H.264/AVC 16 PORT VIDEO (ANALOG SWITCHING AND STREAMING) INTERFACE CARD

Introduction

The OTN concept allows the handling of nearly all existing communication standards for voice, data, LAN and video. The H.264/AVC video interface card is just one of the many interfaces presently available for OTN. For more information and other data sheets, contact the address overleaf.

Description

The H.264/AVC cards are used to transmit up to 16 video signals via OTN-X3M or OTN Classic. The channels on the card can be configured as inputs (encoders) or as outputs (decoders).

Analog video signals are digitized and compressed by the video input circuit and transmitted over the OTN network. The compression technique OTN Systems uses is developed by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC Moving Picture Experts Group (MPEG).

This H.264/MPEG-4 AVC is a block oriented motion-compensation-based codec.

The compressed video data is packetized in the H.264/AVC card and sent across the OTN network. H.264/AVC is a video compression algorithm that offers a higher compression ratio than the MPEG4 or the MJPEG compression. Due to the bandwidth saving, the H.264/AVC is highly suitable for large CCTV video installations.

The two serial connections are used for transporting the PTZ commands of the PTZ cameras. The Ethernet interface front port streams out video from local connected cameras as well as all the video streams within the same assigned network.

The display on the front of the card is used to read out important information pertaining to the configuration of the video interface card, e.g. network parameters, Firmware versions and hardware issues are also displayed.

One LED is provided per video port. This will allow for an initial analysis of the status of the video streams.

Features

16 PAL/NTSC video input/output ports

H.264 Advanced Video Codec

Integrated IP streaming

Display with IP settings, firmware version

LEDs with the status of the signal per video stream

Up to 784 Mbps of Video & IP throughput on the backplane

Ethernet 10/100 base-T

Remote Control:
- OMS
- Webserver
- OVS

Data: Two RS 422/232 control ports

OTN Systems
COMMITTED TO GET YOUR INFORMATION ACROSS

Operation

The H.264/AVC video interface cards provide fixed, switched or streaming connections between video inputs and outputs, both in point-to-point and multidrop configurations.

Bandwidth for fixed, switched or streaming video applications can be allocated by the OMS (OTN Management System) or the web interface.

The bandwidth used by the H.264/AVC codecs can be configured from 256 kbps to 10 Mbps per video connection, depending on the resolution and field rate required; 2 Mbps is adequate for most applications.

The H.264/AVC cards have 16 video inputs, each with their own codecs, offering independent and simultaneous transmission.

In other words, one channel will never affect another in case the demands are momentarily higher.

The H.264/AVC card can be placed in three modes: Streaming, Analog and Standalone.

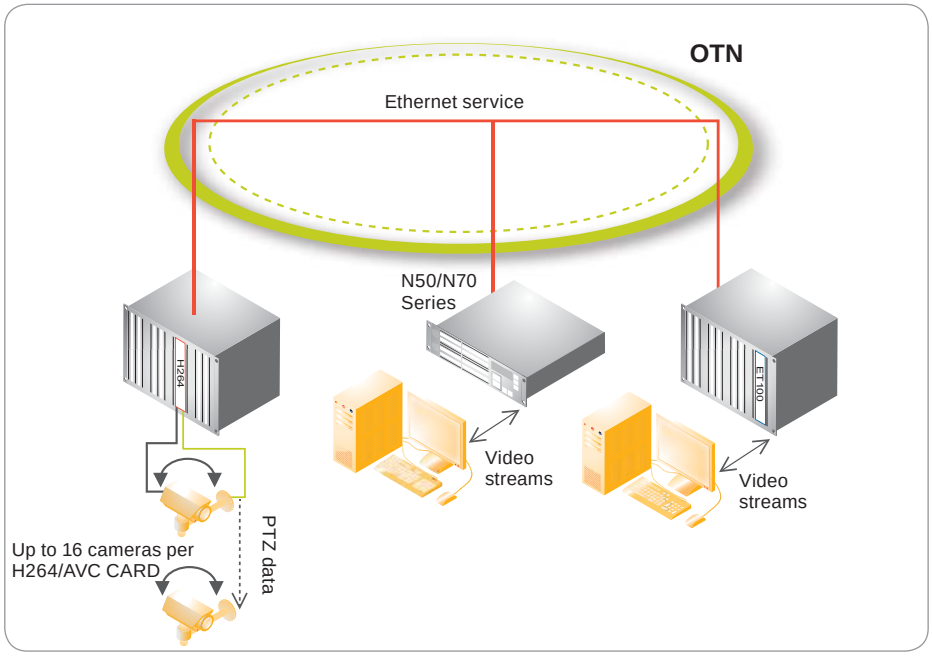

Figure 1: H.264: Streaming mode

Streaming (see Figure 1)

This makes the H264/AVC card a full IP encoder or decoder. The video streams are first digitized and compressed and are mapped in datagrams.

