

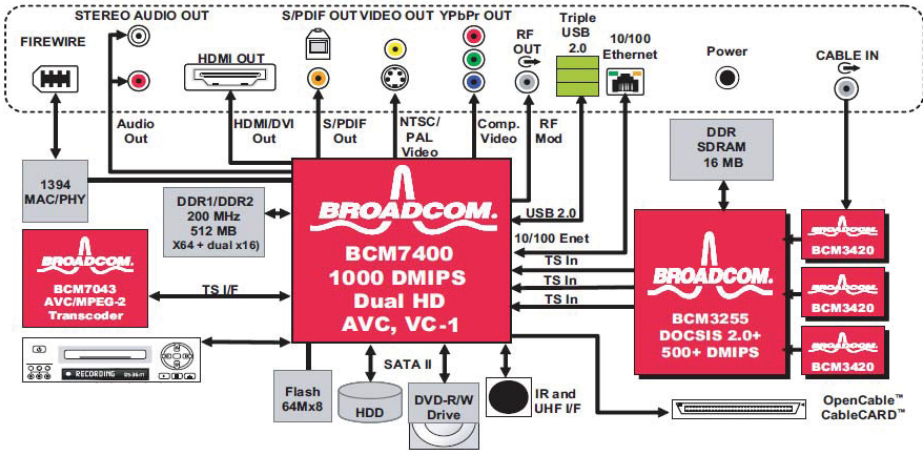
EXHIBIT A
Preliminary Infringement Claim Chart for U.S. Pat. No. 6,233,389
Samsung DVRs

the Claim	Samsung DVRs ¹
Claim 1	
1[a]. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:	<p>A Samsung DVR can simultaneously store and play back multimedia data. <i>See, e.g.,</i> http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>"TIME WARNER CABLE AND SAMSUNG FORGE AGREEMENT FOR TRU2WAY SET-TOP DEVELOPMENT, PURCHASE & DEPLOYMENT Release Date: 07/06/2009</p> <p>Time Warner Cable and Samsung today announced that they have signed a letter of commitment for the continued development, purchase and deployment of Samsung True2Way enabled set-top boxes, including the first second-source DVR. "We look to offer our customers advanced set-top boxes with features that are simple and easy to use," said Mike Hayashi, Executive Vice President of Advanced Engineering for Time Warner Cable. "We have been a leader in the roll-out of Tru2Way devices and we are continuing to grow our relationship with Samsung, a CE company dedicated to the development of new equipment meeting the necessary standards and offering attractive feature sets."</p> <p>Thomas Rhee, SVP, New Business Development for Samsung, added, "We are thrilled to have worked closely with Time Warner Cable to launch Tru2way on our family of cable set-tops including the SMT-H3090 and SMT-H3270 High Definition DVRs. As in Korea, we look forward to the expansion of Tru2way in North America."</p> <p>This agreement further solidifies Time Warner Cable's commitment to its deployment of Tru2Way enabled set-top boxes. To date Time Warner Cable has deployed over 2 million Tru2Way set-top boxes, of which approximately 400,000 are Samsung boxes.</p> <p>Time Warner Cable and Samsung also recently signed an MOU that focuses on collaborating in development of better home</p>

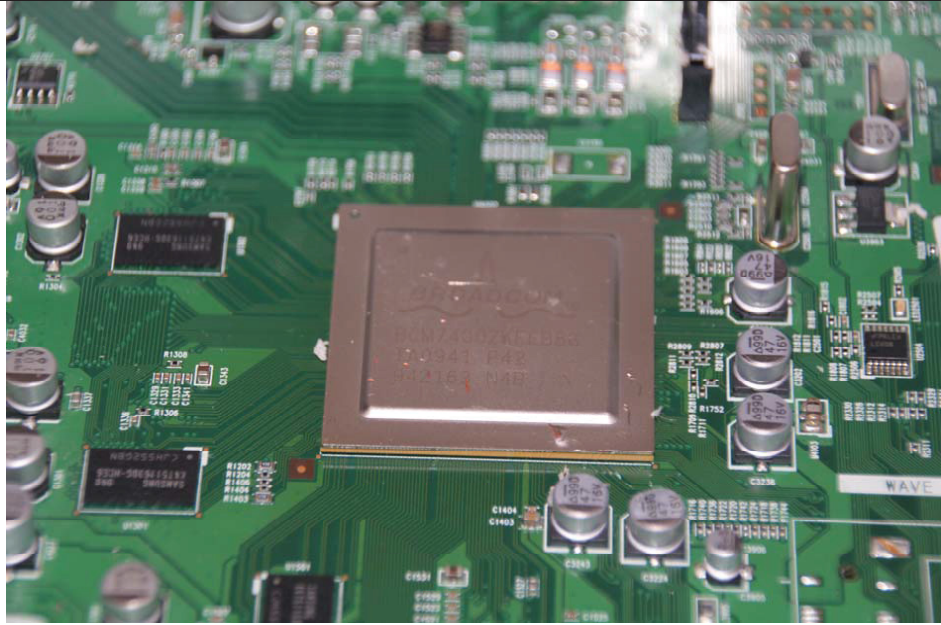
¹ In this chart, reference is made to a Samsung DVR identified as SMT-H3090. The same analysis applies to other Samsung DVRs with the same functionality, including but not limited to set top boxes with DVR functionality bearing the model designations, SMT-H3272, SMTH3270, and SMT-H4372 and other DVRs having the same functionality. Additionally, this chart also references the specific processor included in the SMT-H3090. The same analysis applies to DVRs that include other processors with the same functionality, for example the processors in each of the accused DVRs.


the Claim	Samsung DVRs ¹
	networking solutions for entertainment. This work is part of Time Warner Cable's continuing efforts to provide its customers with technology that brings new levels of ease and convenience." http://www.timewarnercable.com/corporate/about/inthenews.ashx?PRID=2626&MarketID=0

the Claim	Samsung DVRs ¹
[1b] accepting television (TV) broadcast signals, wherein said TV signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;	<p>A Samsung DVR accepts television broadcast signals. On information and belief, Samsung DVRs receive television programming in the form of QAM-modulated MPEG2 transport stream packets.</p> <p><i>See, e.g.</i>, (Samsung SMT-H3090 2008 Data Sheet), p.1 (“Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs Simultaneously.”), p. 2 (“In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM.”));</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 (“RF Input Tuning Range: 88 to 860 MHz.”); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips)</p> <p>On information and belief, Samsung DVRs accept ATSC broadcast signals.</p>
[1c] tuning said TV signals to a specific program;	<p>A Samsung DVR has tuners which can tune TV signals to a specific program. <i>See, e.g.</i>, (Samsung SMT-H3090 2008 Data Sheet), p.1 (“Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs Simultaneously.”), p. 2 (“In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM.”)). For example, based on information and belief the Samsung DVRs tune to a specific frequency or a band of frequencies.</p>
[1d] providing at least one Input Section, wherein said Input Section converts said specific program to an Moving	<p>A Samsung DVR has at least one Input Section, wherein said Input Section converts said specific program to a Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation. The Input Section converts said specific program to an MPEG formatted stream, for example in the course of performing QAM demodulation and Analog-to-Digital conversion (A/D). A Samsung DVR will perform QAM demodulation and Analog-to-Digital conversion in the course of watching live television and recording a television program. <i>See, e.g.</i>,</p>


the Claim	Samsung DVRs ¹
<p>Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation;</p>	<p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("RF Input Tuning Range: 88 to 860 MHz."); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips):</p>  <p>The diagram illustrates the internal architecture of a Samsung DVR. At the center is the BROADCOM BCM7400 1000 DMIPS Dual HD AVC, VC-1 chip. To its left is the BROADCOM BCM7043 AVC/MPEG-2 Transcoder, which interfaces with a 1394 MAC/PHY and Audio Out ports. Above the central chip are various output ports: STEREO AUDIO OUT, HDMI OUT, S/PDIF OUT, VIDEO OUT, YPbPr OUT, NTSC/PAL Video, Comp. Video, RF OUT, Triple USB 2.0, and 10/100 Ethernet. Below the central chip are storage and interface components: Flash 64Mx8, HDD, SATA II, DVD-R/W Drive, IR and UHF I/F, and OpenCable™ CableCARD™. To the right of the central chip is the BROADCOM BCM3255 DOCSIS 2.0+ 500+ DMIPS chip, which is connected to three BCM3420 chips. The system also includes DDR1/DDR2 200 MHz 512 MB X84 + dual x16 memory and DDR SDRAM 16 MB.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Input Section, for example that of converting a specific program into an MPEG stream, in substantially the same way, for example by turning the input data, whatever its format, into a digital representation such as MPEG, to yield the same result, a properly formatted data stream for internal transfer and manipulation.</p>
<p>[1e] providing a Media Switch, wherein said Media Switch parses said MPEG stream, said</p>	<p>A Samsung DVR has a Media Switch, wherein said Media Switch parses MPEG streams, said MPEG stream is separated into its video and audio components. The Media Switch parses MPEG streams, for example, on information and belief, in the course of PID filtering and start code detection. Broadcom chips used inside Samsung DVRs have PID filters or parsers that PID filter or parse multi-program transport streams to a single-program transport stream and start code detectors that perform start code detection. <i>See, e.g.,</i></p>

the Claim	Samsung DVRs ¹
MPEG stream is separated into its video and audio components;	

the Claim	Samsung DVRs ¹
	<div></div> <div>(showing internal chips of Samsung SMT-H3090, Broadcom BCM74xx);</div>

the Claim	Samsung DVRs ¹
	<div></div> <div>(showing internal chips of Samsung SMT-H3090, Broadcom BCM3255).</div> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the media switch, for example that of parsing an MPEG stream, in substantially the same way, for example by performing PID filtering, start code detection, or other analysis of the underlying data, to yield the same result, a data stream</p>


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	<p>including any additional information needed for its further processing.</p> <p>On information and belief, the MPEG stream is separated into its video and audio components, for example, the course of PID filtering, start code detection, and temporary storage in memory. Additionally, the streams are separated when presented to the video and audio decoders. In the course of PID filtering and start code detection, on information and belief, MPEG2 transport stream packets are discretely analyzed. Each MPEG2 transport stream packet contains audio or video data. The MPEG2 transport stream packets are temporarily stored in memory (e.g., on-chip buffers, flash, and/or system DRAM), where each MPEG2 transport stream packet is held in a distinct memory location. As another example, the video and audio data packets of the MPEG data are separated when they are sent to separate decoders. For example, audio packets go to audio decoders while video packets go to video decoders</p> <p>Samsung DVRs may contain MPEG encoders, including the BCM7041:</p>

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	<div></div> <p>(showing internal chips of Samsung SMT-H3090, Broadcom BCM7041).</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Media Switch, that of parsing an MPEG stream and separating an MPEG stream into its video and audio components so that the video and audio components can be provided to the video and audio MPEG decoders, in substantially the same way, by performing PID filtering, start code detection, and separating the video and audio components, to yield the same result, an analyzed MPEG stream that is separated into audio and video components, and therefore would infringe under the doctrine of equivalents.</p>


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	<p>Still further, on information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Media Switch, that of parsing an MPEG stream and separating an MPEG stream into its video and audio components so that the video and audio components can be provided to the video and audio MPEG decoders, in substantially the same way, by sending the video and audio data to separate decoders, regardless of any order of processing in the DVR, to yield the same result, an analyzed MPEG stream that is separated into audio and video components for playback on a user's display, and therefore would infringe under the doctrine of equivalents.</p>

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	<p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
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[1g] providing at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;	<p>A Samsung DVR has at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device. For example, Samsung DVRs allow users to play back recorded television programs to watch at a later time. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>(Samsung SMT-H3090 2008 Data Sheet), at 1:</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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[1h] wherein said Output Section assembles said video and audio components into an MPEG stream;	device, in substantially the same way, for example by reading the data from the storage device, to yield the same result, a retrieved data stream for further processing and display to a viewer.																	
	<p>A Samsung DVR has at least one Output Section that assembles said video and audio components into an MPEG stream. On information and belief, MPEG2 transport stream packets are assembled into an MPEG2 transport stream, de-multiplexed, and packetized elementary streams are constructed when read from the disk and/or before being sent to a decoder.</p> <p>For example, Video and Audio data are read from the disk for playback.</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording
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[1i] wherein said Output Section sends said MPEG	<p>VIDEO AND GRAPHICS DISPLAY</p> <p>OVERVIEW</p> <p>The video and graphics module accepts decoded AVC/MPEG/VC-1 or analog video and performs professional quality compositing of text and graphics with video. The video subsystem takes in uncompressed video from either the AVC/MPEG/VC-1 decoder or the digital ITU-T-656 input. The subsystem processes the input videos based on the input and output format, and system requirements. It can be scaled and converted to the output display format directly, or go through single and multiple capture and playback loops. Each capture and playback loop could involve data processing like DNR, MAD-IT, or scaling.</p> <p>Two independent video streams (one stream must be limited to SD stream) can be processed at the same time and converted to different size and format. Finally, they can be blended together as PIP (picture in picture) windows or drive up to two separate displays. Both displays may have separate graphics inputs to be blended with. The architecture allows users to create a series of frame-buffers that allow an unlimited number of graphics layers to be composited and blended together before being displayed.</p> <p>Once the graphical frame-buffers are available, they can be combined with the video using a new compositor. This new compositor allows up to two video surfaces to be combined with a graphical surface (frame-buffers). The blending order of any surface is controlled by software to allow the utmost flexibility for the end-user.</p> <p>The graphic surface generation is now divorced from the real-time display requirements of the video output. Once the new graphics surface is available, it can be switched in for display. Therefore, all of the graphics development interacts only with the memory—not with any of the display hardware.</p> <p>The architecture goal of this new, modular approach is to allow various chip-sets to share the same basic component building blocks to achieve the customers design requirements. The BCM7405 employs enough of these building blocks to realize a dual video output with independent graphics on each output. Supported video decode and display format combinations can be seen in Table 1-4 on page 1-36.</p> <p>BRCM 7405 Preliminary Hardware Data Module at 1-35</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Output Section, for example that of assembling said video and audio components into an MPEG stream, in substantially the same way, for example by demultiplexing or packetizing the data, to yield the same result, a properly formatted data stream for presentation to the decoder.</p>
	A Samsung DVR has an Output Section that sends said MPEG stream to a decoder. <i>See, e.g.,</i> (BCM7400 Product Brief):

the Claim

stream to a decoder;

Samsung DVRs¹

The diagram illustrates the internal architecture of Samsung DVRs, centered around the BCM7400 chip. Key components include a Dual-Threaded MIPS[®] μ P (32 KB I, 16 KB L, 16 KB D, 128 KB L2 FPU and MMU), a Secure Processor, Advanced 2D Graphics Display Engine, 3D Graphics Rendering Engine, Video processing block (Scalers, Compositors, Digital noise reduction, Deinterlacing, Picture-in-Picture), Dual Multiformat Audio Processors, PCM Audio Engine and DACs, Triple Composite NTSC/PAL VEC with 7 DACs, RF Modulator, BSC, Soft Modem (Si305X, Ethernet 10/100BASE-T), Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, Dual PVR Engine with Trick Modes, MPEG-2/DVB Transport, ITU-R-656 Decoders, and a Bus Bridge. External interfaces include PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, USB 2.0 x2, USB 2.0, IR/UHF RX, IR TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, NTSC Channel 3/4, BSC x5, Gateway Services, Dual 16-bit DDR2 Pixel Op Ports, RMX x2, ISO7816 I/F x3, DCAS, SCARD, MCARD, Transport Input x6, Dual ITU-R-656 I'S In x2, and Dual ITU-R-656 I'S In x2.

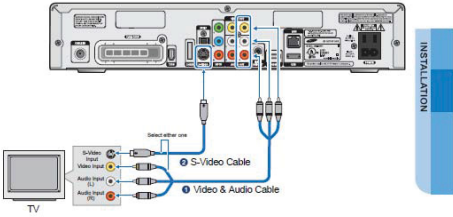
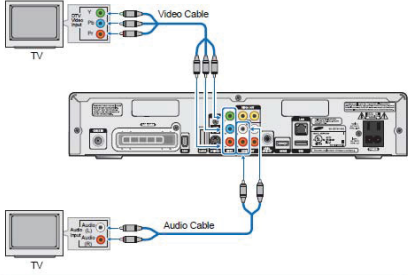
BCM7400 Block Diagram

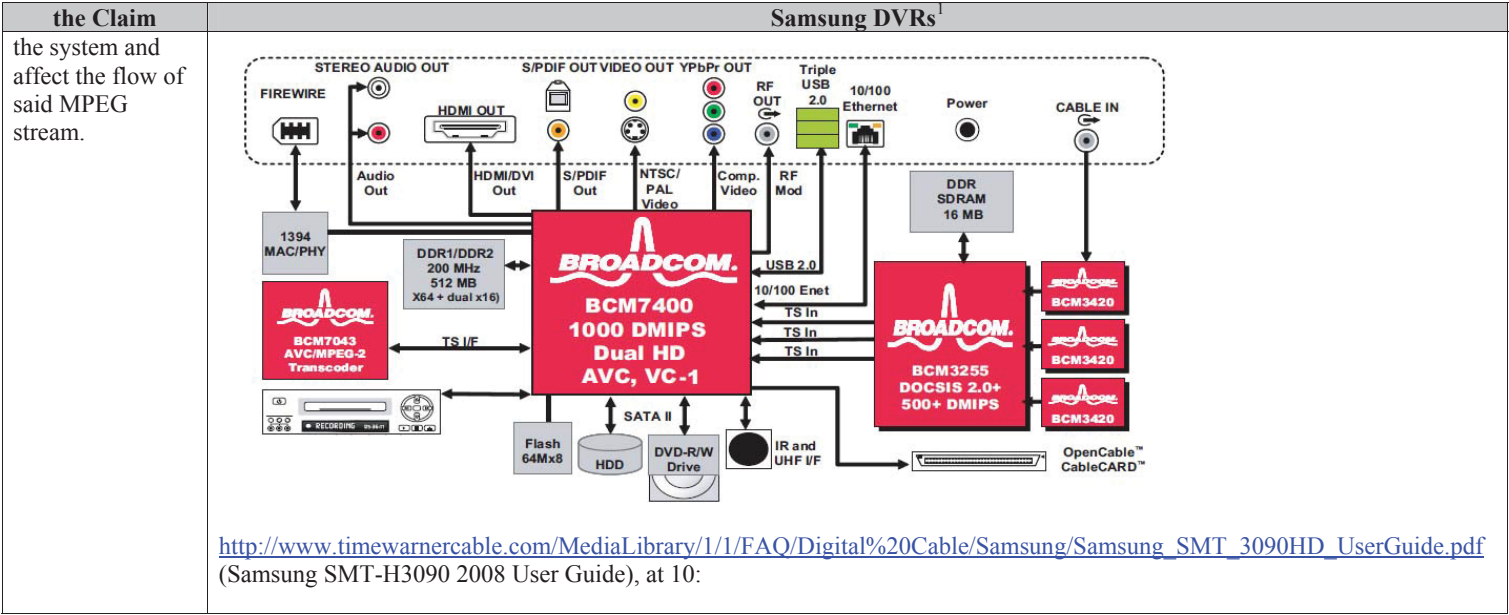
(Samsung SMT-H3090 2008 User Guide), at 6:

the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB</p> <p>Digital HD DVR OCAP STB (Digital High-Definition Digital Video Recorder OpenCable Application Platform Set-Top Box) provides high quality video and audio broadcasting, and interactive services including Video-On-Demand.</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
HDD	Capacity						
160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.						
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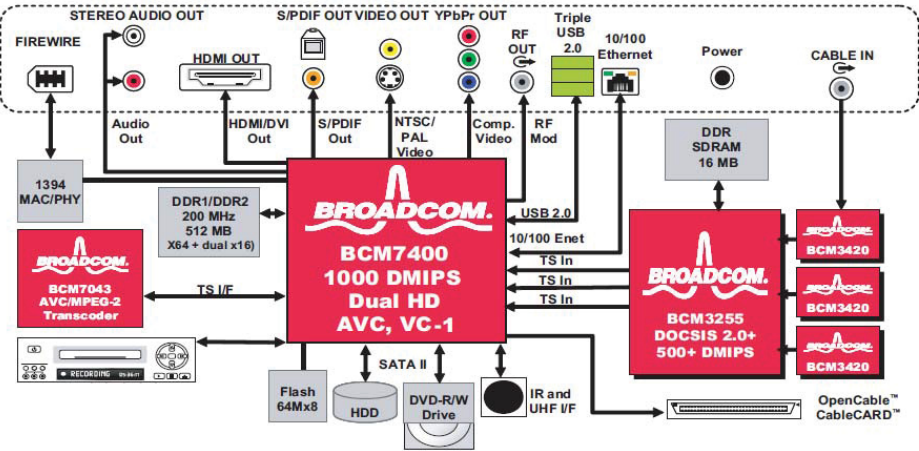
the Claim	Samsung DVRs ¹
<p>[1j] wherein said decoder converts said MPEG stream into TV output signals;</p>	<p>A Samsung DVR has decoders that convert MPEG streams into TV output signals. On information and belief, the Broadcom chips used in Samsung DVRs contain video and audio decoders.</p> <p>See, e.g., (Broadcom BCM 7400 Product Brief), at 1:</p> <div><p>FEATURES</p><ul style="list-style-type: none">• Dual advanced AVC/MPEG-2/VC-1 decoders<ul style="list-style-type: none">• H.264/AVC Main and High Profile to Level 4.1• VC-1 Advanced Profile @ Level 3• VC-1 Simple and Main Profile• HD MPEG-2 and SD MPEG-2• MPEG still-picture decode• DivX[®] and MPEG4 part 2 ASP decode</div> <p>(Broadcom BCM 7400 Product Brief), at 2 (showing video decoders):</p> <div><p>BCM7400 Block Diagram</p><p>The diagram illustrates the internal architecture of the BCM7400 chip. Key components include:</p><ul style="list-style-type: none">Top Section: Dual-Threaded MIPS[®] μP (32 KB I, 16 KB L, 16 KB D, 128 KB L2 FPU and MMU), Bus Bridge, DRAM Controller, DMA, and USB 2.0 ports.Middle Section: Secure Processor, ROM, OTP, Advanced 2D Graphics Display Engine, 3D Graphics Rendering Engine, Video (Scalers, Compositors, Digital noise reduction, Deinterlacing, Picture-in-Picture), Dual Multiformat Audio Processors, PCM Audio Engine and DACs, and GPIO.Bottom Section: ITU-R-656 Decoders, DCAS, SCARD, Transport Input x6, MPEG-2/DVB Transport, Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, Soft Modem, SI305X, Ethernet 10/100BASE-T, BSC, RF Modulator, and Triple Composite NTSC/PAL VEC with 7 DACs.Interfaces: PCI 2.2 & Flash, Dual SATA2, DDR2-SDRAM, USB 2.0 x2, USB 2.0, IR In x2, UHF In x2, IR Out, UARTx3, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, NTSC Channel 3/4, ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, and BSC x5.</div>

