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HTC ONE (M8) DUO CAMERA WHITE PAPERS

INTRODUCTION

In a few short years, the smartphone has become the predominant image-capturing device for millions of people. At **HTC**, we are continually striving to offer customers the most convenient, capable, and versatile camera that satisfies both everyday and professional photographers. To that end, we are developing new ways to leverage the processing capabilities in our smartphones in order to make our cameras smarter. This not only leads to improvements in photo quality, it opens up a host of new possibilities for imaging.

HTC CAMERA INNOVATION IN THE LAST THREE YEARS

2012

HTC introduced its groundbreaking smartphone camera features including **VideoPic** and **Continuous Shooting**. **VideoPic** enabled simultaneous still-image capturing and video recording, while **Continuous Shooting** introduced advanced burst photography.

2013

Instead of engaging in a war of megapixels with other manufacturers, **HTC** chose to focus on technology that offered the best image quality. This yielded the introduction of **HTC's UltraPixel** Camera. Using a highly-advanced CMOS Sensor, ISP, and optical lens system with larger pixels, the **HTC UltraPixel** Camera captures significantly more light than most 8 or 13 megapixel cameras. The results are stunning, offering vivid, true-to-life images with a wide range of colors that can be captured even in low light conditions.

2014

The next evolution in smartphone cameras, the **HTC One (M8) Duo Camera** brings high-quality DSLR effects to a smartphone. This is accomplished by a number of new innovations, most notably the **HTC One (M8)**'s unique dual lens camera system.



The extra BSI Depth Sensor creates a dynamic depth map that enables a whole new range of features, and produces more emotionally engaging photos.

HTC ONE (M8) DUO CAMERA SPECS

- BSI sensor
- Pixel size 2.0 um
- Sensor size 1/3"
- f/2.0
- 28mm lens
- HTC ImageChip 2
- 1080p Full HD video recording with HDR video
- Secondary camera: capture depth information

Front Camera

- 5MP
- f/2.0
- BSI sensor
- Ultra-wide angle lens
- HDR capability
- 1080p full HD video recording

Gallery with **UFocus™**, **Foregrounder**, **Dimension Plus™**, **Seasons**, **Image match**.

This White Paper describes the key components of the HTC One (M8), which includes:

- **DUO CAMERA**
- **SMART STABILIZATION**
- **UFOCUS**
- **FOREGROUNDER**
- **SEASONS**
- **DIMENSION PLUS**
- **DUO FLASH**
- **HTC ULTRAPIXEL**

DUO CAMERA: TRUE PORTRAIT PHOTOS

The **HTC One (M8)** camera utilizes a dual lens and sensor configuration coupled to a 'next-gen' ISP and CPU. **Duo Camera** technology mimics the stereoscopic vision capabilities of the human eye –two independent lenses allow it to detect and calculate the relative distance of subjects in the image.

The imaging system then assigns properties to each individual pixel, which allows them to be re-purposed and reprocessed to maximize image quality.

Duo Camera technology produces images previously beyond the reach of smartphone camera systems. For instance, the camera can now accurately emulate the look of high-end lenses and dedicated professional camera systems. It enables “*pro look*” images with finite shallow depth-of-field control and captivating ‘bokeh’ and focus fall-off, which is particularly effective in portraits.



DUO CAMERA: TRUE PORTRAIT PHOTOS

Duo Camera offers the ability to choose an alternate focal point post-capture to recompose an image.

ORIGINAL



DUO CAMERA



SMART STABILIZATION: ENHANCED SHAKE REMOVAL

Conventional image stabilization is incompatible with stereoscopic rangefinder technology, therefore the **HTC One (M8)** uses smart stabilization. A new ISP paired with the **UltraPixel** sensor enables performance that rivals the traditional Optical Image Stabilization in last year's platform. Smart stabilization enables a host of new features, detailed below.

UFOCUS: ADJUST FOCUS - EVEN AFTER YOU SHOOT

With **UFocus**, the camera automatically captures depth information with every snapped picture. This allows the user to select the object or area of focus after the photo is taken.

Additionally, **UFocus** uses the depth data collected by the dual lens system to allow for professional-looking portraits. With just a tap, a user can easily add an artistic blur effect known as "*bokeh*" around a subject. One can also refocus on any person or object in a photo.



FOREGROUNDER: PHOTOS WITH MORE EMOTION

Foregrounder is designed to emphasize the subject in a photo by de-saturating the image, separating colors, and adding other effects like motion blur. The result is a subject with more presence and expression.



SEASONS: EFFECTS FOR ALL SEASONS.

Add an animated seasonal theme for any photo – snowflakes, dandelion seeds, autumn leaves, or snowflakes. The color temperature of the photo is adjusted to match the season.



DIMENSION PLUS: CHANGE YOUR VIEW

The dual lens system allows for a parallax view, enabling the viewer to see photos from different angles, even the sides that are typically not visible, simply by tilting the device.



