

**MICROSCAN®**

# **HawkEye™ 45T User Manual**

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# Welcome!

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## Purpose of This Manual

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The purpose of the manual is to get you up and running quickly and confidently with your reader.



**Caution**

Laser in the HE45T

LASER RADIATION - AVOID LONG TERM VIEWING OF DIRECT  
LASER RADIATION - LASER CLASS 2M

Wavelength 630 nm - Maximum radiant power: < 1mW

EN 60825-1:2003

---

Note: LED Lighting

Light Emitting Diode Class 1 according to EN 60825-1:2003

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## **Manual Conventions**

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The following typographical conventions are used throughout this manual:

- Items emphasizing important information are **bolded**.
- Menu selections, menu items and entries in screen images are indicated as: Operation, Configure, etc.

# Getting Started

The HawkEye™ 45T (HE45T) establishes a new benchmark for Portable Data Terminals and Hand Held Computers by combining the industry's best imaging technology with a graphic display and rugged keyboard to create the smallest and lightest full-featured bar code reading terminal on the market.

Using the same ergonomic platform as the highly successful HE40T, the HE45T extends mobile all-symbology bar code reading to include information display and keyboard entry.

This combination has created a reading system that supports:

- DPM application
- Department of Defense Unique Identification (DoD UID)
- High density matrix codes and larger low density linear codes
- Superior working range
- High-speed omni-directional decoding
- Wireless and cabled interfaces
- Portable data terminal
- Unsurpassed data rates

Microscan eliminates the need for costly, high-overhead operating systems by providing an open platform JavaScript development environment within its

CodeXML Applications Development Suite. With CodeXML and JavaScript, Developers and Information Technology organizations no longer need to worry about expensive porting of applications between Windows, Windows Pocket PC, Windows CE.Net, et.al. A unique feature of the Applications Development Suite is the ability to protect both development investment and data security by a customer-unique key encryption, which allows the developer to control the distribution and modification of applications to specific serial-numbered HE45T readers.

The HE45T features a 1.3 MegaPixel dual-field image collection engine, a 400MHz AMD Alchemy Au1100 CPU, and 8MB of non-volatile memory. Portable operations are supported by a 1950 mAH Lithium Ion Battery and a Real Time Clock with its own battery backup system. For wireless communications, a 2.4 GHz radio system is available and compatible with a wide range of Bluetooth™ systems, as well as the CodeXML Modem, with a unique data and pairing encryption system for unsurpassed wireless data security.

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Note: Use of this device other than specified by Microscan is prohibited.

---

## Unpacking

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The standard HE45T reader is shipped with a USB cable interface. The reader also features a battery blank that must be installed in the reader at all times.

Various accessories are available for the HE45T.

- 3 cable options (USB, RS-232 or PS/2)
- H2 Cabled Handle (with battery blank)
- BH1 Battery Handle (1950 mAH long-life Lithium-Ion battery)
- BH2 Battery Handle (3900 mAH long-life Lithium-Ion battery)
- Class 1 Bluetooth radio with 300 foot operating range
- External battery charger
- CodeXML Bluetooth modem

Please keep your packing materials. The HE45T is shipped in an approved shipping container and should be used if you ever need to return your equipment for servicing.

## Powering Reader On & Off

To power up the reader, press and hold either of the red trigger buttons for 3 seconds (Figure 1–1). The reader will power down after 2 hours of non-use.


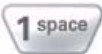
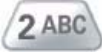
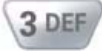
**FIGURE 1–1. Trigger Buttons**




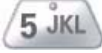
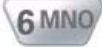



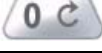
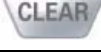
## Keypad/Icon Overview

Note: All characters represented in Table 1–1 are for ASCII mode.

**TABLE 1–1. Button Functions**

Key	Numeric Mode	Upper Case Text Mode	Lower Case Text Mode	Symbol Mode
	Toggles between numeric characters, upper case text, lower case text, and symbol character input	Toggles between numeric characters, upper case text, lower case text, and symbol character input	Toggles between numeric characters, upper case text, lower case text, and symbol character input	Toggles between numeric characters, upper case text, lower case text, and symbol character input
	1	Space, 1	Space, 1	Space ) < _
	2	A, B, C, 2	a, b, c, 2	! * = ‘
	3	D, E, F, 3	d, e, f, 3	“ + > {

**TABLE 1-1. Button Functions (Continued)**






Key	Numeric Mode	Upper Case Text Mode	Lower Case Text Mode	Symbol Mode
	4	G, H, I, 4	g, h, i, 4	#, ?
	5	J, K, L, 5	j, k, l, 5	\$, - @ }
	6	M, N, O, 6	m, n, o, 6	%, . [ ~
	7	P, Q, R, S, 7	p, q, r, s, 7	& / \ Space
	8	T, U, V, 8	t, u, v, 8	' : ] Space
	9	W, X, Y, Z, 9	w, x, y, z, 9	( ; ^ Space
	0	0	0	Toggles between 4 sets of symbols - when pressed, the current symbol set is displayed
	Backspace and clear messages	Backspace and clear messages	Backspace and clear messages	Backspace and clear messages

## Icons

Table 1–2 through Table 1–7 show the icons, and their definitions, for the HE45T Display software.



### Power Icons

**TABLE 1–2. Power Icons**

Icon	Description
	50% to 100% capacity of battery
	20% to 50% capacity of battery
	0% to 20% capacity of battery – recharge battery as soon as possible
	Battery is recharging
	No icon is displayed when battery blank is used with a cabled reader





### Connection Icons

**TABLE 1–3. Connection Icons**

Icon	Description
	Reader is connected physically or wirelessly to a receiving device (computer, handheld, etc.) Note: Some RS232 configurations can not be detected
	No icon is displayed when the reader does not detect a connection







## Communication Mode Icons

TABLE 1-4. Communication Mode Icons

Icon	Description
	RS232 communication mode enabled
	PS2 communication mode enabled
	USB communication mode enabled
	Bluetooth communication mode enabled

## Packet Mode Icons





TABLE 1-5. Packet Mode Icons

Icon	Description
	One way mode – no acknowledgement required
	Two way mode – packetized, bidirectional communication between a HE45T and an application (may also indicate download mode)
	Downloader mode
	Keyboard mode – can be used as either USB keyboard or PS/2 keyboard input mode
	Virtual COM Port One Way mode
	Secure mode – data encryption mode enabled








## Memory Icons

TABLE 1-6. Memory Icons

Icon	Description
	No stored data
	Some stored data
	Memory is at least 90% full
	No batch mode – data will not be stored in the reader's memory if not connected

## Input Mode Icons

TABLE 1-7. Icons

Icon	Description
	Caps Lock – data entered manually on the keypad will be in capital letters
	Lower Case – data entered manually on the keypad will be in lower case letters
	Numeric – data entered manually on the keypad will be numeric
	Symbol – data entered manually on the keypad will be symbols
	Locked – buttons pushed on the reader's keypad will be ignored

---

## Attaching the H2 Cabled Handle

---

The HE45T uses the battery compartment to “snap to” the handle. Figure 1–2 shows the H2 handle with flexible connector. Figure 1–3 shows the battery blank.

**FIGURE 1–2. H2 Handle with Flexible Connector**

---



**FIGURE 1–3. H2 Handle with Battery Blank**

---



To attach the handle to the reader:

1. Push the 8-pin DIN connector at the end of the reader into the flexible connector at the end of the handle, as shown in Figure 1–4.

**FIGURE 1–4. Attaching the H2 Handle**

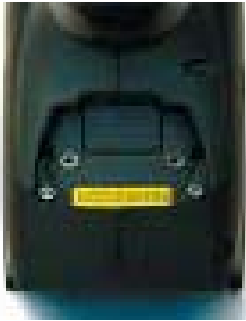


2. Insert the tab on the back of the handle into the reader (Figure 1–4).
3. Snap the reader onto the handle, matching the battery compartment to the battery connectors, visible inside the handle, as shown in Figure 1–4.

The HE45T can be secured further with threaded screws on the under side of the handle, as shown in Figure 1–5.

**FIGURE 1-5. Location of Threaded Screws**

---



## Attaching the BH1/BH2 Battery Handle

---

The HE45T uses the battery compartment to “snap to” the handle. The BH1/BH2 handle is shown in Figure 1-6. The handle with battery is shown in Figure 1-7.

**FIGURE 1-6. BH1/BH2 Handle**

---



**FIGURE 1-7. BH1/BH2 Handle with Battery**



To attach the handle to the reader:

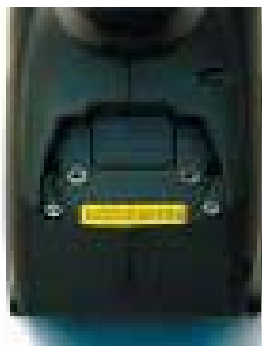
1. Insert the tab on the back of the handle into the reader, as shown in Figure 1-8.
2. Snap the reader onto the handle, matching the battery compartment to the battery connectors, visible inside the handle, as shown in Figure 1-8.

---

**FIGURE 1-8. Attaching the BH1/BH2 Handle**

The HE45T can be secured further with threaded screws on the under side of the handle, as shown in Figure 1-9.

---

**FIGURE 1-9. Location of Threaded Screws**

---

## Charging the Lithium Ion Battery

The battery automatically charges every time a cable interface is attached to the reader and the host is powered up.

---

Note: The RS-232 interface power adapter must be plugged into a wall socket for the reader to charge.

---

If you power up the HE45T with a completely discharged battery, it will take up to 10 minutes before the reader will become operational.

