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Detailed explanation: why Zhou Dongyu's BOE screen is not as good as Samsung screen

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As we all know, Samsung is already the display manufacturer with the highest market share in the world, while the domestically produced BOE is second only to Samsung.

Recently, BOE has even received Apple's approval and has successfully supplied displays for the iPhone 13 series.

Nevertheless, many netizens who are concerned about the mobile phone industry dislike the BOE screen and feel that it is inferior to the Samsung screen. One of the biggest reasons is that BOE's screen uses Zhou Dongyu's arrangement.



But many people only know that the BOE screen arranged by Dongyu Zhou is not as good as the Samsung screen arranged by diamonds, but they don't know why.

Let's explore why this is exactly what happened below.

First of all, many people know that the screen resolution actually refers to the number of horizontal and vertical pixels.

The three primary colors in the display field are red, green, and blue. The various colors we see on the screen are displayed by the light combination of these three colors.

Therefore, the pixel point is composed of the sub-pixel arrangement of three colors of red, green, and blue.

However, the previous LCD screens used a backlight to emit light uniformly, and there would be no difference in the life of the sub-pixels of the three primary colors. As a result, most of the LCD screens can use RGB to arrange the sub-pixels.

R is red, G is green, B is blue, RGB arrangement means that the sub-pixels of the three colors are the same, and the area is often the same.

The OLED screen is different. OLED does not use a backlight to emit light uniformly, but each sub-pixel can emit light independently.

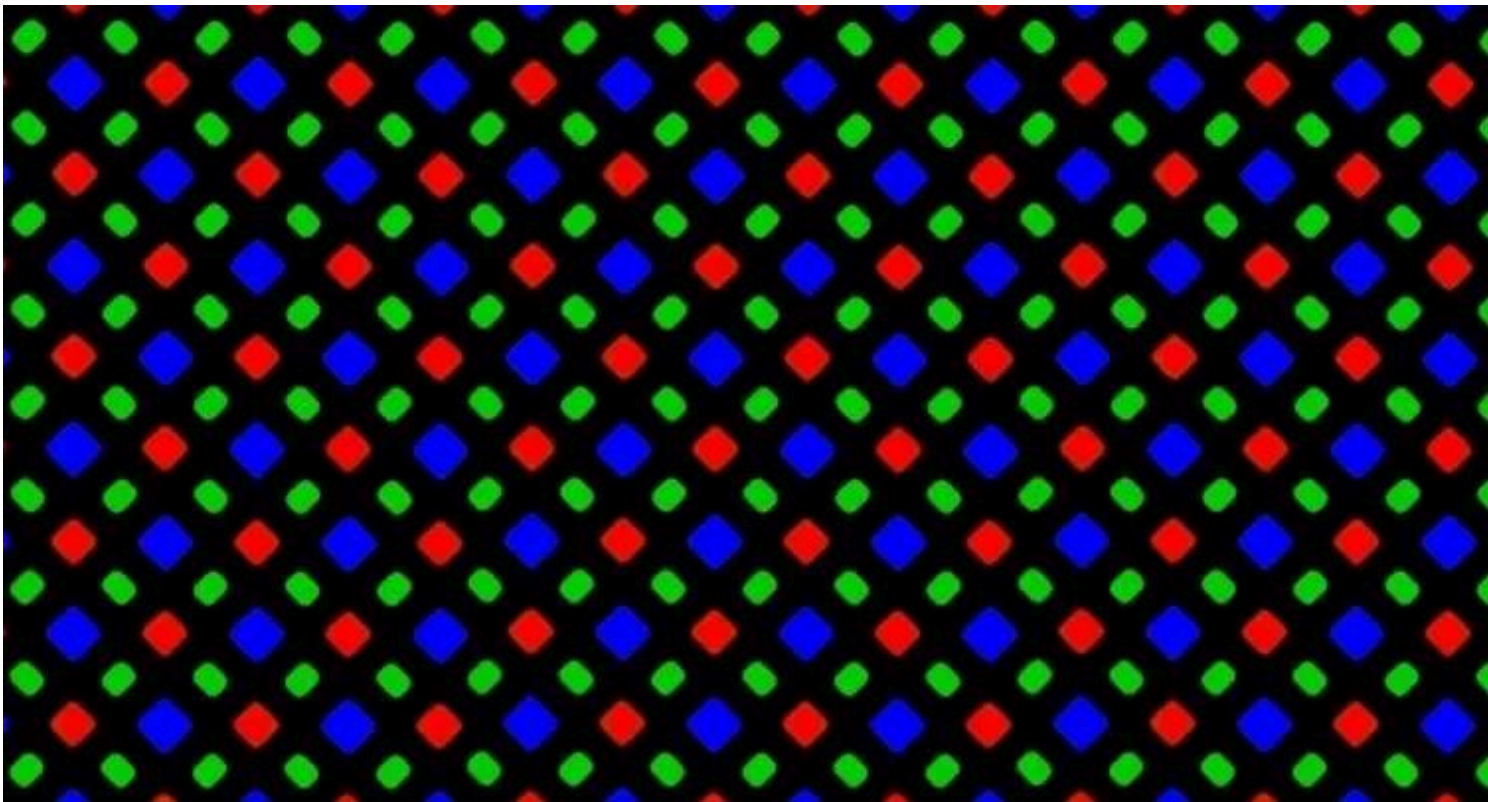
However, there is a disadvantage that the lifetime of the luminescent material of each color sub-pixel is different, and the blue luminescent material has the shortest lifetime, so it will wear out faster.

