settings	UPADFT	7-22
UPC-A	Off	UPAENA0	7-22
	*On	UPAENA1	7-22
UPC-A Check Digit	Off	UPACKX0	7-22
	*On	UPACKX1	7-22
UPC-A Number System	Off	UPANSX0	7-23
	*On	UPANSX1	7-23
UPC-A 2 Digit Addenda	*Off	UPAAD20	7-23
	On	UPAAD21	7-23

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
UPC-A 5 Digit Addenda	*Off	UPAAD50	7-23
	On	UPAAD51	7-23
UPC-A Addenda Required	*Not Required	UPAARQ0	7-24
	Required	UPAARQ1	7-24
UPC-A Addenda Separator	Off	UPAADS0	7-24
	*On	UPAADS1	7-24
UPC-A/EAN-13 with Extended Coupon Code	*On	CPNENA1	7-24
	Off	CPNENA0	7-24
UPC-E0	Default All UPC-E Settings	UPEDFT	7-25
UPC-E0	Off	UPEEN00	7-25
	*On	UPEEN01	7-25
UPC-E0 Expand	*Off	UPEEXP0	7-25
	On	UPEEXP1	7-25
UPC-E0 Addenda Required	Required	UPEARQ1	7-26
	*Not Required	UPEARQ0	7-26
UPC-E0 Addenda Separator	*On	UPEADS1	7-26
	Off	UPEADS0	7-26
UPC-E0 Check Digit	Off	UPECKX0	7-26
	*On	UPECKX1	7-26
UPC-E0 Number System	Off	UPENSX0	7-27
	*On	UPENSX1	7-27
UPC-E0 Addenda	2 Digit Addenda On	UPEAD21	7-27
	*2 Digit Addenda Off	UPEAD20	7-27
	5 Digit Addenda On	UPEAD51	7-27
	*5 Digit Addenda Off	UPEAD50	7-27
UPC-E1	*Off	UPEEN10	7-28
	On	UPEEN11	7-28
EAN/JAN-13	Default All EAN/ JAN Settings	E13DFT	7-28
EAN/JAN-13	Off	E13ENA0	7-29
	*On	E13ENA1	7-29
EAN/JAN-13 Check Digit	Off	E13CKX0	7-29
	*On	E13CKX1	7-29

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
EAN/JAN-13 2 Digit Addenda	2 Digit Addenda On	E13AD21	7-29
	*2 Digit Addenda Off	E13AD20	7-29
	5 Digit Addenda On	E13AD51	7-29
	*5 Digit Addenda Off	E13AD50	7-29
EAN/JAN-13 Addenda Required	*Not Required	E13ARQ0	7-30
	Required	E13ARQ1	7-30
EAN/JAN-13 Addenda Separator	Off	E13ADS0	7-30
	*On	E13ADS1	7-30
ISBN Translate	*Off	E13ISB0	7-30
	On	E13ISB1	7-30
EAN/JAN-8	Default All EAN/ JAN 8 Settings	EA8DFT	7-31
EAN/JAN-8	Off	EA8ENA0	7-31
	*On	EA8ENA1	7-31
EAN/JAN-8 Check Digit	Off	EA8CKX0	7-31
	*On	EA8CKX1	7-31
EAN/JAN-8 Addenda	*2 Digit Addenda Off	EA8AD20	7-32
	2 Digit Addenda On	EA8AD21	7-32
	*5 Digit Addenda Off	EA8AD50	7-32
	5 Digit Addenda On	EA8AD51	7-32
EAN/JAN-8 Addenda Required	*Not Required	EA8ARQ0	7-32
	Required	EA8ARQ1	7-32
EAN/JAN-8 Addenda Separator	Off	EA8ADS0	7-33
	*On	EA8ADS1	7-33
MSI	Default All MSI Settings	MSIDFT	7-33
MSI	*Off	MSIENA0	7-33
	On	MSIENA1	7-33
MSI Check Character	*Validate Type 10, but Don't Transmit	MSICHK0	7-34
	Validate Type 10 and Transmit	MSICHK1	7-34
MSI Message Length	Minimum (4 - 48) *4	MSIMIN##	7-34
	Maximum (4 - 48) *48	MSIMAX##	7-34
Plessey Code	Default All Plessey Settings	PLSDFT	7-34

