

**United States Court of Appeals  
for the Federal Circuit**

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**INPHI CORPORATION,**  
*Appellant*

v.

**NETLIST, INC.,**  
*Appellee*

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2015-1179

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Appeal from the United States Patent and Trademark  
Office, Patent Trial and Appeal Board in No. 95/001,381.

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Decided: November 13, 2015

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DAVID A. JAKOPIN, Pillsbury Winthrop Shaw Pittman  
LLP, Palo Alto, CA, argued for appellant. Also represent-  
ed by ROBERT M. FUHRER, McLean, VA.

MEHRAN ARJOMAND, Morrison & Foerster LLP, Los  
Angeles, CA, argued for appellee. Also represented by  
BRYAN LEITCH, BRIAN ROBERT MATSUI, Washington, DC.

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Before O'MALLEY, REYNA, and CHEN, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

Netlist, Inc. (“Netlist”) is the assignee of U.S. Patent No. 7,532,537 (“the ’537 patent”). Inphi Corporation (“Inphi”) filed a request for *inter partes* reexamination<sup>1</sup> on June 9, 2010. The examiner rejected claims 1–9, 12–31, and 34–44 as obvious in view of the prior art. In order to overcome this rejection, Netlist amended its claims, narrowing them. Thereafter, the examiner withdrew its rejection of the claims and issued a final decision.

Inphi then filed a Notice of Appeal to the Patent Trial and Appeal Board (“PTAB” or “the Board”), alleging, among other things, that the amendment, which introduced a negative claim limitation, failed to satisfy the written description requirement of 35 U.S.C. § 112, paragraph 1 (2006).<sup>2</sup> The Board issued a decision affirming the examiner’s final decision declining to reject the relevant claims. *Inphi Corp. v. Netlist, Inc.*, No. 2013-009066, 2014 WL 187535 (P.T.A.B. Jan. 16, 2014). Inphi filed a request for rehearing on February 18, 2014. The Board denied Inphi’s request and affirmed its decision. *Inphi Corp. v. Netlist, Inc.*, No. 2013-009066, 2014 WL 4180943

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<sup>1</sup> The America Invents Act (AIA) repealed the provisions authorizing *inter partes* reexaminations. Pub. L. No. 112-29, § 6, 126 Stat. 284, 299–305 (2011). But the pre-AIA provisions apply here because Inphi requested the *inter partes* reexamination before the effective date of the AIA. *Id.* § 6(c)(3)(C), 125 Stat. at 305.

<sup>2</sup> Paragraph 1 of 35 U.S.C. § 112 was replaced with newly designated § 112(a) by § 4(c) of the AIA and § 4(e) of the AIA makes those changes applicable “to any patent application that is filed on or after” September 16, 2012. Pub. L. No. 112-29, § 4, 125 Stat. at 296–97. Because the application resulting in the patent at issue in this case was filed before that date, we refer to the pre-AIA version of § 112.

(P.T.A.B. Aug. 13, 2014) (“*Board Decision*”). Inphi appeals from this decision. Because the Board’s determination that the negative claim limitation met the requirements of § 112, paragraph 1 is supported by substantial evidence, we affirm.

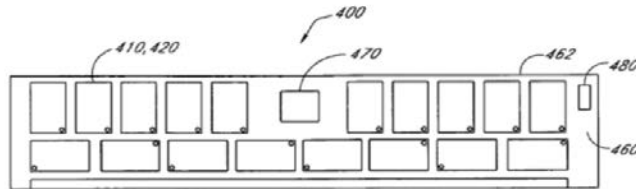
#### BACKGROUND

The ’537 patent, entitled “Memory Module with a Circuit Providing Load Isolation and Memory Domain Translation” has an application date of January 19, 2006.<sup>3</sup> The invention relates to computer system memory modules, which Netlist designs and manufactures. In particular, the invention improves the performance and/or capacity of the memory modules. ’537 Patent, col. 1, ll. 29–32. Conventional computer systems, such as a desktop PC or a laptop, are compatible with modular memory systems. Users may simply insert a memory module into a slot or socket in the motherboard of their personal computer. The ’537 patent concerns random access memory (“RAM”), which provides short-term storage of data for active software programs. Greater performance and/or capacity RAM leads, in general, to a better performing computer.

