

TECHNICAL PROPOSAL
FOR
REAL-TIME BROADCAST OF EVENTS, LIVE TALK AND INTERACTIVE VIDEO CONFERENCE
WITH XVD TECHNOLOGY

(A super-fast, DVD-quality A/V content compression and transmission)

COMPANY BACKGROUND

Compro Computers Pvt. Ltd. is a registered Pvt. Ltd. company that provides IT products, services and solutions to government and non-government agencies and private individuals. The company's office is located in Durbar Marg in the heart of Kathmandu. It has been in existence since 1997 and has built up a very large and satisfied client base over the years. It is one of the few ISO 9001:2000 certified IT companies in the country.

Our clients include the Prime Minister's Office, Nepal Police, international agencies such as DFID and United Mission to Nepal, travel agencies, private businesses, and schools and colleges.

We are proud to introduce for the first time in Nepal the latest cutting-edge XVD technology. XVD is, in fact, so new that it comes directly from the USA (*where it is manufactured*) via Japan.

INTRODUCTION

This proposal is for the installation of a private IP-based network (*either cable or wireless*) for real-time broadcast of events, live talk and interactive video conference using the cutting-edge XVD audio-visual data compression and transmission technology (*explained below*).

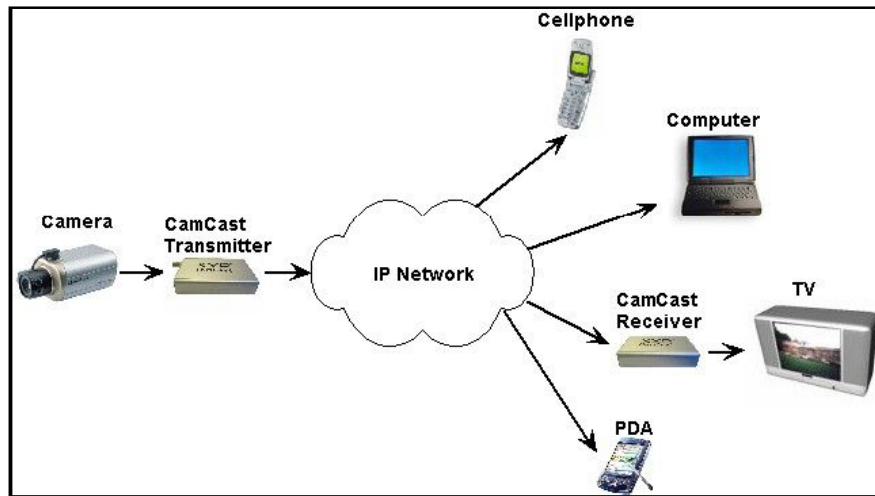
Once in place, this super-fast, DVD-quality A/V transmission system will revolutionize the way television stations broadcast live events and programmes. At the heart of this solution are the following:

1. An IP-based network (either cable or wireless)
2. An SD camera
3. An XVD encoder (*explained below*)
4. A wireless router
5. An XVD decoder (*explained below*)
6. A Desktop PC or Laptop PC or PDA or Television or a cell phone

The XVD system can be implemented either in **Stream Server mode** or as part of an **Enterprise Solution**, depending upon the need.

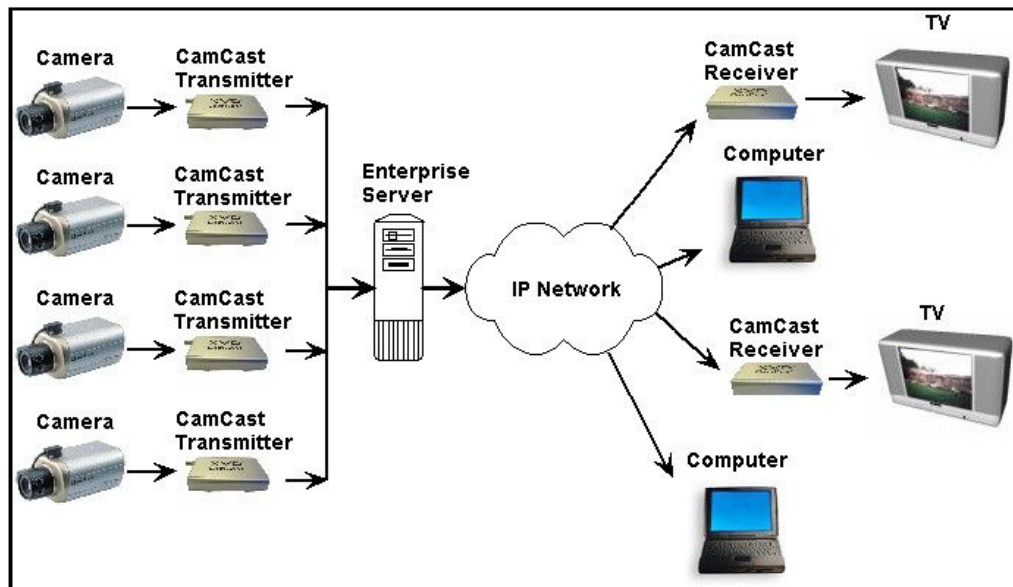
1. Stream-Server Operation

When operating as a Stream-Server, the encoder can transmit an XVD-encoded A/V stream to an IP-based network within a distance of a hundred meters. The *IP network* will transmit the same up to four suitable receivers simultaneously. Each receiver acquires the A/V stream from the Stream-Server as shown below.



2. Enterprise Operation

When operating as part of an Enterprise Solution, one or more encoders sends XVD-encoded A/V streams to an Enterprise Server, which re-broadcasts the streams to suitable receivers through the IP network.