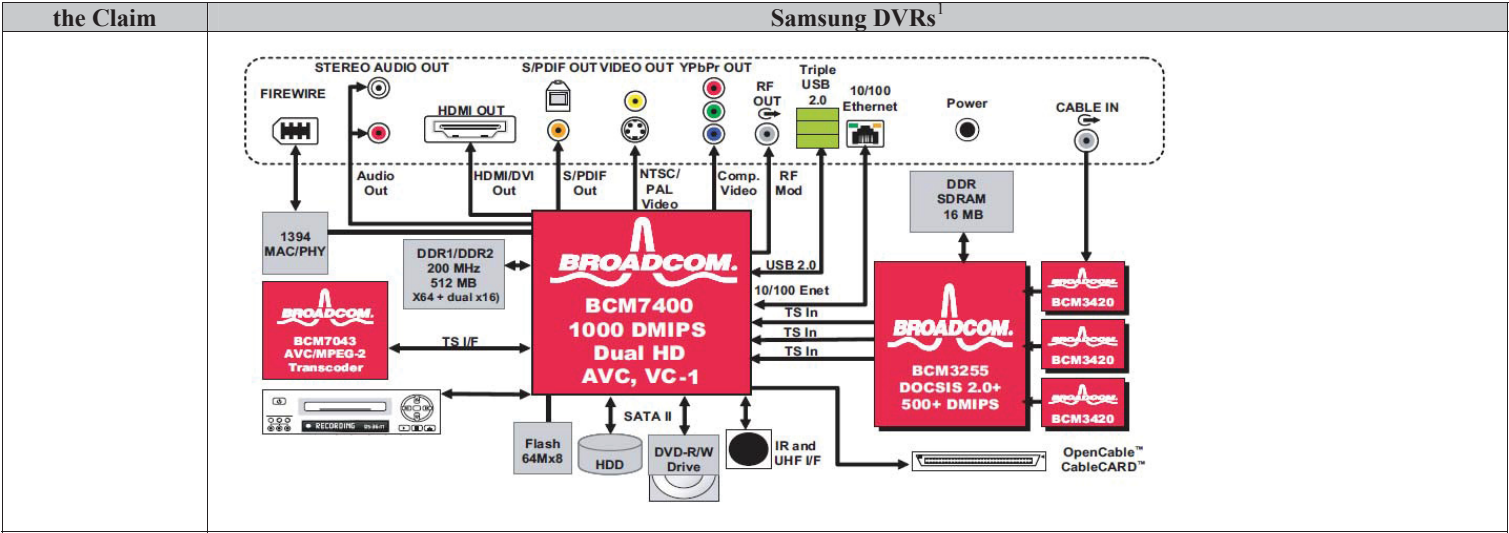
the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>The advanced video decoders featured in the BCM7400 are capable of supporting high definition AVC, VC-1, and MPEG-2 streams. AVC support is for Main and High Profile to level 4.1 for 720p and 1080i high definition support or to Level 3.1 for standard definition streams. AVC High Profile was added to the fidelity range extensions specifically to address the needs of consumer broadcast and playback applications. Tools include additional transform sizes and spatial prediction modes and support for adaptive quantization matrix. The video decoders also support high definition VC-1 (Advanced Profile Level 3, Main, and Simple Profiles) and MPEG-2, Main Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p>

the Claim	Samsung DVRs ¹
<p>[1k] wherein said decoder delivers said TV output signals to a TV receiver; and</p>	<p>A Samsung DVR delivers decoded TV output signals to a TV receiver. A Samsung DVR can be connected to a TV using HDMI, DVI, component, Y Output, Video Output, S-Video Out, Cable Out, or 1394 connectors. <i>See, e.g.,</i> http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 13-14:</p> <div><div><p>Connection to a TV Having a Composite or S-VIDEO Jack</p><p>Below is the method for connecting to a TV having a composite or S-VIDEO jack.</p><p>Video Connection</p><p>1 Connection to the VIDEO OUT jack Using a video connector of Video & Audio cable, connect the VIDEO OUT jack to the Video Input jack on the TV.</p><p>2 Connection to the S-VIDEO OUT jack Using an S-Video cable, connect the S-VIDEO OUT jack to the S-Video Input jack on the TV.</p><p>Audio Connection</p><p>Using the offered Audio cable or audio connectors of Video & Audio cable, connect the AUDIO OUT (L/R) jacks on the rear panel to the Audio Input (L/R) jacks on the TV. Be sure to match the audio jacks with the plugs of the same color.</p></div><div><p>Connection to a TV Having Component Jacks (Y, Pb, Pr)</p><p>See below to connect to a TV having a Component port (Y, Pb, Pr). When connecting the Component Video and Audio cables, be sure to match the jacks to the plugs of the same color.</p><p>Video Connection</p><p>Using the offered Video (Component) cable, connect the Y, Pb, Pr (HDTV) jack to the Y, Pb, Pr (DTV Video Input) jack on the TV.</p><p>Audio Connection</p><p>Using the offered Audio cable, connect the AUDIO OUT (L/R) jacks on the rear panel to the Audio Input (L/R) jacks on the TV. Be sure to match the audio jacks with the plugs of the same color.</p></div></div> <p>SMT-H3090 User Guide, 13 14 © SAMSUNG Electronics Co., Ltd.</p>
<p>[1l] accepting control commands from a user, wherein said control commands are sent through</p>	<p>A Samsung DVR accepts control commands from a user, wherein said control commands are sent through the system and affect the flow of an MPEG stream. The Samsung DVR software is responsive to front panel buttons and a remote control. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The hardware and software receives commands from a user, which affect the flow of data through the system, e.g., begin recording, channel change, trickplay, etc. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):</p>



the Claim	Samsung DVRs ¹																		
	<p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table> <tr> <th>Feature</th><th>Description</th></tr> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function, for example that of accepting control commands from a user, in substantially the same way, for example by including hardware and/or software interfaces that can accept user commands, to yield the same result, wherein said control commands are sent through the system and affect the flow of said MPEG stream.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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EPG Recording	Scheduled recording using EPG																		
Claim 2																			
The process of claim 1, wherein said Input Section directs said MPEG stream to the destination	<p>In addition to the features described above regarding claim 1, Samsung DVRs include an input section that directs an MPEG stream to a destination indicated by said control commands.</p> <p>For example, when a Samsung DVR receives a command to record a television program, an input section, including for example tuners, parsers, and other processing devices may direct MPEG data to any of memory, hard disks, and/or optical storage</p>																		

the Claim	Samsung DVRs ¹
indicated by said control commands.	<p>devices.</p>  <p>The diagram illustrates the internal architecture of a Samsung DVR. At the center is the BROADCOM BCM7400 1000 DMIPS Dual HD AVC, VC-1 chip. It is connected to several input/output blocks: STEREO AUDIO OUT, FIREWIRE, Audio Out, HDMI/DVI Out, S/PDIF Out, VIDEO OUT, YPbPr OUT, NTSC/PAL Video, Comp. Video, RF OUT, Triple USB 2.0, 10/100 Ethernet, Power, and CABLE IN. The central chip is also connected to DDR1/DDR2 200 MHz 512 MB X64 + dual x16 memory. To the left, a 1394 MAC/PHY block connects to the central chip. Below the central chip, there is a Flash 64Mx8 block, an HDD (Hard Disk Drive), and a DVD-R/W Drive. To the right, a BROADCOM BCM3255 DOCSIS 2.0+ 500+ DMIPS chip is connected to the central chip and to three BCM3420 chips. The central chip also connects to a TS I/F (Transport Stream Interface) block. The BCM7043 AVC/MPEG-2 Transcoder is connected to the central chip and the TS I/F block. The IR and UHF I/F (Infrared and Ultra High Frequency Interface) block is connected to the central chip and the OpenCable™ CableCARD™ block.</p>
Claim 3	
The process of claim 1, wherein said Output Section extracts said video and audio components from the storage device indicated by said control commands.	<p>In addition to the features described above regarding claim 1, Samsung DVRs include an output section that extracts video and audio components from the storage device indicated by said control commands.</p> <p>For example, when a Samsung DVR receives a command to play back a television program, an output section, including for example decoders, demodulators, and other processing devices may extract video and audio data from any of memory, hard disks, and/or optical storage devices for display to a viewer.</p>



the Claim	Samsung DVRs ¹
Claim 5	
<p>The process of claim 1, wherein the storing and extracting of said video and audio components from said storage device are performed simultaneously.</p>	<p>A Samsung DVR can simultaneously store and extract video and audio components from a storage device, for example, in the course of simultaneously recording and playing back television programming. <i>See, e.g.,</i> http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function, for example storing and extracting of said video and audio components from said storage device, in substantially the same way, for example by performing these actions substantially simultaneously, to yield the same result, wherein said storing and extracting appear to occur at the same time.</p>
Claim 6	
<p>The process of claim 1, wherein said Media Switch calculates and logically associates a time stamp to said video and audio components.</p>	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch that calculates and logically associates a time stamp to said video and audio components.</p> <p>For example, when a Samsung DVR records a program a local timestamp may be generated by a processor and internal clock, and stored with the video and audio date. <i>See, e.g.,</i> BRCM 7405 functional description at page 1-22:</p> <p>A local timestamp is generated at the input buffer via an internal counter using a 27-MHz clock selectable from any of the three available locked timebases, or the free-running system clock. The local timestamp can be prepended as a 32-bit field to each recorded transport packet. The format of the 32-bit timestamp field is programmable. In one mode, this field contains a 28-bit local timestamp plus a 4-bit parity which can be used during playback to transmit the packets at a rate equivalent to when they were recorded and can be used for PCR correction in the Remux modules. In another mode, the upper two bits of the 32-bit timestamp field are user programmable with the remaining bits being the timestamp.</p>

the Claim	Samsung DVRs ¹
Claim 7	
<p>The process of claim 1, wherein said Media Switch extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.</p>	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch that extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.</p> <p>For example, when a Samsung DVR receives and records digital input stream, it may include a time stamp, such as a presentation time stamp (PTS) that is included in that stream. The PTS will be extracted and stored with the input data stream. See, e.g., BRCM 7405 functional description at page 1-22:</p> <p><i>Record Channel's Index Table Generation</i></p> <p>Index table generation is a function that is supported in the record channel. Although this function handles more than just start code table entries, it will be referred to as the SCD (start code detector) in this document.</p> <p>The SCD records the positions of PES packet header stream_id's and elementary stream start codes within a recorded transport stream for a given PID. There are two transport modes of operation: MPEG and DIRECTV. The data structure for data stored in the memory buffer is a start code index table that is detailed in the Record Index Table Definition section.</p> <p>Within each transport mode (MPEG and DIRECTV), there are four index table modes supported. All modes utilize a 6-word index entry. Four index entry types are supported: Start Code (SC), Presentation Time Stamp (PTS), Transport Field (TF), and Seamless Pause (SP). The following describes the four entry types:</p> <ol style="list-style-type: none"> 1 The SC index entry provides offsets to start-code locations within the associated record buffer. 2 The PTS index entry provides PTS values extracted from the recorded stream. 3 The TPIT transport field parser stores transport field index entries. For the on-change conditions, an initial entry is made for detection of the first PID. For example, if the first packet for a PID with the transport_scrambling_control_change_en bit set has a scrambling control of 10, an index table entry is stored for the transport_scrambling_control_change condition with the transport_scrambling_control_change bit set and the actual value of the scrambling_control of 10 is stored in the scram_control field. 4 The seamless pause feature is intended for use with playback. It allows live viewing of a program with the capability of pausing the program. The program is initially viewed without going through the record/playback path. This eliminates channel change latency incurred when going through this path. When the user wishes to pause the program, a record channel must be enabled with the appropriate PID channels selected for record. Then REC_PAUSE_EN is asserted. This assertion prevents the selected PID channel data from being sent to the audio/video decoders. The user sees this as a pause. Once REC_PAUSE_EN is set, the next packet that is recorded has a seamless pause entry made in the record index table (if the index table is enabled). When the user wishes to resume the program, the stream now comes from a playback channel instead of the live channel. The index table entry made for seamless pause is used to determine where to start the playback.

the Claim	Samsung DVRs ¹																		
Claim 12																			
The process of claim 1, further comprising the step of: increasing the decoder system clock rate for fast playback or fast reverse playback	<p>In addition to the features described above regarding claim 1, Samsung DVRs include fast playback and fast reverse playback.</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table> <tr> <th>Feature</th><th>Description</th></tr> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </table> <p>On information and belief, at least one of these fast playback and fast reverse playback modes are implemented by, among other things, increasing the decoder system clock rate. For example, the PCR block may be used by rate managers to control the playback rate of the decoders.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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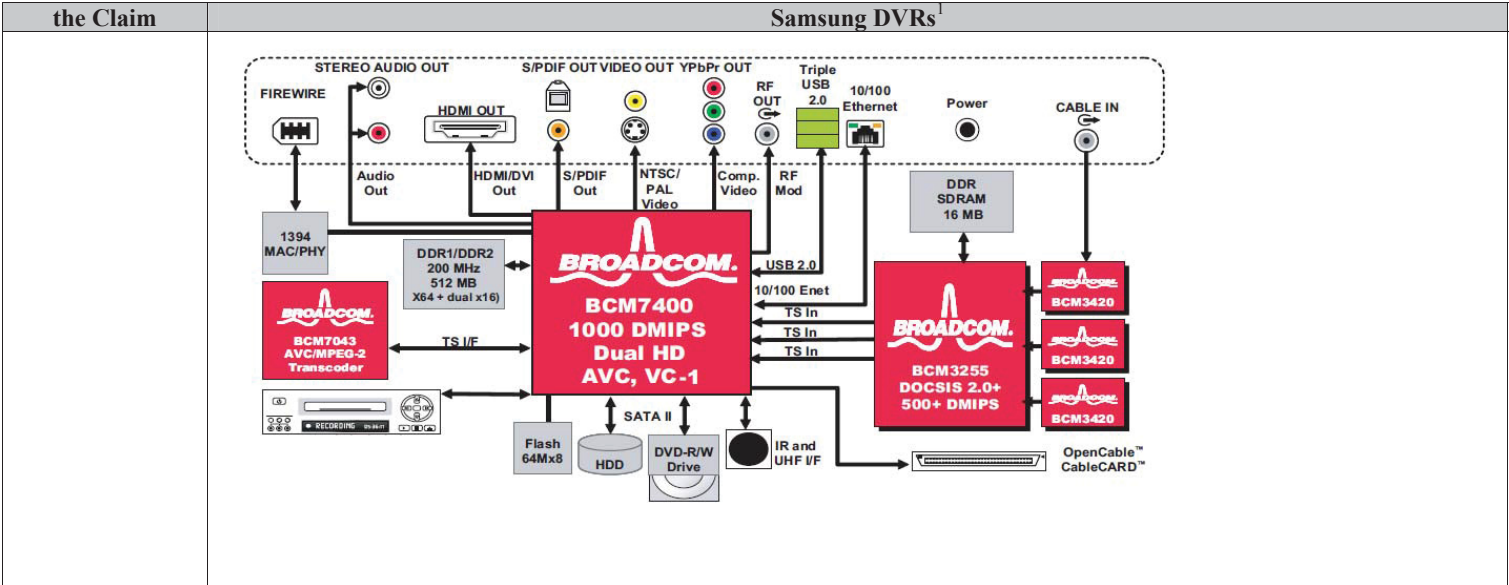
the Claim	Samsung DVRs ¹																		
	<p>PCR Recovery Block</p> <p>The data transport design supports two equivalent PCR recovery circuits, each programmed independently.</p> <p>Each data transport PCR module is capable of extracting the PCR information from a selected packet stream and generating Timebase pulses (Timebase is a 27-MHz pulse train in 108-MHz clock domain) output that can be used by rate managers. Each PCR module is also used to send the extracted PCRs directly to the audio and video decoders to ensure that both decoders are using the same PCR.</p>																		
Claim 13																			
<p>The process of claim 1, further comprising the step of: decreasing the decoder system clock rate for slow playback or slow reverse playback.</p>	<p>In addition to the features described above regarding claim 1, Samsung DVRs include slow playback and slow reverse playback.</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table> <tr> <th>Feature</th><th>Description</th></tr> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </table> <p>On information and belief, at least one of these slow playback and slow reverse playback modes are implemented by, among other things, decreasing the decoder system clock rate. For example, the PCR block may be used by rate managers to control the</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
Feature	Description																		
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EPG Recording	Scheduled recording using EPG																		

the Claim	Samsung DVRs ¹
	<p>playback rate of the decoders.</p> <p>PCR Recovery Block</p> <p>The data transport design supports two equivalent PCR recovery circuits, each programmed independently.</p> <p>Each data transport PCR module is capable of extracting the PCR information from a selected packet stream and generating Timebase pulses (Timebase is a 27-MHz pulse train in 108-MHz clock domain) output that can be used by rate managers. Each PCR module is also used to send the extracted PCRs directly to the audio and video decoders to ensure that both decoders are using the same PCR.</p>

the Claim	Samsung DVRs ¹
Claim 18	
<p>The process of claim 1, wherein said Media Switch has a data bus connecting it to a CPU and DRAM.</p>	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch that has a data bus connecting it to a CPU and DRAM.</p> <p>For example, Samsung DVRs may include a processor that includes, for example, an EBI with a data bus that connects to either of CPU, e.g. a MIPS processor or the like, and DRAM, including memory used for DMA or other storage or buffering functions. See, e.g. BRCM7405 Functional Description at 1-83</p> <p>The BCM7405 EBI provides a 27-bit address bus and a 16-bit bidirectional data bus. In addition, separate read and write strobes are provided along with up to six firmware-configurable chip select signals. Each chip select is fully programmable and:</p> <ul style="list-style-type: none"> • Supports block sizes between 8 KB and 64 MB • Has extended clock cycle access control • Has 8-bit or 16-bit selection of peripheral data bus width <p>The BCM7405 EBI automatically breaks up accesses where the transfer data is larger than the target size, such as a 32-bit read or write initiated by the CPU or internal DMA targeting an 8-bit wide peripheral results in four separate byte-wire read or write accesses to the target.</p> <p>The BCM7405 EBI supports glueless connection to an external Nand Flash device for booting the Host MIPS or for general nonvolatile storage. Many standard Nand Flash devices are supported, from 128 Mbit to 2 Gbit densities, and in x8 and x16 data widths. Hardware ECC, write protect, and local buffering assists with booting.</p> <p>Synchronous burst read operations for an external FLASH ROM on the EBI bus is supported, which allows more code to remain resident in the external EPROM chips instead of mirroring it to DRAM storage.</p> <p>Internal bus protocols need to be extended to allow burst reads. The EBI interface converts these burst accesses into a cache-line read of 16 bytes. Non-cacheable access would be handled as single word reads (as currently happens). This allows the use of synchronous FLASH ROM chips, such as the Intel 28F256Kxx family.</p>
Claim 19	
<p>The process of claim 1, wherein said Media</p>	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch that shares an address bus with a CPU and DRAM.</p>

the Claim	Samsung DVRs ¹
Switch shares an address bus with a CPU and DRAM	<p>For example, Samsung DVRs may include a processor that includes, for example, an EBI with a shared address bus that connects to both a CPU, e.g. a MIPS processor or the like, and DRAM, including memory used for DMA or other storage or buffering functions. See, e.g. BRCM7405 Functional Description at 1-83</p> <p>The BCM7405 EBI provides a 27-bit address bus and a 16-bit bidirectional data bus. In addition, separate read and write strobes are provided along with up to six firmware-configurable chip select signals. Each chip select is fully programmable and:</p> <ul style="list-style-type: none"> • Supports block sizes between 8 KB and 64 MB • Has extended clock cycle access control • Has 8-bit or 16-bit selection of peripheral data bus width <p>The BCM7405 EBI automatically breaks up accesses where the transfer data is larger than the target size, such as a 32-bit read or write initiated by the CPU or internal DMA targeting an 8-bit wide peripheral results in four separate byte-wire read or write accesses to the target.</p> <p>The BCM7405 EBI supports glueless connection to an external Nand Flash device for booting the Host MIPS or for general nonvolatile storage. Many standard Nand Flash devices are supported, from 128 Mbit to 2 Gbit densities, and in x8 and x16 data widths. Hardware ECC, write protect, and local buffering assists with booting.</p> <p>Synchronous burst read operations for an external FLASH ROM on the EBI bus is supported, which allows more code to remain resident in the external EPROM chips instead of mirroring it to DRAM storage.</p> <p>Internal bus protocols need to be extended to allow burst reads. The EBI interface converts these burst accesses into a cache-line read of 16 bytes. Non-cacheable access would be handled as single word reads (as currently happens). This allows the use of synchronous FLASH ROM chips, such as the Intel 28F256Kxx family.</p>
Claim 20	
The process of claim 1, wherein said Media Switch operates asynchronously	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch that operates asynchronously and autonomously with a CPU.</p> <p>For example, Samsung DVRs may include a processor that includes, for example, a PCI bus that allows the media switch to</p>

the Claim	Samsung DVRs ¹
and autonomously with a CPU.	<p>operate asynchronously and autonomously from the CPU. See, e.g. BRCM7405 Functional Description at 1-83</p> <p>PCI AND EXTERNAL BUS INTERFACE</p> <p>The BCM7405 includes a shared interface that supports 33 MHz PCI 2.3 and external buses to allow the internal processor control of external peripherals that may be attached to the PCI bus and to allow an external controller to access the peripherals and memory associated with the BCM7405.</p> <p>The PCI and EBI interfaces share many of the same pins to reduce the overall pin counts. Both PCI and EBI operate at the same PCI clock input frequency. Critical control signals such as FRAMEb and CSb are not shared. The arbitration and multiplexing of this PCI/EBI interface happens completely in hardware. When the interface is operated as an EBI function, PCI devices will not respond because the FRAMEb is not asserted. When the interface is operated as a PCI function, EBI devices will not respond because the CSb is not asserted. Both EBI and PCI interfaces operate at a max clock frequency of 33 MHz.</p> <p>Software running on the internal MIPS processor can allow the BCM7405 to act as a PCI South bridge. This allows an easier migration path for external processors to access the peripheral devices (such as the USB controller).</p> <p>When in PCI Client mode, the EBI function is disabled and the PCI interface supports both internal and external PCI masters. When in PCI Host Bridge mode, the EBI interface functions as an EBI bus master only. It supports asynchronous, synchronous and 68K modes. The PCI interface supports both external and internal PCI masters. The internal PCI arbiter is designed to support the EBI request as a modified PCI master with special request and grant handshaking. If an external PCI arbiter is selected, the special EBI request/grant pair maps to the PCI GNT2b/REQ2b pins.</p>
Claim 21	
The process of claim 1, wherein said storage device is connected to said Media Switch.	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a storage device that is connected to said Media Switch.</p> <p>For example, the Samsung DVRs include, among other things, a hard drive operatively connected to the media switch for storing multimedia data.</p>

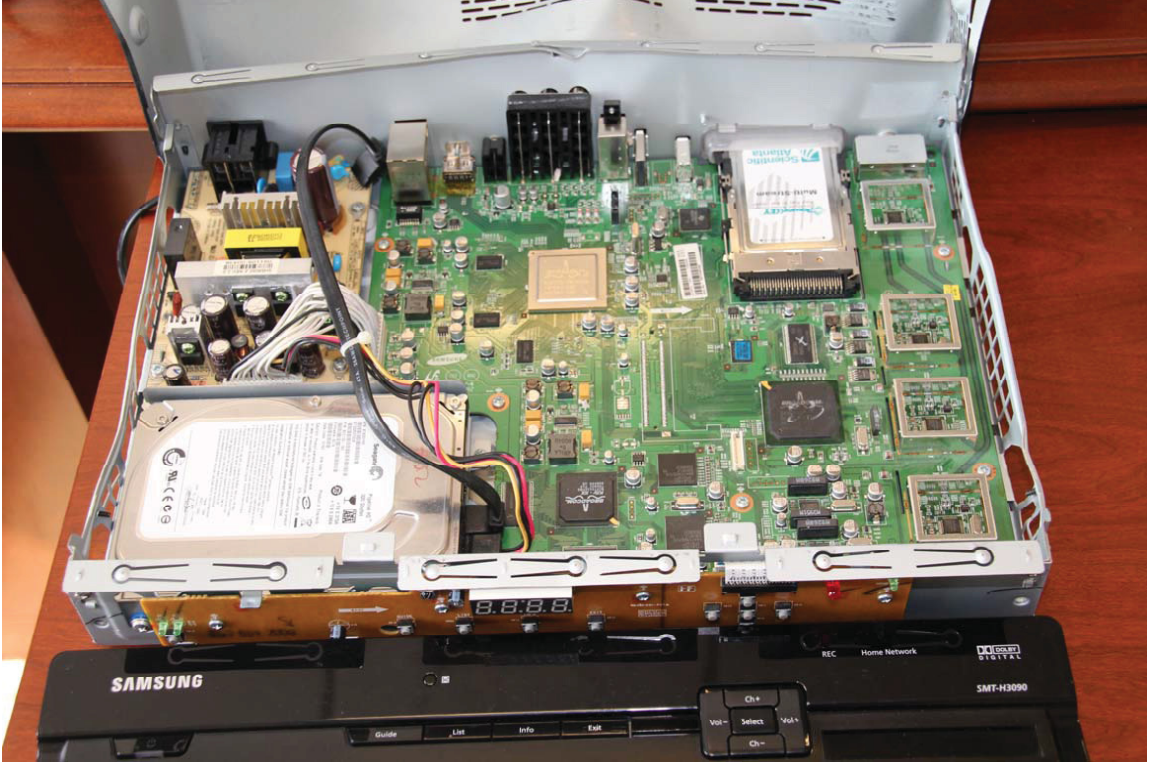


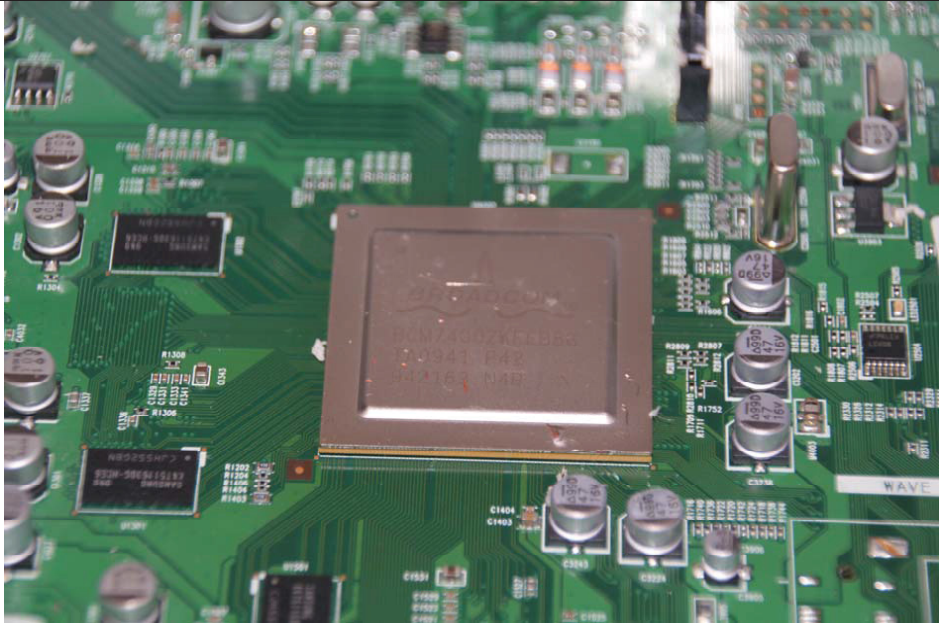
the Claim	Samsung DVRs ¹
Claim 22	
The process of claim 1, wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers	<p>In addition to the features described above regarding claim 1, Samsung DVRs include a Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.</p> <p>For example, a Samsung DVR includes a processor that includes, for example, a MIPS CPU and a DMA controller that may queue up transfers to various busses, memory locations, and/or host controllers. <i>See, e.g.</i> BCM function description at figure 1-1:</p> <p>Figure 1-1 on page 1-7 shows the BCM7405 functional block diagram.</p> <p>Figure 1-1: Functional Block Diagram</p>
Claim 23	
The process of	In addition to the features described above regarding claim 1, Samsung DVRs include a media switch that is implemented in