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Plessey Code	*Off	PLSENA0	7-35
	On	PLSENA1	7-35
Plessey Message Length	Minimum (4 - 48) *4	PLSMIN##	7-35
	Maximum (4 - 48) *48	PLSMAX##	7-35
RSS-14	Default All RSS-14 Settings	RSSDFT	7-35
RSS-14	Off	RSSENA0	7-35
	*On	RSSENA1	7-35
RSS Limited	Default All RSS-14 Limited Settings	RSLDFT	7-36
RSS Limited	Off	RSLENA0	7-36
	*On	RSLENA1	7-36
RSS Expanded	Default All RSS-14 Expanded Settings	RSEDFT	7-36
RSS Expanded	Off	RSEENA0	7-37
	*On	RSEENA1	7-37
RSS Expanded Msg. Length	Minimum (4 - 74) *4	RSEMIN##	7-37
	Maximum (4 - 74) *74	RSEMAX##	7-37
PosiCode	Default All PosiCode Settings	POSDFT	7-39
PosiCode	Off	POSENA0	7-38
	*On	POSENA1	7-38
	A and B On	POSLIM0	7-38
	A and B and Limited A On	POSLIM1	7-38
	*A and B and Limited B On	POSLIM2	7-38
PosiCode Msg. Length	Minimum (2 - 80) *4	POSMIN##	7-39
	Maximum (2 - 80) *48	POSMAX##	7-39
Trioptic Code	*Off	TRIENA0	7-39
	On	TRIENA1	7-39
Codablock F	Default All Codablock F Settings	CBFDFT	7-39
Codablock F	*Off	CBFENA0	7-40
	On	CBFENA1	7-40
Codablock F Msg. Length	Minimum (1 - 2048) *1	CBFMIN####	7-40
	Maximum (1 - 2048) *2048	CBFMAX####	7-40

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Code 16K	Default All Code 16K Settings	16KDFT	7-40
Code 16K	*Off	16KENA0	7-41
	On	16KENA1	7-41
Code 16K Msg. Length	Minimum (0 - 160) *1	16KMIN###	7-41
	Maximum (0 - 160) *160	16KMAX###	7-41
Code 49	Default All Code 49 Settings	C49DFT	7-41
Code 49	Off	C49ENA0	7-42
	*On	C49ENA1	7-42
Code 49 Msg. Length	Minimum (1 - 81) *1	C49MIN##	7-42
	Maximum (1 - 81) *81	C49MAX##	7-42
PDF417	Default All PDF417 Settings	PDFDFT	7-43
PDF417	*On	PDFENA1	7-43
	Off	PDFENA0	7-43
PDF417 Msg. Length	Minimum (1-2750) *1	PDFMIN	7-43
	Maximum (1-2750) *2750	PDFMAX	7-43
MicroPDF417	Default All Micro PDF417 Settings	MPDDFT	7-43
MicroPDF417	*On	MPDENA1	7-44
	Off	MPDENA0	7-44
MicroPDF417 Msg. Length	Minimum (1-366) *1	MPDMIN	7-44
	Maximum (1-366) *366	MPDMAX	7-44
EAN•UCC Composite Codes	On	COMENA1	7-44
	*Off	COMENA0	7-44
EAN•UCC Composite Codes Msg. Length	Minimum (1-2435) *1	COMMIN	7-45
	Maximum (1-2435) *2435	COMMAX	7-45
EAN•UCC Emulation	RSS Emulation	EANEMU2	7-46
	EAN•UCC-128 Emulation	EANEMU1	7-46
	*EAN•UCC Emulation Off	EANEMU0	7-46
TCIF Linked Code 39 (TLC39)	On	T39ENA1	7-46
	*Off	T39ENA0	7-46
Postnet	On	NETENA1	7-47
	*Off	NETENA0	7-47
Postnet Check Digit	Transmit	NETCKX1	7-47
	*Don't Transmit	NETCKX0	7-47

