COMPATIBLE HIGH DEFINITION CABLE TRANSMISSION TECHNIQUE

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High definition television using 1125-line scans is now under advanced development in Japan. The image quality is comparable to 35mm motion picture film. Within the next few years HDTV receivers with video disc or cassette players will undoubtedly be available on the market.

The developers of HDTV recognized the impracticality of the full bandwidth (30 megahertz) distribution. Therefore, they have developed a bandwidth reduced transmission format called "MUSE" that requires 8.3 megahertz bandwidth in a continuous channel. This signal cannot be received by a standard NTSC receiver.

This laboratory has under development a transmission technique that is compatible with NTSC transmission. The design of this system has depended heavily on studies of the visual system in order to determine what information can be removed from transmission without degrading the displayed image.

In the system two channels are used. One is a standard 525-line NTSC channel. The other channel contains the detail information in both luminance and chrominance that is necessary to upgrade this "base" channel to 1125-line resolution. This detail channel has about 3 megahertz bandwidth which does not have to be adjacent in frequency to the "base" channel. A standard 525-line receiver tuned to the "base" channel will reconstruct a normal 525-line image without any modification to the receiver.

An HDTV receiver can combine the base and detail signals to reconstruct an 1125-line image. Even though the base channel has 3x4 aspect ratio, the HDTV reconstructed image has 3x5 aspect ratio.

A bandwidth reduced two-channel system similar to this has been demonstrated at the last two NAB conventions in "closed circuit" form. It has achieved over 800 line limiting resolution from a test chart, both vertically and horizontally in the reconstructed image. Motion rendition with the system is excellent.

For the cable operator this system has several significant advantages:

1. Only one additional half channel is required to upgrade an existing NTSC transmission to HDTV.
2. Since the detail channel need not be adjacent in frequency, the present cable spectrum does not have to be reallocated to upgrade a channel to HDTV.
3. Cable has a characteristic 6 MHz "picket fence" interference spectrum. This would be a serious problem for an 8.3 MHz continuous signal unless the HDTV channels are all located at the bottom of the spectrum at 12 MHz intervals. It is not a problem in a bi-channel system of the above design. Both channels can locate their carriers so that the 6 MHz signature causes no visible interference.