

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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COMCAST CABLE COMMUNICATIONS, LLC,  
Petitioner,

v.

ROVI GUIDES, INC.,  
Patent Owner.

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Case IPR2017-00934  
Patent 8,768,147 B2

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Before KARL D. EASTHOM, BARBARA A. BENOIT, and  
STACY B. MARGOLIES, *Administrative Patent Judges*.

MARGOLIES, *Administrative Patent Judge*.

FINAL WRITTEN DECISION  
*35 U.S.C. § 318(a) and 37 C.F.R. § 42.73*

## I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Comcast Cable Communications, LLC (“Petitioner”) challenges the patentability of claims 1–24 of U.S. Patent No. 8,768,147 B2 (Ex. 1001, “the ’147 patent”), owned by Rovi Guides, Inc. (“Patent Owner”). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 1, 4–11, and 14–24 of the ’147 patent are unpatentable but has not shown by a preponderance of the evidence that claim 2, 3, 12 or 13 is unpatentable.

### A. *Procedural History*

Petitioner filed a Petition for *inter partes* review of claims 1–24 of the ’147 patent. Paper 2 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). On September 11, 2017, we instituted an *inter partes* review of claims 1–24 of the ’147 patent on the following grounds:

<b>References</b>	<b>Basis</b>	<b>Challenged Claims</b>
Wood <sup>1</sup> and Vallone <sup>2</sup>	35 U.S.C. § 103(a) <sup>3</sup>	1, 3–6, 8–11, 13–16, 18–24
Wood, Vallone, and Pierre <sup>4</sup>	35 U.S.C. § 103(a)	2, 12
Wood, Vallone, and Kamath <sup>5</sup>	35 U.S.C. § 103(a)	7, 17
Yap <sup>6</sup> and Vallone	35 U.S.C. § 103(a)	1, 3, 5, 6, 8–11, 13, 15, 16, 18–24
Yap, Vallone, and Pierre	35 U.S.C. § 103(a)	2, 4, 12, 14
Yap, Vallone, and Kamath	35 U.S.C. § 103(a)	7, 17

Paper 8 (“Inst. Dec.”), 41–42.<sup>7</sup>

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 13, “PO Resp.”), to which Petitioner filed a Reply (Paper 16, “Reply”). Petitioner relies on the Declaration of Vernon Thomas Rhyne, III (Ex. 1011) and the Second Declaration of Vernon Thomas Rhyne, III

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<sup>1</sup> U.S. Patent Application Publication No. 2002/0057893 A1, filed Mar. 3, 1999, published May 16, 2002 (Ex. 1002).

<sup>2</sup> U.S. Patent No. 6,847,778 B1, filed Mar. 30, 2000, issued Jan. 25, 2005 (Ex. 1003).

<sup>3</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), revised 35 U.S.C. § 103, effective March 16, 2013. Because the challenged patent was filed before March 16, 2013, we refer to the pre-AIA version of § 103 in this Decision.

<sup>4</sup> U.S. Patent No. 6,678,463 B1, filed Aug. 2, 2000, issued Jan. 13, 2004 (Ex. 1007).

<sup>5</sup> U.S. Patent No. 6,754,696 B1, filed Mar. 24, 2000, issued June 22, 2004 (Ex. 1008).

<sup>6</sup> U.S. Patent Application Publication No. 2001/0033343 A1, filed Apr. 18, 2001, published Oct. 25, 2001 (Ex. 1004).

<sup>7</sup> Even though the Order section in the Institution Decision mistakenly identifies Pierre for the third ground, the analysis and conclusion sections of the Institution Decision properly identify Kamath for that ground. Inst. Dec. 22–26, 41–42. During the trial, both parties considered the instituted ground to pertain to Kamath. *See, e.g.*, PO Resp. 27–30; Reply 9–13, 24–25.

(Ex. 1028). Patent Owner relies on the Declaration of Ravin Balakrishnan, Ph.D. (Ex. 2001).

An oral hearing was held on June 6, 2018, and a transcript of the hearing has been entered into the record. Paper 22 (“Tr.”).

### *B. Related Matters*

The parties identify the following pending matters, which may affect, or be affected by, a decision in this proceeding: (1) *Rovi Guides, Inc. v. Comcast Corporation*, 1:16-cv-09826 (S.D.N.Y.); (2) *Comcast Corporation v. Rovi Corporation*, 1:16-cv-03852 (S.D.N.Y.); and (3) *In the Matter of Certain Digital Video Receivers and Hardware and Software Components Thereof*, ITC Inv. No. 337-TA-1001. Pet. 1–2; Paper 5, 2; *see* 37 C.F.R. § 42.8(b)(2).

### *C. The '147 Patent*

The '147 patent is titled “Systems and Methods for Interactive Program Guides with Personal Video Recording Features.” Ex. 1001, [54]. The '147 patent describes as background that in conventional personal video recording (PVR) systems, “a program buffer is typically used to allow users to pause, rewind, or playback a television broadcast that a user is watching.” *Id.* at 1:50–52. The '147 patent states that a PVR buffer typically stores the most recent n minutes of programming that is watched by a user, and that a drawback of this technique is that “the buffer only allows the user to pause or rewind up to the last ‘n’ minutes and only on the currently tuned channel since it was most recently tuned.” *Id.* at 1:52–57.

The '147 patent discloses an interactive television application that provides enhanced PVR-related functionality. *Id.* at 2:19–22. One feature, according to the patent, is that “[w]hen pausing live content, the interactive

television application may display paused video of the television content and display a timer showing how far back the paused video is behind live content.” *Id.* at 3:32–35. In addition, the ’147 patent discloses using multiple tuners “to permit the PVR to buffer different programs in parallel.” *Id.* at 5:53–56. Specifically, the ’147 patent discloses that “programs may be buffered in parallel by implementing multiple tuners to buffer two programs at the same time.” *Id.* at 73:11–13. The patent discloses a multiple-tuner implementation, which provides a “simultaneous watch/record feature” and which allows the user to watch two programs at the same time, “for example, by switching channels between the two programs and rewinding on each channel change to see the programming that was missed.” *Id.* at 73:16–27; *see also id.* at Fig. 101, 73:28–49 (describing a sequence of buffer management events in which buffering of a first program continues after the user changes the channel to watch a second program).

The ’147 patent also discloses a live controls overlay that is displayed over a video of a television program, as illustrated in Figure 49 below. *Id.* at 52:50–52.

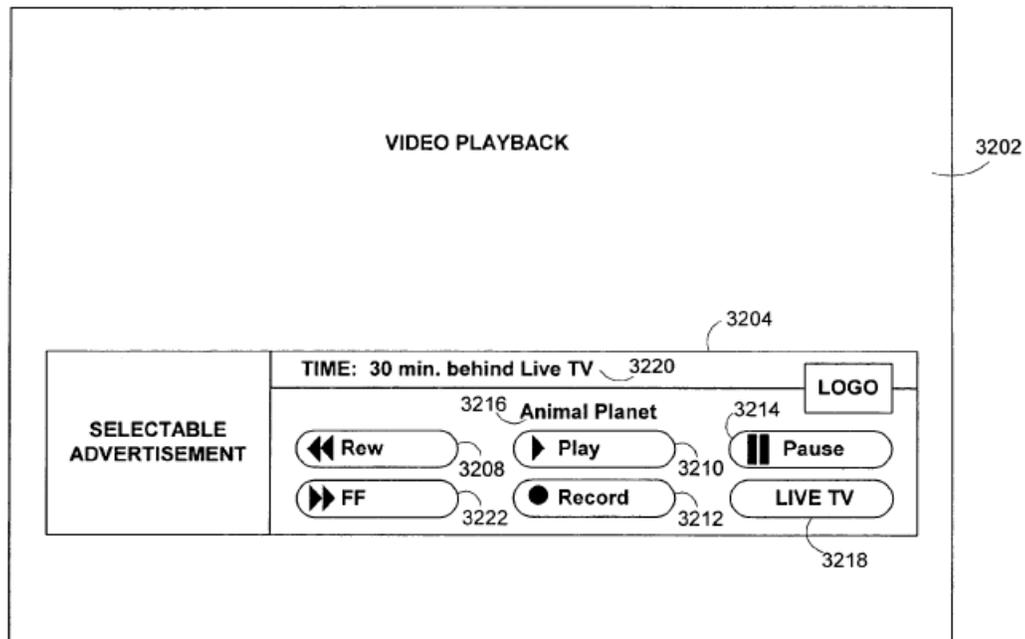


FIG. 49

Figure 49 above illustrates live controls overlay 3204, which may be displayed while buffered video 3202 for a program is playing in the background. *Id.* at 52:52–54. According to the '147 patent, “[t]ime behind live TV indicator 3220 may indicate how far back buffered video 3202 is behind live television.” *Id.* at 52:60–61.

#### D. Illustrative Claim

Among the challenged claims (claims 1–24), claims 1, 11, and 21–24 are independent. Claim 1 is illustrative of the subject matter of the challenged claims and reads as follows:

1. A method of buffering programs, the method comprising:
  - upon receiving a user request to tune to a first channel:
  - receiving a first program from the first channel; and
  - buffering the first program to enable the user to view a previously received portion of the first program; and

*upon receiving a user request to tune to a second channel:  
receiving a second program from the second channel; and*

*buffering the second program to enable the user to view a previously received portion of the second program, wherein the buffering of the first program and the buffering of the second program occur in parallel, wherein an indicator that indicates the availability of at least one of the buffered first program and the buffered second program is generated for display to the user, and wherein the indicator also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program.*

*Id.* at 81:23–41 (emphases added to disputed limitations).

## II. DISCUSSION

### A. *Principles of Law*

To prevail in its challenge to Patent Owner’s patent claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject

matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). “A determination of whether a patent claim is invalid as obvious under § 103 requires consideration of all four *Graham* factors, and it is error to reach a conclusion of obviousness until all those factors are considered.” *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1048 (Fed. Cir. 2016) (en banc) (citations omitted). “This requirement is in recognition of the fact that each of the *Graham* factors helps inform the ultimate obviousness determination.” *Id.*

#### *B. Level of Ordinary Skill in the Art*

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the types of problems encountered in the art, the sophistication of the

technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.* Generally, it is easier to establish obviousness under a higher level of ordinary skill in the art. *Innovation Toys, LLC v. MGA Entm't, Inc.*, 637 F.3d 1314, 1323 (Fed. Cir. 2011) (“A less sophisticated level of skill generally favors a determination of nonobviousness . . . while a higher level of skill favors the reverse.”).

Petitioner, relying on the testimony of its declarant, Dr. Rhyne, asserts that one of ordinary skill in the art would have had “a bachelor’s degree in computer science, electrical engineering, computer engineering, or a similar discipline and at least two years of experience with embedded computer systems.” Pet. 5 (citing Ex. 1011 ¶ 19). Petitioner also asserts that “[a] person of ordinary skill could have equivalent experience in industry or research, such as designing, developing, evaluating, testing, or implementing these technologies.” *Id.* (citing Ex. 1011 ¶ 19).

Patent Owner, relying on the testimony of its declaration, Dr. Balakrishnan, asserts that one of ordinary skill at the time of the invention would have had “a bachelor’s degree in electrical or computer engineering or computer science, or equivalent experience, and two to four years of experience relating to computer programming and user interfaces, including Internet programming or any equivalent knowledge, training and/or experience in the field of services for providing video content or associated content or features (*e.g.*, interactive program guides on screen menus advertising searching), or any hardware or software related to the provision of such services.” PO Resp. 10 (citing Ex. 2001 ¶¶ 18–20). Patent Owner additionally asserts that “[a]dditional graduate education could substitute for professional experience, or significant experience could substitute for formal

education.” *Id.* (citing Ex. 2001 ¶¶ 18–20). Dr. Balakrishnan adds: “Under either my definition or Dr. Rhyne’s definition, . . . my opinions regarding the validity of the ’147 patent would be the same.” Ex. 2001 ¶ 20.

We do not ascertain a meaningful difference between the declarant’s proposals as applied to this case and the parties do not argue that any issue in the case turns on such a difference. We determine that the level of ordinary skill proposed by Petitioner and Dr. Rhyne is consistent with the challenged patent and the asserted prior art and we therefore adopt that level for the purposes of the analysis below.

### *C. Claim Construction*

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Petitioner proposes constructions for “buffering” and “the indicator . . . is interactive.” Pet. 28–29. Patent Owner does not address either of Petitioner’s proposed constructions, but proposes a construction for

“upon receiving a user request to tune to a second channel . . . an indicator . . . is generated for display to the user.” *Id.* at 8–12.

We determine that no claim terms require express construction in order to determine whether or not to institute *inter partes* review.

*D. Asserted Obviousness over Wood and Vallone*

Petitioner contends that claims 1, 3–6, 8–11, 13–16, and 18–24 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. Pet. 4, 22–41. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references teach or suggest the claim limitations and provides reasoning for combining the teachings of the references as claimed. *Id.* at 22–41.

We have reviewed Petitioner’s and Patent Owner’s arguments and evidence of record. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 4–6, 8–11, 14–16, and 18–24 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. Petitioner, however, has not shown by a preponderance of the evidence that claims 3 and 13 are unpatentable as obvious over Wood and Vallone.

*1. Summary of Wood*

Wood is a U.S. patent application publication titled “Digital Recording and Playback.” Ex. 1002, [54]. Wood discloses a digital VCR that acts as a central station for recording and playback of analog and digital audio and video. *Id.* ¶ 18. Wood discloses that “[a] remote control and on-screen menus displayed by the digital VCR on the television may be used to select audio and video from one or more of the attached audio and video sources to be output to a single display device such as the television.” *Id.*

(reference numerals omitted). Wood also discloses producing “graphics overlays to display on-screen user interface elements such as the channel guide display 500” shown in Figure 5. *Id.* ¶ 69.

Figure 5 is shown below.

**FIG. 5**

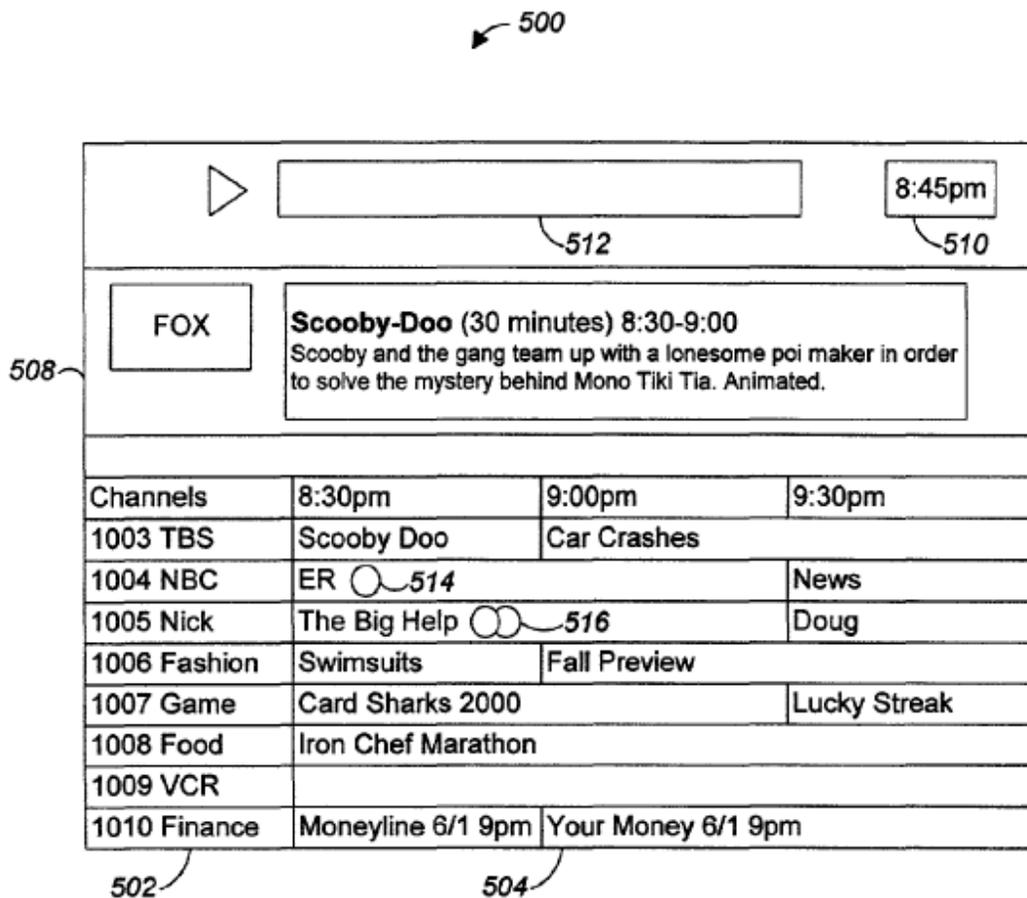


Figure 5 above illustrates channel guide display 500, which “presents the user with a visual representation of information contained in the channel guide database.” *Id.* ¶ 87. The channel guide display also lists additional information, such as current time 510, and channel 1009, which “corresponds to content recorded on the VCR 15.” *Id.* ¶¶ 87, 89. Wood

discloses that a user can scroll through the channel guide display using cursor keys on a remote control to highlight shows and that “[h]ighlighting a show can cause additional information about the show to be displayed in an on-screen display 508.” *Id.* ¶ 88. In Figure 5, an episode of Scooby-Doo has been highlighted. *Id.* Wood also discloses that “[i]f the digital VCR 10 is displaying part of a television show while the television show is being recorded, the on-screen display 508 also contains information about the relation of the content being displayed to the current time.” *Id.* For example, according to Wood, “the on-screen display 508 can indicate that the content being displayed is five minutes behind the current time or in sync with the current time.” *Id.*

According to Wood, a user can “exercise VCR-style control over live television shows.” *Id.* ¶ 7. Wood discloses that if the incoming video stream is recorded into a rewind buffer, the user can rewind (or pause) a live television show simply by pressing Rewind (or Pause). *Id.* Wood discloses that the live television show continues to be recorded while being rewound or paused. *Id.* Wood discloses that “the digital VCR 10 always spools the current show to a rewind buffer that is stored on the hard disk.” *Id.* ¶ 117 (reference numerals omitted).

