

Wireless Video Coding System Demonstration*

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We have developed and present here a prototype point-to-point wireless video system that has been implemented using a combination of commercial components and custom hardware. The coding algorithm being used consists of subband decomposition using low-complexity, integer-coefficient filters, scalar quantization, and run-length and entropy coding.

The prototype system consists of the following major components: spread spectrum radio with interface card and driver, compression board, and an NEC laptop and docking station which provide the PC bus slots and control. The compression algorithms are implemented on a board with a single 10000-gate FPGA. Prior to implementing the algorithms in hardware, a study was performed to resolve issues of word length and scaling, and to select quantization and run length parameters. It was determined that 16-bit precision in the wavelet transform stage is sufficient to prevent underflow and overflow provided that rescaling of data is correctly performed. After processing by the FPGA, the compressed video is transferred to the PC for transmission over the radio. A commercial serial card (PI Card) provides a synchronous serial interface to the radio. The serial controller chip used by this card supports several serial protocols and thus the effect of these protocols on the data in a wireless environment can be tested. The video application transfers data to this interface through a software driver which is written to support FTP's packet driver specification. The device independent nature of this specification allows easy investigation of different interfaces and transmission schemes (e.g. ethernet and wireless).

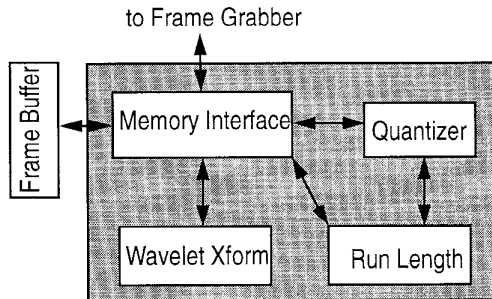


Figure 1a: FPGA block diagram

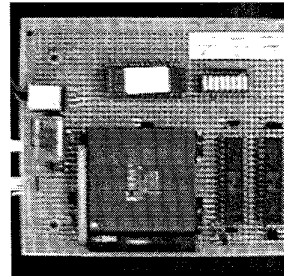


Figure 1b: Photograph of compression board including FPGA and 2 RAM chips.

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