

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ROKU, INC.,
Petitioner,

v.

UNIVERSAL ELECTRONICS, INC.,
Patent Owner.

IPR2019-01614
Patent 9,911,325 B2

Before PATRICK M. BOUCHER, MINN CHUNG, and
SHARON FENICK, *Administrative Patent Judges*.

CHUNG, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review (“IPR”), instituted pursuant to 35 U.S.C. § 314, Roku, Inc. (“Petitioner”) challenges the patentability of claims 1–5 and 7 (the “challenged claims”) of U.S. Patent No. 9,911,325 B2 (Ex. 1001, “the ’325 patent”), owned by Universal Electronics, Inc. (“Patent Owner”). 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, we determine Petitioner has shown by a preponderance of the evidence that claims 1–5 of the ’325 patent are unpatentable, but has not proven by a preponderance of the evidence that claim 7 of the ’325 patent is unpatentable.

II. BACKGROUND

A. Procedural History

On September 18, 2019, Petitioner filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of the challenged claims of the ’325 patent. Patent Owner filed a Preliminary Response (Paper 6, “Prelim. Resp.”).

On April 16, 2020, applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we instituted an *inter partes* review of all challenged claims of the ’325 patent based on all grounds presented in the Petition. Paper 7 (“Inst. Dec.”), 36.

After institution, Patent Owner filed a Patent Owner Response (Paper 15, “PO Resp.”), Petitioner filed a Reply to the Patent Owner Response (Paper 19, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 22, “PO Sur-reply”). An oral hearing was held on December 22, 2020, and a copy of the hearing transcript has been entered into the record. Paper 30 (“Tr.”).

B. Related Matters

Both parties identify *Universal Electronics, Inc. v. Roku, Inc.*, No. 8:18-cv-01580 (C.D. Cal.) (“the related litigation”), as involving the ’325 patent. Pet. 56; Paper 3, 2.

The ’325 patent is one of several patents owned by Patent Owner that are challenged by Petitioner in various petitions for *inter partes* review, including in IPR2019-01595, IPR2019-01608, IPR2019-01612, IPR2019-01613, IPR2019-01615, IPR2019-01619, IPR2019-01620, and IPR2019-01621. Pet. 57; Paper 3, 2. The parties also note that the ’325 patent claims the benefit of the filing date of the following patent applications: U.S. Patent Application No. 13/068,820, filed May 21, 2011 (now U.S. Patent No. 9,355,553 (“the ’553 patent”)); U.S. Patent Application No. 12/462,526, filed August 4, 2009 (now U.S. Patent No. 8,004,389 (“the ’389 patent”)); U.S. Patent Application No. 10/737,029, filed December 16, 2003 (now U.S. Patent No. 7,589,642 (“the ’642 patent”)). Pet. 57; Paper 3, 2–3.

In addition, the ’642 patent was the subject of IPR2014-01082 (“the earlier IPR”), in which institution of trial was denied. *See* Ex. 2007, 369–379; PO Resp. 9. In the earlier IPR, independent claim 2 of the ’642 patent was challenged based on anticipation and single-reference obviousness by six different references. Ex. 2007, 372–373. In considering those earlier challenges, the Board found dispositive Patent Owner’s argument that none of the six references discloses “modulating [a] key code onto a carrier signal, thereby generating a key code signal” recited in claim 2. *Id.* at 373.

The shortcomings identified by the Board for each of the six anticipation challenges in the earlier IPR was the petitioner’s reliance on an inherency argument, namely that each of the asserted references inherently

discloses modulating a key code onto a carrier signal by virtue of its disclosure of transmission of key code signals. *Id.* at 373–376. Specifically, the Board rejected conclusory testimony proffered by the petitioner as lacking sufficient support for “broad statements that transmission of codes requires modulation onto a carrier signal.” *See id.* at 376. The single-reference obviousness challenges suffered from a related deficiency, namely that the petitioner “appear[ed] to conflate obviousness with inherent anticipation and fail[ed] to provide a sufficient obviousness analysis.” *Id.* at 376–377.

C. The '325 Patent

1. Overview

The '325 patent “relates generally to remote control devices and, more specifically, to relaying key code signals through a remote control device to operate an electronic consumer device.” Ex. 1001, 1:18–21. Each of such key code signals “corresponds to a function of the selected electronic device, such as power on, power off, volume up, volume down, play, stop, select, channel up, channel down, etc.” *Id.* at 1:36–41. A set of key codes associated with a particular electronic device is referred to as a “codeset.” *Id.* at 1:36–38. The number of key code signals may be large, particularly when a single remote-control device is used to control multiple electronic devices. *Id.* at 1:54–62. Accordingly, the inventor of the '352 patent sought a system “for enabling a remote control device to control a selected one of multiple different electronic consumer devices without requiring the codeset associated with the selected electronic consumer device to be stored on the remote control device.” *Id.* at 1:66–2:3.

Figure 1 of the '352 patent is reproduced below.

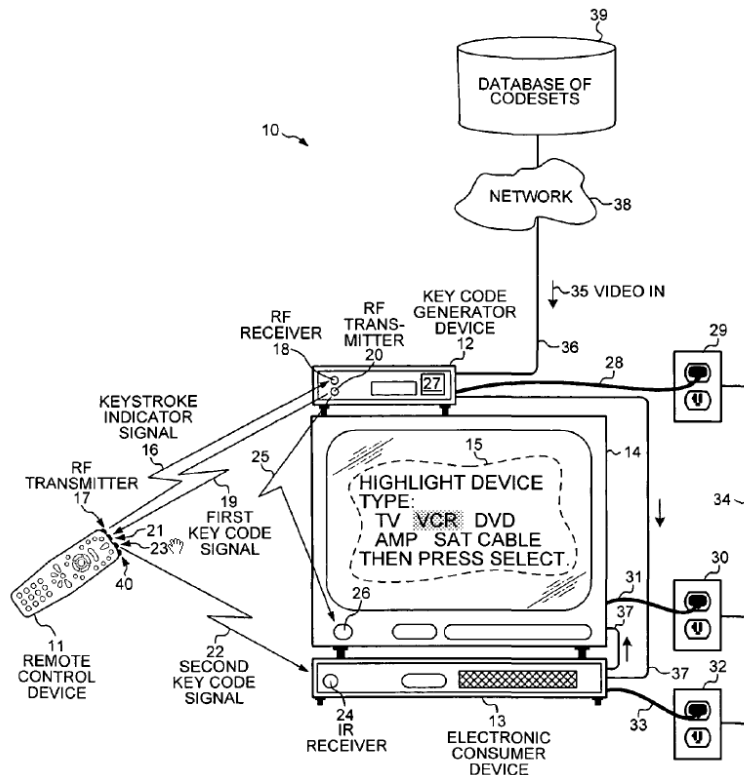


FIG. 1

Figure 1 illustrates a system for relaying a key code through a remote control device to an electronic consumer device. *Id.* at 3:19–21.

As depicted in Figure 1, system 10 includes remote control device 11, key code generator device 12 (shown as a set-top box), first electronic consumer device 13 (shown as a video cassette recorder (“VCR”)), and second electronic consumer device 14 (shown as a television set). *Id.* at 3:23–27, 3:37–40, 3:47–48. With remote control device 11, a user responds to on-screen displays 15 of television set 14, generated by key code generator device 12, “to step through a sequence of menu screens to identify the codeset corresponding to the device that is to be controlled.” *Id.* at 3:31–35, 3:47–53. For example, system 10 may, in this way, identify the

appropriate codeset to enable remote control device 11 to communicate with VCR 13 and television set 14. *Id.* at 3:47–55.

The '325 patent explains that, in some instances, key code generator device 12 is capable of communicating with remotely maintained database of codesets 39 over network 38, which may be the Internet. *Id.* at 8:60–63. A new codeset, such as may be associated with a new electronic consumer device introduced into the market, may thus be distributed from database 39 via network 38 and stored on a mass-storage hard disk within key code generator device 12. *Id.* at 8:64–9:5.

After generating a key code, key code generator device 12 modulates the key code onto a carrier signal, such as an RF signal, to generate “first key code signal 19.” *Id.* at 4:56–59.

Figure 5 of the '352 patent is reproduced below.

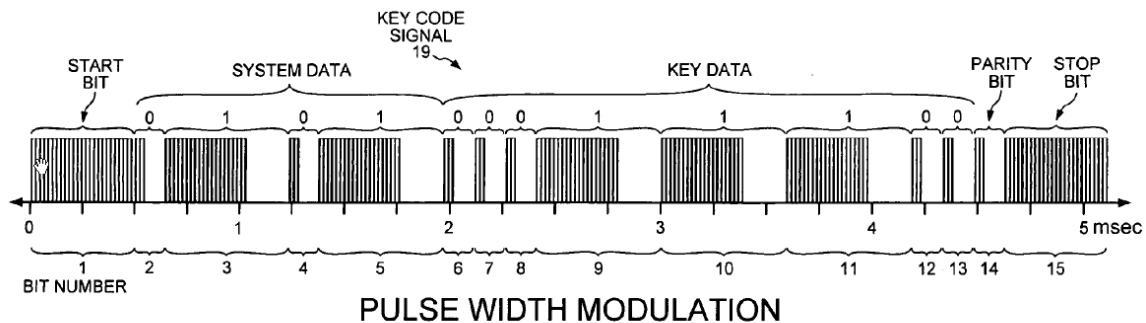


FIG. 5

Figure 5 illustrates a twelve-bit key code modulated onto first key code signal 19 using pulse-width modulation. *Id.* at 5:21–23.

Remote control device 11 receives first key code signal 19 on an RF transmission from key code generator device 12, and relays the key code to the appropriate electronic consumer device, such as VCR 13, in the form of second key code signal 22. *Id.* at 5:59–66. The electronic consumer device receives second key code signal 22, recovers the key code, and, if the key

code is correct for the device, performs the function desired by the user. *Id.* at 6:20–25.

In an alternative embodiment, the electronic consumer device is controlled by an RF key code signal transmitted directly from key code generator device 12. *Id.* at 6:31–33. In this embodiment, the electronic consumer device, e.g., television set 14, has an RF receiver and is capable of receiving RF key code signals. *Id.* at 6:58–59. When the user presses a key on remote control device 11 associated with a desired function of television set 14, a corresponding RF keystroke indicator signal is transmitted to key code generator device 12. *Id.* at 6:40–47. Key code generator device 12 then determines the appropriate key code that corresponds to the pressed key, generates third key code signal 25 by modulating the key code onto an RF carrier signal, and transmits third key code signal 25 directly to television set 14. *Id.* at 6:48–61. Third key code signal 25 is generated using the same modulation technique used for generation of first key code signal 19 described above. *Id.* at 6:52–54. Upon receiving third key code signal 25, television set 14 recovers the key code from the received signal and performs the function desired by the user. *Id.* at 6:61–65.

2. Illustrative Claim

Independent claim 1 is illustrative of the challenged claims and is reproduced below with bracketing used by Petitioner.

1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:

[1.1] a receiver;

[1.2] a transmitter;

[1.3] a processing device coupled to the receiver and the transmitter; and

- [1.4] a memory storing instructions executable by the processing device, the instructions causing the processing device to:
 - [1.4.1] generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;
 - [1.4.2] format the key code for transmission to the second device; and
 - [1.4.3] transmit the formatted key code to the second device in a key code signal via use of the transmitter;
 - [1.4.4] wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and
 - [1.4.5] wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.

Ex. 1001, 10:42–11:5.

3. Prosecution History

The '325 patent issued from U.S. Patent Application No. 15/153,905, filed May 13, 2016 (“the '905 application”). Ex. 1001, codes (21), (22). The '905 application is a continuation of U.S. Patent Application No. 13/068,820 (issued as the '553 patent), which is a continuation of U.S. Patent Application No. 12/462,526 (issued as the '389 patent), which, in turn, is a continuation of U.S. Patent Application No. 10/737,029 (issued as

the '642 patent). *Id.* at code (63), 1:7–14. In what follows, we provide a summary of the prosecution histories of the '642 patent and the '325 patent.

a. Prosecution History of the '642 Patent

The application that matured into the '642 patent was filed with a single independent method claim:

1. A method comprising:
 - (a) receiving a keystroke indicator signal from a remote control device;
 - (b) generating a key code within a key code generator device;
 - (c) modulating said key code onto a carrier signal, thereby generating a key code signal; and
 - (d) transmitting said key code signal from said key code generator device.

Ex. 2007, 25. In a first, nonfinal Office Action, the Examiner rejected this claim for obviousness over the combination of U.S. Patent No. 5,963,624 (“Pope”) and U.S. Patent No. 5,595,342 (“McNair”). *Id.* at 47. According to the Examiner, Pope teaches both the “receiving” and “generating” limitations of this original claim, but “is silent on teaching modulating the key code onto a carrier signal.” *Id.* Nevertheless, the Examiner found that McNair teaches that “the control signal is modulated and transmitted to the controlled apparatus as a conventional practice.” *Id.* In light of this teaching, the Examiner concluded that “[i]t would have been obvious to one of ordinary skill in the art to modulate the key code onto a carrier signal in Pope because modulation of the key code enables the key code signal to be transmitted wirelessly to the appliances and this also represents a conventional practice.” *Id.*

In traversing this rejection, the Applicant argued that “Pope does not receive a keystroke indicator and then generate a key code” because the “appliance control codes are not generated within the base unit 12 of Pope. Instead, the appliance control codes are transmitted from the handset 10/50 to the base unit 12, where they are translated into control signals.” *Id.* at 72. The Examiner considered this argument, but found it unpersuasive in a final Office Action, reiterating that “Pope teaches receiving a keystroke indicator signal which contains an indication of a key on the remote control device 10 that was pressed[, and] generating a key code (codes for communicating the control function to the appliances) within the code generator 12.” *Id.* at 88.

After a further traversal and rejection of original independent claim 1, the Applicant appealed the decision to our predecessor, the Board of Patent Appeals and Interferences (“BPAI”). *Id.* at 116–119, 132–133, 134, 219–256. The BPAI reversed the Examiner with respect to the rejection of original claim 1, agreeing with the Applicant that “McNair does not describe modulating a key code, or any code, onto a carrier signal.” *Id.* at 308. Instead, the BPAI found that “McNair merely describes frequency modulation including frequency shift keying modulation.” *Id.* Concurrent with that finding, the BPAI also issued a new ground of rejection over Pope and U.S. Patent No. 4,005,428 (“Graham”):

Although Pope does not describe modulating the keycode onto a carrier signal, attention is directed to Graham which describes modulating a digital code or binary code onto a carrier signal. . . . Graham describes that doing so offers the advantages of precluding unauthorized or accidental activation of a control associated with the receiving means and provides an exceptional degree of security and privacy. . . . It would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the method of Pope to include modulating the

key code onto a carrier signal since doing so offers the advantages of precluding unauthorized or accidental activation and provides an exceptional degree of security and privacy.

