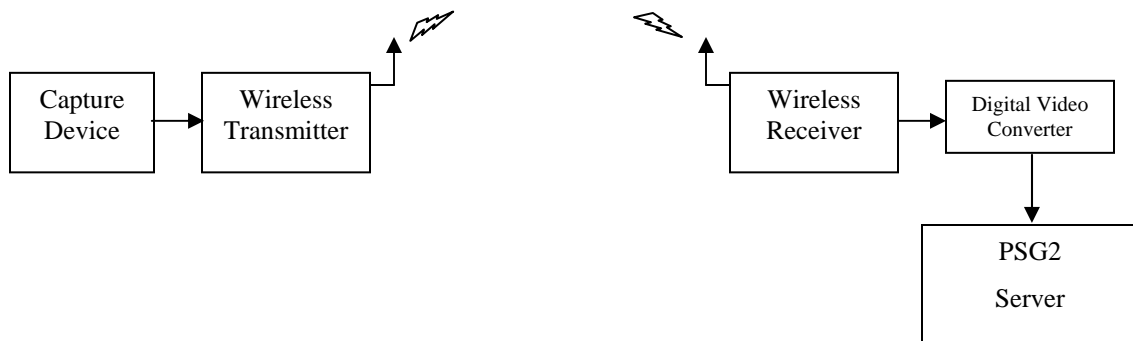


# Leapfrog Technologies' Public Safety Generation2 End to End Hardware Solution

This document has been designed for Public Safety Agencies and provides an End to End hardware solution based on PSG2, Leapfrog Technologies' system for Public Safety, Generation2. Typical Public Surveillance systems consist of a capture device, local/remote viewing device and a transmission medium for sending the video from the camera to the monitoring station. PSG2 greatly enhances multimedia content switching and delivery options based on policies and rules configured using its Command Centre console.

## Basic Setup

The below hardware schematic shows the basic setup for a camera based video surveillance application. Here we have a single capture device sending out a video feed which is monitored at the PSG2 server.



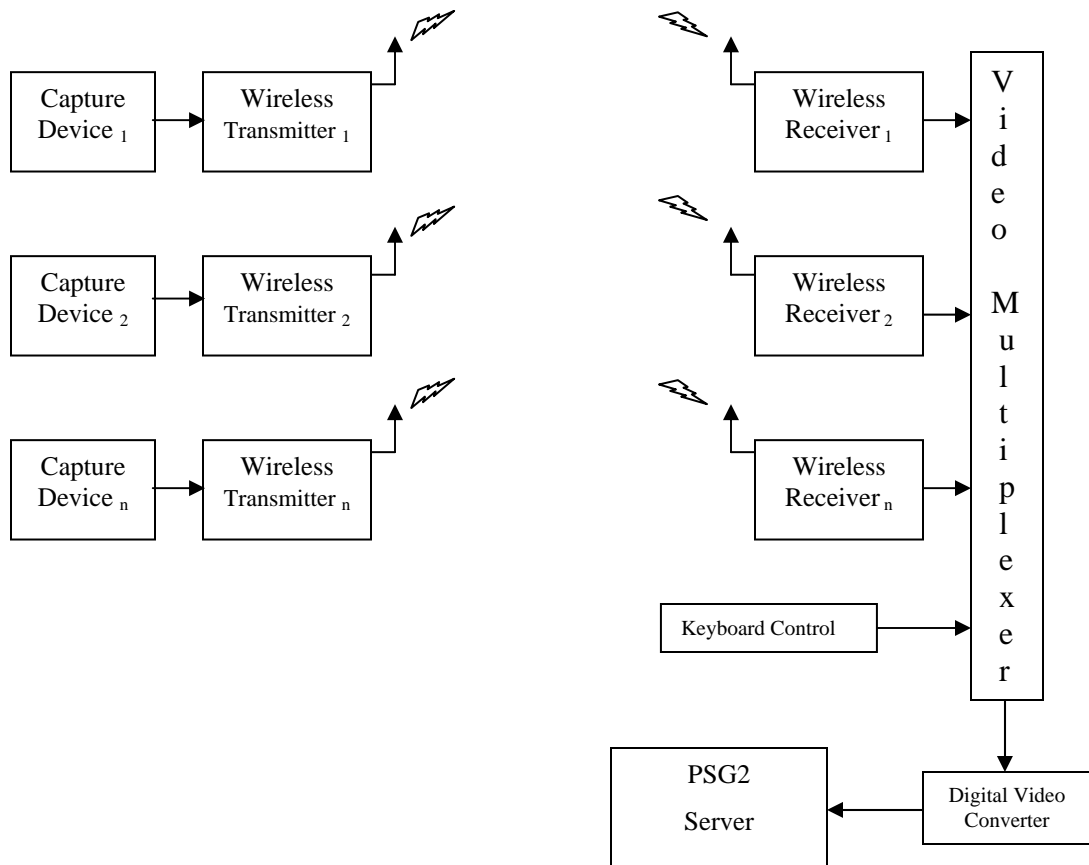
### Basic Hardware setup with the PSG2 System

1. **Capture Device** - Typically this is a surveillance camera, fixed or portable in nature which captures the video. It could also be a videoscope, fiberscope or a borescope. Normally video cameras in the US support the NTSC standard, some support PAL. Most analog cameras have a composite output via a BNC connector, some newer ones have an S-Video output.
2. **Wireless Transmitter** - This device transmits the video from the capture device via the wireless medium. The frequencies used for the wireless transmission could be licensed or unlicensed.