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<sup>3</sup> The ’537 patent is a continuation-in-part of Application No. 11/173,175, filed on July 1, 2005 (now U.S. Patent No. 7,289,386), which claims the benefit of U.S. Provisional Application Serial No. 60/588,244, filed July 15, 2004 and which is a continuation-in-part of Application No. 11/075,395, filed Mar. 7, 2005 (now U.S. Patent No. 7,283,436), which claims the benefit of U.S. Provisional Application Serial No. 60/550,668, filed Mar. 5, 2004, U.S. Provisional Application Serial No. 60/575,595, filed May 28, 2004, and U.S. Provisional Application Serial No. 60/590,038, filed July 21, 2004.

The memory module itself comprises a printed circuit board, on which memory devices (also known as memory chips) are mounted:



**FIG. 16A**

'537 Patent, Figure 16A. Figure 16A presents one side of a printed circuit board, 460. The memory devices—410, 420—of which there can be up to eighteen, are shown attached to the printed circuit board. The specification discloses multiple memory device types, including “random-access memory (RAM), dynamic random-access memory (DRAM), synchronous DRAM (SDRAM), and double-data-rate DRAM (e.g., SDR, DDR-1, DDR-2, DDR-3).” *Id.* at col. 5, ll. 41–44.

The memory devices, therefore, can be of the Double Data Rate (“dDDR”) Synchronous Dynamic RAM (“SDRAM”) type. *See id.* at col. 36, ll. 28–31 (“In certain embodiments, the memory module 400 is a 1-GB unbuffered Double Data Rate (DDR) Synchronous Dynamic RAM (SDRAM) high-density dual in-line memory module (DIMM).”). At issue in this appeal is a negative claim limitation Netlist introduced by amendment, limiting the claimed chip selects to exclude three particular types of

signals (CAS, RAS, and bank-address signals).<sup>4</sup> Representative claim 1, as amended, is as follows:

1. A memory module comprising:

a plurality of memory devices, each memory device having a corresponding load; and

a circuit electrically coupled to the plurality of memory devices and configured to be electrically coupled to a memory controller of a computer system, the circuit selectively isolating one or more of the loads of the memory devices from the computer system, the circuit comprising logic which translates between a system memory domain of the computer system and a physical memory domain of the memory module, **wherein the system memory domain is compatible with a first number of chip selects, and the physical memory domain is compatible with a second number of chip selects equal to twice the first number of chip selects, wherein the plurality of memory devices comprises double-data rate (DDR) dynamic random-access memory (DRAM) devices and the chip selects of the first and second number of chip selects are DDR chip selects that are not CAS, RAS, or bank address signals.**

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<sup>4</sup> DDR is an acronym for “double data rate,” which means that data transfers occur on both a rising edge and a falling edge of the waveform of a certain timing signal for data transfers. CS is an acronym for “chip select,” RAS is an acronym for “row address strobe,” and CAS is an acronym for “column address strobe.” CS, RAS, CAS, and bank address are each names for signals that direct the actions of the memory chip.

Joint Appendix (“J.A.”) 1366 (emphasis added). While the entire emphasized portion was added during reexamination, Inphi challenges only the underlined portion: “DDR chip selects that are not CAS, RAS, or bank address signals.” The examiner found the amendment sufficient to overcome its obviousness rejections. The Board affirmed the examiner’s determination. Inphi contends, to the contrary, that the negative claim limitation added by amendment is not supported by the specification and thus constitutes impermissible new matter in violation of 35 U.S.C. § 112, paragraph 1.

Inphi requested rehearing of the Board’s decision affirming the examiner. In its request, Inphi emphasized this court’s decision in *Santarus, Inc. v. Par Pharm., Inc.*, 694 F.3d 1344, 1351 (Fed. Cir. 2012), which states that “[n]egative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation.” Inphi argued that “[w]hile the Board gives lip service to the standard articulated in *Santarus* . . . the Board also acknowledged that in this case there is no such reason expressly articulated in the specification.” J.A. 2241.

