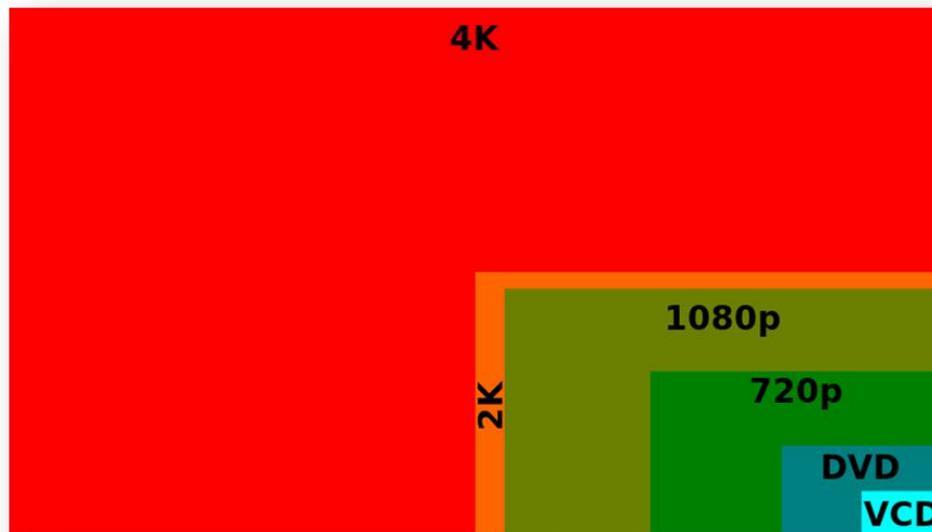


## Introduction of 6G SDI/12G SDI Baseband Signal Uncompressed Transmission Solution

### About digital pixel resolution:

First, for the perspective of resolution (digital pixel), it develops from standard definition to high definition, from past 720x576 to present 1920x1080, and the aspect ratio changes from 4:3 to 16:9, which is familiar to us. 4K is factually based on high definition, and is called "Ultra HD". From 720x576 of 0.4 mega pixel to high definition 1920x1080 of about 20 mega pixel, the resolution of 4K increases four times, which increases from 1920x1080 (1080p60) to 3840x2160 (2160p60), namely, 1920x2 in horizontal direction, 1080x2 in vertical direction, so the resolution totally increases four times. Then what remains changed? It is the aspect ratio, still 16 to 9. Why is it called QFHD? Q represents QUAD, which means four times, F represents FULL, and QFHD means quad full high definition.



**Mainstream 4K ultra HD baseband signals in current market fall into two kinds:** one is 6G/12G-SDI serial digital ultra HD baseband signal for film industry, such as the broadcast-level market, such signal is mostly applied to television stations and broadcast studios, etc.; the other is parallel HDMI1.4/2.0 ultra HD baseband signal for consumer terminals, such as consumer-level camera, game machine, HD digital set-top box and other digital video



output. The following mainly introduces digital video SDI interface.

