

## User's Guide

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## 1. Introduction

### 1.1 Scope

This document is applicable to the **Honeywell Dolphin™ 6500 Mobile Computer with Windows CE 5.0 (D6500)** and **2DTG Data Matrix** Decoding applications utilizing its **DPM Edition library** (DM DPM) and compiled in Windows CE 5.0 environment.

Library features are the same as for the full Windows version. They are described in detail in the User's Guide "**Data Matrix Decoding SDK (Professional, DPM, Enterprise editions)**".

### 1.2 Normative and other references

ISO/IEC 16022 - Symology specification - Data Matrix  
ISO/IEC 15415 - Symbol quality - Two-dimensional symbols  
Honeywell Dolphin™ 6500 Mobile Computer with Windows CE 5.0 User's Guide

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## 2. Delivery package composition

Delivery package is notated as **DPM\_D6500\_v.xx.xx.xx.zip**, and includes the following applications/files:

- **DPM\_CE.exe** – Data Matrix DPM Decoder, allowing to automatically pasting decoded data directly to the foreground MS WordPad or any application supporting “Clip Board” feature.
- **DPM\_CE\_SW.exe** – Scan Wedge version of **DPM\_EH** – emulates key board entry (sends data to any “active window” application (not necessarily supporting “Clip Board” feature))
- **DPM\_CE\_Demo.exe** – Data Matrix DPM Decoder returning decoded data into the message box popping-up over the image of the captured symbol.
- **ImagingProfiles.exm** – “DPM Profile” optimized for capturing DPM images - created by 2DTG for D6500

## 3. Deployment

If DPM Decoding software is purchased together with the D6500, it comes as pre-installed add-on software. No further installation is required for its operation.

If it is purchased without the device, on-site installation is required. It’s an easy procedure that practically does not take any time.

- Synchronize D6500 with the host computer via Mobile Center (WIN 7 ... 10) or ActiveSinc (WIN XP).
- Create on D6500 device a folder for the DPM applications, received from 2DTG, – for example **File Explorer > 2DTG DPM** - and unpack all files from the delivery package to this folder:
- From this folder you can start any application (operational or trial) – just by selecting and tapping appropriate file name.

## 4. Reading Technique

Follow the general guideline described in the “**Activating the Engine**” section of the Honeywell “**Dolphin™ 6500 with Windows CE 5.0**” User’s Guide.

Two of DPM applications, supplied by 2DTG, allow for Image Preview to assist in selecting the optimal reading distance and angle, which sometimes is crucial for DPM marks. When the image capturing process is initiated, the touch screen displays a preview of the mark. Select the best view by slightly changing reading distance and angle.

Overall DPM mark reading involves few steps as follows:

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- Position the terminal over the barcode.
- Project the aiming brackets by pressing and holding “Scan” key.
- Center the aimer crosshair over (or near) the barcode.
- Hold the Device such that its front surface is tilted to the mark surface (to prevent unwanted reflection), and the mark is within the “high-vis aiming pattern”. Depending upon the type of the mark the hade may vary within a ~ 15-45 degree range.
- Slightly change reading distance and angle as necessary to read the DPM mark by monitoring the Image Preview.
- Hold the “Scan” button until the symbol is decoded or you decided to terminate this attempt. When image is decoded the device will stop reading automatically (the decode LED lights green and the terminal beeps).

Reading Distance for DPM marks is from ~ 2 to 8 inches for most samples but it depends very much on the type of substrate (surface), illumination, and type of mark itself. The optimal distance for most readings would be ~ 3-4 inches.

## **Important!**

**Try to avoid direct lighting or bright ambient light when scanning DPM (particularly Dot Peen) samples to prevent patches of reflected light.**

Launching applications for the first time creates **tmpImagingProfiles.exm** file in the operational directory – it is normal - it’s a backup of the original **ImagingProfiles.exm** file.