3. **Wireless Receiver** - The wireless receiver is positioned at the capture upload device and receives the video stream sent out by the transmitter operating in the same frequency spectrum.
4. **Digital Video Converter** - This is a small piece of hardware that digitizes the video feed streamed in from the wireless receiver and passes it on to the PSG2 server.
5. **PSG2 Server** - This is the central component of the PSG2 system. It captures the video stream from the Converter in digital format and provides live streaming video which can be monitored locally on the server. If remote viewing capability is desired then the Command Centre software helps in enforcing Policy based access to the video streams.

### Advanced Setup

In an advanced setup there are multiple capture devices which can be monitored in parallel. Each capture device supports the Pan, Tilt and Zoom (PTZ) functions. The setup is as shown below.



**Advanced Hardware Setup with the PSG2 System**

In the Advance Setup we have the following additional components.

**1. Capture Device**

Video camera which supports the Pan, Tilt and Zoom (PTZ) functionality. If the camera is mounted outdoors it should be able to resist corrosion and other atmospheric reactions.

**2. Video Multiplexer**

A Video Multiplexer provides at least one output video stream switching it between the available input streams coming from multiple capture devices. If there are multiple outputs streams then some of them can have a single camera feed while others can be used to view multiple input feeds on a single screen. Many multiplexers support up to 16 cameras.

**3. Multiplexer Server / Matrix Switcher**

If the number of capture devices used for surveillance is more than a single video multiplexer's capacity, then a Multiplexer Server / Matrix Switcher is used to aggregate the input streams. Devices in this category support up to eight Video Multiplexers, totaling 128 camera inputs. The output video feed from the Server / Switcher is then digitized using the Digital Video Converter and provided to the PSG2 server as mentioned earlier.

**4. Keyboard Control**

Keyboard Control Systems are used to control the Pan, Tilt, Zoom and other camera operations. They are also used to configure and operate the Video Multiplexers and Multiplexer Server / Matrix Switcher. They can be used to switch the video outputs of the multiplexers to the desired input streams and to configure the default options of the attached devices.

**Component List**

**1. Capture Device**

- a. CamLite - <http://www.camlite.com>
- b. DTC Communications - <http://www.dtccom.com/ir-cameras.htm>
- c. Search Systems - <http://www.searchsystems.com/hazmat.html>
- d. Pelco Esprit ES30PC - <ftp://www.pelco.com/ProductSpecs/C311.pdf>

**2. Wireless Transmitter**

- a. DTC Communication - [www.dtccom.com/video-transmitter-250mw.html](http://www.dtccom.com/video-transmitter-250mw.html)
- b. Smart Sight Wireless Transmission System

**3. Wireless Receiver**

- a. DTC Communication - <http://www.dtccom.com/pdfs/Brick.pdf>
- b. Smart Sight Wireless Transmission System

4. **Video Multiplexer**
  - a. Pelco Genex Series Multiplexer - <http://www.pelco.com/products/default.aspx?id=71>
  
5. **Video Multiplexer Server / Matrix Switcher –**
  - a. Pelco MX4000SVR - <http://www.pelco.com/products/default.aspx?id=277>
  - b. Pelco CM6700 - <http://www.pelco.com/products/default.aspx?id=83>
  
6. **Keyboard System**
  - a. Pelco KBD200A/ KDB300A/ CM9760-KBD - <http://www.pelco.com/products/default.aspx?id=68>
  
7. **Digital Video Converter**
  - a. Turtle Beach - <http://turtlebeach.com/site/products/videocapture/vidusb/>
  - b. Pinnacle - <http://www.pinnaclesys.com/PublicSite/us/Products/Consumer+Products/Home+Video/Studio+Family/Studio+500-USB+version+10.htm>
  
8. **PSG2 Server**
  - a. CPU: Dual 2.2 GHz Xeon
  - b. Memory: 2 GB RAM
  - c. Disk Space: 100 MB free Disk space for the PSG2 server software installation. Additional disk space is required if Video files are stored and transmitted from server. The amount of extra space depends on the codec used for recording the video files and the resolution of the input feed. The PSG2 capture program supports the Window Media Video 7, 8 and 9 video codecs and the MPEG-4 codec with an associated compression ratio of 2.4:1 to 3.8:1.
  - d. Network: 802.11b/ 802.11g/ 802.11a client for wireless connectivity or 100 Mbps Ethernet connection if using a wired network
  - e. Operating System: Windows 2000 Server
  - f. Additional Software: Java 1.5

#### **Hardware Redundancy for Failover Support**

If the system is to be designed for Failover then we will have to split the server functionality as follows

- a. Primary Web Server on one machine
- b. Primary Database Server on one machine
- c. Backup Web Server on one machine
- d. Backup Database Server on one machine
- e. Compaq Smart Array Cluster Storage Shared Drive for database sharing between the Primary and Secondary Database servers

Thus, four server machines are required for the failover setup.