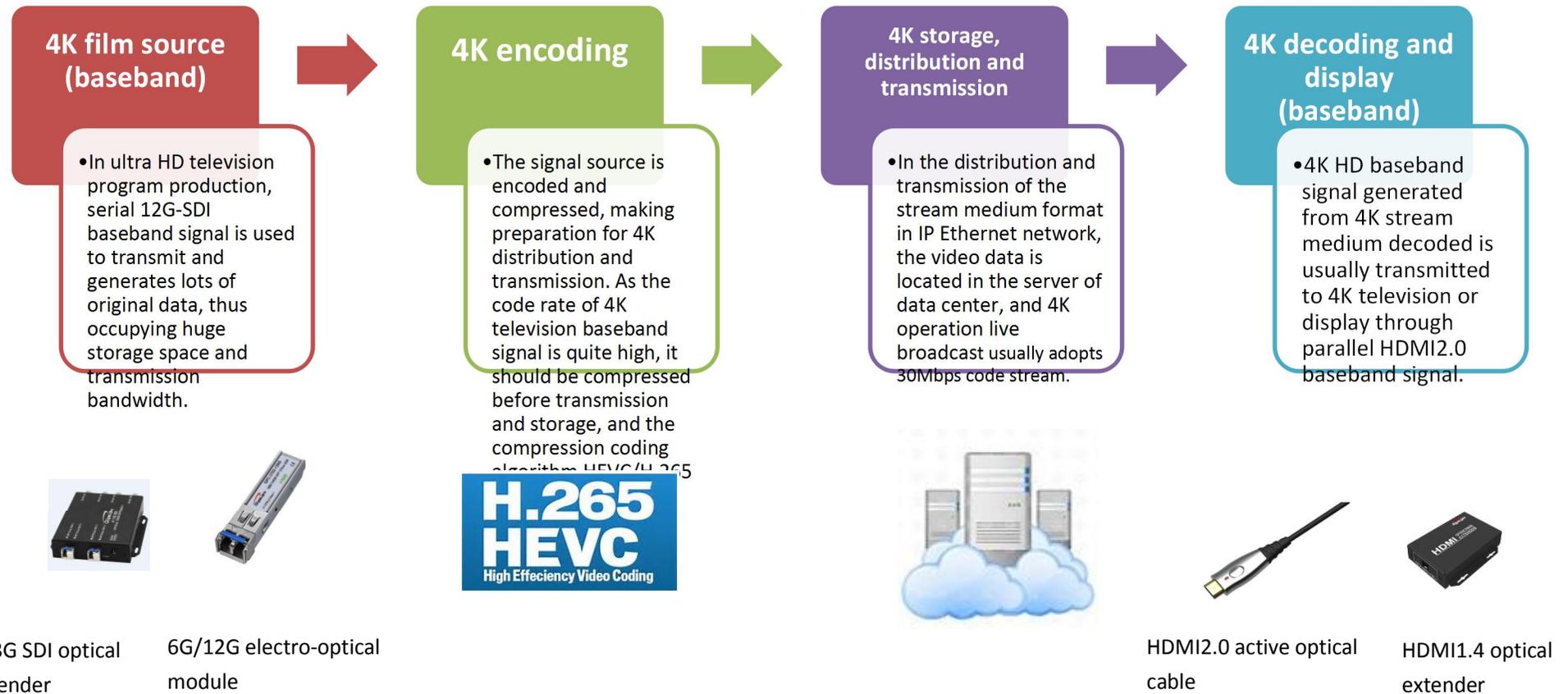
### Digital video SDI interface:

SDI interface is the acronyms of serial digital interface, which is a digital video interface standard established by SMPTE (Society of Motion Picture and Television Engineers). SMPTE is an international organization specialized in preparation of SDI standards, and at present all SDI standards are established by it.

Such serial interface can transfer the bits of data words and corresponding data through the single channel sequence. The serial digital signal belongs to digital baseband signal, and as its data rate is very high, it must be processed before transfer. SMPTE officially published the serial data interfaces 6G-SDI and 12G-SDI in 2015. 6G-SDI is oriented to 2160p30 application, which refreshes 30 frames of pictures per second. While 12G-SDI is oriented to 2160p60 (known as true 4K) application, which refreshes 60 frames of pictures per second.

Standard	Name	Release Time	Operating Rate	Digital Video Format
SMPTE 424M	3G-SDI	2006	2.97 Gbit/s	1080p60
SMPTE ST-2081	6G-SDI	2015	6 Gbit/s	2160p30
SMPTE ST-2082	12G-SDI	2015	12 Gbit/s	2160p60 (true 4K)

