



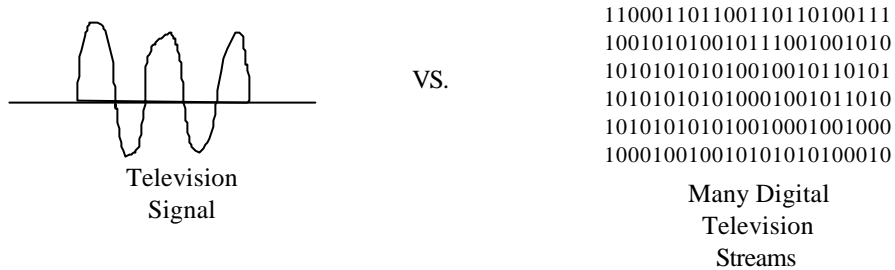
MediaPump MediaSplice Technology Overview

Jack Krooss

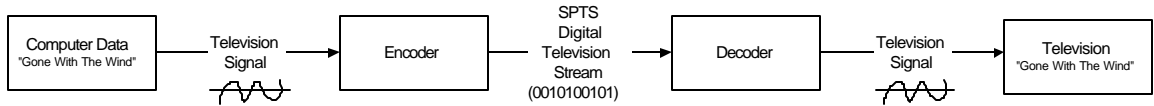
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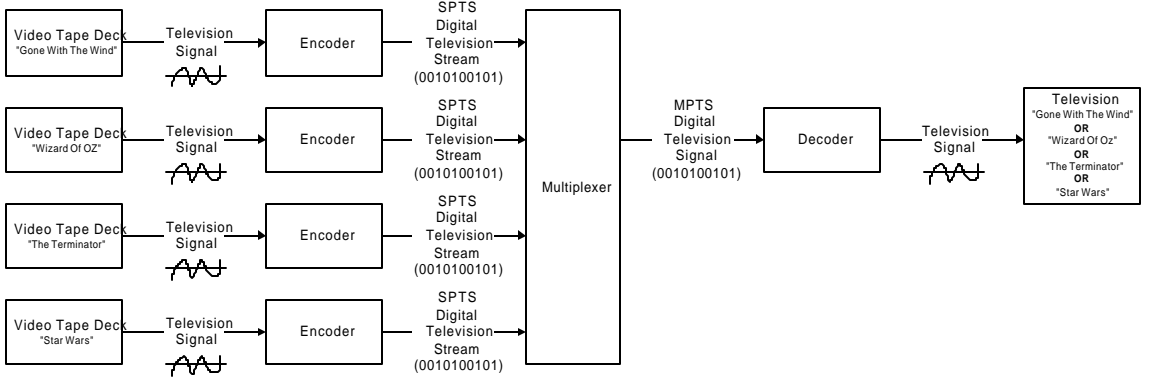
MediaPump is a family of PC boards that allow standard PC's to record, play and process *digital television* (DTV). Digital television is not like ordinary analog television. Rather than being sent as analog electronic signals, the pictures are sent as a stream of digital bits of information. Because it is more efficient to send pictures this way, from four to twelve or even more programs can be sent in the same amount of space as one analog TV signal. Since the TV industry spends huge sums of money every year on picture transmission, this type of gain in capacity results in both fantastic cost savings. It also results in a huge increase in the number of channels available. As a result, the television industry is going through a digital TV revolution as broadcasters change over much of their equipment from analog to digital.