Wood also discloses that “[t]he digital VCR 10 can have a second tuner in addition to the tuner 108 [shown in Figure 2], in which case one live television channel (referred to as a primary channel) can be spooled to the rewind buffer while the user watches a secondary live television channel.” *Id.* ¶ 118. Wood describes the two-tuner operation as follows:

If the digital VCR 10 has two tuners, the user can designate a channel to be a “primary channel.” If, for example, the user is watching a channel that has been designated as a primary

channel, the content of the channel is spooled to the rewind buffer. If the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer. The channel to which the user tunes can be spooled to a second rewind buffer. When the user returns to the primary channel, the user can resume watching the primary channel at the point where the user left off or at the current time. In the latter case the user can rewind the primary channel in order to view portions of the primary channel content that were received while the user was watching other channels.

*Id.* ¶ 142.

## 2. *Summary of Vallone*

Vallone is a U.S. patent titled “Multimedia Visual Progress Indication System.” Ex. 1003, [54]. Vallone discloses a trick play bar that is overlaid onto program material and that visually communicates the operation and progression through that material. *Id.* at 3:61–67.

Specifically, Vallone discloses that as a user watches a program, a trick play bar is overlaid onto the live video. *Id.* at 18:28–30. According to Vallone, the trick play bar visually informs the user of the size of the cache that stores the program (referred to as the circular cache) and, if the circular cache is not at capacity, how much of the cache is filled. *Id.* at 18:32–35, 18:38–39. Figure 26 below shows the trick play bar (element 2601):

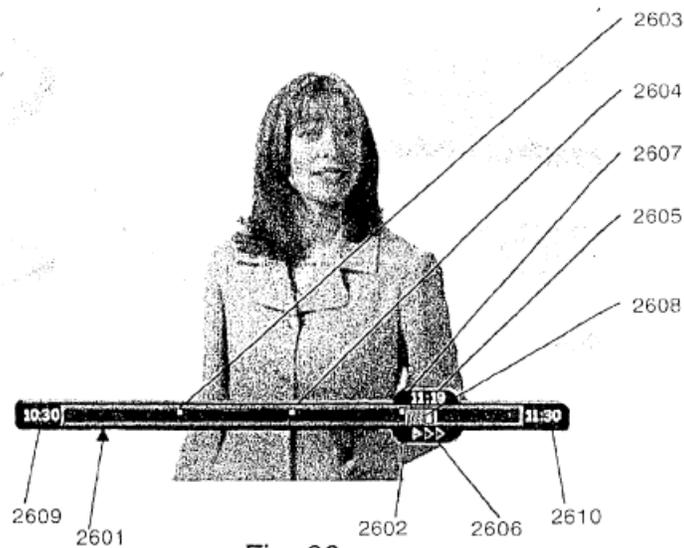


Fig. 26

*Id.*

As illustrated in Figure 26 above, cache bar 2602 inside of trick play bar 2601 indicates, according to Vallone, how much of the circular cache is filled. *Id.* at 18:39–41. Vallone discloses that “[a] slider 2605 moves along the trick play bar 2601 and on top of the cache bar 2602.” *Id.* at 18:55–56. Vallone states that “[t]he slider 2605 along with the position indicator 2608 are linked together and tell the user visually where his current position is within the program material.” *Id.* at 18:55–59. Vallone discloses that the user uses, for example, the play and rewind buttons on the remote control to position the slider. *Id.* at 19:22–26.

### 3. Analysis

#### a. Reason to combine

Petitioner relies on Wood for teaching most of the claim limitations and on Vallone for teaching the “indicator” limitation of independent claims 1, 11, and 21–24. *Id.* at 28–33, 38–41. Petitioner provides persuasive

evidence for why an ordinarily skilled artisan would have combined the teachings of Wood and Vallone in the manner claimed (as recited in claims 1, 3–6, 8–11, 13–16, and 18–24). Pet. 22–28.

Wood discloses a digital VCR with an on-screen interface that displays information about the current program position for a buffered program. Ex. 1002 ¶ 88. Vallone discloses a trick play bar that provides a slider and position indicator to indicate a current program position and that moves along the bar in response to user input, such as pressing a rewind button. Ex. 1003, 18:32–35, 18:55–60, 19:22–27. Vallone discloses that the “trick play bar can be applied to any [v]ideo or audio application where the physical position in the material is readily ascertainable e.g., DVDs, VCRs.” Ex. 1003, 20:19–22.

A person of ordinary skill in the art would have been motivated to combine Vallone’s trick play bar with Wood’s VCR for the purpose of providing users with an on-screen indicator that allows a user to easily interact with the VCR, that enables a user to access another play position within the buffered content, and that enables a user to ascertain a current operational mode of the VCR. Ex. 1003, 3:55–60; Ex. 1011 ¶¶ 151–158. Although Wood discloses an on-screen display that indicates an availability of, and a current play position within, the buffered program, Wood does not disclose that the on-screen display is interactive so as to enable the user to access another play position. A person of ordinary skill in the art would have understood that Wood’s digital VCR and Vallone’s trick play bar would have performed the same functions and maintained their advantageous properties in the combination and would have expected the combination to predictably result in a system that buffers programs in

parallel and has an improved indicator enabling a user to access another play position in a buffered program. Ex. 1011 ¶¶ 167–173, 179–180; Ex. 1003, Fig. 26, 19:22–32.

*b. Independent claim 1*

*i. Limitations of claim 1*

Wood discloses “[a] method of buffering programs,” as recited in claim 1. Wood discloses using “rewind buffers” to buffer live television programs, as explained below. Ex. 1002 ¶¶ 7, 118, 142.

Wood also discloses “upon receiving a user request to tune to a first channel: receiving a first program from the first channel; and buffering the first program to enable the user to view a previously received portion of the first program,” as required by claim 1. Wood discloses that VCR 10 receives a user request to tune tuner 108 to a first channel and receives a first program from the first channel upon receiving the request. Ex. 1002 ¶¶ 18, 117, 118. Wood discloses that “[a] remote control 22 and on-screen menus displayed by the digital VCR 10 on the television 18 may be used to select audio and video from one or more of the attached audio and video sources to be output to a single display device such as the television 18.” *Id.* ¶ 18.

Wood also discloses the following:

The user can watch live television using the digital VCR 10 by tuning to a live television channel using the remote control 22. For example, the user can tune directly to a live television channel by entering the channel number using numeric keys 422–438 on the remote control 22, by using Channel Up button 418 and Channel Down button 420 on the remote control 22, or by selecting a channel in the channel guide display 500. The digital VCR 10 continuously spools the current show’s video and audio streams to a rewind buffer stored on the hard disk drive 142.

*Id.* ¶ 118. Wood also discloses that upon tuning to the first channel, optimized MPEG file system (OMFS) 350 stores the first program in a first rewind buffer, enabling the user to rewind and play back content in the first rewind buffer. *Id.* ¶¶ 7, 18, 59, 118, 142. Wood discloses that “[a] user can . . . exercise VCR-style control over live television shows,” such as rewinding and pausing. *Id.* ¶ 7. In addition, Wood discloses that a user can watch one channel, designated as a primary channel, can tune to another channel, and then can return to the primary channel and “resume watching the primary channel at the point where the user left off or at the current time.” *Id.* ¶ 142. Specifically, “the user can rewind the primary channel in order to view portions of the primary channel content that were received while the user was watching other channels.” *Id.*

Wood teaches “upon receiving a user request to tune to a second channel: receiving a second program from the second channel; and buffering the second program to enable the user to view a previously received portion of the second program,” as required by claim 1. Wood teaches that the digital VCR can include a second tuner and can, in response to a user request to tune another channel, receive the second program from the second channel and buffer that program into a second rewind buffer to enable the user to rewind and view previously received portions of that program. *Id.* ¶¶ 7, 118, 130, 142, 147; Ex. 1011 ¶¶ 133–136. Specifically, Wood discloses “the digital VCR 10 can have one or more tuners in addition to the tuner 108.” *Id.* ¶ 147. Wood also discloses that “the digital VCR 10 always spools the current show to a rewind buffer.” *Id.* ¶ 117. Wood further discloses that “[i]f the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer” and that “[t]he

channel to which the user tunes can be spooled to a second rewind buffer.” *Id.* ¶ 142. As stated above, Wood discloses that the rewind buffers allow a user to “exercise VCR-style control over live television shows,” such as viewing a previously received portion of the second program in the second rewind buffer by rewinding. *Id.* ¶¶ 7, 117, 118, 142. Based on these disclosures, a person of ordinary skill in the art would have understood that Wood teaches buffering the second program to a second rewind buffer that enables the user to view a previously received portion of the second program. Ex. 1011 ¶¶ 132–136.

Wood also discloses the requirement of claim 1 of “wherein the buffering of the first program and the buffering of the second program occur in parallel.” As explained above, Wood discloses that “[i]f the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer” and that “[t]he channel to which the user tunes can be spooled to a second rewind buffer.” *Id.* ¶ 142. Woods also discloses “the digital VCR 10 can have one or more tuners in addition to the tuner 108” and that “[s]uch additional tuners can allow the user to, for example, watch one live television channel while another live television channel is being recorded.” *Id.* ¶ 147. Wood thus discloses that the buffering to the two rewind buffers occur in parallel.

The combination of Wood and Vallone teaches “wherein an indicator that indicates the availability of at least one of the buffered first program and the buffered second program is generated for display to the user.” Wood discloses generating channel guide display 500 (illustrated in Figure 5 shown above) that includes an indication of the relation of buffered content to the current time. Ex. 1002 at Fig. 5, ¶¶ 69, 88 (“If the digital VCR 10 is

displaying part of a television show while the television show is being recorded, the on-screen display 508 also contains information about the relation of the content being displayed to the current time. For example, the on-screen display 508 can indicate that the content being displayed is five minutes behind the current time or in sync with the current time.”). Vallone discloses, as illustrated in Figure 26 shown above, trick play bar 2601 and cache bar 2602 overlaid onto live video buffered to a program cache. Ex. 1003, Fig. 26, 18:28–41. Vallone discloses that “[t]he current program is stored in a circular cache” and that “cache bar 2602 inside of the trick play bar 2601 indicates how much of the circular cache is filled.” *Id.* at 18:38–41; *see also id.* at 18:32–35 (“The trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.”). Wood and Vallone thus teach generating for display to the user an indicator that indicates the availability of at least one of the buffered programs.

The combination of Wood and Vallone also teaches “wherein the indicator also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program.” Vallone teaches that interactive slider 2605 and position indicator 2608 visually indicate a time and position of the displayed program. Ex. 1003, 18:55–61, 19:8–11. Specifically, Vallone discloses that “[t]he slider 2605 along with the position indicator 2608 are linked together and tell the user visually where his current position is within the program material.” *Id.* at 18:56–59. Vallone also discloses that “[t]he slider 2605 can be moved anywhere within the cache bar 2602” in response to user input. *Id.* at 19:22–32, 19:55–63. According to Vallone,

“[t]he user uses the play 1411, rewind 1407, fast forward 1408, pause 1412, slow motion 1413, jump 1414, and instant replay 1415 buttons [on the remote control illustrated in Figure 14] to position the slider 2605.” *Id.* at 19:22–26, 3:1–2, 13:38–40. As explained above, it would have been obvious to one of ordinary skill in the art to combine Vallone’s teachings with Wood’s such that the on-screen interface for the digital VCR taught by Wood enabled the user to access another play position within the buffered content, as taught by Vallone. *See supra* Section II.D.3.a.; Ex. 1011 ¶¶ 151–182.

*ii. Patent Owner’s arguments*

Patent Owner argues that a person of ordinary skill in the art would not have combined Wood with Vallone. PO Resp. 31–33. Patent Owner argues that the VCR disclosed in Wood is different from the VCR referred to in Vallone in the statement that the trick play bar could be applied to a VCR. *Id.* at 31–32. Patent Owner also argues that Vallone’s statement about it being “advantageous to provide a multimedia visual progress indication system that is visually intuitive to the user” is made in the context of prior art progress indicators, which were numeric counters that required the user to “surmise what direction the media is progressing in by observing whether the counter is incrementing or decrementing.” *Id.* at 32 (quoting Ex. 1003, 1:44–47, 1:32–39). According to Patent Owner, because “Wood already discloses that the channel guide display ‘also contains information about the relation of the content being displayed to the current time,’” Petitioner has not shown that an ordinarily skilled artisan would have been motivated to combine Vallone with Wood. *Id.* (quoting Ex. 1002 ¶ 88).

Patent Owner's arguments are not persuasive. Vallone expressly states that its trick play bar "can be applied to any Video or audio application where the physical position in the material is readily ascertainable." Ex. 1003, 20:19–22. Vallone thus not is limited to addressing improving the visual information provided by numeric counters. Vallone's general statement regarding any application where the physical position is readily ascertainable applies to a digital VCR like that disclosed in Vallone.

In addition, even though Wood discloses an on-screen interface which shows the relation between the content being display and the current time, Petitioner shows that a person of ordinary skill in the art would have been motivated to incorporate Vallone's teachings to improve the interface by making it visually intuitive and interactive. Ex. 1011 ¶¶ 158, 159, 171, 177, 178. Dr. Rhyne's testimony is credible and persuasively supported by the teachings of the underlying references. *See* Ex. 1011 ¶¶ 158, 159, 171, 177, 178; Ex. 1002 ¶¶ 6, 7, 88, 142; Ex. 1003, Fig. 26, 1:44–49, 1:53–57, 18:32–44, 19:1–3, 20:19–22. For example, as stated above, Vallone expressly discloses applying its interactive trick play bar more broadly to any device in which physical position in the material is readily ascertainable, such as a VCR. Ex. 1003, 20:19–22. In addition, Vallone describes the known problem of multimedia devices lacking interactivity and intuitive devices. Ex. 1003, 1:11–49. One of ordinary skill in the art would have been aware of this problem and motivated to improve Wood's digital VCR accordingly. Ex. 1011 ¶¶ 158, 159, 171, 177, 178. In addition, as Dr. Rhyne explains, an ordinarily skilled artisan would have been motivated to combine the teachings of the references to provide a single consistent interface for the

user for the multiple video sources, thereby simplifying the tasks performed by the user. Ex. 1011 ¶ 159; Ex. 1002 ¶ 6.

*iii. Conclusion regarding claim 1*

Having considered the evidence of record and the arguments of the parties, Petitioner has shown by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over Wood and Vallone.

*c. Independent claim 11*

Independent claim 11 is very similar to claim 1 but is directed to a system, rather than a method, for buffering programs. Petitioner asserts that the combination of Wood and Vallone teaches the storage device and interactive application recited in claim 11. Pet. 32–33. Petitioner relies on its analysis of claim 1 for showing how the combination of Wood and Vallone teaches the elements of claim 11 that are nearly identical to the corresponding elements in claim 1. *Id.*

Patent Owner raises the same arguments for claim 11 that it raises for claim 1. *See* PO Resp. 31–33.

Having reviewed the record, as explained below, because the combination of Wood and Vallone teaches the features recited in claim 11, Petitioner has shown by a preponderance of the evidence that claim 11 is unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone.

Wood discloses “[a] system for buffering programs, the system comprising: a storage device; and an interactive application implemented at least partially on user equipment,” as recited in claim 11. Figure 1 of Wood illustrates a block diagram of a digital VCR 10 and devices connected to the digital VCR and Figure 2 illustrates a block diagram of digital VCR circuitry 100. Ex. 1002 ¶¶ 12, 13, 20. Wood discloses that digital VCR 10 “acts as a

central station for recording and playback of analog and digital audio and video.” *Id.* ¶ 18. As explained above in connection with claim 1, Wood discloses “rewind buffers” for buffering live television programs. Ex. 1002 ¶¶ 7, 59, 118, 127, 142. Wood discloses that digital VCR 10 includes hard disk 142 for storing rewind buffers and incoming program content. Ex. 1002, Fig. 2, ¶¶ 59, 60, 117. Wood also discloses that digital VCR 10 implements system software 300 to control the various operations of the digital VCR, including receiving and interpreting commands from a user input device, tuning the digital VCR to a selected channel, buffering program content to the hard disk, and generating a display of an on-screen viewer interface. Ex. 1002, Fig. 3, ¶¶ 33, 36, 42, 46, 51, 56, 59, 60.