Id. at 310–311.

Subsequent to the BPAI’s appeal decision, the Applicant amended the “receiving” limitation of original claim 1 to recite that “the keystroke indicator signal indicates a key on said remote control device that a user has selected,” and amended the “generating” limitation to recite “using the keystroke indicator signal.” *Id.* at 315. In doing so, the Applicant characterized the BPAI’s decision as based “on a broad interpretation of the claim term ‘keystroke indicator signal’” that rejected the narrower interpretation of “an indication of a selected key while precluding a control code,” for which the Applicant had advocated. *Id.* at 323. The Applicant thus stated that it “overcomes the new rejection by amending claim 1 explicitly to limit the scope of the term ‘keystroke indicator signal’ to indicate a key on a remote control device that a user has selected.” *Id.*

The Examiner maintained the rejection because “[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to modify the method of Pope to include modulating the key code onto a carrier signal.” *Id.* at 328. But the Examiner also indicated at the same time that dependent claims reciting transmission of the key code signal “to said remote control device” or “to an electronic consumer device” were allowable but for their dependence from a rejected base claim. *Id.* at 328. The Applicant accordingly canceled claim 1 and presented those dependent claims in independent form, leading to allowance of those claims as issued independent claims 1 and 2 of the ’642 patent. *Id.* at 333, 344–347.

b. Prosecution History of the '325 Patent

The '905 application was filed with original claim 1, which is reproduced below.

1. A first device for transmitting a command to control a functional operation of a second device, the first device comprising:

a receiver;

a transmitter;

a processing device coupled to the receiver and the transmitter; and

a memory storing instructions executable by the processing device, the instructions causing the processing device to:

generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated;

format the key code for transmission to the second device;

and

transmit the formatted key code to the second device in a key code signal via use of the transmitter;

wherein the generated key code is a part of a codeset and wherein the codeset comprises time information that describes a digital one and a digital zero.

Ex. 1002, 30. In a first, nonfinal Office Action, the Examiner rejected this claim for obviousness over the combination of Pope and U.S. Patent No. 4,242,664 (“Lindstedt”). *Id.* at 70. According to the Examiner, Pope’s base unit teaches “a first device for transmitting a command to control a functional operation of a second device,” where the first device receives a keystroke indicator signal from a handset (or a phone), i.e., a third device, generates a key code from the keystroke indicator signal, formats the key code for transmission to the second device, and transmits the formatted key code to the second device. *Id.* at 70–71.

In response to the rejection, the Applicant amended the “wherein the generated key code” clause of claim 1 as follows:

wherein the generated key code is a part of comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device.

Id. at 81. Based on this amendment, the Applicant argued

Pope does not disclose, teach, or suggest generating a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated, wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device *as claimed*.

Id. at 85 (emphasis added). The Applicant further asserted “rather than disclose generating a key code *in this manner*, Pope discloses a system in which the handset includes a memory in which is stored appliance control codes.” *Id.* (emphasis added). According to the Applicant, in Pope,

When a user activates a key of the keypad of the handset, the handset transmits a complete appliance control code (as opposed to a keystroke indicator) to the base station, and the base station then functions to simply *transfer* the received appliance control code to an appliance via use of an infrared signal

Id. The Applicant argued that “Pope does not disclose, teach, or suggest the method for generating a key code *as now claimed*.” *Id.* at 86 (emphasis added).

The Examiner allowed the claims without further comment. *Id.* at 96.

D. Evidence

1. Applied References

Petitioner relies upon the following references in its challenges to patentability.

Reference	Date	Designation	Exhibit No.
U.S. Patent Application Pub. No. 2004/0080428 A1	Filed Oct. 25, 2002	Rye ¹	1005
U.S. Patent No. 4,426,662	Issued Jan. 17, 1984	Skeros	1006
U.S. Patent No. 7,562,128 B1	Filed Sept. 1, 2000	Caris	1007
U.S. Patent No. 8,132,105 B1	Filed Oct. 10, 2000	Dubil	1008

¹ For clarity and ease of reference, we only list the first named inventor.

2. Testimonial Evidence

Petitioner relies on two Declarations from Dr. Samuel H. Russ in support of its Petition and Reply. Ex. 1003 (“Russ Declaration”); Ex. 1030 (“Russ Reply Declaration”). Patent Owner cross-examined Dr. Russ by deposition. Ex. 2010 (“Russ Dep.”).

In support of its Patent Owner Response, Patent Owner relies on the Declaration of Dr. Michael D. Sprenger. Ex. 2003 (“Sprenger Declaration”). Petitioner cross-examined Dr. Sprenger by deposition. Ex. 1033 (“Sprenger Dep.”).

E. Instituted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 2–3):

Claims Challenged	35 U.S.C. §	References/Basis
1–5	103(a) ²	Caris, Dubil
1, 2, 3, 5, 7	103(a)	Rye, Skerlos

We instituted an *inter partes* review of all challenged claims on all grounds presented in the Petition. Inst. Dec. 36.

III. ANALYSIS

A. Relevant Principles of Law

To prevail in challenging Patent Owner’s claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103 effective March 16, 2013. Because the ’325 patent has an effective filing date prior to the effective date of the applicable AIA amendment, we refer to the pre-AIA version of § 103.

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 the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *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 skill in the art; and (4) where in evidence, so-called secondary considerations.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Additionally, the obviousness inquiry typically requires an analysis of “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated

³ The parties do not address secondary considerations, which therefore do not constitute part of our analysis.

reasoning with some rational underpinning to support the legal conclusion of obviousness”)); *see Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1366–67 (Fed. Cir. 2012) (holding that “some kind of motivation must be shown from some source, so that the [trier of fact] can understand why a person of ordinary skill would have thought of either combining two or more references or modifying one to achieve the patented [invention]”). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

We analyze Petitioner’s asserted grounds based on obviousness with the principles identified above in mind.

B. Level of Ordinary Skill in the Art

We begin our analysis by addressing the level of ordinary skill in the art. Citing the testimony of Dr. Russ as support, Petitioner proposes that a person of ordinary skill in the art at time of the priority date of the ’325 patent “would have a bachelor’s degree in electrical engineering or equivalent degree with two years of work experience relating to communications and consumer electronics.” Pet. 8 (citing Ex. 1003 ¶¶ 15–18). Patent Owner proposes instead that a person of ordinary skill in the art “would have had a bachelor’s degree which involved computer programming coursework, for example, electrical engineering, computer engineering, computer science, cognitive science, mechanical engineering, industrial engineering, or a similar degree, and at least one year of work experience in software programming, user interfaces, or human factors.” PO Resp. 10. According to Patent Owner, “[a]dditional education might

substitute for some of the experience, and substantial experience might substitute for some of the educational background.” *Id.*

We adopt Petitioner’s articulation. Although Patent Owner’s declarant, Dr. Sprenger, believes Patent Owner’s statement “is more appropriately tailored to the subject matter area of the ’325 patent,” he also concedes that “the differences between the proposed definitions of a [person of ordinary skill in the art] by Petitioner and Patent Owner are relatively minor” such that those differences “do not affect any of [his] analysis.” Ex. 2003 ¶¶ 37, 40. Likewise, our analysis and conclusions in this Final Written Decision would be the same regardless of whether Petitioner’s or Patent Owner’s definition of the level of ordinary skill in the art is adopted.

C. Claim Construction

In an *inter partes* review, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution

history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

The parties discuss claim constructions for four claim terms recited in claim 1—“key code,” “key code signal,” “keystroke indicator,” and “generate a key code using a keystroke indicator.” Pet. 8–9; PO Resp. 11–15; Pet. Reply 2–5; PO Sur-reply 2–3. We address constructions for each of these terms below.

1. “key code”

The parties agree that the term “key code” recited in challenged independent claim 1 should be construed as “a code corresponding to the function of an electronic device, optionally including timing information.” Pet. 9; PO Resp. 11. This construction was adopted by the district court in the related litigation. Ex. 1009, 12. The district court’s construction is consistent with the ordinary and customary meaning of the phrase in light of the Specification, and we adopt the proposed construction for this Final Written Decision. *See, e.g.* Ex. 1001, 5:3–7.

2. “key code signal”

In the related litigation, the parties proposed different constructions of the term “key code signal” recited in challenged independent claim 1. Ex. 1009, 13. The district court provided a construction that differs from both parties’ proposed constructions, namely “a signal containing a modulated key code.” *Id.* at 13–23. In the Institution Decision, we adopted as our preliminary construction the same construction adopted by the district court in the related litigation because we found it consistent with the

ordinary and customary meaning of the phrase in light of the Specification. Ex. 1009, 13–23; Inst. Dec. 11.

Although Patent Owner states that it agrees with this construction, it “clarifies” that the term “key code signal” “excludes a codeset from the same signal.” PO Resp. 13. According to Patent Owner, not only is such an exclusion consistent with the claim language and Specification of the ’352 patent, there was an “express disclaimer during prosecution” that further supports the proposed exclusion. *Id.* at 13–14. We are not persuaded by either Patent Owner’s plain-meaning or prosecution-disclaimer arguments to incorporate its proposed exclusion into the construction of “key code signal.” Rather, we agree with Petitioner that the proposed exclusion improperly adds unsupported limitations to the construction. *See* Pet. Reply 3.

First, Patent Owner contends that “key code is singular and distinct from a codeset in the specification,” citing language from the Specification of the ’352 patent. PO Resp. 13 (citing Ex. 1001, 2:44–45 (“When the key code from one of the codesets . . .”), 4:45 (“which key code of the codeset previously identified . . .”)). The cited passages, however, plainly describe a key code as part of a codeset. It is thus apparent from the cited passages that a signal carrying a codeset may also be a signal carrying a key code. Therefore, Patent Owner provides insufficient reasoning based on the Specification passages it cites to support the exclusion of a codeset. *See, e.g., Inphi Corp. v. Netlist, Inc.*, 805 F.3d 1350, 1355 (Fed. Cir. 2015) (quoting *Santuarus, Inc. v. Par Pharm.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012) (“Negative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation.”)).

Second, Patent Owner directs our attention to the Applicant's statements made during prosecution of the predecessor application leading to the '642 patent to the effect that "Claim 2 recites transmitting *a key code signal* to the remote control device and does not recite transmitting *a codeset* to the remote control device." PO Resp. 13–14 (quoting Ex. 2007, 75–76 (emphasis by Patent Owner); citing Ex. 2007, 241–242, 121). But the Federal Circuit has made clear that the standard for disavowal of full claim scope through prosecution history disclaimer is "exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature." *Poly-America, L.P. v. API Industries, Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016) (citations omitted). "Ambiguous language cannot support disavowal." *Id.* (citations omitted). The Applicant's statements during prosecution do nothing more than reflect the language recited in the claim. They do not provide "clear and unequivocal evidence" of a disavowal by the Applicant of codeset from the signal.

Third, Patent Owner contends that the claim language itself supports its proposed exclusion. PO Resp. 13 (citing Ex. 1001, 10:61–62; Ex. 2008, 57:2–17). But we do not discern any such exclusion from the language Patent Owner highlights, namely "wherein the generated key code comprises a one of a plurality of key code data stored in a codeset." Ex. 1001, 10:61–62. Similar to our discussion of the Specification above, a signal carrying a codeset may also be a signal carrying a key code and nothing in the plain language of the claim says otherwise.

We accordingly construe "key code signal" as "a signal containing a modulated key code," without the Patent-Owner-proposed exclusion of a codeset from the same signal.

3. “*keystroke indicator*”

The parties nominally agree that the term “keystroke indicator” recited in claim 1 should be construed as “a signal, distinct from a key code, corresponding to a pressed key [on a remote control].” Pet. 9; PO Resp. 12. (alteration in original). This agreed construction was adopted by the district court in the related litigation. Ex. 1009, 12–13.

Nevertheless, Patent Owner “clarifies” that its agreement with this construction “means that the keystroke indicator signal cannot contain the claimed key code.” PO Resp. 12. Patent Owner contends that such an exclusion is not only “consistent with the plain and ordinary meaning of ‘distinct from a key code,’ as well as how the term is used in the specification,” but also consistent with an express disclaimer made during prosecution of the application for the ’642 patent. *Id.* at 12–13 (citing Ex. 1001, 8:26–31; Ex. 2007, 323). In addition, Patent Owner observes that “the claims require ‘using the keystroke indicator’ to ‘generate a key code,’ so the keystroke indicator cannot already include the key code or there would be no reason to generate it.” *Id.* at 13 (citing Ex. 1001, 10:52).

Petitioner does not dispute this clarification, which we find consistent both with the distinction embraced by the differences between a “key code” and a “keystroke indicator,” and with the distinction between those terms as recited in the challenged claims. Accordingly, we adopt the parties agreed construction, with Patent Owner’s clarification.

4. “*generate a key code using a keystroke indicator*”

Challenged independent claim 1 recites “generate a key code using a keystroke indicator.” Ex. 1001, 10:52. Patent Owner “proposes that this term can generally be understood by its plain and ordinary meaning, except

that it excludes receiving an appliance control code and merely translating or converting the code into another format, such as an infrared signal.” PO Resp. 14. According to Patent Owner, “[d]uring prosecution, the Applicant repeatedly distinguished generating a key code within a key code generator device from receiving an appliance control code and merely translating or converting the code into another format, such as an infrared signal, such that the latter was expressly disclaimed from the scope of the claim term.” *Id.* (citing PO Resp. § II.C (Prosecution History)).

We are not persuaded that Patent Owner’s argument satisfies the “exacting” standard established by the Federal Circuit for prosecution history disclaimer because the prosecution history lacks the “clear and unequivocal evidence” necessary to support the proposed exclusion. *See Poly-America*, 839 F.3d at 1136.

At best, Patent Owner directs our attention to amendments made in response to rejections during prosecution of the applications for the ’325 patent and the ’642 patent. *See* PO Resp. 6–8. For example, Patent Owner points to the amendments made to the “wherein” clause of original claim 1 during prosecution of the application for the ’325 patent and argues “in distinguishing prior art, the Applicant differentiated the claimed invention from references that merely disclose translating or converting a signal that already includes the control code into another format, such as infrared.” *Id.* at 6 (citing Ex. 1002, 85). As discussed above in Section II.C.3.b, however, the Applicant remarks identified by Patent Owner relate to the “wherein” clause limitation, which recites what “the generated key code” comprises. *See* Ex. 1002, 81. Because there is nothing in the amended “wherein” clause that indicates or suggests *excluding* from the recited “generated key code”

translating or converting the received code, we find Patent Owner's inferences about limiting the scope of the "generate a key code" limitation insufficiently supported by the prosecution record. As discussed in the same section above, based on the amendments to the "wherein" clause, the Applicant argued

Pope does not disclose, teach, or suggest generating a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated, wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros, and wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device *as claimed*.

