



## *Multi-Stream Video Server™*

ultra low bandwidth, multi-function, IP-based server for the *Boundless Security System™*

### Product Overview

The *Multi-Stream Video Server* is a fully networked, video digitizing, scaling, MPEG-4 compression, many-zone motion-detection, distribution, record, forward, search and access device for the *Boundless Security System™*. It captures video from four CCTV cameras at up to 30 fps / camera without muxing and provides a fault-tolerant, redundant, IP-based, digital video system that is **network-friendly**.

It provides live and recorded video for each camera with multiple resolutions, frame rates and quantizations simultaneously, optimizing image quality, storage, display and communications. The acquisition subsystem creates multiple different digital video streams for each camera, satisfying competing needs for **investigations, monitoring @ 30 fps/camera, and emergency response**. The record, forward and search subsystem provides mass-storage and networked access to live and recorded video streams created by the internal acquisition subsystem and/or external Boundless *Multi-Stream Video Servers*.

It uses Boundless' fully distributed, fault-tolerant *Storage Operating System™* (embedded). Additional Boundless *Multi-Stream Video Servers* provide the number of video inputs and amount of disk storage desired. With the Boundless *Control Panel* software, it provides a **virtual video matrix switch** and **virtual video processors** to live and recorded video from all cameras on multiple networks.

The *Boundless Security System™* replaces hybrid systems that use an analog video matrix switch for live monitoring **@ 30 fps/camera** and interfaces to access control devices, and a separate digital system for recording and networked access. It simultaneously provides multiple video resolutions per camera, avoiding DVR's, video multiplexers and quad-processors for **multi-camera display formatting**.

### Key Features

- Records video and provides live / recorded video with multiple resolutions simultaneously to many local / remote users via LAN / WAN for each of multiple CCTV cameras
- Combines **video-on-demand**, low network traffic of a digital video recorder with superior connectivity, access, expansion and ease of installation of IP-based systems
- Up to five simultaneous digital video streams per camera satisfy competing needs for **investigations** (full camera resolution and max. sharpness), **monitoring** to 30 fps/camera, and **situation assessment**
- Boundless' fully distributed, IP-based, *Storage Operating System™* provides disk storage up to 1 PB per network (opt.), and *Physical Diversity Recording™*, which can store different video streams from a camera in different servers to (1) avoid camera loss due to network and server failures, (2) engineer network traffic, and (3) implement multiple network security zones
- Every user can access all live and recorded video from multiple cameras on multiple networks, and view multiple cameras per screen without interfering with one another
- Network-neutral, low, video-on-demand traffic is ideal for enterprise networks and WiFi, cellular, satellite and other LAN and WAN wireless network segments
- Reliable Linux OS optimized for video
- Extensive buffering and reliable protocols avoid packet loss due to transient network and server overloads, and switch throttling
- Hardware supports optional: audio, ATM and POS data, PTZ and access control
- Optional VPN tunneling and encryption
- Extensive system with optional *Archive Server* and *Broadcast Server*

