

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

QSC AUDIO PRODUCTS, LLC
Petitioner

v.

CREST AUDIO, INC.
Patent Owner

Case IPR2014-00131
Patent 5,652,544

PRELIMINARY RESPONSE BY PATENT OWNER
UNDER 37 C.F.R. § 42.107

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PRELIMINARY RESPONSE BY PATENT OWNER
UNDER 37 C.F.R. § 42.107

Patent Owner Crest Audio, Inc. (hereafter “Patent Owner”) hereby respectfully submits this Preliminary Response to the Corrected Petition for *Inter Partes* Review (hereinafter “the Petition”) in this matter. This filing is timely under 35 U.S.C. §21, § 313, and 37 C.F.R. § 42.107, as it is being filed by the next succeeding business day of three months following the November 15, 2013 mailing date of the Notice granting the Petition.¹ A trial should not be instituted in this matter as none of the references relied upon by QSC Audio Products, LLC (hereinafter “Petitioner”) in its Petition gives rise to a reasonable likelihood of Petitioner prevailing with respect to any challenged claim of the U.S. Patent No. 5,652,544 (hereinafter the ’544 Patent), either alone or in any combination with each other.

I. THERE IS NO LIKELIHOOD OF PETITIONER PREVAILING AS TO ANY CHALLENGED CLAIM OF THE ’544 PATENT

“The Director may not authorize an *inter partes* review to be instituted unless the Director determines that the information presented in the petition filed under section 311 . . . shows that there is a reasonable likelihood that the petitioner

¹ The three month date following the November 15, 2013 mailing date of the Notice Granting the Petition is Saturday, February 15, 2014. Pursuant to 35 U.S.C § 21(b), action may be taken on the next succeeding business day when the deadline for taking action falls on a Saturday. Accordingly, the next succeeding business day in this case is Tuesday, February 18, 2014.

would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). As discussed below, combinations of references cited in the Petition lack material limitations recited in the single independent claim, and the proposed combinations proposed by the Petition would not have been obvious to a person having ordinary skill in the art at the time of the invention. Additionally, the Petition mischaracterizes statements made in the ’544 Patent in order to arrive at its conclusion of obviousness for several of the dependent claims. For at least these reasons, the Petition does not show a reasonable likelihood of prevailing with respect to even a single one of the challenged claims, and *inter partes* review should not be instituted.

II. OVERVIEW OF THE ’544 PATENT

The ’544 Patent was issued as a patent on July 29, 1997 after undergoing an examination process at the U.S. Patent and Trademark Office. Generally, the ’544 Patent relates to programming a signal processing circuit of an amplifier. ’544 Patent, Ex. 1001, col. 1, lines 9-10. A drawback of modifying a signal processing circuit of an amplifier is that such modification may require the setting of one or more switches or the removal and replacement of one or more resistors and capacitors. To set the switches or replace the resistors and capacitors, the amplifier housing must be opened, and the signal processing circuit support must be

removed from the amplifier housing. After the switches have been set or the resistors and capacitors have been replaced, the signal processing circuit support must be re-inserted into the amplifier housing, and the amplifier housing must be closed. Such modification is time consuming and does not allow a user to immediately sound check the results of the modification. '544 Patent, Ex. 1001, col. 1, lines 62-67 and col. 2, lines 1-10.

Although manual knobs located on an amplifier control plate may be used to modify the elements of the signal processing circuit, a person can make unauthorized modifications to the signal processing parameters by simply turning one of the knobs. Also, to repeat the desired settings in multiple amplifiers in a network, each of the knobs of each amplifier must be individually and manually set to be the exact same value. '544 Patent, Ex. 1001, col. 2, lines 22-34.

The '544 Patent discloses apparatus and methods for programming an amplifier through the user of a portable programmer that is removably connectable to the amplifier. When the portable programmer is connected to the amplifier, information relating to parameter and signal processing circuit elements can be modified through the programmer. As a result, processing of a signal transmitted through the amplifier is changed. '544 Patent, Ex. 1001, abstract.

III. PATENT OWNER'S RESPONSE TO PETITION'S INVALIDITY ARGUMENTS

The Petition challenges the validity of claims 1-15, 18-21, and 23-26 of the '544 Patent as allegedly being unpatentable under 35 U.S.C. § 103. For at least the reasons that follow, the Petition does not show a reasonable likelihood that even a single one of the challenged claims is unpatentable.

