

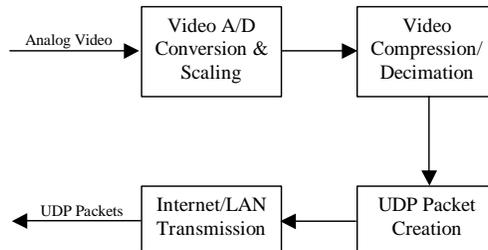
JAY-Cam RTVS

Real Time Video System

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Project Proposal

In broad terms, we will be using the FPGA and its peripherals to construct a simple web cam that will take in analog video, convert the video into a digital bit stream, and then broadcast the data on the Internet. The flow of data from the input camera to the Internet/LAN connected client computer involves several essential stages outlined below.



- Analog video input using the on-board Phillips SAA7114H chip.
The SAA7114H is a super fast chip whose primary purpose is “to capture and scale video images to be provided as a digital video stream through the image port of a VGA controller, for display via VGA’s frame buffer, or for capture to system memory.”¹ We will use this chip to capture an analog signal, convert it to a digital signal, and then use the on-chip scaler to scale down the frame size.
- Video compression/decimation
If the newly created digital signal is still too big for the FPGA to handle, we will slow down the frame rate and further decrease the frame size. If Ethernet bandwidth becomes a problem, we may implement a simple compression protocol.
- UDP packet creation
Once we have our ideal digital video signal, we will pack the video bytes along with other information (i.e. video frame number and other video details) into the data portion of UDP packets. This process will probably be implemented in software, but may be moved into hardware if faster speeds are necessary to keep up with the video. The choice of UDP over raw Ethernet packets was made for a couple reasons. Firstly, there is a lot of source code floating around for UDP/IP stacks and drivers that are compatible with the on-board Ethernet controller. And secondly, the use of a transport layer protocol (such as UDP) will make client-side programming much simpler (i.e. it is very easy to open a UDP socket and receive/send data using Java or C).
- Internet broadcasting using on-board ASIX AX88796L Ethernet controller
As the packets are created, we will send them to the Ethernet controller for transmission on the Internet/LAN. As of now, we are unsure whether the data will be sent to a specific IP address or if we will just broadcast the data on a well-known broadcast IP.

¹ Philips SAA7114H NTSC/PAL/SECAM video decoder data sheet, page 4.