## **Important!**

**Dolphin 6500s are equipped with 5300 Standard Range (5300SR) image engines, having the resolution of 10 mil on a Data Matrix “paper” label. For DPM marks the effective resolution is even slightly lower than that. Accordingly, though DPM Decoder on D6500 platform provides good solution for many DPM needs, for “critical” applications we recommend using our Decoder with Dolphin 7800 and/or Xenon 1900/1902/1910 platforms, which utilize more advanced Adaptus 6.0 Imaging Technology.**

## 5. Running DPM Applications

There are three DPM software applications designed to meet different decode requirements: DPM\_CE, DPM\_CE\_ScanWedge and DPM\_CE\_Demo.

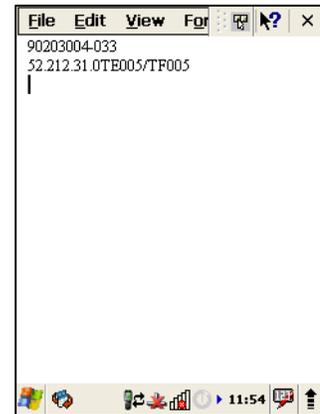
To access these applications tap **File Explorer > 2DTG DPM:**

- Select **DPM\_CE** to be able to automatically paste decoded data directly to the MS WordPad application installed on the terminal (MS WordPad should be opened in the foreground at this time), or
- Select **DPM\_CE\_ScanWedge** to be able to send decoded data to the foreground application as keystrokes, or
- Select **DPM\_CE\_Demo** if you just want to see the decode result on the terminal screen.

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When a DPM application is open, press the **Scan** key to activate the imager engine.

Please note that all applications come in **trial mode**. Trial application versions are fully functional but some characters in the decode output are artificially replaced with asterisks.



## 5.1 DPM\_CE

- Launch the program - tap **File Explorer > 2DTG DPM > DPM\_CE.exe** - a blank Decoder's window opens.
- Project the aiming brackets by pressing and holding "Scan" key as it is described in Section 4 - you can monitor the image quality while changing the reading distance and angle (see pictures below):



### **Important!**

**Only one application using Imager can be running at the same time. If you want to launch another application using imager, please, close the running one first.**

For parsing decode data into MS WordPad:

- Launch MS WordPad while keeping DPM\_CE.exe running.
- Place cursor into the position where you want the decode data to be parsed.
- Switch to DPM\_CE.exe (you can also scan while keeping DPM\_CE in the background, but in this case you will not be able to monitor the image in the Decoder's window, while reading DPM marks without "watching them" might be challenging sometimes).
- Read the symbol (press and hold "Scan" button).
- Decoded data will be parsed to the MS WordPad, which is running in the "background" (see picture above-right). Each new read will be placed on a new line.

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- To close application - tap “x” in the upper-right corner of the Decoder’s window.

## 5.2 DPM\_CE\_ScanWedge

This application is functionally similar to the ScanWedge utility – it sends data from the DPM Decoder to the foreground application as keystrokes (as if the data were entered via a keyboard). The foreground application is the open software application whose window is currently active on the display.

This is particularly useful when working in the network environment with the software programs providing a direct connection from a mobile device to any web or legacy host application - like, for example, a ClientMax - client software platform for mobile devices.

Overall this application operates the same way as DPM\_CE with the exception that you cannot monitor the image in the Decoder’s window while scanning.

### **Important!**

**Only alphanumeric characters of the English alphabet and special symbols are allowed to be send in ScanWedge application. No Cyrillic characters are allowed.**

**Make sure that host application is currently active on the display when using this program to avoid “strange behavior” of your device.**

To close application - tap DPM\_EH\_SW.exe again – “pop-up” message box will ask to confirm that you want to close - choose “Yes”.

## 5.3 DPM\_CE\_Demo

This application is particularly useful when you do not need to parse data into the data collection system but want just to see the decode result. The result is printed to the “pop-up” Message Box. Like with the DPM\_CE you can monitor the image while finding the best scanning position for your device.