## Specifications

<b>Operating mode for acquisition subsystem</b>	<p>Within Boundless' ultra low bandwidth, multi-function, <i>Multi-Stream Video Server</i>, the <i>acquisition</i> subsystem operates concurrently with the internal Boundless <i>record, forward and search</i> subsystem and:</p> <ol style="list-style-type: none"><li>1) creates files using global date and time stamps</li><li>2) checks for inadequate video input, due to either loss of camera or inadequate light condition</li><li>3) simultaneously and continuously digitizes analog video inputs from four external CCTV cameras without multiplexing (or 8 cameras with multiplexing in some units)(and 4 IP cameras in some units)</li><li>4) produces multiple resolutions and frame rates simultaneously for each camera (programmable for each camera independently)</li><li>5) compresses each video stream using MPEG-4 Variable Bit Rate / Constant Quality with user-programmable quantization for each stream</li><li>6) performs motion detection with many programmable zones, building a motion list for each camera and embedding it in the camera's video stream in a manner that facilitates rapid searching</li><li>7) encapsulates each compressed digital video stream in Boundless' distributed <i>Storage Operating System™</i> protocols</li><li>8) encapsulates each digital video stream in Internet protocols</li><li>9) reliably sends each stream to a Boundless' <i>Multi-Stream Video Server</i> for recording and live-forwarding using TCP/IP, providing <i>Physical Diversity Recording™</i> when different digital video streams from the same camera are sent to different <i>Multi-Stream Video Servers</i>.</li></ol>
<b>Operating mode for record, forward and search subsystem</b>	<p><b>Pentaplex – beyond triplex.</b> Within Boundless' ultra low bandwidth, multi-function, <i>Multi-Stream Video Server</i>, the <i>record forward and search</i> subsystem simultaneously (1) records video, (2, 3) provides networked access to live and recorded video, and (4, 5) allows archiving and searching.</p> <p>The <i>Boundless Security System™</i> provides reliable recording and <u>networked</u> access to both live and recorded video with superior quality to many users simultaneously. All users can access all live/recorded video via a <b>fully interconnected, virtual matrix switch</b>.</p> <p>Multiple image resolutions per camera and IP-based distribution of all live and recorded video streams enable multi-camera screen formatting to be done independently on each PC used for viewing rather than relying on a multiplexer within the capture or display device.</p> <p>The <i>record, forward and search</i> subsystem operates concurrently with the internal acquisition subsystem and one or more external <i>Multi-</i></p>

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	<p><i>Stream Video Servers</i> and simultaneously:</p> <p>1) records video sent to it by Boundless' acquisition subsystems with all details of file and folder management and selection of the record, forward and search subsystem controlled by the acquisition subsystems. The record, forward and search subsystem acts as a client of the acquisition subsystem, regardless of the physical location of the acquisition subsystem (internal or external).</p> <p>2) forwards live video to Boundless' <i>Control Panel / Video Players</i> under command and control of <i>Video Players</i>. High quality live video at up to <b>30 fps/camera</b> is available throughout the entire network to many users simultaneously. The record, forward and search subsystem of the <i>Multi-Stream Video Server™</i> acts as a server to the client display devices.</p> <p>3) provides access to recorded video to Boundless' <i>Control Panel / Video Players</i> under command and control of <i>Video Players</i>. High quality recorded video @ <b>30 fps/camera</b> is available throughout the network to many users simultaneously. Boundless' <i>Multi-Stream Video Server™</i> acts as a server to the client display and search software.</p>
<b>CCTV Video Input</b>	These functions are provided by the acquisition subsystem
Signal Levels	4 composite video inputs for external analog CCTV cameras: 1 vpp, 75-ohm internal termination; all video inputs are digitized and processed simultaneously without multiplexing
Connectors	Subminiature case: 4 x RCA jacks for composite video on rear panel. A BNC(jack)-to-RCA(plug) adapter is provided for each video input. Shuttle and Rack cases: 4 x BNC video jacks on rear panel.
Compression	<p>MPEG-4 is used. Variable Bit Rate (VBR) with a nominal maximum value limit is used for each stream. Data rate varies with frame-to-frame changes ("motion").</p> <p>A user-configurable file sets all parameters for all streams for all cameras independently. Options are provided to limit data rates and cpu time for each stream.</p> <p>YUV411 (YUV420) is used for color and B&amp;W cameras. Default operation is continuous recording without motion detection to gate recording. "4CIF" video is compressed by frames. CCTV cameras with progressive scan are recommended for optimum "4CIF" performance to minimize motion artifacts due to interlaced scanning. "High resolution" CCTV cameras are recommended for maximum sharpness.</p>
Video Standard	NTSC (optional PAL, software configuration, both can be in a single unit at the same time)