Id. at 85 (emphasis added). The Applicant further asserted "rather than disclose generating a key code *in this manner*, Pope discloses a system in which the handset includes a memory in which is stored appliance control codes." *Id.* (emphasis added). According to the Applicant, in Pope,

When a user activates a key of the keypad of the handset, the handset transmits a complete appliance control code (as opposed to a keystroke indicator) to the base station, and the base station then functions to simply *transfer* the received appliance control code to an appliance via use of an infrared signal

Id. The Applicant argued that "Pope does not disclose, teach, or suggest the method for generating a key code *as now claimed*." *Id.* at 86 (emphasis added). Thus, the Applicant remarks cited by Patent Owner simply reflect

the language of the amended “wherein” clause of the claim and, therefore, do not represent clear and unequivocal evidence of express disclaimer to support Patent Owner’s proposed exclusion of translating or converting the received code from the term “generate a key code using a keystroke indicator received from a third device.” *See* Ex. 1002, 85–86.

Patent Owner also points to amendments that resulted from rejection, by both the Examiner and the BPAI on appeal, during prosecution of the application for the ’642 patent, as well as the Applicant’s distinction made during prosecution between “generating” codes and a process of “receiving” and “translating” codes, as taught by Pope. *See* PO Resp. 6–7; Ex. 2007, 73–74 (Applicant arguing that Pope’s base unit 12 “does not generate the appliance control codes. Instead base unit 12 receives the appliance control codes and then translates them into infrared control signals.”), 88 (Examiner finding argument unpersuasive), 154–155 (Applicant repeating argument on appeal to the BPAI), 310⁴ (BPAI finding that “Pope’s description that base unit (i.e., key code generator) processor 84 gets an infrared control code (i.e., key code) from memory 86 based on a received appliance control code (key stroke indicator signal) meets the limitation of ‘generating a key code within a key code generator device . . .’”). Patent Owner provides the following explanation of subsequent amendments to the claims:

In response, the Applicant amended the claim at issue to add “wherein the keystroke indicator signal indicates a key on

⁴ Patent Owner remarks that the Board’s disagreement with the Applicant’s distinctions was “under the broadest reasonable interpretation, but that is no longer the claim construction standard for IPRs.” PO Resp. 7 (citing Ex. 2007, 311). We would conclude that Pope meets the “generating” limitation also under the current claim-construction standard the Board applies to *inter partes* reviews.

said remote control device that a user has selected” and “using the keystroke indicator signal,” stating that the purpose was “explicitly to limit the scope of the term ‘keystroke indicator signal’” to exclude the broader interpretation used by the Appeal Board and Examiner and to narrow “the term ‘keystroke indicator signal’ to mean an indication of a selected key while precluding a control code” ([Ex. 2007,] 323).

Thus, during prosecution, the Applicant expressly disclaimed from the scope of “keystroke indicator (signal)” and “generate(s) a key code using the keystroke indicator (signal)” a device that receives a control code and merely translates or converts the code into another format, such as an infrared signal.

PO Resp. 7–8. We are not persuaded by this explanation. The Applicant remarks identified by Patent Owner relate to the term “keystroke indicator signal,” and we find Patent Owner’s inferences about limiting the scope of the “generating” limitation insufficiently supported by the prosecution record. Based on the complete record, we find that there was not an unambiguous, clear, and unmistakable prosecution history disclaimer that supports Patent Owner’s proposed exclusion of translation of a received code from the scope of the term “generate a key code.”

Nor do we find Patent Owner’s proposed exclusion is supported by other intrinsic evidence of record. We agree with Petitioner that Patent Owner’s proposed exclusion in construing the “generate a key code” limitation “improperly imports requirements far beyond the plain and ordinary meaning of this term.” Pet. Reply 3 (citing Ex. 1030 ¶¶ 10–11). In the related litigation, for example, the district court concluded (in the context of considering its construction of “key code generator device”) that “any challenge Roku has to the meaning of the term ‘generate,’ including a suggestion that it could only be satisfied by creating a key code from scratch, is rejected.” Ex. 1009, 29. Although Patent Owner asserts that it

“does not seek to impose any such requirement,” Patent Owner nonetheless seeks to draw a fine line with its proposed exclusion. *See* PO Resp. 14.

Turning to the Specification, Patent Owner contends that the proposed exclusion is “consistent with how the terms are used in the specification.” PO Resp. 14 (citing Ex. 1001, 5:63–6:19; Ex. 2003 ¶¶ 123–126); *see* PO Sur-reply 3. In the cited paragraph of his Declaration, Dr. Sprenger states that “[t]he ’325 patent specification confirms [the proposed exclusion] when it uses the terms ‘translating’ and ‘converted’ when describing the remote control receiving the key code in a first carrier signal and merely modulating that key code onto a second carrier signal.” Ex. 2003 ¶ 126 (citing Ex. 1001, 5:63–6:19).

The cited portion of the Specification describes an embodiment where a key code generator device transmits key code signal 19 to a remote control device, which in turn translates it into key code signal 22 and then transmits the translated key code signal to a VCR, a consumer electronic device. Ex. 1001, 5:59–6:19 (describing steps 104 and 105 of the method for relaying key code signals depicted in Figure 2). The Specification also describes “a second example,” where a key code generator device, after generating a key code signal, transmits it directly to an electronic consumer device. *See id.* at 6:31–65. It is well established that “it is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited.” *Epos Techs. Ltd. v. Pegasus Techs. Ltd.*, 766 F.3d 1338, 1341 (Fed. Cir. 2014) (quoting *Liebel-Flarsheim v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004)). A disclaimer or disavowal of claim scope must be “clear and

unmistakable, requiring ‘words or expressions of manifest exclusion or restriction’ in the intrinsic record.” *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1358 (Fed. Cir. 2016) (quoting *Teleflex, Inc. v. Ficos N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed. Cir. 2002)). In view of the word “example” used in the Specification, we determine that the particular embodiment cited by Patent Owner does not rise to the level of a clear and unmistakable disavowal to support the exclusion proposed by Patent Owner.

The Specification of the ’325 patent describes a user pressing a key on a remote control device so that the remote control device transmits a keystroke indicator signal to the key code generator device. Ex. 1001, 3:56–4:3. Step 102 of key code generator device to “generate a key code corresponding to the pressed key” is accomplished by “determin[ing] which key code of the codeset previously identified . . . corresponds to the pressed key.” *Id.* at 4:44–46, Fig. 2. Based on this disclosure of the ’325 patent, Patent Owner takes the position that “identifying a key code from a codeset is [‘]generating[’], but translating one is not [‘]generating[’].” Tr. 89:12–17 (Patent Owner agreeing such a characterization of its position is “exactly right”).

We are not persuaded that there is sufficient basis for construing the “generate a key code” limitation so broadly as to capture the *identification* of a key code from a codeset while simultaneously excluding *translation* of a received code. By forgoing a straightforward recitation of “identifying” in the claims in favor of a broader recitation of “generate a key code,” the patentee clearly meant for the term not to be limited to mere identification of a key code but also to include other forms of generation of the key code.

Patent Owner further argues that its proposed exclusion is “supported by the fact that ‘format the key code for transmission’ is a separate limitation in claim 1 from ‘generate a key code,’ and would be rendered superfluous if ‘generate a key code’ included simple formatting of the key code for transmission.” PO Resp. 15 (citing Ex. 1001, 10:52–58). We disagree with Patent Owner’s argument because the claim recites “format the key code,” not “translate or convert the key code.” Patent Owner’s argument is not supported by the claim language because Patent Owner does not explain adequately why the limitation “format the key code” would be rendered superfluous if the term “generate a key code” encompasses “translate or convert a key code.”

We depart from the plain and ordinary meaning in only two instances: (1) when a patentee acts as his own lexicographer and (2) when the patentee disavows the full scope of the claim term in the specification or during prosecution. *Poly-Am.*, 839 F.3d at 1136 (citation omitted). Here, Patent Owner does not argue lexicography. Because we find no disavowal in the Specification or during prosecution that supports Patent Owner’s proposed exclusion of translation of a received code from the scope of the term, we apply the plain and ordinary meaning of “generate a key code” without such an exclusion.

No other claim terms, beyond those terms discussed above, need to be construed expressly for purposes of this Final Written Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that only terms that are in controversy need to be construed, and “only to the extent necessary to resolve the controversy”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017

(Fed. Cir. 2017) (applying *Vivid Techs.* in the context of an *inter partes* review).

D. Scope and Content of the Prior Art

1. Rye (Ex. 1005)

Rye describes “a remote control system for use in controlling the operation of a multi-brand audiovisual component system.” Ex. 1005 ¶ 12.

Figure 2 of Rye is reproduced below.

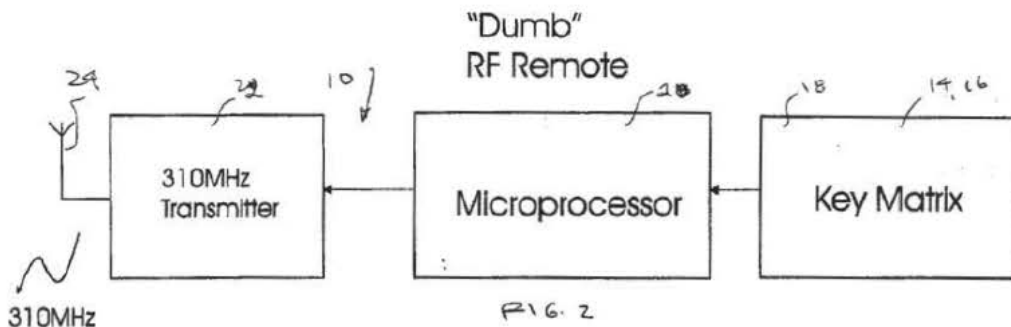


Figure 2 is a schematic diagram of remote control unit 10, which includes key matrix 18, microprocessor 20, modulator-transmitter 22, and antenna 24. *Id.* ¶ 22.

As described in Rye, microprocessor 20 stores a plurality of binary control codes corresponding to various functions of the audiovisual components to be controlled by operation of remote control unit 10. *Id.* “The binary control codes stored in the microprocessor 20 are generic codes in that they are not specific for any particular brand or model of audiovisual product.” *Id.* In response to user operation of a push button on remote control unit 10, key matrix 18 produces a memory address signal that is applied to microprocessor 20. *Id.* The binary coded signal generated by microprocessor 20 is applied to modulator-transmitter 22 for radio-frequency modulation and transmission by antenna 24. *Id.*

Figure 3 of Rye is reproduced below.

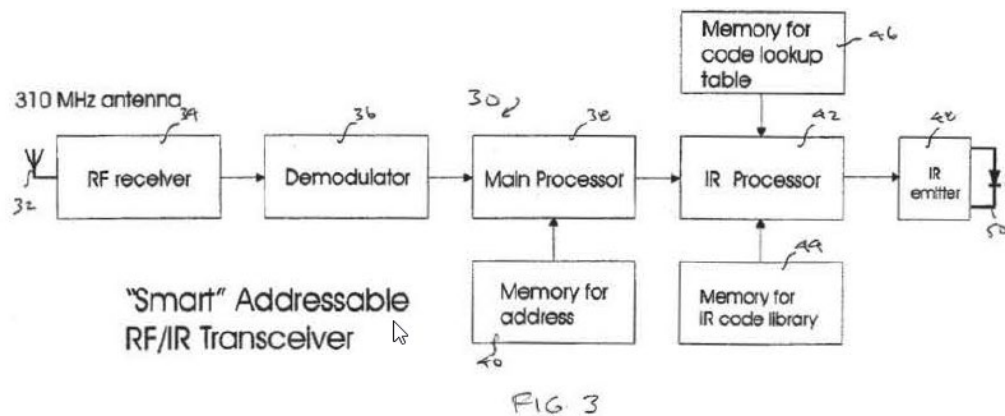


Figure 3 is a schematic diagram of addressable transceiver 30, which receives binary coded signals transmitted by antenna 24 of Figure 2. *Id.* “In overview, those signals are converted in transceiver 30 to corresponding binary coded infrared (IR) signals, which are then transmitted over-the-air to the selected audiovisual component to control its operation.” *Id.* ¶ 23.

As illustrated in the drawing, transceiver 30 includes RF antenna 32, RF receiver 34, demodulator 36, main processor 38 (with memory 40), infrared microprocessor 42 (with memories 44, 46), and infrared emitter 48. *Id.* ¶¶ 23–25. Memory 40 stores addresses used by main processor 38 in identifying particular audiovisual components to be controlled. *Id.* ¶¶ 23–24. Memory 44 “contains the remote control codes for all brands . . . and models of commercially available audiovisual components.” *Id.* ¶ 24. Remote control codes stored in memory 46 “are derived from code library memory 44 through the microprocessor 42 [and] may be periodically supplemented or otherwise modified by the user when a new audiovisual component is acquired or a currently owned component is discarded.” *Id.*

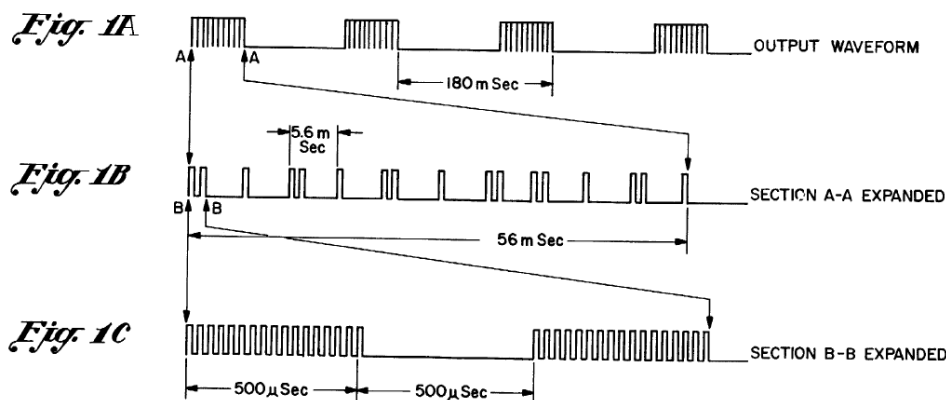
In operation, radio-frequency binary-coded control and address signals transmitted by antenna 24 are received at antenna 32 and receiver 34,

and demodulated by demodulator 36, such that main microprocessor 38 generates a signal applied to infrared microprocessor 42 after comparing the address portion to product codes stored in memory 40. *Id.* ¶ 26. Infrared processor 42 converts the control portion of the signal for compatibility with the operating binary code of the audiovisual component whose remote-control code is obtained from memory 46, and transmits that signal to the audiovisual component. *Id.* ¶ 27.

2. Skerlos (Ex. 1006)

Skerlos “relates to remote control receivers and more specifically is directed to an infrared (IR) remote control detector/decoder providing improved noise immunity particularly adapted for use with a television receiver.” Ex. 1006, 1:5–9. In particular, Skerlos describes a remote-control system in which pulse code modulated (“PCM”) output signals are generated in response to user-operated controls. *Id.* at 2:66–3:2.