Wood also discloses that the interactive application is configured to, “upon receiving a user request, from a user input device, to tune to a first channel: receive a first program from the first channel; and buffer the first program to enable the user to view on a display device a previously received portion of the first program,” as required by claim 11. Wood discloses that VCR 10 receives a user request to tune tuner 108 to a first channel and receives a first program from the first channel upon receiving the request. Ex. 1002 ¶¶ 18, 117, 118. Wood discloses that “[a] remote control 22 and on-screen menus displayed by the digital VCR 10 on the television 18 may be used to select audio and video from one or more of the attached audio and video sources to be output to a single display device such as the television 18.” *Id.* ¶ 18. Wood also discloses the following:

The user can watch live television using the digital VCR 10 by tuning to a live television channel using the remote control 22. For example, the user can tune directly to a live television channel by entering the channel number using numeric keys . . . on the remote control 22, by using Channel Up button 418 and

Channel Down button 420 on the remote control 22, or by selecting a channel in the channel guide display 500. The digital VCR 10 continuously spools the current show's video and audio streams to a rewind buffer stored on the hard disk drive 142.

*Id.* ¶ 118. Wood also discloses that upon tuning to the first channel, optimized MPEG file system (OMFS) 350 stores the first program in a first rewind buffer, enabling the user to rewind and play back content in the first rewind buffer. *Id.* ¶¶ 7, 18, 59, 118, 142. Wood discloses that “[a] user can . . . exercise VCR-style control over live television shows,” such as rewinding and pausing. *Id.* ¶ 7. In addition, Wood discloses that a user can watch one channel (designated as a primary channel), can tune to another channel, and then can return to the primary channel and “resume watching the primary channel at the point where the user left off or at the current time.” *Id.* ¶ 142. Specifically, “the user can rewind the primary channel in order to view portions of the primary channel content that were received while the user was watching other channels.” *Id.*

Wood teaches that the interactive application is configured to, “receive from the user input device a user request to tune to a second channel; and upon receiving the user request to tune to a second channel: receive a second program from the second channel; and buffer on the storage device the second program to enable the user to view a previously received portion of the second program,” as required by claim 11. Wood teaches that the digital VCR can include a second tuner and can, in response to a user request from a remote control to tune another channel, receive the second program from the second channel and buffer that program into a second rewind buffer to enable the user to rewind and view previously received portions of that program. *Id.* ¶¶ 7, 118, 130, 142, 147; Ex. 1011 ¶¶ 133–136.

Specifically, Wood discloses “the digital VCR 10 can have one or more tuners in addition to the tuner 108.” *Id.* ¶ 147. Wood also discloses that “the digital VCR 10 always spools the current show to a rewind buffer.” *Id.* ¶ 117. Wood further discloses that “[i]f the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer” and that “[t]he channel to which the user tunes can be spooled to a second rewind buffer.” *Id.* ¶ 142. As stated above, Wood discloses that the rewind buffers allow a user to “exercise VCR-style control over live television shows,” such as viewing a previously received portion of the second program in the second rewind buffer by rewinding. *Id.* ¶¶ 7, 117, 118, 142. In addition, Wood discloses that digital VCR 10 includes hard disk 142 for storing rewind buffers and incoming program content. Ex. 1002, Fig. 2, ¶¶ 59, 60, 117. Based on these disclosures, a person of ordinary skill in the art would have understood that Wood teaches buffering the second program to a second rewind buffer that enables the user to view a previously received portion of the second program. Ex. 1011 ¶¶ 132–136.

Wood also discloses the requirement of claim 11 of “wherein the first program and the second program are buffered in parallel.” As explained above, Wood discloses that “[i]f the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer” and that “[t]he channel to which the user tunes can be spooled to a second rewind buffer.” *Id.* ¶ 142. Woods also discloses “the digital VCR 10 can have one or more tuners in addition to the tuner 108” and that “[s]uch additional tuners can allow the user to, for example, watch one live television channel while another live television channel is being recorded.”

*Id.* ¶ 147. Wood thus discloses that buffering the first and second programs in parallel.

The combination of Wood and Vallone teaches “wherein an indicator that indicates the availability of at least one of the buffered first program and the buffered second program is generated for display on the display device to the user.” Wood discloses generating, on a television, channel guide display 500 (illustrated in Figure 5 shown above) that includes an indication of the relation of buffered content to the current time. Ex. 1002 at Fig. 5, ¶¶ 69, 88 (“If the digital VCR 10 is displaying part of a television show while the television show is being recorded, the on-screen display 508 also contains information about the relation of the content being displayed to the current time. For example, the on-screen display 508 can indicate that the content being displayed is five minutes behind the current time or in sync with the current time.”). Vallone discloses, as illustrated in Figure 26 shown above, trick play bar 2601 and cache bar 2602 overlaid onto live video buffered to a program cache. Ex. 1003, Fig. 26, 18:28–41. Vallone discloses that “[t]he current program is stored in a circular cache” and that “cache bar 2602 inside of the trick play bar 2601 indicates how much of the circular cache is filled.” *Id.* at 18:38–41; *see also id.* at 18:32–35 (“The trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.”). Wood and Vallone thus teach generating for display on the display device to the user an indicator that indicates the availability of at least one of the buffered programs.

The combination of Wood and Vallone also teaches “wherein the indicator also indicates a current play position and is interactive to enable

the user to access another play position associated with the at least one of the first program and the second program.” Vallone teaches that interactive slider 2605 and position indicator 2608 visually indicate a time and position of the displayed program. Ex. 1003, 18:55–61, 19:8–11. Specifically, Vallone discloses that “[t]he slider 2605 along with the position indicator 2608 are linked together and tell the user visually where his current position is within the program material.” *Id.* at 18:56–59. Vallone also discloses that “[t]he slider 2605 can be moved anywhere within the cache bar 2602” in response to user input. *Id.* at 19:22–32, 19:55–63. According to Vallone, “[t]he user uses the play 1411, rewind 1407, fast forward 1408, pause 1412, slow motion 1413, jump 1414, and instant replay 1415 buttons [on the remote control illustrated in Figure 14] to position the slider 2605.” *Id.* at 19:22–26, 3:1–2, 13:38–40. As explained above, it would have been obvious to one of ordinary skill in the art to combine Vallone’s teachings with Wood’s such that the on-screen interface for the digital VCR taught by Wood enabled the user to access another play position within the buffered content, as taught by Vallone. *See supra* Section II.D.3.a.; Ex. 1011 ¶¶ 151–182.

For the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner’s arguments are not persuasive. *See supra* Section II.D.3.b.ii.

*d. Dependent claims 3 and 13*

Claim 3 recites:

[t]he method of claim 1, wherein the first program is buffered to a first buffer, further comprising:

tuning to a third channel;

determining that a third program on the third channel is the first program; and

buffering the third program to the first buffer.

Claim 13 depends from claim 11 and recites a similar limitation.

Petitioner contends that “Wood recognizes the benefit of managing storage space to provide additional memory on the digital VCR for storing program content.” Pet. 33 (citing Ex. 1002 ¶¶ 10, 97; Ex. 1011 ¶ 190).

Petitioner further contends “it would have been obvious to use Wood’s channel guide information” to determine whether the same program appears on a first channel and a different channel (e.g., third channel). *Id.* at 34.

Petitioner asserts that rather than creating a new buffer to store the program, a person of ordinary skill in the art “would have been motivated to modify Wood’s VCR to store the program on the first channel to the first rewind buffer so as to save storage space for buffering other programs.” *Id.* (citing Ex. 1011 ¶ 194).

Patent Owner argues that Wood and Vallone do not disclose, or provide a motivation to implement, buffering a third program to the first buffer. PO Resp. 16–21. Patent Owner argues that Petitioner’s reliance on the motivation of saving storage space is based on an incorrect premise that the same part of the same program would be buffered on two different channels at the same time. *Id.* at 17. Patent Owner also argues that saving disk space is an insufficient motivation to implement the proposed modification of Wood’s VCR because there are other ways of saving disk space that do not involve buffering to the same buffer. *Id.* at 18–20.

In Reply, Petitioner asserts that, in Wood’s two-tuner, parallel buffering system, the two buffers would contain overlapping program material and therefore the motivation that Petitioner relies on applies. Specifically, Petitioner, relying on the testimony of Dr. Rhyne, asserts that “[w]hen a first program on a first channel is buffered, and the user tunes to a third channel showing a third program that is the first program, a new buffer would be created to buffer that same program on the third channel, resulting in overlapping program material on two buffers.” Reply 2 (citing Ex. 1028 ¶ 9).

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claims 3 and 13 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–34; Ex. 1011 ¶¶ 187–196. We note that claim 3 does not specify a causal relationship between the step of “determining that a third program on the third channel is the first program” and the step of “buffering the third program to the first buffer.” Claim 13, which requires that the interactive application be configured to perform those functions, likewise does not recite a causal relationship between the two functions. Nevertheless, Petitioner has not shown that the combination of Wood and Vallone teaches “buffering the third program to the first buffer.”

The combination of Wood and Vallone teaches the other limitations of claims 3 and 13. Wood discloses that digital VCR 10 buffers a first program to a first rewind buffer. Ex. 1002 ¶¶ 7, 51, 59, 117, 118, 142. Wood also discloses that the digital VCR may tune a tuner to a variety of available channels. Ex. 1002 ¶¶ 7, 18, 82, 91–93. Wood further discloses that digital

VCR 10 obtains and uses program information to identify and distinguish programs on different channels. Ex. 1002 ¶¶ 8, 84–86, 97 (describing using information in the channel guide database to determine whether to record a particular program), 101, 103, 108, 110; Ex. 1011 ¶ 187. For example, Wood discloses that “[t]he digital VCR 10 can determine which shows the user has previously viewed by storing channel guide information for each show that the user watches.” Ex. 1002 ¶ 103. Wood also discloses “comparing channel guide information for upcoming shows to channel guide information for shows that the user has previously watched and/or recorded” to identify upcoming instances of a particular program to record. Ex. 1002 ¶ 108; Ex. 1011 ¶ 187. Wood further discloses that the digital VCR can determine when the user returns to a previously viewed program/channel and allow the user to resume watching (or to rewind) the buffered program upon returning to the previously viewed program/channel. Ex. 1002 ¶ 142; Ex. 1011 ¶ 187. As mentioned, Wood also discloses that the digital VCR determines whether a user has previously viewed or stored a particular program. Ex. 1002 ¶¶ 94, 97, 103; Ex. 1011 ¶ 187. A person of ordinary skill in the art would have understood from these disclosures in Wood that digital VCR 10 would determine whether the program that airs on a first channel is the same program that airs on a different (third) channel by using the channel guide information. Ex. 1011 ¶ 187. An ordinarily skilled artisan also would have understood that the digital VCR would use program information to determine that a third program is the same as the first program. Ex. 1011 ¶ 187. Wood thus teaches “determining that a third program on the third channel is the first program,” as required by claim 3

and similarly required by claim 13. Ex. 1011 ¶ 192; Ex. 1002 ¶¶ 97, 103, 142.

Petitioner, however, does not persuasively show that “buffering the third program to the first buffer” would have been obvious over the teachings of Wood and Vallone. Wood discloses two rewind buffers and a scenario in which a user switches away from, and returns to, a first channel (referred to as a “primary channel”). Ex. 1002 ¶¶ 117, 142. Specifically, Wood discloses the following:

If the digital VCR 10 has two tuners, the user can designate a channel to be a “primary channel.” If, for example, the user is watching a channel that has been designated as a primary channel, the content of the channel is spooled to the rewind buffer. *If the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer.* The channel to which the user tunes can be spooled to a second rewind buffer. *When the user returns to the primary channel, the user can resume watching the primary channel at the point where the user left off or at the current time. In the latter case the user can rewind the primary channel in order to view portions of the primary channel content that were received while the user was watching other channels.*

*Id.* ¶ 142 (emphases added). As illustrated in the description above, Wood discloses that the first rewind buffer continues to spool the contents of the first program while the user is watching other “channels” (plural). Wood thus expressly describes the scenario of the user tuning to a third channel and the first rewind buffer continuing to store program content from the first channel. Based on the teachings of Wood—which include that “the digital VCR 10 always spools the current show to a rewind buffer” (*id.* ¶ 117)—the contents of the third channel would be spooled to a second rewind buffer

while the contents of the first channel continue to be spooled to a first rewind buffer.

Petitioner's assertions that buffering the third program to the first buffer would have been obvious are too conclusory. *See* Pet. 34. Citing the declaration testimony of Dr. Rhyne, Petitioner first states that rather than creating a new buffer, an ordinarily skilled artisan would have been motivated to "modify Wood's VCR" to store the program on the first rewind buffer so as to save storage space for buffering other programs. *Id.* (citing Ex. 1011 ¶ 194). Dr. Rhyne makes the same conclusory statement and cites as purported supported the disclosure in paragraph 59 of Wood that OMFS 350 allocates fixed space on hard disk 142 for creating rewind buffers. The notion of creating rewind buffers is different from managing the buffers and affirmatively choosing to spool into a different buffer. Dr. Rhyne's conclusory statement is not persuasive. Petitioner also asserts—again relying only on the testimony of Dr. Rhyne—that "using Wood's channel guide information to differentiate between buffered programs on different channels would predictably result in preventing the creation of a new buffer for a program that is already being buffered by Wood's VCR." Pet. 34 (citing Ex. 1011 ¶ 194). Dr. Rhyne makes the same conclusory statement, without further explanation or citation to any evidence. Ex. 1011 ¶ 194.

Petitioner's showing on this claim limitation is not persuasive. Petitioner fails to cite support in Wood or Vallone of teaching of any buffer management mechanism, let alone a buffer management mechanism to address overlapping material. *See* Pet. 33–34; *see also* Reply 1–4. Although Petitioner asserts that "Wood recognizes the benefit of managing storage space to provide additional memory" (Pet. 33 (citing Ex. 1002 ¶¶ 10, 97),

Wood is describing managing the number of recorded programs retained in storage. The cited paragraphs do not address the rewind buffers or managing the buffering of content to the rewind buffers. *See* Ex. 1002 ¶¶ 10, 97. Petitioner thus does not persuasively show that it would have been obvious to modify the teachings of Wood and “buffer[] the third program to the first buffer.”

*e. Dependent claims 4 and 14*

Claim 4 depends from claim 1 and adds “wherein the first program is buffered to a first buffer, further comprising allocating a buffer size to the first buffer, the buffer size being determined based on an amount of time remaining in the first program.” Claim 14 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 4 and 14 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 35. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c. In addition, as explained above, Wood discloses that “OMFS 350 can use ‘circular’ files to store one or more rewind buffers.” Ex. 1002 ¶ 59. Wood discloses that “[s]uch files are allocated a fixed amount of contiguous disk space upon their creation.” *Id.* Wood also discloses, as an example, that “if the digital VCR 10 is about to record a 30-minute television show, the file system 350 creates a new file and allocates sufficient space on the hard disk drive 142 to store 30 minutes of video.” *Id.* ¶ 60. Wood thus discloses that

OMFS 350 allocates a fixed amount of space on disk 142 based on a length of the program to be recorded when creating a rewind buffer. Ex. 1002 ¶¶ 59, 60. Wood thus teaches, when a first program is buffered to a first rewind buffer, the buffer size of that rewind buffer is allocated based on the amount of time required to store that program. Ex. 1002 ¶ 60; Ex. 1011 ¶¶ 197–201. Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a.

*f. Dependent claims 5 and 15*

Claim 5 depends from claim 1 and adds “further comprising displaying the first program upon receiving the user request to tune to the first program, wherein buffering the first program comprises storing a portion of the first program that was previously displayed.” Claim 15 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5 and 15 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 35; Ex. 1011 ¶¶ 202–206. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c. In addition, Wood discloses that “[t]he user can watch live television using the digital VCR 10 by tuning to a live television channel using the remote control 22.” Ex. 1002 ¶ 118. Wood also discloses that digital VCR 10 outputs a tuned channel to display device 18

(shown in Figure 1) for display to the user. *Id.* ¶¶ 18, 118. Wood also discloses that when the user tunes to a live television channel, the show being displayed on the current channel is stored onto a rewind buffer and that the user can access the previously displayed portions of the program by rewinding the buffered content. *Id.* ¶¶ 7, 59, 117, 118, 130, 142. For example, a user can watch live television on a first channel, tune to a second channel, tune back to the first channel, and rewind the buffered content for that first channel. *Id.* ¶¶ 118, 142. The first rewind buffer will contain segments of the program on the first channel that were previously displayed. *Id.* ¶¶ 118, 142.

Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a.

*g. Dependent claims 6 and 16*

Claim 6 depends from claim 1 and adds “further comprising allocating storage space on a personal video recorder for buffering the first program, wherein the personal video recorder is included on user equipment.” Claim 16 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 6 and 16 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 36; Ex. 1011 ¶¶ 207–211. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra*

Sections II.D.3.b. and II.D.3.c. In addition, Wood discloses that digital VCR 10 “acts as a central station for recording and playback of analog and digital audio and video,” including cable television programs. Ex. 1002, Fig. 1, ¶ 18. Wood also discloses that OMFS 350, which is part of digital VCR 10, stores rewind buffers to hard disk 142, and further discloses that the rewind buffers “are allocated a fixed amount of contiguous disk space upon their creation.” *Id.* at Figs. 2, 3, ¶¶ 33, 59. A person of ordinary skill in the art would have understood that digital VCR 10 comprises user equipment, which includes a personal video recorder for accessing/storing program content from/to a hard disk. Ex. 1011 ¶¶ 207–209; Ex. 1002, Figs. 1–3, ¶¶ 7, 18, 117, 118.

Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a.

*h. Dependent claims 8 and 18*

Claim 8 recites

[t]he method of claim 1 wherein the second program is buffered to a first buffer, further comprising:

receiving a user input to save the second program as a recording;  
and

in response to receiving the user input, storing a segment of the second program from the first buffer as part of the recording for the second program.

Claim 18 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner's and Patent Owner's evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 8 and 18 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 36–37; Ex. 1011 ¶¶ 212–217. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c. In addition, Wood discloses that the digital VCR stores television programs to a rewind buffer. Ex. 1002 ¶¶ 7, 117, 118. Wood also discloses that the digital VCR 10 receives user commands to record a program in response to a user selecting a record button on remote control 1401. *Id.* ¶¶ 82, 129. Wood discloses that, in response to receiving a user request to record a program, the digital VCR “saves the data that has been recorded in the rewind buffer, so that the entire show being viewed on the current channel can be recorded.” *Id.* ¶ 129.

Vallone likewise discloses buffering live television content to a program cache. Ex. 1003, 18:38–39. Vallone also discloses that the user may select the record button on remote control 1401 to instruct the system to record. *Id.* at Fig. 14, 13:38–46, 17:19–24, 17:41–45. For example, Vallone discloses that “[i]f the user is watching a show and tells the system to record the program in progress, then the system will record the program from that point on and will add onto the saved recording (prepending) the portion of the program that has already passed and has been buffered.” *Id.* at 17:19–24.

The combination of Wood and Vallone thus teaches the limitations of claims 8 and 18. Ex. 1011 ¶¶ 212–217. Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine

the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a.

*i. Dependent claims 9 and 19*

Claim 9 depends from claim 1 and adds “wherein the indicator indicates how much of the at least one of the buffered first program and the buffered second program has been buffered, and wherein the indicator is displayed on top of or adjacent to the at least one of the buffered first program and the buffered second program.” Claim 19 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 9 and 19 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 37–38; Ex. 1011 ¶¶ 218–224. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c. In addition, Wood discloses that on-screen display 508 indicates the relation of the displayed content to the current time. Ex. 1002 ¶ 88. Wood discloses that the on-screen display can be displayed on top of the video of the current channel. *Id.* ¶ 87. Wood also discloses two rewind buffers for buffering first and second programs. *Id.* ¶ 118. Vallone discloses that “[t]he trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.” Ex. 1003, 18:32–35. Vallone also discloses that “trick play bar 2601 is overlaid onto the live video.” *Id.*

at Fig. 26, 18:28–30, 1:58–60. The combination of Wood and Vallone thus teaches the limitations of claims 9 and 19. Ex. 1011 ¶¶ 218–224.

Moreover, for the reasons explained above, and also to provide the useful, intuitive feature of the progression of the television content stored in the buffer, one of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a; Ex. 1011 ¶ 222.

*j. Dependent claims 10 and 20*

Claim 10 recites

[t]he method of claim 1 further comprising:

creating a first buffer that is associated with the first program, wherein the first program is buffered to the first buffer; and

creating a second buffer that is associated with the second program upon receiving the user request to tune to the second channel, wherein the second program is buffered to the second buffer.

Claim 20 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 10 and 20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. *See* Pet. 28–33, 38; Ex. 1011 ¶¶ 225–229. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c. In addition, as explained above, Wood discloses that OMFS 350 allocates disk space on hard disk 142 to store

rewind buffers. Ex. 1002, Figs. 2, 3, ¶¶ 59, 60. Wood also discloses that the digital VCR always buffers a current show to a rewind buffer. *Id.* ¶¶ 117, 118. Wood discloses that the digital VCR stores, to a rewind buffer, program content airing on a first channel. *Id.* ¶¶ 117, 118, 142. Wood also discloses that the digital VCR can tune a second tuner to a second program in response to user input, and store the second program to a second rewind buffer. *Id.* ¶¶ 91, 142.

Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a.

*k. Independent claims 21 and 22*

Independent claims 21 and 22 are identical to claim 1 except that each recites a different feature for the claimed indicator. Rather than require (as does claim 1) that the indicator “also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program,” claim 21 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a live feed* of the at least one of the first program and the second program.” Similarly, claim 22 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a point* of the at least one of the first program and the second program.”

Petitioner asserts that the combination of Wood and Vallone teaches the indicator features specific to claims 21 and 22. Pet. 38–40. Petitioner

relies on its analysis of claim 1 for showing how the combination of Wood and Vallone teaches the remaining limitations of claims 21 and 22. *Id.*

Patent Owner raises the same arguments for claims 21 and 22 that it raises for claim 1. *See* PO Resp. 31–33.

Having reviewed the parties’ arguments and the evidence of record, Petitioner has shown by a preponderance of the evidence that claims 21 and 22 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. With respect to the limitations that are identical to the limitations of 1, Petitioner has shown that the combination of Wood and Vallone teaches those features. *See supra* Section II.D.3.b. In addition, Wood discloses that “[i]f the digital VCR 10 is displaying part of a television show while the television show is being recorded, the on-screen display 508 also contains information about the relation of the content being displayed to the current time.” Ex. 1002 ¶ 88. For example, according to Wood, “the on-screen display 508 can indicate that the content being displayed is five minutes behind the current time or in sync with the current time.” *Id.* Vallone discloses an interactive trick play bar with cache bar 2602, which indicates how much of the cache has been filled. Ex. 1003, Fig. 26, 18:39–41. Vallone discloses that “[t]ime marks 2603, 2604 are displayed inside the trick play bar 2601[,] giving the user a visual reference point from which to judge the current time and how far back in time the cache has recorded.” *Id.* at 18:41–44. Vallone also discloses that cache bar 2602 expands “to the right as more of the program is stored in the circular cache.” *Id.* at 19:1–3. Thus, the far-right end of the cache bar corresponds to the current time/position of the live television show. Ex. 1011 ¶¶ 147, 233. Vallone further discloses that slider 2605 and position indicator 2608 will shift “in

unison with the cache bar 2602, reflecting the current position in the cache.” Ex. 1003, 19:8–11. Vallone thus discloses that features of the trick play bar reflect the current position within the cache and behind the live feed (the point of current time). *Id.* at Fig. 26, 18:39–54, 19:1–11; Ex. 1011 ¶¶ 233–234. Vallone also discloses that “slider 2605 can be moved anywhere within the cache bar 2602 by the user” and that the user uses remote control buttons such as play, rewind, and fast forward to position the slider. Ex. 1003, 19:22–25. The combination of Wood and Vallone thus teaches the indicator features recited in claims 21 and 22.

Moreover, for the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner’s arguments are not persuasive. *See supra* Section II.D.3.b.ii.

*l. Independent claims 23 and 24*

Independent claims 23 and 24 are identical to claim 11 except that each recites a different feature for the claimed indicator. Rather than require (as does claim 11) that the indicator “also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program,” claim 23 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a live feed* of the at least one of the first program and the second program.” Similarly, claim 24 requires that the indicator “is interactive and also indicates a current position

within the at least one of the buffered first program and the buffered second program *behind a point* of the at least one of the first program and the second program.” The indicator limitations of claims 23 and 24 are identical to the indicator limitations of claims 21 and 22 discussed above.

Petitioner asserts that the combination of Wood and Vallone teaches the indicator features specific to claims 23 and 24. Pet. 40–41. Petitioner relies on its analysis of claim 11 for showing how the combination of Wood and Vallone teaches the remaining limitations of claims 23 and 24. *Id.* at 41.

Patent Owner raises the same arguments for claims 23 and 24 that it raises for claim 11. *See* PO Resp. 31–33.

Having reviewed the parties’ arguments and the evidence of record, Petitioner has shown by a preponderance of the evidence that claims 23 and 24 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone. With respect to the limitations that are identical to the limitations of 11, Petitioner has shown that the combination of Wood and Vallone teaches those features. *See supra* Section II.D.3.c. In addition, for the reasons discussed above in connection with claims 21 and 22, the combination of Wood and Vallone also teaches the indicator features recited in claims 23 and 24. *See supra* Section II.D.3.k.

Moreover, for the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Wood and Vallone in the manner claimed. *See supra* Section II.D.3.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner’s arguments are not persuasive. *See supra* Section II.D.3.b.ii.

*E. Asserted Obviousness over Wood, Vallone, and Pierre*

Petitioner contends that claims 2 and 12 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood, Vallone, and Pierre. Pet. 4, 41–47. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references allegedly teach or suggest the claim limitations and provides purported reasoning for combining the teachings of the references. *Id.* at 41–47.

We have reviewed Petitioner's and Patent Owner's arguments and evidence of record. As explained below, we determine that Petitioner has not shown by a preponderance of the evidence that claims 2 and 12 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood, Vallone, and Pierre.

*1. Summary of Pierre*

Pierre is a U.S. patent titled "System and Method for Incorporating Previously Broadcast Content into Program Recording." Ex. 1007, [54]. Pierre discloses a system that "allows a viewer to record an entire broadcast program after a portion of it has already been viewed." *Id.* at 2:17–19. Pierre discloses combining first and second portions of a program that are stored in different storage areas to create a recording of the program. *Id.* at Abstract.

Figures 1 and 2 of Pierre illustrate set top box 16 connected to storage device 18. *Id.* at 4:1–4, 5:4–8. According to Pierre, storage device 18 may be divided into a temporary storage area (first storage area), which contains a circular buffer, and a semi-permanent storage area (second storage area). *Id.* at 6:37–43. Pierre discloses that a control processor automatically records the broadcast at a start of a program to store a first portion of the

program in the circular buffer. *Id.* at 6:49–53. Pierre discloses that the program will continue to be recorded and stored within the buffer for a period of time. *Id.* at 6:53–55. According to Pierre, if a viewer decides to record the program after the start of the program, the processor will allocate space within the semi-permanent storage area of the storage device. *Id.* at 6:55–58.

Pierre states that “[a]fter the recording is complete[,] the first portion of the program, which was previously stored in the circular buffer, will be copied into the semi-permanent storage area, preferably in front of the allocated space within the semi-permanent storage.” *Id.* at 6:61–65 (reference numerals omitted). Pierre explains that, “[i]n this way, the first portion is physically combined with the second portion of the program to form a contiguous recording.” *Id.* at 6:65–67. Pierre notes that the first and second portions could be joined virtually rather than physically. *Id.* at 7:9–11. Pierre adds the following:

In either case, a viewer watching a replay of the entire recording should not be able to detect that the two parts of the recording were originally stored separately. Thus, the portions of the program may be physically contiguous or the portions of the program may be stored separately in a non-contiguous format as long as the entire recorded program can be played back in a continuous manner (i.e., viewer does not notice a transition between the playback of the first and second portions of the program).

*Id.* at 7:15–23.

## 2. Analysis

Claim 2 recites

[t]he method of claim 1, wherein the first program is buffered to a first buffer, further comprising:

tuning to a third channel;  
creating a second buffer for a third program on the third channel;  
determining that a third program is the first program; and  
combining the second buffer with the first buffer.

Claim 12 depends from claim 11 and recites similar limitations. We note that claim 2 does not specify a causal relationship between the step of “determining that a third program is the first program” and the step of “combining the second buffer with the first buffer.” Claim 12, which requires that the interactive application be configured to perform those functions, likewise does not recite a causal relationship between the two functions.

As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b. and II.D.3.c.

The combination of Wood, Vallone, and Pierre teaches “wherein the first program is buffered to a first buffer,” as required by claims 2 and 12. Wood discloses that OMFS 350 of the digital VCR allocates disk space on hard disk 142 to store a rewind buffer. Ex. 1002 ¶¶ 59, 60. Wood also discloses that “the digital VCR 10 always spools the current show to a rewind buffer that is stored on the hard disk.” *Id.* ¶ 117.

The combination of Wood, Vallone, and Pierre also teaches “tuning to a third channel,” as required by claims 2 and 12. Wood discloses that the digital VCR may include two tuners for tuning live television channels. *Id.* ¶¶ 117, 118, 142, 147. Wood also discloses that the digital VCR 10 may tune a tuner to a variety of available channels. *Id.* ¶¶ 7, 18, 82, 117, 118, 142.

The combination of Wood, Vallone, and Pierre also teaches “creating a second buffer for a third program on the third channel,” as required by claims 2 and 12. As stated above, Wood discloses that OMFS 350 of the digital VCR allocates disk space on hard disk 142 to store a rewind buffer. Ex. 1002 ¶¶ 59, 60. Wood also discloses that the digital VCR always buffers a current show to a rewind buffer and that, if the user tunes to a different channel, the digital VCR will begin spooling the contents of that channel to a second rewind buffer. *Id.* ¶¶ 117, 118, 142 (“If the user tunes to another channel, the contents of the primary channel continue to be spooled to the rewind buffer. The channel to which the user tunes can be spooled to a second rewind buffer.”).

The combination of Wood, Vallone, and Pierre also teaches “determining that a third program is the first program,” as required by claims 2 and 12. As explained above in connection with claims 3 and 13, Wood discloses that digital VCR 10 obtains and uses program information to identify and distinguish programs on different channels. Ex. 1002 ¶¶ 8, 84–86, 97 (describing using information in the channel guide database to determine whether to record a particular program), 101, 103, 108, 110; Ex. 1011 ¶ 250. For example, Wood discloses that “[t]he digital VCR 10 can determine which shows the user has previously viewed by storing channel guide information for each show that the user watches.” Ex. 1002 ¶ 103. Wood also discloses “comparing channel guide information for upcoming shows to channel guide information for shows that the user has previously watched and/or recorded” to identify upcoming instances of a particular program to record. Ex. 1002 ¶ 108; Ex. 1011 ¶ 250. Wood further discloses that the digital VCR can determine when the user returns to a previously

viewed program/channel and allow the user to resume watching (or to rewind) the buffered program upon returning to the previously viewed program/channel. Ex. 1002 ¶ 142. Similarly, Wood discloses that the digital VCR can determine when the user (i) tunes to a first program airing on a first channel (a primary channel), (ii) begins viewing other programs airing on other channels, and then (iii) returns back to the first program. *Id.*; Ex. 1011 ¶ 250. As mentioned, Wood also discloses that the digital VCR determines whether a user has previously viewed or stored a particular program. Ex. 1002 ¶¶ 94, 97, 103, 108; Ex. 1011 ¶ 250. A person of ordinary skill in the art would have understood from these disclosures in Wood that digital VCR 10 would determine whether the program that airs on a first channel is the same program that airs on a different (third) channel by using the channel guide information. Ex. 1011 ¶ 250. An ordinarily skilled artisan also would have understood that the digital VCR would use program information to determine that a third program is the same as the first program. *Id.*

Petitioner has not shown that the combination of Wood, Vallone, and Pierre teaches “combining the second buffer with the first buffer,” as required by claims 2 and 12. Wood discloses that “the digital VCR 10 always spools the current show to a rewind buffer.” Ex. 1002 ¶ 117. As discussed above in connection with claims 3 and 13, Wood also discloses two rewind buffers and tuning to different channels. Ex. 1002 ¶ 142. Specifically, Wood discloses the following:

If the digital VCR 10 has two tuners, the user can designate a channel to be a “primary channel.” If, for example, the user is watching a channel that has been designated as a primary channel, the content of the channel is spooled to the rewind buffer. *If the user tunes to another channel, the contents of the*

*primary channel continue to be spooled to the rewind buffer. The channel to which the user tunes can be spooled to a second rewind buffer. When the user returns to the primary channel, the user can resume watching the primary channel at the point where the user left off or at the current time. In the latter case the user can rewind the primary channel in order to view portions of the primary channel content that were received while the user was watching other channels.*

*Id.* ¶ 142 (emphases added).

As illustrated in the description above, Wood discloses that the first rewind buffer continues to spool the contents of the first program while the user is watching other “channels” (plural). Wood thus describes a scenario in which the user tunes to a third channel and the first rewind buffer continues to store program content from the first channel. Based on the teachings of Wood—which include that “the digital VCR 10 always spools the current show to a rewind buffer” (*id.* ¶ 117)—the contents of the third channel would be spooled to a second rewind buffer while the contents of the first channel continue to be spooled to a first rewind buffer.

Petitioner asserts that a person of ordinary skill in the art “would have modified Wood’s VCR, using Pierre’s storage techniques, to combine program data stored in separate rewind buffers (e.g., the first and second rewind buffers) to a single rewind buffer.” Pet. 45 (citing Ex. 1011 ¶¶ 260–264). Petitioner asserts that “[k]nowing that Wood’s VCR can use guide information to distinguish between programs on different channels . . . , [a person of ordinary skill in the art] would have modified Wood’s VCR to combine content stored in separate locations (as taught by Pierre) when the VCR determines that the content stored in these locations is the same program.” Pet. 46–47 (citing Ex. 1011 ¶¶ 257, 264). Petitioner asserts that

an ordinarily skilled artisan would have made the modification to Wood’s VCR “to conserve storage space for buffered programs.” *Id.* at 45–46 (citing Ex. 1011 ¶¶ 264–266).