Then, in order to maintain a consistent life span, the blue sub-pixel area will be made larger.

Therefore, OLED screens cannot directly use RGB arrangement, so various manufacturers have made various arrangements.

Among them, the arrangement of Samsung is as follows:





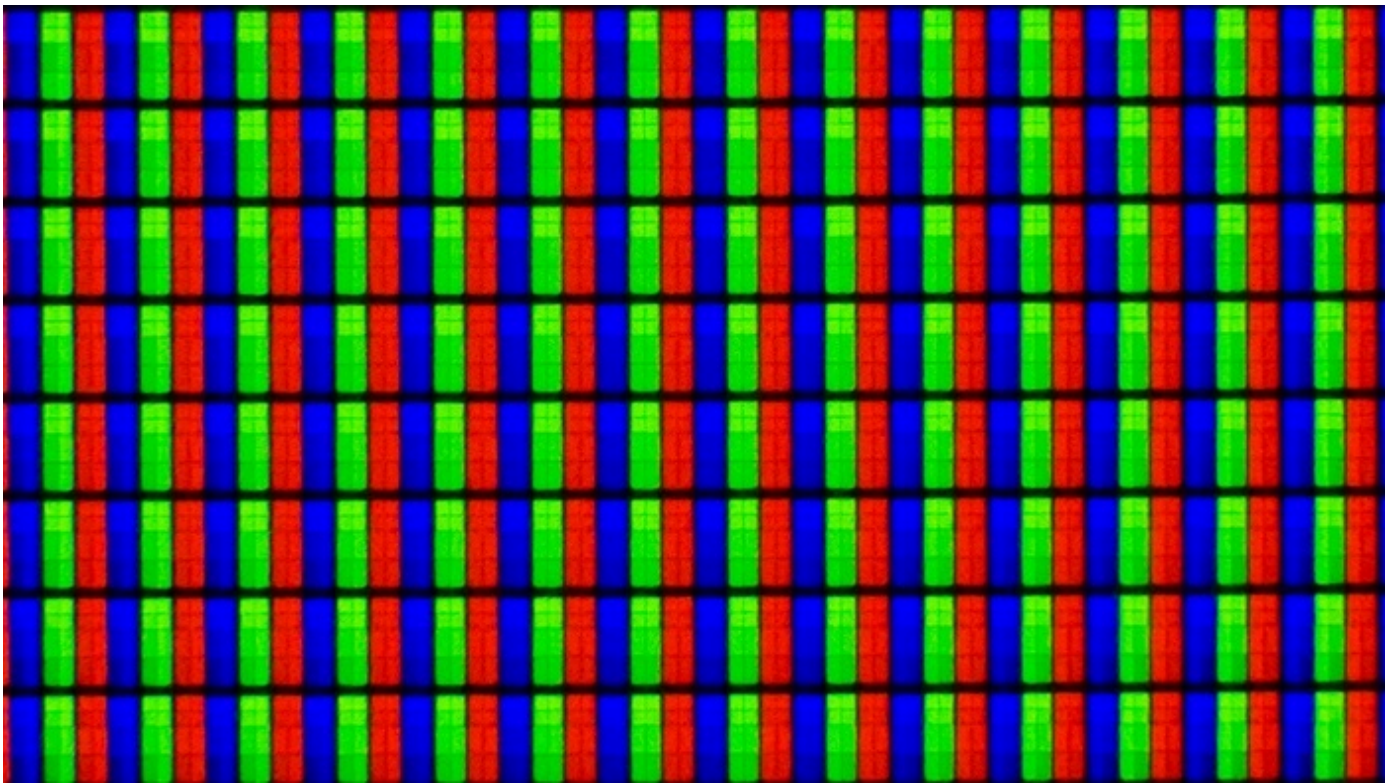
Blue is the largest, red is the second, and green is the smallest, but the number is the largest. Because this way is arranged in a diamond shape, it is called a diamond arrangement.