**4K ultra HD television ecosystem includes:**





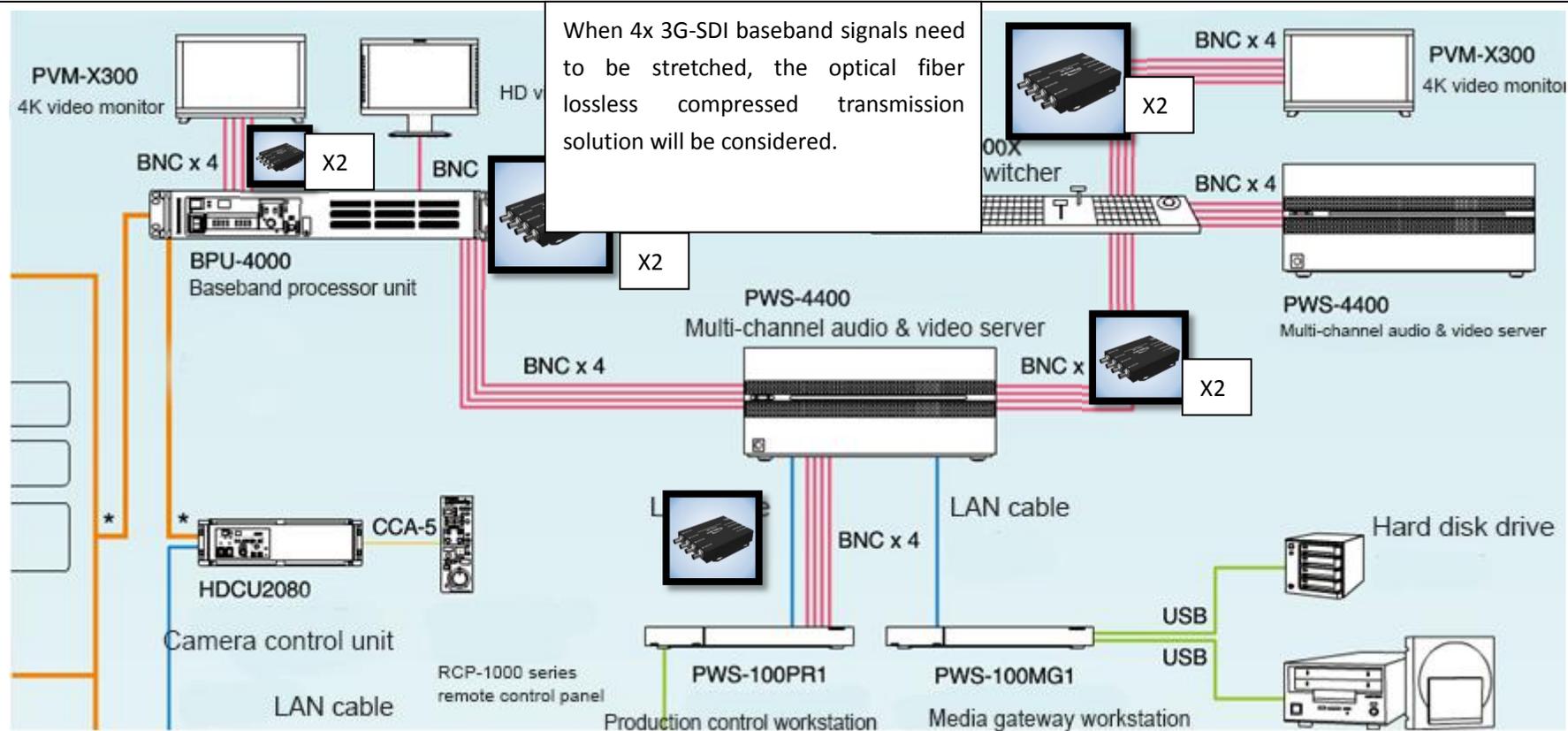
深圳市易飞扬通信技术有限公司  
Shenzhen Gigalight Technology Co., Ltd

Optical interconnect technology innovator

[www.gigalight.com](http://www.gigalight.com)

### **Application of 4K ultra HD baseband signal, production process of 4K film source:**

In the recording of 4K programs of film industry and broadcasting stations, they mostly adopt the professional 4K HD camera and editing system. In the present market, most HD 4K professional cameras employ four-way BNC to concurrently transmit 12G SDI HD signals, which belongs to 4x 3G-SDI parallel mode. For example, SONYPMW-F55 4K camera currently adopts such digital video interface. Currently 4K HD video is used, 60-meter high-quality cable is trial-tested in rebroadcasting, and it can meet the requirements of transmission, and one-way 3G SDI signal stretched 60 meters is close to the limit, otherwise there will be problem with image quality.