---

## Batch Operation

---

---

Note: To utilize batch functionality, you will need to use the BH1 or BH2 battery handle.

---

Batch data storage and data transfer are controlled by the resident JavaScript application on your HE45T reader. Please consult the HE45T Display User Manual for the application on your HE45T for instructions on how to control data storage and transfer. For Auto Transfer Buffer Memory, use the codes in Figure 1–10, too:

FIGURE 1-10. Batch Data Storage & Transfer Codes



M075\_01  
Send & Buffer  
Mode (Default)



M072\_01  
Log Only Mode



M076\_01  
Send & Log Mode



M077\_02  
Transfer All Data in Memory



M078\_02  
Transfer Only Unsent  
Data in Memory



M071\_01  
Delete Scanned Data  
from Memory



M070\_01  
Enable Auto Transfer  
Buffer Memory (Default)



M069\_01  
Disable Auto Transfer  
Buffer Memory



## RS232 Considerations

- In **RS-232 Batch Cable - Detect** mode, the HE45T will detect if it is connected to a powered serial cable, and will send the data. If a powered serial cable is not connected or if the power adapter is not connected to the serial cable, the HE45T will buffer the data. When the HE45T is then connected to a powered serial cable, the data will automatically upload.
- In **RS-232 Cabled - No Power** mode, the HE45T will behave as if it is always connected even though the serial cable is disconnected or the power adapter is unplugged. Scanned data will be sent, regardless of connection status. Data scanned in Cabled mode will be lost if the HE45T is not connected to the serial cable. It will not buffer the data, unless Send & Store mode has been enabled.

---

Note: If you are in RS232 Cabled-No Power mode, when you place a reader in a charger, the reader will behave as if it is being cabled, and download the data. **THE DATA WILL BE ERASED FROM MEMORY.** To disable this feature, scan the RS232 Cable - Detect code.

---

**FIGURE 1-11. RS-232 Batch Cable - Detect & Cabled - No Power Codes**

---



M073\_02

RS-232 Batch Cable - Detect (Default)



M074\_02

RS-232 Cabled - No Power

## Cabled Operation

---

The HE45T is available with USB, RS-232 and PS2 cables. All of the cables are connected to the HE45T with a 8-pin DIN connector. Different cables may be required for different hosts.

- HE45T with H2 Cabled Handle — The 8-pin DIN connection is at the bottom of the handle. Firmly push the 8-pin connector into the bottom of the handle. The cable has a locking mechanism that will firmly hold the cable in place (Figure 1–12). To detach the cable from the reader, you must pinch the plastic on the 8-pin DIN (Figure 1–12) and pull back to disengage the connector.

**FIGURE 1–12. Handle with Cable Attached**

---



Install the optional cable clip to further secure the cable to the handle with two threaded screws, as shown in Figure 1–13.

---

**FIGURE 1–13. Securing Cable Clip with Two Threaded Screws**

---



- HE45T with BH1/BH2 Battery Handle — Firmly push the 8-pin connector into the back end of the reader, as shown in Figure 1–14. The cable has a locking mechanism that will firmly hold the cable in place. To detach the cable from the reader, you must pinch the plastic on the 8-pin DIN and pull back to disengage the connector.

---

**FIGURE 1–14. Handle with Cable Attached**

---



## USB Cable Installation

To connect the HE45T to your host computer via USB interface:

1. Make sure the USB cable is sufficiently attached to your HE45T (Figure 1–12 and Figure 1–14).

**FIGURE 1–15. Installing the USB Cable**



2. You DO NOT need to power off your host computer (Figure 1–15). The HE45T with USB interface can be plugged into any host while the computer is powered up.
3. Connect the USB interface cable to the host (Figure 1–15). If you are unsure of the proper location to connect the USB cable, please consult the manual of your host computer.
4. The USB interface does not require an additional power supply. If you are using a battery handle (BH1 or BH2) for batch mode, the HE45T will automatically recharge the battery whenever the reader is attached to a host that is powered up.
5. The HE45T will power on automatically.
6. Scan the USB Keyboard Mode code and then the Save Settings code to configure the reader:

**FIGURE 1–16. USB Keyboard Mode & Save Settings Codes**



M134\_02

USB Keyboard Mode



M188\_02

Save Settings

7. Your HE45T should be ready for use. Open the application on your host computer that you wish to send data to and begin scanning.

## USB Communication Settings

- USB Keyboard Mode — Data is sent from the Reader and interpreted by the host just as if a US keyboard was being used to enter data.
- USB Downloader — This mode is the standard way of transferring unformatted, unpacketized data through the USB port.

Scan the codes in Figure 1–17 to set the appropriate USB communication setting:

**FIGURE 1–17. USB Communication Settings Codes**



M134\_02

USB Keyboard



M133\_01

USB Downloader



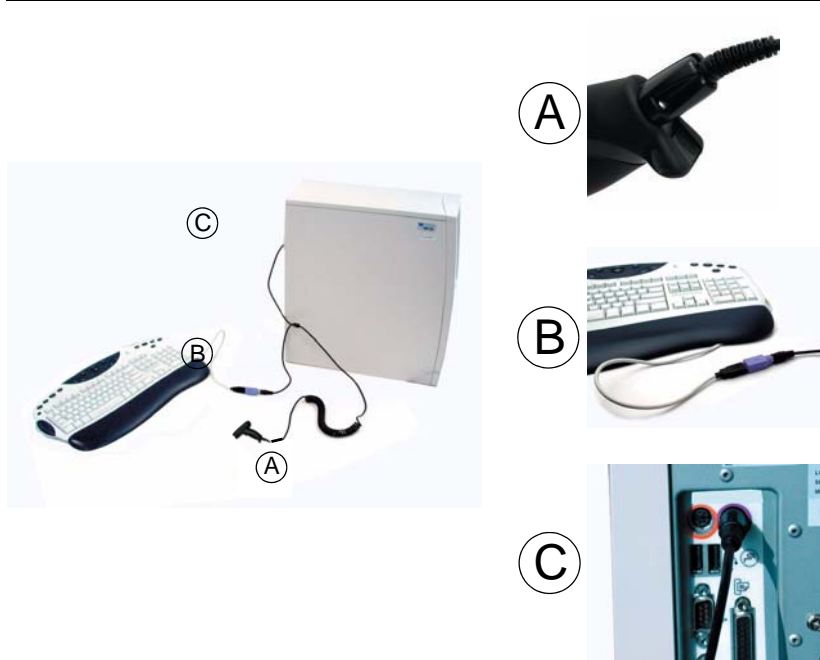
M049\_03

Reset to USB Factory Defaults  
Radio settings will not be reset with this code.

Note: The USB Factory Defaults include all the other settings, such as symbology, trigger, etc.

## PS2 Cable Installation

1. Power off the host computer.
2. Attach the end of the PS2 cable with the single connector (A) to the HE45T.
3. If an external keyboard exists, detach your keyboard from the host and connect the appropriate connector to the PS2 cable (B).
4. Connect the other connector to host computer into keyboard port (C). The HE45T is powered by the PS2 port and does not require a power supply.

**FIGURE 1–18. Installing the PS2 Cable**

5. Set the HE45T to PS2 mode by scanning the PS2 Mode code in Figure 1–19.
6. Scan the Save Settings code.
7. Your HE45T is now ready. Open the appropriate application and begin scanning data.

**Notice**

Microscan does not recommend using Batch or Bluetooth Radio modes with the PS2 interface. You may need to disconnect the HE45T and the keyboard which may result in the host computer freezing.

---

Note: Microscan does not guarantee compatibility with all models of laptops.

---

## PS2 Communication Settings

Scan the codes in Figure 1–19 to set the reader to the PS2 communication setting:

**FIGURE 1–19. PS2 Communication Settings Codes**



Note: The PS2 Factory Defaults include all the other settings, such as symbology, trigger, etc.

## RS-232 Cable Installation

To connect the HE45T to your host computer via RS-232 interface:

1. Make sure the RS-232 cable is sufficiently attached to your reader (Figure 1–12 and Figure 1–14).
2. Connect the RS-232 interface cable to your host computer (Figure 1–20). If you are unsure of the proper location to connect the RS-232 cable, please consult the manual of your host computer.
3. The RS-232 interface should have come with a power supply. Plug the power supply adapter into the RS-232 interface cable (Figure 1–20), and then plug the power adapter into a wall socket (Figure 1–20). The RS-232 interface does not require additional power. However, if you are using the RS-232 interface and utilizing Batch functionality with the BH1/BH2 battery handle, the HE45T will recharge the battery whenever the reader is attached to a RS-232 cable that is plugged into a wall socket.

FIGURE 1–20. Installing the RS-232 Cable



4. The HE45T will power on automatically.
5. Scan the RS-232 One Way Mode code and then the Save Settings code to configure the reader:

FIGURE 1–21. RS-232 One Way Mode &amp; Save Settings Codes



M131\_01

RS-232 One Way Mode



M188\_02

Save Settings

6. Your HE45T should be ready for use. Open the application on your host computer that will receive scanned data and begin scanning.

**Caution**

You must use a Microscan-approved power adapter. Reader failure due to use of incorrect power adapter will void all warranties.