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Video File Format	MP4-like with embedded motion and event data, and audio (opt.)
Resolution of Digital Video Streams	<p>Programmable for each video input via a configuration file. The highest resolution selected (<b>investigations stream</b>) is divided by 2 in each dimension to get the middle-resolution video stream, and that resolution is divided by 2 in each dimension to get the lowest-resolution video stream. The highest resolution should be divisible by 16 in both dimensions. If this is not possible, the <i>Multi-Stream Video Server</i> fills unused lines with black prior to compression.</p> <p>Non-standard resolutions are supported. Video can be cropped vertically before compression to remove unwanted areas, such as a background of trees, to reduce data rates and storage requirements.</p> <p>The highest resolution selected for a given camera should be consistent with the actual horizontal and vertical resolution of the camera, with higher resolutions selected for higher values of TVL (TV lines) of camera resolution. See <i>Anamorphic Capture</i>.</p> <p>Note: All video stream names, “investigations,” “monitoring,” and “emergency response,” are used for descriptive purposes only to reflect the typical use of each stream. Other uses are possible; all live and recorded video streams are handled similarly and can be accessed similarly locally and remotely.</p> <p>Typical digitized resolutions for NTSC streams include:</p> <ul style="list-style-type: none"> <li>a) “4CIF” (704 x 480), “1CIF” (352 x 240), “QCIF” (176 x 120), or</li> <li>b) VGA (640 x 480), QVGA (320 x 240), QQVGA (160 x 120)</li> </ul> <p><b>Note:</b> Terms such as “N CIF” are used to describe relative resolution.</p>
Anamorphic Capture	<p>The <i>Multi-Stream Video Server</i> should be configured to digitize video based upon the horizontal and vertical TVL (TV Lines) of resolution of each camera, rather than using a fixed resolution for all cameras. This minimizes capture and display computation load, file size and communications bandwidth.</p> <p>Different horizontal and vertical display scale factors can be applied by Boundless’ <i>Control Panel / Video Player</i> to compensate for lens scale factors and variations in image sensor resolution.</p> <p>A CCTV camera with 330 TVL of resolution should be captured with approx. 336 lines and 4/3 as many pixels (448) per line. A CCTV camera with 450 TVL of resolution should be captured with 480 lines and 4/3 as many pixels (640) per line. Both could be displayed in the same size window if both capture the same field of view.</p>
Capture Frame Rate	Programmable for each digital video stream for each video input, choices for NTSC include up to and including <b>30 fps/camera</b> .

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	<p>The aggregate “frame rate x resolution” (resolution is measured in units of “CIF”) for all four cameras nominally totals more than 200 CIF fps. Frames may be dropped at point of digitization if there is excessive motion or the capture parameters are set too high.</p> <p><i>Example calculation:</i></p> <p><i>(live and recorded) 4 CIF @ 5 fps/camera = 20 CIF fps/camera, plus</i>  <i>(live only) 1 CIF @ 15 fps/camera = 15 CIF fps/camera, plus</i>  <i>(live and recorded) 1 CIF @ 5 fps/camera = 5 CIF fps/camera, plus</i>  <i>(live only) QCIF @ 15 fps/camera = 3.75 CIF fps/camera, plus</i>  <i>(live and recorded) QCIF @ 5 fps/camera = 1.25 CIF fps/camera</i>  <b>TOTAL = 45 CIF fps/camera</b></p> <p><i>These streams can be provided for each of 4 cameras simultaneously.</i></p> <p><i>Note: Performance of miniature, subminiature, outdoor models is less.</i></p>
<p>Quantization</p>	<p>Programmable for each digital video stream for each video input. Values range from Q = 1 for highest sharpness, fewest compression artifacts and largest file size / highest data rate, to Q = 15 for lowest sharpness, most compression artifacts but smallest file size / lowest data rate. Known as “quality” in some systems. Typical Q values are:</p> <ul style="list-style-type: none"> <li>a) “4 CIF” (<b>investigations</b>): Q = 3 or 4</li> <li>b) “1 CIF” (<b>monitoring</b> medium resolution): Q = 6 or 8</li> <li>c) “QCIF” (<b>situation assessment</b>): Q = 8 or 10</li> </ul>
<p>Number of Networked Digital Video Streams per Camera</p>	<p>Up to 5 streams can be specified per camera so long as the aggregate processing requirements do not exceed the cpu capacity. Configuration files select the resolution, frame rate, quantization and compression parameters for each networked digital video stream for each camera. Different cameras can use different configurations.</p> <p>Streams can be both live and recorded, or, to save storage, as live-only.</p>
<p>Recording Performance</p>	<p>The acquisition subsystem, not the record, forward and search subsystem, determines the video recording performance. The acquisition subsystem controls the record, forward and search subsystems in one or more <i>Multi-Stream Video Servers</i> to record video. Those <i>Multi-Stream Video Servers</i> simultaneously record the compressed video sent to them by the acquisition subsystems of the <i>Multi-Stream Video Servers</i> and, <u>on demand</u>, live-forward the video streams for networked viewing in real time. Multiple <i>Multi-Stream Video Servers</i> can be used by a single acquisition subsystem to provide <b>Physical Diversity Recording™</b>, storing different video streams from a given camera in different <i>Multi-Stream Video Servers</i> in different</p>