A Video Management System takes control of the encoder and pushes the video and network settings into the card. The video streams are 'bandwidth friendly' so that the full capacity of the available bandwidth on the links can be used. A VMS vendor could be chosen to integrate with the H.264/AVC card.

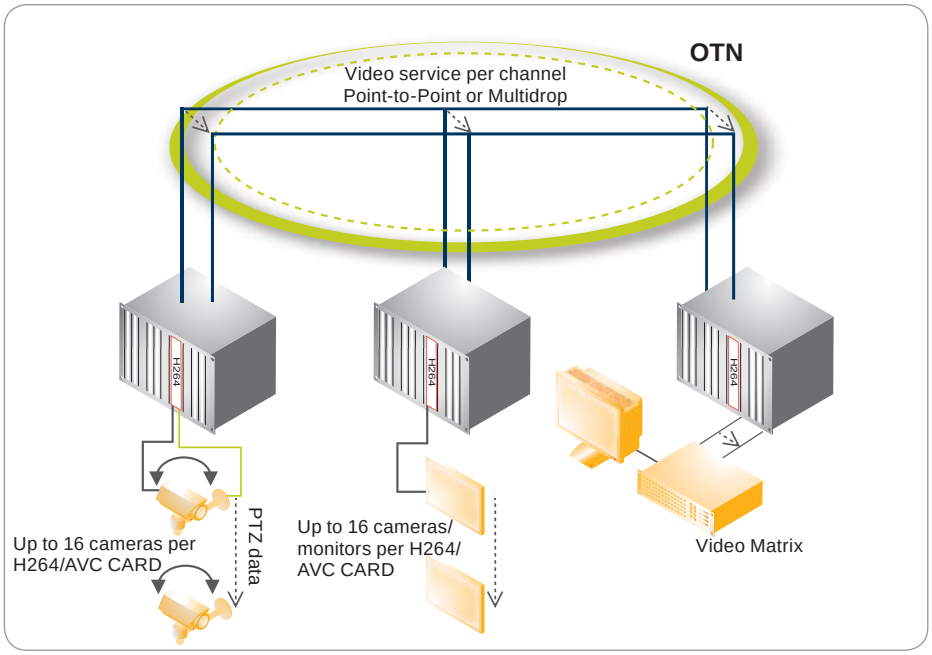

Figure 2: H.264: Analog mode

Analog (see Figure 2)

Through the OMS analog point-to-point or multidrop services can be laid between input (camera) and output (monitor). In this way cameras have a fixed connection with one or more outputs.

The analog CCTV installation can be maintained in case the network needs to be refurbished. The interface cards can easily be swapped into the streaming mode should the need for an IP CCTV installation arise.

An OVS may be used to switch between different inputs and outputs. In this way the card can be compared to a distributed analog matrix.

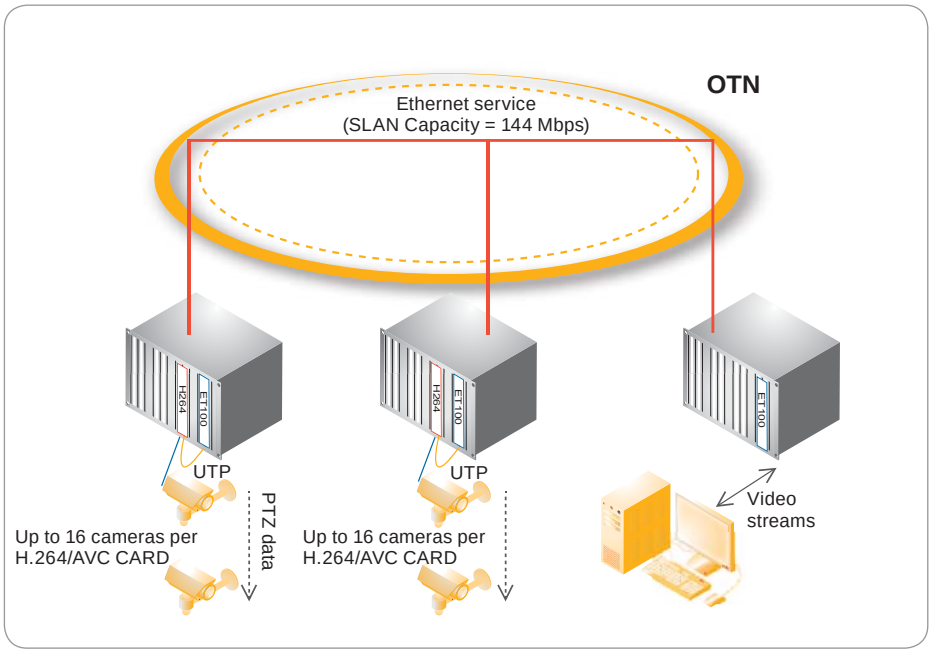

Figure 3: H.264/AVC CARD: 'Standalone'

Standalone (see Figure 3)

In case the H.264/AVC card is placed into an OTN Classic network the card will automatically switch over to the 'Standalone Mode'.