Petitioner’s assertions are too conclusory and not sufficiently rooted in the references, other supporting evidence, or persuasive argument. Wood does not teach or suggest combining the contents of the two rewind buffers. *See* Ex. 1002 ¶¶ 59, 60, 142. Wood discloses allocating a fixed amount of contiguous disk space upon creation of the rewind buffers, and does not address any concern regarding overlapping program material being spooled into both buffers (and thus the need to conserve storage space for buffered programs). *See id.* at ¶¶ 59, 60. Nor does Pierre teach or suggest combining the contents of two buffers. Pierre’s Figure 4, shown below, illustrates storage areas of storage device 18 (illustrated in Pierre’s Figures 1 and 2). Ex. 1007, 6:37–38.

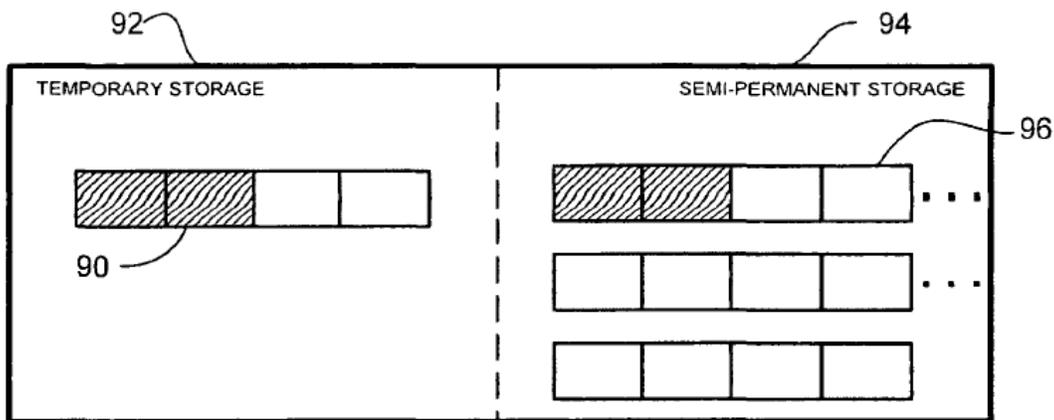


FIG. 4

Figure 4 above illustrates that storage device 18 “may be divided into a temporary storage area (first storage area) 92[,] which contains the circular buffer 90” and a semi-permanent storage area (second storage area) 94,

“which is utilized to store complete program recordings or a portion of a program during the recording.” *Id.* at 6:37–43. Pierre discloses that control processor 30 (illustrated in Figure 2) “automatically records the broadcast at a start of the program to store a first portion of the program in the circular buffer 90 within the temporary storage area 92” and that “[t]he program will continue to be recorded and stored within the buffer 90 for a predetermined period of time (e.g., 15 minutes).” *Id.* at 6:49–55. Pierre explains that the buffer is called a circular buffer because “[w]hen the end of the buffer is reached, the CPU in the control processor is interrupted, at which time it will reconfigure the DMA controller to start writing at the beginning of the buffer.” *Id.* at 6:18–21. Pierre discloses that “[i]f a viewer decides to record the program after the start of the program, . . . the processor 30 will allocate space within the semi-permanent storage area 94 of the storage device 18. *Id.* at 6:55–58. Pierre adds that “[a]fter the recording is complete[,] the first portion of the program, which was previously stored in the circular buffer 90, will be copied into the semi-permanent storage area, preferably in front of the allocated space within the semi-permanent storage 94.” *Id.* at 6:61–65. Pierre thus discloses combining the contents of the circular buffer with the contents of semi-permanent storage. Pierre does not describe combining the contents of two circular buffers or any concern regarding overlapping program material being spooled into two circular buffers (and thus the need to conserve storage space for buffered programs). Nor does Petitioner rely on any teaching or suggestion in Pierre of combining the contents of two circular buffers. Rather, Petitioner relies on unsupported testimony of Dr. Rhyne that a person of ordinary skill in the art would have modified Wood’s VCR and apply “Pierre’s storage techniques” (Pet. 45–46) to arrive at the

inventions recited in claims 2 and 12. *See* Pet. 45–47 (citing, e.g., Ex. 1011 ¶¶ 257, 260–266).

For the above reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the subject matter of claims 2 and 12 would have been obvious over Wood, Vallone, and Pierre.

*F. Asserted Obviousness over Wood, Vallone, and Kamath*

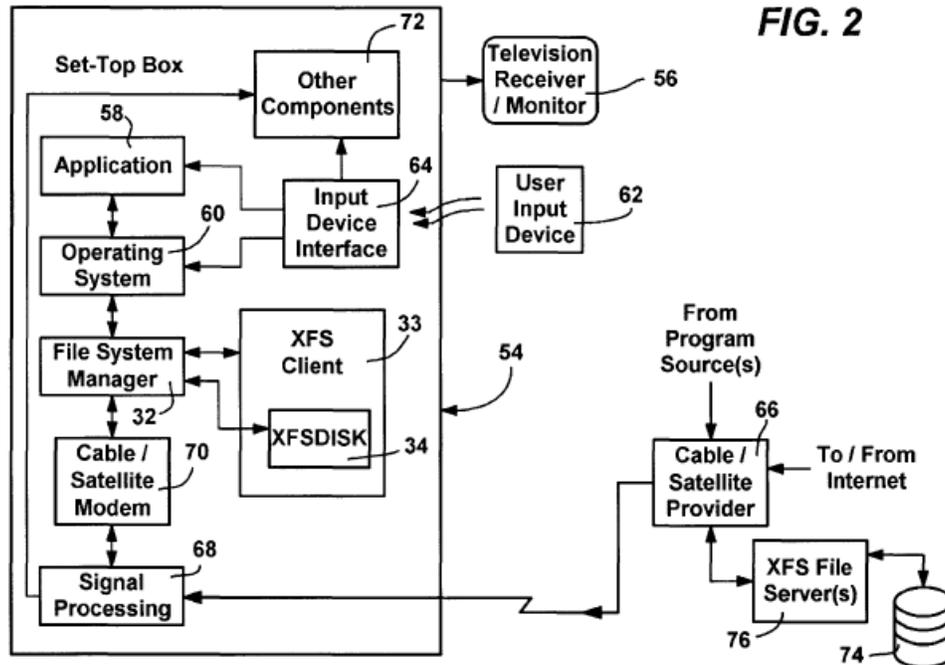
Petitioner contends that claims 7 and 17 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood, Vallone, and Pierre. Pet. 4, 47–51. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references teach or suggest the claim limitations and provides reasoning for combining the teachings of the references. *Id.* at 47–51.

We have reviewed Petitioner's and Patent Owner's arguments and evidence of record. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 7 and 17 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood, Vallone, and Kamath.

*1. Summary of Kamath*

Kamath is a U.S. patent titled “Extended File System.” Ex. 1008, [54]. Kamath describes as background that devices such as cable television set-top boxes have “lack-of-memory problems.” *Id.* at 1:14–22. Kamath proposes a solution of “transparently combining remote and local storage to act as one or more virtual local drives for a computer system client, such as a . . . set[-]top box.” *Id.* at 1:66–2:3.

Figure 2 of Kamath, shown below, illustrates the set-top box:



*Id.* at 4:33–36. As shown in Figure 2 above, set-top box 54 is connected to television receiver/monitor 56, user input device 62, and cable/satellite provider 66. *Id.* at 4:33–36, 4:43–47, 4:49–52.

Kamath discloses that set-top box 54 includes extended file system (XFS) client 33 for accessing files maintained in remote storage 74 by XFS file servers 76. *Id.* at 5:1–9, 5:13–17. Kamath discloses that a client device such as set-top box 54 is capable of connecting to one or more servers 76<sub>1</sub>–76<sub>m</sub> (as illustrated in Kamath’s Figure 3) over a network via a service provider. *Id.* at 5:16–18. Kamath discloses that “remote files may be quickly accessed by the client” and that “the client device provides local storage for caching some of the data maintained at the remote storage device 74.” *Id.* at 5:42–48.

## 2. *Analysis*

Claim 7 recites “[t]he method of claim 1, further comprising allocating storage space on a remote server for buffering the first program.” Claim 17 depends from claim 11 and similarly recites “wherein the interactive application is further configured to allocate storage space on a remote server for buffering the first program.”

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 7 and 17 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood, Vallone, and Kamath. *See* Pet. 47–51. As explained above, the subject matter of claims 1 and 11 would have been obvious over Wood and Vallone. *See supra* Sections II.D.3.b and II.D.3.c. In addition, Wood discloses that digital VCR application 330 reads and writes to files on hard disk drive 142 using optimized MPEG file system (OMFS) 350 of the digital VCR. Ex. 1002 ¶ 51. Wood also discloses that OMFS 350 allocates storage space on hard disk 142 for buffering programs. *Id.* ¶¶ 59, 60. Wood further discloses that digital VCR 10 includes modem 148, which may be used to send to, and receive from, a remote server program information and other information. *Id.* ¶¶ 19 (“The digital VCR 10 includes a modem 148 . . . which is connected to a telephone line 20 and which may be used to send and receive information about upcoming television shows and other information . . .”), 70, 113. Kamath discloses allocating storage space on a remote storage 74 and that the “remote files may be quickly accessed by the client.” Ex. 1008, Figs. 2, 3, 5:1–9, 5:13–17, 5:39–45.

Moreover, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Wood, Vallone, and Kamath in the manner claimed. Pet. 47–51; Ex. 1011 ¶¶ 274–282. As explained above, a person of ordinary skill in the art would have been motivated to combine the teachings of Wood and Vallone. *See supra* Section II.D.3.a. In addition, Kamath discloses that consumer devices, such as television set-top boxes, have “lack-of-memory problems” and that it would be advantageous to provide a system that allows such devices to load and store files remotely. Ex. 1008, 1:14–22, 2:3–10. Aware of the known problem of storage capacity issues, a person of ordinary skill in the art would have been motivated to modify the file system (OMFS 350) of Wood’s digital VCR (as modified by Vallone) to allocate space on a remote storage device for storing a rewind buffer for the purpose of increasing the storage space for buffered programs. Ex. 1011 ¶ 276. A person of ordinary skill in the art would have known how to implement Kamath’s extended file system on Wood’s digital VCR and use modem 148 (shown in Figures 2 and 3 of Wood) to access a remote storage (e.g., remote servers 76<sub>1</sub>–76<sub>m</sub> in Figure 3 of Kamath) and store a rewind buffer on the remote storage. Ex. 1011 ¶¶ 276–280; Ex. 1002 ¶¶ 19, 45, 46, 59, 60, 85.

Patent Owner argues that Petitioner’s proposed combination changes Kamath’s principle of operation. PO Resp. 27–30. Patent Owner asserts that “Kamath discloses using . . . remote storage for the ‘least recently used’ files—*not* files like buffers that are actively being written to.” *Id.* at 27 (bold emphasis omitted) (quoting Ex. 1008, 6:42–57). Patent Owner notes that Kamath teaches that storing content locally is valuable because “even when physically connected to a provider, the Internet is unreliable and can

be susceptible to long delays in transmission.” *Id.* at 28 (quoting Ex. 1008, 5:39–57). Patent Owner asserts that a person of ordinary skill in the art would have understood that storing frequently-used files locally is a key principle of operation for Kamath and that relocating continuously-used files to remote storage would violate this principle of operation. *Id.* at 29–30 (citing, e.g., Ex. 2001 ¶¶ 64, 65)

Patent Owner’s arguments are not persuasive. First, Patent Owner’s declarant, Dr. Balakrishnan, relies on one passage from Kamath regarding the “local-always” attribute as the basis for why one of ordinary skill in the art would have understood that storing frequently-used files locally as a key principle of operation of Kamath. Ex. 2001 ¶ 64 (citing Ex. 1008, 13:23–33). That evidence is not persuasive. Kamath does not characterize storing frequently-used files locally as a key principle of operation. *See* Ex. 1008, 6:41–47, 13:23–38; *see* Ex. 1028 ¶¶ 41–42. To the extent there is a key principle of operation described in Kamath, it is to extend the small-capacity local storage of consumer devices with large-capacity remote storage in a transparent manner. *Id.* at 30:26–36. It is the teaching of using remote storage that is being used to modify the Wood-Vallone VCR. Second, Kamath discloses that “the client device provides local storage for caching some of the data [already] maintained at the remote storage device.” Ex. 1008, 5:45–48. Kamath thus discloses that any local data that is modified on the client device—including frequently-used files—is automatically stored to the remote storage. Ex. 1028 ¶ 42. Kamath also discloses that the “local always” designation is not a permanent attribute and varies based on a number of factors, including file size and storage. Ex. 1008, 13:63–67. According to Kamath, updates to locally stored data may cause a change in

designation such that data is retrieved only from remote storage. *Id.* at 13:23–27, 13:58–61, 14:5–7. Thus, the “local-always” designation would not necessarily be applied to all buffer files. Ex. 1028 ¶ 45. Finally, because, according to Kamath, updates made to locally stored data are automatically stored to the remote server (*id.* at 5:45–48), implementing the Least Recently Used algorithm (*id.* at 6:41–47) would not prevent Kamath’s system from allocating storage space on a remote sever for storing buffer files. Ex. 1028 ¶ 44.

Patent Owner also argues that because Wood already addressed the purported storage problem by proposing different ways to manage storage space efficiently, Petitioner has not made a sufficient showing why a person of ordinary skill in the art would have been motivated to combine Kamath with Wood and Vallone. PO Resp. 39–40 (citing, e.g., Ex. 1002 ¶¶ 10, 97, 102, 30). Patent Owner’s argument is not persuasive. In describing ways of managing the storage of recordings, Wood does not teach away from using remote storage for buffering programs. Ex. 1002 ¶¶ 10 (deleting recorded episodes from storage when a maximum number is reached), 97 (canceling a recording of a show that already has been recorded or viewed), 102 (deleting recordings to make room for new content). Similarly, Wood does not discourage using a remote server for storage even though it also discloses using an additional VCR for added storage capacity. *Id.* ¶ 30. The alternative approaches described in Wood thus would not have discouraged a person of ordinary skill in the art from adding remote storage as taught by Kamath to the Wood-Vallone VCR. *See In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (“[A] finding that the prior art as a whole suggests the desirability of a particular combination need not be supported by a finding

that the prior art suggests that the combination claimed . . . is the preferred, or most desirable, combination.”).

In sum, considering Petitioner’s and Patent Owner’s evidence and arguments, Petitioner has shown by a preponderance of the evidence that the subject matter of claims 7 and 17 of the ’147 would have been obvious over Wood, Vallone, and Kamath.

*G. Asserted Obviousness over Yap and Vallone*

Petitioner contends that claims 1, 3, 5, 6, 8–11, 13, 15, 16, and 18–24 of the ’147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. Pet. 4, 51–67. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references teach or suggest the claim limitations and provides reasoning for combining the teachings of the references. *Id.* at 51–67.

We have reviewed Petitioner’s and Patent Owner’s arguments and evidence of record. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 5, 6, 8–11, 15, 16, and 18–24 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. Petitioner, however, has not shown by a preponderance of the evidence that claims 3 and 13 are unpatentable as obvious over Yap and Vallone.

*1. Summary of Yap*

Yap is a U.S. patent application publication titled “Multi-Tuner DVR.” Ex. 1004, [54]. Yap discloses a multiple receiver/tuner in which multiple content streams can be received, tuned, and provided to a storage device. *Id.* ¶ 18. Yap discloses that “one program can be recorded while

another is being viewed either from a live broadcast or from the previously recorded video library in the storage unit.” *Id.*

Figure 2 of Yap, below, illustrates an embodiment “designed for reception/tuning of plural programs, simultaneous recording of two or more programs, as well as simultaneously recording one program while viewing or playing back another program.” *Id.* ¶ 85.

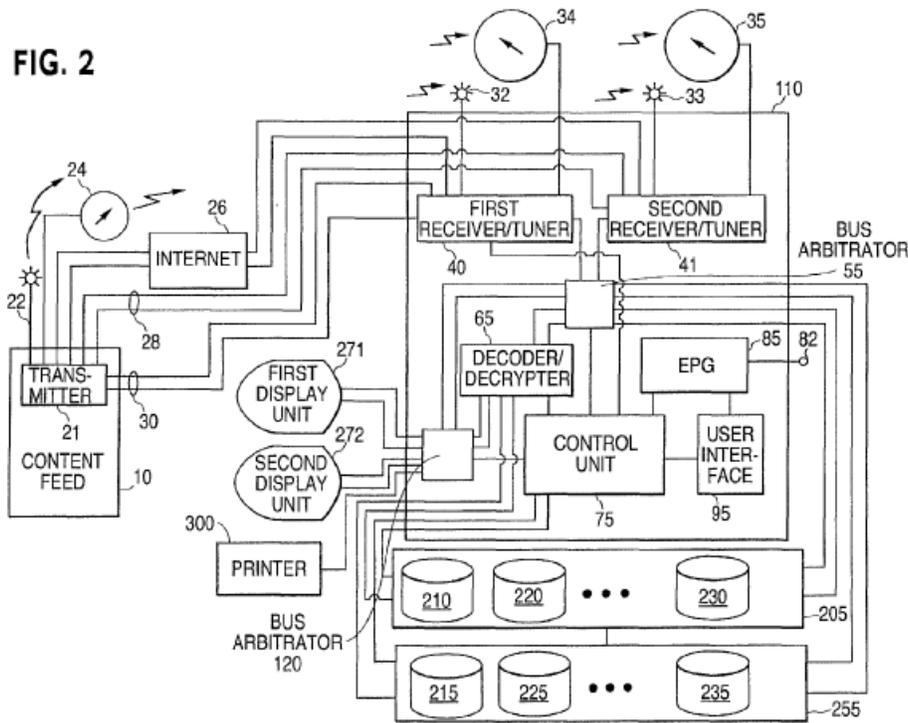


Figure 2 above shows that apparatus 110 includes first receiver/tuner 40 and second receiver/tuner 41. *Id.* ¶ 89. Yap discloses that electronic program guide (EPG) 85 “may handle a plurality of content streams” and that user interface 95 “permits the user to enter commands for both of the content streams.” *Id.* ¶¶ 94, 95. Yap also discloses that “two programs from two separate content streams can be simultaneously recorded by the storage device 205” or “one of the programs can be fed to storage device 205 while the other is fed to storage device 255.” *Id.* ¶ 128.