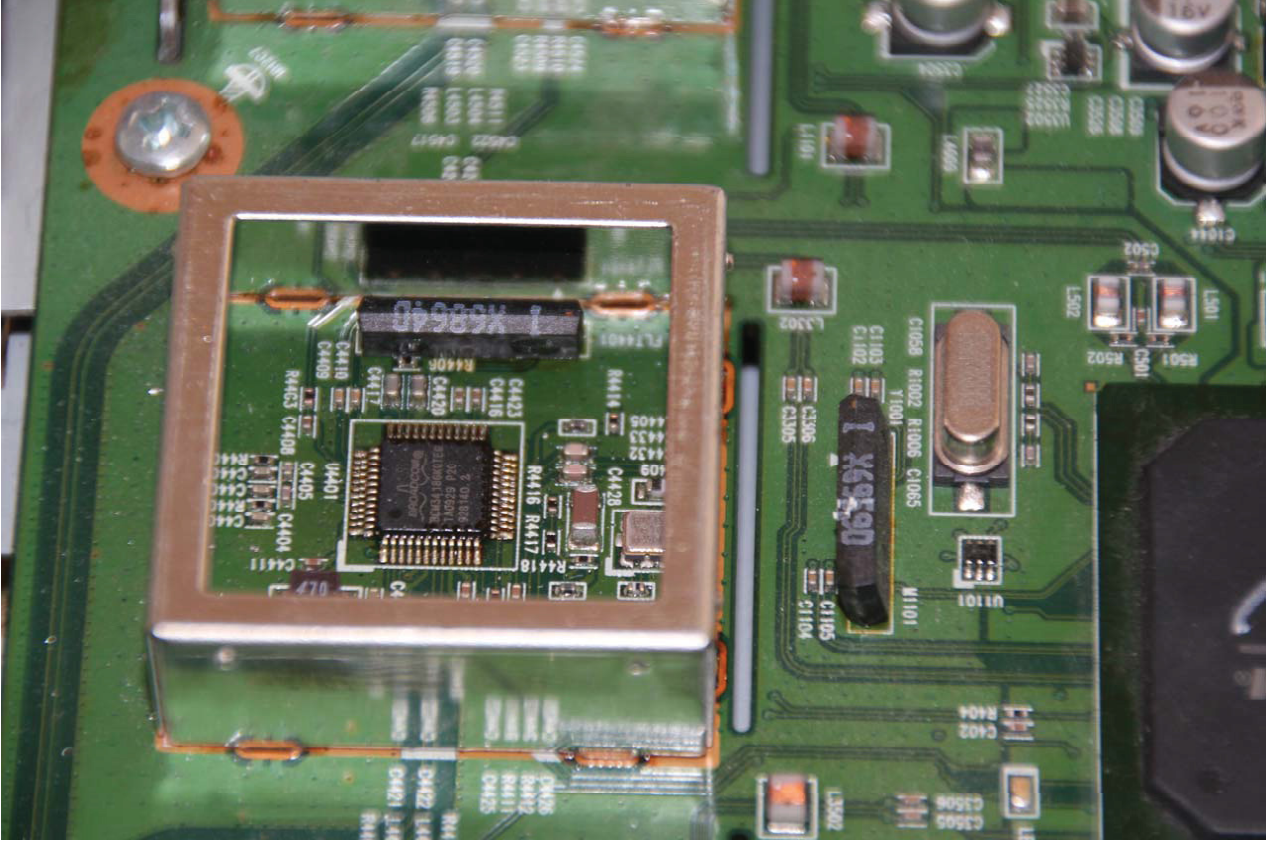
the Claim	Samsung DVRs ¹
claim 1, wherein said Media Switch is implemented in hardware.	<p>hardware.</p> <p>For example, a Samsung DVR includes a processor, such as a BRCM7405 that may be implemented as a "system on chip" or physical hardware instantiation. See, e.g., Function description at 1-4:</p> <p>TOP-LEVEL OVERVIEW</p> <p>The BCM7405 is a next-generation high-definition satellite, cable, and IP set-top box solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-4 Part 2, MPEG-2, and VC-1 video decoding technology. It also supports China AVS standard, DivX, H.263, and XviD formats. The BCM7405 combines a data transport processor, high-definition video decoder, advanced-audio decoder, 2D graphics processing, high-quality video scaling and motion adaptive de-interlacing, six video DACs, stereo high-fidelity audio DACs, a MIPS 4380 class processor with FPU, and a peripheral control unit providing a variety of set-top box control functions.</p> <p>The Data Transport Processor is an MPEG-2 DVB-compliant transport stream message/PES parser and demultiplexer. It is capable of simultaneously processing 255 PIDs via 255 PID channels in up to six channels which can be selected from six independent external transport stream inputs and five internal playback channels. The data transport supports decryption for up to 128 PID channels in all streams. All 128 PID channels can be used by the Record, Audio, and Video interface engine (RAVE), PCR processors, message filter as well as for output via the high-speed transport or remux module. The data transport module RAVE supports 24 channels. Each RAVE channel can be configured as either a record channel for PVR functionality or as an AV channel to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards.</p>
Claim 31	
31[a]. A process for the simultaneous storage and play back of multimedia data, comprising the steps of:	<p>A Samsung DVR can simultaneously store and play back multimedia data. See, e.g., http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>"TIME WARNER CABLE AND SAMSUNG FORGE AGREEMENT FOR TRU2WAY SET-TOP DEVELOPMENT, PURCHASE & DEPLOYMENT Release Date: 07/06/2009</p>

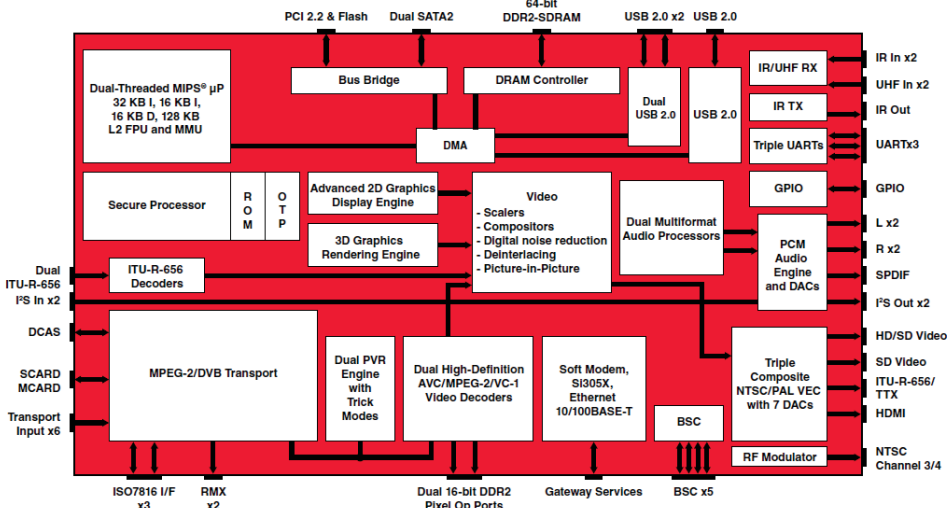
the Claim	Samsung DVRs ¹
	<p>Time Warner Cable and Samsung today announced that they have signed a letter of commitment for the continued development, purchase and deployment of Samsung True2Way enabled set-top boxes, including the first second-source DVR.</p> <p>“We look to offer our customers advanced set-top boxes with features that are simple and easy to use,” said Mike Hayashi, Executive Vice President of Advanced Engineering for Time Warner Cable. “We have been a leader in the roll-out of Tru2Way devices and we are continuing to grow our relationship with Samsung, a CE company dedicated to the development of new equipment meeting the necessary standards and offering attractive feature sets.”</p> <p>Thomas Rhee, SVP, New Business Development for Samsung, added, “We are thrilled to have worked closely with Time Warner Cable to launch Tru2way on our family of cable set-tops including the SMT-H3090 and SMT-H3270 High Definition DVRs. As in Korea, we look forward to the expansion of Tru2way in North America.”</p> <p>This agreement further solidifies Time Warner Cable’s commitment to its deployment of Tru2Way enabled set-top boxes. To date Time Warner Cable has deployed over 2 million Tru2Way set-top boxes, of which approximately 400,000 are Samsung boxes.</p> <p>Time Warner Cable and Samsung also recently signed an MOU that focuses on collaborating in development of better home networking solutions for entertainment. This work is part of Time Warner Cable’s continuing efforts to provide its customers with technology that brings new levels of ease and convenience.”</p> <p>http://www.timewarnercable.com/corporate/about/inthenews.ashx?PRID=2626&MarketID=0</p>
<p>[31b] providing a physical data source, wherein said physical data source accepts broadcast data from an input device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data;</p>	<p>A Samsung DVR has an input device that may include cable input, tuners, an analog to digital converter, and/or, on information and belief, other components such as the Broadcom BCM3255 or other similar chip that may perform QAM demodulation, including chips made by other third parties. <i>See, e.g.</i>, (Samsung SMT-H3090 2008 Data Sheet), p.1 (“Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs Simultaneously.”), p. 2 (“In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM.”));</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 (“RF Input Tuning Range: 88 to 860 MHz.”); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips):</p>


the Claim	Samsung DVRs ¹
	<div></div> <p>A Samsung DVR has a physical data source, which accepts broadcast data from the input device, analyzes the video and audio data, and temporarily stores the data in, for example, internal memory and/or DRAM buffers. For example, the Samsung SMT-H3090 DVR uses Broadcom BCM7400 and/or other chips such as the BCM3255 QAM Receiver, in conjunction with SDRAM and/or other temporary storage.</p> <p>(The Samsung SMT-H3090 use Broadcom BCM3418 tuners instead of the BCM3420 tuners)</p>

the Claim	Samsung DVRs ¹
	 <p>The image shows the internal components of a Samsung DVR. A green printed circuit board (PCB) is populated with various electronic components, including a central processing unit (CPU), memory modules, and integrated circuits. A power supply unit (PSU) is visible on the left side, and a hard drive is mounted in the center. The front panel of the device is visible at the bottom, featuring the Samsung logo, a digital display showing '8.8.8.8', and several control buttons including 'Guide', 'List', 'Info', 'Exit', 'Vol-', 'Select', 'Vol+', 'Ch-', and 'Ch+'. The model number 'SMT-H3090' is printed on the front panel.</p>

the Claim	Samsung DVRs ¹
	

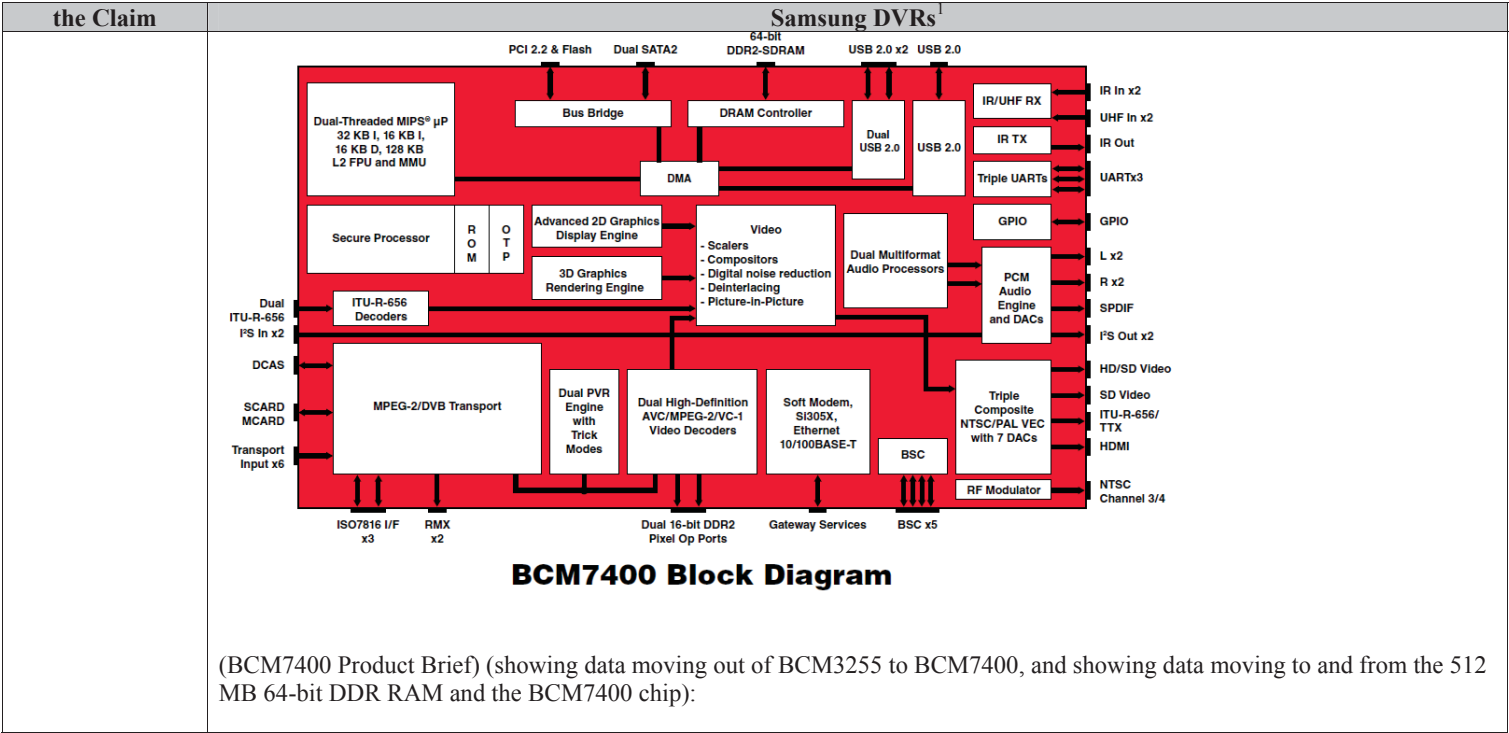
the Claim	Samsung DVRs ¹
	

the Claim	Samsung DVRs ¹
	<p>(BCM7400 Product Brief) (64-bit DDR Interface and On-chip 1000 DMIPS dual-threaded MIPS32-bit core):</p> <ul style="list-style-type: none">● 1000 DMIPS dual-threaded MIPS32[®]-bit core with FPU and MMU class processor● 64-bit DDR1/DDR2 DRAM controller and dual 16-bit pixel-op DDR1/DDR2 ports  <p>The BCM7400 Block Diagram illustrates the internal architecture of the chip. At the top, it shows interfaces for PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, and USB 2.0 x2. The central processing area includes a Dual-Threaded MIPS[®] μP (32 KB I, 16 KB L, 16 KB D, 128 KB L2 FPU and MMU), a Bus Bridge, a DMA, and a DRAM Controller. Below these are the Secure Processor, ROM, and OTP. The graphics section features an Advanced 2D Graphics Display Engine, a 3D Graphics Rendering Engine, and a Video block containing scalers, compositors, digital noise reduction, deinterlacing, and picture-in-picture. Audio processing is handled by Dual Multiformat Audio Processors and PCM Audio Engine and DACs. The transport section includes ITU-R-656 Decoders, DCAS, SCARD MCARD, and Transport Input x6. Video output is managed by Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, and a Soft Modem, Si305X, Ethernet 10/100BASE-T. The bottom section shows ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, BSC x5, and an RF Modulator. On the right side, various external interfaces are listed: IR In x2, UHF In x2, IR Out, Triple UARTs, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4.</p> <p style="text-align: center;">BCM7400 Block Diagram</p>

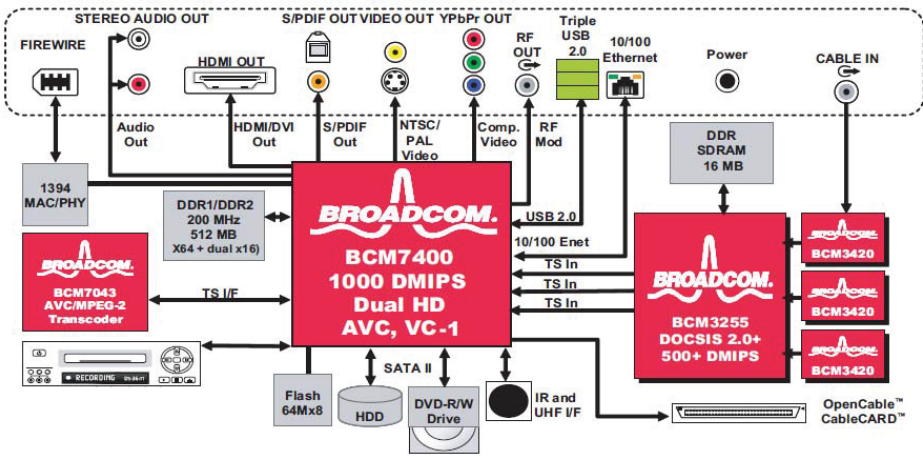
the Claim	Samsung DVRs ¹
	<p>The Samsung SMT-H3090 provides a physical data source, which includes a processor that accepts input data, analyzes the video and audio, and temporarily stores the data in internal and RAM buffers.</p> <p>Samsung DVRs manufactured by Samsung may contain MPEG encoders, including the BCM7041:</p> <div></div> <p>(showing internal chips of Samsung SMT-H3090 DVR).</p> <p>A Samsung DVR parses the data. For example, it analyzes a transport stream to identify video and audio data. <i>See, e.g.</i>, (BCM7400 Product Brief), at p. 2 (noting transport processor and dual digital audio processors):</p>

the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>On information and belief, the Broadcom chips, such as the BCM3255 chip, BCM7400 chip, etc., used inside Samsung DVRs and other chips used inside Samsung DVRs, PID filter multi-program transport streams and perform start code detection. Schematics and specifications on Broadcom chips such as the BCM7400 may be proprietary and thus inaccessible to TiVo at this time.</p> <p>In addition, a Samsung DVR includes DDR SDRAM and/or other RAM and/or flash memory and/or other internal on-chip memory that can be used to temporarily store video and audio data. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing 16MB SRAM and 512MB 64-bit DDR bi-directionally coupled to the BCM3255 and BCM7400 chips, respectively):</p> <p>Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p> <p>High-quality video and graphics processing is integrated, featuring advanced studio-quality 2D and 3D graphics processing. Also included are motion-adaptive deinterlacing with 3:2 pull-down, and letterbox detection. Digital noise reduction minimizes mosquito noise and MPEG artifacts, including block noise. Picture-in-picture, split picture, and independent picture in graphics are supported.</p> <p>The BCM7400 has a dual-stream analog video encoder with Macrovision that supports the following output standards: NTSC-M, NTSC-J, PAL-BDGHIN, PAL-M, and PAL-Nc. The following output formats are supported: composite, S-Video, SCART, RGB, and YPrPb component. The following output resolutions are supported: 480i, 480p, 576i, 576p, 720p, 1080i, and 1080p 24/30. Seven output video DACs are available to be shared among the output functions. The BCM7400 also supports output over an HDMI interface and a channel 3/4 RF modulator. An ITU-R-656 output port is also available with teletext sideband.</p>

the Claim	Samsung DVRs ¹
	<div></div> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the physical data source, for example that accepting, parsing, and temporarily storing, in substantially the same way, for example by receiving data that has been transmitted to the DVR, PID filtering, startcode detecting and otherwise analyzing that data, and writing that data to memory locations and disks, to yield the same result, a properly formatted data stream for further processing by the rest of the system.</p> <div><p>[31c] providing a source object, wherein said source object extracts video and audio data from said physical data source;</p></div> <div><p>A Samsung DVR provides a source object, a collection of data and operations that, among other things, extracts video and audio data from the physical data source. For example, in a Samsung DVR, video and audio data move from the Broadcom BCM3255 chip, or similar chip, to memory, including DRAM and/or the Data Transport processor of the Broadcom 7400 chip, or similar chip, and from the BCM7400 chip, or similar chip, to memory, including DRAM. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing Transport Input data going into MPEG-2/DVB Transport of the Broadcom BCM7400 chip:</p></div>

