

HDCVI DAC Technology

Delivering Broadcast-quality Audio to
HD-over-Coax Surveillance

White Paper by Dahua Technology



Release 1.0

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1 Background

Within a complete surveillance system, audio provides various monitoring scenarios with important evidence such as capturing conversations, which can be used to resolve disputes. Although the transmission of video and audio within standard analog surveillance installations achieves a result of video with sound, the following user pain points still exist:

1. When not using a technology with the ability to transmit audio and video over the same coaxial cable, audio must be transmitted over an additional cable. This greatly increases system labor and maintenance costs. At the same time, the non-synchronous nature of the video and audio signals will cause discrepancies in the captured surveillance monitoring information.
2. Even if cameras are powered by a centralized power supply, each point still requires extra design and cabling work. At the same time, if poor quality materials are used, or the distance of power transmission is too great, it could cause an increase in voltage drops, resulting in the centralized power supply not being able to satisfy device requirements for normal operation.

HDCVI technology is the first on the HD-over-Coax market to realize audio transmission over coaxial cable. It is also the only technology to have achieved the commercialization of audio over coax. HDCVI DAC (Digital Audio-over-Coax) technology transmits a digital audio signal directly over coaxial cable. As a result, not only is installation much more convenient, but there is also a remarkable increase in audio transmission quality, achieving lossless “broadcast-level” audio quality, thus providing users with a multidimensional, high-quality video surveillance solution.

2 Key Technology

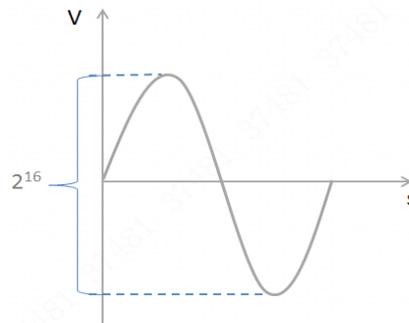
HDCVI DAC technology converts a captured audio signal into a digital signal and combines it with the analog video signal. Then, the signal is transmitted to the XVR via coaxial cable, where it is received and processed.



HDCVI DAC Technology Solution Diagram

High-Definition Sampling and Digital Signal Transmission

Previous audio transmission over coaxial cable was performed with the use of an analog signal. Within these configurations, it is easy for the signal to be affected by interference during the transmission process, making it difficult for the receiving end to precisely restore the sent audio signal. HDCVI DAC technology uses digital signal transmission technology to resolve this problem. It converts the analog audio signal collected from a sound pick-up or a built-mic into a digital audio signal via an AD module (Analog-Digital conversion module), whereby it then engages in processing and transmission. This results in the data on both the sending end and the receiving end being exactly the same, guaranteeing lossless transmission. At the same time, the AD sampling module uses 16 bit high precision sampling to divide the signal amplitude to 216. In comparison with previous 8 bit audio, this provides more precise sampling.



Sampling Precision Graph

Noise Reduction via Software Filtering

Audio noise is often introduced during audio collection. No matter whether the user employs an external pickup or built-in mic, noise is unavoidable. With HDCVI DAC technology, after conversion from an analog to digital audio signal, the signal is processed by an ISP, which uses an algorithm to achieve filtering, resulting in a maximum reduction of pickup input related noise.

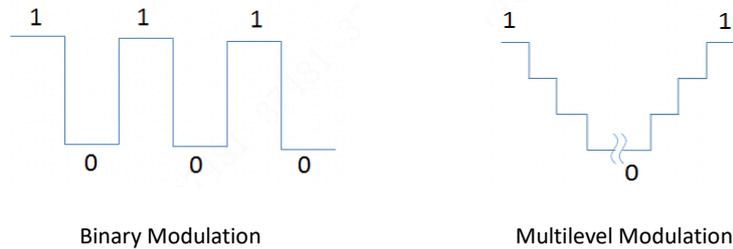
Note: Due to ISP performance limit, this technology is only adopted on some models.

Baseband Multilevel Modulation/Demodulation

HDCVI DAC technology uses baseband multilevel modulation. Baseband modulation allows for strong signal interference resistance and low signal degradation, allowing for longer range transmission. Multilevel modulation transforms the process from simple high-low levels into a number of levels, increasing the quantity of data transmission and reducing the audio data bit error rate.

When the composite video signal is transmitted to the XVR, HDCVI DAC technology uses

multilevel demodulation to completely extract and isolate the exact digital signal sent from the sending end, achieving lossless audio restoration.



Audio Signal Judgment and Extraction

HDCVI DAC technology adds audio flags to audio signals, preventing interference with the video signal. When the composite video signal passes through a coaxial cable and reaches the XVR device, the XVR will check for audio flags within the signal. If audio flags are not found, the device will not accept the audio signal, which reduces noise in the absence of audio input and further increases audio quality.

3 Application Scenarios

HDCVI DAC technology provides high quality audio for various monitoring scenarios, offering important supplementary evidence for traditional video surveillance.

In the shops and other business applications, high quality HDCVI video and audio provides useful evidence for disputes on behaviors or trading. Also, the synchronization of video and audio ensures high accuracy and reliability of the surveillance. Provided a customer and a cashier disagrees on some issue at the cashier desk. Besides restoring the scene of incident by video monitoring system, HDCVI DAC technology can be applied to provide audio evidence. Thus, the conflict can be mediated with a more reasonable and effective solution.

Besides the function of recording evidence, high quality audio and video surveillance system can also identify abnormal behaviors when applies in schools, offices, or home applications. As for students' fights and illegal intrusions, audio and video surveillance can intuitively, accurately and timely restores information. Thereby it helps us identify suspect faster and better protect life and property.

4 Conclusion

HDCVI DAC technology adopts the digital signal audio-over-coax transmission technology, which

guarantees the lossless transmission of the audio signal. At the same time, HDCVI DAC technology realizes effective noise reduction in the whole audio transmission process, remarkably enhancing the audio quality. It satisfies the user's demand for auxiliary audio information in various monitoring applications with little increase on device or installation costs

About Dahua Technology

Dahua Technology is a world-leading video surveillance solution provider. Our company enjoys the world's second largest market share according to the IMS 2015 report. We believe in investing and building strong R&D capabilities for new technology and innovation. The company invests more than 10% of sales revenue in R&D every year. Dahua technology has more than 4000 professionals in R&D team, who are dedicated to provide cutting edge products and solutions for our valuable customers. The company has 592 patents in total till end of 2005 and advocates opens to share or license its technical know-how with global partners.

Dahua's product portfolio includes: Advanced Video Surveillance Products/Solutions and related Software, Access Control, VDP, Alarm, Intelligent Building Management Systems and Intelligent Traffic Management System etc.

Dahua's products are widely used in banking, public security, energy infrastructure, telecommunication, intelligent-building and intelligent-transportation etc. Many significant projects have been installed with Dahua's solutions including: The Sanxia Hydropower Plant, Six-Country Summit, Beijing Olympic Venues, APEC, Shanghai World Expo, UNESCO site in Italy and London Underground Subway as well as many others.