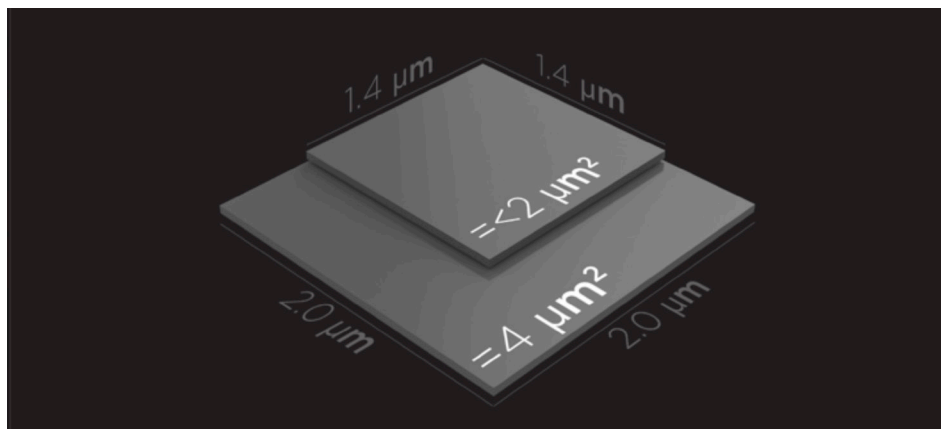
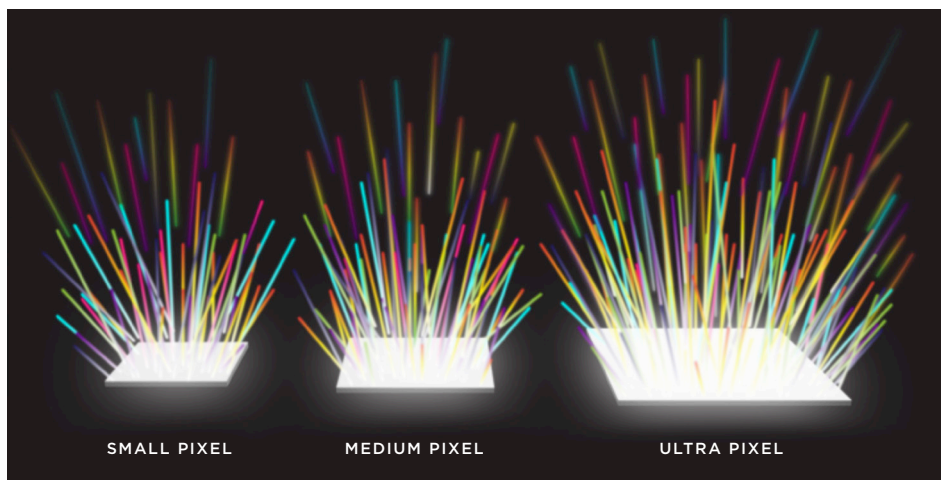
DUO FLASH: LIFELIKE PHOTOS EVERY TIME

The twin LED **Smart Flash** system is designed to vastly improve flash photos, eliminating the overblown glare and unnatural color of typical flash systems. It works by making an instant light reading and firing the cool and warm LEDs in one of over a five hundred unique color temperature combinations that best match the scene. This results in precisely controlled exposures, yielding more true-to-life pictures with vivid, authentic colors and especially accurate skin tones, even in difficult lighting conditions.

HTC ULTRAPIXEL: BETTER PHOTOS IN LOW LIGHT

Last year, the **HTC One (M7)** proved that pixel size is just as important – if not more so – than pixel count. Extremely positive feedback from professional photographers, industry experts, and **HTC One (M7)** customers have confirmed that UltraPixel technology delivers amazing images.

Building upon the success of the UltraPixel performance in the **HTC One (M7)**, the **HTC One (M8)** includes a refined **UltraPixel** sensor while retaining the 2.0UM pixel size. It enables each pixel to capture up to 300% more light than some leading 8 and 13 megapixel cameras. The result has pushed image quality to even higher levels. Because larger pixels record more light and data, captured photos more accurately display a wider range of colors and shades.



FASTER FOCUS, BETTER RESULTS

One of the keys to taking a great photo is focus time. The shorter time it takes to focus, the greater chance of capturing the moment without blur. The **HTC One (M8)** uses advanced technology that greatly improves focus performance in a number of scenarios: when one is trying to launch the camera and quickly capture a shot, when refocusing from near to far, and when using continuous auto-focus to track a moving object.

The **HTC One (M8)**'s redesigned auto focus system is faster than ever, capable of focusing in 0.3 of a second.

NEVER MISS A MOMENT

HTC One (M8) senses certain motions. When the phone is picked up in landscape orientation the camera automatically launches by simply pressing the volume button.

SHARPEST PHOTO SELECTOR

When the shutter clicks, the camera examines the queue of images to find the sharpest one. So the photo one sees after pressing the shutter will always be the best possible one.

CONCLUSION

By combining the latest advances in Qualcomm's S4 Image Signal Processor with **HTC**'s proprietary image-processing technology, the new camera on the **HTC One (M8)** raises sharpness, improves noise reduction and elevates overall photo quality to levels previously unseen.

The enhanced performance and smart algorithms will give amateur photographers confidence that they'll get the best photo with every click, and will give professionals a new enhanced tool with which to practice their craft.