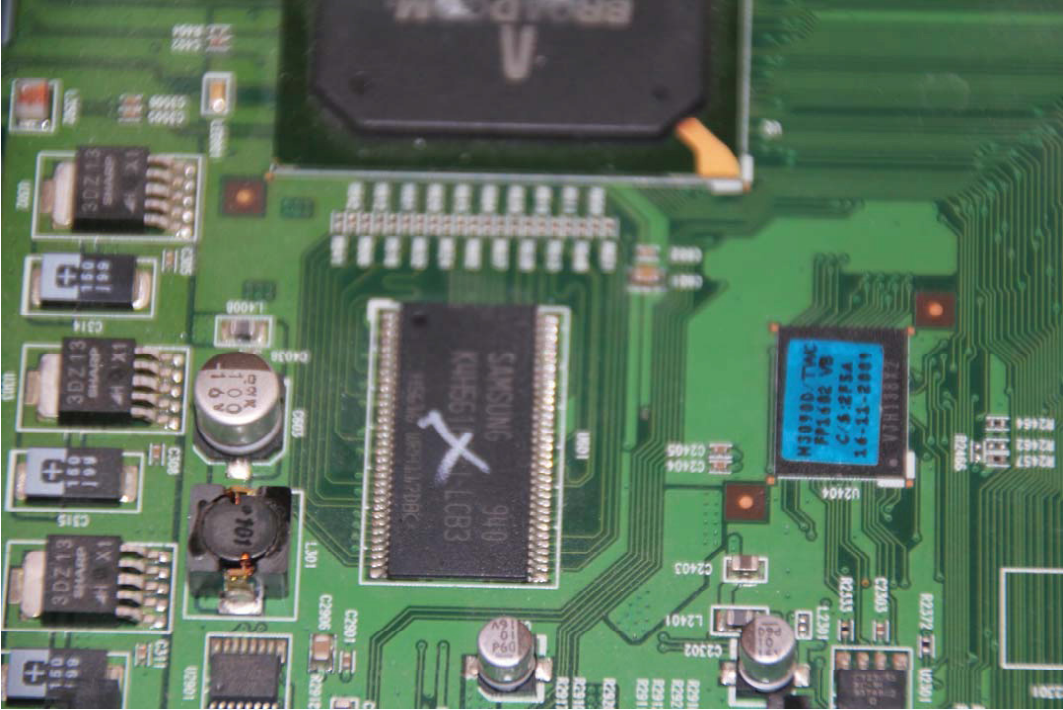


the Claim	Samsung DVRs ¹
	<div></div> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Source Object, for example that of extracting video and audio data from said physical data source, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that operate on the video and audio data from the physical data source.</p>
[31d] providing a transform object, wherein said transform object stores and retrieves data streams onto a storage device;	<p>A Samsung DVR provides a transform object, a collection of data and operations that, among other things, transforms the form of data upon which it operates. For example, Samsung DVRs transform the form of the data. Upon information and belief, the Samsung DVRs store television program data during recording, and play back certain portions, such as certain frames, during certain trickplay operations.</p> <p>As another example, Samsung DVRs also perform a temporal transform. For example, Samsung DVRs allow users to store television programs to watch at a later time or can pause live television. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf</p>

the Claim	Samsung DVRs ¹
	<p>(Samsung SMT-H3090 2008 User Guide), p. 10 ("User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording."); p. 10 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>Samsung DVRs store data streams on and retrieve data streams from a hard disk drive (HDD) during recording and playback, respectively. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing SATA II interface to HDD):</p>  <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 6:</p>


the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table> <p>In the course of recording a television program, Samsung DVRs may generate index information using start code information. For example, in the Samsung DVRs, on information and belief, data streams in the form of MPEG2 transport stream packets are stored in blocks on the hard disk drive. Index information is stored on the hard disk drive as *.clt files, which have pointers to the locations of the MPEG2 transport stream packets of the various recorded programs.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object, for example that of storing and retrieving data streams onto a storage device, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that move video and audio data to and from storage locations.</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
HDD	Capacity						
160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.						
320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.						
[31e] wherein said source objects obtains a buffer from said transform object, said source object	A Samsung DVR provides a source object, a collection of data and operations that, among other things, obtains a buffer from the transform object, converts video data into data streams, and fills the buffer with the streams. Samsung DVR software obtains a buffer, converts video data into data streams and fills the buffer with the streams. <i>See, e.g.,</i> (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.")						

the Claim	Samsung DVRs ¹
converts video data into data streams and fills said buffer with said streams;	<p>On information and belief, Samsung DVR software converts the data, for example, during selection of a particular channel, and similar functions, including without limitation recording a television program. <i>See, e.g.</i>, (BCM7400 Product Brief) (showing a MPEG-2/DVB Transport unit):</p> <div><p>The diagram illustrates the internal architecture of the BCM7400. At the top, it shows various input and output interfaces: PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, USB 2.0 x2, and USB 2.0. The central processing area includes a Dual-Threaded MIPS® µP (32 KB I, 16 KB D, 128 KB L2 FPU and MMU), a Bus Bridge, a DRAM Controller, and a DMA. Below these are the Secure Processor, ROM, and OTP. The video processing section features an Advanced 2D Graphics Display Engine, a 3D Graphics Rendering Engine, and a Video block containing Scalers, Compositors, Digital noise reduction, Deinterlacing, and Picture-in-Picture. Audio is handled by Dual Multiformat Audio Processors and PCM Audio Engine and DACs. The transport section includes ITU-R-656 Decoders, MPEG-2/DVB Transport, Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, and a Soft Modem, Si305X, Ethernet 10/100BASE-T. Other components include Triple Composite NTSC/PAL VEC with 7 DACs, BSC, and RF Modulator. The bottom of the diagram shows various output and control interfaces: IR In x2, UHF In x2, IR Out, IR TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I²S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4. On the left side, there are inputs for Dual ITU-R-656 I²S In x2, DCAS, SCARD, MCARD, and Transport Input x6. At the bottom left, there are ISO7816 I/F x3 and RMX x2. At the bottom center, there are Dual 16-bit DDR2 Pixel Op Ports and Gateway Services. At the bottom right, there are BSC x5 and RF Modulator.</p><p>BCM7400 Block Diagram</p></div> <p>Also, a Samsung DVR has a buffer in the system memory. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Source Object, for example that of obtaining a memory location, converting the data stream, and filling the memory location in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that operate on the video</p>

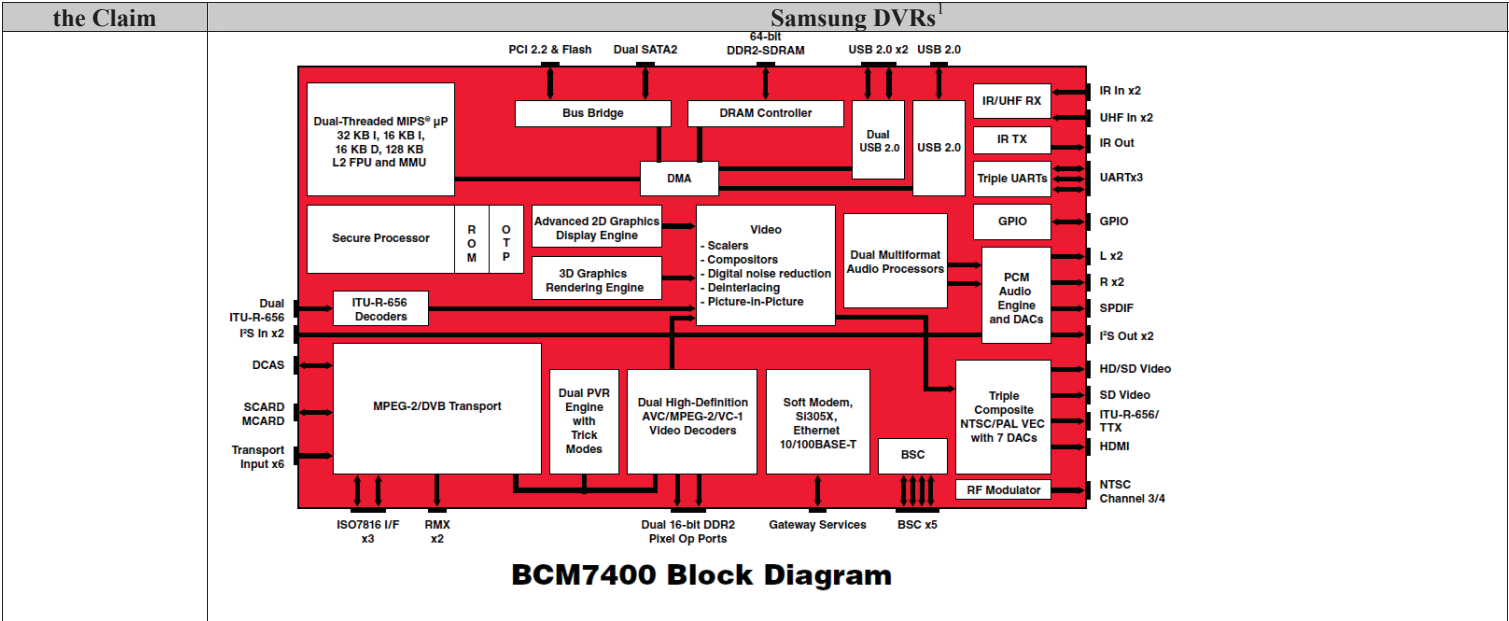
the Claim	Samsung DVRs ¹
	and audio data in conjunction with memory locations and other software processes.
[31f] wherein said source object is automatically flow controlled by said transform object;	<p>A Samsung DVR has a source object that, among other things, is automatically flow controlled by a transform object. On information and belief, the Samsung DVR software has self-regulating data flow in relation to, for example, the single-port DRAM. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> 

the Claim	Samsung DVRs ¹
<p>[31g] providing a sink object,</p>	<div></div> <p>(showing standard single-port Samsung K4T511630G 512MB RAM and Samsung K4H561638 RAM).</p> <p>In regular operation, there is no significant corruption of data due to overwriting or lack of self-regulation.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object's automatic flow control of the Source Object, for example that of self-regulating the processing, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that are self regulated.</p>
<p>[31g] providing a sink object,</p>	<p>A Samsung DVR provides a sink object, a collection of data and operations that, among other things, obtains data stream buffers from a transform object and outputs the streams to a video and audio decoder. The Samsung DVR software obtains data streams</p>

the Claim	Samsung DVRs ¹
<p>wherein said sink object obtains data stream buffers from said transform object and outputs said streams to a video and audio decoder;</p>	<p>from a buffer retrieved from a transform object and the hard disk drive and outputs the data streams to a video and audio decoder. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> <p>A Samsung DVR has a video and audio decoder that converts data streams into display signals and sends those signals to a display. <i>See, e.g.</i>, (BCM7400 Product Brief):</p> <div><p>The diagram illustrates the internal architecture of the BCM7400 microprocessor. At the top, it shows connections for PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, and two USB 2.0 ports. The central processing area includes a Dual-Threaded MIPS® uP (32 KB I, 16 KB D, 128 KB L2 FPU and MMU), a Bus Bridge, a DRAM Controller, and a DMA. Below these are a Secure Processor, ROM, OTP, an Advanced 2D Graphics Display Engine, a 3D Graphics Rendering Engine, a Video block (containing Scalers, Compositors, Digital noise reduction, Deinterlacing, and Picture-in-Picture), and Dual Multiformat Audio Processors. On the left, inputs include Dual ITU-R-656 I'S In x2, DCAS, SCARD MCARD, and Transport Input x6. On the right, outputs include IR/UHF RX, IR TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4. At the bottom, there are connections for ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, BSC x5, and an RF Modulator. Other internal blocks include ITU-R-656 Decoders, MPEG-2/DVB Transport, Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, a Soft Modem (Si305X, Ethernet 10/100BASE-T), and a Triple Composite NTSC/PAL VEC with 7 DACs.</p></div> <p style="text-align: center;">BCM7400 Block Diagram</p> <p>(Samsung SMT-H3090 2008 User Guide), at 6:</p>

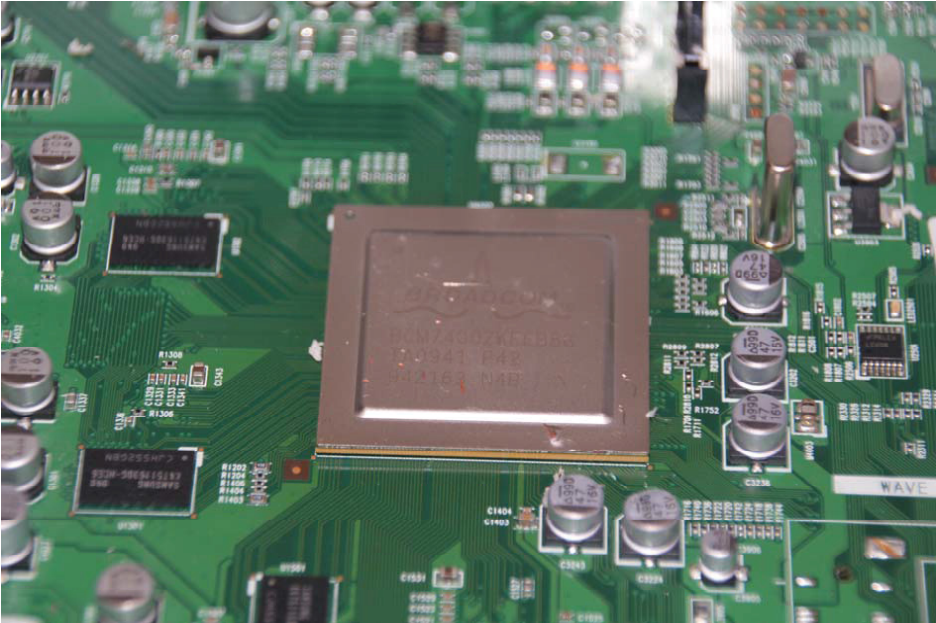
the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB</p> <p>Digital HD DVR OCAP STB (Digital High-Definition Digital Video Recorder OpenCable Application Platform Set-Top Box) provides high quality video and audio broadcasting, and interactive services including Video-On-Demand.</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table> <p>(Samsung SMT-H3090 2008 Data Sheet), at 1:</p> <div><p>Imagine Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs simultaneously.</p></div> <p>(Samsung SMT-H3090 2008 Data Sheet), at 2:</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
HDD	Capacity						
160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.						
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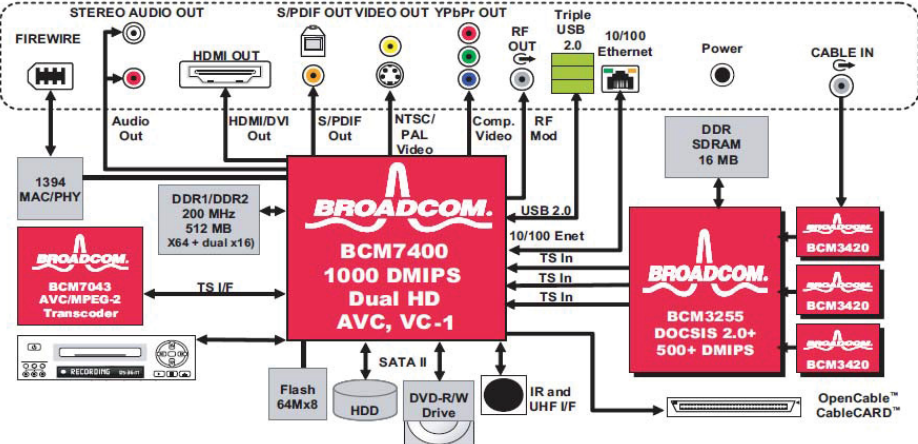
the Claim	Samsung DVRs ¹														
	<p>Home Networking</p> <ul style="list-style-type: none">_ Contents sharing with networked media devices by using advanced Home network standards (DLNA, UPnP)_ DTCP-IP for Home network content protection_ MoCA (Multimedia over Coaxial Alliance) upgradable (Optional) <p>Back Panel Features</p> <table><tr><th>Feature</th><th>Description</th></tr><tr><td>RF Input</td><td>F-type Female</td></tr><tr><td>AV Out</td><td>2 NTSC-M RCA (CVBS), S-Video, Component (Y/Pb/Pr) Video, HDMI, 2 RCA, 2 S/PDIF (Optical, Electrical)</td></tr><tr><td>AV In</td><td>1 Component (Y/Pb/Pr) Video, 1 RCA (L/R)</td></tr><tr><td>Connections-Interactive</td><td>USB 2.0 Host, IEEE 1394, E-SATA, RJ-45 Ethernet (10/100M)</td></tr><tr><td>CableCARD</td><td>Multi-Stream CableCARD™</td></tr><tr><td>Power</td><td>AC 120V, 60Hz, AC Outlet</td></tr></table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Sink Object, for example that of obtaining buffers or pointers thereto and outputting data streams, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, datastreams being output to a decoder.</p>	Feature	Description	RF Input	F-type Female	AV Out	2 NTSC-M RCA (CVBS), S-Video, Component (Y/Pb/Pr) Video, HDMI, 2 RCA, 2 S/PDIF (Optical, Electrical)	AV In	1 Component (Y/Pb/Pr) Video, 1 RCA (L/R)	Connections-Interactive	USB 2.0 Host, IEEE 1394, E-SATA, RJ-45 Ethernet (10/100M)	CableCARD	Multi-Stream CableCARD™	Power	AC 120V, 60Hz, AC Outlet
Feature	Description														
RF Input	F-type Female														
AV Out	2 NTSC-M RCA (CVBS), S-Video, Component (Y/Pb/Pr) Video, HDMI, 2 RCA, 2 S/PDIF (Optical, Electrical)														
AV In	1 Component (Y/Pb/Pr) Video, 1 RCA (L/R)														
Connections-Interactive	USB 2.0 Host, IEEE 1394, E-SATA, RJ-45 Ethernet (10/100M)														
CableCARD	Multi-Stream CableCARD™														
Power	AC 120V, 60Hz, AC Outlet														
[31h] wherein said decoder converts said streams into display signals and sends said signals to a display;	<p>A Samsung DVR has a decoder that converts data streams into display signals and sends those signals to a display. <i>See, e.g.</i>, (Broadcom BCM 7400 Product Brief), at 1:</p> <div><p>FEATURES</p><ul style="list-style-type: none">• Dual advanced AVC/MPEG-2/VC-1 decoders<ul style="list-style-type: none">• H.264/AVC Main and High Profile to Level 4.1• VC-1 Advanced Profile @ Level 3• VC-1 Simple and Main Profile• HD MPEG-2 and SD MPEG-2• MPEG still-picture decode• DivX[®] and MPEG4 part 2 ASP decode</div> <p>(Broadcom BCM 7400 Product Brief), at 2 (showing video decoders):</p>														



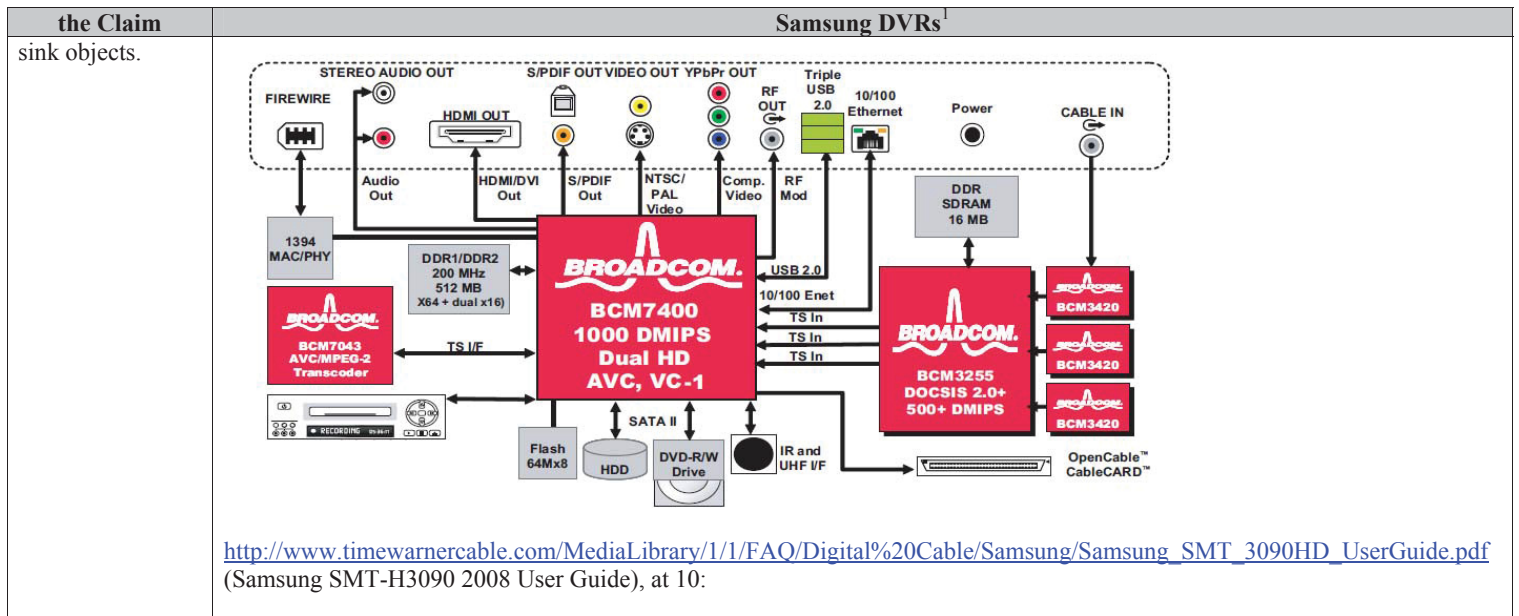
BCM7400 Block Diagram

the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>The advanced video decoders featured in the BCM7400 are capable of supporting high definition AVC, VC-1, and MPEG-2 streams. AVC support is for Main and High Profile to level 4.1 for 720p and 1080i high definition support or to Level 3.1 for standard definition streams. AVC High Profile was added to the fidelity range extensions specifically to address the needs of consumer broadcast and playback applications. Tools include additional transform sizes and spatial prediction modes and support for adaptive quantization matrix. The video decoders also support high definition VC-1 (Advanced Profile Level 3, Main, and Simple Profiles) and MPEG-2, Main Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p> <p>On information and belief, Samsung DVRs have an MPEG-2 decoder that decodes standard definition and/or high definition television programs.</p>

the Claim	Samsung DVRs ¹
<p>[31i] wherein said sink object is automatically flow controlled by said transform object;</p>	<p>A Samsung DVR has a sink object that, among other things, is automatically flow controlled by a transform object. On information and belief, the Samsung DVR playback software has self-regulated data flow in relation to, for example, the DRAM. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p>  <p>In regular operation, there is no significant corruption of data due to overwriting or lack of self-regulation.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object's automatic flow control of the Sink Object, for example that of self-regulating the processing, in substantially the same way, for example by using one or more instantiations of software codes and/or</p>

the Claim	Samsung DVRs ¹
	hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that are self regulated.
[31j] providing a control object, wherein said control object receives commands from a user, said commands control the flow of the broadcast data through the system; and	<p>A Samsung DVR provides a control object, a collection of data and operations that, among other things, receives user commands, which control the flow of the broadcast data through the system. The Samsung DVR software is responsive to front panel buttons and a remote control. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The hardware and software receives user commands, which control the flow of data through the system, e.g., begin recording, channel change, trickplay, etc. <i>See, e.g.</i>, (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):</p>  <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p>

the Claim	Samsung DVRs ¹																		
	<p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Control Object, for example that of receiving commands same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, controlling the flow of the broadcast data through the system.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
Feature	Description																		
File Playback	Play, Stop, Rewind, Pause for recorded contents.																		
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Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs																		
EPG Recording	Scheduled recording using EPG																		
[31k] wherein said control object sends flow command events to said source, transform, and	A Samsung DVR provides a control object, a collection of data and operations that, among other things, sends flow command events to source, transform, and sink objects. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The Samsung DVR software is responsive to front panel buttons and a remote control. The hardware and software receives user commands and sends command events to other portions of the software to control the various functions of the unit, e.g., channel selection, start recording, trickplay, picture-in-picture, etc. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):																		