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Planet Code	On	PLNENA1	7-48
	*Off	PLNENA0	7-48
Planet Code Check Digit	Transmit	PLNCKX1	7-48
	*Don't Transmit	PLNCKX0	7-48
British Post	On	BPOENA1	7-49
	*Off	BPOENA0	7-49
Canadian Post	On	CANENA1	7-49
	*Off	CANENA0	7-49
Kix (Netherlands) Post	On	KIXENA1	7-50
	*Off	KIXENA0	7-49
Australian Post	On	AUSENA1	7-49
	*Off	AUSENA0	7-50
Japanese Post	On	JAPENA1	7-50
	*Off	JAPENA0	7-50
China Post	Default All China Post Settings	CPCDFT	7-50
China Post	*Off	CPCENA0	7-51
	On	CPCENA1	7-51
China Post Msg. Length	Minimum (2 - 80) *4	CPCMIN##	7-51
	Maximum (2 - 80) *80	CPCMAX##	7-51
Korea Post	Default All Korea Post Settings	KPCDFT	7-52
Korea Post	*Off	KPCENA0	7-52
	On	KPCENA1	7-52
Korea Post Msg. Length	Minimum (2 - 80) *4	KPCMIN##	7-52
	Maximum (2 - 80) *48	KPCMAX##	7-52
QR Code	Default All QR Code Settings	QRCDFT	7-53
QR Code	*On	QRCENA1	7-53
	Off	QRCENA0	7-53
QR Code Msg. Length	Minimum (1-3500) *1	QRCMIN	7-53
	Maximum (1-3500) *3500	QRCMAX	7-53
Data Matrix	Default All Data Matrix Settings	IDMDFT	7-54
Data Matrix	*On	IDMENA1	7-54
	Off	IDMENA0	7-54

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Data Matrix Msg. Length	Minimum (1-1500) *1	IDMMIN	7-54
	Maximum (1-1500) *1500	IDMMAX	7-54
MaxiCode	Default All MaxiCode Settings	MAXDFT	7-54
MaxiCode	*On	MAXENA1	7-55
	Off	MAXENA0	7-55
MaxiCode Msg. Length	Minimum (1-150) *1	MAXMIN	7-55
	Maximum (1-150) *150	MAXMAX	7-55
Aztec Code	Default All Aztec Code Settings	AZTDFT	7-55
Aztec Code	*On	AZTENA1	7-56
	Off	AZTENA0	7-56
Aztec Code Msg. Length	Minimum (1-3750) *1	AZTMIN	7-56
	Maximum (1-3750) *3750	AZTMAX	7-56
Aztec Runes	Enable Runes	AZTRUN1	7-56
	*Disable Runes	AZTRUN0	7-56

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Imaging Default Commands			
Image Snap	Default all Imaging Commands	IMGDFT	8-1
	Imaging Style - Decoding	SNPSTY0	8-1
	*Imaging Style - Photo	SNPSTY1	8-1
	Imaging Style - Manual	SNPSTY2	8-1
	Beeper On	SNPBEP1	8-1
	*Beeper Off	SNPBEP0	8-1
	Exposure	SNPEXP	8-1
	Frame Rate (0-30) *30	SNPFRM##	8-2
	*Gain - Light	SNPGAN1	8-2
	Gain - Medium	SNPGAN2	8-2
	Gain - Heavy	SNPGAN4	8-2
	Gain - Maximum	SNPGAN8	8-2
	Delta for Acceptance (0-255) *10	SNPDEL###	8-2
	*LED State - Off	SNPLED0	8-2
	LED State - On	SNPLED1	8-2
	*Wait for Trigger Off	SNPTRG0	8-2
	Wait for Trigger On	SNPTRG1	8-2
	Update Tries (0-10) *6	SNPTRY##	8-2
	Target White Value (0-255) *140	SNPWHT###	8-2
	Target Set Point Percentage (1-99) *50	SNPPCT##	8-2

