

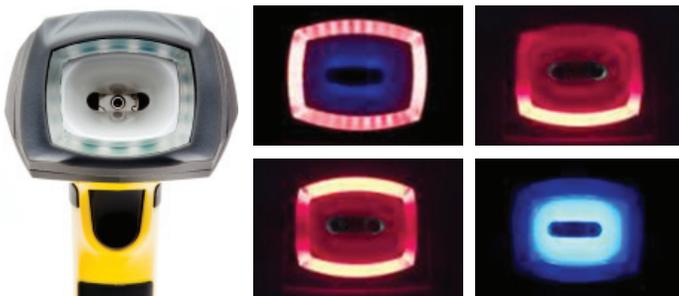
UltraLight Integrated Illumination for DPM Reading



Introduction

Integrated, patented UltraLight® illumination technology provides optimal lighting for DPM (Direct Part Mark) codes on a variety of surfaces. Dot peen, ink jet, laser etched, on glass, smooth or rough metal or on shiny curved surfaces — **we can read it!**

Both the DataMan® 8500 handheld ID readers, as well as the DataMan 9500 mobile computers, feature UltraLight technology. This tech note will explain how integrated lighting technology can help you achieve higher read rates with DataMan handheld readers.

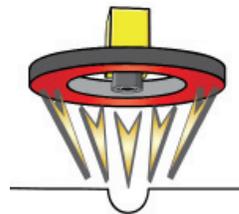


Understanding DPM Illumination

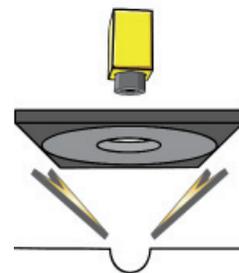
Before your ID reader can find the code and extract the data; it must be able to see it. So the first step in reading a Data Matrix code is to illuminate it. Light angle and direction, surface finish, shape and color all determine how the mark is seen by the reader. Applying the optimal lighting improves reading reliability, speed and ease of use of the ID reader.

When codes are printed with high contrast such as dark printing on a white background, even the most basic barcode imager can read the code. When codes are permanently marked onto a part by dot peening, laser marking, electro-chemical etching or inkjet printing, however, challenges can arise: low contrast, poor print quality or damage due to the part's interaction with manufacturing processes. These DPMs require special lighting so that the imager can find and decode the mark within the field of view.

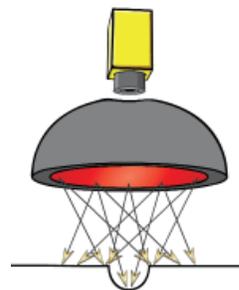
There are three primary types of lighting used in DPM applications:



1. Bright Field Lighting. Light projects at 90 degrees to the marked surface and then reflects back up into the imager, giving a basic lighting effect on the marked surface. Most readers on the market today use simple bright field lighting which can handle many high contrast labels and marks.



2. Dark Field Lighting. Light is projected at low angles (30-45 degrees) to the marked surface and then reflects back up into the imager. This effect creates contrast for dot peen or laser marks that are difficult to see in bright field lighting.



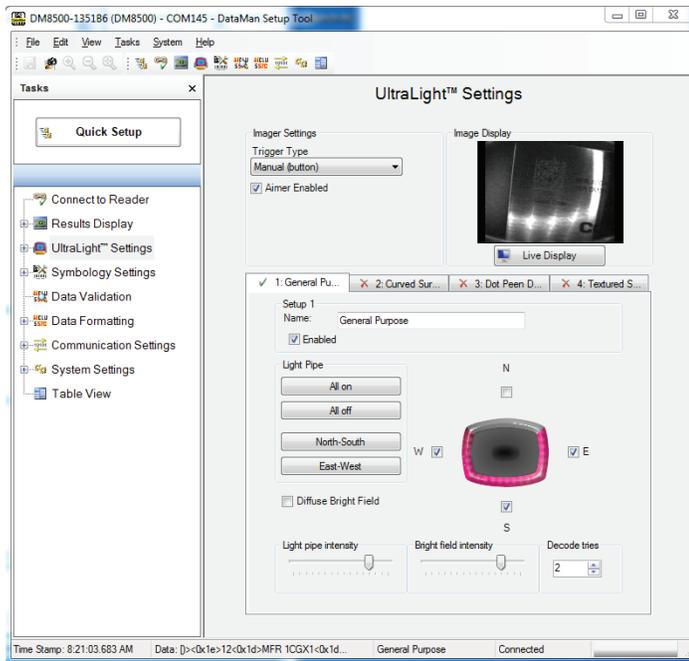
3. Dome Lighting. Also known as *cloudy day* or *diffused off-axis* lighting, this effect projects light from many different directions to negate shadows. This technique is ideal for providing even lighting across a curved reflective surface to simulate a flat object.

