

What is an SDI Signal? Classification, Characteristics, and Applications of SDI Signals

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Introduction

In the field of video transmission, SDI (Serial Digital Interface) signals are a widely used digital video transmission standard. Known for their high speed, high fidelity, and low latency, they play a crucial role in various domains such as broadcasting, film production, and video surveillance. This article will provide a detailed introduction to what SDI signals are, their classification, key characteristics and advantages, as well as common application cases.



What is an SDI Signal?

Classification of SDI Signals

SDI signals can be classified into various types based on the different supported interface transmission rates. Different SDI interface types correspond to different defined standards and video parameters. The common types of SDI signals are shown in the figure below.

名称	标准	传输速率	视频参数
SD-SDI	SMPTE 259M	270 Mbit/s	720x576
HD-SDI	SMPTE 292M	1.485 Gbit/s	1080p 30Hz
3G-SDI	SMPTE 424M	2.97 Gbit/s	1080p 60Hz
6G-SDI	SMPTE ST-2081	6 Gbit/s	4K 30Hz
12G-SDI	SMPTE ST-2082	12 Gbit/s	4K 60Hz

1. **SD-SDI:** A trusted SDI variant, its full name is Standard Definition Serial Digital Interface, corresponding to the SMPTE 259M standard. SD-SDI supports various bitrates: 270, 360, 143, and 177 Mbit/s. This diversity allows it to handle different video quality levels. In terms of video format examples, SD-SDI supports 480i and 576i. These are standard definition formats, making them suitable for basic broadcast applications.
2. **HD-SDI:** Stands for High Definition Serial Digital Interface. Its standard is SMPTE 292M, introduced in 1998. HD-SDI supports two bitrates: 1485 Mbit/s and 1485/1.001 Mbit/s, significantly higher than its predecessor. Such high bitrates ensure transmission quality, maintaining fidelity when sending video signals over coaxial cable. It supports formats like 720p and 1080i, which are high-resolution, thereby increasing video data clarity. HD-SDI revolutionized the industry, making the concept of high-definition serial digital interface a reality. HD-SDI is also commonly used in the security surveillance field for high-definition cameras.
3. **3G-SDI:** Represents the third-generation Serial Digital Interface. The standard is SMPTE 424M, supporting higher bitrates and frame rates. Notably, its bitrate can manage 2970 Mbit/s and 2970/1.001 Mbit/s, indicating very high data transfer rates. Supported video formats include 1080p60, providing high-definition video and a smooth viewing experience.

4. **6G-SDI:** The sixth-generation Serial Digital Interface, specified by SMPTE ST 2081, supports Ultra High Definition (UHD) video transmission. 6G-SDI supports advanced video formats, for example, 1080p120 and 2160p30. These formats provide UHD video, translating into a stronger viewing experience.
5. **12G-SDI:** An innovation in SDI technology. It stands for the twelfth-generation Serial Digital Interface. Its specified standard is SMPTE ST 2082. This format emerged in 2015, offering higher performance than previous versions. A key feature of 12G-SDI is its bitrate, supporting rates up to 11970 Mbit/s, a huge leap in data transfer speed. It supports UHD video transmission at higher data rates, such as formats like 2160p60.

Characteristics and Advantages of SDI Signals

Common Application Cases