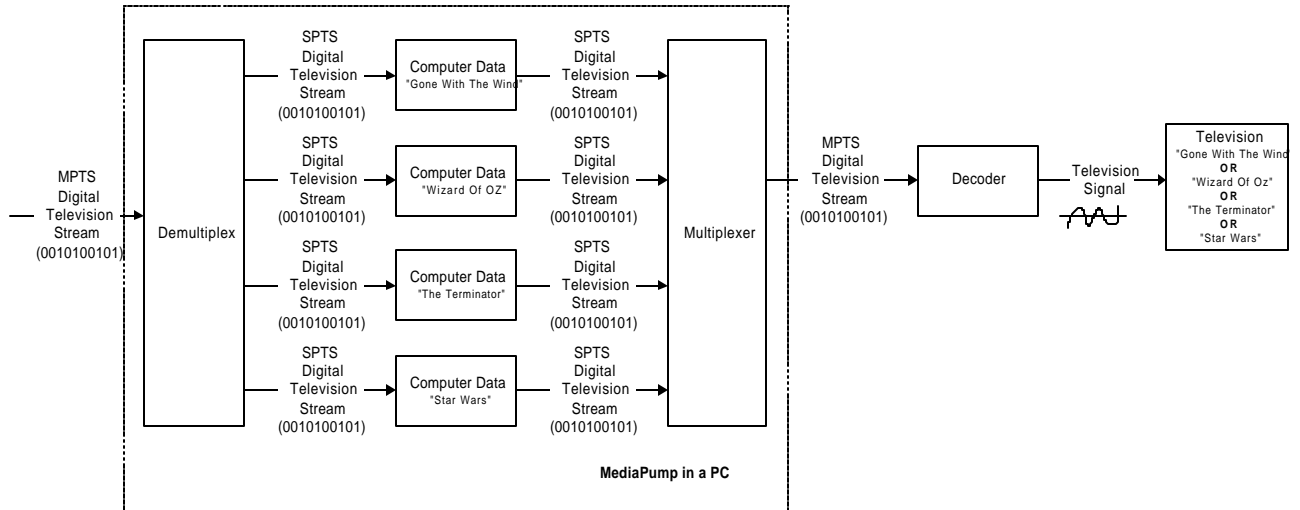
In order to convert analog television to digital, the analog television signal is played into an *encoder*. A digital television stream comes out of the encoder. One type of encoding that is dominant right now is called *MPEG2*, and the encoded digital streams are called *MPEG2 Transport Streams*. Transport Streams can be either single or multiple. A *single program transport stream (SPTS)*, like those coming out of an encoder contains only one program channel of information. For example, if you played the movie "Gone With The Wind" into an encoder, a single program transport stream (SPTS) of digital bits would come out of the encoder. This stream can go into a *decoder*, in order to convert the digital stream back into pictures that can be seen on a normal television.



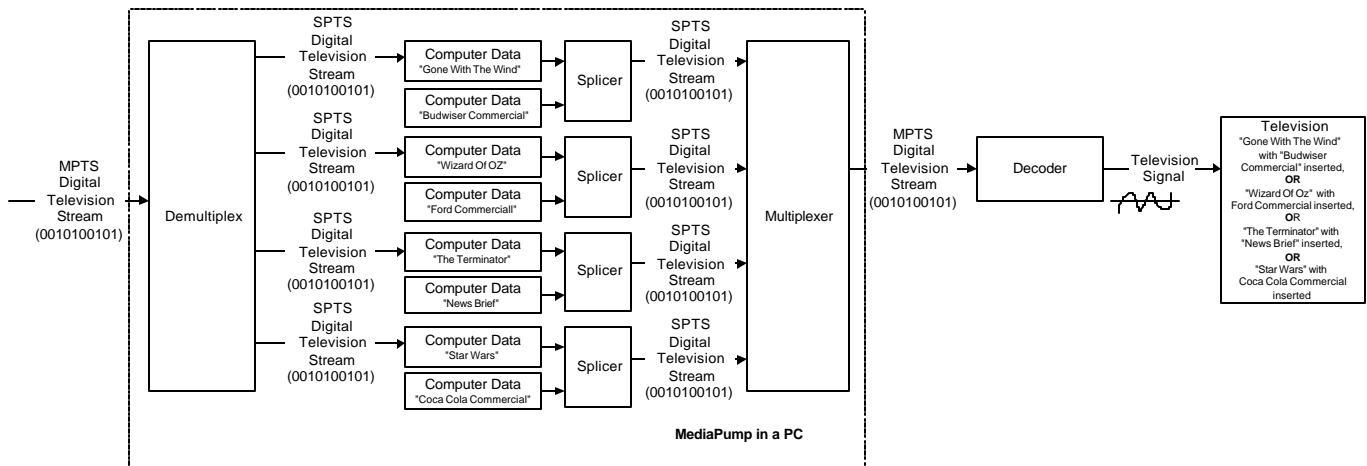
In order to realize the benefit of digital television many of these single program transport streams (SPTS) are combined together into one *multiple program transport stream (MPTS)*. This combining is done by something called a *multiplexer*. The input to a multiplexer is several single program transport streams (SPTS). The output of a multiplexer is one multiple program transport stream (MPTS). For example, if the movies "Gone With The Wind", "Wizard of Oz", "The Terminator", and "Star Wars" are all encoded and multiplexed together, one multiple program transport stream (MPTS) would carry all four of the digital television programs. This stream goes into a decoder to convert any one of the programs back to television pictures.