The interface card can be placed in any position in the N215 and N22 node. It could be placed in an X1 or X2 slot but will not be visible in the OMS. The power constraints must be taken into consideration when these extension slots are used.

The analog video feeds will enter the interface card through the 16 channel break out cable. The video streams will be digitized and compressed, and will stream out on the Ethernet front port of the H.264/AVC card. An Ethernet card may be placed alongside the video card to bring the video streams onto an Ethernet segment.

In this case, the maximum usable bandwidth per node is 144 Mbps and up to three H.264/AVC cards can be placed per node. This would amount to 48 cameras.

Integration through the SDK description

Some VMS vendors have integrated with our video cards. Different reasons could push a customer to use an additional integration.

The MVIDIP and the H.264/AVC cards can easily be integrated into a SCADA system or a Video Management System. Three simple steps can be followed to gain full command and control of the card along with decoding the video stream.

- Streaming format: A standard VLC player can be used to decode the stream. Some may choose their own software decoder. In this case our stream complies with the standard and is easy to implement in your existing environment. A description of this can be obtained.
- Control and Manage the stream: A driver may be developed to control the MVIDIP and the H.264/AVC card. A third party can interface with the cards by just sending the right HTTP requests to the webserver and receiving the right responses. The degree of integration is a decision of the customer.
- Validate and Test: It is needless to say that this third step should take place, according to the needs and desires of the customer. OTN Systems is always ready to assist you in any possible way.

Applications

The H.264/AVC card is highly suitable for large CCTV (Closed Circuit Television) video installations, where a high number of video camera inputs have to be collected in each node and where many video channels need to be transported through the OTN network simultaneously.

Transparent point-to-point or multipoint connections can be established for PAL or NTSC signals. This allows analog cameras (fixed, PTZ or dome) to be connected to analog video equipment such as analog monitors or video walls over very long distances.

When the Video-over-IP streaming feature is used, the video data is encapsulated into IP packets that can be sent to digital video display walls for monitoring purposes, Network Video Recorders (NVR) for storage and analysis or to other PC based applications.

Video connections over the OTN network can either be fixed, or dynamically switched by a video management application or streamed over IP under the control of an NVR. In this way, the H.264/AVC card helps to build high-quality, real-time and reliable integrated video applications.

Specifications

CE marking
EMC directive 2004/108/EC
LVD directive 2006/95/EC

Bandwidth used on OTN-X3M
between 256 kbps and
10 Mbps (2 Mbps typical)

Latency: Typical: 180ms

Compression algorithm
H.264 Base Line Profile Level 3
(with Main Profile extensions)

Supported resolutions:

Resolution	PAL (NTSC) H x V
D1	720x576(480)
3/4D1	528x576(480)
2/3D1	480x576(480)
1/2D1	720x288(240)
CIF	352x288(240)
QCIF	176x144(120)

Frame rate
1..25(30) fps PAL (NTSC)

Video connections
Composite video (16 inputs or outputs), CVBS, DB50F (DB50M to 16 BNC cable)

Video standard
PAL-B/G, NTSC-M

Output signal level
1Vpp at 75 Ohm

Signal to noise ratio
> 60dB (weighted)

Differential gain
< 5%

Differential phase
< 2.5°

Insertion gain variation
+/- 0.2dB

Amplitude vs. frequency characteristics
Bandwidth 5.5 MHz (typical)

Chrominance to luminance gain inequality < 7%

Chrominance to luminance delay inequality < +/-70ns

IP Streaming port
RJ45 port with 10/100BASE-T Ethernet transceiver

Control data port
2 RJ45 ports (RS232/RS422) for camera PTZ Control or external equipment control

Card size
Double Eurocard 200 x 233.4 mm

Weight
Approx. 500 g

Reliability (MTBF) at 25°C (77°F)
> 20 Years

Power consumption
Approx. 25 W

Ordering information

Compatibility
The H.264/AVC card can be installed in the N22 and N215 nodes, and in the N42, N42C and N415 nodes for OTN-X3M.

OMS software
- OMS v7.0 and up

OVS software
- OVS v5.0 and up

H.264/AVC 16 Ports
S30824-Q131-X501
- 16 analog ports
- OVS switching / 16 ports decoding
- Encoding - Streaming
- Ethernet interface
- Streaming - Decoding
- Standalone function

OTN Systems NV

Industrielaan 17b, 2250 Olen, Belgium
Fax: +32 14 25 20 23
E-mail: info@otnsystems.com
www.otnsystems.com - www.otn.be

Ref. No.: AE-S264-E-7
Issued October, 2011

OPEN TRANSPORT NETWORK