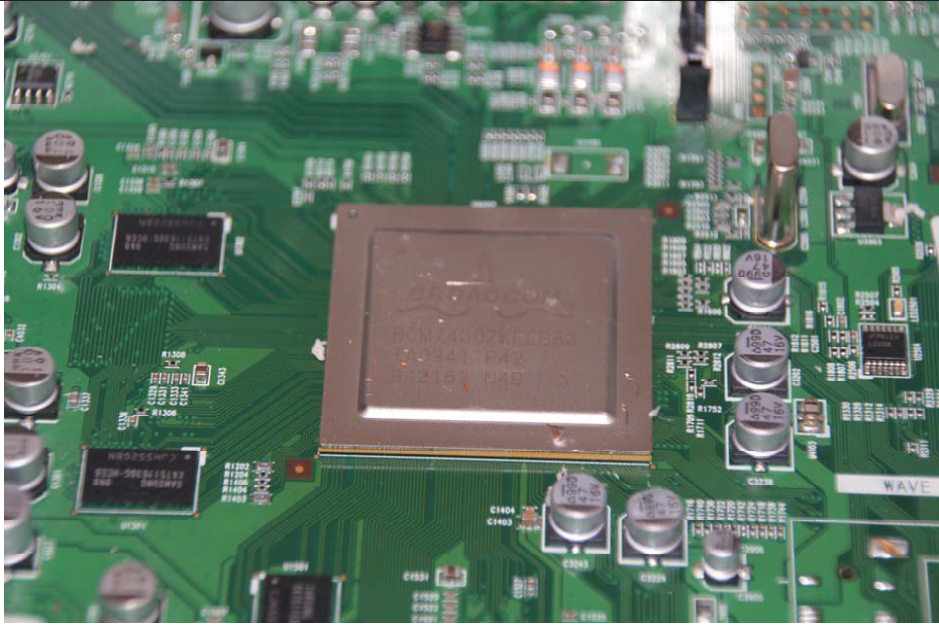



the Claim	Samsung DVRs ¹																		
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Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.																		
Instant Recording	Record live TV program instantly																		
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Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs																		
EPG Recording	Scheduled recording using EPG																		

the Claim	Samsung DVRs ¹
Claim 32	
32[a]. An apparatus for the simultaneous storage and play back of multimedia data, comprising:	<p>A Samsung DVR can simultaneously store and play back multimedia data. <i>See, e.g.</i>, http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>"TIME WARNER CABLE AND SAMSUNG FORGE AGREEMENT FOR TRU2WAY SET-TOP DEVELOPMENT, PURCHASE & DEPLOYMENT Release Date: 07/06/2009</p> <p>Time Warner Cable and Samsung today announced that they have signed a letter of commitment for the continued development, purchase and deployment of Samsung True2Way enabled set-top boxes, including the first second-source DVR. "We look to offer our customers advanced set-top boxes with features that are simple and easy to use," said Mike Hayashi, Executive Vice President of Advanced Engineering for Time Warner Cable. "We have been a leader in the roll-out of Tru2Way devices and we are continuing to grow our relationship with Samsung, a CE company dedicated to the development of new equipment meeting the necessary standards and offering attractive feature sets."</p> <p>Thomas Rhee, SVP, New Business Development for Samsung, added, "We are thrilled to have worked closely with Time Warner Cable to launch Tru2way on our family of cable set-tops including the SMT-H3090 and SMT-H3270 High Definition DVRs. As in Korea, we look forward to the expansion of Tru2way in North America."</p> <p>This agreement further solidifies Time Warner Cable's commitment to its deployment of Tru2Way enabled set-top boxes. To date Time Warner Cable has deployed over 2 million Tru2Way set-top boxes, of which approximately 400,000 are Samsung boxes.</p> <p>Time Warner Cable and Samsung also recently signed an MOU that focuses on collaborating in development of better home networking solutions for entertainment. This work is part of Time Warner Cable's continuing efforts to provide its customers with technology that brings new levels of ease and convenience."</p> <p>http://www.timewarnercable.com/corporate/about/inthenews.ashx?PRID=2626&MarketID=0</p>
[32b] a module for accepting television (TV) broadcast signals, wherein said TV	<p>A Samsung DVR accepts television broadcast signals. On information and belief, Samsung DVRs receive television programming in the form of QAM-modulated MPEG2 transport stream packets.</p> <p><i>See, e.g.</i>, (Samsung SMT-H3090 2008 Data Sheet), p.1 ("Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable</p>


the Claim	Samsung DVRs ¹
signals are based on a multitude of standards, including, but not limited to, National Television Standards Committee (NTSC) broadcast, PAL broadcast, satellite transmission, DSS, DBS, or ATSC;	<p>subscribers to watch and record two HD programs Simultaneously.””), p. 2 (“In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM.”));</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 (“RF Input Tuning Range: 88 to 860 MHz.”); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips)</p> <p>On information and belief, Samsung DVRs accept ATSC broadcast signals.</p>
[32c] a module for tuning said TV signals to a specific program;	<p>A Samsung DVR has tuners which can tune TV signals to a specific program. <i>See, e.g.</i>, (Samsung SMT-H3090 2008 Data Sheet), p.1 (“Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs Simultaneously.””), p. 2 (“In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM.”)). For example, based on information and belief the Samsung DVRs tune to a specific frequency or a band of frequencies.</p>
[32d] at least one Input Section, wherein said Input Section converts said specific program to an Moving Pictures Experts Group (MPEG) formatted stream for internal	<p>A Samsung DVR has at least one Input Section, wherein said Input Section converts said specific program to a Moving Pictures Experts Group (MPEG) formatted stream for internal transfer and manipulation. The Input Section converts said specific program to an MPEG formatted stream, for example in the course of performing QAM demodulation and Analog-to-Digital conversion (A/D). A Samsung DVR will perform QAM demodulation and Analog-to-Digital conversion in the course of watching live television and recording a television program. <i>See, e.g.</i>,</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 (“RF Input Tuning Range: 88 to 860 MHz.”); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips):</p>

the Claim	Samsung DVRs ¹
	 <p>The image shows the internal components of a Samsung DVR. A green printed circuit board (PCB) is populated with various electronic components, including a central processing unit (CPU), memory modules, and other integrated circuits. A power supply unit (PSU) is visible on the left side, and a hard drive is mounted in the center. The front panel of the device is visible at the bottom, featuring a digital display showing '8.8.8.8', several buttons (Ch+, Ch-, Select, Vol+, Vol-), and the Samsung logo. The model number 'SMT-H3090' is printed on the front panel.</p>

the Claim	Samsung DVRs ¹
	<div></div> <p>Samsung SMT-H3090, Broadcom BCM74xx); (showing internal chips of</p>

the Claim	Samsung DVRs ¹
	<div></div> <p>(showing</p> <p>internal chips of Samsung SMT-H3090, Broadcom BCM3255).</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the media switch, for example that of parsing an MPEG stream, in substantially the same way, for example by performing PID filtering, start code detection, or other analysis of the underlying data, to yield the same result, a data stream</p>


the Claim	Samsung DVRs ¹
	<p>including any additional information needed for its further processing.</p> <p>On information and belief, the MPEG stream is separated into its video and audio components, for example, the course of PID filtering, start code detection, and temporary storage in memory. Additionally, the streams are separated when presented to the video and audio decoders. In the course of PID filtering and start code detection, on information and belief, MPEG2 transport stream packets are discretely analyzed. Each MPEG2 transport stream packet contains audio or video data. The MPEG2 transport stream packets are temporarily stored in memory (e.g., on-chip buffers, flash, and/or system DRAM), where each MPEG2 transport stream packet is held in a distinct memory location. As another example, the video and audio data packets of the MPEG data are separated when they are sent to separate decoders. For example, audio packets go to audio decoders while video packets go to video decoders</p> <p>Samsung DVRs may contain MPEG encoders, including the BCM7041:</p>

the Claim	Samsung DVRs ¹
	<div></div> <p>(showing internal chips of Samsung SMT-H3090, Broadcom BCM7041).</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Media Switch, that of parsing an MPEG stream and separating an MPEG stream into its video and audio components so that the video and audio components can be provided to the video and audio MPEG decoders, in substantially the same way, by performing PID filtering, start code detection, and separating the video and audio components, to yield the same result, an analyzed MPEG stream that is separated into audio and video components, and therefore would infringe under the doctrine of equivalents.</p>


the Claim	Samsung DVRs ¹
	<p>Still further, on information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Media Switch, that of parsing an MPEG stream and separating an MPEG stream into its video and audio components so that the video and audio components can be provided to the video and audio MPEG decoders, in substantially the same way, by sending the video and audio data to separate decoders, regardless of any order of processing in the DVR, to yield the same result, an analyzed MPEG stream that is separated into audio and video components for playback on a user's display, and therefore would infringe under the doctrine of equivalents.</p>

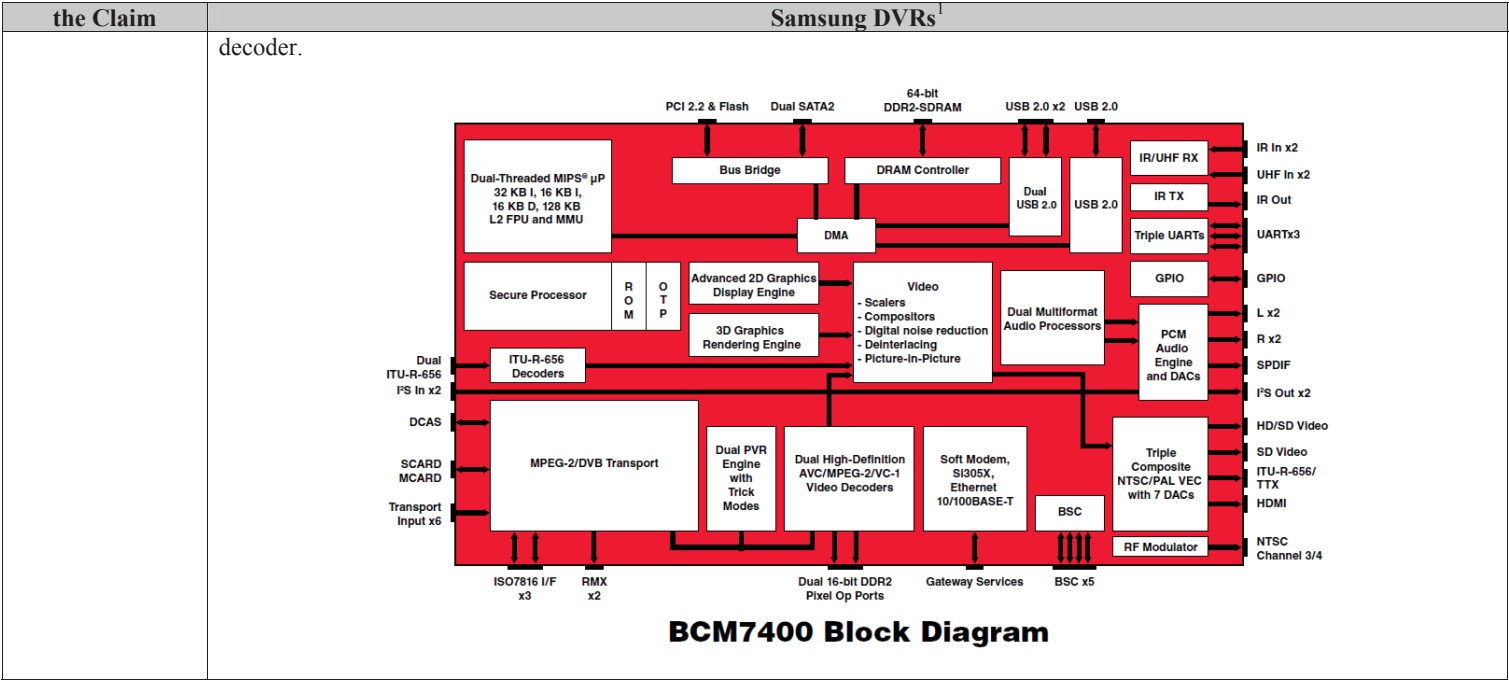
the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
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the Claim	Samsung DVRs ¹																		
<p>[32g] at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device;</p>	<p>A Samsung DVR has at least one Output Section, wherein said Output Section extracts said video and audio components from said storage device. For example, Samsung DVRs allow users to play back recorded television programs to watch at a later time. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>(Samsung SMT-H3090 2008 Data Sheet), at 1:</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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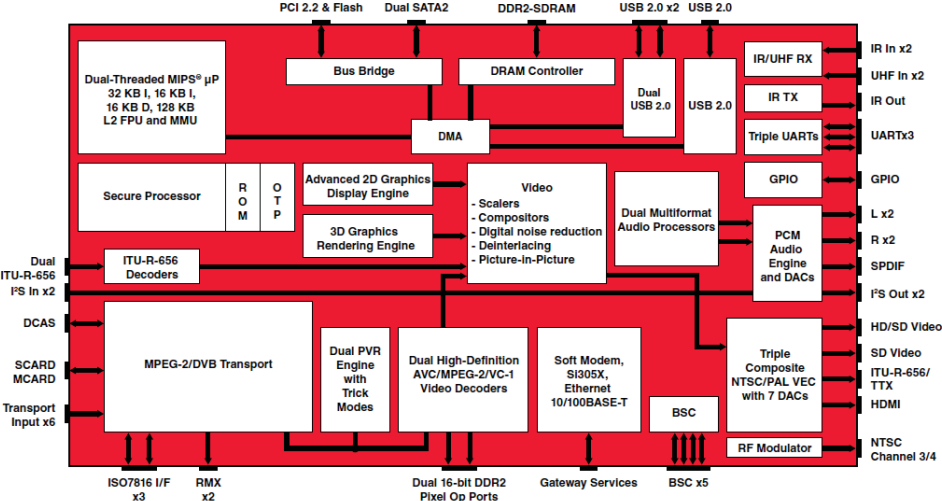
the Claim	Samsung DVRs ¹						
	<div>  <p>imagine Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs simultaneously.</p> </div> <p>On information and belief, Samsung DVRs extract MPEG2 transport stream packets from a hard disk drive (HDD) during play back. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 6:</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none"> - An MPEG decoder capable of processing HD/SD stream - SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling - Digital AV transmission, such as IEEE1394 and HDMI - Content Protection - CableCARD Interface for CAS - OCAP™ 1.0 application platform - DVR Features - Recording : <table border="1"> <thead> <tr> <th>HDD</th><th>Capacity</th></tr> </thead> <tbody> <tr> <td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr> <tr> <td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr> </tbody> </table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Output Section, for example that of extracting said video and audio components from said storage</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
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the Claim	Samsung DVRs ¹																		
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[32h] wherein said Output Section assembles said video and audio components into an MPEG stream;	<p>A Samsung DVR has at least one Output Section that assembles said video and audio components into an MPEG stream. On information and belief, MPEG2 transport stream packets are assembled into an MPEG2 transport stream, de-multiplexed, and packetized elementary streams are constructed when read from the disk and/or before being sent to a decoder. .</p> <p>For example, Video and Audio data are read from the disk for playback.</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table> <tr> <th>Feature</th><th>Description</th></tr> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </table>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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the Claim	Samsung DVRs ¹						
	<p>(Samsung SMT-H3090 2008 Data Sheet), at 1:</p> <div>  <p>Imagine Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs simultaneously.</p> </div> <p>On information and belief, Samsung DVRs extract MPEG2 transport stream packets from a hard disk drive (HDD) during play back. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 6:</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none"> - An MPEG decoder capable of processing HD/SD stream - SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling - Digital AV transmission, such as IEEE1394 and HDMI - Content Protection - CableCARD Interface for CAS - OCAP™ 1.0 application platform - DVR Features - Recording : <table> <tr> <th>HDD</th><th>Capacity</th></tr> <tr> <td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr> <tr> <td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr> </table> <p>These video and audio data are assembled into an MPEG stream so that they can be processed and displayed by an MPEG</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
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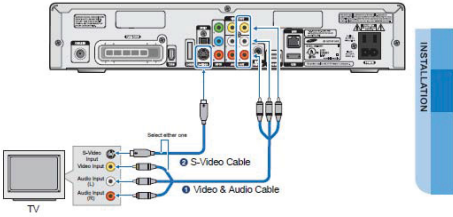
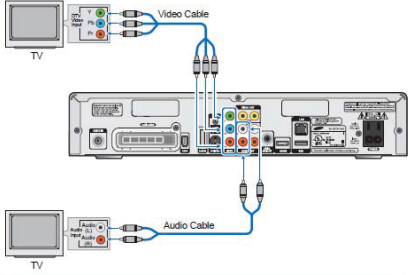
the Claim	Samsung DVRs ¹
	<p>VIDEO AND GRAPHICS DISPLAY</p> <p>OVERVIEW</p> <p>The video and graphics module accepts decoded AVC/MPEG/VC-1 or analog video and performs professional quality compositing of text and graphics with video. The video subsystem takes in uncompressed video from either the AVC/MPEG/VC-1 decoder or the digital ITU-T-656 input. The subsystem processes the input videos based on the input and output format, and system requirements. It can be scaled and converted to the output display format directly, or go through single and multiple capture and playback loops. Each capture and playback loop could involve data processing like DNR, MAD-IT, or scaling.</p> <p>Two independent video streams (one stream must be limited to SD stream) can be processed at the same time and converted to different size and format. Finally, they can be blended together as PIP (picture in picture) windows or drive up to two separate displays. Both displays may have separate graphics inputs to be blended with. The architecture allows users to create a series of frame-buffers that allow an unlimited number of graphics layers to be composited and blended together before being displayed.</p> <p>Once the graphical frame-buffers are available, they can be combined with the video using a new compositor. This new compositor allows up to two video surfaces to be combined with a graphical surface (frame-buffers). The blending order of any surface is controlled by software to allow the utmost flexibility for the end-user.</p> <p>The graphic surface generation is now divorced from the real-time display requirements of the video output. Once the new graphics surface is available, it can be switched in for display. Therefore, all of the graphics development interacts only with the memory—not with any of the display hardware.</p> <p>The architecture goal of this new, modular approach is to allow various chip-sets to share the same basic component building blocks to achieve the customers design requirements. The BCM7405 employs enough of these building blocks to realize a dual video output with independent graphics on each output. Supported video decode and display format combinations can be seen in Table 1-4 on page 1-36.</p> <p>BRCM 7405 Preliminary Hardware Data Module at 1-35</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Output Section, for example that of assembling said video and audio components into an MPEG stream, in substantially the same way, for example by demultiplexing or packetizing the data, to yield the same result, a properly formatted data stream for presentation to the decoder.</p>
[32i] wherein said Output Section sends said MPEG	A Samsung DVR has an Output Section that sends said MPEG stream to a decoder. <i>See, e.g.,</i> (BCM7400 Product Brief):

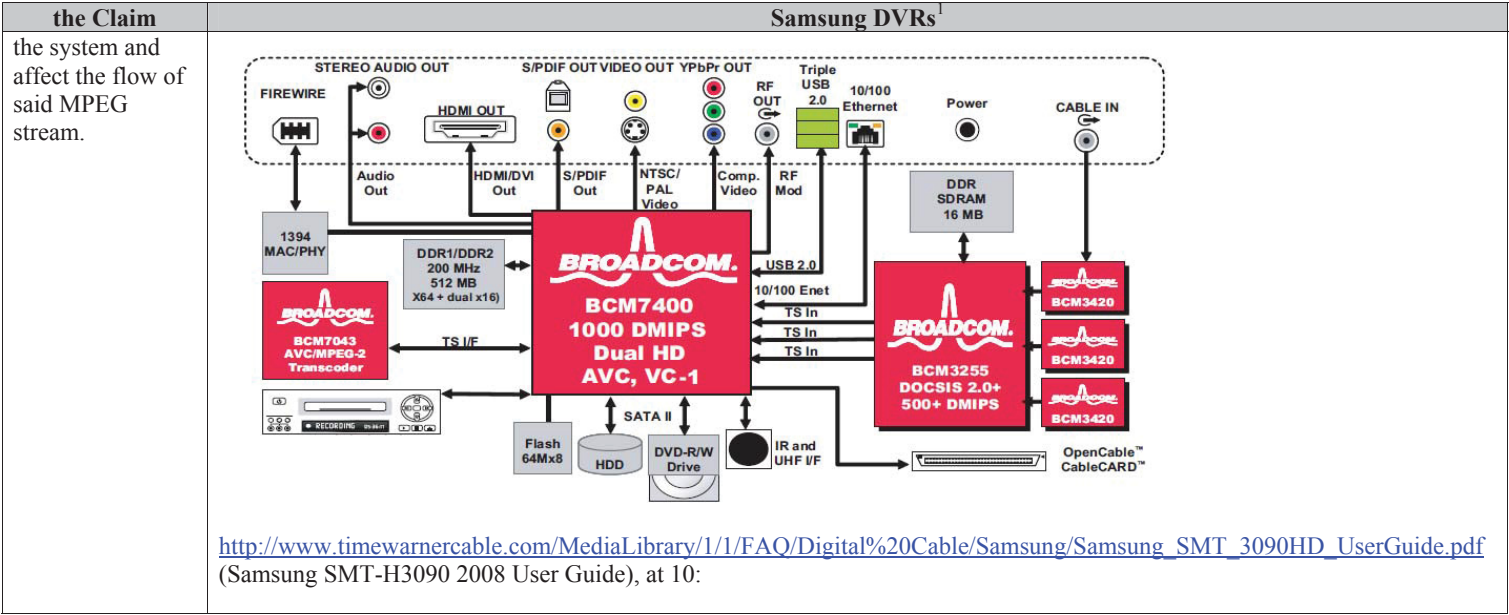
the Claim	Samsung DVRs ¹
stream to a decoder;	 <p style="text-align: center;">BCM7400 Block Diagram</p> <p>(Samsung SMT-H3090 2008 User Guide), at 6:</p>

the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB</p> <p>Digital HD DVR OCAP STB (Digital High-Definition Digital Video Recorder OpenCable Application Platform Set-Top Box) provides high quality video and audio broadcasting, and interactive services including Video-On-Demand.</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
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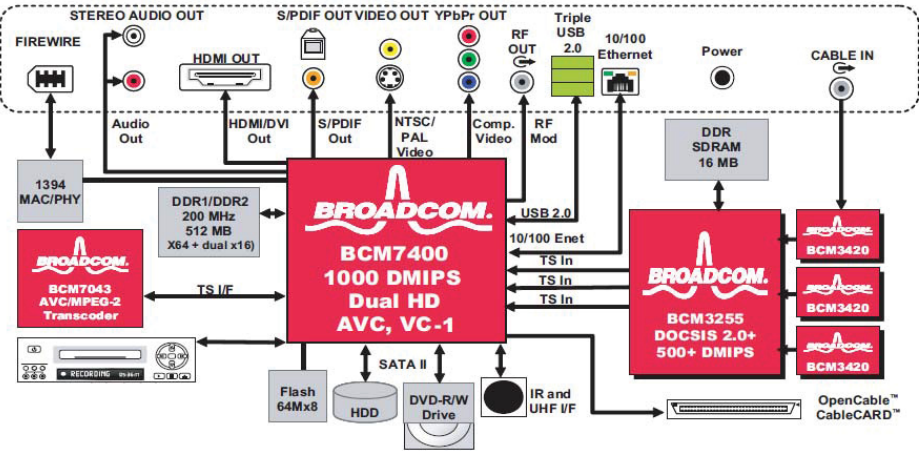
the Claim	Samsung DVRs ¹
<p>[32j] wherein said decoder converts said MPEG stream into TV output signals;</p>	<p>A Samsung DVR has decoders that convert MPEG streams into TV output signals. On information and belief, the Broadcom chips used in Samsung DVRs contain video and audio decoders.</p> <p>See, e.g., (Broadcom BCM 7400 Product Brief), at 1:</p> <div><p>FEATURES</p><ul style="list-style-type: none">• Dual advanced AVC/MPEG-2/VC-1 decoders<ul style="list-style-type: none">• H.264/AVC Main and High Profile to Level 4.1• VC-1 Advanced Profile @ Level 3• VC-1 Simple and Main Profile• HD MPEG-2 and SD MPEG-2• MPEG still-picture decode• DivX[®] and MPEG4 part 2 ASP decode</div> <p>(Broadcom BCM 7400 Product Brief), at 2 (showing video decoders):</p> <div><p>BCM7400 Block Diagram</p><p>The diagram illustrates the internal architecture of the BCM7400 chip. Key components include:</p><ul style="list-style-type: none">Top Section: Dual-Threaded MIPS[®] μP (32 KB I, 16 KB D, 128 KB L2 FPU and MMU), Bus Bridge, DRAM Controller, DMA, and USB 2.0 ports.Left Side: Secure Processor, ROM, OTP, ITU-R-656 Decoders, DCAS, SCARD, and Transport Input x6.Center: Advanced 2D Graphics Display Engine, 3D Graphics Rendering Engine, Video (Scalers, Compositors, Digital noise reduction, Deinterlacing, Picture-in-Picture), Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, Soft Modem, Si305X, Ethernet 10/100BASE-T, and BSC.Right Side: IR/UHF RX, IR TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, NTSC Channel 3/4, and RF Modulator.Bottom: ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, and BSC x5.</div>