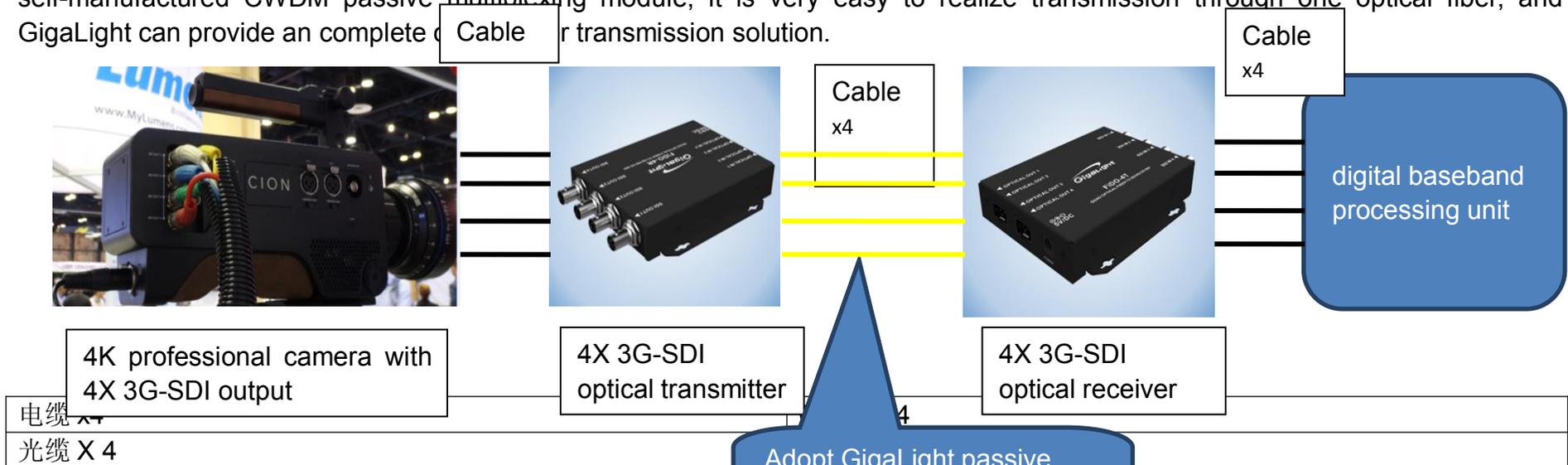


### Why choose GigaLight 4x 3G-SDI optical extender?

In the test, please pay attention to the compliance of mapping and format of baseband signals on SDI, rationality of transmission time delay between SDIs, and compliance of electrical characteristics of SDI interface.

The baseband signals are usually transmitted through SDI interface or optical fiber interface, which includes single link, dual link, four link and so on. At present stage, 4K baseband digital signals of China mostly adopt four-link 3Gbps SDI transmission form. Therefore, the test mainly aims at the data format in 3Gbps SDI signal, electrical characteristic indexes of interface, and time delay differential among four 3Gbps SDI channels. The signals among four 3Gbps SDI channels may not be totally synchronous in case of tiny difference in the links of signal processing and physical transmission, and when the situation is serious, the image might be abnormal. Therefore, GigaLight performs strict tests and ensures the relative time delay of signals among various channels is within a reasonable range.

Four-way optical fibers among 4X 3G-SDI optical extenders can adopt GigaLight 3G CWDM optical module and self-manufactured CWDM passive multiplexing module, it is very easy to realize transmission through one optical fiber, and GigaLight can provide a complete Cable or transmission solution.



For 4K ultra HD baseband application, GigaLight also develops single-way 6G SDI optical module/electric module, and single-way 12G-SDI optical module/electric module, and they will be widely applied to uncompressed transmission systems, such as 4K digital matrix, 4K optical transmission equipment and even 4K camera, as shown in the figure below.