APPLICATIONS

A. Applications:

The areas of applications of the above for TV stations are:

- Link the TV station with public places (such as sports stadium, auditorium, convention halls, trouble hot-spots, etc.) for live report and programming

- Link two or more stations for live talk, interview and interactive video conference
- Live monitoring and broadcast of events such as elections, parades, festivals, sports, news reports and breaking news in real-time.

B. Installation Considerations:

XVD has several advantages over conventional A/V compression and transmission technology.

- With XVD, there will be no need for the TV station to setup satellite or microwave link to transport live picture. One line (fiber or network cable) is enough to transport the same with XVD plug-in.
- A bandwidth of only 1 Mbps is enough to transport DVD-quality picture.
- XVD is the perfect solution for TV stations that cannot afford to buy a high-end microwave link.
- In the case of Kathmandu valley, most of the public places are concentrated in a relatively small area, so cable running is easy to setup from each point with the station. This can be done using either NTC network or other cable operators.
- As there are very few tall buildings in Kathmandu to block RF transmission, it will be easy to setup a wireless link.

WHAT IS THE XVD TECHNOLOGY?

XVD is the latest video encoding format beyond the performance level of any conventional formats available in the market at present. It is the most advanced real-time DVD-quality encoding/decoding format and supports from SD to HDTV motion video contents. A high quality XVD video source can be streamed at low bit-rate, without any freezing and traffic-error-like block noise.

A. Some Outstanding Features of XVD that make it superior to other technologies available:

- SD Video and Audio signals can be transmitted at a lower bit rate than conventional MPEG formats.
Video: 32 Kbps to 2.2 Mbps
Audio: 16 Kbps to 64 Kbps

Note: For a conventional MPEG 1 to 4 formats the bit rate is as high as 2.5 Mbps to 5 Mbps. The video quality drops sharply if the bit rate is decreased to near 1000 Kbps (1 Mbps). This doesn't happen with XVD.

- Wide scalability of resolution:
Step selection for HxV resolution on menu control from 720x576 (D1) to 192x144 (1/4D1) in PAL, and from 720x480 (D1) to 192x128 (1/4D1) in NTSC.
- Faster encoding:
Ability to encode A/V content at 30 frames per second in NTSC and 25 frames per second in PAL.

- No delay between video and audio signals after transmission with decoding.
- Over 10 years of development and field testing (by a multinational team of American, Japanese and Russian researchers) supports XVD codec design providing much higher performance and efficiency than other block-based real-time video compression systems.
- XVD's patented video codec is optimized for the human visual system and adds several unique features such as: Automatic Scene Change Detection, Object Motion Detection/Estimation; plus CBR/VBR bit-rate control with a configurable window size to improve perceived video quality at a dramatically lower data rates.
- The XVD audio codec also provides high performance at significantly lower data rates, allowing many more data channels to be carried in any chosen bandwidth.

B. Special qualities of XVD that make it useful for real-time broadcast/programme

The XVD technology has some special qualities that make it very useful for real-time, super-fast, DVD-quality A/V encoding and transmission.

- Real-time SD encoding
- Analog (NTSC and PAL) input
- TCP/IP and RTF/FEC
- Compact Mini-server
- Ultra-small size
- Light weight (less than 1 lbs)
- Low power consumption

C. The XVD Encoder

The XVD technology makes use of a patented *XVD encoder* connected to the camera and within a 100 meters distance of an IP-based network to transmit high-resolution (DVD quality), full-speed audio-visual content.

The **encoder** (called *XVD™ CamCast SD-TX100*) captures and compresses analog video data (NTSC & PAL) from a camera to a high-resolution XVD data stream (at 32 Kbps to 2.2 Mbps) in real time. At the heart of this solution is the powerful SD-TX100 transmitter, a compact DSP-powered mini-server that connects directly to any video camera and IP-based network. The mini-server mode allows the encoder to transmit the compressed A/V stream to multiple destination receivers using a variety of transmission options. Using TCP/IP the stream can be directly transmitted to a receiver, and/or to a streaming server for transmission in an *Enterprise environment*. The encoder can use a number of devices for its A/V content source. Suitable sources include:

1. Cameras
2. Set-top boxes (cable, satellite, personal video recorder)

3. VCRs
4. DVD Players

The encoder software includes an embedded Web server, which allows it to send up to 4 embedded streams *simultaneously*. Instead of 4 separate A/V streams, the encoder can transmit a single A/V stream to a CamCast Enterprise Server for re-broadcast to multiple receivers.

D. The XVD Decoder

The XVD technology makes use of a patented *XVD decoder* at the receiving end to deliver high-resolution (DVD quality), full-speed audio-visual content through an IP-based network.

The **decoder** (called *XVD™ CamCast SD-RX100*) receives data packets that are retransmitted from a centrally located Streaming Server, or directly transmitted from an encoder in mini-server mode. The decoder can use a number of devices for its A/V content destination. Suitable receivers of A/V content include:

1. CamCast Enterprise Receivers
2. CamCast Streaming Server
3. CamCast Enterprise PC-based player applications
4. CamCast Internet Explorer ActiveX Plug-in Player
5. CamCast MultiView Player
6. PDA with CamCast Player Software
7. Cell phone with CamCast Player Software

These compact devices are powered by the patented XVD video compression technology and provide the highest quality (full-D1) resolution video possible at any given bandwidth. Because of the compression efficiency of the video codec, they can send and receive lifelike video at a full 30 frames per second (fps) over an IP-based connection, whereas a comparable M-JPEG system can send only 2 to 5 fps.

Note:

Instead of separate encoder (SD-TX100) and decoder (SD-RX100), an integrated encoder/decoder (called *XVD™ CamCast SD-CX100*) can be used at both ends for two-way communication. This is especially useful for live talk and interactive video conference.