



191 Forest Avenue
Locust Valley, NY 11560-2132 USA
1-(800)-4TV-TEST
1-(800)-488-8378, 1-(516)-671-7278
FAX 1-(516)-671-3362
E-Mail: info@multidyne.com
Web Site: <http://www.multidyne.com>

A White Paper on the Multidyne RGB2000 RGB and VGA Media Converter and Fiber Optic Transport

Written by Jim Jachetta, MS EE
V. P., Sales and Product Development

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The Problem

- Currently known video modems are multi-fiber analog (AM and FM) based and have been seen to produce loss in video quality such as color convergence problems, color shifting, smearing, and edge blurring possibly due to the limitations of the technology. The government is seeking a solution for a modem pair capable of transporting detailed SXGA at 60Hz RGBHV graphics over fiber optics with minimal distortion as compared to the original signal.

The Solution

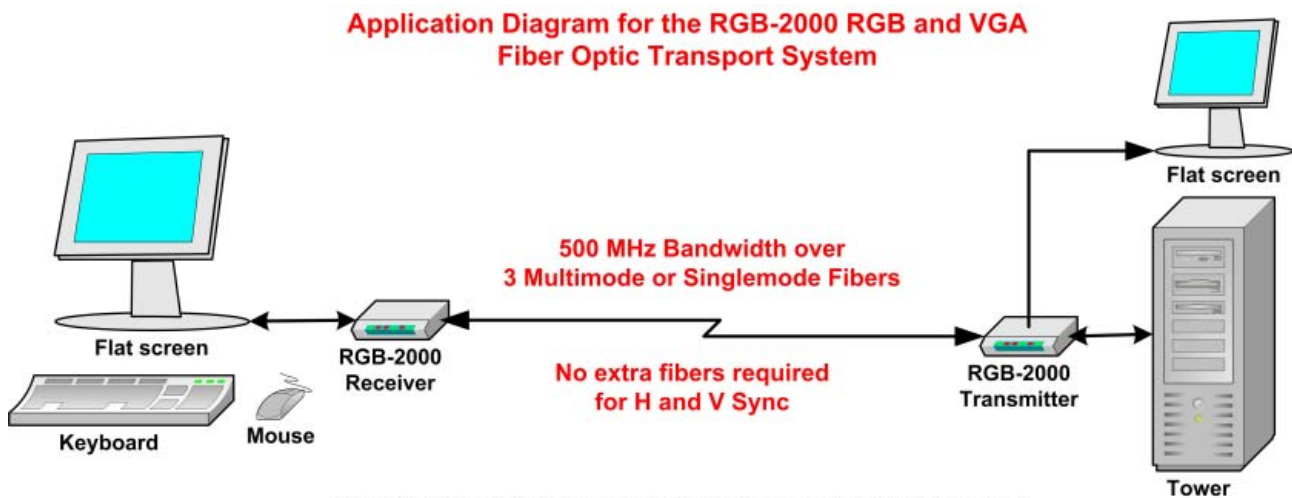
- Fiber Optic Transmitter – Utilize a fiber optic transmitter with 5 loop-through BNC RGBHV 75 Ω inputs and 1 loop-through HD15 input, where each input is buffered with a wide band amplifier. After buffering, the signal would then be DC-restored and clamped. This is required as an unclamped video signal can cause clipping, compression and distortion. After the clamping process, the input signal would then be automatically analyzed (auto-sensed) to determine the H and V sync protocol. Once determined, sync protocol can then be added to each video component to be used as an automatic gain control (AGC) reference in the far end receiver for level restoration. For signal transportation to the far end receiver and cost reduction, the transmitter would multiplex the R, G, B, H and V signals onto three fibers to be transmitted via three 1310nm ultra-linear Singlemode lasers, or three ultra-linear 850nm Multimode LEDs depending on the cable infrastructure requirements. The loop-through BNC and HD15 inputs facilitate the use of a local monitor at the video source or transmit side as shown in the diagram below.
- Fiber Optic Receiver – Utilize a receiver with three ultra-linear PIN detectors. Process each of the 3 individual components with an opto-electric AGC scheme. This process will utilize the previously inserted sync signals as a gain reference for proper level restoration to the original signal levels. Ultimately, this method provides for highly linear equalization for the transport path within a specified optical loss budget, defined herein as 10dB for Multimode and 13dB for Singlemode. After restoration of each component, a digital locking scheme would then be applied to each component to analyze and begin the sync restoration process. This will allow

precise sync timing information to be stripped and digitally generated, restoring the complete original RGBHV signal parameters.

- The opto-electric AGC circuit would include three bi-colored LEDs to indicate the received optical signal level or loss budget for each component. These LEDs would emit a bright green glow for a strong optical signal, and become progressively dimmer as the optical signal decreases or as the optical budget increases. When the receiver loses the optical input or exceeds the optical budget, the LEDs would then glow RED.

Conclusion

- Conclusion - The circuitry in the proposed solution will be identical for each component with throughput delays of each channel being precisely matched and calibrated. This will prevent any distortion and convergence problems and provide for highly accurate reproduction of signals up to 1600 by 1200 or UXGA. Additionally, the AGC schemes employed will ensure that balanced levels and channel intensities are maintained for distortion free signal distribution over a temperature range of 0 to 50 degrees C at a distance of up to 20KM.



The RGB-2000 permits the separation of the display from the image source. A common application is the separation of a computer monitor, keyboard and mouse from the large bulky processor unit.