

Discussion on 4K Video Technology

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Keywords: 4K, Imaging Technique; Video Products

Abstract. When many people are still praising the amazing screen of new iPad, a kind of imaging technology with twice higher resolution ratio, 4k, enters into our sights. At present, SONY, Canon, Toshiba, sharp, JVC have released 4k video products, including flat-screen televisions, monitors, video camera, projector and other terminals. Although high prices and the lack of auxiliary products make it need more time to enter into the mainstream market, 4k video products, as the future development trend of the video display products, is the existence which can not be ignored.

Introduction

4k images mainly refer to the image with 3840 x 2160 pixel resolution, expanded the full HD resolution twice in both horizontal and vertical direction. The UHD (ultra high definition, ultra-high resolution) has become the official name of the 4k. In fact, there is another definition of 4k image, which is the image with higher horizontal resolution of 4096 x 2160 pixels. The resolution is defined for digital cinema by film industry groups.

If you'd like to know 4k product, you should start from of the relevant standards about 4k images first. The size of the image can be represented with pixel resolution, for example, the 1920 * 1080 resolution means that the image is 1920 pixels by the horizontal line and the vertical column is made up of 1080 pixels. For the reason of convenient communication, the industry often express the size of the image with the image pixel values on the horizontal direction, and in order to simplify the communication process, "K" is usually used to describe the pixel values, among them 1K is equivalent to 1024 pixels, a few K refers to the image pixels on the horizontal line reach or is close to several times of 1024.

The dynamic development of 4 k technology

Nowadays, 4k resolution in the domestic technology engaged by TV, telecom operators and home appliance manufacturers refers to 3840*2160 pixels. The pixel of 8k image developed by Japanese broadcasting association (NHK) with the name of SHV is four times of 4k images.

In addition to Japan, other countries also went into action. In January 2013, SONY announced that it would send services of 4k video in the USA in this summer. South Korean public radio and TV station KBS is preparing for carrying out the test broadcasting 4k video in microwave digital TV. Samsung electronics and large-scale VOD (video on demand) providers are also doing the test of sending 4k images. What's more, in addition to in television, 4k video playback function is also added in smart phones, tablet and other portable terminals.

Since the liquid crystal display technology era, the development of high-resolution screen has never stopped, even faster in recent years. Whether mobile phone, tablet PC, laptop or display, high resolution has been widely applied in the current mainstream products. The reporters get that, in the category of the monitor, the 2k (screen resolution reach 2560 x 1440 or 2560 x 1600) products are very rich, and the market is also very mature. However, as the high-end users pursue the display resolution endlessly, the consumer groups are growing, currently including SONY, Toshiba, Panasonic and other companies have introduced the display products supporting 4k resolution. Through showing you can see, 4k product has better performance, and the delicate degree of the

picture is extremely increased. The personage inside course of study says, 2k market has been fully mature and reaches boiling point at present, and 4k will outbreak and make people's family entertainment experience to upgrade again.

So many facilities, such as content, storage, playback devices limit the rapid popularity of the 4k, but there is no doubt that 4k resolution still has a positive effect in the display area, whether in the domestic field, or in a smaller screen, 4k is needed. As technology advances, 4k will walk into homes one day.

Difference between 4K video technology and 2K video technology

The difference between 4k and 2k is not just the ascension of resolution. although the change of the resolution is the most intuitive feelings brought by 4k to people, at the same time, it also makes people ignore other important elements containing by 4k image, such as sampling method and frame frequency, color gamut and quantitative depth, high bit rate with the high storage requirements, and more abundant stereo effect matching with vision field. And these elements are crucial to enjoying the best telepresence and real sense according to human visual properties, visual angle and viewing distance. If closely look at existing 2k resolution pixels, the image "particles" is still serious. At the same time, HD resolution image can not meet the requirement of presence and reality after video compression, but compared with the 2k, visual angle of 4k has been greatly enhanced.

