

Introduction

With the 54 Mbps RF data rate of the ESTEem Model 195Eg Ethernet product, real time video camera images and phone communication systems can be sent simply over a wireless Ethernet network.

Ethernet Video is the conversion of an analog video image into an Ethernet data packet for transmission over a network. There are many different vendors for Ethernet Cameras available with products ranging from stand-alone video encoders that take a camera output and change to Ethernet to complete Ethernet cameras that attach directly to the network. Remote Ethernet video applications can replace proprietary closed caption television (CCTV) networks for security, production or maintenance applications. The Ethernet video network is based upon standard Ethernet technology and can therefore be implemented in any existing computer network with minimal impact of the data system performance. The grade of the picture quality and frame rate can also be adjusted for the available bandwidth in the network. The higher bandwidth capability of the network, the greater performance will be seen in the video hardware.

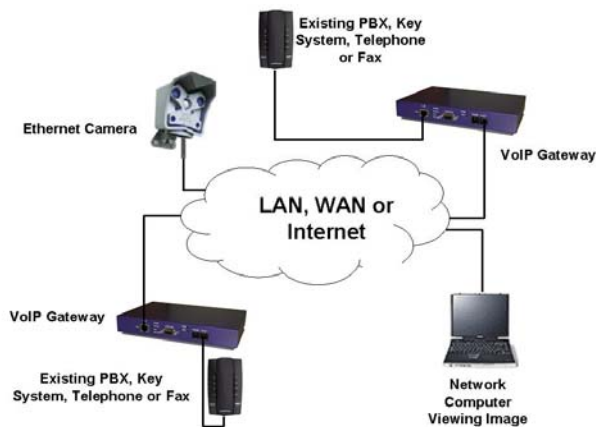


Figure 1: Basic Ethernet Diagram

Voice over Internet Protocol (VoIP) allows voice grade telephone communication to be used over an Ethernet network. The vendors for VoIP hardware allow telephone communication to be implemented in different network sizes, types, speeds and PBXs. VoIP networks can replace standard phone lines to remote locations or link multiple phone systems together within the same company without paying for a commercial phone line. This allows the user to own and control the phone network without residual costs. The grade of the telephone communication can also be adjusted for the available bandwidth in the network. Software is available to prioritize the VoIP and network data. The higher bandwidth capability of the network, the greater performance will be seen in the VoIP hardware.

The common element between Video and VoIP is the Ethernet interface (Figure 1). With the implementation of the ESTEem Model 195Eg wireless Ethernet radio modem, video monitoring and phone communications can be made available to remote locations without the cost of cabling over large distances. The primary advantages to a wireless network can be realized in cost, speed and system up-time (Figure 2). By using the ESTEem Model 195Eg, 54 MBps, Wireless Ethernet radio modem, a wireless video network can be used to provide monitoring to remote or inaccessible areas without running cables. The high bandwidth capabilities of the Model 195Eg will allow the video Ethernet hardware to function at the same time as other Ethernet hardware for data and VoIP communications.

Many types of Ethernet Video and VoIP hardware are available on the market based upon your system requirements. The video hardware used was a Mobotix M1M Ethernet. The Voice over IP hardware used was an IPCS VoIP Gateway Model EGW-902. This is a simple VoIP module that is available with either 2 FXS ports or 1 FXS port and 1 FXO port.

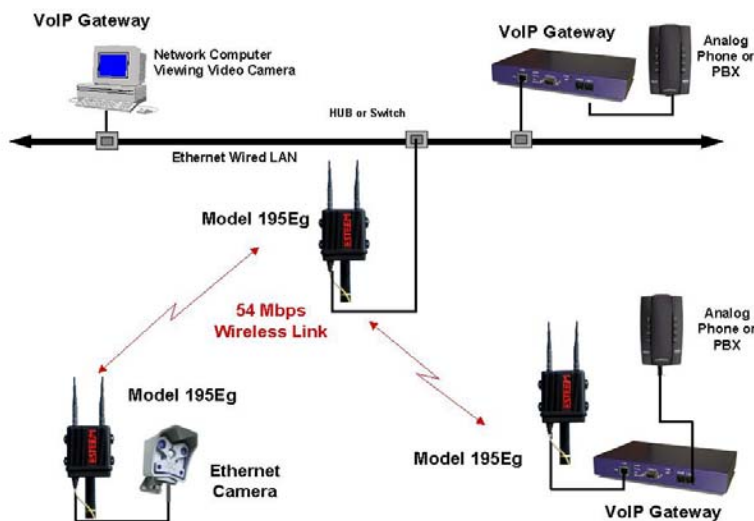


Figure 2: ESTEem Wireless Ethernet Diagram

Hardware Configuration

The configuration of the ESTeem, Video, and VoIP hardware is very simple. You first connected your computer via a serial port to the respective hardware and use terminal emulation software such as Microsoft® Hyper Terminal to set the IP address to match your network. Once the IP addresses are set, you configure all the parameters of the ESTeem, Video Camera, and VoIP using your web browser.