Yap also discloses a “current delay feature allows the user to see how far the recording is behind a live feed when pausing the live signal.” *Id.*

¶ 141. Yap further discloses an “[o]n-screen time display” feature, which displays the current time into the show while in playback, fast-forward, or rewind. *Id.* ¶ 140.

## 2. Analysis

### a. Reason to combine

Petitioner relies on Yap for teaching most of the claim limitations and on Vallone for teaching the “indicator” limitation of independent claims 1, 11, and 21–24. *Id.* at 56–61, 66–67. Petitioner provides persuasive evidence for why an ordinarily skilled artisan would have combined the teachings of Yap and Vallone in the manner claimed (as recited in claims 1, 3–6, 8–11, 13–16, and 18–24). Pet. 51–55.

Yap discloses a multi-tuner DVR for buffering and displaying television content that allows a user to select desired play positions within the buffered content via a remote control. Ex. 1004, Fig. 2, ¶¶ 20, 21, 144, 148. Yap discloses that the DVR provides “a status indicator function which can be displayed via a user interface.” *Id.* ¶ 140. Yap discloses that the status indicator indicates whether the material the viewer is watching is live or recorded. *Id.* ¶ 141. Yap also discloses a current delay feature, which “allows the user to see how far the recording is behind a live feed when pausing the live signal.” *Id.* As described above in connection with the first ground, Vallone discloses a trick play bar that provides a slider and position indicator to indicate a current program position and that moves along the trick play bar in response to user input, such as pressing a rewind button. Ex. 1003, 18:32–35, 18:55–60, 19:22–27. Vallone discloses that the “trick

play bar can be applied to any [v]ideo or audio application where the physical position in the material is readily ascertainable e.g., DVDs, VCRs.” Ex. 1003, 20:19–22.

A person of ordinary skill in the art would have been motivated to combine Vallone’s trick play bar with Yap’s DVR for the purpose of providing users with an improved, visually intuitive interface that allows a user to easily interact with the DVR, that enables a user to access another play position within the buffered content, and that enables a user to ascertain a current operational mode of the DVR, thereby providing users with enhanced control over buffered content. Ex. 1003, 3:55–60; Ex. 1011 ¶¶ 305, 306, 316–325. Although Yap discloses an on-screen indicator that indicates the current play position and a relation of a buffered program to a live feed (Ex. 1004 ¶¶ 140–141), Yap does not disclose that the indicator is interactive so as to enable the user to access another play position of the buffered program. A person of ordinary skill in the art would have understood that Yap’s DVR and Vallone’s trick play bar would have performed the same functions and maintained their advantageous properties in the combination and would have expected the combination to predictably result in a system that buffers programs in parallel and has an improved indicator enabling a user to access another play position in a buffered program. Ex. 1011 ¶¶ 309, 316–319, 325; Ex. 1003, Fig. 26, 19:22–32.

*b. Independent claim 1*

*i. Limitations of claim 1*

Yap discloses “[a] method of buffering programs,” as recited in claim 1. Yap discloses that hard disk drive (HDD) 320 (illustrated in Figure 6), with 20 Gbytes available for various recording applications and “the

remainder flexibly allocated for pause applications.” Ex. 1004 ¶ 103. Yap also discloses that when the apparatus is turned on, “an auto pause function may be enabled that automatically pauses (records) the currently-tuned channel.” *Id.* ¶ 144.

Yap also discloses “upon receiving a user request to tune to a first channel: receiving a first program from the first channel; and buffering the first program to enable the user to view a previously received portion of the first program,” as required by claim 1. Yap discloses that upon receiving a user request to tune a channel, Yap’s DVR receives content using first tuner 40 (illustrated in Figure 2), and routes content to a display unit. Ex. 1004 ¶¶ 12, 40, 41, 85, 86, 89, 92. Yap also discloses that a user uses an input device such as a remote control to control the DVR to select programs/channels. *Id.* ¶¶ 12, 41, 48 (“The user interface 90 permits the user to interact with the apparatus 100 and electronic program guide 80 and thereby select content for recording and on-demand playback.”), 55, 56, 95. Yap also discloses that when the system is turned on, an “auto pause” function is enabled, which causes the DVR to buffer the first program from the currently-tuned channel to the hard disk. *Id.* ¶¶ 103, 144. The DVR includes features—such as instant replay—that allow a user to access a previously displayed segment of the program. *Id.* ¶¶ 20, 71, 103, 122, 144, 148.

Yap teaches “upon receiving a user request to tune to a second channel: receiving a second program from the second channel; and buffering the second program to enable the user to view a previously received portion of the second program,” as required by claim 1. Yap discloses that the DVR may include multiple tuners to provide simultaneous

storing/viewing of programs. Ex. 1004, Fig. 2, ¶ 127. Yap also discloses that a user may control the DVR using an input device such as a remote control to select desired programs/channels. *Id.* ¶¶ 41, 48, 55, 56, 95. Yap further discloses that, upon receiving a user request to tune a second channel, the DVR receives a second program using tuner 41 and routes content for display to the viewer. *Id.* at Fig. 2, ¶¶ 12, 85, 127. As illustrated in Figure 2, Yap discloses that the DVR may include multiple tuners to simultaneously record and play back multiple programs. *Id.* ¶¶ 19, 85, 127, 128. Yap discloses an auto pause function in which, upon tuning to a channel, the DVR buffers the program to a hard disk. *Id.* ¶¶ 103, 144. A person of ordinary skill in the art would have recognized that the auto pause function would have been applied to content tuned by the second tuner (tuner 41 in Figure 2) such that the DVR automatically buffers the second program upon tuning to the program. Ex. 1011 ¶¶ 291–294. Yap also discloses that the DVR allows a user to access previously buffered content. Ex. 1004 ¶¶ 71, 148, 150.

Yap also teaches the requirement of claim 1 of “wherein the buffering of the first program and the buffering of the second program occur in parallel.” Yap discloses that the DVR provides simultaneous recording and playback of multiple programs and an auto pause function for automatically buffering tuned programs. Ex. 1004 ¶¶ 9 (“Another object of the invention is to provide simultaneous recording, play back, and viewing of multiple signals.”), 21 (“The back to pause function may be utilized to jump between any two or more live or playback signals.”), 127 (“[T]wo simultaneous content streams can be provided to the receiver/tuners 40, 41.”), 128, 144, 162 (“[T]he various exemplary embodiments of the present invention

include several modes, including . . . watching one or more signals, while recording one or more other signals . . .”). A person of ordinary skill in the art would have recognized that the auto pause function can be applied to tuners 40 and 41 and that the DVR buffers, in parallel, the first program and the second program to a hard disk. Ex. 1011 ¶¶ 293–299.

The combination of Yap and Vallone teaches “wherein an indicator that indicates the availability of at least one of the buffered first program and the buffered second program is generated for display to the user.” Yap discloses that the DVR provides an indicator indicating an availability of a buffered program, including how far the program is behind a live feed and the current play position. Ex. 1004 ¶¶ 140, 141. Vallone discloses, as illustrated in Figure 26, trick play bar 2601 and cache bar 2602 overlaid onto live video buffered to a program cache. Ex. 1003, Fig. 26, 18:28–41. Vallone discloses that “[t]he current program is stored in a circular cache” and that “cache bar 2602 inside of the trick play bar 2601 indicates how much of the circular cache is filled.” *Id.* at 18:38–41; *see also id.* at 18:32–35 (“The trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.”). Yap and Vallone thus teach generating for display to the user an indicator that indicates the availability of at least one of the buffered programs.

The combination of Yap and Vallone also teaches “wherein the indicator also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program.” Yap discloses a current delay feature, which indicates a current play position corresponding to how far the

buffered program is behind a live feed. Ex. 1004 ¶¶ 140, 141. Vallone teaches that interactive slider 2605 and position indicator 2608 visually indicate a time and position of the displayed program. Ex. 1003, 18:55–61, 19:8–11. Specifically, Vallone discloses that “[t]he slider 2605 along with the position indicator 2608 are linked together and tell the user visually where his current position is within the program material.” *Id.* at 18:56–59. Vallone also discloses that “[t]he slider 2605 can be moved anywhere within the cache bar 2602” in response to user input. *Id.* at 19:22–32, 19:55–63. According to Vallone, “[t]he user uses the play 1411, rewind 1407, fast forward 1408, pause 1412, slow motion 1413, jump 1414, and instant replay 1415 buttons [on the remote control illustrated in Figure 14] to position the slider 2605.” *Id.* at 19:22–26, 3:1–2, 13:38–40. As explained above, it would have been obvious to one of ordinary skill in the art to combine Vallone’s teachings with Yap’s such that the on-screen interface for the digital VCR taught by Yap provided a visually intuitive display which enabled the user to access another play position within the buffered content, as taught by Vallone. *See supra* Section II.G.2.a.; Ex. 1011 ¶¶ 303–307.

*ii. Patent Owner’s arguments*

Patent Owner argues that a person of ordinary skill in the art would not have combined Yap with Vallone for reasons similar to the reasons it raised in connection with the combination of Wood and Vallone. PO Resp. 33–35. Patent Owner adds that “Yap already provides a different ‘status indicator’ from the ‘numeric counters’ that are criticized by Vallone.” *Id.* at 34. Patent Owner also argues that Petitioner’s arguments about improving Yap rely on improper hindsight by using claim 1 as a roadmap for the combination. *Id.* at 34–35.

Patent Owner's arguments are not persuasive. Vallone expressly states that its trick play bar "can be applied to any video or audio application where the physical position in the material is readily ascertainable." Ex. 1003, 20:19–22. Vallone thus not is limited to addressing improving the visual information provided by numeric counters.

In addition, even though Yap discloses a "current delay feature allows the user to see how far the recording is behind a live feed when pausing the live signal" (Ex. 1004 ¶ 141), Petitioner shows that a person of ordinary skill in the art would have been motivated to incorporate Vallone's teachings to improve the interface by making it visually intuitive and interactive. Ex. 1011 ¶¶ 306, 307, 313–315, 318, 319. Dr. Rhyne's testimony is credible and persuasively supported by the teachings of the underlying references. *See* Ex. 1011 ¶¶ 306, 307, 313–315, 318, 319; Ex. 1004 ¶¶ 140, 141; Ex. 1003, Fig. 26, 18:32–41, 19:1–3, 20:19–22. For example, as stated above, Vallone expressly discloses applying its interactive trick play bar more broadly to any device in which physical position in the material is readily ascertainable, such as a VCR. Ex. 1003, 20:19–22. In addition, Vallone describes the known problem of multimedia devices lacking interactivity and intuitive devices. Ex. 1003, 1:11–49. One of ordinary skill in the art would have been aware of this problem and motivated to improve Yap's DVR accordingly. Ex. 1011 ¶¶ 306, 307, 313–315, 318, 319, 325. In addition, as Dr. Rhyne explains, an ordinarily skilled artisan would have been motivated to combine the teachings of the references to provide an improve on-screen interfaced that communicates the operation and progression of a program buffered by the DVR and enables a user to easily/intuitively interact with the

DVR using a remote control to access other desired play positions within the buffered program. *Id.* ¶ 325.

*iii. Conclusion regarding claim 1*

Having considered the evidence of record and the arguments of the parties, Petitioner has shown by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over Yap and Vallone.

*c. Independent claim 11*

Independent claim 11 is very similar to claim 1 but is directed to a system, rather than a method, for buffering programs. Petitioner asserts that the combination of Yap and Vallone teaches the storage device and interactive application recited in claim 11. Pet. 60–61. Petitioner relies on its analysis of claim 1 for showing how the combination of Yap and Vallone teaches the elements of claim 11 that are nearly identical to the corresponding elements in claim 1. *Id.*

Patent Owner raises the same arguments for claim 11 that it raises for claim 1. *See* PO Resp. 33–35.

Having reviewed the record, as explained below, because the combination of Yap and Vallone teaches the features recited in claim 11, Petitioner has shown by a preponderance of the evidence that claim 11 is unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone.

Yap discloses “[a] system for buffering programs, the system comprising: a storage device; and an interactive application implemented at least partially on user equipment,” as recited in claim 11. Yap discloses a system for buffering programs. Ex. 1004 at Fig. 2, ¶¶ 20, 55, 85, 103, 116, 117, 122. As illustrated in Figure 2, Yap discloses that the DVR system includes storage devices, such as storage device 205 and storage device 255.

*Id.* at Fig. 2, ¶¶ 30, 53, 85, 90. Yap further discloses that the DVR system executes interactive software to control the functions of the system. Ex. 1004, Figs. 1, 2, ¶¶ 55, 56, 140, 166, 167.

Yap also discloses that the interactive application is configured to, “upon receiving a user request, from a user input device, to tune to a first channel: receive a first program from the first channel; and buffer the first program to enable the user to view on a display device a previously received portion of the first program,” as required by claim 11. Yap discloses that upon receiving a user request to tune a channel, Yap’s DVR receives content using first tuner 40 (illustrated in Figure 2), and routes content to a display unit. Ex. 1004 ¶¶ 12, 40, 41, 85, 86, 89, 92. Yap also discloses that a user uses an input device such as a remote control to control the DVR to select programs/channels. *Id.* ¶¶ 12, 41, 48 (“The user interface 90 permits the user to interact with the apparatus 100 and electronic program guide 80 and thereby select content for recording and on-demand playback.”), 55, 56, 95. Yap also discloses that when the system is turned on, an “auto pause” function is enabled, which causes the DVR to buffer the first program from the currently-tuned channel to the hard disk. *Id.* ¶¶ 103, 144. The DVR includes features—such as instant replay—that allow a user to access a previously displayed segment of the program. *Id.* ¶¶ 20, 71, 103, 122, 144, 148.

Yap also teaches that the interactive application is configured to, “receive from the user input device a user request to tune to a second channel; and upon receiving the user request to tune to a second channel: receive a second program from the second channel; and buffer on the storage device the second program to enable the user to view a previously received

portion of the second program,” as required by claim 11. Yap discloses that the DVR may include multiple tuners to provide simultaneous storing/viewing of programs. Ex. 1004, Fig. 2, ¶ 127. Yap also discloses that a user may control the DVR using an input device such as a remote control to select desired programs/channels. *Id.* ¶¶ 41, 48, 55, 56, 95. Yap further discloses that, upon receiving a user request to tune a second channel, the DVR receives a second program using tuner 41 and routes content for display to the viewer. *Id.* at Fig. 2, ¶¶ 12, 85, 127. As illustrated in Figure 2, Yap discloses that the DVR may include multiple tuners to simultaneously record and play back multiple programs. *Id.* ¶¶ 19, 85, 127, 128. As described above, Yap discloses an auto pause function in which, upon tuning to a channel, the DVR buffers the program to a hard disk. *Id.* ¶¶ 103, 144. A person of ordinary skill in the art would have recognized that the auto pause function would have been applied to content tuned by the second tuner (tuner 41 in Figure 2) such that the DVR automatically buffers the second program upon tuning to the program. Ex. 1011 ¶¶ 291–294. Yap also discloses that the DVR allows a user to access previously buffered content. Ex. 1004 ¶¶ 71, 148, 150.

Yap also discloses the requirement of claim 11 of “wherein the first program and the second program are buffered in parallel.” As explained above, Yap discloses that the DVR provides simultaneous recording and playback of multiple programs and an auto pause function for automatically buffering tuned programs. Ex. 1004 ¶¶ 9, 21, 127, 128, 144, 162. A person of ordinary skill in the art would have recognized that the auto pause function can be applied to tuners 40 and 41 and that the DVR buffers, in

parallel, the first program and the second program to a hard disk. Ex. 1011 ¶¶ 293–299.

The combination of Yap and Vallone teaches “wherein an indicator that indicates the availability of at least one of the buffered first program and the buffered second program is generated for display on the display device to the user.” Yap discloses that the DVR provides an indicator indicating an availability of a buffered program, including how far the program is behind a live feed and the current play position. Ex. 1004 ¶¶ 140, 141. Vallone discloses, as illustrated in Figure 26, trick play bar 2601 and cache bar 2602 overlaid onto live video buffered to a program cache. Ex. 1003, Fig. 26, 18:28–41. Vallone discloses that “[t]he current program is stored in a circular cache” and that “cache bar 2602 inside of the trick play bar 2601 indicates how much of the circular cache is filled.” *Id.* at 18:38–41; *see also id.* at 18:32–35 (“The trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.”). Yap and Vallone thus teach generating for display on the display device to the user an indicator that indicates the availability of at least one of the buffered programs.