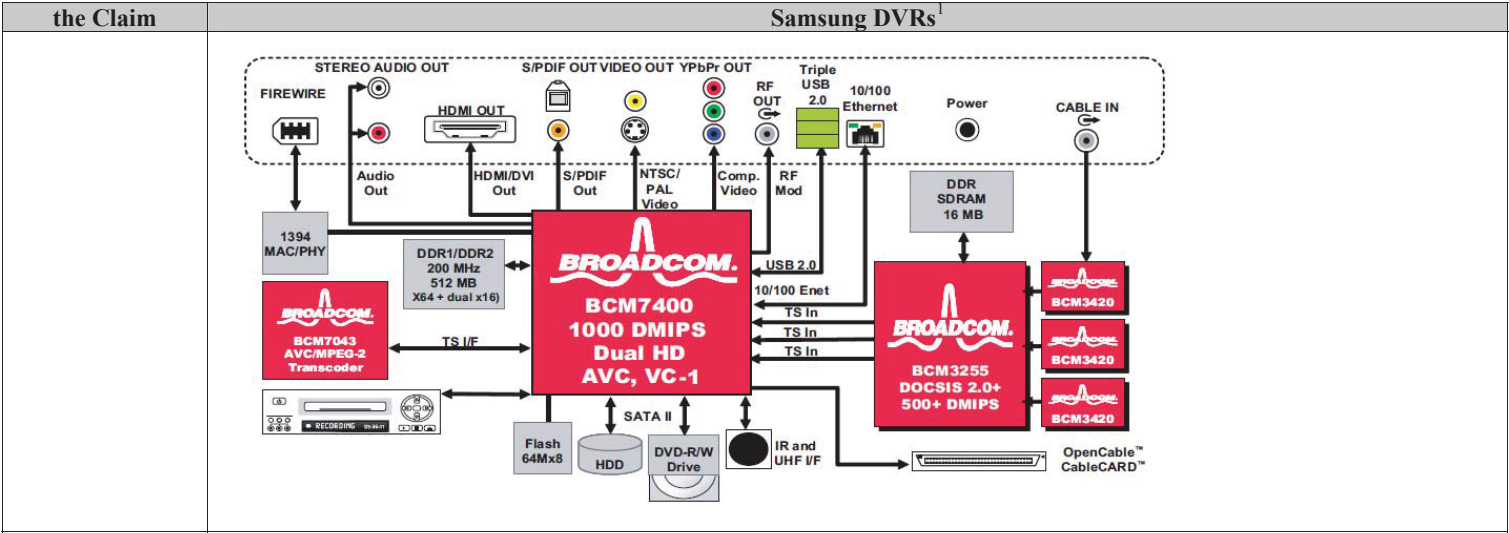
the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>The advanced video decoders featured in the BCM7400 are capable of supporting high definition AVC, VC-1, and MPEG-2 streams. AVC support is for Main and High Profile to level 4.1 for 720p and 1080i high definition support or to Level 3.1 for standard definition streams. AVC High Profile was added to the fidelity range extensions specifically to address the needs of consumer broadcast and playback applications. Tools include additional transform sizes and spatial prediction modes and support for adaptive quantization matrix. The video decoders also support high definition VC-1 (Advanced Profile Level 3, Main, and Simple Profiles) and MPEG-2, Main Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p>

the Claim	Samsung DVRs ¹
<p>[32k] wherein said decoder delivers said TV output signals to a TV receiver; and</p>	<p>A Samsung DVR delivers decoded TV output signals to a TV receiver. A Samsung DVR can be connected to a TV using HDMI, DVI, component, Y Output, Video Output, S-Video Out, Cable Out, or 1394 connectors. <i>See, e.g.,</i> http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 13-14:</p> <div><div><p>Connection to a TV Having a Composite or S-VIDEO Jack</p><p>Below is the method for connecting to a TV having a composite or S-VIDEO jack.</p><p>Video Connection</p><p>1 Connection to the VIDEO OUT jack Using a video connector of Video & Audio cable, connect the VIDEO OUT jack to the Video Input jack on the TV.</p><p>2 Connection to the S-VIDEO OUT jack Using an S-Video cable, connect the S-VIDEO OUT jack to the S-Video Input jack on the TV.</p><p>Audio Connection</p><p>Using the offered Audio cable or audio connectors of Video & Audio cable, connect the AUDIO OUT (L/R) jacks on the rear panel to the Audio Input (L/R) jacks on the TV. Be sure to match the audio jacks with the plugs of the same color.</p></div><div><p>Connection to a TV Having Component Jacks (Y, Pb, Pr)</p><p>See below to connect to a TV having a Component port (Y, Pb, Pr). When connecting the Component Video and Audio cables, be sure to match the jacks to the plugs of the same color.</p><p>Video Connection</p><p>Using the offered Video (Component) cable, connect the Y, Pb, Pr (HDTV) jack to the Y, Pb, Pr (DTV Video Input) jack on the TV.</p><p>Audio Connection</p><p>Using the offered Audio cable, connect the AUDIO OUT (L/R) jacks on the rear panel to the Audio Input (L/R) jacks on the TV. Be sure to match the audio jacks with the plugs of the same color.</p></div></div> <p>SMT-H3090 User Guide, 13 14 © SAMSUNG Electronics Co., Ltd.</p>
<p>[32l] accepting control commands from a user, wherein said control commands are sent through</p>	<p>A Samsung DVR accepts control commands from a user, wherein said control commands are sent through the system and affect the flow of an MPEG stream. The Samsung DVR software is responsive to front panel buttons and a remote control. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The hardware and software receives commands from a user, which affect the flow of data through the system, e.g., begin recording, channel change, trickplay, etc. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):</p>



the Claim	Samsung DVRs ¹																		
	<p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function, for example that of accepting control commands from a user, in substantially the same way, for example by including hardware and/or software interfaces that can accept user commands, to yield the same result, wherein said control commands are sent through the system and affect the flow of said MPEG stream.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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Claim 33																			
The apparatus of claim 32, wherein said Input Section directs said MPEG stream to the destination	<p>In addition to the features described above regarding claim 32, Samsung DVRs include an input section that directs an MPEG stream to a destination indicated by said control commands.</p> <p>For example, when a Samsung DVR receives a command to record a television program, an input section, including for example tuners, parsers, and other processing devices may direct MPEG data to any of memory, hard disks, and/or optical storage</p>																		

the Claim	Samsung DVRs ¹
indicated by said control commands.	<p>devices.</p>  <p>The diagram illustrates the internal architecture of a Samsung DVR. At the center is the BROADCOM BCM7400 1000 DMIPS Dual HD AVC, VC-1 chip. This central processor is connected to several peripheral components and interfaces:</p> <ul style="list-style-type: none">Input/Output Ports (top): STEREO AUDIO OUT, FIREWIRE, Audio Out, HDMI/DVI Out, S/PDIF Out, VIDEO OUT, YPbPr OUT, NTSC/PAL Video, Comp. Video, RF OUT, Triple USB 2.0, 10/100 Ethernet, Power, and CABLE IN.Memory and Storage: DDR1/DDR2 (200 MHz, 512 MB, X64 + dual x16) and DDR SDRAM (16 MB) are connected to the central chip. Storage options include a Flash 64Mx8, HDD, and DVD-R/W Drive, all connected via SATA II.Processing and Control: A BROADCOM BCM7043 AVC/MPEG-2 Transcoder is connected via TS I/F. A BROADCOM BCM3255 DOCSIS 2.0+ 500+ DMIPS chip handles network and cable signals, connected via TS In and TS Out. It also interfaces with an OpenCable™ CableCARD™.Other Components: A 1394 MAC/PHY is connected to the FireWire port. An IR and UHF I/F is connected to the front panel.
Claim 34	
The apparatus of claim 32, wherein said Output Section extracts said video and audio components from the storage device indicated by said control commands.	<p>In addition to the features described above regarding claim 32, Samsung DVRs include an output section that extracts video and audio components from the storage device indicated by said control commands.</p> <p>For example, when a Samsung DVR receives a command to play back a television program, an output section, including for example decoders, demodulators, and other processing devices may extract video and audio data from any of memory, hard disks, and/or optical storage devices for display to a viewer.</p>



the Claim	Samsung DVRs ¹
Claim 36	
The apparatus of claim 32, wherein the storing and extracting of said video and audio components from said storage device are performed simultaneously.	<p>In addition to the features described above regarding claim 32, Samsung DVR can simultaneously store and extract video and audio components from a storage device, for example, in the course of simultaneously recording and playing back television programming.</p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function, for example storing and extracting of said video and audio components from said storage device, in substantially the same way, for example by performing these actions substantially simultaneously, to yield the same result, wherein said storing and extracting appear to occur at the same time.</p>
Claim 37	
The apparatus of claim 32, wherein said Media Switch calculates and logically associates a time stamp to said video and audio components.	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch that calculates and logically associates a time stamp to said video and audio components.</p> <p>For example, when a Samsung DVR records a program a local timestamp may be generated by a processor and internal clock, and stored with the video and audio date. See, e.g., BRCM 7405 functional description at page 1-22:</p> <p>A local timestamp is generated at the input buffer via an internal counter using a 27-MHz clock selectable from any of the three available locked timebases, or the free-running system clock. The local timestamp can be prepended as a 32-bit field to each recorded transport packet. The format of the 32-bit timestamp field is programmable. In one mode, this field contains a 28-bit local timestamp plus a 4-bit parity which can be used during playback to transmit the packets at a rate equivalent to when they were recorded and can be used for PCR correction in the Remux modules. In another mode, the upper two bits of the 32-bit timestamp field are user programmable with the remaining bits being the timestamp.</p>
Claim 38	
The apparatus of claim 32, wherein said Media Switch extracts time stamp values	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch that extracts time stamp values from a digital TV stream and logically associates said time stamp values to said video and audio components.</p> <p>For example, when a Samsung DVR receives and records digital input stream, it may include a time stamp, such as a presentation time stamp (PTS) that is included in that stream. The PTS will be extracted and stored with the input data stream.</p>

the Claim	Samsung DVRs ¹
<p>from a digital TV stream and logically associates said time stamp values to said video and audio components.</p>	<p>See, e.g., BRCM 7405 functional description at page 1-22:</p> <p><i>Record Channel's Index Table Generation</i></p> <p>Index table generation is a function that is supported in the record channel. Although this function handles more than just start code table entries, it will be referred to as the SCD (start code detector) in this document.</p> <p>The SCD records the positions of PES packet header stream_id's and elementary stream start codes within a recorded transport stream for a given PID. There are two transport modes of operation: MPEG and DIRECTV. The data structure for data stored in the memory buffer is a start code index table that is detailed in the Record Index Table Definition section.</p> <p>Within each transport mode (MPEG and DIRECTV), there are four index table modes supported. All modes utilize a 6-word index entry. Four index entry types are supported: Start Code (SC), Presentation Time Stamp (PTS), Transport Field (TF), and Seamless Pause (SP). The following describes the four entry types:</p> <ol style="list-style-type: none"> 1 The SC index entry provides offsets to start-code locations within the associated record buffer. 2 The PTS index entry provides PTS values extracted from the recorded stream. 3 The TPIT transport field parser stores transport field index entries. For the on-change conditions, an initial entry is made for detection of the first PID. For example, if the first packet for a PID with the transport_scrambling_control_change_en bit set has a scrambling control of 10, an index table entry is stored for the transport_scrambling_control_change condition with the transport_scrambling_control_change bit set and the actual value of the scrambling_control of 10 is stored in the scram_control field. 4 The seamless pause feature is intended for use with playback. It allows live viewing of a program with the capability of pausing the program. The program is initially viewed without going through the record/playback path. This eliminates channel change latency incurred when going through this path. When the user wishes to pause the program, a record channel must be enabled with the appropriate PID channels selected for record. Then REC_PAUSE_EN is asserted. This assertion prevents the selected PID channel data from being sent to the audio/video decoders. The user sees this as a pause. Once REC_PAUSE_EN is set, the next packet that is recorded has a seamless pause entry made in the record index table (if the index table is enabled). When the user wishes to resume the program, the stream now comes from a playback channel instead of the live channel. The index table entry made for seamless pause is used to determine where to start the playback.
Claim 43	
<p>The apparatus of claim 32, further comprising: a module for increasing the decoder system</p>	<p>In addition to the features described above regarding claim 32, Samsung DVRs include fast playback and fast reverse playback.</p>

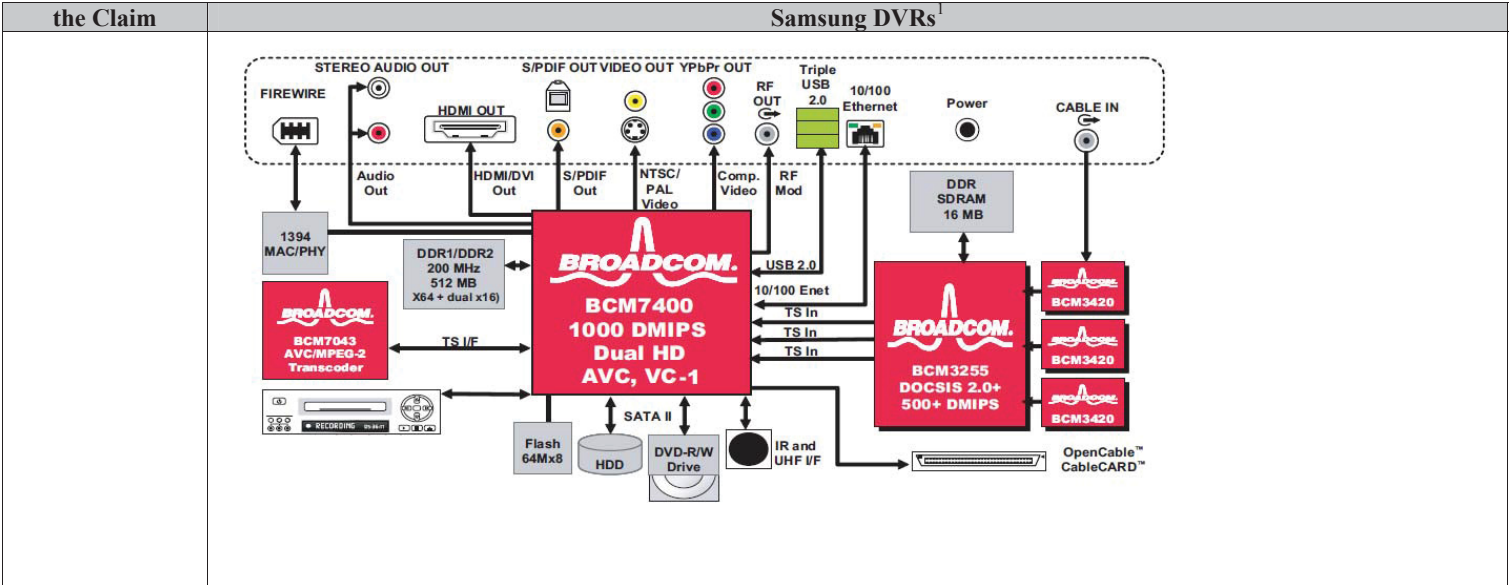
the Claim	Samsung DVRs ¹																		
clock rate for fast playback or fast reverse playback	<p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table> <tr> <th>Feature</th><th>Description</th></tr> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </table> <p>On information and belief, at least one of these fast playback and fast reverse playback modes are implemented by, among other things, increasing the decoder system clock rate. For example, the PCR block may be used by rate managers to control the playback rate of the decoders.</p> <p>PCR Recovery Block</p> <p>The data transport design supports two equivalent PCR recovery circuits, each programmed independently.</p> <p>Each data transport PCR module is capable of extracting the PCR information from a selected packet stream and generating Timebase pulses (Timebase is a 27-MHz pulse train in 108-MHz clock domain) output that can be used by rate managers. Each PCR module is also used to send the extracted PCRs directly to the audio and video decoders to ensure that both decoders are using the same PCR.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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Claim 44																			
The apparatus of	In addition to the features described above regarding claim 32, Samsung DVRs include slow playback and slow reverse																		

the Claim	Samsung DVRs ¹																		
<p>claim 32, further comprising: a module for decreasing the decoder system clock rate for slow playback or slow reverse playback.</p>	<p>playback.</p> <p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>On information and belief, at least one of these slow playback and slow reverse playback modes are implemented by, among other things, decreasing the decoder system clock rate. For example, the PCR block may be used by rate managers to control the playback rate of the decoders.</p> <p>PCR Recovery Block</p> <p>The data transport design supports two equivalent PCR recovery circuits, each programmed independently.</p> <p>Each data transport PCR module is capable of extracting the PCR information from a selected packet stream and generating Timebase pulses (Timebase is a 27-MHz pulse train in 108-MHz clock domain) output that can be used by rate managers. Each PCR module is also used to send the extracted PCRs directly to the audio and video decoders to ensure that both decoders are using the same PCR.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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the Claim	Samsung DVRs ¹
Claim 49	
<p>The apparatus of claim 32, wherein said Media Switch has a data bus connecting it to a CPU and DRAM.</p>	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch that has a data bus connecting it to a CPU and DRAM.</p> <p>For example, Samsung DVRs may include a processor that includes, for example, an EBI with a data bus that connects to both a CPU, e.g. a MIPS processor or the like, and DRAM, including memory used for DMA or other storage or buffering functions. See, e.g. BCM7405 Functional Description at 1-83</p> <p>The BCM7405 EBI provides a 27-bit address bus and a 16-bit bidirectional data bus. In addition, separate read and write strobes are provided along with up to six firmware-configurable chip select signals. Each chip select is fully programmable and:</p> <ul style="list-style-type: none"> • Supports block sizes between 8 KB and 64 MB • Has extended clock cycle access control • Has 8-bit or 16-bit selection of peripheral data bus width <p>The BCM7405 EBI automatically breaks up accesses where the transfer data is larger than the target size, such as a 32-bit read or write initiated by the CPU or internal DMA targeting an 8-bit wide peripheral results in four separate byte-wire read or write accesses to the target.</p> <p>The BCM7405 EBI supports glueless connection to an external Nand Flash device for booting the Host MIPS or for general nonvolatile storage. Many standard Nand Flash devices are supported, from 128 Mbit to 2 Gbit densities, and in x8 and x16 data widths. Hardware ECC, write protect, and local buffering assists with booting.</p> <p>Synchronous burst read operations for an external FLASH ROM on the EBI bus is supported, which allows more code to remain resident in the external EPROM chips instead of mirroring it to DRAM storage.</p> <p>Internal bus protocols need to be extended to allow burst reads. The EBI interface converts these burst accesses into a cache-line read of 16 bytes. Non-cacheable access would be handled as single word reads (as currently happens). This allows the use of synchronous FLASH ROM chips, such as the Intel 28F256Kxx family.</p>
Claim 50	
<p>The apparatus of claim 32, wherein said Media</p>	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch that shares an address bus with a CPU and DRAM.</p>

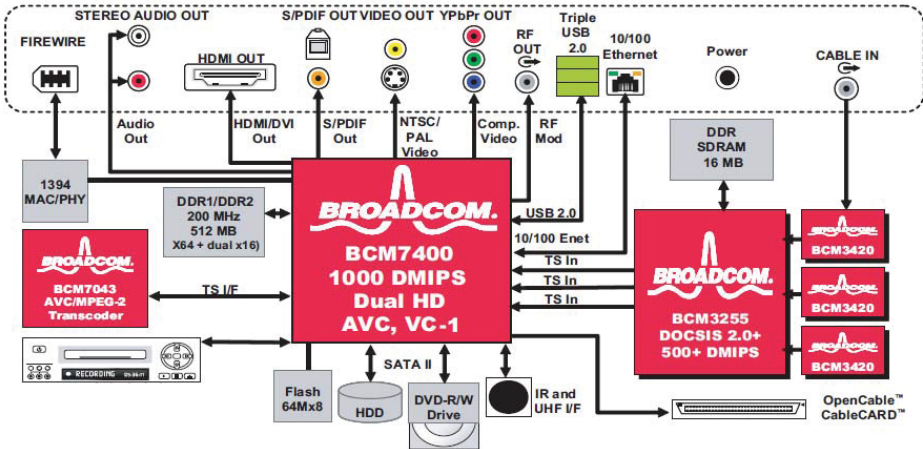
the Claim	Samsung DVRs ¹
Switch shares an address bus with a CPU and DRAM.	<p>For example, Samsung DVRs may include a processor that includes, for example, an EBI with a shared address bus that connects to both a CPU, e.g. a MIPS processor or the like, and DRAM, including memory used for DMA or other storage or buffering functions. See, e.g. BRCM7405 Functional Description at 1-83</p> <p>The BCM7405 EBI provides a 27-bit address bus and a 16-bit bidirectional data bus. In addition, separate read and write strobes are provided along with up to six firmware-configurable chip select signals. Each chip select is fully programmable and:</p> <ul style="list-style-type: none"> • Supports block sizes between 8 KB and 64 MB • Has extended clock cycle access control • Has 8-bit or 16-bit selection of peripheral data bus width <p>The BCM7405 EBI automatically breaks up accesses where the transfer data is larger than the target size, such as a 32-bit read or write initiated by the CPU or internal DMA targeting an 8-bit wide peripheral results in four separate byte-wire read or write accesses to the target.</p> <p>The BCM7405 EBI supports glueless connection to an external Nand Flash device for booting the Host MIPS or for general nonvolatile storage. Many standard Nand Flash devices are supported, from 128 Mbit to 2 Gbit densities, and in x8 and x16 data widths. Hardware ECC, write protect, and local buffering assists with booting.</p> <p>Synchronous burst read operations for an external FLASH ROM on the EBI bus is supported, which allows more code to remain resident in the external EPROM chips instead of mirroring it to DRAM storage.</p> <p>Internal bus protocols need to be extended to allow burst reads. The EBI interface converts these burst accesses into a cache-line read of 16 bytes. Non-cacheable access would be handled as single word reads (as currently happens). This allows the use of synchronous FLASH ROM chips, such as the Intel 28F256Kxx family.</p>
Claim 51	
The apparatus of claim 32, wherein said Media Switch operates asynchronously	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch that operates asynchronously and autonomously with a CPU.</p> <p>For example, Samsung DVRs may include a processor that includes, for example, PCI bus that allows the media switch to</p>

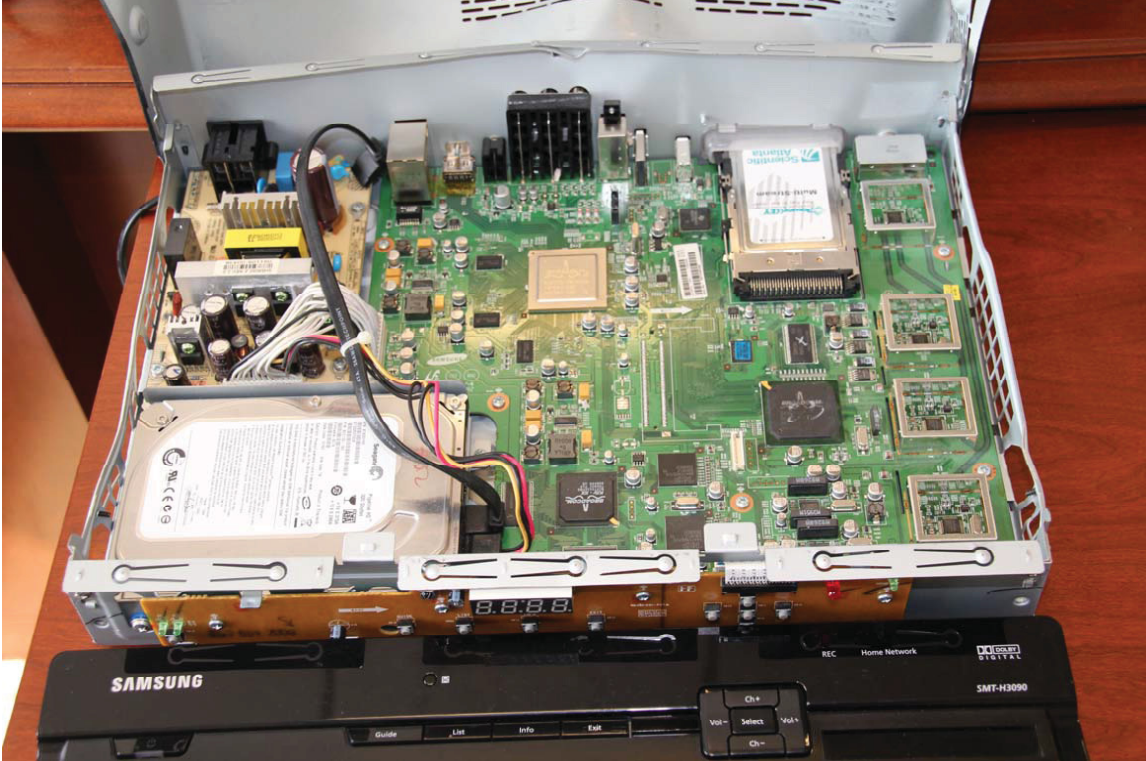
the Claim	Samsung DVRs ¹
and autonomously with a CPU.	<p>operate asynchronously and autonomously from the CPU. See, e.g. BRCM7405 Functional Description at 1-83</p> <p>PCI AND EXTERNAL BUS INTERFACE</p> <p>The BCM7405 includes a shared interface that supports 33 MHz PCI 2.3 and external buses to allow the internal processor control of external peripherals that may be attached to the PCI bus and to allow an external controller to access the peripherals and memory associated with the BCM7405.</p> <p>The PCI and EBI interfaces share many of the same pins to reduce the overall pin counts. Both PCI and EBI operate at the same PCI clock input frequency. Critical control signals such as FRAMEb and CSb are not shared. The arbitration and multiplexing of this PCI/EBI interface happens completely in hardware. When the interface is operated as an EBI function, PCI devices will not respond because the FRAMEb is not asserted. When the interface is operated as a PCI function, EBI devices will not respond because the CSb is not asserted. Both EBI and PCI interfaces operate at a max clock frequency of 33 MHz.</p> <p>Software running on the internal MIPS processor can allow the BCM7405 to act as a PCI South bridge. This allows an easier migration path for external processors to access the peripheral devices (such as the USB controller).</p> <p>When in PCI Client mode, the EBI function is disabled and the PCI interface supports both internal and external PCI masters. When in PCI Host Bridge mode, the EBI interface functions as an EBI bus master only. It supports asynchronous, synchronous and 68K modes. The PCI interface supports both external and internal PCI masters. The internal PCI arbiter is designed to support the EBI request as a modified PCI master with special request and grant handshaking. If an external PCI arbiter is selected, the special EBI request/grant pair maps to the PCI GNT2b/REQ2b pins.</p>
Claim 52	
The apparatus of claim 32, wherein said storage device is connected to said Media Switch.	<p>In addition to the features described above regarding claim 32, Samsung DVRs include a storage device is connected to said Media Switch.</p> <p>For example, the Samsung DVRs include, among other things, a hard drive operatively connected to the media switch for storing multimedia data.</p>