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Image Ship	*Infinity Filter - Off	IMGINF0	8-3
	Infinity Filter - On	IMGINF1	8-3
	*Compensation Off	IMGCOR0	8-3
	Compensation On	IMGCOR1	8-3
	*Pixel Depth - 8 bits/pixel (grayscale)	IMGBPP8	8-3
	Pixel Depth - 1 bit/pixel (B&W)	IMGBPP1	8-3
	*Don't Sharpen Edges	IMGEDG0	8-3
	Sharpen Edges (0-23)	IMGEDG##	8-3
	*File Format - JPEG	IMGFMT6	8-3
	File Format - KIM	IMGFMT0	8-3
	File Format - TIFF binary	IMGFMT1	8-3
	File Format - TIFF binary group 4, compressed	IMGFMT2	8-3
	File Format - TIFF grayscale	IMGFMT3	8-3
	File Format - Uncompressed binary	IMGFMT4	8-3
	File Format - Uncompressed grayscale	IMGFMT5	8-3
	File Format - BMP	IMGFMT8	8-3
	*Histogram Stretch Off	IMGHIS0	8-4
	Histogram Stretch On	IMGHIS1	8-4
	Invert Image around X axis	IMGNVX1	8-4
	Invert Image around Y axis	IMGNVY1	8-4
	*Fly Spec (Noise Reduction) Off	IMGFSP0	8-4
	Fly Spec (Noise Reduction) On	IMGFSP1	8-4
	Rotate Image 90° right	IMGROT1	8-4
	Rotate Image 180° right	IMGROT2	8-4
	Rotate Image 90° left	IMGROT3	8-4
	JPEG Image Quality (0-100) *50	IMGJQF###	8-4
	*Gamma Correction Off	IMGGAM0	8-4
	Gamma Correction On (1-255)	IMGGAM###	8-4
	Image Crop - Left (0-640 or 752) *0	IMGWNL###	8-5

Selection	Setting ** Indicates default*	Serial Command *# Indicates a numeric entry*	Page
Image Ship (continued)	Image Crop - Bottom (0-480) *479	IMGWNB###	8-5
	Image Crop - Margin (1-238) *0	IMGMAR###	8-5
	Protocol - None (raw)	IMGXFR0	8-5
	Protocol - None (default USB)	IMGXFR2	8-5
	Protocol - Hmodem	IMGXFR3	8-5
	Protocol - Hmodem Compressed	IMGXFR4	8-5
	Ship Every Pixel	IMGSUB1	8-5
	Ship Every 2nd Pixel	IMGSUB2	8-5
	Ship Every 3rd Pixel	IMGSUB3	8-5
	*Document Image Filter Off	IMGUSH0	8-6
	Document Image Filter On (0-255)	IMGUSH###	8-6
	*Don't Ship Histogram	IMGHST0	8-6
	Ship Histogram	IMGHST1	8-6
OCR Selections			
OCR	Default All OCR Settings	OCRDFT	9-1
	OCR-A On	OCRENA1	9-2
	OCR-B On	OCRENA2	9-2
	U.S. Currency On	OCRENA3	9-2
	MICR E-13B On	OCRENA4	9-2
	SEMI Font	OCRENA5	9-3
	* All OCR Off	OCRENA0	9-3
OCR Templates	Enter OCR Template	OCRTMP	9-13
	Enter User-Defined Variable g	OCRGPG	9-13
	Enter User-Defined Variable h	OCRGPH	9-13
	OCR Modulo 10 Check Character	"OCRCHK0123456789"	9-8
	OCR Modulo 36 Check Character	"OCRCHK0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ"	9-9

Troubleshooting

The imager automatically performs self-tests whenever you turn it on. If your imager is not functioning properly, review the following Troubleshooting Guide to try to isolate the problem.

Is the power on? Is the red or green aiming illumination line on?

If the red or green aiming illumination line doesn't appear, check that:

- The cable is connected properly.
- The host system power is on (if external power isn't used).

Is the imager having trouble reading your symbols?

If the imager isn't reading symbols well, check that the symbols:

- Aren't smeared, rough, scratched, or exhibiting voids.
- Aren't coated with frost or water droplets on the surface.
- Are enabled in the imager or in the decoder to which the imager connects.

Is the bar code displayed but not entered?

The bar code is displayed on the host device correctly, but you still have to press a key to enter it (the Enter/Return key or the Tab key, for example).