Figures 1A–1C of Skerlos are reproduced below.



Figures 1A–1C of Skerlos depict the pulse train of a transmitted control signal in Skerlos’s IR remote control system. *Id.* at 2:48–51.

Figure 1A shows the output waveform of a transmitted IR signal, which is repeated every 180 milliseconds. *Id.* at 3:20–22. Each series of

pulses is pulse code modulated as illustrated in Figure 1B, which shows in expanded form the arrangement of pulse code modulation for an individual pulse train. *Id.* at 3:22–25. Figure 1C shows pulses that represent the ON/OFF pulsing of the IR transmitter's light emitting diodes (LEDs). *Id.* at 3:31–33.

3. Caris (Ex. 1007)

Caris addresses perceived disadvantages in conventional programming of a remote control to be used with consumer electronics equipment. Ex. 1007, 3:24–49.

Figure 1 of Caris is reproduced below.

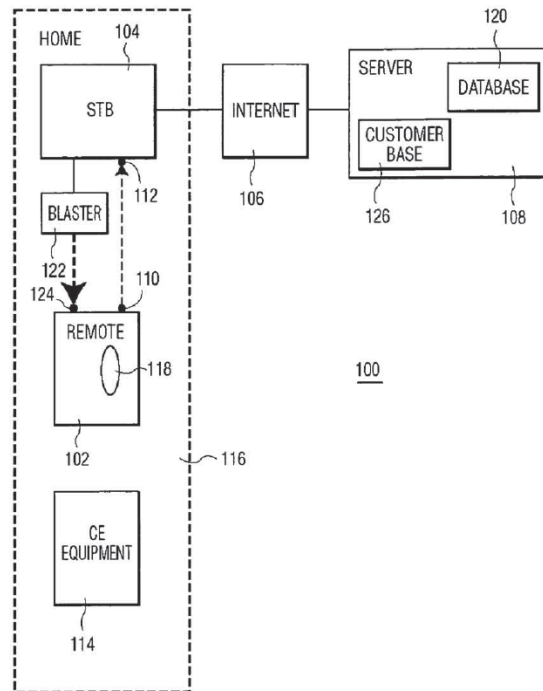


FIG. 1

Figure 1 is a block diagram of system 100, which includes remote control device 102, appliance 104 (which is connected to Internet 106), and server 108. *Id.* at 5:25–30.

In this example, appliance 104 comprises a set top box (STB) purchased by a consumer in combination with remote control device 102 for operating appliance 104 via, e.g., infrared transmitter 110 and receiver 112. *Id.* at 5:30–33. Remote control device 102 has hard buttons (such as dedicated button 118) or a touch screen, and “is programmable in order to adopt control codes for other IR- or RF-controllable equipment, e.g., appliance 114, that the consumer has installed or will install in his/her home 116.” *Id.* at 5:27–29; 5:34–37. “The IR or RF code transmitted by remote 102 upon the consumer activating button 118 is interpreted by [set top box] 104 as a request to send a message to server 108.” *Id.* at 5:46–49. Server 108 has database 120, which “relates types, versions and brands of apparatus to their individual command control code sets and [user-interface] aspects.” *Id.* at 5:58–60. Remote control device 102 may be programmed via infrared or radio-frequency blaster 122 connected to appliance 104. *Id.* at 6:4–5. When positioned close to, and with input 124 facing, blaster 122, remote control device 102 receives and processes an incoming stream of data that comprises the control codes and user-interface data requested from server 108, and potentially also certain user customizations. *Id.* at 6:5–12.

Caris describes an alternative embodiment using a look-up table. *Id.* at 6:53–7:8. Figure 2 of Caris is reproduced below.

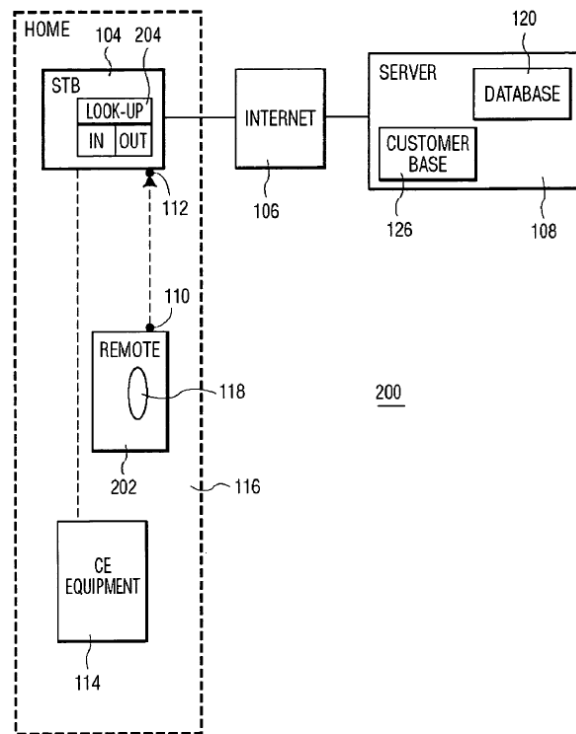


FIG. 2

Figure 2 illustrates a system in which remote control device 202 is preprogrammed. *Id.* at 6:53–55.

In this embodiment, remote control device 202 uses a fixed protocol to communicate with set-top box 104 for controlling apparatus 114. *Id.* at 6:55–57. In response to activating dedicated hard button 118 on remote control device 202, set-top box 104 connects to a server on the Internet, downloads “data representative of a control code for control of apparatus 114,” and stores the data in look-up table 204 that associates an input received from remote 202 with an output as programmed. *Id.* at 6:58–7:4. The output is now the data for the control command required for control of apparatus 114 via STB 104. *Id.* at 7:4–5. Specific codes are then retrieved when receiving subsequent inputs from remote control device 202. *Id.* at 7:2–5.

4. *Dubil (Ex. 1008)*

Dubil “relates to remote control devices and to a service for enabling the programming of remote controls to be used with consumer electronics (CE) equipment.” Ex. 1008, 1:6–8. According to Dubil, “[a]n Internet service makes available control codes for use on a programmable universal remote.” *Id.*, Abstr. A server supplies the control codes as XML data that gets processed at the receiver’s set top box or personal computer (PC), or the remote itself. *Id.*

Figure 1 of Dubil is reproduced below.

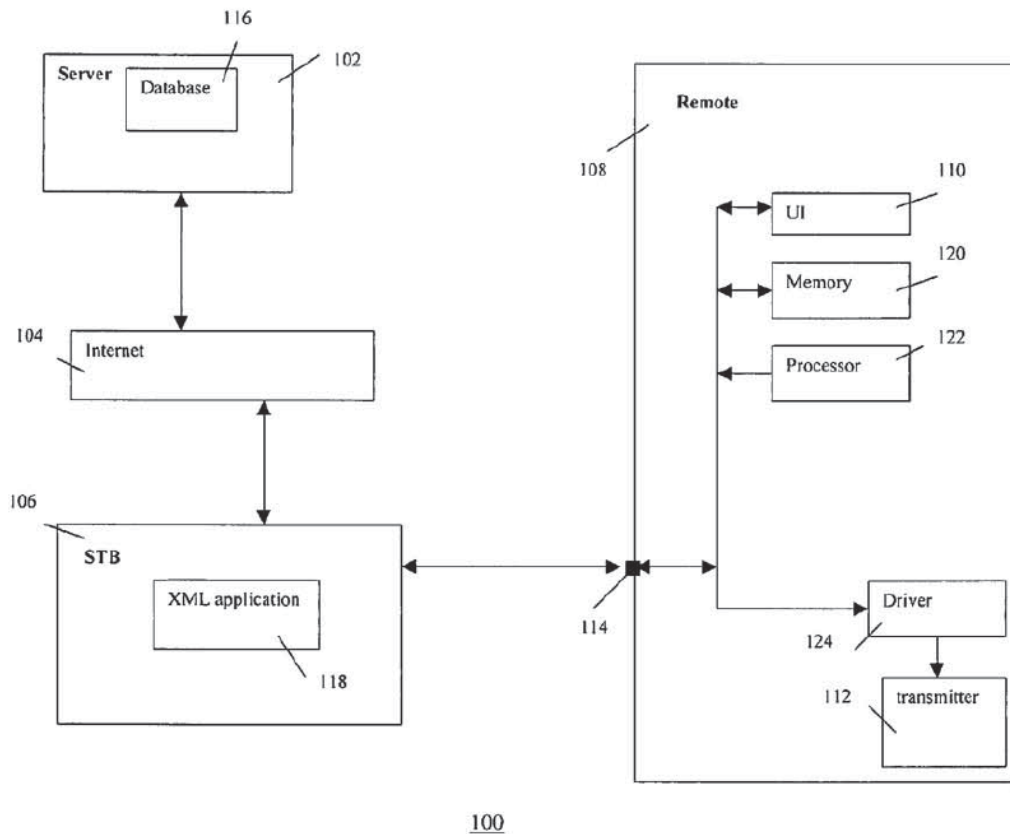


Fig.1

Figure 1 is a block diagram of system 100, which comprises server 102 connected via Internet 104 to appliance 106, such as a set-top box or personal computer, at a user’s home. *Id.* at 4:48–51.

The user has “universal programmable remote control device 108,” which includes transmitter 112 for sending IR or RF control codes to electronics equipment, such as TVs, VCRs, CD players, set-top boxes, DVD players, audio pre-amplifiers and tuners, etc. *Id.* at 4:51–57. Input 114 of remote control device 108 allows for communication with appliance 106. *Id.* at 4:57–59.

Server 102 includes database 116, which maintains an inventory of IR and RF control codes for commercially available consumer electronics equipment of various brands and types. *Id.* at 4:60–62. The codes maintained in database 116 are formatted as XML (Extensible Markup Language) documents such that “relevant parameters of a particular control code or command are defined using XML tags.” *Id.* at 4:64–66. According to Dubil, control codes, such as IR or RF codes, can be described using a number of parameters defined by XML tags, for example, IR or RF carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern of the command code, semantic meaning of the code, type of device for which it is intended (CD, VCR, TV, DVD, etc.), the brand name of the specific protocol, etc. *Id.* at 2:61–3:1; 4:33–41.

In operation, “[t]he user requests via appliance 106 a code set from server 102 for control of the apparatus, type, brand, serial no., etc., as specified by the user and to be controlled via remote 108.” *Id.* at 5:6–8. For example, a set top box (STB) may download IR codes based on the user input “descriptive of the device to be controlled, its brand and type number.” *Id.* at 3:5–8. Server 102 runs a query and, if there is a match, supplies the associated set of codes via Internet 104 to appliance 106 (or the STB) as an

XML document. *Id.* at 5:11–13. Appliance 106 has XML application 118 that extracts the data based on the relevant tags and interprets the data according to the semantics of the tags in order to generate the control codes for remote 108. *Id.* at 5:14–17. The control codes are then supplied to remote 108 for installation and remote control operation. *Id.* at 5:18–26.

E. Obviousness over Caris and Dubil

Petitioner asserts that claims 1–5 are unpatentable under 35 U.S.C. § 103(a) over the combination of Caris and Dubil. Pet. 35–55.

*1. Discussion of Independent Claim 1 —
Differences Between the Claimed Subject Matter and the Prior Art*

In addressing the recitations of claim 1, Petitioner relies on an embodiment of Caris illustrated in Figure 2 of Caris (reproduced above in Section III.D.3). Pet. 39–53. Specifically, Petitioner draws a correspondence between (1) the recited “first device” and Caris’s set top box (STB); (2) the recited “second device” and Caris’s appliance/consumer electronics (CE) equipment/apparatus 114; and (3) the recited “third device” and Caris’s remote control. *Id.* at 39–40 (citing Ex. 1007, 6:53–7:5, Fig. 2). Petitioner further draws a correspondence between (4) the recited “receiver” and Caris’s receiver 112 included in the STB (*id.* at 40 (citing Ex. 1007, 5:30–33, Fig. 2)); and (5) the recited “transmitter” and Caris’s “IR or RF transmitter in the front bezel,” which is an “IR or RF blaster” that is connected to or integrated within the STB (*id.* at 41 (citing Ex. 1007, 3:65–4:4, 4:47–51, 6:57–58)).

In making these correspondences or mappings, Petitioner relies generally on Caris’s described functionality to meet the limitations of

claim 1 requiring to “generate a key code using a keystroke indicator received from a third device” and “transmit the . . . key code to the second device in a key code signal.” *Id.* at 44–45, 48–49. Petitioner relies on Dubil’s disclosure in addressing the “format the key code” limitation, contending that a person of ordinary skill in the art would have looked to Dubil for “operational details” that are not explicitly described in Caris. *Id.* at 45–48.

Petitioner also asserts that Caris teaches “[a] first device for transmitting a command to control a functional operation of a second device,” as recited in the preamble of claim 1 because Caris’s STB (the claimed “first device”)

downloads control codes (i.e., key codes) and programs these codes into a “look-up table 204 that associates an input received from remote 202 with an output as programmed.” The output is now the data for the control command required for control of apparatus 114 [the claimed “second device”] via STB 104.

Id. at 39–40 (alteration added) (citing Ex. 1007, 6:66–7:5, Fig. 2).

Patent Owner does not dispute that Caris teaches “a first device,” “a second device,” “a third device,” “a receiver,” “a transmitter,” and the preamble of claim 1. *See* PO Resp. 42–54.

Based on the complete record and for the reasons explained by Petitioner, we find that Petitioner has demonstrated sufficiently Caris teaches “a first device,” “a second device,” “a third device,” “a receiver”

(limitation [1.1]), “a transmitter” (limitation [1.2]), and the preamble⁵ of claim 1.⁶

Patent Owner disputes Petitioner’s showing with respect to the rest of the limitations of claim 1, and also disputes Petitioner’s rationale for combining the teachings of Caris and Dubil. *See* PO Resp. 39–54. We address each of these disputed issues below.

a. Limitations [1.3] and [1.4]

Claim 1 recites “a processing device coupled to the receiver and the transmitter” and “a memory storing instructions executable by the processing device, the instructions causing the processing device to” perform the steps to “generate a key code,” “format the key code,” and “transmit the formatted key code.” Ex. 1001, 10:47–60. Petitioner designates the recited “processing device” and “memory” limitations as limitations [1.3] and [1.4], respectively. Pet. 42, 43. Petitioner also designates the limitations reciting the steps or functions performed by the processing device, i.e., the limitations reciting “generate a key code,” “format the key code,” and “transmit the formatted key code,” as limitations [1.4.1], [1.4.2], and [1.4.3], respectively. *Id.* at 44, 45, 48.

⁵ Because Petitioner has shown that the recitations in the preamble are satisfied by Caris, we need not determine whether the preamble is limiting. *See Vivid Techs.*, 200 F.3d at 803.