Since blue has the largest single area and green has the smallest area, it also has the most sub-pixels.

The red and blue sub-pixels need to be shared with adjacent pixels due to their small number.

The nominal number of pixels is based on the green sub-pixels, that is, there are a few green sub-pixels and just a few pixels. That is to say, in the case of the same number of pixels, the number of red and blue sub-pixels in the diamond arrangement is not as good as the RGB arrangement.

The RGB arrangement is shown in the figure below:



It can be seen that the area and number of sub-pixels in the three colors of the RGB arrangement are the same.

This makes the number of red and blue sub-pixels of the LCD screen with RGB arrangement at the same pixel point will not decrease, so it can display more delicately than the OLED screen with non-RGB arrangement.

When OLED is arranged in non-RGB arrangement, the number of red and blue sub-pixels will be reduced under the same pixel point, and the actual display effect is not as good as LCD. Therefore, an equivalent PPI is born.

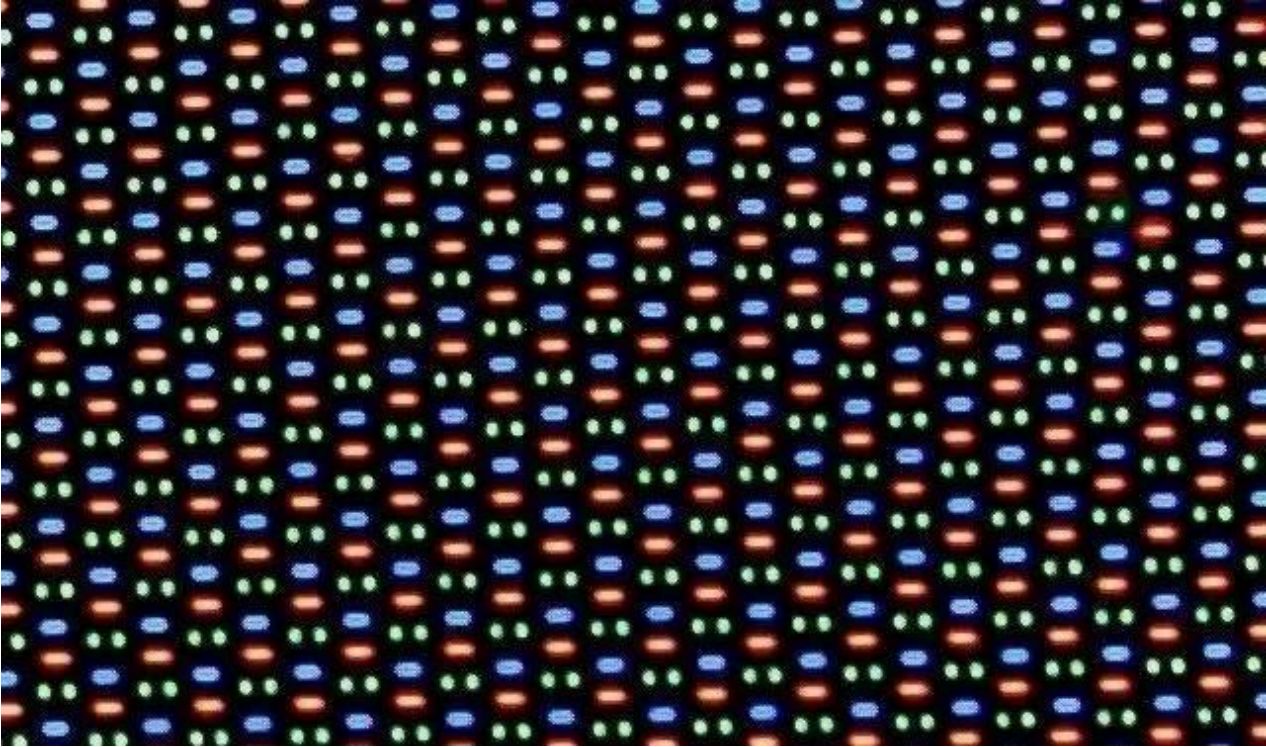
PPI refers to the number of pixels per inch, and the equivalent PPI will have a conversion formula. On a non-RGB array of OLED screens, the conversion will be a value consistent with the effect of an RGB array of LCD screens.

It can be seen from the above that Samsung's diamond arrangement is not as good as the SRG arrangement on the LCD screen, so is BOE's arrangement inferior to the diamond arrangement?



Yes.