You need to program a suffix. Programming a suffix enables the imager to output the bar code data plus the key you need (such as "CR") to enter the data into your application. Refer to "Prefix/Suffix Overview" on page 5-1 for further information.

Does the imager read the bar code incorrectly?

If the imager reads a bar code, but the data is not displayed correctly on the host screen:

- The imager may not be programmed for the appropriate terminal interface. For example, you scan "12345" and the host displays "@es%."

  Reprogram the imager with the correct Plug and Play or Terminal selection bar code. See Chapter 2 and Chapter 3.
- The imager may not be programmed to output your bar code data properly. For example, you scan "12345" and the host displays "A12345B."

  Reprogram the imager with the proper symbology selections. See Chapter 7.

The imager won't read your bar code at all.

1. Scan the sample bar codes in the back of this manual. If the imager reads the sample bar codes, check that your bar code is readable.
   Verify that your bar code symbology is enabled (see Chapter 7).

Symbology Chart

Symbology	AIM ID	Possible AIM ID Modifiers (*m*)	MK-5000 Code ID (hex)
All Symbologies			(0x99)
Australian Post	]X0		A (0x41)
Aztec Code	]z*m*	0-9, A-C	z (0x7A)
British Post	]X0		B (0x42)
Canadian Post	]X0		C (0x43)
China Post	]X0		Q (0x51)
Codabar	]F*m*	0-1	a (0x61)
Codablock F	]O*m*	0, 1, 4, 5, 6	q (0x71)
Code 11	]H3		h (0x68)
Code 128	]C*m*	0, 1, 2, 4	j (0x6A)
Code 16K	]K*m*	0, 1, 2, 4	o (0x6F)
Code 32 Pharmaceutical (PARAF)	]X0		< (0x3C)
Code 39	]A*m*	0, 1, 3, 4, 5, 7	b (0x62)
Code 49	]T*m*	0, 1, 2, 4	l (0x6C
Code 93 and 93i	]G*m*	0-9, A-Z, a-m	i (0x69
Data Matrix	]d*m*	0-6	w (0x77)
EAN-13	]E0		d (0x64)
EAN-8	]E4		D (0x44)
EAN•UCC Composite	]e*m*	0-3	y (0x79)
EAN-13 with Extended Coupon Code	]E3		d (0x64)
Interleaved 2 of 5	]I*m*	0, 1, 3	e (0x65)
Japanese Post	]X0		J (0x4A)
KIX (Netherlands) Post	]X0		K (0x4B)
Korea Post	]X0		? (0x3F)
Matrix 2 of 5	]X0		m (0x6D)
MaxiCode	]U*m*	0-3	x (0x78)
MicroPDF417	]L*m*	3-5	R (0x52)

Symbology	AIM ID	Possible AIM ID Modifiers (*m*)	MK-5000 Code ID (hex)
MSI	]M*m*	0	g (0x67)
No Read			(0x9C)
OCR-A	]o1		O (0x4F)
OCR-B	]o2		O (0x4F)
OCR MICR E-13B	]ZE		O (0x4F)
OCR US Money Font	]o3		O (0x4F)
SEMI Font	]o3		O (0x4F)
PDF417	]L*m*	0-2	r (0x72)
Planet Code	]X0		L (0x4C)
Plessey Code	]P0		n (0x6E)
PosiCode	]p*m*	0, 1, 2	W (0x57)
Postnet	]X0		P (0x50)
QR/Micro QR Code	]Q*m*	0-6	s (0x73)
Reduced Space Symbology (RSS-14, RSS Limited, RSS Expanded)	]e*m*	0	y (0x79)
Straight 2 of 5 IATA (two-bar start/stop)	]R*m*	0, 1, 3	f (0x66)
TCIF Linked Code 39 (TLC39)	]L2		T (0x54)
Telepen	]B*m*	0, 1, 2, 4	t (0x74)
Trioptic Code	]X0		= (0x3D)
UCC/EAN-128	]C1		I (0x49)
UPC-A	]E0		c (0x63)
UPC-A with Extended Coupon Code	]E3		c (0x63)
UPC-E	]E0		E (0x45)
VeriCode*	]X0		v (0x76)

* Only available by special order.