The combination of Yap and Vallone also teaches “wherein the indicator also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program.” Yap discloses a current delay feature, which indicates a current play position corresponding to how far the buffered program is behind a live feed. Ex. 1004 ¶¶ 140, 141. Vallone teaches that interactive slider 2605 and position indicator 2608 visually indicate a time and position of the displayed program. Ex. 1003, 18:55–61,

19:8–11. Specifically, Vallone discloses that “[t]he slider 2605 along with the position indicator 2608 are linked together and tell the user visually where his current position is within the program material.” *Id.* at 18:56–59. Vallone also discloses that “[t]he slider 2605 can be moved anywhere within the cache bar 2602” in response to user input. *Id.* at 19:22–32, 19:55–63. According to Vallone, “[t]he user uses the play 1411, rewind 1407, fast forward 1408, pause 1412, slow motion 1413, jump 1414, and instant replay 1415 buttons [on the remote control illustrated in Figure 14] to position the slider 2605.” *Id.* at 19:22–26, 3:1–2, 13:38–40. As explained above, it would have been obvious to one of ordinary skill in the art to combine Vallone’s teachings with Yap’s such that the interface for the DVR taught by Yap enabled the user to access another play position within the buffered content, as taught by Vallone. *See supra* Section II.G.2.a.; Ex. 1011 ¶¶ 308–325.

For the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner’s arguments are not persuasive. *See supra* Section II.G.2.b.ii.

*d. Dependent claims 3 and 13*

Claim 3 recites

[t]he method of claim 1, wherein the first program is buffered to a first buffer, further comprising:

tuning to a third channel;

determining that a third program on the third channel is the first program; and

buffering the third program to the first buffer.

Claim 14 depends from claim 11 and recites a similar limitation.

Petitioner contends that “Yap recognizes the benefits of providing adequate space on user equipment for storing programs.” Pet. 61 (citing Ex. 1004 ¶ 9). Petitioner further contends “[i]t would have been obvious to use Yap’s intelligent agent and [electronic program guide]/tag information” to determine that a third program on a third channel is the first program. *Id.* (citing Ex. 1011 ¶ 334). Petitioner also asserts that a person of ordinary skill in the art would have recognized that “apportioning a new buffer to store a program already being buffered to the [hard disk drive] would be inefficient.” *Id.* (citing Ex. 1011 ¶¶ 334, 336). According to Petitioner, rather than apportioning a new buffer for the program, a person of ordinary skill in the art would have been motivated to “modify the DVR” to store the program “to an existing program buffer in order to preserve space on the hard disk.” *Id.* at 61–62 (citing Ex. 1011 ¶¶ 334, 335). Petitioner further asserts that “[c]ommon sense also indicates that users would want to avoid creating duplicate program buffer[s] for the same program since this would limit available space on user equipment for storing other programs.” *Id.* at 62.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claims 3 and 13 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. Petitioner has not shown that the combination of Yap and Vallone teaches “buffering the third program to the first buffer.”

As discussed above, Yap discloses that hard disk drive (HDD) 320 (illustrated in Figure 6), with 20 Gbytes available for various recording applications and “the remainder flexibly allocated for pause applications.” Ex. 1004 ¶ 103. Yap also discloses that when the apparatus is turned on, “an auto pause function may be enabled that automatically pauses (records) the currently-tuned channel.” *Id.* ¶ 144. A person of ordinary skill in the art would have recognized that the auto pause function would have been applied to content tuned by the second tuner (tuner 41 in Figure 2) such that the DVR automatically buffers a second program upon tuning to the program. Ex. 1011 ¶¶ 291–294. In contrast to Wood, Yap does not describe the scenario in which a user tunes to a third channel when the auto pause function is in use. Yap thus does not describe the location in the hard disk to which the content of the program on the third channel is buffered. Indeed, Petitioner does not cite any disclosure in Yap describing buffer management techniques. Petitioner merely states that “Yap recognizes the benefits of providing adequate space on user equipment for storing programs.” Pet. 61 (citing Ex. 1004 ¶ 9). In the cited passage, Yap lists objects of the present invention, including “enable video-on-demand equipment with a capacity large enough to accommodate potentially desired content” and “to provide an expandable storage device that can be easily added to by a consumer thereby increasing the capacity for the personal video library.” Ex. 1004 ¶ 9. Neither statement teaches or suggests managing the buffering of program content in order to save space for buffering when the auto pause function is used. Petitioner also relies on the declaration testimony of Dr. Rhyne. Pet. 61–62 (citing Ex. 1011 ¶¶ 333–336). Dr. Rhyne’s opinions are conclusory and not sufficiently supported by Yap or other prior art evidence. Dr. Rhyne

asserts that “Yap acknowledged the benefits of collecting program information to distinguish between television programs broadcast on the same/different channel, while also providing mechanisms to prevent the inefficient/unnecessary use of storage space on user equipment to store duplicate program content.” Ex. 1011 ¶ 333. None of the Yap passages cited by Dr. Rhyne—paragraphs 7, 20, 21, 47, 132, and 140—address management of multiple buffers used with the auto pause feature or duplicate program content across such buffers. Neither Petitioner nor Dr. Rhyne points to any discussion in Yap of inefficient/unnecessary use of multiple buffers used with auto pause or a problem with overlapping content across the buffers. Dr. Rhyne’s reliance on Yap’s disclosures of identifying matches between programs and preventing duplicate recordings likewise is not persuasive because none of these disclosures are directed to overlapping program content with the auto pause feature. *See* Ex. 1011 ¶ 334 (citing Ex. 1004 ¶¶ 13, 132–134). Dr. Rhyne’s additional, bare assertion regarding common sense is unsupported by any evidence in the record. Ex. 1011 ¶ 336.

In sum, Petitioner does not persuasively show that it would have been obvious to modify the teachings of Yap and Vallone and “buffer[] the third program to the first buffer.”

*e. Dependent claims 5 and 15*

Claim 5 depends from claim 1 and adds “further comprising displaying the first program upon receiving the user request to tune to the first program, wherein buffering the first program comprises storing a portion of the first program that was previously displayed.” Claim 15 depends from claim 11 and recites a similar limitation. Patent Owner does

not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner's and Patent Owner's evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 5 and 15 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. *See* Pet. 56–63; Ex. 1011 ¶¶ 338–341. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b. and II.G.2.c. In addition, Yap discloses that a user can tune a tuner (e.g., tuner 40) to a live television channel using a remote control. Ex. 1004 ¶¶ 39–41, 48, 89, 90, 95. Yap also discloses that the DVR system outputs the contents of a tuned channel to a display unit for display to the user. *Id.* ¶¶ 12, 42–44, 56, 86, 92. Yap also discloses that when the system is turned on, an auto pause function may be enabled such that when the user tunes to a live television channel, the currently-tuned show is automatically buffered to the hard disk. *Id.* ¶¶ 103, 144. Yap further discloses that a user may view previously displayed portions of the buffered content, for example, by initiating an instant replay feature. *Id.* ¶¶ 21, 103, 140, 141, 144, 148 (“A personal instant replay is another feature of the present invention which permits a variable back tracking instant replay (up to the length of the pause.”).

Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a.

*f. Dependent claims 6 and 16*

Claim 6 depends from claim 1 and adds “further comprising allocating storage space on a personal video recorder for buffering the first program, wherein the personal video recorder is included on user equipment.” Claim 16 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 6 and 16 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. *See* Pet. 56–61, 63; Ex. 1011 ¶¶ 342–345. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b. and II.G.2.c. In addition, Yap discloses a personalized DVR apparatus 110 (shown in Figure 2) that may embodied as a set-top box. Ex. 1004, Fig. 2, ¶¶ 30, 39, 86, 166. Yap discloses that the DVR flexibly allocates space on a hard disk for buffering live television content. Ex. 1004 ¶¶ 85–88, 103, 144. A person of ordinary skill in the art would have understood that apparatus 110 comprises user equipment that includes a personal video recorder for storing to, and accessing from, a hard disk television program content. *Id.* at Fig. 2, ¶¶ 85, 86, 89, 90, 103, 144; Ex. 1011 ¶ 344. In addition, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.3.a.

*g. Dependent claims 8 and 18*

Claim 8 recites

[t]he method of claim 1 wherein the second program is buffered to a first buffer, further comprising:

receiving a user input to save the second program as a recording;  
and

in response to receiving the user input, storing a segment of the second program from the first buffer as part of the recording for the second program.

Claim 18 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner's and Patent Owner's evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 8 and 18 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. *See* Pet. 56–61, 63–64; Ex. 1011 ¶¶ 346–350. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b. and II.G.2.c. In addition, as discussed above, Yap discloses that when the system is turned on, an auto pause function may be enabled such that the DVR automatically buffers the currently tuned channel to a hard disk. Ex. 1004 ¶¶ 103, 144. Yap also discloses that the DVR receives user commands/input to record a program in response to a user pressing a button on a remote control. *Id.* ¶¶ 56, 144. Yap further discloses that the DVR provides a clear/convert function and a “record after watching” function that allow a user to record the entirety of a program after viewing it for some time, including permanently storing a portion of the program that was buffered prior to initiating the record command. *Id.* at Abstract, ¶¶ 20, 144–147, 162.

Vallone likewise discloses buffering live television content to a program cache. Ex. 1003, 18:38–39. Vallone also discloses that the user may select the record button on remote control 1401 to instruct the system to record. *Id.* at Fig. 14, 13:38–46, 17:19–24, 17:41–45. For example, Vallone discloses that “[i]f the user is watching a show and tells the system to record the program in progress, then the system will record the program from that point on and will add onto the saved recording (prepending) the portion of the program that has already passed and has been buffered.” *Id.* at 17:19–24.

The combination of Yap and Vallone thus teaches the limitations of claims 8 and 18. Ex. 1011 ¶¶ 346–350. Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a.

*h. Dependent claims 9 and 19*

Claim 9 depends from claim 1 and adds “wherein the indicator indicates how much of the at least one of the buffered first program and the buffered second program has been buffered, and wherein the indicator is displayed on top of or adjacent to the at least one of the buffered first program and the buffered second program.” Claim 19 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 9 and 19 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. *See* Pet. 56–61, 64–

65; Ex. 1011 ¶¶ 351–355. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b. and II.G.2.c. In addition, Yap discloses a “current delay feature allows the user to see how far the recording is behind a live feed when pausing the live signal.” Ex. 1004 ¶ 141. Yap further discloses an “[o]n-screen time display” feature, which displays the current time into the program. *Id.* ¶ 140. Yap discloses that the current delay feature and on-screen time display feature may be displayed on the user’s display device while the viewer is watching a program. *Id.* ¶¶ 140, 141. Vallone discloses that “[t]he trick play bar 2601[] visually informs the user of the size of the circular program cache . . . and, if the cache is not at capacity, how much of the cache is filled.” Ex. 1003, 18:32–35. Vallone also discloses that “trick play bar 2601 is overlaid onto the live video.” *Id.* at Fig. 26, 18:28–30, 1:58–60. The combination of Yap and Vallone thus teaches the limitations of claims 9 and 19. Ex. 1011 ¶¶ 351–355.

Moreover, for the reasons explained above, and also to provide the useful, intuitive feature of the progression of the television content stored in the buffer, one of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a; Ex. 1011 ¶¶ 315, 319, 324, 355.

*i. Dependent claims 10 and 20*

Claim 10 recites

[t]he method of claim 1 further comprising:

creating a first buffer that is associated with the first program, wherein the first program is buffered to the first buffer; and

creating a second buffer that is associated with the second program upon receiving the user request to tune to the second

channel, wherein the second program is buffered to the second buffer.

Claim 20 depends from claim 11 and recites a similar limitation. Patent Owner does not raise any arguments specific to these dependent claims. *See generally* PO Resp.

Having reviewed the Petitioner's and Patent Owner's evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 10 and 20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. *See* Pet. 56–61, 65–66; Ex. 1011 ¶¶ 356–360. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b. and II.G.2.c. In addition, as explained above, Yap discloses that the DVR receives program content tuned by a first tuner (e.g., tuner 40) and the received content is routed to a display device. Ex. 1004, Fig. 2, ¶¶ 12, 40, 41. Yap also discloses that when the system is turned on, an auto pause function may be enabled such that the DVR automatically buffers the contently tuned channel to a hard disk. *Id.* ¶ 144. Yap further discloses that the DVR flexibly allocates space on the hard disk to store the buffered content. *Id.* ¶ 103. Also as explained above, Yap discloses that the DVR includes multiple tuners and that a second tuner (e.g., tuner 41) can tune a second program in response to a user request. *Id.* at Fig. 2, ¶¶ 85–89, 95–97. A person of ordinary skill in the art would have understood that the auto pause function is available on each of tuners 40 and 41 and that Yap's DVR buffers a first program tuned via tuner 40 and a second program tuned via tuner 41. Ex. 1011 ¶¶ 293, 294, 356; Ex. 1004, Abstract, ¶¶ 9 (“Another object of the invention is to provide simultaneous recording, play back, and

viewing of multiple signals.”), 21 (“The back to pause function may be utilized to jump between any two or more live or playback signals.”), 127 (“[T]wo simultaneous content streams can be provided to the receiver/tuners 40, 41.”), 128, 144, 162 (“[T]he various exemplary embodiments of the present invention include several modes, including . . . watching one or more signals, while recording one or more other signals . . .”).

Moreover, for the reasons explained above, one of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.3.a.

*j. Independent claims 21 and 22*

Independent claims 21 and 22 are identical to claim 1 except that each recites a different feature for the claimed indicator. Rather than require (as does claim 1) that the indicator “also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program,” claim 21 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a live feed* of the at least one of the first program and the second program.” Similarly, claim 22 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a point* of the at least one of the first program and the second program.”

Petitioner asserts that the combination of Yap and Vallone teaches the indicator features specific to claims 21 and 22. Pet. 66. Petitioner relies on its analysis of claim 1 for showing how the combination of Yap and Vallone teaches the remaining limitations of claims 21 and 22. *Id.*

Patent Owner raises the same arguments for claims 21 and 22 that it raises for claim 1. *See* PO Resp. 33–35.

Having reviewed the parties’ arguments and the evidence of record, Petitioner has shown by a preponderance of the evidence that claims 21 and 22 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. With respect to the limitations that are identical to the limitations of 1, Petitioner has shown that the combination of Yap and Vallone teaches those features. *See supra* Section II.G.2.b. In addition, Yap discloses that the DVR system provides a status indicator that displays an indication of an availability of a buffered program, including how far a buffered program is “behind a live feed.” Ex. 1004 ¶¶ 140, 141. Vallone discloses an interactive trick play bar with cache bar 2602, which indicates how much of the cache has been filled. Ex. 1003, Fig. 26, 18:39–41. Vallone discloses that “[t]ime marks 2603, 2604 are displayed inside the trick play bar 2601[,] giving the user a visual reference point from which to judge the current time and how far back in time the cache has recorded.” *Id.* at 18:41–44. Vallone also discloses that cache bar 2602 expands “to the right as more of the program is stored in the circular cache.” *Id.* at 19:1–3. Thus, the far-right end of the cache bar corresponds to the current time/position of the live television show. Ex. 1011 ¶¶ 147, 233. Vallone further discloses that slider 2605 and position indicator 2608 will shift “in unison with the cache bar 2602, reflecting the current position in the cache.” Ex. 1003, 19:8–11. Vallone thus discloses that features of the trick play bar reflect the current position within the cache and behind the live feed (the point of current time). *Id.* at Fig. 26, 18:39–54, 19:1–11; Ex. 1011 ¶¶ 364–366. Vallone also discloses that “slider 2605 can be moved anywhere within the cache bar 2602 by the

user” and that the user uses remote control buttons such as play, rewind, and fast forward to position the slider. Ex. 1003, 19:22–25. The combination of Yap and Vallone thus teaches the indicator features recited in claims 21 and 22. Ex. 1011 ¶¶ 361–371.

Moreover, for the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner’s arguments are not persuasive. *See supra* Section II.G.2.b.ii.

*k. Independent claims 23 and 24*

Independent claims 23 and 24 are identical to claim 11 except that each recites a different feature for the claimed indicator. Rather than require (as does claim 11) that the indicator “also indicates a current play position and is interactive to enable the user to access another play position associated with the at least one of the first program and the second program,” claim 23 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a live feed* of the at least one of the first program and the second program.” Similarly, claim 24 requires that the indicator “is interactive and also indicates a current position within the at least one of the buffered first program and the buffered second program *behind a point* of the at least one of the first program and the second program.” The indicator limitations of claims 23 and 24 are identical to the indicator limitations of claims 21 and 22 discussed above.

Petitioner asserts that the combination of Yap and Vallone teaches the indicator features specific to claims 23 and 24. Pet. 67. Petitioner relies on its analysis of claim 11 for showing how the combination of Yap and Vallone teaches the remaining limitations of claims 23 and 24. *Id.*

Patent Owner raises the same arguments for claims 23 and 24 that it raises for claim 11. *See* PO Resp. 33–35.