- Launch the program - tap **File Explorer > 2DTG DPM > DPM\_CE\_Demo.exe** - a blank Decoder’s window opens.
- Project the aiming brackets by pressing and holding “Scan” key as it is described in Section 4 - you can monitor the image quality while changing the reading distance and angle (see pictures below).

Decode result is shown in the “pop-up” Message Box along with decode time and number of decode cycles.

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## 5.4 Decode speed

Decode speed strongly depends on the Image profile chosen for decoding.

We offer 2 profiles optimized for different kind of DPM samples and located in the corresponding folders of the Delivery package:

- Folder “**ImagingProfiles\_Robust**” – for all types of DPM samples, particularly “Dot Peened”
- Folder “**ImagingProfiles\_Fast**” – for most DPM samples (including Dot Peened), particularly having relatively good contrast – default profile.

To switch to the “Robust” profile just replace default profile in the “2DTG DPM” folder with the “Robust” one (copy it from “Robust” folder).

The profile can also be adjusted for specific application as it’s described in the Appendix 1.

Aimer and Illumination can also be turned OFF/ON as it’s described in the Appendix 1.

Typical decode time for “robust” version is about 600-700 ms, for the “fast” ~ 300 ms. Though the “robust” version seems slower than we get used to when using a “regular” scanner, it’s still more efficient overall then the other one due to the higher decode (success) rate. Besides, any DPM scanner is slower than the general purpose one both because of the lower quality mark and more complicated decoding algorithm.

## 6. Licensing DPM Decoder

License for each Mobile Computer is generated using proprietary encryption mechanism, which uses Device’s **Terminal Number** as an input parameter to generate configuration file

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**License.txt.** The Computer will check the license status every time the DPM Decoder is launched.

## **How to get your License Key:**

1. In the “My Account” section of the site (under Order No.) when you are logged in.

Note: enter **Terminal Serial Number(s)** in the “Order Comments” window at the end of the Check-out process.

2. Configuration file for each submitted **Terminal Serial Number** will be e-mailed to you within 24 hours.
3. Contact Customer Support.

Copy received **License.txt** file into the same directory where you have placed **2DTG’s** applications.

If **License Key** is invalid, the error message will pop-up: “License Key is invalid. Trial mode.” – the program will continue to operate in trial mode

## **How to find your License Key:**

On your D6500 device go to **Program Files > Power Tools** and open **SysInfo** file (double tap on it).

The **Terminal Serial Number** is located in the SYSTEM INFO section.

You can save the file (**File / Save to File**) and keep it on your host computer for convenience.

## **7. Verifying that DPM Decoder is installed/enabled**

If, at any time, you need to make sure the DPM Decoder is enabled try to read Data Matrix symbols below. If you can decode these symbols – Decoder is installed and running correctly.



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| Operational Decoder:      |       |                    | Trial Decoder:     |       |                  |
|---------------------------|-------|--------------------|--------------------|-------|------------------|
| 2D<br>Technology<br>Group | Test1 | Data Matrix<br>xxx | 2D<br>Technol***** | Tes** | Data<br>Mat***** |