**RS-232 Communication — Data Bit Settings**

Scan the codes in Figure 1–22 to set the appropriate data bit:

FIGURE 1–22. RS-232 Data Bit Codes



M100\_01

7 Data Bits



M101\_01

8 Data Bits (Default)



## RS-232 Communication — Stop Bit Settings

Scan the codes in Figure 1–23 to set the appropriate stop bit data:

FIGURE 1–23. RS-232 Stop Bit Codes



M105\_01

1 Stop Bit (Default)



M106\_01

2 Stop Bits

## RS-232 Communication — Baud Rate Settings

Scan the codes in Figure 1–24 to set the appropriate baud rate:

FIGURE 1–24. RS-232 Baud Rate Codes



M092\_01

1200



M093\_01

2400



M094\_01

4800



M095\_01

9600



M096\_01

19200



M097\_01

38400



M098\_01

57600 (Default)



M099\_01

115200

## RS-232 Communication — Parity Settings

Scan the codes in Figure 1–25 to set parity:

FIGURE 1–25. RS-232 Parity Codes



M102\_01

Even



M104\_01

Odd



M103\_01

None (Default)

## Cabled Reader — Timeout Settings

Scan the codes in Figure 1–26 to set the amount of time a cabled HE45T will be enumerated before entering sleep mode. The battery is re-charged at the fastest rate when the HE45T is in sleep mode:

**FIGURE 1–26. Cabled Reader Timeout Settings Codes**



M136\_01  
Cabled - 2 Hours



M137\_01  
Cabled - Always (Default)

## Bluetooth Radio Operation

Wireless HE45T readers feature a Bluetooth® wireless radio. The radio allows for point to point wireless communication with other Bluetooth devices that support serial port protocol (SPP). The following information will give you general instructions on connecting your HE45T to a desktop or laptop computer with a Bluetooth radio.

### Connecting With A QuickConnect Code

If you purchased a CodeXML Bluetooth Modem or a Belkin® Bluetooth adapter from Microscan or from an authorized distributor, a QuickConnect code was included (Figure 1–27).

**FIGURE 1–27. QuickConnect Code**



The QuickConnect code has the information of the Bluetooth address (often a reference to go to the BD\_ADDR) of that device. You can usually find the 12-character Bluetooth address somewhere on the device near the device's serial number (Figure 1–27). This code will link your HE45T directly to the desired Bluetooth device.

Note: While installing the Bluetooth Configuration Manager software that was included with your Bluetooth adapter, make sure to note the Virtual COM Port number the software assigned for the adapter (e.g. COM 10). This is the COM Port your HE45T will connect through.

To connect your reader, scan the Reset to Factory Defaults in Figure 1–28. Then, the QuickConnect Code and your HE45T will automatically connect. You should also scan the Save Settings code if you want to save these settings.

Note: If the HE45T powers off without scanning the Save Settings code, you will lose your settings.

FIGURE 1–28. Reset to RF Factory Defaults Code



### Radio Range and Transferring Data

The HE45T radio is a Class 1 device. If connected to another Class 1 device, the reader has roughly a 300 foot line of sight operating range. If connecting to a Class 2 or Class 3 device, the operating range may drop to match the lower range. Once a reader is connected, the application software on the host must be open to receive data.

When the HE45T detects the radio is out of range, the HE45T will store data on the reader’s non-volatile memory. The reader will continue to try and send data until radio is back in range. Once the data is sent, the data will be erased from the reader’s memory. If the radio cannot connect in 90 seconds, it will give an error beep. The reader will continue to try and connect until it has reached the programmable radio timeout setting.

The HE45T Bluetooth protocol allows for two forms of communication:

- One Way Mode — Defined as one way communication between the reader and host. One Way mode is only recommended when connecting to a device well within its specified range, or if connected to a device without an operating system (i.e., printer). There are two settings in this mode:
  - Max Range (Default) — Greater range but data reliability is lower
  - Max Reliability — Limits range but reliability is improved

**FIGURE 1–29. RF One Way Mode Range & Reliability Codes**



M127\_01

RF One Way Mode  
(Max Range)



M128\_01

RF One Way Mode  
(Max Reliability)

Note: While robust, One Way Mode doesn't guarantee data integrity and you may have data loss when operating in the fringes of radio range or in the presence of radio interference.

- RF Two Way Mode — This is two way communication between the host and reader. This requires the implementation of software at the application level. The reader receives confirmation via packet protocol verification and is 100% reliable. Data will be retransmitted automatically if necessary.

**FIGURE 1–30. RF Two Way Mode Codes**



M129\_02

RF Two Way Mode

Note: You will need to install application software that supports packet communication to operate in RF Two Way Mode. Microscan offers the CodeXML Bluetooth Modem and a Windows or Pocket PC version of software called CodeXML Router - Bluetooth Edition (BE) that provides for end-to-end

---

Bluetooth handshakes that eliminate out-of-range data loss. CodeXML Router - BE also offers Bluetooth to keyboard wedge communication for applications that require keyboard port input.

---

If you are using the CodeXML Bluetooth modem, you must use RF Two Way Mode.

## Save Settings

Scan the code in Figure 1–31 to make the RF settings permanent on the reader:

**FIGURE 1–31. Save Settings**

---



Save Settings

## Disconnecting from the Reader

You can force a disconnect by reading the disconnect code in Figure 1–32 (the HE45T may not appear disconnected in the slave Bluetooth connection manager for 10 – 15 seconds after the command is issued). The HE45T will also disconnect after 90 seconds of inactivity.

---

Note: You may change the radio frequency sleep timeout setting; however, it may reduce battery life.

---

**FIGURE 1–32. Bluetooth Disconnect Code**

---



Bluetooth Disconnect

## Reconnecting to the Reader

If the device is saved in RF mode, it will automatically reconnect when the HE45T:

- Is powered up

- Wakes from sleep mode
- Reads another code

## Bluetooth Radio — Auto Connect & Auto Disconnect

After coming out of sleep mode or after powering up (you need to save the connection), the HE45T tries to auto connect with the last Bluetooth radio it was connected with. You may always connect by scanning a QuickConnect code.

Scan the codes in Figure 1–33 to enable/disable the Auto Connect feature for the Bluetooth radio:

**FIGURE 1–33. Bluetooth Radio Auto Connect & Disconnect Codes**



Bluetooth Radio Auto  
Connect On (Default)



Bluetooth Radio Auto  
Connect Off

The Auto Disconnect feature is used when multiple HE45T readers are connecting to the same Bluetooth Radio. By enabling Auto Disconnect, the HE45T radio disconnects after each data transmission, allowing other radios to connect.

Scan the codes in Figure 1–34 to enable/disable the Auto Disconnect feature for the Bluetooth radio:

**FIGURE 1–34. Bluetooth Radio Auto Disconnect On/Off Codes**



Bluetooth Radio  
Auto Disconnect On



Bluetooth Radio  
Auto Disconnect Off (Default)

Note: Auto Connect should always be set to “On” if Auto Disconnect is set to “On”. (Otherwise the QuickConnect code would need to be re-scanned after every disconnect).

## Bluetooth Radio — Timeout Settings (Uncabled)

Scan the codes in Figure 1–35 to set the period of time before the Bluetooth Radio will go into sleep mode from inactivity:

Note: Increasing the time before the reader will timeout will decrease battery life. If the reader has power (USB cable, power cable, etc.), it will disconnect based on cable timeout settings.

FIGURE 1–35. Bluetooth Radio Timeout Settings Codes



M125\_01

90 Seconds  
(Default)



M121\_01

5 Minutes



M122\_01

10 Minutes



M123\_01

15 Minutes



M124\_01

30 Minutes



M119\_01

1 Hour



M120\_01

2 Hours

## Bluetooth Radio — Out of Range Notification Settings

Scan the codes in Figure 1–36 to enable a beep or vibrate notification when the radio goes out of range:

**FIGURE 1–36. Bluetooth Radio Out of Range Notification Codes**

---



Bluetooth - Out of Range Beep: On



Bluetooth - Out of Range Notify with Vibrate: On



Bluetooth - Out of Range Vibrate & Beep: On






Bluetooth - Out of Range Vibrate and/or Beep: Off (Default)




## Reader Feedback

Table 1–8 through Table 1–11 show potential icon combinations in the HE45T Display software. Consult the table to verify a configuration.







**TABLE 1–8. Possible HE45T Configurations (RS-232)**

Mode	Description
RS-232 One Way 	This is the standard way of transferring unformatted, unpacketized data through the serial/RS232 port.
RS-232 Two Way 	This mode allows for reliable communication by utilizing packet acknowledgement protocol.
RS-232 Secure 	This mode is used for transferring data in an encrypted format from the HE45T to a host computer through the serial/RS232 port.




**TABLE 1–9. Possible HE45T Configurations (PS2)**

Mode	Description
PS2 Keyboard 	This is the standard mode for transferring data from the HE45T through a PS2 port.

**TABLE 1-10. Possible HE45T Configurations (USB)**

Mode	Description
USB One Way 	This is the standard way of transferring unformatted, unpacketized data through a USB port.
USB Two Way   	This mode is used when there is a need for packetized, bidirectional communication between the HE45T and an application through a USB port.  This mode emulates the transfer of data from the HE45T to a host computer via a keyboard interface.
USB Virtual COM Port 1 	This mode allows communication between a USB port and an application expecting serial input. A virtual com driver must be loaded onto the host computer before reader can be utilized in this mode.
USB Secure 	This mode is used for transferring data in an encrypted format from the HE45T to a host computer through a USB port.
USB Downloader 	This mode is used when downloading firmware changes to the reader.