A. There Is No Reasonable Likelihood of Independent Claim 1 Being Found Obvious over *Sudo* in view of *Porambo*.

The Petition challenges the validity of independent claim 1 as allegedly being obvious under 35 U.S.C. § 103 over U.S. Patent No. 5,882,775, issued to Sudo *et al.* (hereinafter “*Sudo*”), in view of U.S. Patent No. 5,450,624, issued to Porambo *et al.* (hereinafter “*Porambo*”). For at least the reasons discussed below, there is no reasonable likelihood of independent claim 1 being found obvious over *Sudo* in view of *Porambo*.

With respect to the claim limitation “the external programmer being removably connectable to the programming signal input port,” the Petition alleges that the microcomputer 20 in *Sudo* operates as an external programmer and is removably connected to the DSP 2 through the interface 19. Petition, pp. 21 and 23-24. However, such an interpretation is entirely speculative and not supported by the description in *Sudo*. Specifically, *Sudo* states, “[t]he microcomputer 20 is

connected to the main bus 17 through an interface 19.” *Sudo*, Ex. 1005, col. 3, lines 51-52). There is not even a discussion in *Sudo* regarding the type of connection between the interface 19 and the controller 20 or how *Sudo* could function if the connection were designed to be removably connectable. As such, the Petition’s assertion that the controller 20 is removably connectable to the DSP 2 through the interface 19 is entirely speculative and not supported by the disclosure in *Sudo*.

To address this glaring defect, Petitioner relies on the Declaration of Professor Ellis to fill in the gap. This declaration alleges, “[t]he fact that the microcomputer 20 is shown connected to the DSP through the interface 19 suggests that the microcomputer 20 is not hardwired to the DSP but is connected via some sort of removable connection.” Ex. 1003, p. 5, ¶ 13. The declaration fails to provide any factual basis for this opinion, and therefore, the declaration should be given little to no weight. 37 C.F.R. § 42.65 (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

FIG. 1 of *Sudo* is produced below.

FIG. 1

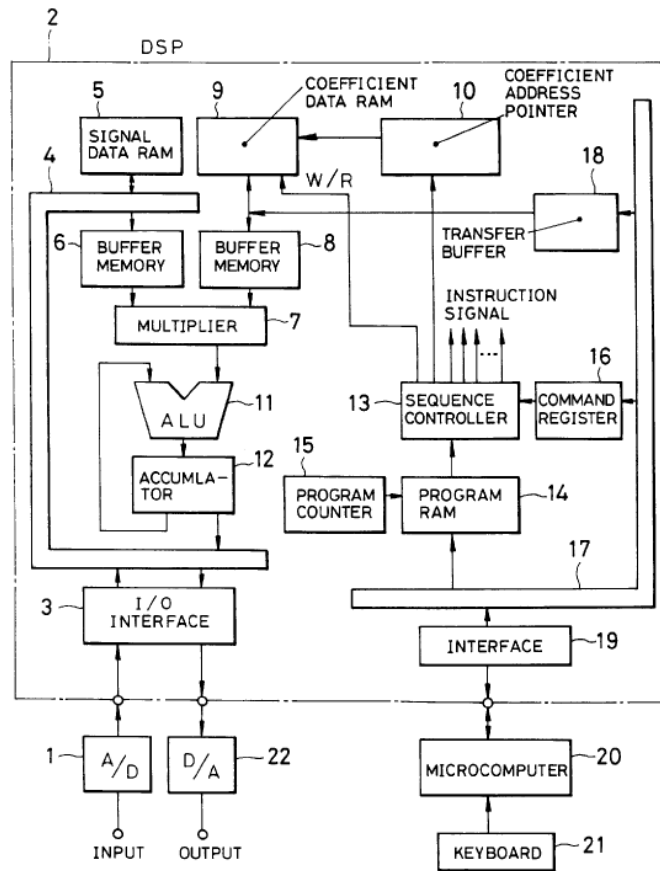


FIG. 1 of *Sudo* shows the microcomputer and the interface connected by lines. However, there is nothing regarding these lines suggests that the microcomputer 20 in *Sudo* is a removable connection, as alleged in the Declaration of Professor Ellis. Instead, FIG. 1 shows merely that the microcomputer 20 is connected to the interface 19, which is consistent with the written description provided in *Sudo*. *Sudo*, Ex. 1005, col. 3, lines 51-52.