⁶ We also find that Patent Owner has waived any argument directed to these recitations of claim 1. *See* Paper 8 (Scheduling Order), 8 (“Patent Owner is cautioned that any arguments for patentability not raised in the response may be deemed waived.”).

Petitioner asserts that “Caris describes the functionality of an STB as well as a receiver and a transmitter.” Pet. 42; *see also id.* at 39–41 (citing Ex. 1007, 3:65–4:4, 4:47–51, 5:30–33, 6:53–7:5, Fig. 2). Although Petitioner acknowledges that Caris does not explicitly describe “the processing device of the STB” that is used for performing the described functions, Petitioner asserts, supported by the testimony of Dr. Russ, “in view of the STB functionality described in Caris, a [person of ordinary skill in the art] would have found it obvious that this functionality would have been performed using a processing device coupled to the receiver and the transmitter.” *Id.* at 42 (citing Ex. 1003 ¶ 173). Similarly, Petitioner contends, with support from Dr. Russ, that although “Caris does not explicitly describe memory used to store instructions executable by the processing device,” “a [person of ordinary skill in the art] would have found it obvious that for Caris to perform the functions of identifying and transmitting a key code, the STB would include memory with instructions executed by a processing device.” *Id.* at 43 (citing Ex. 1003 ¶ 178).

Addressing first the “processing device” limitation, Petitioner asserts, citing the testimony of Dr. Russ, that “STBs using processing devices to process received commands and to transmit key codes were well-known in the art prior to the earliest priority date of the ’325 patent” and, therefore, a person of ordinary skill in the art would have understood that Caris’s STB includes a processing device in order to perform the functions described in Caris. Pet. 42 (citing Ex. 1003 ¶¶ 173–176). In the cited paragraphs of his Declaration, Dr. Russ refers to his discussion of the electronic consumer device control technology well-known in the art before the priority date of the ’325 patent and testifies that “STBs typically included processing

devices such as processors or microcontrollers that controlled the functionality of the STBs.” Ex. 1003 ¶¶ 173–174 (citing Ex. 1003 § VI.C (¶¶ 62–79)). In particular, Dr. Russ discusses U.S. Patent No. 6,909,471 B2 (Ex. 1018, “Bayley”) and opines that Bayley “depicts an example STB configuration which includes a processor used to control the volume of a TV in response to receiving a command from a remote control.” Ex. 1003 ¶ 174 (citing Ex. 1018, 5:12–20, Fig. 2). Dr. Russ further discusses the operation of the processor described in Bayley and testifies that “[a]s illustrated in Bayley, processing devices in STBs were well-known prior to the ’325 patent and executed instructions in memory to receive commands and transmit corresponding control codes.” *Id.* ¶ 175 (citing Ex. 1018, 3:31–39). Citing his additional discussion of the electronic consumer device control technology well-known in the art at the time of the priority date of the ’325 patent, Dr. Russ opines that

A [person of ordinary skill in the art] would have understood that STBs would receive a command from a remote control and use a processing device to interpret the command and identify a corresponding key code. The STBs would also identify potential parameters, such as modulation and timing parameters, used to transmit the key code to another device. A processing device would be used to access memory and retrieve the corresponding key code as well as perform the modulation of the key code for transmission.

Id. ¶ 176 (citing Ex. 1003 §§ VI.A–D (¶¶ 39–91)). Based on his discussion and the cited evidence, Dr. Russ testifies that a person of ordinary skill in the art “would have understood that Caris’ STB would include a processing device in order to perform the functions described in Caris.” *Id.*

Addressing the “memory” limitation, Petitioner asserts that Caris’s description of “look-up table 204” within the STB suggests that Caris’s STB includes a memory accessible by a processing device. Pet. 43 (citing Ex. 1007, 7:2–5; Ex. 1003 ¶ 177). In an argument closely related to its argument on the “processing device” limitation, Petitioner further asserts, citing the testimony of Dr. Russ, that “STBs typically included processing device with corresponding memory such as read-only memory (ROM) that would store instructions executed by the processing device to perform STB operations” and, therefore, “a [person of ordinary skill in the art] would have found it obvious that for Caris to perform the functions of identifying and transmitting a key code, the STB would include memory with instructions executed by a processing device.” *Id.* (citing Ex. 1003 ¶¶ 178–183).

In the cited paragraphs of his Declaration, Dr. Russ discusses Bayley as depicting “a well-known memory device including a database as well as an OS (operating system), volume control application, and driver for operating volume controls.” Ex. 1003 ¶ 178 (citing Ex. 1018, 1:56–58, 6:41–48, Fig. 2). Dr. Russ further discusses the details of Bayley’s memory system 230, which “may include any one or combination of volatile memory elements (e.g., random access memory (RAM), dynamic RAM (DRAM), static RAM (SRAM), synchronous DRAM (SDRAM), magnetic RAM (MRAM), etc.) and nonvolatile memory elements (e.g., read only memory (ROM), hard drive, tape, compact disk ROM (CD-ROM), etc.).” *Id.* ¶ 179 (quoting Ex. 1018, 3:40–46). Dr. Russ also discusses the operation of Bayley’s STB, where “*the processor 224 is configured to execute software stored within the memory system 230, to communicate data to and from the memory system 230, and to generally control operations of the DHCT*

[STB] 200 pursuant to the software.” *Id.* ¶ 181 (quoting Ex. 1018, 3:31–39). According to Dr. Russ, as illustrated in Bayley, it was well-known to those of ordinary skill in the art to “use memory to include instructions to facilitate the operations of a processing device” and “controls such as the volume control . . . would have been performed using instructions executable by processing devices.” *Id.* ¶ 182. As explained above with respect to the “processing device” limitation, Dr. Russ discusses the operation of the processor described in Bayley and testifies that “[a]s illustrated in Bayley, processing devices in STBs were well-known prior to the ’325 patent and executed instructions in memory to receive commands and transmit corresponding control codes.” *Id.* ¶ 175 (citing Ex. 1018, 3:31–39).

Patent Owner makes several arguments to assert that Petitioner does not make a sufficient showing. First, Patent Owner asserts that there is no explicit teaching or suggestion in Caris of a processing device or memory used to store instructions executable by the processing device. *See* PO Resp. 42, 43. We disagree with Patent Owner’s argument.

To start, Petitioner’s theory of unpatentability is one of obviousness. Under 35 U.S.C. § 103, the obviousness inquiry turns not only on the prior art, but whether “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art to which the claimed invention pertains.” *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337 (Fed. Cir. 2020) (quoting 35 U.S.C. § 103). And “the inquiry into whether any ‘differences’ between the invention and the prior art would have rendered the invention obvious to a skilled artisan *necessarily depends*

on such artisan's knowledge.” Id. (emphasis added) (citing *Dow Jones & Co. v. Abblaise Ltd.*, 606 F.3d 1338, 1349, 1353 (Fed. Cir. 2010); *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013)).

Here, as discussed above, Petitioner asserts, supported by the testimony of Dr. Russ, a person of ordinary skill in the art would have understood that Caris's STB includes a processing device to “perform the functions described in Caris.” Pet. 42 (citing Ex. 1003 ¶¶ 173–176). In the cited paragraphs of his Declaration, Dr. Russ testifies that a person of ordinary skill in the art would have understood that Caris's STB would include a processing device and that the functions performed by the processing device would include operations to interpret the command received from a remote control, identify a corresponding key code, access memory and retrieve the corresponding key code, and “perform the modulation of the key code for transmission.” Ex. 1003 ¶¶ 173–176. Similarly, Dr. Russ testifies that as illustrated in Bayley, it was well-known to those of ordinary skill in the art to “use memory to include instructions to facilitate the operations of a processing device” and “controls such as the volume control . . . would have been performed using instructions executable by processing devices.” *Id.* ¶ 182. Dr. Russ further explains that “[a]s illustrated in Bayley, processing devices in STBs were well-known prior to the '325 patent and executed instructions in memory to receive commands and transmit corresponding control codes.” *Id.* ¶ 175 (citing Ex. 1018, 3:31–39). Dr. Russ's testimony is corroborated by Bayley and other evidence of the electronic consumer device control technology that was well-known to ordinary artisans before the priority date of the '325

patent, as discussed in the Russ Declaration. *See id.* ¶¶ 174–176 (citing Ex. 1003 §§ VI.A–D (¶¶ 39–91); Ex. 1018, 3:31–39, 5:12–20, Fig. 2), ¶¶ 178–183 (citing Ex. 1018, 1:56–58, 3:31–46, 6:41–48, Fig. 2).

Patent Owner argues that Bayley is not included in the asserted ground and that Petitioner has not presented any motivation to combine Bayley with Caris and Dubil. PO Resp. 43–44; PO Sur-reply 12; Ex. 2003 ¶ 236. The record is clear, however, that Petitioner’s asserted ground (upon which we instituted trial) is based on Caris and Dubil and that the additional references discussed by Dr. Russ, including Bayley, are being relied on exclusively for their documentation of what was well-known in the art. *See* Ex. 1003 ¶¶ 173–176. As such, Petitioner’s use of Bayley is proper in the asserted ground of obviousness over Caris and Dubil because “[a]rt can legitimately serve to document the knowledge that skilled artisans would bring to bear in reading the prior art identified as producing obviousness.” *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015) (citing *Randall Mfg.*, 733 F.3d at 1362–63); *see also Lone Star Silicon Innovations LLC v. Iancu*, 809 F. App’x 773, 777 (Fed. Cir. 2020) (finding that the petitioner properly relied on additional references in an asserted ground of obviousness over Watatani and Tanaka when “the additional references were being relied on exclusively for their teachings about what was well-known in the art”) (nonprecedential).

Next, Patent Owner, observing that claim 1 requires the claimed processing device to “generate a key code,” “format the key code,” and “transmit the formatted key code,” contends that Petitioner does not show that Caris teaches limitation [1.3] because Petitioner fails to assert that Caris’s processing device is used to “format the key code.” PO Resp. 42–

43; PO Sur-reply 11. In a related argument, Patent Owner asserts that Caris does not teach a processor for performing the claimed functions because, as conceded by Petitioner, “Caris does not explicitly describe the format of the key codes or the operational details for transmitting the key codes.” PO Resp. 42 (citing Pet. 52); PO Sur-reply 11.

We disagree with Patent Owner’s arguments. Limitation [1.3] does not recite formatting the key code or any particular format of the key code. Nor does it recite “generate a key code,” “transmit the formatted key code,” or any operational details for transmitting the key codes. The Petition addresses these functions with respect to limitations [1.4.1], [1.4.2], and [1.4.3]. *See* Pet. 44–49. As discussed below with respect to limitation [1.4.2], Petitioner shows sufficiently that the combination of Caris and Dubil teaches or suggests the recited function of “format the key code for transmission to the second device” performed by the processing device. *See id.* at 45–48. And as discussed below with respect to limitations [1.4.1] and [1.4.3], Petitioner also shows sufficiently that Caris teaches the functions “generate a key code” and “transmit the formatted key code” performed by the processing device. *Id.* at 44–45, 48–49. Indeed, in its Reply, Petitioner clarifies that “a [person of ordinary skill in the art] would have understood that Caris’s STB would include a processing device in order to perform the functions described in Caris and the functions in the Caris/Dubil combination.” Pet. Reply 15 (citing Pet. 42, 44–49; Ex. 1003 ¶¶ 173–176; Ex. 1030 ¶ 44).

Patent Owner contends that Petitioner’s mention of “the functions in the Caris/Dubil combination” in the Reply is a “brand new” argument because the Petition “[did] not rely on Dubil for *this* claim element,” i.e.,

limitation [1.3]. PO Sur-reply 11 (emphasis added) (citing PO Resp. 43). Again, limitation [1.3] does not recite formatting the key code or any particular format of the key code. As discussed above, it is apparent on the face of the Petition that Petitioner relies on the combination of Caris and Dubil to teach limitation [1.4.2] reciting the function “format the key code for transmission to the second device” performed by the processing device. Pet. 45–48. Thus, we disagree with Patent Owner’s argument that Petitioner’s Reply presents a new argument.

Next, regarding the “memory” limitation, Patent Owner argues that in Bayley, executable instructions can be stored in many places, including a CD-ROM, and, therefore, “do not have to be stored in a memory on the first device, as required by the claim.” PO Resp. 44 (citing Ex. 1003 ¶ 179; Ex. 2003 ¶¶ 245–246; Ex. 2010 (Russ Dep.), 51:16–53:2); *see also* PO Sur-reply 12 (citing Ex. 1003 ¶ 179; Ex. 2003 ¶ 246).

As discussed by Dr. Russ, however, Bayley’s memory system 230 is included in DHCT 200, which is a set-top box. *See* Ex. 1003 ¶ 178 (citing Ex. 1018, 1:56–58, Fig. 2); *see also* Ex. 1018, 1:10–14 (“In implementing enhanced programming, the home communication terminal (‘HCT’), otherwise known as the *set-top box*, has become an important computing device for accessing various video services.” (emphasis added)), 3:27–29 (“As shown in FIG. 2, the DHCT 200 includes at least one processor 224 and memory system 230, among other components.”). Dr. Russ further explains that Bayley’s memory system 230 (included in the set-top box) “may include any one or combination of volatile memory elements,” such as random access memory (RAM), and “nonvolatile memory elements (e.g., read only memory (ROM) . . . compact disk ROM (CD-ROM), etc.).”

Ex. 1003 ¶ 179 (citing Ex. 1018, 3:40–46). Thus, contrary to Patent Owner’s contention, Bayley does *not* “confirm[] that executable instructions do not have to be stored in a memory on the [set-top box] . . . , but instead can be stored on a *separate* CD-ROM among many other places.” See PO Resp. 44 (alteration and emphasis added). Rather, as Dr. Russ explains, Bayley illustrates that “STBs typically used memory along with a processing device to perform functions such as transmitting key codes” and that “[a] processing device executing instructions from memory in an STB was a well-known STB configuration.” Ex. 1003 ¶¶ 177–183. Nothing in the evidence cited by Patent Owner shows otherwise.

Thus, Patent Owner does not offer any evidence that contradicts or negates Petitioner’s evidence, e.g., Dr. Russ’s testimony and the corroborating evidence cited by Dr. Russ. See PO Resp. 42–44 (citing Ex. 2003 ¶¶ 234–249). Dr. Sprenger, Patent Owner’s declarant, in the cited paragraphs of his Declaration, essentially repeats Patent Owner’s arguments but does not present any evidence that contradicts or negates Dr. Russ’s testimony or the corroborating evidence cited by Dr. Russ, including Bayley. See Ex. 2003 ¶¶ 234–249.