## 8. Appendix 1. Editing DPM Profile on the host computer

- Make a backup copy of the **ImagingProfiles.exm** file.
- Open the **ImagingProfiles.exm** file, received from 2DTG, with the Notepad on your computer.
- Scroll through its content down to the **2dtg profile** (default profile is depicted):

```
<Section name="2dtg" flags="8">
  <Section name="Automatic Exposure Control">
    <Key name="Exposure Method">1</Key>
    <Key name="Target Value">140</Key>
    <Key name="Target Percentile">65</Key>
    <Key name="Target Accept Gap">32</Key>
    <Key name="Max Exp">520</Key>
    <Key name="Max Gain">1</Key>
    <Key name="Conform Image">1</Key>
    <Key name="Conform Tries">3</Key>
    <Key name="Specular Exclusion">4</Key>
    <Key name="Specular Sat">250</Key>
    <Key name="Specular Limit">5</Key>
  </Section>
  <Section name="Processing">
    <Section name="Histogram Stretch">
      <Key name="Flags">1</Key>
      <Key name="Low">2</Key>
      <Key name="High">2</Key>
      <Key name="Mode">1</Key>
    </Section>
    <Section name="Gamma Correction">
      <Key name="Flags">1</Key>
      <Key name="Gamma">0.45</Key>
    </Section>
    <Section name="Infinity Filter">
      <Key name="Flags">1</Key>
    </Section>
  </Section>
  <Section name="Settings">
    <Key name="Aimer">1</Key>
    <Key name="Illumination">1</Key>
  </Section>
</Section>
```

- Change parameters as required (see the Table below for the parameters description) and save the file without changing its name.

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- Synchronize D6500 with the host computer via Mobile Center (WIN 7, Vista) or ActiveSinc (WIN XP).
- Replace **ImagingProfiles.exm** on the device with the new file.

### Adjustable DPM Profile Parameters (automatic exposure mode)

| Parameter         | Description  |
|-------------------|--|
| EXPOSURE METHOD   | Set to one of the following : <ul style="list-style-type: none"><li>• “0” - Uses all image data when calculating automatic exposure setting</li><li>• “1” - Uses only the data in the center of the image when calculating automatic exposure setting</li><li>• “2” - Uses all image data, but weights the data in the center of the image more heavily when calculating automatic exposure setting</li></ul>  |
| TARGET VALUE      | The auto exposure algorithm tries to get a given percentile of all of the pixel values of the image, to fall at a target value. This parameter specifies the desired target value. The default value for this parameter is 150 (for DPM – 200), with a minimum of 1 and a maximum of 255.  |
| TARGET PERCENTILE | The auto exposure algorithm tries to get a given percentile of all of the pixel values of the image, to fall at a certain value. This parameter sets where that percentile is in the image data. This value is configurable between 1 and 99, where 1 represents the darkest percentile of the image, and 99 represents the lightest percentile of the image.  |
| TARGET ACCEPT GAP | This specifies how far the pixel value of the TargetPercentile can stray from the TargetValue but still be considered an acceptable image. The default value for this parameter is 10 (for DPM – 32), the minimum value is 1 and the maximum value is 50. It should be noted however that as this value gets smaller, the time to acquire a conforming image might be lengthened.  |
| MAX EXP           | This specifies the maximum exposure value to be used by the auto exposure logic during image acquisition. The default value for this parameter is 1312 (for DPM – 400), the minimum value is 1 and the maximum value is 7874, in units of 127uS. It should be noted that this parameter would allow for the adjustment of the frame rate of the imager to achieve larger exposure times; therefore it will affect the speed at which the imager acquires an image. |
| MAX GAIN          | This specifies the maximum gain value to be used by the auto exposure logic during image acquisition. The default value for this parameter is 1, the minimum value is 1 and the maximum value is 4.  |
| CONFORM IMAGE     | Where the auto exposure software is always trying to get the TargetPercentile of pixel data to fall at the TargetValue, this parameter tells the image acquisition software that the acquired image must conform to the defined imager settings, (target percentile, target value, number of updates). The default value for this parameter is 0 (for DPM  |

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|               |   |
|---------------|---|
|               | <p>– 1) for false, indicating that every image regardless of whether or not the target percentile of pixel values falls within the acceptance gap of the target value.</p>  |
| CONFORM TRIES | <p>This specifies the maximum number of attempts that the auto exposure logic can use while attempting to acquire an image that conforms to the target values set up for the auto exposure algorithm, before considering the image as conforming. This parameter is only valid when the ImageMustConform value is set to 1 or true. The default value for this parameter is 6 (for DPM – 3), the minimum value is 1 and the maximum value is 8.</p> |