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	<p>locations on the network, for fault-tolerance, network security, and to engineer network traffic for accessing the live and recorded video. If all streams from an acquisition subsystem are directed to a co-located record, forward and search subsystem, then <u>no network traffic</u>, i.e., traffic outside the ethernet segment to the nearest ethernet switch, is created.</p> <p>When <b>four cameras</b> are configured with the <b>same parameters</b> for video capture, the typical recording performance for <b>each camera</b> is:</p> <ul style="list-style-type: none"> <li>a) “4 CIF” (640 x 480) @ 5 fps/camera @ Q = 3 [equivalent to a total of 20 CIF fps/camera] <b>plus</b></li> <li>b) “1 CIF” (320 x 240) @ 5 fps/camera @ Q = 6 [equivalent to a total of 5 CIF fps/camera] <b>plus</b></li> <li>c) “QCIF” (160 x 120) @ 5 fps/camera @ Q = 6 [equivalent to a total of 1.25 CIF fps/camera] = <b>TOTAL of 26 CIF fps/camera.</b></li> </ul> <p>Note: <b>Other configurations are possible.</b> Configuration files are provided to select the resolution, frame rate and quantization of each networked digital video stream for each camera. Different cameras can use different configurations. The <b>aggregate resolution-weighted recording frame rate</b> for the <i>Multi-Stream Video Server</i> exceeds 200 CIF fps for Q = 4. Higher aggregate CIF fps values are possible for higher values of Q, which reduces the computation load.</p> <p>Fewer than four cameras can be used to achieve higher frame rates for the cameras used.</p> <p><i>Note: Performance of subminiature and outdoor models is less.</i></p>
<p>Network Bandwidth Required for Video On Demand</p>	<p>The <i>Multi-Stream Video Server</i> provides low, <b>video-on-demand</b> network traffic. If all of the video streams from an acquisition subsystem are directed to the co-located record, forward and search subsystem in the <i>Multi-Stream Video Server</i>™, then the network traffic is virtually zero. Only negligible “heartbeat” traffic is required.</p> <p>The only network traffic is when the live or recorded video from that <i>Multi-Stream Video Server</i>™ is requested, or when a search is performed. This localization of network traffic enables the unit to use a wide variety of wireless clients to connect to the main network, and to only create traffic on the link when the video is requested. A search engine within the <i>Multi-Stream Video Server</i> keeps video traffic internally and provides a graph, with a negligible amount of traffic, when a motion search is requested.</p> <p>The amount of network traffic on the network segment to the nearest ethernet switch depends on resolutions, frame rates, quantizations and compression parameters selected, camera resolution (TVL) and</p>