Additionally, FIG. 1 of *Sudo* shows that the A/D converter 1 and the D/A converter 22 are connected to the input/output interface 3 in the same manner in which the microcomputer 20 is connected to the interface 19. Under the reasoning

provided by the Declaration of Professor Ellis that any interface connection is necessarily removably connectable (*see* Ex. 1003, p. 5, ¶ 13), the A/D converter 1 and the D/A converter 22 in *Sudo* would also be removably connectable. However, there is no evidence that suggests that the A/D converter 1 or the D/A converter 22 in *Sudo* are removable, so it is clear that none of the connections between the DSP 2 and the A/D converter 1, the D/A converter 22, and/or the microcomputer 20 is a removable connection.

Instead of the microcontroller 20 employing a removable connection, the microcontroller 20 is in constant connection with the DSP 2. As described in *Sudo*, upon receiving a change command from the keyboard 21, the microcomputer 20 sends a command through the interface 19 and the main bus 17 to the command register 16 to execute a read cycle steal. *Sudo*, Ex. 1005, col. 5, lines 3-6. At no time during this process is there a check to determine whether the microcomputer 20 is in communication with the DSP 2, nor is there any type of notification given to indicate that the microcomputer 20 has been connected to the DSP 2. As such, the system in *Sudo* expects the microcomputer 20 to be in constant connection with the interface 19. Thus, *Sudo* fails to disclose or render obvious at least the material claim limitation “the external programmer being removably connectable to the programming signal input port,” as recited in claim 1.

Porambo does not cure the deficiencies of the Petition’s allegations, nor does the Petition allege that this claim limitation is disclosed or rendered obvious by *Porambo*. Instead, *Porambo* is directed towards “determining the status of [an] amplifier-to-speaker connection.” *Porambo*, Ex. 1006, col. 2, lines 14-15.

Therefore, the combination of *Sudo* and *Porambo* fails to disclose or render obvious all of the elements of independent claim 1. For at least this reason, there is no reasonable likelihood of independent claim 1 being found obvious over *Sudo* in view of *Porambo*.

B. There Is No Reasonable Likelihood of Independent Claim 1 Being Found Obvious over *Sudo* in view of *Krokstad*.

The Petition also challenges the validity of independent claim 1 as allegedly being obvious under 35 U.S.C. § 103 over *Sudo* in view of WIPO Publication No. WO 91/08654, filed by Krokstad *et al.* (hereinafter “*Krokstad*”). For at least the reasons discussed below, there is no reasonable likelihood of independent claim 1 being found obvious over *Sudo* in view of *Krokstad*.

Sudo is directed towards a method of rewriting coefficient data by performing a read cycle steal using a microcomputer and a DSP that employs a pipeline process. *Sudo*, Ex. 1005, col. 2, line 23-31. *Sudo* states, “it is necessary to write the coefficient data into new values while continuing the arithmetic operation in order not to cause an inconvenience, such as stopping the arithmetic

operation currently being executed and breaking the reproduction sound of the audio signal.” *Sudo*, Ex. 1005, col. 1, lines 6-67. In response to the keyboard 21 providing a command to change filter characteristics, the microcomputer 20 sends a read cycle steal instruction to the command register 16 in the DSP 2. *Sudo*, Ex. 1005, col. 5, lines 3-10. When the address of the program counter 15 coincides with the address for which the read cycle steal is to be executed, the sequence controller 13 in the DSP 2 transmits a transfer request to the microcomputer 20. *Sudo*, Ex. 1005, col. 5, lines 42-46. Upon the transfer request being received, the microcomputer 20 then transfers coefficient data from the microcomputer 20 to the transfer buffer 18 in the DSP 2. *Sudo*, Ex. 1005, col. 5, lines 46-49. Thereafter, the coefficient data is transferred from the transfer buffer 18 and buffer memory 8, and the arithmetic operation of the DSP 2 is performed using the transferred coefficient data without the arithmetic operation being interrupted. *Sudo*, Ex. 1005, col. 5, lines 58-62 and col. 1, lines 61-64.