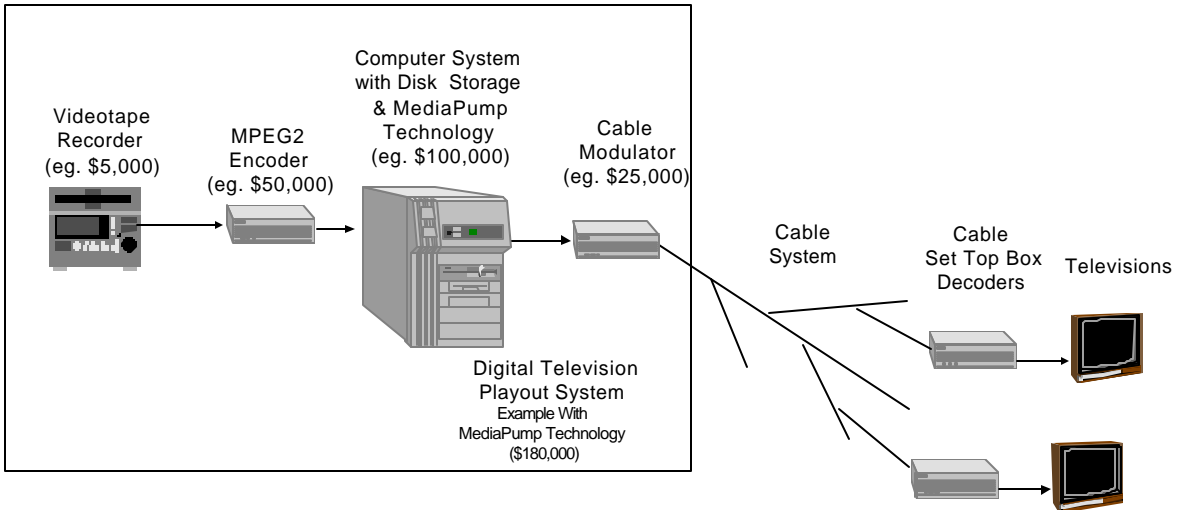
What Viewgraphics MediaPump Mux-Adapter does is record, play and process multiple program transport streams (MPTS). The MediaPump can capture all the programs in our example multiple program transport stream (MPTS) stream and transform them into *computer data*, one data package for each program in the stream. This computer data is like the data in a Microsoft Word document, but contains the digital data bits for a single program transport stream (SPTS). The MediaPump takes the computer data from several single program transport streams (SPTS), and combines it together into one multiple program transport stream (MPTS). This combining is done by the MediaPump's multiplexer. The MediaPump then plays this stream out.