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	<p>color/B&amp;W, amount of frame-frame changes (“motion”), scene content and noise. Nominal, not to exceed data rates for security video with moderate motion, good lighting, low noise and no camera motion are approx.:</p> <ul style="list-style-type: none"> <li>a) “4CIF” @ 5 fps/camera @ Q = 6: 512 Kbps/camera</li> <li>b1) “1CIF” @ 15 fps/camera @ Q = 6: 392 Kbps/camera</li> <li>b2) “1CIF” @ 5 fps/camera @ Q = 6: 128 Kbps/camera</li> <li>c1) “QCIF” @ 15 fps/camera @ Q = 8: 96 Kbps/camera</li> <li>c2) “QCIF” @ 5 fps/camera @ Q = 8: 32 Kbps/camera</li> </ul> <p>Nominal not to exceed data rates are equivalent to a stiff wall, not a brick wall. Typical data rates at night can be as low as 1/6 these values, and during the day, 1/3 to ½ these values. Sudden, large scale increases in motion can exceed the nominal not to exceed values.</p>
<p>Capacity of record, forward and search subsystem for networked access to live and recorded video</p>	<p>The record, forward and search subsystem can support access via the network to any combination of live and/or recorded video streams for a total of more than 1,000 CIF fps and a total of more than 25 concurrent live and/or recorded video streams in any combination in the rack mount units. These figures are in addition to the number of video streams that the <i>Multi-Stream Video Server</i> is recording under control of a co-located and/or remote acquisition subsystems.</p> <p>Example of video-on-demand access capacity of <i>Multi-Stream Video Server</i> in rack-mount housings:</p> <ul style="list-style-type: none"> <li>a) a total of 20 live and/or recorded video streams in any combination, each with 1 CIF @ 30 fps/stream = 600 CIF fps, plus</li> <li>b) a total of 20 live and/or recorded video streams in any combination, each with 4 CIF @ 5 fps/stream = 400 CIF fps</li> </ul> <p>TOTAL = 40 live and/or recorded streams totaling 1,000 CIF fps</p> <p><i>Note: Performance of smaller units is less.</i></p>
<p>End-to-End Latency</p>	<p>Measured from time of subject movement in front of a camera until the corresponding movement can be seen on a video monitor using Boundless’ <i>Video Player</i> on the same LAN:</p> <p><b>Live video &lt; ½ sec</b> (suitable for viewing &amp; controlling PTZ cameras)</p> <p><b>Recorded video &lt; 10 sec</b> (including recalling most-recent video)</p>
<p>Video Access Time</p>	<p>Measured from the time a video stream is selected for viewing until the video can be seen on a video monitor using Boundless’ <i>Control Panel, Video Player</i> on the same LAN:</p> <p><b>Live and recorded video &lt; 2 sec (typ.) for 1CIF</b> (depends on</p>