Compare 4k with 2k TV, the difference is resolution. The resolution of 4k TV is 3840 * 2160 while 2k TV is 1920 * 1080. With pixel, 4k television is 8.2944 million pixels while 2k is 2 million pixels. The pixel of the former is four times than the latter, so 4k TV resolution is much higher than 2k television. Broadly speaking, in addition to the resolution, the color gamut of the 4k television coverage, contrast, brightness, interface, image display format, features and other performance indicators are superior to the 2k TV, especially the 4k TV is very strict in clarity and wide color gamut.

Specifically, the color of 4k television is richer and more nature than 2k TV, definition is more exquisite, you can even see clearly the fiber pores of the figures, which is not exaggerated. It is true that (the premise is 4k TV screen is large enough, at least 55 inches, otherwise the thrill of feeling will significantly reduce), and support more pictures, video, music files in different formats.

4k video technology products

Recently, many new home theater projectors have launched in the market, 4k VPL - VW1000ES projector, the world's first civilian level brought by Sony, is most prominent. In fact SONY developed SXR chip with 1.55 inch and 4k level as early as the year of 2004, then applied at the projectors of business level. This year, through the design and transformation of the technical, SONY has developed a new SXR chip with 0.74 inch and 4k level, precision of the pixels reaching 4 um, making the overall size of the projector reduce to the level of ordinary home theater projectors, thus promoting the VPL - VW1000ES projection to enter into ordinary families earlier.

Today, including SONY, Panasonic, Sharp, Samsung, LG, Hisense, Skyworth, Konka, Haier, TCL, Lenovo and other domestic and foreign manufacturers have introduced different sizes of 4k TV set. In the market, TV variety is rich, including 4k TV with 85 inch super size and those with 39 inch. The author required on Jingdong mall that the cheapest TV with 39 inches launched by konka only sell 2899 Yuan. Perhaps a few years ago we mentioned words about "full hd", "3 d" when talking about the TVs, but now 4k TV television industry has become a new swimmer. To buy a 4k TV at home does not need too much.

In recent one or two years, 4k TV sets of 50 ~ 60 inches have been appeared on the market, but actually, more and more people have watched 4k images on 4k TV. Through ordinary image size put at home, we can also experience the third dimension based on high resolution and the real sense like looking at photographs.

The development bottleneck of 4k technology

Some people think that, although 4k format is good, some films such as cartoon do not necessarily require 4k image quality due to the pattern problem of 4k and 2k. Because animated film does not need so much information as 4k, the 4k production cost is also too high, and projection equipment also needs to upgrade. In order to send 4k images to families, it not only needs to develop and manufacture receivers, but also needs to introduce commercial radio and television equipment supporting 4k video, which requires increasing the initial investment. Therefore, the threshold of the ultra fine imaging services service operators involving in is very high.

With the increasing of pixels, dynamic late film editors will fall into dilemma. Whether ordinary home computer can smoothly edit 4k images remains to be tested. The problem of storage capacity limit also needs a breakthrough. 4k is a double-edged sword, which can allow the users to obtain high resolution images, but also bring troubles to the ordinary consumers in the late edit and storage. How to solve these two problems, is also worth digital camera manufacturer considering. After all consumers having no digital single lens reflex are ordinary consumers, and home users are the main. Fool editing software is more enjoyed by this kind of people. To solve the troubles at present, the age of 4k video civil stage will come true. In addition, due to too high price and too little content and other bottlenecks, 4k high-definition TV still needs some time to truly realize population. If not reach the designated position, probably like OLED TV, early enter into the market, and do not appear in the color TV market until now .

Conclusion

Because of the development of science and technology, 4k video technology develops fast and becomes popular, and we can feel more clearly visual feast. As new home theater projectors release in the market, 4k video technology has gradually entered into the ordinary family, which will be a huge market development space. But there are many problems, like high cost of 4k image production, big previous input. How to improve the quality of infrastructure, reduce the cost of 4k video production, and make full use of the service brought by 4k image resolution, need video service providers and home appliance manufacturers to take the lead in development. From the point of the development trend of flat TV, 4k technology will become the focus of the development of color TV sets. After all, TV as the tools, the quality is the most concerned problem. And 4k picture resolution is very high and the screen size is also large. The author thinks that, only 4k high-definition TV is more and more rich in the film source, and the price is more civilianized, the comprehensive popularization is just around the corner.

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