In the pipeline process of *Sudo*, one read instruction corresponds to three cycles in the DSP 2. *Sudo*, Ex. 1005, col. 5, lines 11-13, FIG. 2. The exchange of the transfer request and the coefficient data are purposely synchronized between the microcomputer 20 and the DSP 2 so that the entire read cycle steal operation is prepared and executed within the three cycles of the read instruction. *Sudo*, Ex. 1005, col. 6, lines 4-16, FIG. 2. Because of this synchronized communication

between the microcomputer 20 and the DSP 2, a high speed DSP 2 is not needed to write coefficient data without stopping the arithmetic operation of the DSP 2 or reproduction of an audio signal. *Sudo*, Ex. 1005, col. 2, lines 24-28. Thus, the transfer of coefficient data in *Sudo* operates on the principle that the microcomputer 20 and the DSP 2 are in constant connection so that the microcomputer 20 and the DSP 2 can communicate in a synchronized fashion. By communicating in this synchronized fashion, the coefficient data is transferred without interrupting the arithmetic operations of the DSP 2 or the reproduction of an audio signal.

In contrast, *Krokstad* is directed towards a programmable hybrid hearing aid. *Krokstad*, Ex. 1007, abstract. When the hearing aid is not in use, the hearing aid's main section 1 can be connected to a secondary section 2, which functions as a storage case. *Krokstad*, Ex. 1007, p. 9. The hearing aid can be reprogrammed when not in use by connecting the main section 1 of the hearing aid to the secondary section 2 (*i.e.*, the case) and using an RS232 interface to connect the case to a personal computer. *Krokstad*, Ex. 1007, p. 21. Constant connection between the personal computer and hearing aid is not necessary because the reprogramming in *Krokstad* operates on the principle that the hearing aid is reprogrammed while it is being stored in a case and not in use. Because *Krokstad* is not concerned with interrupting a DSP's arithmetic operation or reproduction of

an audio signal, synchronization between the personal computer and the hearing aid to perform a read cycle steal is not necessary and not even a concern in *Krokstad*.

Petitioner's obviousness allegation is based entirely on modifying the interface connection of *Sudo* to operate like the interface of *Krokstad*. However, it would not have been obvious for a person having ordinary skill in the art at the time of the invention to modify the teachings of *Sudo* so that it includes the RS232 interface shown in *Krokstad* because such modification would change the basic principles in which the microcomputer 20 and DSP 2 in *Sudo* were designed to operate. *See In re Ratti*, 270 F.2d 810, 813 (C.C.P.A. 1959) (holding that a modification to a reference is not obvious when the resulting modification changes the principle of operation of the reference). In *Sudo*, the microcomputer 20 and DSP 2 are synchronized and in constant connection so that coefficient data can be replaced without interrupting an arithmetic operation or the reproduction of an audio signal. *Sudo*, Ex. 1005, col. 6, lines 2-4. By contrast, the hearing aid in *Krokstad* uses a removable RS232 interface so that the hearing aid can be programmed while connected to a storage case and not in use. *Krokstad*, Ex. 1007, pp. 9 and 21. If the microcomputer 20 and DSP 2 in *Sudo* were modified to incorporate the RS232 interface in *Krokstad*, the basic principle of the microcomputer 20 and DSP 2 being synchronized to perform a read cycle steal

would be greatly changed. Thus, the proposed modification of *Sudo* is not obvious because such modification would change the principle of operation of the reference.

Additionally, the proposed modification of *Sudo* would render the connection between the microcomputer 20 and the DSP 2 unsatisfactory for its intended purpose. See *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (holding that a modification to a reference is not obvious when the resulting modification renders the reference unsuitable for its intended purpose). *Sudo* specifically states, “it is necessary to write the coefficient data into new values while continuing the arithmetic operation in order not to cause an inconvenience, such as stopping the arithmetic operation currently being executed and breaking the reproduction sound of the audio signal.” *Sudo*, Ex. 1005, col. 1, lines 61-66 (*emphasis added*). By incorporating the RS232 interface in *Krokstad*, the microcomputer 20 and DSP 2 would not write coefficient data without interrupting an arithmetic operation and the reproduction of an audio signal. Instead, *Krokstad* teaches that the RS232 interface is used when the hearing aid is not in use and being stored in a case. *Krokstad*, Ex. 1007, pp. 9 and 21. Thus, the proposed modification of *Sudo* is not obvious because the proposed modification would prevent the microcomputer 20 and DSP 2 from functioning as intended in *Sudo*.