**TABLE 1-11. Possible HE45T Configurations (Bluetooth Radio)**

Mode	Description
Bluetooth One Way  1	This is a way of transferring unformatted, unpacketized data by radio frequency (Bluetooth).
Bluetooth Two Way  2	This mode is used when there is a need for packetized, bidirectional communication between the HE45T and an application by radio frequency (Bluetooth). This requires implementation of software at the application level. The reader receives confirmation via packet protocol verification and is 100% reliable. Microscan offers a Windows or PocketPC version of software called CodeXML Router Bluetooth Edition (BE) that automatically provides packet protocol verification. CodeXML Router BE allows for end-to-end Bluetooth handshakes that eliminate issues with out-of-range data loss.
Bluetooth Secure  S	This mode is used for transferring data in an encrypted format from the HE45T to a host computer through a Bluetooth connection.

## Targeting and Reading Techniques

The HE45T utilizes digital camera technology to take a picture of a symbol. Once an image is captured, the HE45T utilizes advanced decoding algorithms to extract data from the captured image.

The reader features left and right triggers. These triggers may be programmed to perform various features. The reader is shipped with the left trigger and right trigger functioning as a decode symbol command.

The H2 Cabled Handle and BH1/BH2 Battery Handle each feature a trigger on the handle. The two triggers on the top of the reader also work when the handle is attached.

**FIGURE 1-37. Handle with Trigger**



---

Note: The trigger on the handle attachment is light. Squeezing too hard may damage the reader.

---

To read a symbol with the HE45T:

1. The HE45T features omnidirectional decoding. Center the symbol in any orientation within the laser dot aiming pattern (Figure 1–38).

**FIGURE 1–38. Centering the Symbol Within the Laser Dot**



Note: The HE45T can read a symbol that is not centered; however, the HE45T performs best when a code is centered.

The HE45T features omnidirectional decoding. Aiming the targeting laser at the center of the symbol ensures the best performance for decoding. The HE45T can read a symbol that is not centered and, under certain circumstances if multiple symbols are within the field of view, the user must take care of which symbol is read. The decoder will start from the center, but if the center symbol is not decodable, it may decode another symbol, if multiple symbols are present within the field of view.

2. The HE45T was developed to decode both very small 2-D symbols and larger 1-D symbols. The reader has an innovative dual field decode zone. The HE45T DECODES BOTH ZONES SIMULTANEOUSLY. The reader has a lens focused on a near-field for smaller codes (optimal focal point is 4 inches) and one lens focused on a far-field for larger codes (optimal focal point 9 inches). To read smaller symbols move the HE45T closer to the symbol. To read larger symbols move the reader farther away from the symbol. The entire HE45T decode zone varies between two (2”) and twenty (20+”) or more inches.
3. Hold the HE45T still - DO NOT SWIPE OR MOVE THE READER. Press the trigger until the HE45T beeps, indicating the code has been successfully decoded.
4. To read a symbol with a shiny background, hold the HE45T slightly tilted to avoid the reflected light from the LEDs.

5. The reader may be optimized to your specific environment by scanning codes in Chapter 6, “Advanced Decoder Performance”.

## Imager Field of View and Resolution

The HE45T's megapixel imager, with a dual field optical system, can provide you the best image for 1-D and 2-D applications.

The 1.3 Million Pixel imager is divided into near field and far field decode zones. In each zone, the resolution is 1024 x 640 pixels (see Figure 1.25). In this mode of operation the reader utilizes the highest resolution creating the widest working range on bar code and 2-dimensional symbols of all densities. The trade-off is the amount of time the reader spends processing the image. This time can be reduced by optimization functions:

- If only the near field is used (small, high density symbols), the far field image can be ignored.
- If only the far field is used (large, lower density symbols), the near field can be ignored.

Further optimization may be obtained by “windowing” the field to a smaller area.

**FIGURE 1-39. SXGA Imaging Area**

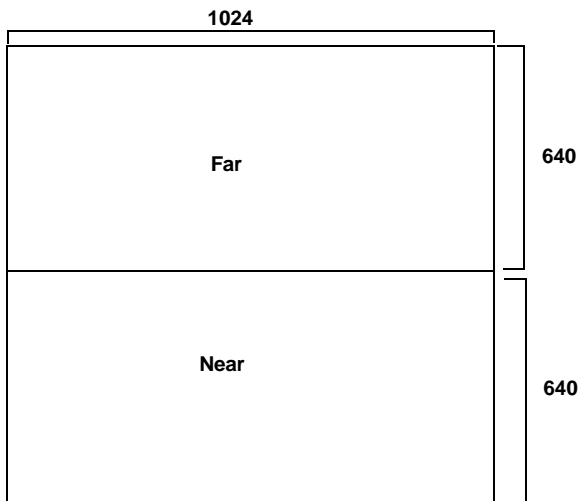
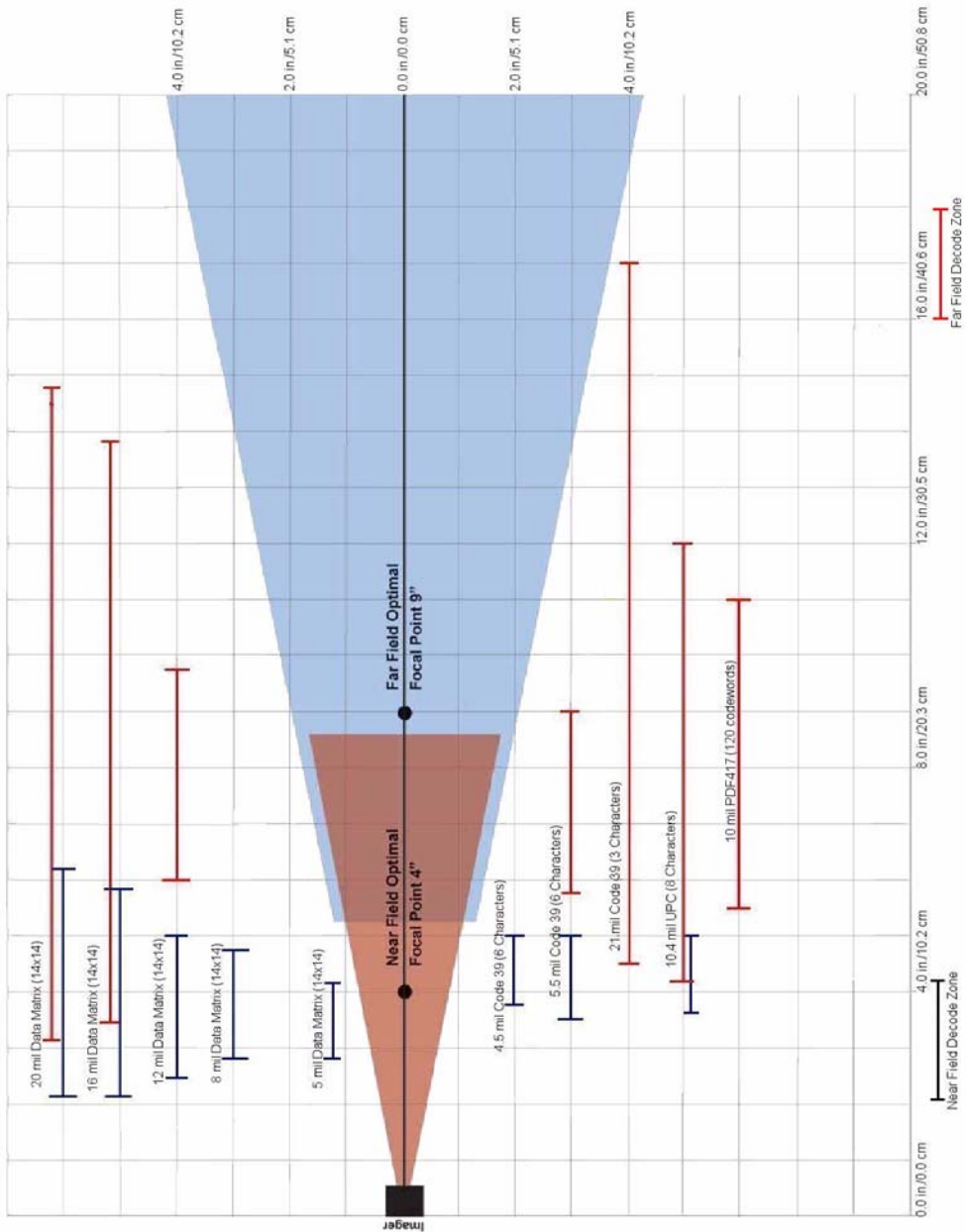


FIGURE 1-40. HE45T Focal Lengths





# Optimization and Trigger Programming

## Introduction

The HE45T comes with SXGA mode and its dual field optical system activated for all the triggers. From the moment you turn on your HE45T, you are taking full advantage of the dual path 1.3 megapixel imager and the 400 MHz processor with Microscan' industry leading DPM technology.

The HE45T is easily customizable; each trigger can be independently programmed for different behavior.

- Near Field (NF) — The nearest field of the HE45T's two image fields. It has an optimal focal point of 4" (101.6 mm) away from the lens of the reader. The width of the Field of View is 1.5" (38.1 mm) at the optimal focus point.
- Far Field (FF) — The farthest field of the HE45T's two image fields. It has an optimal focal point of 9" (228.6 mm) away from the lens of the reader. The width of the Field of View is 4" (101.6 mm) at the optimal focus point.

The following sections provide you with the ability to program individual triggers, or all triggers, to perform with different parameters.