The Board explained in its decision on Inphi’s request for rehearing that, “the ’537 patent did not articulate *expressly* a reason to exclude RAS and CAS signals . . . .” *Board Decision*, 2014 WL 4180943, at \*1. The Board identified, however, three parts of the specification of the ’537 patent upon which it relied in finding that the negative claim limitation was reasonably supported: “(1) consistency with [Joint Electron Device Engineering Council (“JEDEC”)] standards; (2) the ’537 patent’s excluding RAS and CAS signals in Table 2; and (3) various other passages from the ’537 patent [including Figure 9A] . . . .” *Id.*

The JEDEC is a global standard setting body for the microelectronics industry. The ’537 patent incorporates

by reference a JEDEC standards publication for DDR-1 memory devices, namely the JEDEC “Double Data Rate (DDR) SDRAM Specification,” published February 2004 (“JESD79D”). J.A. 1866–1948. The incorporation is provided in the description of Table 3A of the ’537 patent: “Table 3A provides the numbers of rows and columns for DDR-1 memory devices, as specified by JEDEC standard JESD79D . . . incorporated in its entirety by reference herein.” ’537 Patent, col. 22, ll. 28–32. The JEDEC standard specifies that DDR signals (including CS, RAS, CAS, and bank address signals) are distinct from each other. See J.A. 1882 (depicting Truth Table 1a, a logic table similar to Table 2 in the ’537 patent).

“Table 2 provides a logic table compatible with certain embodiments . . . for the selection among ranks of memory devices [] using gated CAS signals.” ’537 Patent, col. 18, ll. 25–27. Table 2 distinguishes among the relevant signals by providing separate columns for CS, RAS, and CAS.

Figure 9A, which the Board references in its discussion of “various other passages,” distinguishes chip select signals ( $CS_0$ ,  $CS_1$ ), command signals (understood to include CAS and RAS signals), and bank address signals ( $BA_0$ - $BA_m$ ) by displaying them on different signal lines in Figure 9A. As the patent describes, “[t]he circuit 40 receives the two chip-select signals ( $CS_0$ - $CS_1$ ) and one row/column address signal ( $A_{n+1}$ ) from the computer system. Both the circuit 40 and the register 230 receive the bank address signals ( $BA_0$ - $BA_m$ ) and at least one command signal (e.g., refresh, precharge, etc.) from the computer system.” ’537 Patent, col. 17, ll. 2–7; see also *id.* at col. 16, ll. 62–66.

The Board found Inphi’s challenges to the first two sources of evidence—the JEDEC standard and Table 2—“unpersuasive.” *Board Decision*, 2014 WL 4180943, at \*1. In particular, the Board found that, “[a]t a minimum,

ordinarily skilled artisans would reasonably infer at least an *implicit* reason to exclude [RAS and CAS signals] based on their *explicit* exclusion in the context of [Table 2].” *Id.* Inphi’s request for rehearing failed to address the “various other passages,” including Figure 9A. But in its decision, the Board relied on these “various other passages” that indicate that “chip selects are distinct from CAS, RAS, and bank address signals.” *Id.* at \*2.

Finally, the Board described the “[p]atent owner’s reference to JEDEC standards and [Inphi’s expert’s] unrebutted testimony that ordinarily skilled artisans would understand a DDR chip select to be exclusive of RAS, CAS, and bank address signals” as “bolster[ing] support for the negative limitation.” *Id.* at \*2. Inphi appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### DISCUSSION

This court reviews legal conclusions of the PTAB *de novo*. *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004). We review factual findings of the Board for substantial evidence. *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000); *Capon v. Eshhar*, 418 F.3d 1349, 1351 (Fed. Cir. 2005). This is a deferential standard of review. *See In re Jolley*, 308 F.3d 1317, 1320 (Fed. Cir. 2002) (“If the evidence in record will support several reasonable but contradictory conclusions, we will not find the Board’s decision unsupported by substantial evidence simply because the Board chose one conclusion over another plausible alternative.”).