We credit Dr. Russ’s testimony and are persuaded by Petitioner’s argument and the cited evidence that, in view of what was well-known to ordinarily skilled artisans, it would have been obvious to a person of ordinary skill in the art that Caris’s STB would include a processing device that performs the claimed functions, including the functions to “generate a key code,” “format the key code,” and “transmit the formatted key code” and that for Caris to perform the claimed functions, the STB would include memory storing instructions executed by the processing device. See Pet. 42–

43; Ex. 1003 ¶¶ 173–183; *see also Koninklijke Philips*, 948 F.3d at 1338 (finding that the Board properly determined that the challenged claims would have been obvious over the cited prior art “in light of the general knowledge of a skilled artisan” when “the Board relied on expert evidence, which was corroborated by Hua, in concluding that pipelining was not only in the prior art, but also within the general knowledge of a skilled artisan” and the patent owner “offered no evidence to rebut the conclusion that a skilled artisan would have known about pipelining”).

For the foregoing reasons and based on the complete record, we determine that Petitioner has demonstrated sufficiently that it would have been obvious to a person of ordinary skill in the art that Caris’s STB would include “a processing device coupled to the receiver and the transmitter” and “a memory storing instructions executable by the processing device, the instructions causing the processing device to” perform the claimed functions, as recited in claim 1.

b. Limitation [1.4.1]

Claim 1 recites “generate a key code using a keystroke indicator received from a third device in communication with first device via use of the receiver, the keystroke indicator having data that indicates an input element of the third device that has been activated,” which Petitioner designates as limitation [1.4.1]. Pet. 44. As discussed above, Petitioner maps the recited “first device” to Caris’s set top box (STB) and the recited “third device” to Caris’s remote control. *Id.* at 39–40 (citing Ex. 1007, 6:53–7:5, Fig. 2). In addressing the recitations of limitation [1.4.1], Petitioner also draws a correspondence between (1) the recited “key code” and the control codes identified from Caris’s look-up table 204 (*id.* at 44)

and (2) the recited “keystroke indicator received from a third device” and Caris’s “IR or RF code” transmitted by remote control device 202 to the STB upon activation of dedicated button 118, or as input received from remote control device 202 by the STB (*id.* at 44–45).

Petitioner presents two alternative theories that rely on different identifications of the “keystroke indicator” in Caris, as noted above. We focus on the second of these theories, which we find more directly supports Petitioner’s contention that the limitation is taught by Caris. Specifically, Petitioner identifies the “keystroke indicator” recited in limitation [1.4.1] as the “input received from remote 202” described in the following disclosure of Caris: “The data gets programmed into a look-up table 204 that associates an *input received from remote 202* with an output as programmed.” Pet. 45; Ex. 1007, 7:2–5 (emphasis added). Dr. Russ explains that a person of ordinary skill in the art would have understood that this input refers to commands corresponding to buttons on the remote control device other than dedicated hard button 118, such as a “channel up” button. Ex. 1003 ¶ 186; *see also* Pet. 45 (citing Ex. 1003 ¶¶ 186–187). According to Dr. Russ, Caris teaches limitation [1.4.1] reciting “generate a key code using a keystroke indicator received from a third device” because Caris describes that after receiving the input, the STB subsequently identifies and retrieves the corresponding key code from look-up table 204. Ex. 1003 ¶ 187 (citing Ex. 1007, 7:2–4); *see* Pet. Reply 16 (“a particular key code stored in the look-up table is retrieved in response to ‘input received from remote 202’”) (citing Pet. 44–45; Ex. 1007, 6:58–7:5). Because this identification is consistent with our adopted construction of the “generate a

key code using a keystroke indicator” limitation, Petitioner makes a sufficient showing. *See supra* § III.C.4.

Patent Owner disputes this showing “because Caris does not disclose that the ‘input received from remote 202’ (the alleged ‘the keystroke indicator’) is distinct from a key code, nor does Petitioner assert that it is.” PO Resp. 45 (citing Pet. 45, Ex. 1003 ¶¶ 186–187); PO Sur-reply 13. But Petitioner’s theory relies on different elements of Caris for the “keystroke indicator” and the generated “key code,” with the latter resulting from a specific look-up operation that relies on the former, such that we find those identifications consistent with our adopted constructions of those terms.

Patent Owner next asserts that “Petitioner *fails to present any argument or evidence* regarding the limitation ‘the keystroke indicator having *data* that indicates an input element of the third device that has been activated’” because “Petitioner fails to identify any data to show how ‘this input . . . would also indicate that an ‘input element’ of the remote control had been activated.’” PO Resp. 46–47 (underlined emphasis added) (citing Pet. 45); PO Sur-reply 13.

As discussed above, however, Petitioner relies on the specific operation of Caris’s look-up table 204 “that associates an input received from remote 202 with an output as programmed.” Pet. 44–45 (citing Ex. 1007, 6:58–7:5; Ex. 1003 ¶¶ 186–187); Pet. Reply 16 (citing Pet. 44–45; Ex. 1007, 6:58–7:5). In the cited paragraph of his Declaration, Dr. Russ testifies

[A]fter receiving the input, Caris describes retrieving a key code from “look-up table 204” corresponding to the input to generate a corresponding output “control command.” A [person of ordinary skill in the art] would have understood that *this retrieval*

of this control command would also teach the claimed generating of a key code using the keystroke indicator signal.

Ex. 1003 ¶ 187 (emphasis added) (citing Ex. 1007, 7:2–4). In its Reply, Petitioner elaborates that

UEI does not address the specific operation of Caris’s look-up table “that associates an input received from remote 202 with an output as programmed.” . . . Specifically, a particular key code stored in the look-up table is retrieved in response to “input received from remote 202.” Thus . . . this “input” discloses the claimed keystroke indicator, and Caris’s *use of the look-up table* discloses generating a key code.

Pet. Reply 16 (emphasis added) (citing Pet. 44–45; Ex. 1007, 6:58–7:5; Ex. 1030 ¶ 47). The cited passage of Caris describes that

The *data* gets programmed into a look-up table 204 that *associates an input received from remote 202* with an output as programmed. The *output* is now the *data* for the control command [i.e., the generated key code] required for control of apparatus 114 via STB 104.

Ex. 1007, 7:2–5 (alteration and emphases added). Based on the record presented, we understand Petitioner to argue that a person of ordinary skill in the art would have understood the operation of Caris’s look-up table to generate the key code by identifying the entry in the look-up table that matches the data from the received input with the data for the corresponding key code. We find that Petitioner’s and Dr. Russ’s understanding is sufficiently supported by the cited disclosures of Caris and the inferences which one skilled in the art would reasonably be expected to draw from them. *See In re Preda*, 401 F.2d 825, 826 (CCPA 1968) (“[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled

in the art would reasonably be expected to draw therefrom.”). Thus, we agree with Petitioner that the specific operation of Caris’s look-up table relied upon by Petitioner teaches or suggests the “generate a key code” limitation to a person of ordinary skill in the art, including the recitation “the keystroke indicator having data that indicates an input element of the third device that has been activated.” Accordingly, based on the complete record, we find that Petitioner shows sufficiently that Caris teaches or suggests limitation [1.4.1].

c. Limitation [1.4.2]

Claim 1 recites “format the key code for transmission to the second device,” which Petitioner designates as limitation [1.4.2]. Pet. 45. For this limitation, Petitioner asserts that the combination of Caris with Dubil teaches this limitation by describing “modulation of the key code onto an infrared carrier signal.” *Id.* at 46–47.

First, Petitioner asserts that the Specification of the ’325 patent does not use the term “format” or provide an explicit definition for “formatting” a key code for transmission. *Id.* at 46 (citing Ex. 1003 ¶ 189); *see also id.* at 22 (citing Ex. 1003 ¶ 134). Petitioner argues that the Specification instead describes modulating a key code onto a carrier signal to transmit the key code to the second device, such as a television set. *Id.* at 46 (citing Ex. 1001, 7:2–24); *see also id.* at 22 (citing Ex. 1001, 6:48–65). For instance, Petitioner asserts that Figure 5 of the ’325 patent depicts a “formatted” version of a key code generated by modulating the key code (i.e., modulating the binary values of ones and zeros representing the key code) onto a carrier signal. *Id.* at 22–23 (citing Ex. 1001, 4:47–55, 5:21–27, 6:48–65, Figs. 3, 5). Petitioner argues, therefore, that a person of ordinary

skill in the art would have understood from these disclosures in the Specification that the recited “format[ting] the key code for transmission” would encompass “using the well-known technique of modulating the key code onto a carrier signal to prepare the key code for transmission.” *Id.* at 23 (citing Ex. 1001, 1:48–53; Ex. 1003 ¶¶ 134–136); *see also id.* at 46 (citing Ex. 1001, 1:48–53; Ex. 1003 ¶ 190).

In the Institution Decision, we noted that the language of other limitations of claim 1 supports Petitioner’s position. Inst. Dec. 19–20; *see Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1299 (Fed. Cir. 2003) (“While certain terms may be at the center of the claim construction debate, the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of those terms.”). In particular, claim 1 recites that “the codeset further comprises *time information* that describes *how a digital one and/or a digital zero* within the selected one of the plurality of *key code data is to be represented in the key code signal* to be transmitted to the second device.” Ex. 1001, 11:1–5 (emphases added). This language indicates or suggests that the recited “format[ting] the key code for transmission to the second device” is about “how a digital one and/or a digital zero . . . of [a] key code . . . is to be represented in the key code signal to be transmitted to the second device,” which is described in the “time information” included in the codeset.

Turning to the Specification, the ’325 patent describes that the “*timing information*” in the codesets “describes *how the key codes should be modulated onto carrier signals* to generate key code signals.” *Id.* at 1:48–53 (emphases added). That is, the Specification explains that the “*time*

information” in the codeset recited in claim 1 that describes arranging digital ones and digital zeros of a key code in a key code signal for transmission—i.e., arranging a key code into a format of a signal for transmission—is the same information that describes “modulating” the key code onto carrier signals for transmission.

In the Institution Decision, we noted that Patent Owner in its Preliminary Response did not propose any construction of “format the key code for transmission” or otherwise sufficiently described flaws in Petitioner’s claim construction position. Inst. Dec. 19. Thus, based on the preliminary record, we agreed with Petitioner that “format[ing] the key code for transmission” recited in claim 1 encompasses “modulating the key code onto a carrier signal to prepare the key code for transmission.” *Id.* at 20. During the trial, Patent Owner has not disputed our preliminary construction, nor has it proposed a different construction for the term “format the key code for transmission.” *See* PO Resp. 11–15. Based on the complete record, for this Final Written Decision, we construe the term “format the key code for transmission” to encompass “modulating the key code onto a carrier signal to prepare the key code for transmission.”

Petitioner asserts that Caris teaches this type of formatting and transmission by describing wireless transmission of a control code to “IR- or RF-controllable equipment, e.g., appliance 114” via a “wired or wireless link with apparatus 114.” Pet. 46 (citing Ex. 1007, 5:35–37; 6:57–58; 7:4–5). Citing the testimony of Dr. Russ, Petitioner argues that a person of ordinary skill in the art would have known that such wireless transmission would be accomplished via “the modulation of the key code onto an infrared carrier

signal,” as acknowledged in the ’325 patent as a well-known wireless transmission protocol. *Id.* (citing Ex. 1001, 1:48–53; Ex. 1003 ¶ 191).

Although Petitioner acknowledges that Caris does not explicitly describe the operational details behind the wireless transmission of key codes, Petitioner argues, citing the testimony of Dr. Russ, a person of ordinary skill in the art would have looked to references such as Dubil to understand these operational details for formatting or modulating the key codes for transmission. Pet. 46–47 (citing Ex. 1003 ¶ 191). Petitioner further contends that Dubil describes specific modulation schemes, including frequency-shift keying (“FSK”), binary phase-shift keying (“BPSK”), and pulse-width modulation (“PWM”). *Id.* at 47 (citing Ex. 1008, 2:61–3:8, 4:33–47, 4:60–5:5). Petitioner also asserts that Dubil describes using those modulation techniques to format and transmit “IR or RF codes” on an “IR or RF carrier frequency.” *Id.* (citing Ex. 1008, 2:61–3:8; 4:66–5:3).

Dr. Russ explains that the details of the modulation techniques mentioned in Dubil were well-known to persons of ordinary skill in the art. Ex. 1003 ¶ 192. In support of his testimony, Dr. Russ cites his discussion of various prior art references in the Background section of his Declaration. *Id.* (citing Ex. 1003 §§ VI.A, VI.B, VI.D). In the cited portions of his Declaration, Dr. Russ discusses several references, including Hill (Ex. 1021), Mikhak (Ex. 1022), Emelko (Ex. 1023), and Landry (Ex. 1024), and explains that the cited references show that the details of the modulation techniques, such as FSK, PWM, and BPSK, were well-known to those of ordinary skill in the art. Ex. 1003 ¶¶ 80–91.

Citing the testimony of Dr. Russ, Petitioner argues that a person of ordinary skill in the art would have understood that Dubil’s technique of

using well-known modulation protocols and IR and RF carrier frequencies to format and transmit control codes would similarly be used in Caris's STB for wireless transmission via an IR or RF transmitter. Pet. 47 (citing Ex. 1003 ¶ 192).

Supported by the testimony of Dr. Russ, Petitioner provides a motivation for the combination of teachings by explaining that a person of ordinary skill in the art using the STB described in Caris and looking to understand how Caris formats and transmits its control codes would have recognized that Dubil provided that understanding because, among other reasons, both Caris and Dubil describe set-top boxes that retrieve and transmit key codes. Pet. 48 (citing Ex. 1003 ¶¶ 193, 169; Ex. 1007, 6:58–7:5; Ex. 1008, 4:60–5:26). Petitioner asserts, supported by testimony of Dr. Russ, “[i]mplementing the modulation techniques described in Dubil with the STB described in Caris would result in merely combining known elements to yield predictable results.” *Id.* (citing Ex. 1003 ¶¶ 193, 169).

Patent Owner disputes Petitioner's reasoning to combine the teachings because Caris and Dubil “teach away from one another,” and because “neither Petitioner nor its expert provides any reason why a [person of ordinary skill in the art] would have sought to modulate the signals transmitted in Caris [onto a carrier signal].” PO Resp. 39–41.

First, Patent Owner contends that Petitioner does not establish sufficient motivation to combine Caris and Dubil because Petitioner and Dr. Russ “assumed that modulation onto a carrier signal is inherently required, which is the exact assumption the Board previously rejected.” PO Resp. 39, 48 (citing Ex. 2007, 376). To the extent Patent Owner implies that Petitioner's argument in this proceeding is akin to the arguments advanced

in the earlier IPR, we disagree. On its face, the Petition advances neither an anticipation ground nor a single-reference obviousness ground that requires finding a reference inherently to disclose modulation of a key code onto a carrier signal. *See* Ex. 2007, 373–376. Instead, unlike the conflation of inherent anticipation with single-reference obviousness that the Board found problematic in the earlier IPR, the instant Petition identifies additional prior art that describes modulation in the form of Dubil, and articulates reasons for effecting the proposed combination.