Having reviewed the parties' arguments and the evidence of record, Petitioner has shown by a preponderance of the evidence that claims 23 and 24 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap and Vallone. With respect to the limitations that are identical to the limitations of 11, Petitioner has shown that the combination of Yap and Vallone teaches those features. *See supra* Section II.G.2.c. In addition, for the reasons discussed above in connection with claims 21 and 22, the combination of Yap and Vallone also teaches the indicator features recited in claims 23 and 24. *See supra* Section II.G.2.j.

Moreover, for the reasons explained above, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Yap and Vallone in the manner claimed. *See supra* Section II.G.2.a. In addition, for the reasons explained above in connection with claim 1, Patent Owner's arguments are not persuasive. *See supra* Section II.G.2.b.ii.

#### *H. Asserted Obviousness over Yap, Vallone, and Pierre*

Petitioner contends that claims 2, 4, 12, and 14 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap, Vallone, and Pierre. Pet. 4, 67–73. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references allegedly teach or suggest the claim

limitations and provides purported reasoning for combining the teachings of the references. *Id.* at 67–73.

We have reviewed Petitioner’s and Patent Owner’s arguments and evidence of record. For the reasons that follow, we determine that Petitioner has not shown by a preponderance of the evidence that claims 2, 4, 12, and 14 of the ’147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap, Vallone, and Pierre.

*1. Claims 2 and 12*

Claim 2 recites

[t]he method of claim 1, wherein the first program is buffered to a first buffer, further comprising:

tuning to a third channel;

creating a second buffer for a third program on the third channel;

determining that a third program is the first program; and

combining the second buffer with the first buffer.

Claim 12 depends from claim 11 and recites a similar limitations.

Claim 12, which requires that the interactive application be configured to perform those functions.

Petitioner asserts that a person of ordinary skill in the art “would have using Pierre’s techniques to improve Yap’s DVR to combine program data stored in separate locations of the HDD (e.g., first and second apportioned portions of the HDD) to a single location for storing buffered content. Pet. 68–69 (citing Ex. 1004 ¶ 103; Ex. 1011 ¶¶ 391, 392). Petitioner asserts that “[k]nowing that Yap’s DVR can utilize [electronic program guide]/tag information to differentiate between programs on different channels . . . , [a person of ordinary skill in the art] would have been motivated to modify

Yap's DVR to combine content stored in separate locations of the hard disk (as taught by Pierre) when the DVR determines that such content is for the same program." Pet. 70 (citing Ex. 1011 ¶¶ 383, 384). Petitioner asserts that an ordinarily skilled artisan would have made the modification to Yap's VCR "to preserve space apportioned to the HDD for buffering programs." *Id.* (citing Ex. 1004 ¶¶ 9, 103; Ex. 1011 ¶¶ 381–384).

Petitioner has not shown that the combination of Yap, Vallone, and Pierre teaches "combining the second buffer with the first buffer," as required by claims 2 and 12. Petitioner's assertions are too conclusory and not sufficiently rooted in the references, other supporting evidence, or persuasive argument. Yap does not teach or suggest combining the contents of two portions of the HDD apportioned for buffered content. *See* Ex. 1004 ¶¶ 9, 85, 103, 144. Yap discloses that "HDD 320 may have a capacity of at least about 25 Gbytes, where preferably about at least 20 Gbytes is available for various recording applications, and the remainder flexibly allocated for pause applications in architecture." *Id.* ¶ 103. Yap does not address any concern regarding overlapping program material being allocated in two portions of the hard disk during the pause applications (and thus the need to preserve space for buffered programs). *See id.* at ¶¶ 85, 103, 144. Nor does Pierre teach or suggest combining the contents of two buffers, as discussed above in connection with the second ground. Pierre's Figure 4, shown below, illustrates storage areas of storage device 18 (illustrated in Pierre's Figures 1 and 2). Ex. 1007, 6:37–38.

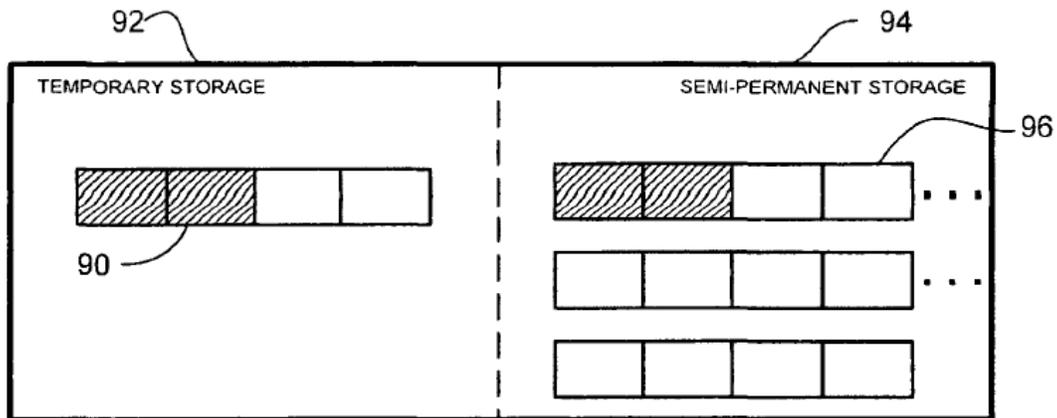


FIG. 4

Figure 4 above illustrates that storage device 18 “may be divided into a temporary storage area (first storage area) 92[,] which contains the circular buffer 90 . . . , and a semi-permanent storage area (second storage area) 94[,] which is utilized to complete program recordings or a portion of a program during the recording.” *Id.* at 6:37–43. Pierre discloses that control processor 30 (illustrated in Figure 2) “automatically records the broadcast at a start of the program to store a first portion of the program in the circular buffer 90 within the temporary storage area 92” and that “[t]he program will continue to be recorded and stored within the buffer 90 for a predetermined period of time (e.g., 15 minutes.” *Id.* at 6:53–55. Pierre explains that the buffer is called a circular buffer because “[w]hen the end of the buffer is reached, the CPU in the control processor is interrupted, at which time it will reconfigure the DMA controller to start writing at the beginning of the buffer.” *Id.* at 6:18–21. Pierre discloses that “[i]f a viewer decides to record the program after the start of the program, . . . the processor 30 will allocate space within the semi-permanent storage area 94 of the storage device 18. *Id.* at 6:55–58. Pierre adds that “[a]fter the recording is complete[,] the first portion of the

program, which was previously stored in the circular buffer 90, will be copied into the semi-permanent storage area, preferably in front of the allocated space within the semi-permanent storage 94.” *Id.* at 6:61–65. Pierre thus discloses combining the contents of the circular buffer with the contents of semi-permanent storage. Pierre does not describe combining the contents of two circular buffers or any concern regarding overlapping program material being spooled into two circular buffers (and thus the need to conserve storage space for buffered programs). Nor does Petitioner rely on any teaching or suggestion in Pierre of combining the contents of two circular buffers. Rather, Petitioner relies on unsupported testimony of Dr. Rhyne that a person of ordinary skill in the art would have been motivated to modify Yap’s DVR and apply “Pierre’s known storage techniques” (Pet. 68–46) to arrive at the inventions recited in claims 2 and 12. *See* Pet. 45–47 (citing, e.g., Ex. 1011 ¶¶ 381–384).

For the above reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the subject matter of claims 2 and 12 would have been obvious over Yap, Vallone, and Pierre.

## 2. *Claims 4 and 14*

Claim 4 depends from claim 1 and adds “wherein the first program is buffered to a first buffer, further comprising allocating a buffer size to the first buffer, the buffer size being determined based on an amount of time remaining in the first program.” Claim 14 depends from claim 11 and recites a similar limitation.

As explained above, Yap discloses flexibly allocating space on a hard disk to buffer program content. Ex. 1004 ¶¶ 103, 142. Specifically, Yap discloses that “HDD 320 may have a capacity of at least about 25 Gbytes,

where preferably about at least 20 Gbytes is available for various recording applications, and the remainder flexibly allocated for pause applications in architecture.” *Id.* ¶ 103. Yap also discloses that “when the apparatus 100 is turned on, an auto pause function may be enabled that automatically pauses (records) the currently-tuned channel.” *Id.* ¶ 142. Yap does not disclose allocating a buffer size based on an amount of time remaining in the first program. Petitioner asserts that “it would have been obvious to modify Yap-Vallone to arrive at claim 4 in view of the storage/buffering techniques of Pierre.” Pet. 70–71.

Petitioner has not shown that the combination of Yap, Vallone, and Pierre teaches “the buffer size being determined based on an amount of time remaining in the first program,” as required by claims 4 and 14. Petitioner’s assertions are too conclusory and not sufficiently rooted in the references themselves. Yap’s disclosure regarding allocating the portion of the hard disk for the auto pause function is minimal and has no details regarding how the amount of portion allotted is determined. *See* Ex. 1004 ¶¶ 103, 142. Petitioner asserts that Pierre discloses determining whether the hard disk has sufficient space to store the entirety of a television program. Pet. 71 (citing Ex. 1007, 8:1–12, 8:39–44). The cited passages of Pierre address the amount of space in the semi-permanent storage for the recorded program, not the amount of space in the temporary storage for the buffered program. Ex. 1007, 8:1–12 (“If available, a space that is large enough to hold the entire program is allocated on the storage device 18 in the second storage area 94 . . . .”), 8:39–44. Petitioner also asserts—relying on the testimony of Dr. Rhyne—that Pierre discloses calculating a buffer size based upon the time to be recorded in a program. *Id.* (citing Ex. 1011 ¶ 403). In the cited

testimony, Dr. Rhyne cites Pierre’s disclosure of allocating a size of the buffer. *See* Ex. 1011 ¶ 403 (citing, e.g., Ex. 1007, 6:9-16). Pierre discloses that “[t]he number of minutes of viewing data to be recorded in the buffer is preferably selected by the viewer, however, the set top box 16 may be preset with a default value such as fifteen minutes.” Ex. 1007, 6:9–13. Pierre adds that “[t]he control processor’s CPU calculates the size of the buffer to allocated based upon the number of minutes and the maximum speed at which bits in the transport stream that the viewer is watching will be sent.” *Id.* at 6:13–16. The remaining passages cited by Dr. Rhyne do not describe determining the size of the buffer. *See id.* at 2:32–34, 5:65–6:9, 6:53–55, 8:1–12, 8:39–44. Dr. Rhyne does not persuasively show why, based on the teachings of Pierre, an ordinarily skilled artisan would have modified Yap (combined with Vallone) to determine a buffer size “based on an amount of time remaining in the first program.” Pierre discloses that a user can select the number of minutes to be recorded in the buffer, but does not disclose that that number is based on an amount of time remaining in the program. Ex. 1007, 6:9–16. Dr. Rhyne’s assertions based on Pierre’s management of a program to be recorded and stored in semi-permanent storage (*see* Ex. 1011 ¶¶ 403–409) are not sufficiently tied to the claimed subject matter—amount of storage for buffered content.

For the above reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the subject matter of claims 4 and 14 would have been obvious over Yap, Vallone, and Pierre.

*I. Asserted Obviousness over Yap, Vallone, and Kamath*

Petitioner contends that claims 7 and 17 of the ’147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap, Vallone, and

Pierre. Pet. 4, 73–76. Relying in part on the testimony of Dr. Rhyne, Petitioner explains how the references teach or suggest the claim limitations and provides reasoning for combining the teachings of the references. *Id.* at 73–76.

Claim 7 recites “[t]he method of claim 1, further comprising allocating storage space on a remote server for buffering the first program.” Claim 17 depends from claim 11 and similarly recites “wherein the interactive application is further configured to allocate storage space on a remote server for buffering the first program.”

Having reviewed the Petitioner’s and Patent Owner’s evidence and arguments, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 7 and 17 are unpatentable under 35 U.S.C. § 103(a) as obvious over Yap, Vallone, and Kamath. *See* Pet. 73–76. As explained above, the subject matter of claims 1 and 11 would have been obvious over Yap and Vallone. *See supra* Sections II.G.2.b and II.G.2.c. In addition, Yap discloses that the DVR system allocates space on a storage device to buffer program content. Ex. 1004 ¶ 103 (“HDD 320 may have a capacity of at least about 25 Gbytes, where preferably about at least 20 Gbytes is available for various recording applications, and the remainder flexibly allocated for pause applications in architecture.”). Yap also discloses that the storage devices used by the DVR may be integrated within the DVR or accessible via a network. *Id.* ¶ 53. Specifically, Yap discloses that “[t]he storage device further may be reconfigurable, including, as examples, expandable, addable, removable, and/or replaceable.” *Id.* Yap explains that “[t]he memory devices 210, 220, 230 may be integrated with the storage device 200 and/or the apparatus or accessible via a network

(either local or wide-area) utilizing a transfer protocol . . . or a combination of integrated and removable memory.” *Id.* Kamath discloses allocating storage space on a remote storage 74 and that the “remote files may be quickly accessed by the client.” Ex. 1008, Figs. 2, 3, 5:1–9, 5:13–17, 5:39–45.

Moreover, Petitioner provides persuasive evidence for why a skilled artisan would have combined the teachings of Yap, Vallone, and Kamath in the manner claimed. Pet. 73–76; Ex. 1011 ¶¶ 412–420. As explained above, a person of ordinary skill in the art would have been motivated to combine the teachings of Yap and Vallone. *See supra* Section II.G.2.a. In addition, Kamath discloses that consumer devices, such as television set-top boxes, have “lack-of-memory problems” and that it would be advantageous to provide a system that allows such devices to load and store files remotely. Ex. 1008, 1:14–22, 2:3–10. Aware of the known problem of storage capacity issues, a person of ordinary skill in the art would have been motivated to modify Yap’s DVR (as modified by Vallone) to allocate space on a remote storage device for storing a rewind buffer for the purpose of increasing the storage space for buffered programs. Ex. 1011 ¶ 414. A person of ordinary skill in the art would have known how to implement Kamath’s extended file system on Yap’s DVR to access a remote storage (e.g., remote servers 76<sub>1</sub>–76<sub>m</sub> in Figure 3 of Kamath) and store buffering program content on the remote storage. Ex. 1011 ¶¶ 417–419; Ex. 1004 ¶¶ 53, 87, 103, 144.

Patent Owner argues that Petitioner’s proposed combination changes Kamath’s principle of operation. PO Resp. 27–30. As explained above in

connection with the Wood-Vallone-Kamath ground, Patent Owner's argument is not persuasive. *See supra* Section II.F.2.

Patent Owner also argues that because Yap already teaches how to manage storage space efficiently, Petitioner has not made a sufficient showing that the need of remote storage would have motivated a person of ordinary skill in the art to combine Kamath with Yap and Vallone. PO Resp. 40–42. Patent Owner argues that Yap's device does not suffer from a lack-of-memory problem because "Yap teaches a device with 'a capacity of at least about 25 Gbytes' including ample space 'available for various recording applications.'" *Id.* at 41 (quoting Ex. 1004 ¶ 103). Patent Owner also argues that "Yap already teaches how to manage storage space efficiently by, for example, using a duplicate filter function and implementing modular storage." *Id.* at 41–42 (citing, e.g., Ex. 1004 ¶ 134).

Patent Owner's arguments are not persuasive. First, Yap does not specifically identify the amount of space on the HDD available for the buffered content used with the auto pause function. *See* Ex. 1004 ¶ 103. Second, in describing alternatives for adding storage capacity, Yap does not teach away from or criticize using remote storage. Ex. 1004 ¶¶ 49–53. Similarly, Yap does not discourage using a remote server for buffered content even though it also discloses halting recordings or erasing recordings of duplicate episodes. *Id.* ¶ 134. The alternative approaches described in Yap thus would not have discouraged a person of ordinary skill in the art from adding remote storage as taught by Kamath to the Yap-Vallone DVR. *See In re Fulton*, 391 F.3d at 1200.

In sum, considering Petitioner's and Patent Owner's evidence and arguments, Petitioner has shown by a preponderance of the evidence that the

subject matter of claims 7 and 17 of the '147 would have been obvious over Yap, Vallone, and Kamath.

### III. CONCLUSION

For the above reasons, Petitioner has demonstrated by a preponderance of the evidence that (i) claims 1, 4–6, 8–11, 14–16, and 18–24 of the '147 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Wood and Vallone; (ii) claims 7 and 17 of the '147 patent are unpatentable as obvious over Wood, Vallone, and Kamath; (iii) claims 1, 5, 6, 8–11, 15, 16, and 18–24 of the '147 patent are unpatentable as obvious over Yap and Vallone; and (iv) claims 7 and 17 of the '147 patent are unpatentable as obvious over Yap, Vallone, and Kamath. Petitioner has *not* demonstrated by a preponderance of the evidence that (i) claims 3 and 13 of the '147 patent are unpatentable as obvious over Wood and Vallone; (ii) claims 2 and 12 of the '147 patent are unpatentable as obvious over Wood, Vallone, and Pierre; (iii) claims 3 and 13 of the '147 patent are unpatentable as obvious over Yap and Vallone; or (iv) claims 2, 4, 12, and 14 of the '147 patent are unpatentable as obvious over Yap, Vallone, and Pierre.

### IV. ORDER

Accordingly, it is

ORDERED that claims 1, 4–11, and 14–24 of U.S. Patent No. 8,768,147 B2 are unpatentable; and

FURTHER ORDERED that, because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2017-00934  
Patent 8,768,147 B2

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