## Left Trigger Programming

---

Scan the codes in Figure 2–1 to set the left trigger functionality:

**FIGURE 2–1. Left Trigger Programming Codes**

---



Read Codes with Both Imagers (Default)



Read with Far-Field Imager ONLY



Read with Near-Field Imager ONLY

## Right Trigger Programming

---

Scan the codes in Figure 2–2 to set the right trigger functionality:

**FIGURE 2–2. Right Trigger Programming Codes**

---



Read Codes with Both Imagers (Default)



Read Code with Far-Field Imager Only



Read Code with Near-Field Imager ONLY

---

## Handle Trigger Programming

---

Scan the codes in Figure 2–3 to set the handle trigger functionality:

**FIGURE 2-3. Handle Trigger Programming Codes**

---



Read Codes with Both Imagers (Default)



Read Code with Far-Field Imager ONLY



Read Code with Near-Field Imager ONLY

---

## Continuous Scan Settings

---

Scan the codes in Figure 2–4 to turn continuous scanning on/off:

**FIGURE 2-4. Continuous Scan On/Off Codes**

---



Both Near & Far Field On



Near Field Only On



Far Field Only On



Off (Default)

---

Note: This function is only recommended for short term use because of battery consumption (see “Continuous Scan — Sleep Timeout” on page 2-4).

---

## Continuous Scan — Sleep Timeout

Scan the codes in Figure 2–5 to set the amount of time a cabled HE45T will operate in continuous scan mode before entering sleep mode:

**FIGURE 2-5. Continuous Scan Sleep Timeout Codes**



Cabled - 2 Hours



Cabled - Always (Default)

Scan the codes in Figure 2–6 to set the amount of time an uncabled HE45T will operate in continuous scan mode before entering sleep mode:

**FIGURE 2-6. Continuous Scan Wait Before Enter Sleep Mode Codes**



Uncabled - 5 Minutes (Default)



Uncabled - 15 Minutes



Uncabled - 30 Minutes

Note: This function is only recommended for short term use because of battery consumption.

## Continuous Scan — Trigger Delays

Scan the codes in Figure 2–7 to set delay time between scans:

**FIGURE 2–7. Continuous Scan Trigger Delay Codes**

---



M142\_01

0 Seconds (Default)



M143\_01

1 Second



M144\_01

3 Seconds

## Continuous Scan — Duplicate Scan Delay

Scan the codes in Figure 2–8 to set the delay time for reading duplicate codes:

**FIGURE 2–8. Continuous Scan Duplicate Scan Codes**

---



M222\_01

0 Seconds (Default)



M223\_01

1 Second



M224\_01

3 Seconds

## Motion Detection Scan Settings

---

Scan the codes in Figure 2–9 to set the reader to read when it detects motion in its scanning zone:

**FIGURE 2–9. Motion Detection Scan On/Off Codes**

---



M701\_01

On



M702\_01

Off (Default)



# HE45T Programming: Symbology Settings

Use the programming codes in this chapter to change the symbology settings on the HawkEye™ 45T.

To reset the reader to factory defaults or to save the current settings, scan one of the codes in Figure 3–1.

**FIGURE 3–1. Reset to Factory Defaults Codes**

Save Settings



Reset to USB Factory Defaults  
Radio setting will not be reset with this code



Reset to PS2 Factory Defaults  
Radio setting will not be reset with this code



Reset to RS-232 Factory Defaults  
Radio setting will not be reset with this code



Reset to RF One Way Factory Defaults



Clear All CodeXML Rules

Readers are shipped from manufacturing with default communication settings that are hardware dependent.

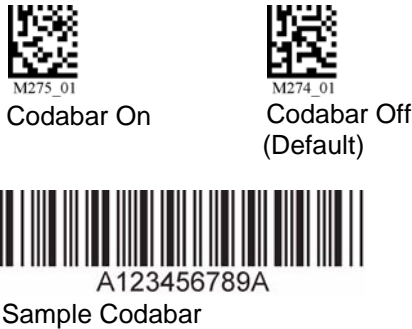
Note: If you do not save your settings and the HE45T loses power, you will lose your settings.



## Codabar Symbology

Scan the codes in Figure 3–2 to enable/disable Codabar symbology settings:

**FIGURE 3–2. Codabar Symbology Codes**



## Code 39 Symbology

Scan the codes in Figure 3–3 to enable/disable Code 39 symbology settings:

**FIGURE 3–3. Coded 39 Symbology Codes**



## Code 93 Symbology

---

Scan the codes in Figure 3–4 to enable/disable Code 93 symbology settings:

**FIGURE 3–4. Code 93 Symbology Codes**

---



M281\_02

Code 93 On



M280\_01

Code 93 Off (Default)



123456789

Sample Code 93 Code

## Code 128 Symbology

---

Scan the codes in Figure 3–5 to enable/disable Code 128 symbology settings:

**FIGURE 3–5. Code 128 Symbology Codes**

---



M283\_01

Code 128 On



M282\_01

Code 128 Off (Default)



12345678912345

Sample Code 128 Code

## Interleaved 2 of 5 Symbology

---

Scan the codes in Figure 3–6 to enable/disable Interleaved 2 of 5 symbology settings:

**FIGURE 3–6. Interleaved 2 of 5 Symbology Codes**

---



Int 2 of 5 On



Int 2 of 5 Off (Default)



123456789

Sample Int 2 of 5 Code

## PDF 417 Symbology

---

Scan the codes in Figure 3–7 to enable/disable PDF 417 symbology settings:

**FIGURE 3–7. PDF417 Symbology Codes**

---



PDF 417 On



PDF 417 Off (Default)



Sample PDF 417 Code

---

## QR Code Symbology

---

Scan the codes in Figure 3–8 to enable/disable QR/Micro QR Code symbology settings:

**FIGURE 3–8. QR Code Symbology Codes**

---



M261\_01

QR/Micro QR On



M260\_01

QR/Micro QR Off (Default)



Sample QR Code

## UPC/EAN/JAN

Scan the codes in Figure 3–9 to enable/disable UPC/EAN/JAN symbology settings:

**FIGURE 3–9. UPC/EAN/JAN Symbology Codes**



UPC On



UPC Off (Default)



UPC Extension On



UPC Extension Off (Default)



Sample UPC A Code

## All 1D Bar Codes

Scan the codes in Figure 3–10 to enable all supported 1D bar codes (Code 128, Code 39, Code 93, I 2 of 5, Codabar, UPC).

**FIGURE 3–10. All 1D Codes On/Off**



All 1D Codes On



All 1D Codes Off



# Department of Defense Unique Identification (UID)

UID is a mandatory Department of Defense requirement on all solicitations issued January 1, 2004. This policy mandates the use of Data Matrix symbology on a large class of equipment and parts procured by DoD. The HE45T reader complies with Department of Defense Standard Practice Identification (MIL-STD-130).

Once the HE45T decodes the Data Matrix symbol, and, if the Unique Item Identifier (UII), Current Part Number (CPN), and Lot/Batch Number (LBN) are turned on, it checks the ISO 15434 syntax with ISO 15418 (ANSI MH10.8.2 - AI & DI) and ISO 21849 (ATA - TEI) semantics to construct UII, CPN, and LBN.

## DoD UID Settings

The following UID data output options are applicable to Data Matrix only and have no effect on other symbologies:

- **UII/CPN DM On** — The HE45T is configured to construct Unique Item Identifier (UII), Current Part Number (CPN), and Lot/Batch Number (LBN). If there is a valid UII/CPN/LBN, a UII/CPN/LBN string is outputted. For decoded Data Matrix with invalid UII/CPN/LBN, HE45T stops image acquisition without an output string. The UII/CPN DM On option will have the following output format:

TABLE 4-1. UII/CPN DM On Options

Content of Decoded Data Matrix	UII/CPN
Valid UII	UII:UII_data Example: UII:12345678
Valid CPN	CPN:CPN_data Example: CPN:87654321
Valid LBN	LBN:LBN_data Example: LBN:87654321
Valid UII and CPN	UII:UII_data CPN:CPN_data Example: UII:12345678 CPN:87654321
Valid UII and LBN	UII:UII_data LBN:LBN_data Example: UII:12345678 LBN:87654321
Valid UII and invalid CPN	UII:UII_data (CPN ERROR) Example: UII:12345678 (CPN ERROR)
Valid UII and invalid LBN	UII:UII_data (LBN ERROR) Example: UII:12345678 (LBN ERROR)
Invalid UII and valid CPN	(UII ERROR) CPN:CPN_data Example: (UII ERROR) CPN:87654321
Invalid UII and valid LBN	(UII ERROR) LBN:LBN_data Example: (UII ERROR) LBN:87654321
None of the above (Invalid UII; Invalid CPN; Invalid LBN; Invalid UII and Invalid CPN; Invalid UII and Invalid LBN)	No output data

- UII/CPN DM with Data Fields — The HE45T is configured to construct UII/CPN/LBN with all the data fields. The UII/CPN with Data Field option has the following output format:

UII/CPN; DF0; DF1; DF2; DF3; DF4; DF5; DF6; DF7



TABLE 4-2. UII/CPN DM with Data Field On

Content of Decoded Data Matrix	UII/CPN	DF0
Valid UII	UII:UII_data Example: UII:12345678	Constructed UII type Example: Construct_1
Valid CPN	CPN:CPN_data Example: CPN:87654321	Constructed CPN type Example: PNR
Valid LBN	LBN:LBN_data Example: LBN:87654321	Constructed LBN type Example: 30T
Valid UII and CPN	UII:UII_data CPN:CPN_data Example: UII:12345678 CPN:87654321	Constructed UII/CPN type Example: Construct_1/PNR
Valid UII and LBN	UII:UII_data LBN:LBN_data Example: UII:12345678 LBN:87654321	Constructed UII/LBN type Example: Construct_1/30T
Valid UII and Invalid CPN	UII:UII_data (30P ERROR: xxxx) UII:UII_data (PNR ERROR: xxxx)	Constructed UII type Example: Construct_1
Valid UII and Invalid LBN	UII:UII_data (240 ERROR: xxxx) UII:UII_data (30T ERROR: xxxx)	
Invalid UII and Valid CPN	(UII ERROR: xxxx) CPN:CPN_data	Constructed CPN type: 30P, PNR, 240
Invalid UII and Valid LBN	(UII ERROR: xxxx) LBN:LBN_data	Constructed LBN type: 30T
Invalid UII	(UII ERROR: xxxx) (15434 ERROR: xxxx) Example: (UII ERROR: DATA ELEMENT CHARACTER)	Original decoded data
Invalid CPN	(30P ERROR:xxxxx) (PNR ERROR:xxxxx)	Original decoded data
Invalid LBN	(240 ERROR:xxxxx) (30T ERROR:xxxxx) (15434 ERROR: xxxxx)	
Invalid UII and Invalid CPN	(UII ERROR: xxxx) (30P ERROR: xxxx) (UII ERROR: xxxx) (PNR ERROR: xxxx)	Original decoded data
Invalid UII and Invalid LBN	(UII ERROR: xxxx) (240 ERROR: xxxx) (UII ERROR: xxxx) (30T ERROR: xxxx)	

The following options apply to all symbologies:

- **UII/CPN On for All Symbologies** — The HE45T is configured to construct UII/CPN/LBN for all symbologies. For decoded symbologies without valid UII/CPN/LBN, the HE45T stops image acquisition without an output string.
- **UII/CPN Off** — The HE45T is back to normal decoder behavior without constructing UII/CPN/LBN.

**FIGURE 4–1. UII Codes**



UII/CPN DM On



UII/CPN DM with Data Field



UII/CPN On for All Symbologies



UII/CPN Off

Output Format: UII/CPN; DF0; DF1; DF2; DF3; DF4; DF5; DF6; DF7

- DF1 - DF7: The fields display data elements:
  - If there are **less than** seven data elements, an empty string is filled in at the end.
  - If there are **more than** seven elements, only first seven elements are displayed.
- There is a space between UII and CPN in both tables (UII:12345678  
CPN:87654321).
- The constructed UII type can be Construct\_1, Construct\_2, Construct\_1\_2, or IUID\_EQUIVALENT.
- The constructed CPN type can be PNR, 30P, or 240. The constructed LBN type is 30T.

- An error message, if the process fail based on corresponding configuration with Data Field on. List of error messages:

15434 ERROR: DATA ELEMENT SEPARATOR  
15434 ERROR: DOUBLE TRAILER  
15434 ERROR: FORMAT INDICATOR  
15434 ERROR: HEADER - 1ST POSITION  
15434 ERROR: HEADER - 2ND POSITION  
15434 ERROR: HEADER - 3RD POSITION  
15434 ERROR: HEADER - 4TH POSITION  
15434 ERROR: HEADER - GROUP SEPARATOR  
15434 ERROR: TRAILER - END OF TRANSMISSION  
15434 ERROR: TRAILER - RECORD SEPARATOR  
PNR ERROR: TOO LONG  
PNR ERROR: TOO SHORT  
PNR ERROR: CHARACTER  
30P ERROR: TOO LONG  
30P ERROR: TOO SHORT  
30P ERROR: CHARACTER  
240 ERROR: TOO LONG  
240 ERROR: TOO SHORT  
240 ERROR: CHARACTER  
UII ERROR: DATA ELEMENT CHARACTER  
UII ERROR: DATA ELEMENT TOO LONG  
UII ERROR: DATA ELEMENT TOO SHORT  
UII ERROR: LOWER CASE CHARACTER  
UII ERROR: NEED UII ELEMENT FIRST  
UII ERROR: SPACE AFTER TEI DATA QUALIFIER  
UII ERROR: TEI DATA QUALIFIER  
UII ERROR: UII ELEMENT INCOMPLETE  
UII ERROR: WRONG FORMAT INDICATOR  
UII ERROR: UII STRING TOO LONG

- ; — A field separator.



# Reader Feedback and Special Settings

## Volume and Vibration Settings

Scan the codes in Figure 5–1 to set vibration mode:

**FIGURE 5–1. Vibration & Volume Codes**



M107\_01

Vibrate On  
Beep On



M109\_01

Vibrate On  
Beep Off



M108\_01

Vibrate Off  
Beep On (Default)

Scan the codes in Figure 5–2 to set your reader's volume:

**FIGURE 5–2. Volume Codes**



M110\_01

Beep Off



M111\_01

Beep Low



M112\_01

Beep High (Default)

Scan the codes in Figure 5–3 to set the volume for keypad button press sounds:

**FIGURE 5–3. Keypad Volume Codes**



## Backlight Intensity Settings

---

Scan the codes in Figure 5–4 to set the intensity of the HE45T’s backlight with High being the brightest and Low being the dimmest:

**FIGURE 5–4. Backlight Intensity Codes**

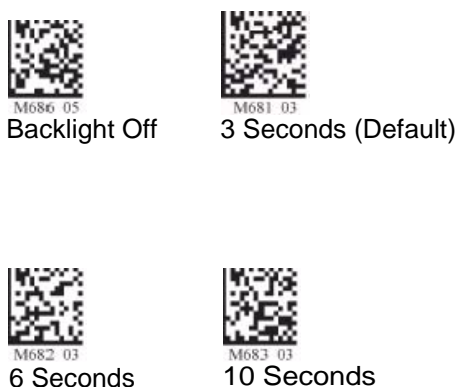


## Backlight Timeout Settings

---

Scan the codes in Figure 5–5 to set the backlight timeout settings:

**FIGURE 5–5. Backlight Timeout Codes**



---

## Laser Settings

---

Scan the codes in Figure 5–6 to turn laser targeting on/off:

**FIGURE 5-6. Laser On/Off Codes**

---



M055\_01

On (Default)



M054\_01

Off

Scan the codes in Figure 5–7 to set the brightness of the HE45T laser:

**FIGURE 5-7. Laser Brightness Codes**

---



M058\_01

High (Default)



M057\_01

Medium



M056\_01

Low

---

## Reader Power Off Settings

---

Scan the codes in Figure 5–8 to set the amount of time before a reader powers down:

**FIGURE 5-8. Reader - Amount of Time Before Power Down Codes**

---



M691\_02

1 Hour



M688\_02

2 Hours  
(Default)



M689\_02

4 Hours

Press and hold (3 seconds) any red trigger on the reader to power up a reader.

---

## Reader ID and Firmware Version

---

To find out the Reader ID and firmware version, open a text editor program (i.e. Notepad, Microsoft Word) and read the code in Figure 5–9:

**FIGURE 5-9. Reader ID & Firmware Version Code**

---



Reader ID & Firmware

---

Note: For readers with a Bluetooth Radio, the Reader ID is also your Bluetooth Radio PIN #.

---

You will get a text string with your firmware version and HE45T ID number:

Xap/iVVVVWWWXXXXSSSSSSSSSPXXXXXXXXXMicroscanZ.Z.Z.ZZ

- Xap/i — Microscan Internal ID (not applicable)
- VVVV — The application firmware version number
- WWW — The bootloader firmware version number
- XXXX — The radio firmware version number
- SSSSSSSSS — The reader’s serial number (ten digits)
- P — Is “A” if running firmware is the application, “B” if bootLoader
- XXXXXXXX — Microscan Internal ID (not applicable)
- MicroscanZ.Z.Z.ZZ — Microscan software release version

### Example

Xap/i3308314606040010029505A17?0016?Microscan1.0.1.7



## Reader Settings Locked & Unlocked

---

Scan the codes in Figure 5–10 to lock or unlock the current settings on your reader:

**FIGURE 5–10. Reader Settings Locked/Unlocked Codes**

---



Reader Settings Locked



Reader Settings Unlocked

---

Note: Prefix and Suffix programming codes, memory transfer and delete commands, “Clear All CodeXML Rules” and “Suffix - Erase/None” commands are not locked by this feature.

---

## Keyboard Support

---

- **US English (Default)** — Use this option with the U.S. keyboard to display characters of ASCII values from 1 to 126. Non-printable characters with ASCII values from 1 to 31 are shown as symbols in Windows. You can enter them by holding down the Alt key, typing the digits of the ASCII value using the numeric keypad, and then releasing the Alt key.
- **US English With Leading 0** — Use this option with the U.S. keyboard to display full ASCII characters the same way as they are entered by typing Alt + 0 + ASCII value from the numeric keypad. Non-printable characters are shown as “action” in Windows. For example, typing Alt + 0 + 13 results in the Carriage Return that moves the cursor to the beginning of the next line.
- **French** — Use this option with the French keyboard to display ASCII characters the same way as the US English With Leading 0 option with the U.S. keyboard.
- **German** — Use this option with the German keyboard to display ASCII characters the same way as the US English With Leading 0 option with the U.S. keyboard.

- **Universal Keyboard** — Use this option to support any type of keyboard; however, requires more time for displaying each character. The characters are displayed the same way as the US English With Leading 0 option with the U.S. keyboard.