Additionally, the Petition fails to sufficiently explain why it would be obvious to modify *Sudo* to incorporate the teachings of *Krokstad*. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”). First, the Petition alleges that a person having ordinary skill in the art would have been motivated to make such a modification “in order to allow the programmer to be easily connected to or disconnected from the DSP.” Petition, p. 25. In other words, the Petition alleges that the proposed combination is obvious because a benefit would arise as a result of the modification. However, this rationale is not sufficient under *KSR*, as this rationale would render obvious practically any invention that provides a benefit over previous technologies. Additionally, when discussing advantages of using an external programmer that is removably connectable to a programming signal input port, the ’544 Patent itself states that “the programmer can be quickly and easily connected.” ’544 patent, Ex. 1001, col. 4:51-53. Thus, the rationale provided by the Petition has been gleaned from the ’544 Patent itself. It is improper to use knowledge gleaned from the ’544 patent itself to support the conclusion of obviousness. *In re McLaughlin*, 443 F.2d 1392, 1395 (C.C.P.A. 1971).

The Petition also alleges that the proposed modification of *Sudo* is obvious because it would “allow a general purpose computer that could be used for other

tasks to be used in programming the DSP.” Petition, p. 25. Again, this rationale alleges that the proposed modification is obvious because a benefit would result from the modification. However, this rationale is insufficient under *KSR*, as it would render obvious practically any invention that provides a benefit over previous technologies.

Besides alleging that the proposed modification of *Sudo* would be beneficial, the Petition makes no attempt to explain why a person having ordinary skill in the art would be motivated to modify *Sudo* in the way proposed in the Petition. *Sudo* operates on the principle that the microcomputer 20 and DSP 2 are synchronized and in constant connection so that coefficient data can be replaced without interrupting an arithmetic operation or the reproduction of an audio signal. *Sudo*, Ex. 1005, col. 6, lines 2-4. *Sudo* specifically states, “it is necessary to write the coefficient data into new values while continuing the arithmetic operation in order not to cause an inconvenience, such as stopping the arithmetic operation currently being executed and breaking the reproduction sound of the audio signal.” *Sudo*, Ex. 1005, col. 1, lines 61-66 (*emphasis added*). Thus, *Sudo* actually teaches away from the use of a removable connection, such as the RS232 interface used in *Krokstad*. As such, the Petition’s conclusion of obviousness is based on impermissible hindsight.

Therefore, modifying *Sudo* to incorporate the teachings of *Krokstad* would change the basic principles in which the microcomputer 20 and DSP 2 in *Sudo* were designed to operate. Additionally, the proposed modification would result in the connection between the microcomputer 20 and the DSP 2 being unsatisfactory for its intended purpose. Furthermore, the Petition fails to provide sufficient reasoning as to why it would have been obvious to make the proposed combination. Instead, *Sudo* teaches away from the Petition's proposed modification of *Sudo*, and the Petition's conclusion of obviousness is based on impermissible hindsight bias. For at least these reasons, there is no reasonable likelihood of independent claim 1 being found obvious over *Sudo* in view of *Krokstad*.

C. There Is No Reasonable Likelihood of Dependent Claims 7, 20-21, or 23-26 Being Found Obvious over *Sudo* in view of either *Porambo* or *Krokstad* and the '544 Patent Itself.

The Petition challenges the validity of dependent claims 7, 20-21, and 23-26 as allegedly being obvious under 35 U.S.C. § 103 over *Sudo* in view of either *Porambo* or *Krokstad* in further view of the '544 Patent itself. For at least the reasons discussed below, there is no reasonable likelihood of claims 7, 20-21, or 24-26 being found obvious over *Sudo* in view of either *Porambo* or *Krokstad* and further in view of the '544 Patent itself.

First, in order to allege that the '544 Patent has admitted that various claim limitations were well known, the Petition mischaracterizes and improperly applies statements in the '544 Patent regarding conventional amplifiers. Specifically, the Petition relies on portions of the '544 patent that describe a signal processing circuit rather than a digital signal processor. For example, claim 20 recites, in part, “wherein said **digital signal processor** receives and stores at least one of a signal processing function and a signal processing function parameter for a crossover function.” (*Emphasis added*). With respect to this claim limitation, the Petition alleges that the '544 Patent discloses that “it was well known to provide a crossover function in an amplifier via **a signal processing circuit**.” Petition, p. 52 (*emphasis added*).