Next, Patent Owner contends that Caris and Dubil “teach away from one another” because “Caris teaches that a set-top box can communicate directly to a consumer electronic device, but Dubil teaches that a set-top box must communicate through a remote control.” PO Resp. 40–41. Patent Owner further argues that a person of ordinary skill in the art “would not have combined a reference that teaches a set-top box communicating with a consumer electronic device with a reference that teaches a set-top box *not* communicating with a consumer electronic device.” *Id.* at 41. In a related argument, Patent Owner asserts that Caris and Dubil teach away from one another because “Caris teaches a set-top box communicates using IR or RF, but Dubil specifically does not teach RF for transmissions from the set-top box.” *Id.* Patent Owner also contends that Dubil does not “disclose[] a first device (set-top box) modulating a key code onto a carrier signal” and “Dubil cannot teach its set-top box modulating a signal or transmitting a modulated signal to the remote because Dubil does not disclose a remote control that is capable of demodulating a signal from a set-top box.” *Id.* at 49. Similarly, Patent Owner asserts that “Dubil does not describe modulating onto a carrier signal for any transmission from the set-top box.” PO Sur-reply 15.

In its Reply, Petitioner states “[t]he Petition does not advocate for physically combining the STB described in Caris with the STB described in Dubil.” Pet. Reply 25. Rather, Petitioner argues, a person of ordinary skill in the art “using the STB described in Caris would have easily implemented and utilized the same modulation techniques and parameters described in Dubil to format and modulate a key code onto an IR carrier frequency using Caris’s IR transmitter or IR blaster.” *Id.* (citing Pet. 45–48).

We agree with Petitioner’s argument and disagree with Patent Owner’s argument because Patent Owner improperly relies upon the bodily incorporation of one reference into another, rather than maintaining focus on the teachings of the references. “[T]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) (*quoting In re Keller*, 642 F.2d 413, 425 (CCPA 1981)).

Patent Owner also argues that Caris and Dubil teach away from each other “in terms of where data is stored and the number and types of transmissions required to operate a consumer electronic device” because “Caris teaches the remote control transmits each button press to the set-top box during operation, but Dubil teaches that the remote control stores the codeset such that it never needs to transmit to the set-top box during operation.” PO Resp. 41. We disagree with Patent Owner’s argument because we find that the distinctions Patent Owner identifies do not rise to the level of the type of specific criticism or discouragement required to show

that the references teach away from each other. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (a prior-art reference does not teach away from the claimed subject matter unless the prior-art reference also criticizes, discredits, or otherwise discourages the solution claimed).

For the foregoing reasons and based on the complete record, we determine that Petitioner has demonstrated sufficiently that the proposed combination of Caris and Dubil teaches or suggests “format the key code for transmission to the second device,” as recited in claim 1.

d. Limitation [1.4.3]

Claim 1 recites “transmit the formatted key code to the second device in a key code signal via use of the transmitter.” Petitioner designates this recitation as limitation [1.4.3]. Pet. 48. For this limitation, Petitioner relies on Caris’s disclosure of transmission of a key code from its STB to an “apparatus 114” (the claimed “second device”). Pet. 48 (citing Ex. 1007, 6:53–7:5). As discussed above, Petitioner shows sufficiently that the “IR or RF transmitter” or “IR or RF blaster” of Caris connected to or integrated within the STB teaches the recited “transmitter” of claim 1. *Id.* at 41 (citing Ex. 1007, 3:65–4:4, 4:47–51, 6:57–58). For limitation [1.4.3], Petitioner points to the operation of Caris’s STB and look-up table discussed above in Section III.E.1.b (Limitation [1.4.1]), where the STB receives inputs from the remote and transmits a corresponding output control code used to control apparatus 114. *Id.* at 48 (citing Ex. 1007, 6:53–7:5). Petitioner asserts that the STB uses a wired or a wireless link with apparatus 114 to transmit the control codes to apparatus 114. *Id.* at 49 (citing Ex. 1007, 6:53–7:5, Fig. 2 (showing a dotted line between apparatus 114 and STB 104)). Citing the testimony of Dr. Russ, Petitioner argues that a person of ordinary skill in the

art would have understood that the “IR or RF transmitter” or “IR or RF blaster” described in Caris would be used to wirelessly transmit the formatted key code. *Id.* (citing EX1007, 4:47–51, 3:65–4:4; Ex. 1003 ¶ 194).

Patent Owner asserts that Caris does not teach limitation [1.4.3] because “[n]either Caris nor Dubil discloses a first device formatting a key code or a key code signal” for the reasons Patent Owner discussed with respect to limitations [1.4] and [1.4.1]. PO Resp. 50 (citing PO Resp. §§ IV.B.4.b & c). Patent Owner argues, therefore, neither Caris nor Dubil teaches or suggests a first device transmitting any such formatted key code to a second device. *Id.*

We disagree with Patent Owner’s argument because, for the reasons discussed above in Sections III.E.1.a & b, Petitioner shows sufficiently that Caris or the combination of Caris and Dubil teaches or suggests limitations [1.4] and [1.4.1]. Based on the complete record, we determine that Petitioner has demonstrated sufficiently that Caris teaches “transmit the formatted key code to the second device in a key code signal via use of the transmitter,” as recited in claim 1.

e. Limitations [1.4.4] and [1.4.5]

Claim 1 recites “wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros,” which Petitioner designates as limitation [1.4.4]. Pet. 49. Claim 1 also recites “wherein the codeset further comprises time

information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted to the second device,” which Petitioner designates as limitation [1.4.5]. *Id.* at 52.

For these limitations, Petitioner maps Caris’s database of control codes as the recited “codeset.” Pet. 49 (citing Ex. 1007, 2:12–20, 3:52–63). Petitioner also identifies Caris’s “input received from remote 202” as the recited “keystroke indicator received from the third device.” *Id.* at 49–50. In making these mappings, Petitioner relies on the operation of Caris’s look-up table to teach the recited selection of a key code data from the codeset “as a function of the keystroke indicator.” *Id.* at 50. For the recitations “wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros” and “wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal to be transmitted,” Petitioner relies on Dubil. *Id.* at 50–53.

As described in Caris, the database is downloaded from a server and stored on the STB when the data representing the control codes are programmed into the look-up table within the STB. Pet. 49 (citing Ex. 1007, 2:12–20, 2:24–39, 3:52–63, 7:2–4). As discussed above with respect to limitation [1.4.1] (i.e., the limitation reciting “generate a key code using a keystroke indicator received from a third device”), Petitioner presents two alternative theories that rely on different identifications of the “keystroke indicator” in Caris. *See* Pet. 44–45, 49. As with our analysis of limitation [1.4.1], we focus on the second of these theories, which we find more

directly supports Petitioner’s contention that the limitation is taught by Caris. Specifically, Petitioner identifies the “keystroke indicator” recited in limitations [1.4.1] and [1.4.4] as the “input received from remote 202” described in the following disclosure of Caris: “The data gets programmed into a look-up table 204 that associates an *input received from remote 202* with an output as programmed. The output is now the data for the control command required for control of apparatus 114 via STB 104.” Pet. 45, 50; Ex. 1007, 7:2–5 (emphasis added). Citing the testimony of Dr. Russ, Petitioner asserts that a person of ordinary skill in the art would have understood that an identification of a corresponding output data for the “control command” from “look-up table 204” teaches the selection of a key code data from the codeset “as a function of the keystroke indicator received from the third device,” as recited in limitation [1.4.4]. *Id.* at 50 (citing Ex. 1003 ¶ 197).

Addressing the recitation “wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros,” Petitioner asserts that Dubil’s binary parameters for IR or RF control codes such as a “bit pattern of the command code” as well as “on/off times of the [transmitted key code] signal” teach the claimed “digital ones and digital zeroes.” Pet. 51 (citing Ex. 1008, 2:61–3:8; 4:33–47; 4:60–5:5; Ex. 1003 ¶ 199). Addressing the recitation “wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be represented in the key code signal,” Petitioner argues Dubil explains that parameters including “*carrier frequency, duty cycle, protocol type (FSK, biphase, PWM, etc.), repetition time, on/off times of the signal, bit pattern*

of the command code . . .” would be used to wirelessly transmit a key code using a carrier signal. *Id.* at 52 (citing Ex. 1008, 2:61–3:8, 4:33–47, 4:60–5:5; Ex. 1003 ¶ 202). Citing the testimony of Dr. Russ, Petitioner asserts that a person of ordinary skill in the art would have understood that parameters such as “duty cycle,” “repetition time,” and “on/off times of the signal” would be timing information used to modulate a binary number onto a carrier frequency. *Id.* (citing Ex. 1003 ¶¶ 203–205). In the cited paragraphs of his Declaration, Dr. Russ provides a detailed discussion of Dubil and other prior art well-known in the art to support his testimony. Ex. 1003 ¶¶ 203–205 (citing Ex. 1003 §§ VI.A and VI.B). Relying on the same testimony of Dr. Russ, Petitioner asserts that the timing information described in Dubil teaches how the STB in Caris would transmit the key code, as discussed with respect to limitation [1.4.3]. Pet. 53 (citing Ex. 1003 ¶¶ 203–205).

Petitioner further contends that a person of ordinary skill in the art would have been motivated to look to Dubil’s teachings when seeking to understand how to use Caris’s STB to wirelessly transmit the key code to apparatus 114, including the details on the key code format (i.e., a bit pattern of ones and zeros) and how to modulate the key code data onto a carrier signal for transmission (i.e., modulating the binary numbers of ones and zeros on to a carrier signal using timing information). Pet. 51 (citing Ex. 1003 ¶¶ 200, 169; Ex. 1008, 2:61–3:8, 4:33–47, 4:60–5:5), 53 (citing Ex. 1003 ¶¶ 203–205, 169; Ex. 1008, 2:61–3:8, 4:33–47, 4:60–5:5). Petitioner asserts that a person of ordinary skill in the art would have implemented the techniques of Dubil within the Caris’s STB because both

describe the transmission of the same type of key codes used to control an electronic consumer device. *Id.* at 51 (citing Ex. 1003 ¶¶ 200, 169), 53.

Patent Owner disputes the sufficiency of Petitioner’s showing. Regarding the recitation of a “digital ones and/or digital zeros,” Patent Owner contends that a person of ordinary skill in the art “would understand that a digital one and digital zero means that there is a more complex pattern than simply a one is on and a zero is off.” PO Resp. 52. Although Dr. Sprenger provides some discussion of the terms in his Declaration, Patent Owner has not proposed any construction of “digital one” or “digital zero” that would distinguish such terms from binary code. *See id.* (“This equating of on/off times to a digital one and digital zero is incorrect because that would imply that all binary code is always a digital one and a digital zero, which is not true.”). We decline to infer what construction Patent Owner might have proposed adopting in light of Dr. Sprenger’s testimony, and how such a construction might distinguish from the binary information identified by Petitioner. On the record before us, we find Petitioner’s identification of such binary information sufficient to meet the claim’s recitation.

Next, Patent Owner argues that the proposed combination of Caris and Dubil does not teach that the “key code data *stored in the codeset* comprises a series of digital ones and/or digital zeros” because “all of the XML parameters in Dubil, including the ‘on/off times’ and ‘bit pattern of the command code,’ are stored at the set-top box as separate XML tags.” PO Resp. 52 (citing Ex. 2003 ¶¶ 289–290). In a related argument, Patent Owner asserts that Dubil does not teach that “the codeset comprises time information” because Dubil’s the XML tags for “duty cycle,” “repetition time,” and “on/off times of the signal” are all separate from the XML tag for

the “bit pattern of the command code.” PO Resp. 54. Patent Owner contends that “Dubil actually *teaches away* from a codeset that comprises time information.” *Id.* In its Reply, Petitioner responds that “[t]he Petition does not rely on a bodily incorporation of Dubil’s XML tags.” Pet. Reply 19. Petitioner argues that they instead relies on the combination of the teachings of Caris and Dubil by using Dubil’s teaching of timing factors describing how to modulate a binary key code onto a carrier signal and implementing “these timing factors with the key codes (i.e., codeset) stored in Caris’s STB to perform the wireless transmission of the key codes.” *Id.* (citing Pet. 52–53; Ex. 1008, 2:61–3:8, 4:33–47, 4:60–5:5). We agree with Petitioner’s argument and disagree with Patent Owner’s argument because Patent Owner improperly relies upon the bodily incorporation of one reference into another, rather than maintaining focus on the teachings of the references. *See MCM Portfolio*, 812 F.3d at 1294.

Lastly, Patent Owner asserts that the combination of Caris and Dubil does not teach the recited selection of key code data from the codeset because “[t]he combination of Caris and Dubil would not select key code data from a codeset at the first device” for the reasons Patent Owner discussed with respect to limitations [1.4.1], [1.4.2], and [1.4.3]. PO Resp. 51 (citing PO Resp. §§ IV.B.4.c–e). We disagree with Patent Owner’s argument because, for the reasons discussed above in Sections III.E.1.b–d, Petitioner shows sufficiently that Caris or the combination of Caris and Dubil teaches or suggests limitations [1.4.1], [1.4.2], and [1.4.3].

For the foregoing reasons and based on the complete record, we determine that Petitioner has demonstrated sufficiently that the proposed

combination of Caris and Dubil teaches or suggests limitations [1.4.4] and [1.4.5].

f. Rationale for Combining Caris and Dubil

As summarized above, Petitioner relies on Caris for all limitations of independent claim 1, but relies on the combination of Caris with Dubil for the “format the key code” limitation. Petitioner also relies on the combination of Caris with Dubil for limitations [1.4.4] and [1.4.5] reciting the details of the key code format and modulation of the key code signal. For example, Petitioner relies on Caris’s teaching of wireless transmission of key codes by the STB to apparatus 114 using an “IR or RF transmitter” or an “IR or RF blaster.” Pet. 45–46. Petitioner reasons that a person of ordinary skill in the art would have understood that such wireless transmission would be accomplished via “the modulation of the key code onto an infrared carrier signal,” as acknowledged in the ’325 patent as a well-known wireless transmission protocol. *Id.* at 46 (citing Ex. 1001, 1:48–53; Ex. 1003 ¶ 191). For example, the “BACKGROUND” section of the ’325 patent states that it was known that “[t]he codesets can differ from each other not only by the bit patterns assigned to various functions of the associated electronic consumer device, but also by the timing information that describes how the key codes should be *modulated onto carrier signals* to generate key code signals.” Ex. 1001, 1:48–53 (emphasis added).

Petitioner’s declarant, Dr. Russ, testifies that “[w]hile Caris does not explicitly describe the operational details behind the wireless transmission of key codes, a [person of ordinary skill in the art] looking to understand these formatting or operational details would have known to look to references such as Dubil.” Ex. 1003 ¶ 191. The combination of this testimony, Caris’s

disclosure of infrared or radio-frequency transmission, and the '325 patent's acknowledgment that carrier-signal modulation was known provides rational underpinning that supports Petitioner's articulated reasoning for combining the teachings of Caris and Dubil in the manner proposed by Petitioner.