Substantial evidence supports a finding that the specification satisfies the written description requirement when “the essence of the original disclosure” conveys the necessary information—“regardless of *how* it” conveys such information, and regardless of whether the disclosure’s “words [a]re open to different interpretation[s].” *In re Wright*, 866 F.2d 422, 424–25 (Fed. Cir. 1989) (citation and internal quotation marks omitted); *see also Falko-*



*Gunter Falkner v. Inglis*, 448 F.3d 1357, 1365–66 (Fed. Cir. 2006) (finding substantial evidence supported written description based on “several passages in the [patentee’s] application” and the unrebutted “testimony of [the patentee’s] expert,” which showed that skilled artisans would understand the invention); *Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1346 (Fed. Cir. 2013) (discussing the metaphor from *In re Ruschig*, 379 F.2d 990, 995 (1967) that a disclosure should “provide sufficient ‘blaze marks’ to guide a reader through the forest of disclosed possibilities toward the claimed compound”).

Whether a patent claim satisfies the written description requirement of 35 U.S.C. § 112, paragraph 1 depends on whether the description “clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562–63 (Fed. Cir. 1991) (internal quotation marks omitted) (quoting *In re Gosteli*, 872 F.2d 1008, 1012 (Fed. Cir. 1989)).

[W]hatever the specific articulation, the test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed.

*Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

In particular, “[n]egative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation.” *Santarus*, 694 F.3d at 1351.

At the heart of this appeal is whether the specification of the '537 patent provides a “reason to exclude” CAS, RAS, or bank address signals that is sufficient to satisfy the written description requirement embodied in *Santarus*. In its briefs, Inphi argued that *Santarus* requires “that the patentee describes a preference for the included signal(s) over the excluded signals (or alternatively a disadvantage of the excluded signals).” Inphi Reply Br. 6. In other words that the specification identify the comparative advantage of the material remaining after any narrowing amendment. *Id.* During oral argument, counsel for Inphi appeared to back away from this argument, suggesting that *Santarus* does not require listing advantages or disadvantages to alternative signal types. Oral Arg. at 02:14–03:45; 08:22–08:53, *available at* <http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2015-1179.mp3>. The question that remains is whether properly describing alternative features—without articulating advantages or disadvantages of each feature—can constitute a “reason to exclude” under the standard articulated in *Santarus*. We hold that it can.

The patent at issue in *Santarus* related to the treatment of acid-caused gastrointestinal disorder. *Santarus*, 694 F.3d at 1350. This court found that the negative claim limitation—“wherein the composition contains no sucralfate”—is supported by the specification as required by 35 U.S.C. § 112, paragraph 1. *Id.* at 1350–51. In support of the negative claim limitation, the specification described that “sucralfate . . . [has] certain *disadvantages* associated with [its] use. . . . Proton pump inhibitors such as omeprazole represent an *advantageous* alternative to the use of . . . sucralfate as a treatment for complications related to stress-related mucosal damage.” *Id.* at 1350 (emphasis added). And, further, that sucralfate “was known to have occasional adverse effects.” *Id.* at 1350–51. The specification, therefore, noted both that the disclaimed element—sucralfate—has disadvantages and

that the claimed element—proton pump inhibitors such as omeprazole—was advantageous.

In *Santarus*, the district court below held that “it is inadequate that the specification states that [the] claimed composition is ‘advantageous’ as compared with sucralfate . . . .” *Id.* at 1350. In reversing the district court, the panel first noted that “the patentee is entitled” to narrow the claims. *Id.* at 1351. The court continued:

The Manual of Patent Examining Procedure explains that claims may state the exclusion of alternatives. See MPEP § 2173.05(i) (“*If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims.*”). For example, in *In re Johnson*, 558 F.2d 1008, 101[8] (CCPA 1977), the applicant narrowed the claims to exclude the content of a lost interference count, and the court observed that: “*It is for the inventor to decide what bounds of protection he will seek.*”

*Negative claim limitations are adequately supported when the specification describes a reason to exclude the relevant limitation. Such written description support need not rise to the level of disclaimer. In fact, it is possible for the patentee to support both the inclusion and exclusion of the same material.* The claim limitation that the Phillips formulations contain no sucralfate is adequately supported by statements in the specification expressly listing the disadvantages of using sucralfate. The district court’s holding that the ’772 patent claims are invalid on written description grounds is thus reversed.