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	frequency of key frames selected) and < 10 sec for other resolutions
Capacity of Virtual Matrix Switch	<p>The number of inter-connections per network is essentially unlimited. It is not limited to the number of cameras connected to a single <b>Multi-Stream Video Server™</b>.</p> <p>It handles all live and recorded video streams, with multiple resolutions, frame rates and quantizations simultaneously per camera as specified in each <b>Multi-Stream Video Server™</b> configuration file.</p>
Multi-Camera Screen Formatting / Capacity of Virtual Video Processor	<p>Unlike a DVR that limits networked viewing of multiple cameras on a given screen to the cameras connected to that particular DVR, and can select only one group of its live images at a time for combining into a single screen for remote viewing via the network, the <b>Boundless Security System™</b> provides far greater viewing flexibility.</p> <p>The <b>Boundless Security System™</b> provides a <i>virtual video processor</i> at every display device. It enables every user to view whatever s/he wants independently of all others. Both live and recorded video can be on each screen at the same time. Boundless <b>DisplayServer HDTV</b> enables up to <b>63</b> live and recorded streams to be viewed simultaneously on each PC, bandwidth permitting.</p> <p>The <b>Boundless Security System™</b> enables every authorized user to simultaneously view video from any combination of multiple cameras, with any combination of available resolutions and frame rates, any combination of live and/or recorded video streams, from any combination of multiple Boundless <b>Multi-Stream Video Servers</b> on any combination of multiple networks. Every user can view every stream completely independently of all other users using Boundless' <b>Control Panel</b> software.</p>
Motion Detection	The acquisition subsystem provides fully programmable, many-zoned motion detection for each camera. Parameters include size of movement, speed of movement, and masking of zone. Motion detection provides event data that can be searched quickly by the <b>Control Panel</b> .
File Time-Stamp	Uniform date- and time-stamping of all files in on a given network is provided. An Internet-based time source is used when available. Recording of all files starts at approximately the same instant.
Erasing	Each video stream for each camera can have its own storage retention policy. For example, one can choose to retain the "4CIF" video streams on disk longer than the "1CIF" video streams.
Software for Systems Integrators	Boundless' <b>Video Player</b> software provides a portal to the <b>Boundless Security System™</b> . Boundless' <b>Control Panel</b> software provides a GUI and a virtual video processor for each display device.

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<b>Digital Video Input</b>	(Optional) These functions are provided by the acquisition subsystem
Connector	Provided by the USB 2.0 connectors.
Compression	Digital cameras using raw digital video output are supported.
Resolution of Digital Video Streams	<p>Programmable for each video input via a configuration file. The highest resolution selected is divided by 2 in each dimension to get the middle-resolution video stream, and that resolution is divided by 2 in each dimension to get the lowest-resolution video stream. The highest resolution should be divisible by 16 in both dimensions for color cameras. If this is not possible, the acquisition subsystem fills unused lines with black prior to compression.</p> <p>Digital USB cameras with megapixel resolution can be supported. Four different resolutions of digital video streams can be created per camera simultaneously, with very high, high, medium and low resolutions.</p>
<b>Serial Port</b>	<b>(optional software support, hardware is provided)</b>
Interface	1 x RS-232
Connector	1 x DB9 jack on rear panel
Operating Mode	UART configurable by Linux configuration file; opt. access software for ATM, POS and PTZ. External, ethernet-to-serial port adapter.
<b>Binary IO</b>	<b>(optional software support, hardware is provided)</b>
Alarm Inputs	TTL: total of 4 bits; events can be indicated on leading and/or trailing edges of inputs by software with programmable filtering in software
Control Outputs	TTL: total of 4 bits
Connector	DB25 enhanced parallel port on rear panel (not on Shuttle)
Operating Mode	configurable by Linux configuration file; optional access software
<b>Audio</b>	<b>(optional software support, hardware is provided)</b>
Signal Levels	1 x Stereo Input: -46 to -3 dBV into 1 K ohm
Connectors	1 x 2.5 mm stereo audio jack on rear panel for input
Operating Mode	configurable by Linux configuration file; optional access software
Compression	none (linear), $\mu$ -law (telecom), A-law (telecom), MP3
Resolution	8 or 16 bits per sample
Sampling Rate	8 KHz to 44 KHz
File Format	embedded in video stream to maintain synchronization with video
<b>Networked Recording and</b>	The use of the 100 Mbps network connection in the Subminiature, Shuttle and Rack cases enables the <i>Multi-Stream Video Server</i> to