Patent Owner nevertheless advances a number of arguments disputing the sufficiency of Petitioner's showing. First, Patent Owner argues that a person of ordinary skill in the art would not have been motivated to combine Caris and Dubil because "neither Petitioner nor its expert provides any reason why a [person of ordinary skill in the art] would have sought to modulate the signals transmitted in Caris." PO Resp. 39. As discussed above, this argument is not persuasive. Although Caris may not be explicit in suggesting carrier-signal modulation, Dr. Russ provides sufficient basis, in light of the well-known practice of using carrier-signal modulation for RF and IR transmission, that a person of skill in the art would have understood such a suggestion from Caris's disclosure of such transmission techniques. Indeed, Dr. Russ devotes a significant section of his Declaration to an overview of such techniques to support his assertion that "it was well-known to utilize modulation techniques to wirelessly transmit key codes." Ex. 1003 ¶¶ 80–91.

Patent Owner's expert, Dr. Sprenger, also acknowledges that carrier-signal modulation was widely known for transmission of IR and RF signals. Ex. 2003 ¶ 54 ("All of these methods were widely known and available in 2003"). Nevertheless, Dr. Sprenger emphasizes that "the claimed modulating onto a carrier signal is only one of several options for transmitting a signal," and describes various tradeoffs that a person of skill in the art might consider when selecting among those several options.

Ex. 2003 ¶¶ 220–224. But the availability of alternatives does not negate an otherwise-supported motivation to combine reference teachings. *See In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (even the availability of better alternatives in the prior art “does not mean that an inferior combination is inapt for obviousness purposes”).

In the context of its analysis of limitations [1.4.1] and [1.4.2], Patent Owner argues that Petitioner does not establish a sufficient motivation to combine because a combination of Caris and Dubil different from the combination relied on by Petitioner—i.e., the combination of Dubil with Caris’s Figure 1 embodiment, as opposed to the relied-on combination with Caris’s Figure 2 embodiment—would have been more efficient. PO Resp. 46 (citing Ex. 2003 ¶ 259 (“any combination of Caris and Dubil would use the first embodiment of Caris and not the second”)), 50 (citing Ex. 2003 ¶ 279 (“if a POSITA was combining Caris and Dubil, the combination would use the first embodiment of Caris (STB transmits back to the remote) and not the second embodiment (STB transmits to the consumer appliance)”). We disagree with Patent Owner’s argument because the law “does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention.” *Novartis Pharm. Corp. v. W.-Ward Pharm. Int’l Ltd.*, 923 F.3d 1051, 1059 (Fed. Cir. 2019) (quoting *Fulton*, 391 F.3d at 1200).

To the extent Patent Owner argues that the existence of the allegedly “more efficient” combination of Dubil with Caris’s Figure 1 embodiment teaches away from the Petitioner-proposed combination of Dubil with Caris’s Figure 2 embodiment (*see* PO Resp. 46), we disagree with Patent

Owner because “the ‘mere disclosure of more than one alternative’ does not amount to teaching away from one of the alternatives where the reference does not ‘criticize, discredit, or otherwise discourage the solution claimed.’” *SightSound Techs., LLC v. Apple Inc.*, 809 F.3d 1307, 1320 (Fed. Cir. 2015) (quoting *Fulton*, 391 F.3d at 1201). We addressed Patent Owner’s other “teaching away” arguments above, and for the reasons discussed above, we disagree with all of them.

For these reasons, we determine that Petitioner articulates sufficient reason, supported by rational underpinning, for effecting the combination of teachings from Caris and Dubil that it proposes.

g. Conclusion on Claim 1

In consideration of the foregoing and based on the complete record, we are persuaded by Petitioner’s arguments and evidence, notwithstanding Patent Owner’s arguments, addressed above. Having weighed each of the *Graham* factors, including the scope and content of the prior art and the differences between the prior art and the challenged claim, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) over the combination of Caris and Dubil.

2. Dependent Claim 2

Claim 2 depends from claim 1 and further recites “wherein the receiver comprises an RF receiver.” Ex. 1001, 11:6–7. Petitioner asserts that Caris describes that its STB (i.e., “appliance 104” and the claimed “first device”) is configured to receive IR or RF codes transmitted from the remote control in response to a user activating a button on the remote control. Pet.

54 (citing Ex. 1007, 5:46–49, 6:36–38). Citing the testimony of Dr. Russ, Petitioner argues that a person of ordinary skill in the art would have understood that for the STB described in Caris to receive and process an “RF code” transmitted from the remote control, the STB would comprise an RF receiver. *Id.* (citing Ex. 1003 ¶ 206).

Patent Owner contends that “Dubil only teaches using infrared between the set-top box and the remote control” and, therefore, the combination of Caris and Dubil would not have an RF receiver to receive input from the remote control. PO Resp. 54. In its Reply, Petitioner argues that Petitioner relies on Caris for its teaching of an RF receiver. Pet. Reply 20. We disagree with Patent Owner’s argument because Patent Owner improperly relies upon the bodily incorporation of one reference into another, rather than maintaining focus on the teachings of the references. *See MCM Portfolio*, 812 F.3d at 1294.

Based on the complete record, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 2 is unpatentable under 35 U.S.C. § 103(a) over the combination of Caris and Dubil.

3. Dependent Claims 3–5

Claim 3 depends from claim 1 and further recites “wherein the transmitter comprises an IR transmitter.” Ex. 1001, 11:8–9. Petitioner asserts that Caris teaches the limitation recited in claim 3 because Caris teaches that the STB is equipped with an “IR . . . transmitter in the front bezel.” Pet. 54 (citing Ex. 1007, 4:47–51). Petitioner makes a sufficient showing.

Claim 4 depends from claim 1 and further recites “wherein the formatted key code is transmitted from the first device to the second device via a wired connection between the first device and the second device.”

Ex. 1001, 11:10–13. Petitioner argues that Caris teaches the limitation recited in claim 4 because Caris teaches that the STB may use a wired link with apparatus 114 to transmit the control codes. Pet. 54–55 (citing Ex. 1007, 6:53–7:5; Ex. 1003 ¶ 208). Petitioner shows sufficiently that Caris teaches the limitation recited in claim 4.

Claim 5 depends from claim 1 and further recites “wherein the formatted key code is transmitted from the first device to the second device via a wireless connection between the first device and the second device.” Ex. 1001, 11:14–17. Petitioner argues that Caris teaches the limitation recited in claim 5 because Caris teaches that the STB may use a wireless link with apparatus 114 to transmit the control codes. Pet. 55 (citing Ex. 1007, 6:53–7:5; Ex. 1003 ¶ 209). Petitioner makes a sufficient showing.

Patent Owner does not respond separately to Petitioner’s challenge to claims 3–5 beyond Patent Owner’s arguments advanced with respect to claim 1 discussed above. *See* PO Resp. 55–56.

Based on the complete record presented, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 3, 4, and 5 are unpatentable under 35 U.S.C. § 103(a) over the combination of Caris and Dubil.

F. Obviousness over Rye and Skerlos

Petitioner asserts that claims 1, 2, 3, 5, and 7 are unpatentable under 35 U.S.C. § 103(a) over the combination of Rye and Skerlos. Pet. 10–35.

1. Claim 1

Petitioner challenges independent claim 1 as unpatentable under 35 U.S.C. § 103(a) over Rye and Skerlos. Pet. 13–32. In addressing the recited limitations, Petitioner draws a correspondence between (1) the recited “first device” and Rye’s transceiver 30 (*id.* at 13–14 (citing Ex. 1005, Abstr., ¶ 23, Figs. 2, 3)); (2) the recited “second device” and Rye’s selected audiovisual component (*id.* at 14 (citing Ex. 1005, Abstr., ¶ 23, Figs. 2, 3)); and (3) the recited “third device” and Rye’s remote control unit 18 (*id.* at 19–20 (citing Ex. 1005 ¶ 21, Figs. 2, 3)). Petitioner further draws a correspondence between (4) the recited “receiver” of the “first device” and Rye’s RF receiver 34 within Rye’s transceiver 30 (*id.* at 15 (citing Ex. 1005 ¶ 23, Fig. 3)); (5) the recited “transmitter” of the “first device” and Rye’s IR emitter 48 (*id.* at 15–16 (citing Ex. 1005 ¶¶ 23, 25, Fig. 3)); (6) the recited “processing device coupled to the receiver and the transmitter” and Rye’s main processor 38 and IR processor 42 (*id.* at 16–18 (citing Ex. 1005 ¶¶ 23–25, Fig. 3)); and (7) the recited “memory storing instructions executable by the processing device” and Rye’s address memory 40, memory for code lookup table 46, and code library memory 44 (*id.* at 18–19 (citing Ex. 1005 ¶¶ 23–25, Fig. 3)). In addition, Petitioner maps the recited “keystroke indicator received from a third device” to Rye’s radio-frequency binary coded signal transmitted from antenna 24 of remote control unit 18 to transceiver 30 (*id.* at 20–21 (citing Ex. 1005 ¶¶ 21–23, Fig. 2)) and maps the recited “key code” to a control code identified by Rye’s transceiver 30 (*id.* at 21 (citing Ex. 1005 ¶¶ 23, 24, 27–31, 36–38, Fig. 3)). In making these correspondences or mappings, Petitioner relies generally on Rye’s described functionality to meet the limitations of claim 1 requiring the recited

“processing device” to “generate a key code using a keystroke indicator received from a third device” and “transmit the . . . key code to the second device in a key code signal.” *Id.* at 21 (citing Ex. 1005 ¶¶ 23, 24, 27–31, 36–38, Fig. 3), 27 (citing Ex. 1005 ¶¶ 25, 27).

For the limitation requiring the recited “processing device” to “format the key code for transmission to the second device,” Petitioner relies on the combination of Rye with Skerlos, arguing that the proposed combination of Rye with Skerlos teaches “format[ing] the key code for transmission” by describing “formatting of a key code [for transmission] by modulating the key code onto a carrier signal.” *Id.* at 22–25.

Addressing limitation [1.4.4] reciting “wherein the generated key code comprises a one of a plurality of key code data stored in a codeset, wherein the one of the plurality of key code data is selected from the codeset as a function of the keystroke indicator received from the third device, wherein each of the plurality of key code data stored in the codeset comprises a series of digital ones and/or digital zeros,” Petitioner maps Rye’s code library 44 to the recited “codeset.” Pet. 27 (citing Ex. 1005 ¶¶ 24, 38). Petitioner asserts that Rye describes that the key codes stored in code library 44 are used to generate “binary coded infrared (IR) signals.” *Id.* at 28 (citing Ex. 1005 ¶¶ 15, 16, 23, 25, 27). Petitioner contends that a person of ordinary skill in the art would have understood that these “binary” signals would include a binary number representing a “digital one” and “digital zero.” *Id.* (citing Ex. 1003 ¶ 146).

Addressing limitation [1.4.5] reciting “wherein the codeset further comprises time information that describes how a digital one and/or a digital zero within the selected one of the plurality of key code data is to be

represented in the key code signal to be transmitted to the second device,” Petitioner acknowledges that “Rye does not explicitly describe the operational details explaining how the binary numbers are modulated onto an IR carrier signal to produce these signals.” Pet. 30 (Ex. 1005 ¶ 23). Petitioner thus relies on Skerlos for its disclosure of “describes timing factors related to key code transmission and how binary key codes are modulated onto carrier signals.” *Id.* (citing Ex. 1006, 2:68–3:8, 6:12–14, 6:27–30). Petitioner contends that Skerlos describes using the timing information to perform the modulation of the binary code using the pulse code modulated (PCM) technique. *Id.* at 31 (citing Ex. 1006, 3:20-36, Figs. 1A–1C).

Patent Owner asserts that Petitioner does not show sufficiently that the combination of Rye with Skerlos teaches that the codeset comprises time information. PO Resp. 33. We agree with Patent Owner’s argument. As discussed above, Petitioner repeatedly states that “binary coded infrared (IR) signals” are *generated* from the key code stored in code library 44. *See* Pet. 28 (“the key codes stored in code library 44 are used to *generate* ‘binary coded infrared (IR) signals’” (emphasis added)), 30 (“the key codes generated at the transceiver include binary numbers and *generate* ‘binary coded infrared (IR) signals’” (emphasis added); “the key codes include binary numbers that are used to *generate* “binary coded infrared (IR) signals” (emphasis added)). And it is those “binary coded infrared (IR) signals” Petitioner contends include digital ones and zeros. *See* Pet. 28. Petitioner does *not* argue that the “binary coded infrared (IR) signals” are stored in code library 44 (i.e., the claimed “codeset”). Thus, even if Skerlos’s PCM modulation technique is used to provide time information for

Rye’s “binary coded infrared (IR) signals,” it does not show sufficiently how Rye’s code library 44 (the claimed “codeset”) comprises time information, as required by the claim. Thus, we agree with Patent Owner that timing information in the transmitted signal disclosed in Skerlos does not necessarily teach what the codeset comprises on Rye’s set-top box. PO Resp. 33. In addition, Patent Owner argues that the BPAI made the same distinction during prosecution of a predecessor application, and we agree with that distinction. *Id.* (citing Ex. 2006, 256).

Accordingly, we determine that Petitioner does not show by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) over the combination of Rye and Skerlos.

2. Dependent Claims 2, 3, 5, and 7

Claims 2, 3, 5, and 7 each depend directly from claim 1. Petitioner’s arguments and evidence presented with respect to these dependent claims only address the additionally recited limitation of the claims, and, therefore, do not remedy the deficiencies in Petitioner’s analysis of independent claim 1 discussed above. Therefore, for the same reasons discussed above with respect to claim 1, Petitioner has not shown by a preponderance of the evidence that claims 2, 3, 5, and 7 are unpatentable under 35 U.S.C. § 103(a) over the combination of Rye and Skerlos.

IV. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has met its burden of proof, by a preponderance of the evidence, in showing that

claims 1–5 of the '325 patent are unpatentable.⁷ For the reasons discussed above, Petitioner has not demonstrated, by a preponderance of the evidence, claim 7 of the '325 patent is unpatentable. The chart below summarizes our conclusions.

Claims	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–5	103(a)	Caris, Dubil	1–5	
1, 2, 3, 5, 7	103(a)	Rye, Skerlos		1, 2, 3, 5, 7
Overall Outcome			1–5	7

V. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1–5 of the '325 patent are determined to be unpatentable;

FURTHER ORDERED that claim 7 of the '325 patent is not determined to be unpatentable; and

⁷ Should Patent Owner wish to pursue amendment of claims 1–5 in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

FURTHER ORDERED that, because this is a Final Written Decision, a party to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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