Note: "m" represents the AIM modifier character. Refer to International Technical Specification, Symbology Identifiers, for AIM modifier character details.

Note: Prefix/Suffix entries for specific symbologies override the universal (All Symbologies, 99) entry.

Refer to *Data Editing* beginning on page 5-1 and *Data Formatting* beginning on page 6-1 for information about using Code ID and AIM ID.

ASCII Conversion Chart (Code Page 1252)

Note: This table applies to U.S. style keyboards. Certain characters may differ depending on your Country Code/PC regional settings.

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
0	00	NUL	32	20		64	40	@	96	60	‘
1	01	SOH	33	21	!	65	41	A	97	61	a
2	02	STX	34	22	“	66	42	B	98	62	b
3	03	ETX	35	23	#	67	43	C	99	63	c
4	04	EOT	36	24	$	68	44	D	100	64	d
5	05	ENQ	37	25	%	69	45	E	101	65	e
6	06	ACK	38	26	&	70	46	F	102	66	f
7	07	BEL	39	27	‘	71	47	G	103	67	g
8	08	BS	40	28	(	72	48	H	104	68	h
9	09	HT	41	29	)	73	49	I	105	69	i
10	0A	LF	42	2A	*	74	4A	J	106	6A	j
11	0B	VT	43	2B	+	75	4B	K	107	6B	k
12	0C	FF	44	2C	,	76	4C	L	108	6C	l
13	0D	CR	45	2D	-	77	4D	M	109	6D	m
14	0E	SO	46	2E	.	78	4E	N	110	6E	n
15	0F	SI	47	2F	/	79	4F	O	111	6F	o
16	10	DLE	48	30	0	80	50	P	112	70	p
17	11	DC1	49	31	1	81	51	Q	113	71	q
18	12	DC2	50	32	2	82	52	R	114	72	r
19	13	DC3	51	33	3	83	53	S	115	73	s
20	14	DC4	52	34	4	84	54	T	116	74	t
21	15	NAK	53	35	5	85	55	U	117	75	u
22	16	SYN	54	36	6	86	56	V	118	76	v
23	17	ETB	55	37	7	87	57	W	119	77	w
24	18	CAN	56	38	8	88	58	X	120	78	x
25	19	EM	57	39	9	89	59	Y	121	79	y
26	1A	SUB	58	3A	:	90	5A	Z	122	7A	z
27	1B	ESC	59	3B	;	91	5B	[	123	7B	{
28	1C	FS	60	3C	<	92	5C	\	124	7C	|
29	1D	GS	61	3D	=	93	5D	]	125	7D	}
30	1E	RS	62	3E	>	94	5E	^	126	7E	~
31	1F	US	63	3F	?	95	5F	_	127	7F	

Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char	Dec	Hex	Char
128	80	€	160	A0		192	C0	À	224	E0	à
129	81	□	161	A1	¡	193	C1	Á	225	E1	á
130	82	‚	162	A2	¢	194	C2	Â	226	E2	â
131	83	*ƒ*	163	A3	£	195	C3	Ã	227	E3	ã
132	84	„	164	A4	¤	196	C4	Ä	228	E4	ä
133	85	…	165	A5	¥	197	C5	Å	229	E5	å
134	86	†	166	A6	¦	198	C6	Æ	230	E6	æ
135	87	‡	167	A7	§	199	C7	Ç	231	E7	ç
136	88	ˆ	168	A8	¨	200	C8	È	232	E8	è
137	89	‰	169	A9	©	201	C9	É	233	E9	é
138	8A	Š	170	AA	ª	202	CA	Ê	234	EA	ê
139	8B	‹	171	AB	«	203	CB	Ë	235	EB	ë
140	8C	Œ	172	AC	¬	204	CC	Ì	236	EC	ì
141	8D	□	173	AD	-	205	CD	Í	237	ED	í
142	8E	Ž	174	AE	®	206	CE	Î	238	EE	î
143	8F	□	175	AF	¯	207	CF	Ï	239	EF	ï
144	90	□	176	B0	°	208	D0	Đ	240	F0	ð
145	91	‘	177	B1	±	209	D1	Ñ	241	F1	ñ
146	92	’	178	B2	²	210	D2	Ò	242	F2	ò
147	93	“	179	B3	³	211	D3	Ó	243	F3	ó
148	94	”	180	B4	´	212	D4	Ô	244	F4	ô
149	95	•	181	B5	µ	213	D5	Õ	245	F5	õ
150	96	–	182	B6	¶	214	D6	Ö	246	F6	ö
151	97	—	183	B7	·	215	D7	×	247	F7	÷
152	98	˜	184	B8	¸	216	D8	Ø	248	F8	ø
153	99	™	185	B9	¹	217	D9	Ù	249	F9	ù
154	9A	š	186	BA	º	218	DA	Ú	250	FA	ú
155	9B	›	187	BB	»	219	DB	Û	251	FB	û
156	9C	œ	188	BC	¼	220	DC	Ü	252	FC	ü
157	9D	□	189	BD	½	221	DD	Ý	253	FD	ý
158	9E	ž	190	BE	¾	222	DE	Þ	254	FE	þ
159	9F	Ÿ	191	BF	¿	223	DF	ß	255	FF	ÿ