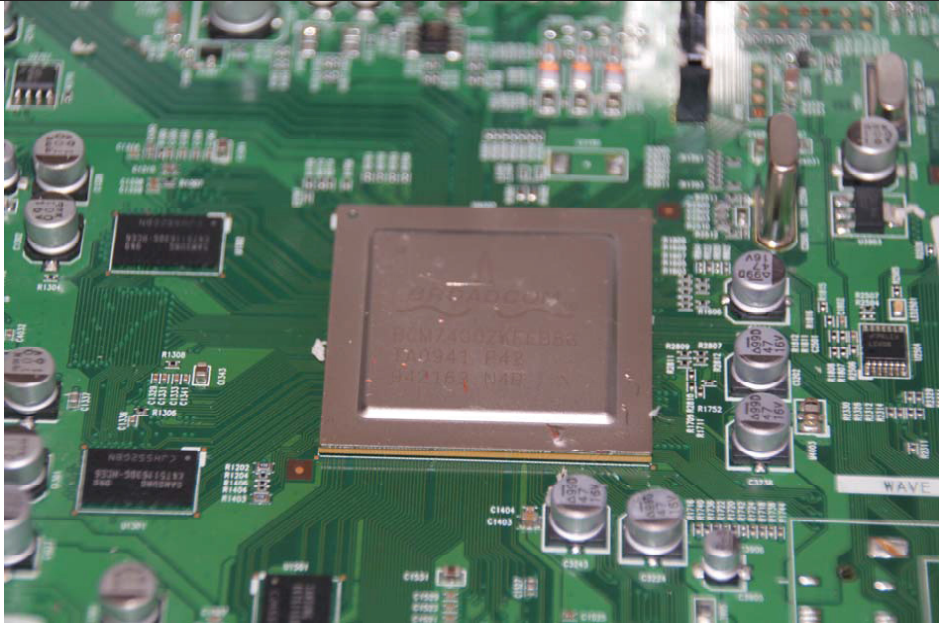


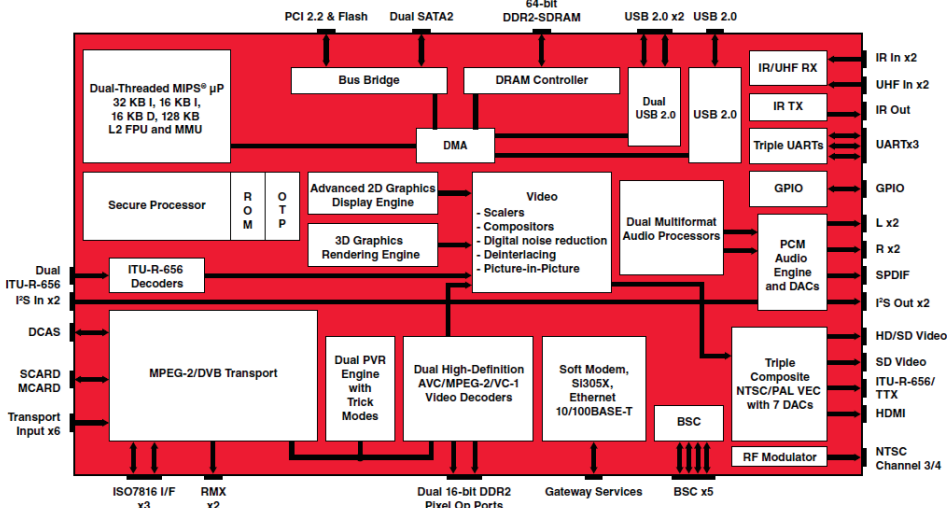
the Claim	Samsung DVRs ¹
Claim 53	
The apparatus of claim 32, wherein said Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers.	In addition to the features described above regarding claim 32, Samsung DVRs include a Media Switch allows the CPU to queue up Direct Memory Access (DMA) transfers. For example, a Samsung DVR includea a processor that includes, for example, a MIPS CPU and a DMA controller that may queue up transfers to various busses, memory locations, and/or host controllers. See, e.g. BCM function description at figure 1-1: Figure 1-1 on page 1-7 shows the BCM7405 functional block diagram.
	<p>Figure 1-1: Functional Block Diagram</p>
Claim 61	
61[a]. An	A Samsung DVR can simultaneously store and play back multimedia data. <i>See, e.g.,</i>


the Claim	Samsung DVRs ¹
apparatus for the simultaneous storage and play back of multimedia data, comprising:	<p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("Viewing one program while recording another program." "Simultaneous Time Shifted Buffering for two Programs."); p. 9 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>"TIME WARNER CABLE AND SAMSUNG FORGE AGREEMENT FOR TRU2WAY SET-TOP DEVELOPMENT, PURCHASE & DEPLOYMENT Release Date: 07/06/2009</p> <p>Time Warner Cable and Samsung today announced that they have signed a letter of commitment for the continued development, purchase and deployment of Samsung True2Way enabled set-top boxes, including the first second-source DVR. "We look to offer our customers advanced set-top boxes with features that are simple and easy to use," said Mike Hayashi, Executive Vice President of Advanced Engineering for Time Warner Cable. "We have been a leader in the roll-out of Tru2Way devices and we are continuing to grow our relationship with Samsung, a CE company dedicated to the development of new equipment meeting the necessary standards and offering attractive feature sets."</p> <p>Thomas Rhee, SVP, New Business Development for Samsung, added, "We are thrilled to have worked closely with Time Warner Cable to launch Tru2way on our family of cable set-tops including the SMT-H3090 and SMT-H3270 High Definition DVRs. As in Korea, we look forward to the expansion of Tru2way in North America."</p> <p>This agreement further solidifies Time Warner Cable's commitment to its deployment of Tru2Way enabled set-top boxes. To date Time Warner Cable has deployed over 2 million Tru2Way set-top boxes, of which approximately 400,000 are Samsung boxes.</p> <p>Time Warner Cable and Samsung also recently signed an MOU that focuses on collaborating in development of better home networking solutions for entertainment. This work is part of Time Warner Cable's continuing efforts to provide its customers with technology that brings new levels of ease and convenience."</p> <p>http://www.timewarnercable.com/corporate/about/inthenews.ashx?PRID=2626&MarketID=0</p>
[61b] a physical data source, wherein said physical data source accepts broadcast data from an input	A Samsung DVR has an input device that may include cable input, tuners, an analog to digital converter, and/or, on information and belief, other components such as the Broadcom BCM3255 or other similar chip that may perform QAM demodulation, including chips made by other third parties. <i>See, e.g.</i> , (Samsung SMT-H3090 2008 Data Sheet), p.1 ("Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs Simultaneously.""), p. 2 ("In-band Tuner : 54 to 864MHz, Receiving 64 or 256 QAM."));

the Claim	Samsung DVRs ¹
<p>device, parses video and audio data from said broadcast data, and temporarily stores said video and audio data;</p>	<p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), p. 2 ("RF Input Tuning Range: 88 to 860 MHz."); (BCM7400 Product Brief) (showing BCM3420 and BCM3255 chips):</p>  <p>A Samsung DVR has a physical data source, which accepts broadcast data from the input device, analyzes the video and audio data, and temporarily stores the data in, for example, internal memory and/or DRAM buffers. For example, the Samsung SMT-H3090 DVR uses Broadcom BCM7400 and/or other chips such as the BCM3255 QAM Receiver, in conjunction with SDRAM and/or other temporary storage.</p> <p>(The Samsung SMT-H3090 use Broadcom BCM3418 tuners instead of the BCM3420 tuners)</p>

the Claim	Samsung DVRs ¹
	 <p>The image shows the internal components of a Samsung DVR. A green printed circuit board (PCB) is populated with various electronic components, including a central processing unit (CPU), memory modules, and integrated circuits. A power supply unit (PSU) is visible on the left side, and a hard drive is mounted in the center. The front panel of the device is visible at the bottom, featuring the Samsung logo, a digital display showing '8.8.8.8', and several control buttons including 'Guide', 'List', 'Info', 'Exit', 'Ch+', 'Ch-', 'Vol+', 'Vol-', and 'Select'. The model number 'SMT-H3090' is printed on the front panel.</p>

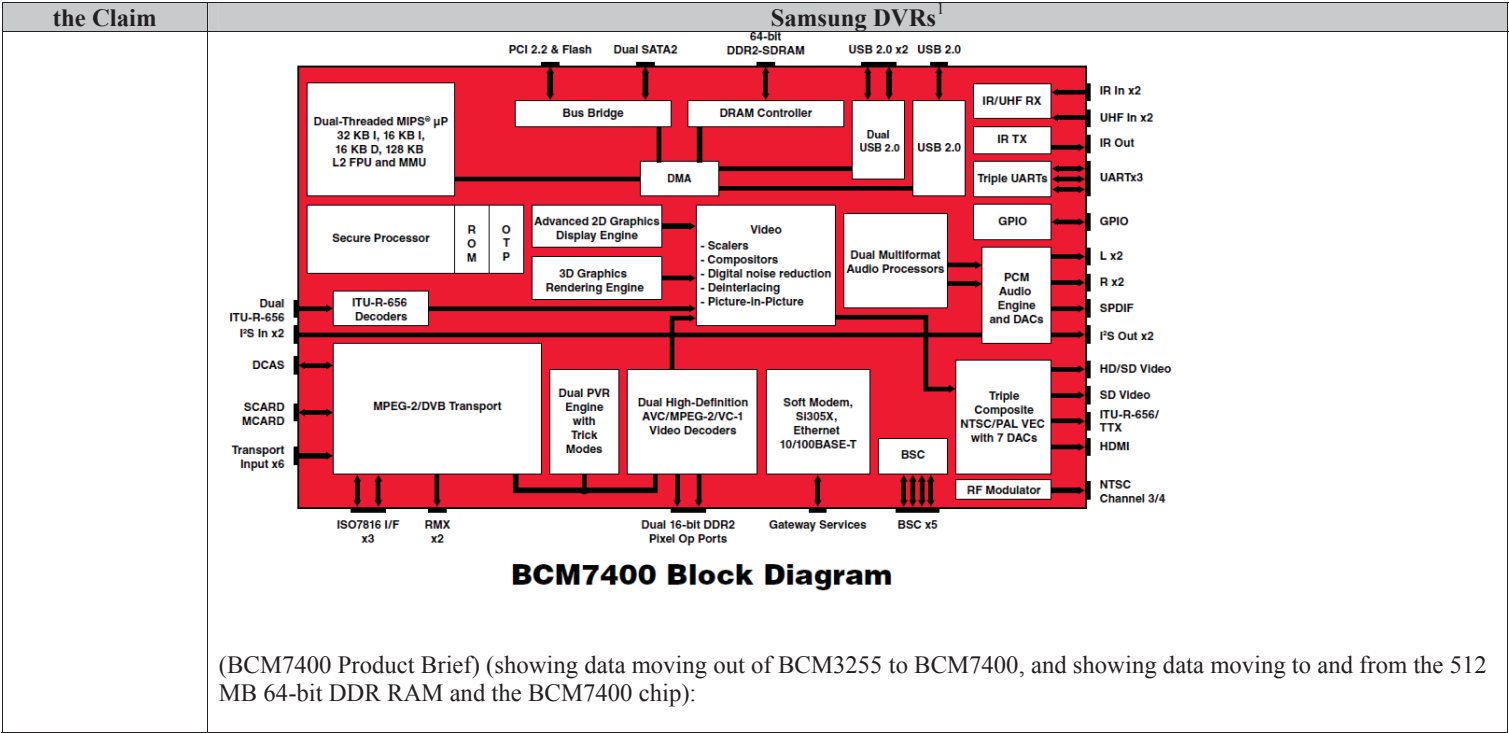
the Claim	Samsung DVRs ¹
	

the Claim	Samsung DVRs ¹
	<p>(BCM7400 Product Brief) (64-bit DDR Interface and On-chip 1000 DMIPS dual-threaded MIPS32-bit core):</p> <ul style="list-style-type: none">● 1000 DMIPS dual-threaded MIPS32[®]-bit core with FPU and MMU class processor● 64-bit DDR1/DDR2 DRAM controller and dual 16-bit pixel-op DDR1/DDR2 ports  <p>The BCM7400 Block Diagram illustrates the internal architecture of the chip. At the top, it shows interfaces for PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, and USB 2.0 x2. The central processing area includes a Dual-Threaded MIPS[®] μP (32 KB I, 16 KB D, 128 KB L2 FPU and MMU), a Secure Processor, ROM, and OTP. It also features an Advanced 2D Graphics Display Engine, a 3D Graphics Rendering Engine, a Video block with scalers, compositors, digital noise reduction, deinterlacing, and picture-in-picture, and Dual Multiformat Audio Processors. Input/output blocks include ITU-R-656 Decoders, DCAS, SCARD MCARD, Transport Input x6, ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, BSC x5, and an RF Modulator. On the right side, various external interfaces are listed: IR In x2, UHF In x2, IR Out, UARTx3, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4.</p> <p style="text-align: center;">BCM7400 Block Diagram</p>

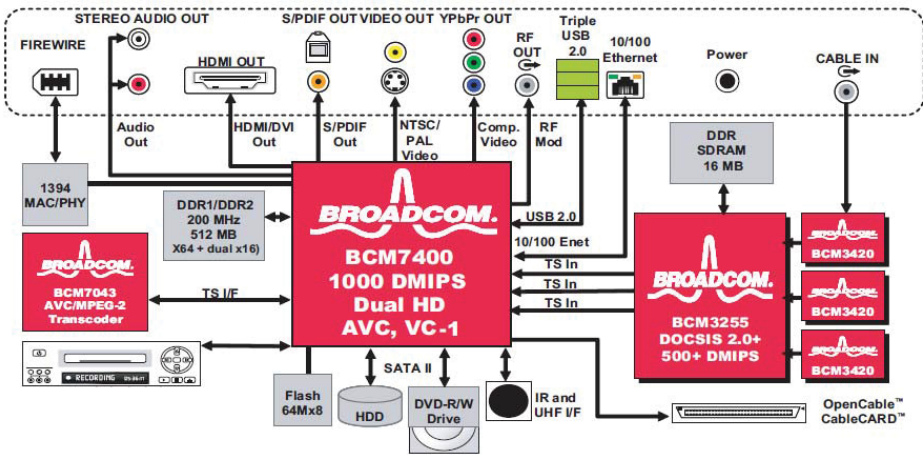
the Claim	Samsung DVRs ¹
	<p>The Samsung SMT-H3090 provides a physical data source, which includes a processor that accepts input data, analyzes the video and audio, and temporarily stores the data in internal and RAM buffers.</p> <p>Samsung DVRs manufactured by Samsung may contain MPEG encoders, including the BCM7041:</p> <div></div> <p>(showing internal chips of Samsung SMT-H3090 DVR).</p> <p>A Samsung DVR parses the data. For example, it analyzes a transport stream to identify video and audio data. <i>See, e.g.</i>, (BCM7400 Product Brief), at p. 2 (noting transport processor and dual digital audio processors):</p>

the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>On information and belief, the Broadcom chips, such as the BCM3255 chip, BCM7400 chip, etc., used inside Samsung DVRs and other chips used inside Samsung DVRs, PID filter multi-program transport streams and perform start code detection. Schematics and specifications on Broadcom chips such as the BCM7400 may be proprietary and thus inaccessible to TiVo at this time.</p> <p>In addition, a Samsung DVR includes DDR SDRAM and/or other RAM and/or flash memory and/or other internal on-chip memory that can be used to temporarily store video and audio data. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing 16MB SRAM and 512MB 64-bit DDR bi-directionally coupled to the BCM3255 and BCM7400 chips, respectively):</p> <p>Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p> <p>High-quality video and graphics processing is integrated, featuring advanced studio-quality 2D and 3D graphics processing. Also included are motion-adaptive deinterlacing with 3:2 pull-down, and letterbox detection. Digital noise reduction minimizes mosquito noise and MPEG artifacts, including block noise. Picture-in-picture, split picture, and independent picture in graphics are supported.</p> <p>The BCM7400 has a dual-stream analog video encoder with Macrovision that supports the following output standards: NTSC-M, NTSC-J, PAL-BDGHIN, PAL-M, and PAL-Nc. The following output formats are supported: composite, S-Video, SCART, RGB, and YPrPb component. The following output resolutions are supported: 480i, 480p, 576i, 576p, 720p, 1080i, and 1080p 24/30. Seven output video DACs are available to be shared among the output functions. The BCM7400 also supports output over an HDMI interface and a channel 3/4 RF modulator. An ITU-R-656 output port is also available with teletext sideband.</p>

the Claim	Samsung DVRs ¹
<p>[61c] a source object, wherein said source object extracts video and audio data from said physical data source;</p>	<div></div> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the physical data source, for example that accepting, parsing, and temporarily storing, in substantially the same way, for example by receiving data that has been transmitted to the DVR, PID filtering, startcode detecting and otherwise analyzing that data, and writing that data to memory locations and disks, to yield the same result, a properly formatted data stream for further processing by the rest of the system.</p>
	<p>A Samsung DVR provides a source object, a collection of data and operations that, among other things, extracts video and audio data from the physical data source. For example, in a Samsung DVR, video and audio data move from the Broadcom BCM3255 chip, or similar chip, to memory, including DRAM and/or the Data Transport processor of the Broadcom 7400 chip, or similar chip, and from the BCM7400 chip, or similar chip, to memory, including DRAM. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing Transport Input data going into MPEG-2/DVB Transport of the Broadcom BCM7400 chip:</p>

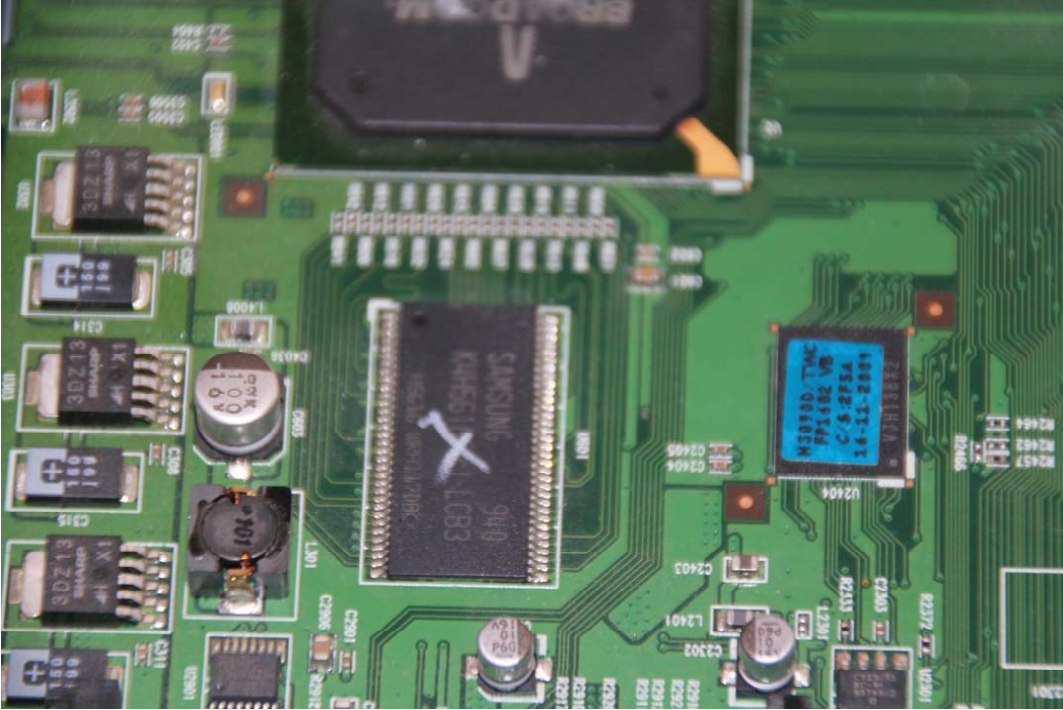


the Claim	Samsung DVRs ¹
	<div></div> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Source Object, for example that of extracting video and audio data from said physical data source, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that operate on the video and audio data from the physical data source.</p>
[61d] a transform object, wherein said transform object stores and retrieves data streams onto a storage device;	<p>A Samsung DVR provides a transform object, a collection of data and operations that, among other things, transforms the form of data upon which it operates. For example, Samsung DVRs transform the form of the data. Upon information and belief, the Samsung DVRs store television program data during recording, and play back certain portions, such as certain frames, during certain trickplay operations.</p> <p>As another example, Samsung DVRs also perform a temporal transform. For example, Samsung DVRs allow users to store television programs to watch at a later time or can pause live television. <i>See, e.g.,</i></p> <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf</p>

the Claim	Samsung DVRs ¹
	<p>(Samsung SMT-H3090 2008 User Guide), p. 10 ("User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording."); p. 10 ("Record two live TV programs simultaneously while watching two recorded programs on HDD.")</p> <p>Samsung DVRs store data streams on and retrieve data streams from a hard disk drive (HDD) during recording and playback, respectively. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing SATA II interface to HDD):</p>  <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 6:</p>


the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table> <p>In the course of recording a television program, Samsung DVRs may generate index information using start code information. For example, in the Samsung DVRs, on information and belief, data streams in the form of MPEG2 transport stream packets are stored in blocks on the hard disk drive. Index information is stored on the hard disk drive as *.clt files, which have pointers to the locations of the MPEG2 transport stream packets of the various recorded programs.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object, for example that of storing and retrieving data streams onto a storage device, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that move video and audio data to and from storage locations.</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
HDD	Capacity						
160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.						
320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.						
[61e] wherein said source object obtains a buffer from said transform object, said source object	A Samsung DVR provides a source object, a collection of data and operations that, among other things, obtains a buffer from the transform object, converts video data into data streams, and fills the buffer with the streams. Samsung DVR software obtains a buffer, converts video data into data streams and fills the buffer with the streams. <i>See, e.g.</i> , (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.")						

the Claim	Samsung DVRs ¹
<p>converts video data into data streams and fills said buffer with said streams;</p>	<p>On information and belief, Samsung DVR software converts the data, for example, during selection of a particular channel, and similar functions, including without limitation recording a television program. <i>See, e.g.</i>, (BCM7400 Product Brief) (showing a MPEG-2/DVB Transport unit):</p> <div><p>The diagram illustrates the internal architecture of the BCM7400, a system-on-chip for digital video recording. It features a central processing unit (Dual-Threaded MIPS® µP) with 32 KB L1, 16 KB L1, 16 KB D, and 128 KB L2 cache, FPU, and MMU. This unit is connected to a Bus Bridge, which manages communication with external storage (PCI 2.2 & Flash, Dual SATA2) and memory (64-bit DDR2-SDRAM, DRAM Controller). The system also includes a DMA controller and a Secure Processor. Video processing is handled by an Advanced 2D Graphics Display Engine and a 3D Graphics Rendering Engine, which interface with ITU-R-656 Decoders and a Video block containing scalers, compositors, digital noise reduction, deinterlacing, and picture-in-picture. Audio is managed by Dual Multiformat Audio Processors and PCM Audio Engine and DACs. The system supports various input/output protocols including USB 2.0, IR/UHF RX/TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I²S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4. It also includes a Triple Composite NTSC/PAL VEC with 7 DACs, a BSC (Baseband Subsystem Controller) x5, and an RF Modulator. The system is designed for high-performance video processing, with a Dual PVR Engine with Trick Modes and Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders. The chip also includes a Soft Modem, Si305X, Ethernet 10/100BASE-T, and a BSC x5. The system is designed for high-performance video processing, with a Dual PVR Engine with Trick Modes and Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders. The chip also includes a Soft Modem, Si305X, Ethernet 10/100BASE-T, and a BSC x5.</p></div> <p style="text-align: center;">BCM7400 Block Diagram</p>
	<p>Also, a Samsung DVR has a buffer in the system memory. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Source Object, for example that of obtaining a memory location, converting the data stream, and filling the memory location in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that operate on the video</p>