Let's look at the following picture first:



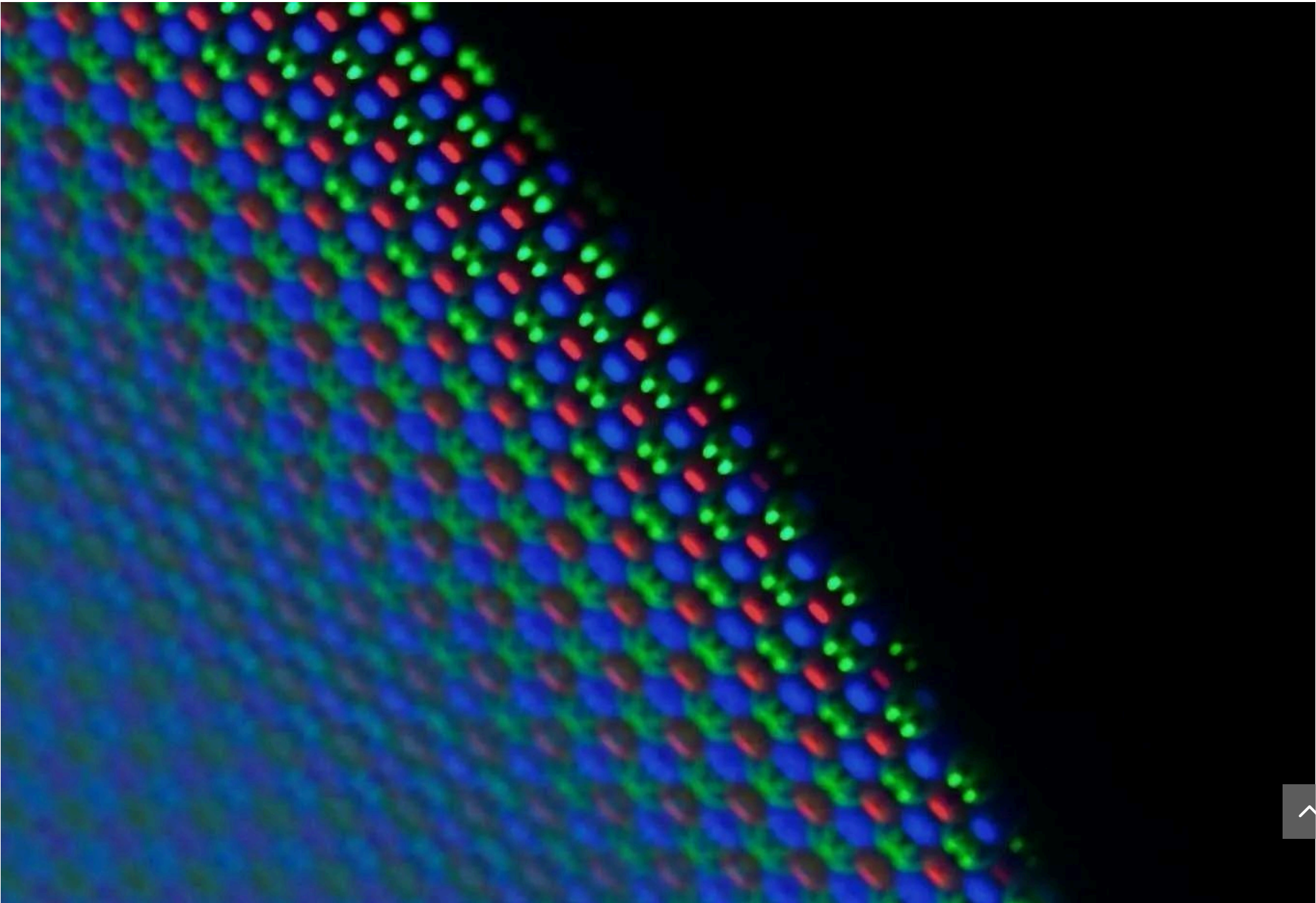
Because Zhou Dongyu's arrangement divides the green sub-pixel into two parts, it also has the most green sub-pixels, and the red and blue sub-pixels are also reduced.

But one of the biggest problems with Zhou Dongyu's arrangement is that the arrangement of sub-pixels is not uniform. Although there are two green sub-pixels very close to each other, the other sub-pixels are far apart.

The OLED screen is to control each sub-pixel to emit light, and display various colors after mixing with other sub-pixels.

However, if the distance between the sub-pixels is too far, there will be a coverage problem, and the display effect of the far away area will deteriorate.

In addition, if the edge of the display area is just divided into the gap position of the sub-pixel arrangement, it may cause the sub-pixels of a certain color to emit light at the edge position. (The edge of the picture below:)



Therefore, in the case of the same nominal PPI, the display effect of RGB>Samsung diamond arrangement>BOE Dongyu Zhou arrangement.

Of course, many people always feel that BOE's screen effect is not as good as Samsung, so using BOE is to secretly save costs.

In fact, it is not. The most important factor that affects the cost of the screen is the material, labor, and yield rate, rather than the pixel arrangement.

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