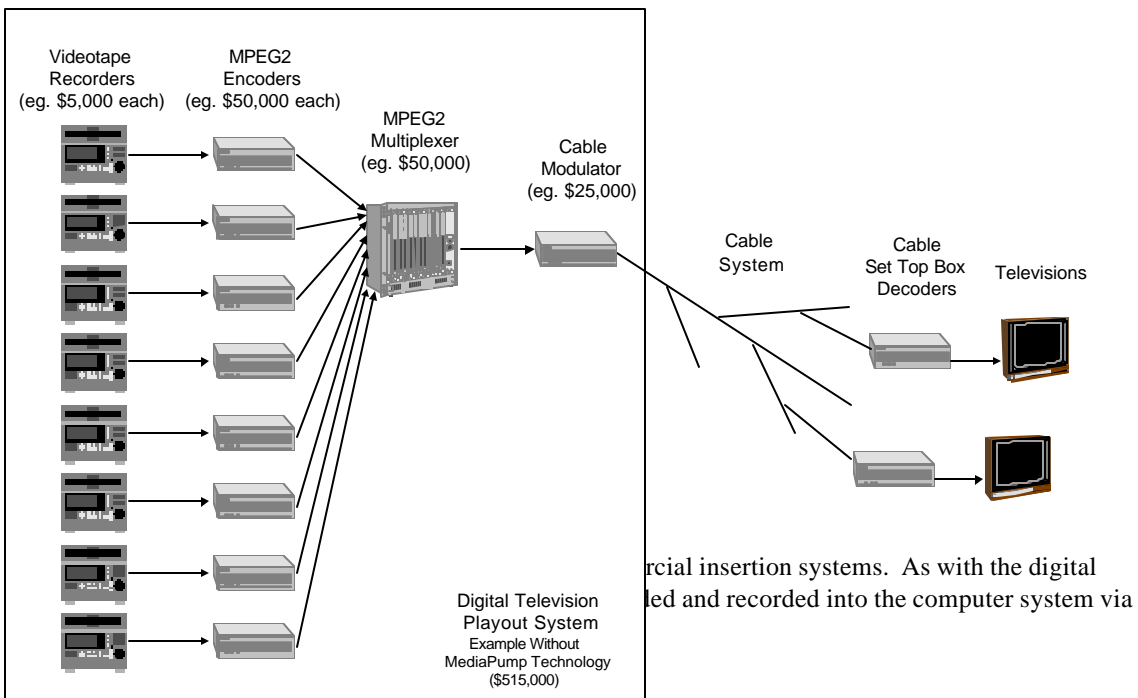
Before creating the output multiple program transport streams, the MediaPump companion product, MediaSplice, can also *splice* together the digital data bits for two single program transport streams (SPTS). This splicing capability is very important, particularly in the United States, because it is the key to switching from one TV program to another and *insertion* of commercials. Unfortunately, this capability is technically very difficult. If special measures are not taken the splice will mess up the picture on the television, and the viewers will either lose the picture entirely for a second or two on their televisions, or they will see an ugly break-up of their television picture.



MediaPump/MediaSplice is used to create a wide variety of systems for sending out digital television. For example, it is possible to construct a system that plays out movies for a cable television system's "pay-per view" service. In such a system, the MediaPump is inserted in a computer with a large amount of disk storage. The movies to be shown are played out from a videotape recorder into an encoder. The output single program transport streams are then recorded onto the computer system through the MediaPump. Once the movies have been recorded on the computer they can be played out as a multiple program transport stream and sent out via the cable television system to homes where they can be decoded and viewed.



Without something like the MediaPump technology, it is much more expensive to create such systems. The approach has been to play all the movies out of different videotape recorders into encoders at the same time. The single program transport streams that come out of the encoders are multiplexed together by a real time multiplexer device into a multiple program transport stream. This stream is sent out for decoding and viewing. This type of system can be very expensive. An eight channel system requires eight videotape recorders, eight real time encoders, plus the multiplexer; each costing many tens of thousands of dollars. MediaPump gives the same ability of storing and multiplexing multiple compressed digital media files for the cost of a computer with storage and a MediaPump adapter. MediaPump technology makes possible hundreds of thousands of dollars to millions of dollars of savings on each digital television playout system.



the MediaPump. The MediaPump technology also receives digital television multiple program transport streams containing programs sent to it from the television networks like ABC, CBS, NBC, HBO etc. During times when the network program is on, the commercial insertion system simply passes the digital streams through. When it is time for a commercial, the commercial insertion system splices in one of the stored commercials into any program stream. This technology is extremely valuable because it allows advertisers to target their commercial messages based on demographics.

Without MediaPump/MediaSplice technology it is very complex to do commercial insertion for digital television. All of the network channels must be decoded to analog television signals. The commercials can then be switched in using conventional television switches. All of these channels must then be encoded again and multiplexed together prior to being sent out. The cost of such a system is prohibitive.