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<b>Access Capacity</b>	simultaneously record, live-forward and provide networked access to recorded video for approx. 100 digital video streams simultaneously, depending on resolutions, frame rates and quantizations. Networked recording has priority over networked access to live/recorded video.
<b>Operating System</b>	Linux optimized for video. The device is delivered with all software installed for a default configuration, ready for use. Linux configuration files may require modification to change the default configuration.
<b>Application Software</b>	Boundless' <i>Video Management System</i> configured for the specific unit(s) purchased.  <i>No other software may be loaded or run except by certified service personnel and only for diagnostic purposes.</i>
<b>Hard Disks</b>	Internal. Depends on model specified. Not field upgradeable.
<b>Other Disk Drives</b>	None. No floppy or CD-ROM drives. Not field upgradeable.
<b>PC Video Output</b>	DB-15 for standard PC video monitor only. Not used for normal operation. Video cannot be directly viewed on the unit.
<b>Network</b>	
Interface	Ethernet 10 BaseT / 100BaseTX
Connector	RJ-45 jack on rear panel
Protocols	DHCP client, SSH, TCP/IP, Boundless' <i>Storage Operating System™</i> , others. Boundless <i>Control Panel</i> or <i>Video Player</i> client software required for video access.
<b>Other Requirements</b>	Ethernet LAN and one or more PC's running Boundless' <i>Control Panel</i> or <i>Video Player</i> . A router with <b>port redirection</b> , i.e., both NAT and PAT, is required on the network with the <i>Multi-Stream Video Server</i> if it is desired to access multiple <i>Multi-Stream Video Servers</i> on that network via the Internet. Router should support static DHCP addressing (fixed IP address given based on MAC address). Router requirements are relaxed when <i>Multi-Stream Video Server</i> has optional VPN Tunneling, and Boundless' <i>Broadcast Server</i> is used.  Ethernet switches, not hubs, should be used, but error-correcting protocols are used by the <i>Boundless Security System™</i> and enable Wi-Fi and cellular data network segments to be used (see Video Input >> Bandwidth Required at Output of <i>Acquisition Subsystem</i> ).  No keyboard, mouse or monitor provided or required. Unit is "headless" and controlled via LAN using SSH.
<b>Power</b>	Shuttle and Rackmount cases: 120 VAC @ 60 Hz / 220 VAC @ 50 Hz, high reliability power supply. Multiple ball-bearing fans. Approx. 200w dissipation. Use of external uninterruptible power supply

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	<p>required.</p> <p>Subminiature case: 12 VDC, approx. 30w dissipation (car battery power option)</p>
<b>Ordering</b>	
Part Number	<p><b>Multi-Stream Video Server-A with XX GB in YY Case (and Options...):</b></p> <p>where:</p> <p><b>A</b> (choose one):</p> <p><b>4A</b> – four non-multiplexed analog CCTV inputs</p> <p><b>XX</b> (choose one) = ask for current sizes</p> <p><b>YY</b> (choose one):</p> <p><b>Subminiature</b> – approx. 6” W x 10”L x 1.75”H (max. 160 GB)</p> <p><b>Subminiature Ventless</b> – approx. 6.25” W x 10”L x 2.25”H plus 0.5” height for external fans (max. 160 GB)</p> <p><b>Shuttle</b> – approx. 8”W x 7.4”H x 12”L (max 1.5 TB)</p> <p><b>R1U</b> – 19-inch, 1U rack-mount (max. 4.5 TB)</p> <p><b>Options:</b></p> <p><b>Access Control</b> = access control, binary inputs and outputs software (external, third-party buffers/translators may be required)</p> <p><b>PAL</b> = European standard video format</p> <p><b>PTZ</b> = Pan-Tilt-Zoom control software (external, third-party, RS-232 to RS-485 conversion device, or ethernet to serial port adapter required)</p> <p><b>NOTE: See <i>Indoor Products Ordering Guide</i> for latest information.</b></p>
Description	<p>The Boundless multi-function, ultra low bandwidth, <i>Multi-Stream Video Server™</i> is a four-CCTV-camera, IP-based, video digitizing, MPEG-4 compression, multi-zoned motion detection, multi-stream-formation per camera, record, storage, networked access, and networked live video device for the <i>Boundless Security System™</i>.</p>

**Rev. August 31, 2006. Specifications subject to change without notice. Typographical errors subject to correction. Product photo may vary. See Boundless' Standard Terms and Conditions of Sale.**