ESTeem Access Point Bridge Mode

The ESTeem Model 195Eg will provide wireless Ethernet communications to all Ethernet hardware in the system. The mode of operation for this type of application is the ESTeem Access Point Bridge Mode. The Bridge Mode will link multiple Ethernet devices connected to the Model 195Eg through either an Ethernet HUB or Switch on a single wireless Ethernet network (Figure 4). All ESTeem Model 195Egs that are configured for the same Bridge network will link together and allow there connected Ethernet devices to communicate.

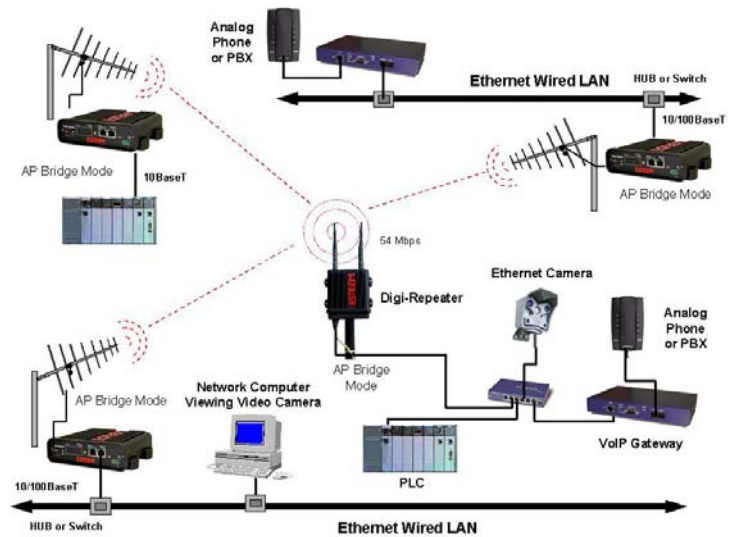


Figure 3: Ethernet Bridging Diagram

Digi-Repeating and Mesh Networking

Any ESTeem Model 195Eg in the wireless Ethernet network can be used as repeater (Digi-Repeater) to extend the range of the system or overcome line-of-site blockages (Figure 3). The repeater routing will dynamically adjust to maintain the best communication link and will self-heal if a communication route is lost. This mesh network configuration allows the Model 195Eg used as a repeater to still function as an Ethernet Bridging modem on the network.

Testing Results

The Mobotix M1M camera and VoIP hardware was tested between two (2) Model 195Eg radio modems providing an Ethernet bridge between to network HUBs with multiple Ethernet device attached to each Hub (Figure 4). To test the operation of the camera and VoIP hardware in heavy network use conditions, all Ethernet equipment were running simultaneously.

The laptop computer was reading data from an Allen-Bradley SLC 5/05 through its Ethernet port. At the same time the PLC programming software, RSLogix, was on-line programming the PLC through the Ethernet interface. The laptop computer was also viewing the ESTeem configuration web pages in both Model 195Eg radio modems.

With the Mobotix camera configured for maximum bandwidth utilization (best video quality), no delay was noticed in any of the other Ethernet equipment. The OPCS Gateway was configured for highest quality voice. In operation the voice and video quality was perfect.

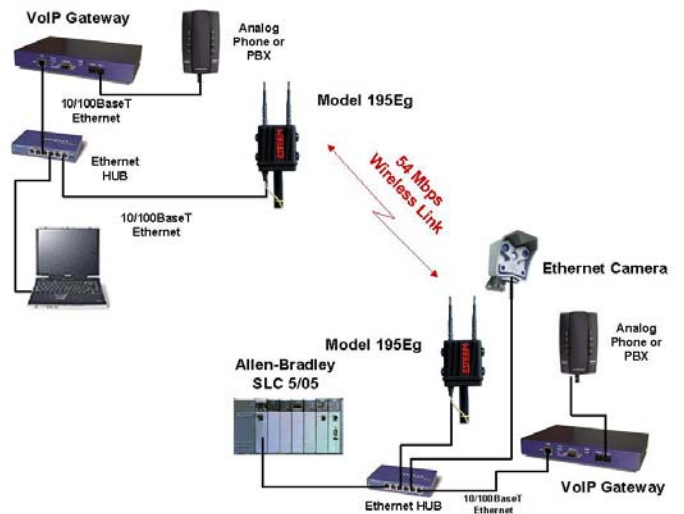


Figure 4: Hardware Setup Diagram