Scan the codes in Figure 5–11 to set appropriate keyboard mapping:

**FIGURE 5–11. Keyboard Mapping Codes**



M172\_01

US English (Default)  
No Leading 0



M602\_01

US English  
With Leading 0



M606\_01

US English - ctrl + char  
For Non-Printable ASCII



M603\_01

French



M604\_01

German



M605\_01

Japanese



M173\_01

Universal Keyboard



M171\_01

Custom Keyboard  
(Request that map be installed)

## Time Stamp Settings

The HE45T has a battery-powered real time clock embedded. When enabled, the time stamp will be a prefix to the data. Time stamping continues until disabled. The time stamp will be shown in the following format:  
YYYYMMDD HH:MM:SS

**FIGURE 5–12. Time Stamp On/Off Codes**



Note: Turning on the time stamp feature will cause the reader to re-start. Make sure previous settings have been saved prior to scanning the code or you will lose unsaved settings.

The HE45T also has a separate time set feature for logging data (defaulted off in shipped readers). If you enable the time set feature, every time the HE45T is powered off or rebooted, the timer will stop.

Scan the codes in Figure 5–13 to turn the time set on/off:

**FIGURE 5–13. Time Set On/Off Codes**



Note: The time set feature is in relative time from when the reader was last powered up.



# Advanced Decoder Performance

## Turbo Dot Peen Mode Settings

The HE45T with the default settings offers the best overall performance for Data Matrix DPM reading. For reading dot peen marks with cell size larger than 15 mils or 0.015 inches, it is often possible to improve the reading performance by enabling the Turbo Dot Peen mode. It is also recommended that you use Read With Near Field Only mode in conjunction with the Turbo Dot Peen On mode to achieve the best reading response.

Note: Turbo Dot Peen mode should not be used for reading small marks (dot peen or others) as it may increase the processing time and reduce the robustness of reading small marks.

**FIGURE 6-1. Turbo Dot Peen Mode On/Off Codes**





# Adding a Prefix or Suffix

## Prefix Settings

---

If you scan the codes in Figure 7-1, you may lose your current settings. Make sure you save settings on your reader before scanning the prefix codes. If you scan more than one prefix, you will receive each scanned prefix in your scanned data (i.e., if you scan the comma prefix twice, you will get two comma prefixes). Scan the codes in Figure 7-1 to set the appropriate prefix.

FIGURE 7-1. Prefix Codes



M159\_02  
Prefix - Comma



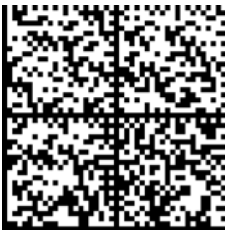
M164\_02  
Prefix - Space



M166\_01  
Prefix - Tab (USB/PS2)



M218\_02  
Prefix - Tab (RS-232)



M404\_01  
Prefix - Erase  
This code will erase  
all prefix data



M214\_02  
Prefix - Carriage Return  
Line Feed (RS-232)



M188\_02  
Save Settings



## Suffix Settings

If you scan the codes in Figure 7–2 (there are two pages of suffix codes), you may lose your current settings. Make sure you save settings on your reader before scanning the Suffix codes. If you scan more than one suffix you will receive each scanned suffix in your scanned data (i.e., if you scan the comma suffix twice, you will get two comma suffixes). Scan the codes in Figure 7–2 to set appropriate suffix:

**FIGURE 7–2. Suffix Codes**



M165\_04

Suffix - Space



M160\_04

Suffix - Comma



M161\_04

Suffix - Enter  
(USB/PS2)



M170\_04

Suffix - Carriage Return  
Line Feed  
(RS-232)



M168\_04

Suffix - Carriage Return  
(RS-232)



M169\_04

Suffix - Line Feed  
(RS-232)



M188\_02

Save Settings

FIGURE 7-3. Suffix Codes (Continued)



Suffix - Tab (RS-232)



Suffix - Tab (USB/PS2)



Suffix - Erase / None  
This code will erase all suffix data



Save Settings

## Erase Prefix and Suffix Settings

Scan the codes in Figure 7-4 to erase all prefix and suffix data:

FIGURE 7-4.



Erase Prefix & Suffix Data

# Maintenance and Troubleshooting

## Reset Reader to Factory Defaults

Scan the codes in Figure 8–1 and Figure 8–2 to reset the reader:

**FIGURE 8–1. Reset Reader to Factory Defaults Codes**



M049\_03

Reset to USB Factory  
Default Settings  
(Radio settings will not  
be reset with this code)



M060\_03

Reset to PS2 Factory  
Default Settings  
(Radio settings will not  
be reset with this code)



M418\_02

Reset to RS-232  
Factory Default Settings  
(Radio settings will not  
be reset with this code)



M684\_01

Reset to RF One Way  
Factory Default Settings



M692\_01

Bootloader Mode is utilized to  
download new version of  
bootloader firmware and  
custom applications

Bootloader Mode

**FIGURE 8–2. Reset Reader to Factory Defaults Codes (Continued)**

Note: If you scan the codes in Figure 8–1 and Figure 8–2, you may lose your current settings. Therefore, make sure you save settings on your reader before scanning the codes in Figure 8–1 and Figure 8–2.

---

## General Safety Information

---

**Repairs and Adjustments** — Only those individuals authorized by Microscan should attempt to make repairs or adjustments to HE45T equipment. If the reader casing is opened, the warranty is voided.

**Power Supply** — Use only the particular power supply provided for use with a specific reader when operating Microscan equipment.

**Accessories** — Only those accessories approved by Microscan should be utilized with Microscan equipment. Non-compliance with any of the above may result in:

- Injury to individuals handling the equipment
- Damage to the equipment
- Voiding of the maintenance contract

**Bootloader mode** is utilized to download new versions of bootloader firmware and custom applications.

**Lasers** — The HE45T utilizes a laser FOR TARGETING PURPOSES ONLY. If the laser is activated, do not stare into the beam.



### Warning

Charge the Lithium Ion Battery in the BH1/BH2 with Microscan' cables ONLY. Do not open battery, dispose of in fire, or short circuit; it may ignite, explode, leak, or get hot, causing personal injury.

## HE45T Accessories

---

Please call your Microscan representative for more information on accessories.

## HE45T Maintenance

---

The HE45T operates efficiently and reliably and needs only a minimum of maintenance to operate. A few tips are given below for maintenance suggestions.

### Cleaning the HE45T's Window

The HE45T's window should be clean to allow the best performance. The window is the clear plastic piece inside the head of the Reader. Do not touch the window. Your HE45T uses CMOS technology that is much like a digital camera. A dirty window may stop the HE45T from reading codes.

If the window becomes dirty, clean it with a soft, non-abrasive cloth or a facial tissue (no lotions or additives) that has been moistened with water. You may use a mild detergent to clean the window, but the window should be wiped with a water moistened cloth or tissue after using the detergent.

The HE45T's display screen and housing may be cleaned in the same way.

For applications that require cleaning with disinfectant, please use products with the following ingredients:

- Isopropyl Alcohol
- Ethyl Alcohol (Denatured Grade)

Microscan does not recommend using bleach.



## Programming Codes for Alternate OS Compatibility

Use the following procedure to program the HE45T to work with the Mac platform, running under OS X:

1. Scan the code Figure A-1 to restore USB factory default settings:

**FIGURE A-1. Reset to USB Factory Defaults Code**



M049\_03

Reset to USB Factory Defaults Settings

2. Scan the three programming codes (Figure A-2) in the following order:
  - Microsoft Windows CE, Linux, Mac OS X code
  - USB Keyboard Mode code
  - Save Settings code

**FIGURE A-2. Scan Codes in order, top to bottom**

---



M585\_01

Microsoft Windows CE, Linux, Mac OS X



M134\_01

USB Keyboard Mode



M188\_02

Save Settings

3. Cycle the power on the HE45T by removing and re-installing the battery in the unit.



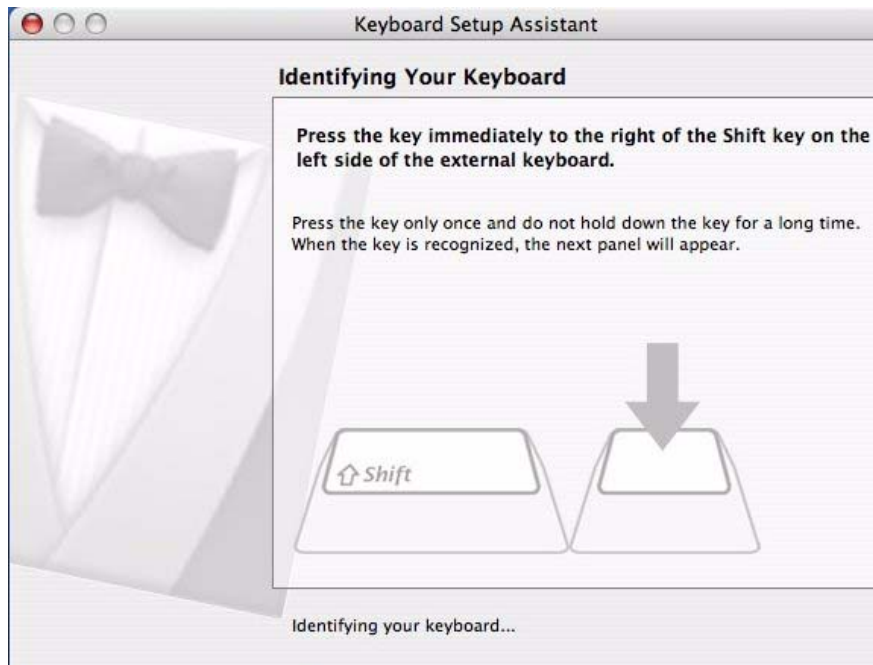
- 
4. Plug the USB cable into the Mac processor (not the keyboard). The screen in Figure A-3 is displayed:

**FIGURE A-3. Keyboard Setup Assistant Screen - Introduction**



- 5. Click Continue. The screen Figure A-4 is displayed:

**FIGURE A-4. Keyboard Setup Assistant Screen - Identifying Keyboard**



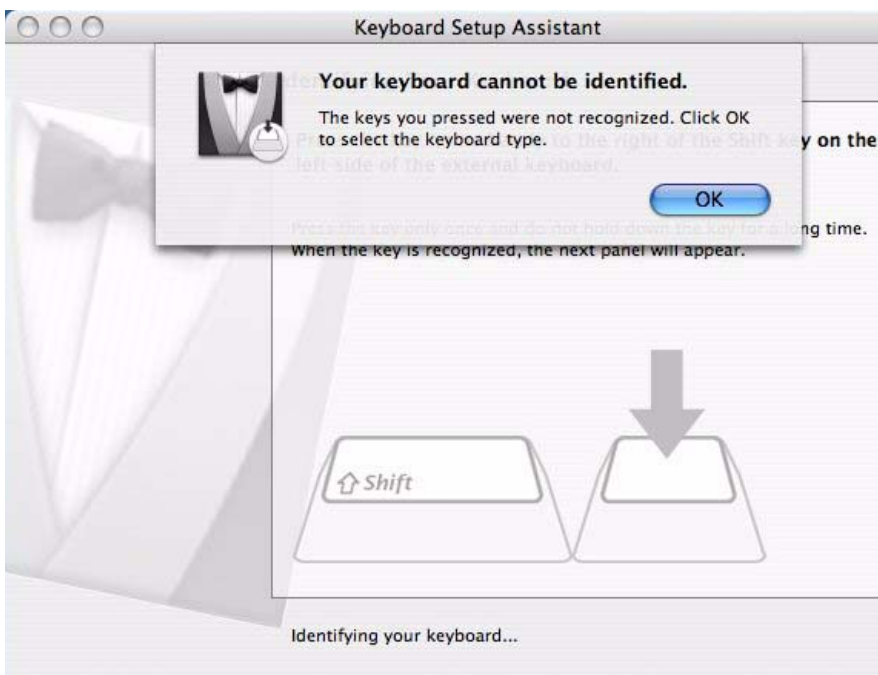
- 
6. Scan the code in Figure A-5:

**FIGURE A-5. Code**



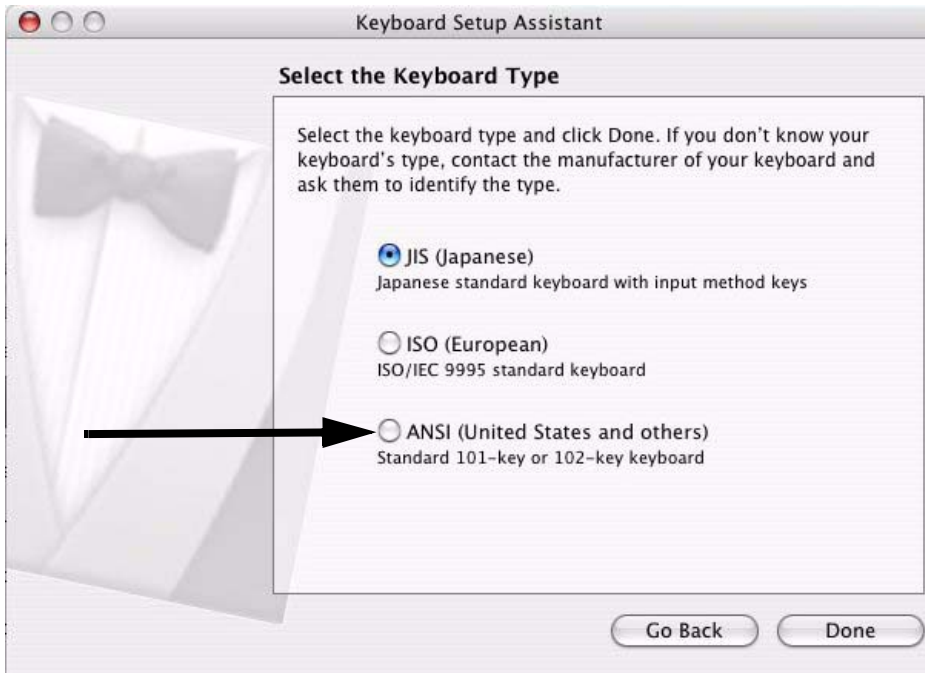
The screen in Figure A-6 is displayed:

**FIGURE A-6. Keyboard Setup Assistant Screen - Cannot Identify Keyboard**



7. Click OK. The Select the Keyboard Type screen is displayed:

**FIGURE A-7. Keyboard Setup Assistant Screen - Select Keyboard Type**



8. Select ANSI and then click Done.

You are now ready to scan codes in using Mac OS X.

# Certification and Specifications

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## CE Compliance

---

The HawkEye™ 45T has been certified to conform to the requirements of Council Directives 89/336/EEC, 73/23/EEC, and 1999/5/EC to comply with the following European Standards:

- EN 60950-1:2001 Low Voltage/Safety
- EN 300 238-2(2000-07) Radio
- EN 55022:1994 Class B Radiated Emissions, and Class B Conducted Emissions
- EN 55024:1998 EMC Immunity Requirements
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated RF Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Conducted RF Immunity
- EN 61000-4-8 Magnetic Fields
- EN 61000-4-11 Line Interruption

All Microscan products bearing the CE mark have been declared to be in conformance with the applicable EEC Council Directives. However, certain factory installed options or customer requested modifications may compromise electromagnetic compatibility and prohibit use of the CE mark. Note that the use of interconnect cables that are not properly grounded and shielded may affect CE compliance. For further information regarding CE Compliance, see “Service & Support on the Internet” on page xi.

## **FCC Statement**

---

The HawkEye™ 45T has been tested for compliance with FCC regulations and was found to be compliant with all applicable FCC Rules and Regulations

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense. Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

---

Important Note: To comply with FCC RF exposure compliance requirements, this device must not be co-located or operate in conjunction with any other antenna or transmitter.

---

---

## FDA Statement

---

This equipment complies with

US21 CFR Subchapter J Part 1040.10

EN 60950-1:2001



The HawkEye™ 45T can be set to use targeting lasers. If the targeting lasers are activated, do not stare into the beams. The HawkEye™ 45T's targeting lasers have been rated as Class 2M Lasers by IEC 60825-1

---

## Safety Guidelines

---



### Caution

Laser in the HE45T

LASER RADIATION - AVOID LONG TERM VIEWING OF DIRECT  
LASER RADIATION - LASER CLASS 2M

Wavelength 630 nm - Maximum radiant power: <math>< 1\text{ mW}</math>

EN 60825-1:2003

---

Important Note: LED Lighting

Light Emitting Diode Class 1 according to EN 60825-1:2003

---

---

## Specifications

---

### HawkEye™ 45T

#### Physical Characteristics

Reader Dimensions: 1.6" H x 4.4" D x 1.8" W  
(4.1cm H x 11.0cm D x 4.6cm W)  
Handle Dimensions: 4.6" H x 3.8" L x 1.9" W  
(11.6cm H x 9.7cm L x 4.9cm W)  
Reader Weight w/Battery: 6.0 oz (172 gm)  
Battery Weight: 2.1 oz (60 gm)  
Handle Weight: 2.1 oz (60 gm)

#### Performance Characteristics

Power Requirements:	Reader @ 4.2Vdc – Peak (w/backlight) = 400mA; Continuous Scan (w/backlight) = 350mA; Idle (no backlight) = 150mA; sleep = 12 mA, Power Off = 0.5uA Bluetooth Radio @ 10m away at 4.2V Peak (w/backlight) = 525mA; Continuous Scan 9W/backlight) = 400mA; Idle (no back light) = 250mA
Illumination:	Embedded Class 1 LED
Field of View:	Near: 1.0" H x 1.5" W (2.5cm H x 3.8cm W) at focal point Far: 2.5" H x 4.0" W (6.4cm H x 10.2cm W) at focal point
Focal Point:	Near: approximately 4" (10.2cm) Far: approximately 9" (22.9cm)
Sensor:	Progressive Scan CMOS 1.33 MP (1024x1280) 256 level gray scale
Optical Resolution:	Near Field: 1024 x 640 pixels Far Field: 1024 x 640 pixels
Pitch:	± 60° (from front to back)



Skew:	± 60° from plane parallel to symbol (side-to-side)
Rotational Tolerance:	± 180°
Target Beam:	Class 2M Visible Laser Diode at 630 nm
Ambient Light Immunity:	Sunlight: Up to 9,000ft-candles/98,890 lux
Shock:	Withstands multiple drops of 4 feet (1.2 meters) concrete
Optional Cable Interfaces:	USB (Full Speed), RS-232 & PS/2
Memory:	4MB of memory for data and user programs
Programming:	Use programming Data Matrix code

### User Environment

Operating Temperature:	0° C to 40° C, 32° F to 104° F
Storage Temperature:	-20° C to 60° C, -4° F to 140° F
Humidity:	5% to 95% non-condensing
Decode Capability:	Data Matrix, PDF417, QR Code, MicroQR Code, Code 39, Code 128, UPC/EAN/JAN, Int 2 of 5, Codabar, Code 93
Image Output Options:	JPEG or BMP (Uncompressed)
Field Selection:	Near or Far
Resolution Selection:	SXGA (1024 x 640)
Real Time Clock:	7 year On-Board Battery Backup



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