Code Page Mapping of Printed Bar Codes

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, select the code page with which the bar codes were created. The data characters should then appear properly.

Note: The Code Page option is available for Code 39, Code 93, and Code 128.

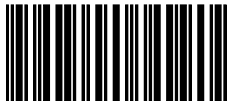
Code Page	Standard	Description
1	CP ISO646	
2 (Default)	ISO 2022	Automatic National Replacement Characters
3	CP Binary	
82	ISO 2022 11 Swe	Swedish Replacement Characters
83	ISO 2022 69 Fra	French/Belgium Replacement Characters
81	ISO 2022 25 Fra	French/Belgium Replacement Characters
84	ISO 2022 11 Ger	German Replacement Characters
85	ISO 2022 11 Ita	Italian Replacement Characters
86	ISO 2022 11 Swi	Swiss Replacement Characters
87	ISO 2022 11 UK	British Replacement Characters
88	ISO 2022 11 Dan	Danish Replacement Characters
89	ISO 2022 11 Nor	Norwegian Replacement Characters
90	ISO 2022 11 Spa	Spanish Replacement Characters

Sample Symbols

UPC-A

0 123456 7890

Interleaved 2 of 5

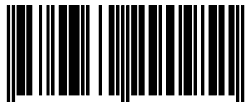


1234567890

Code 128

Code 128

EAN-13

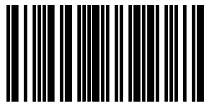


9 780330 290951

Code 39

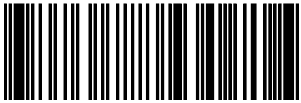
BC321

Codabar



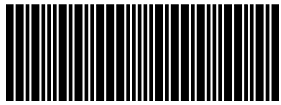
A13579B

Code 93



123456-9$

Straight 2 of 5 Industrial



123456

Sample Symbols

Matrix 2 of 5

6543210

RSS-14

(01)00123456789012

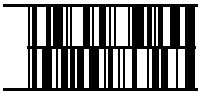
PDF417

Car Registration

Postnet

Zip Code

Code 49



1234567890

Data Matrix

Test Symbol

QR Code

Numbers

Sample Symbols

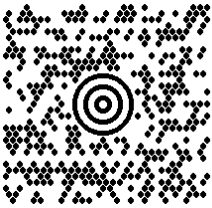
Aztec

Package Label

Micro PDF417

Test Message

MaxiCode



Test Message

OCR-B with Modulo 10 check character

5324277

OCR-A with Modulo 36 check character

532427D

OCR Programming Chart

K6.K1.
a

K6.K4.
d

K6.K7.
g

K6.KC.
l

K7.K4.
t

MNUABT.
Discard

K6.K3.
c

K6.K5.
e

K6.K8.
h

K7.K2.
r

MNUSAV.
Save

Programming Chart

A

B

C

D

E

F

0

1

2

3

Programming Chart

4

5

6

7

8

9

Save

Discard

Note: If you make an error while scanning the letters or digits (before scanning Save), scan Discard, scan the correct letters or digits, and **Save**.