The following is an excerpt of a portion of the '544 Patent that Petitioner uses to justify the APA allegation:

The signal processing circuits include several resistive elements, capacitive elements, switching elements, operational amplifiers, and other suitable devices which are selected to modify an input signal in a desired manner. The various elements of a signal processing circuit define a plurality of sound processing parameters such as a frequency and an amplitude of a cross-over function

'544 Patent, Ex. 1001, col. 1, lines 27-33 (*emphasis added*). As stated above, physical resistive elements, capacitive elements, switching elements, and operational amplifiers in this conventional **signal processing circuit** can define parameters for a cross-over function. However, the relevant claim limitations are

directed to *a digital processing circuit*. As would be understood by a person having ordinary skill in the art, a digital signal processor could not receive and process a physical resistive element, a capacitive element, a switching element, or an operation amplifier as discussed in this portion of the '544 Patent. Thus, the Petition has mischaracterized the '544 Patent's statements regarding a cross-over function and improperly applied this statement in order to arrive at its conclusion of obviousness.

As another example, the Petition mischaracterizes and improperly applies statements from the '544 Patent in order to allege that claim 23 is obvious. Claim 23 recites, in part, "wherein said digital signal processor receives and stores at least one of a signal processing function and a signal processing function parameter for a volume control function." Regarding this claim limitation, the Petition alleges that the '544 Patent admits that "it was conventional (e.g. well known) for amplifiers to include controls for adjusting that volume of the amplifier." Petition, p. 54. Specifically, the portion of the '544 Patent cited in the Petition states, "a plurality of control knobs 116 for controlling gain, volume, an equalizer circuit, a level threshold, etc. are provided on the control panel 112 as is conventional." '544 Patent, Ex. 1001, col. 5, lines 51-54. Thus, the '544 Patent describes that manual control knobs can adjust the volume of the conventional amplifier. However, the Petition mischaracterizes and improperly applies this statement in

order to arrive at its conclusion that it would be obvious for a digital signal processor to receive and store at least one of a signal processing function and a signal processing function parameter for a volume control function.

Additionally, the Petition improperly fails to consider all limitations in the claims when using statements from the '544 Patent to arrive at its conclusions of obviousness. *See In re Wilson*, 424 F.2d 1382, 1385, 165 (C.C.P.A. 1970) (“All words in a claim must be considered in judging the patentability of that claim against the prior art.”).

For example, even with Petitioner’s mischaracterization that “it was well known to provide a crossover function,” Petitioner fails to consider the claims as a whole when alleging that 20 is obvious. Claim 20 recites “modifying at least one of a signal processing function and a signal processing function parameter” when “said digital signal processor receives and stores at least one of a signal processing function and a signal processing function parameter for a crossover function.” Petitioner has failed to demonstrate how a crossover function is modified.

As another example, claim 7 recites, in part, “a control panel, wherein said programming signal input port is provided on the control panel.” With respect to this claim limitation, the claim chart on page 38 of the Petition alleges, “Patent Owner’s APA discloses controls for an amplifier on a control panel.” However, the Petition does not even address where the claim limitation “wherein said

programming signal input port is provided on the control panel” is allegedly disclosed in any of the cited references. As such, the Petition fails to consider all claim limitations and therefore fails to establish a *prima facie* case of obviousness when using the various statements from the ’544 Patent.

Therefore, the Petition’s allegations that the ’544 Patent itself admits that various claim limitations are obvious is misleading. The Petition has mischaracterized statements made in the ’544 Patent and improperly applied these statements in order to arrive at its conclusions of obviousness. Additionally, the Petition fails to consider all claim limitations. For at least these reasons, there is no reasonable likelihood of claims 7, 20-21, or 23-26 being found obvious over *Sudo* in view of either *Porambo* or *Krokstad* and further in view of the ’544 Patent itself.

IV. CONCLUSION

For the foregoing reasons, there is no reasonable likelihood of Petitioner prevailing with respect to even one of the challenged claims. Accordingly, the Petition should be denied under 35 U.S.C. § 314(a).

Respectfully submitted,
Thomas Horstemeyer LLP

/ N. Andrew Crain /

N. Andrew Crain
Lead Counsel
Attorney for Patent Owner
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February 17, 2014
Date

CERTIFICATE OF SERVICE

In accordance with 37 C.F.R. §§ 42.6(e) and 42.107, the undersigned certifies that on the 17th day of February, 2014, a complete and entire copy of the **PRELIMINARY RESPONSE BY PATENT OWNER UNDER 37 C.F.R. § 42.107** (“Preliminary Response”) including exhibits relied upon were served on counsel of record for Petitioner at the correspondence address as follows,

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via Federal Express No. 8019 4601 4457 , postage prepaid because this is likely to effect service.