UltraLight Illumination and the Industry-leading Algorithm

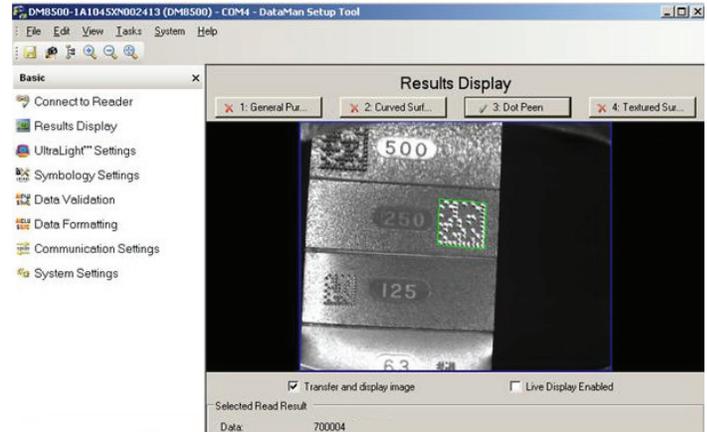
Cognex UltraLight integrated illumination provides all three different types of lighting techniques used for reading DPM codes. You can make adjustments to the UltraLight settings electronically, using the software interface. Additionally, the reader can be set up to toggle between multiple lighting configurations.

The DataMan Setup Tool provides four preset configurations out of the box. You have the ability to customize these save sets, even to rename them.

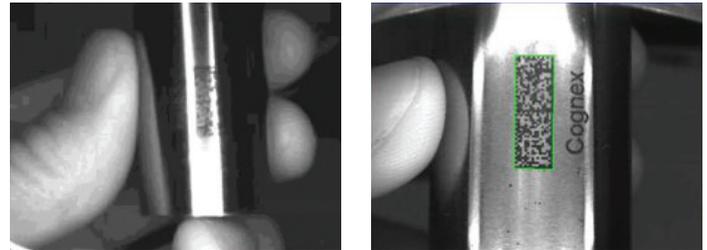
The DataMan handheld readers are also optimized with the Cognex 2DMax™ algorithm for continuously high read rates. With the proper lighting, 2DMax handles a wide range of marking types and degradations to the appearance of 2-D DPM or printed codes no matter what the cause or surface.



You may customize the UltraLight settings by turning on and off lighting quadrants and adjusting the light intensity to suit your own requirements.



The Dot Peen setting creates a dark field lighting effect to make the cells appear bright and easy to decode against a textured surface.



This stainless steel cylinder has an electrical chemical etched mark. Standard bright field lighting (left) creates too much specular interest to be able to read the code. The Curved Surface setting (right) creates an even lighting effect to make this challenging part easy to read.

Four UltraLight Illuminations Settings

You may use one of these preconfigured settings or make adjustments for your own challenging situation.

- 1. General Purpose.** Start here for high contrast DPM codes using bright field illumination.
- 2. Curved Surface.** Create a dome or cloudy day lighting effect for shiny curved parts.
- 3. Dot Peen.** Use a low angle or dark field lighting effect to illuminate a dot peen Data Matrix code.
- 4. Textured Surface.** This setting works well for a variety of surface textures.

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