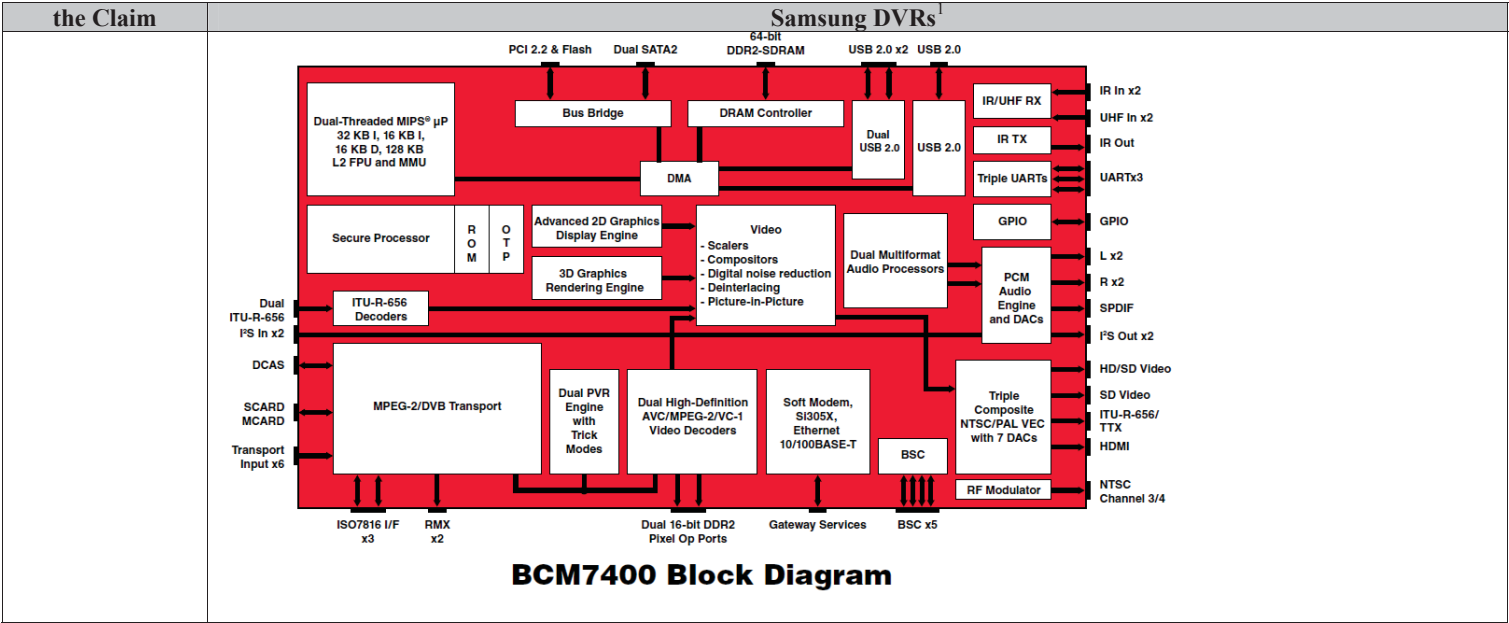
the Claim	Samsung DVRs ¹
	and audio data in conjunction with memory locations and other software processes.
[61f] wherein said source object is automatically flow controlled by said transform object;	<p>A Samsung DVR has a source object that, among other things, is automatically flow controlled by a transform object. On information and belief, the Samsung DVR software has self-regulating data flow in relation to, for example, the single-port DRAM. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> 

the Claim	Samsung DVRs ¹
<p>[61g] a sink object, wherein</p>	<div></div> <p>(showing standard single-port Samsung K4T511630G 512MB RAM and Samsung K4H561638 RAM).</p> <p>In regular operation, there is no significant corruption of data due to overwriting or lack of self-regulation.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object's automatic flow control of the Source Object, for example that of self-regulating the processing, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that are self regulated.</p>
	<p>A Samsung DVR provides a sink object, a collection of data and operations that, among other things, obtains data stream buffers from a transform object and outputs the streams to a video and audio decoder. The Samsung DVR software obtains data streams</p>

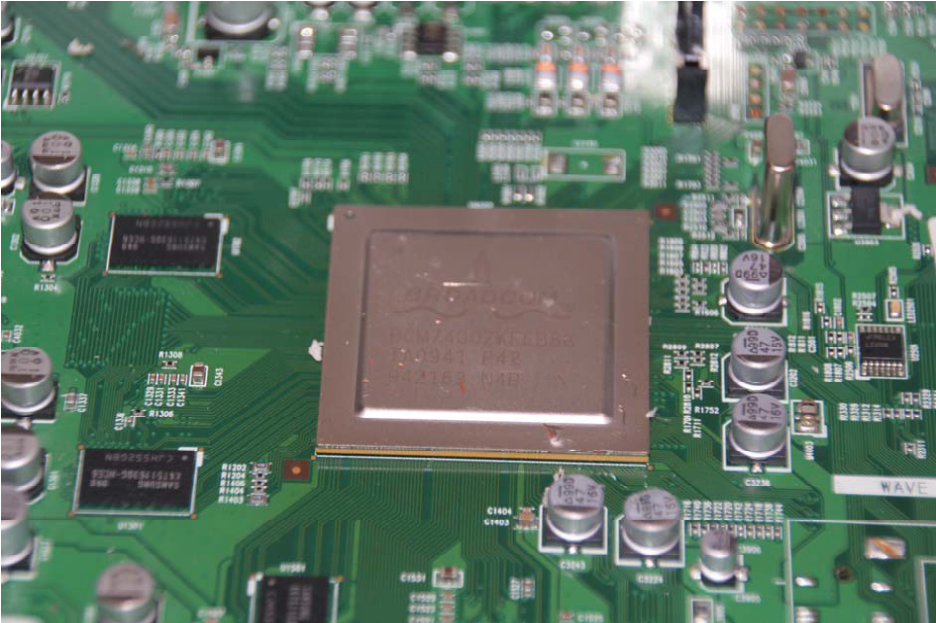
the Claim	Samsung DVRs ¹
<p>said sink object obtains data stream buffers from said transform object and outputs said streams to a video and audio decoder;</p>	<p>from a buffer retrieved from a transform object and the hard disk drive and outputs the data streams to a video and audio decoder. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p> <p>A Samsung DVR has a video and audio decoder that converts data streams into display signals and sends those signals to a display. <i>See, e.g.</i>, (BCM7400 Product Brief):</p> <div><p>The diagram illustrates the internal architecture of the BCM7400 microprocessor. At the top, it shows connections for PCI 2.2 & Flash, Dual SATA2, 64-bit DDR2-SDRAM, and two USB 2.0 ports. The central processing unit includes a Dual-Threaded MIPS® uP with 32 KB I, 16 KB D, 128 KB L2 FPU and MMU, a Secure Processor, and a Bus Bridge. It also features a DMA controller, a DRAM Controller, and a Video section with scalers, compositors, digital noise reduction, deinterlacing, and picture-in-picture. The graphics section includes an Advanced 2D Graphics Display Engine and a 3D Graphics Rendering Engine. Audio processing is handled by Dual Multiformat Audio Processors and a PCM Audio Engine with DACs. The diagram also shows various input and output ports: IR/UHF RX and TX, Triple UARTs, GPIO, L x2, R x2, SPDIF, I'S Out x2, HD/SD Video, SD Video, ITU-R-656/TTX, HDMI, and NTSC Channel 3/4. Other components include ITU-R-656 Decoders, MPEG-2/DVB Transport, Dual PVR Engine with Trick Modes, Dual High-Definition AVC/MPEG-2/VC-1 Video Decoders, a Soft Modem (Si305X, Ethernet 10/100BASE-T), and a BSC (Baseband Subsystem Controller) with 5x BSC ports. The bottom of the diagram shows connections for ISO7816 I/F x3, RMX x2, Dual 16-bit DDR2 Pixel Op Ports, Gateway Services, and BSC x5.</p></div> <p style="text-align: center;">BCM7400 Block Diagram</p> <p>(Samsung SMT-H3090 2008 User Guide), at 6:</p>

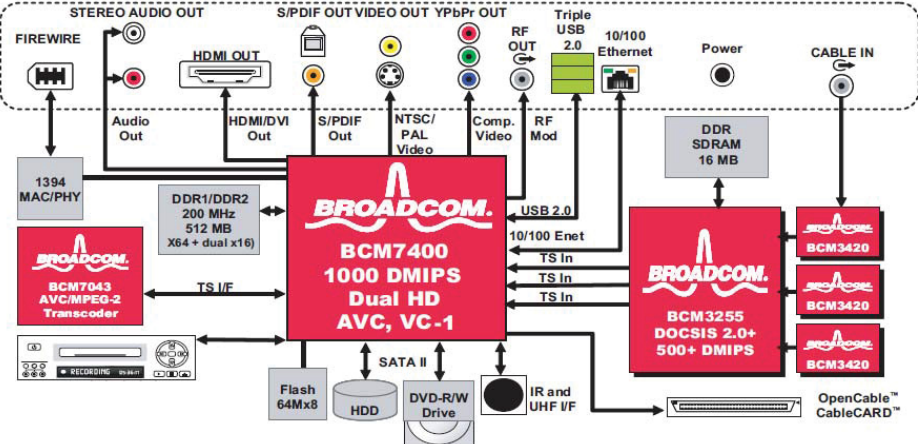
the Claim	Samsung DVRs ¹						
	<p>Digital HD DVR STB</p> <p>Digital HD DVR OCAP STB (Digital High-Definition Digital Video Recorder OpenCable Application Platform Set-Top Box) provides high quality video and audio broadcasting, and interactive services including Video-On-Demand.</p> <p>Digital HD DVR STB (SMT-H3090) provides the following functions.</p> <ul style="list-style-type: none">- An MPEG decoder capable of processing HD/SD stream- SCTE55-1, 55-2 and DOCSIS Cable Modem for OOB Signaling- Digital AV transmission, such as IEEE1394 and HDMI- Content Protection- CableCARD Interface for CAS- OCAP™ 1.0 application platform- DVR Features- Recording : <table><tr><th>HDD</th><th>Capacity</th></tr><tr><td>160GB</td><td>Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.</td></tr><tr><td>320GB</td><td>Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.</td></tr></table> <p>(Samsung SMT-H3090 2008 Data Sheet), at 1:</p> <div><p>Imagine Samsung SMT-H3090 is Dual tuner Digital Video Recorder(DVR) which provides Standard Definition (SD), High-Definition(HD) and Analog video signals. Dual tuner DVR allows cable subscribers to watch and record two HD programs simultaneously.</p></div> <p>(Samsung SMT-H3090 2008 Data Sheet), at 2:</p>	HDD	Capacity	160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.	320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.
HDD	Capacity						
160GB	Up to 65 hours for SD (Standard Definition) stream Up to 15 hours for HD (High Definition) stream.						
320GB	Up to 130 hours for SD (Standard Definition) stream Up to 30 hours for HD (High Definition) stream.						

the Claim	Samsung DVRs ¹														
	<p>Home Networking</p> <ul style="list-style-type: none">_ Contents sharing with networked media devices by using advanced Home network standards (DLNA, UPnP)_ DTCP-IP for Home network content protection_ MoCA (Multimedia over Coaxial Alliance) upgradable (Optional) <p>Back Panel Features</p> <table><tr><th>Feature</th><th>Description</th></tr><tr><td>RF Input</td><td>F-type Female</td></tr><tr><td>AV Out</td><td>2 NTSC-M RCA (CVBS), S-Video, Component (Y/Pb/Pr) Video, HDMI, 2 RCA, 2 S/PDIF (Optical, Electrical)</td></tr><tr><td>AV In</td><td>1 Component (Y/Pb/Pr) Video, 1 RCA (L/R)</td></tr><tr><td>Connections-Interactive</td><td>USB 2.0 Host, IEEE 1394, E-SATA, RJ-45 Ethernet (10/100M)</td></tr><tr><td>CableCARD</td><td>Multi-Stream CableCARD™</td></tr><tr><td>Power</td><td>AC 120V, 60Hz, AC Outlet</td></tr></table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Sink Object, for example that of obtaining buffers or pointers thereto and outputting data streams, in substantially the same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, datastreams being output to a decoder.</p>	Feature	Description	RF Input	F-type Female	AV Out	2 NTSC-M RCA (CVBS), S-Video, Component (Y/Pb/Pr) Video, HDMI, 2 RCA, 2 S/PDIF (Optical, Electrical)	AV In	1 Component (Y/Pb/Pr) Video, 1 RCA (L/R)	Connections-Interactive	USB 2.0 Host, IEEE 1394, E-SATA, RJ-45 Ethernet (10/100M)	CableCARD	Multi-Stream CableCARD™	Power	AC 120V, 60Hz, AC Outlet
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CableCARD	Multi-Stream CableCARD™														
Power	AC 120V, 60Hz, AC Outlet														
[61h] wherein said decoder converts said streams into display signals and sends said signals to a display;	<p>A Samsung DVR has a decoder that converts data streams into display signals and sends those signals to a display. <i>See, e.g.</i>, (Broadcom BCM 7400 Product Brief), at 1:</p> <div><p>FEATURES</p><ul style="list-style-type: none">• Dual advanced AVC/MPEG-2/VC-1 decoders<ul style="list-style-type: none">• H.264/AVC Main and High Profile to Level 4.1• VC-1 Advanced Profile @ Level 3• VC-1 Simple and Main Profile• HD MPEG-2 and SD MPEG-2• MPEG still-picture decode• DivX[®] and MPEG4 part 2 ASP decode</div> <p>(Broadcom BCM 7400 Product Brief), at 2 (showing video decoders):</p>														

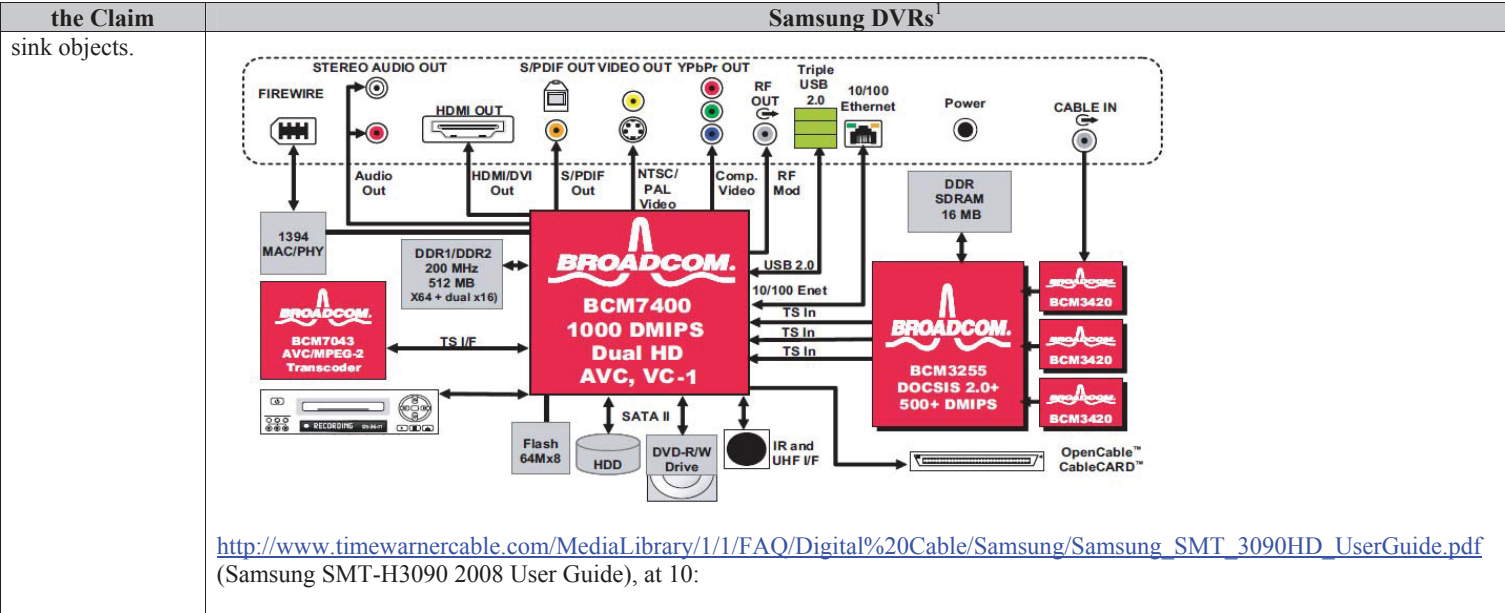


the Claim	Samsung DVRs ¹
	<p>The BCM7400 is a dual-channel high definition satellite, cable, and IP set-top box DVR solution offering integrated AVC (H.264/MPEG-4 Part 10), MPEG-2, MPEG-4 Part 2, DivX, and VC-1 video decoding technology. It combines a data transport processor, two high-definition AVC/MPEG-2/VC-1 video decoders, two advanced-audio decoders, 2D and 3D graphics processing, high-quality video scaling and motion adaptive deinterlacing, seven video DACs, dual stereo high-fidelity audio DACs, a dual-threaded 350-MHz MIPS32 with FPU class CPU, and a peripheral control unit providing a variety of set-top box control functions. The BCM7400 supports either DDR1 or DDR2 memory architectures.</p> <p>The MPEG-2 DVB-compliant transport stream/PES parser and demultiplexer is capable of simultaneously processing 256 PIDs via 128 PID channels in up to six independent external transport stream inputs and four internal playback channels. All 128 PID channels can be used by the record, audio, and video interface engine, PCR processing, message filter, and for output via the high-speed transport or remux module. The data transport module can be configured to support eight record channels for PVR functionality and six AV channels to interface to audio and video decoders. The transport provides 1DES/3DES/DVB/Multi2/AES descrambling support. A memory-to-memory DMA security module may be programmed for supporting AES/1DES/3DES/CSS/CPRM/CPM/DTCP copy protection algorithms/standards. The BCM7400 features the Broadcom secure processor, providing secure key generation, management, and protection.</p> <p>The advanced video decoders featured in the BCM7400 are capable of supporting high definition AVC, VC-1, and MPEG-2 streams. AVC support is for Main and High Profile to level 4.1 for 720p and 1080i high definition support or to Level 3.1 for standard definition streams. AVC High Profile was added to the fidelity range extensions specifically to address the needs of consumer broadcast and playback applications. Tools include additional transform sizes and spatial prediction modes and support for adaptive quantization matrix. The video decoders also support high definition VC-1 (Advanced Profile Level 3, Main, and Simple Profiles) and MPEG-2, Main Profile at Main and High Level. The BCM7400 has two advanced audio processors capable of decoding Dolby Digital, Dolby Digital Plus, AAC 5.1, AAC+ level 2, and MPEG 1 layers 1, 2, and 3 with simultaneous pass-through support. 3D SRS audio is also supported. Available audio outputs are I²S, S/PDIF, and two pairs of analog outputs.</p> <p>On information and belief, Samsung DVRs have an MPEG-2 decoder that decodes standard definition and/or high definition television programs.</p>

the Claim	Samsung DVRs ¹
<p>[61i] wherein said sink object is automatically flow controlled by said transform object;</p>	<p>A Samsung DVR has a sink object that, among other things, is automatically flow controlled by a transform object. On information and belief, the Samsung DVR playback software has self-regulated data flow in relation to, for example, the DRAM. <i>See, e.g.</i>, (BCM7400 Product Brief) ("The BCM7400 incorporates a complete MIPS32-Verified™ microprocessor subsystem, including caches with bridging to memory and a local bus.").</p>  <p>In regular operation, there is no significant corruption of data due to overwriting or lack of self-regulation.</p> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Transform Object's automatic flow control of the Sink Object, for example that of self-regulating the processing, in substantially the same way, for example by using one or more instantiations of software codes and/or</p>

the Claim	Samsung DVRs ¹
	hardware/firmware combinations, to yield the same result, data and operations executing in the DVR that are self regulated.
[61j] a control object, wherein said control object receives commands from a user, said commands control the flow of the broadcast data through the system; and	<p>A Samsung DVR provides a control object, a collection of data and operations that, among other things, receives user commands, which control the flow of the broadcast data through the system. The Samsung DVR software is responsive to front panel buttons and a remote control. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The hardware and software receives user commands, which control the flow of data through the system, e.g., begin recording, channel change, trickplay, etc. <i>See, e.g.</i>, (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):</p>  <p>http://www.timewarnercable.com/MediaLibrary/1/1/FAQ/Digital%20Cable/Samsung/Samsung_SMT_3090HD_UserGuide.pdf (Samsung SMT-H3090 2008 User Guide), at 10:</p>

the Claim	Samsung DVRs ¹																		
	<p>DVR Features</p> <p>SMT-H3090 supports DVR feature through the Hard Disk Drive as follows.</p> <table border="1"> <thead> <tr> <th>Feature</th><th>Description</th></tr> </thead> <tbody> <tr> <td>File Playback</td><td>Play, Stop, Rewind, Pause for recorded contents.</td></tr> <tr> <td>File Trick Mode</td><td>1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)</td></tr> <tr> <td>Time-Shift Recording</td><td>User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.</td></tr> <tr> <td>Instant Recording</td><td>Record live TV program instantly</td></tr> <tr> <td>Watching and Recording</td><td>Record two live TV programs simultaneously while watching two recorded programs on HDD.</td></tr> <tr> <td>Audio/Radio Recording</td><td>Audio or Radio program recording</td></tr> <tr> <td>Simultaneous Recording and Time Shift Recording</td><td>Up to two Simultaneous Recording and Time-Shift Recording on live TV programs</td></tr> <tr> <td>EPG Recording</td><td>Scheduled recording using EPG</td></tr> </tbody> </table> <p>To the extent any differences are alleged to exist between this claim element and the above referenced functionality, such differences are insubstantial. On information and belief, the hardware and software in the Samsung DVRs perform substantially the same function as the Control Object, for example that of receiving commands same way, for example by using one or more instantiations of software codes and/or hardware/firmware combinations, to yield the same result, controlling the flow of the broadcast data through the system.</p>	Feature	Description	File Playback	Play, Stop, Rewind, Pause for recorded contents.	File Trick Mode	1, 4, 8, 32 times FFP (Fast Forward Play) 1, 4, 8, 32 times FRP (Fast Rewind Play) 1/2, frame by frame skipping SFP (Slow Forward Play) 1/2, Frame by frame SRP (Slow Rewind Play)	Time-Shift Recording	User can pause live TV program for a certain amount of time, and resume it to watch. The STB allows 90 minutes of recording for Time-shift recording.	Instant Recording	Record live TV program instantly	Watching and Recording	Record two live TV programs simultaneously while watching two recorded programs on HDD.	Audio/Radio Recording	Audio or Radio program recording	Simultaneous Recording and Time Shift Recording	Up to two Simultaneous Recording and Time-Shift Recording on live TV programs	EPG Recording	Scheduled recording using EPG
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[61k] wherein said control object sends flow command events to said source, transform, and	A Samsung DVR provides a control object, a collection of data and operations that, among other things, sends flow command events to source, transform, and sink objects. On information and belief, the remote control sends IR signals that are received by the Samsung DVR. The Samsung DVR software is responsive to front panel buttons and a remote control. The hardware and software receives user commands and sends command events to other portions of the software to control the various functions of the unit, e.g., channel selection, start recording, trickplay, picture-in-picture, etc. <i>See, e.g.,</i> (BCM7400 Product Brief) (showing front panel controls input to the BCM7400 chip):																		



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