*Id.* (emphases added). The meaning of this passage is the central dispute between the parties. Inphi argues that the phrase “reason to exclude” requires something more than properly describing alternative features of the pa-

tented invention. Netlist, on the other hand, argues that the written description requirement is satisfied when alternative features are properly described. The *Santarus* court found that the patent-at-issue’s express recitation of (dis)advantages was sufficient to provide a reason to exclude the claim limitation at issue. That court did not hold, however, that such recitations were required to satisfy the written description requirements of § 112, paragraph 1 for negative claim limitations. Nor do we see any reason to now articulate a new and heightened standard for negative claim limitations.<sup>5</sup>

When viewed in its proper context, *Santarus* simply reflects the fact that the specification need only satisfy the requirements of § 112, paragraph 1 as described in this court’s existing jurisprudence, including through compliance with MPEP § 2173.05(i) (“If alternative elements are positively recited in the specification, they may be explicitly excluded in the claims.”) and *In re Johnson*, 558 F.2d at 1018 (“It is for the inventor to decide what bounds of protection he will seek.”).

The “reason” required by *Santarus* is provided, for instance, by properly describing alternative features of the patented invention. See *In re Johnson*, 558 F.2d at 1019 (“The facts of the prosecution are properly presented and relied on, under these circumstances, to indicate that appellants are merely excising the invention of another, to

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<sup>5</sup> The dissent in *Santarus* incorrectly characterized the “describe a reason” language in the majority as a “new rule.” *Id.* at 1358–59. It is telling that both the majority and dissent cite the same passages in *In re Johnson* and MPEP § 2173.05. Compare *id.* at 1351, with *id.* at 1359. These references are consistent with the *Santarus* requirement that “the specification describe[] a reason to exclude . . . .” *Id.* at 1351.

which they are not entitled, and are not . . . claiming ‘new matter.’”).

That is not to say that in all cases, a patentee may arbitrarily dissect its invention by amending the claims in order to avoid the prior art. In one recent case, this court found that if the specification directly forecloses the negative claim limitation, it is invalid under § 112. *See In re Bimeda Research & Dev. Ltd.*, 724 F.3d 1320, 1322 (Fed. Cir. 2013) (affirming Board rejection of negative claim limitation for lack of written description where “[t]he specification . . . leaves no room for argument that the inventor possessed a formulation that excludes only [an antiinfective] while permitting the use of antibiotics”).

In this case, however, substantial evidence supports the Board’s finding that the specification properly distinguishes the relevant signal types—CS, CAS, RAS, and bank address. Indeed, the parties agree that the disclosure in the ’537 patent distinguishes among the relevant signal types, but simply disagree about whether that distinction creates a “reason to exclude” that satisfies the requirements of § 112, paragraph 1. *Compare* Inphi Op. Br. 26 (“Thus, in effect, the Board—and Netlist’s attorney’s—confused ‘distinguishment’ of various signals that can be used as chip selects with ‘a reason to exclude’ certain signals over others as chip selects.”), *with* Netlist Resp. Br. 27 (“This means that a DDR chip select signal is not a CAS signal, a RAS signal, or a bank address signal. That **distinction** ‘reasonably conveys’ a reason to exclude, which provides substantial evidence to uphold the Board’s decision.”). The Board’s review of the specification makes it clear that there was substantial evidence that Netlist possessed the negative claim limitation as of the filing date, as is evidenced through the Board’s reliance on the JEDEC standard, Table 2, and other various passages in the specification, including Figure 9A.

We affirm the Board's finding, as supported by substantial evidence, that the "original '537 patent disclosure reasonably conveys a reason to exclude the relevant limitations." *Board Decision*, 2014 WL 4180943, at \*1. We hold that *Santarus* did not create a heightened written description standard for negative claim limitations and that properly described, alternative features are sufficient to satisfy the written description standard of § 112, paragraph 1 for negative claim limitations.

#### CONCLUSION

For the foregoing reasons, and because we find that Inphi's remaining arguments are without merit, we conclude that the Board properly affirmed its previous opinion upholding the examiner's finding that the negative claim limitation at issue satisfied the standard for written description under 35 U.S.C. § 112, paragraph 1. Accordingly, the Board's decision is affirmed.

**AFFIRMED**