

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROCHIP TECHNOLOGY INC.,
Petitioner,

v.

HD SILICON SOLUTIONS LLC,
Patent Owner.

IPR2021-01421
Patent 7,260,731 B1

Before FRANCES L. IPPOLITO, NATHAN A. ENGELS, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

ENGELS, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

Petitioner Microchip Technology, Inc. filed a Petition (Paper 3, “Pet.”) requesting *inter partes* review of claims 8–18 of U.S. Patent No. 7,260,731 B1 (Ex. 1001). Patent Owner HD Silicon Solutions LLC filed a Preliminary Response. Paper 12 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the Petition and any response thereto shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” For the reasons explained below, upon considering the Petition, Preliminary Response, and evidence of record, we determine the information presented in the Petition does not establish a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we do not institute *inter partes* review.

A. Real Parties in Interest

Petitioner identifies Microchip Technology Inc. as the real party-in-interest. Pet. 1. Patent Owner identifies HD Silicon Solutions LLC as the real party-in-interest. Paper 4, 2.

B. Related Matters

The parties state that the ’731 patent is the subject of *HD Silicon Solutions LLC v. Microchip Technology Inc.*, No. 6:20-cv-01092 (W.D. Tex.). Pet. 1; Paper 4, 2. That case has been transferred to *HD Silicon Solutions LLC v. Microchip Technology Inc.*, No. 3:21-cv-08295-SK (N.D. Cal.). Paper 6, 2.

C. The ’731 Patent

Titled “Saving Power When in or Transitioning to a Static Mode of a Processor,” the ’731 patent is directed to reducing power consumption of a

computer system during intervals in which a processor is stopped. Ex. 1001, 1:7–11, codes (54), (57). The '731 patent states that typically a processor is stopped by terminating the system clocks furnished to the processor, putting the processor into a “deep sleep” state. Ex. 1001, 1:26–53. Maintaining that state requires application of a core voltage to various circuits, “which generates a power dissipation referred to in th[e] specification as ‘static power’ usage because the processor is in its static state in which clocks are disabled.” Ex. 1001, 1:53–57. The '731 patent describes reducing core voltage to the processor to a value sufficient to maintain state during the mode in which system clocks are disabled thereby reducing the power used by the processor in the deep sleep state. Ex. 1001, 2:3–9, 3:18–22.

D. Illustrative Claims

Of the challenged claims, claims 8, 12, 13, 14, and 15 are independent claims. Claim 8, reproduced below with labels added corresponding to those used in the Petition, is illustrative.

8[pre] A circuit for providing a regulated voltage to a processor comprising:

8[a] a voltage regulator having:

8[a.1] an output terminal providing a selectable voltage, and

8[a.2] an input terminal for receiving signals indicating the selectable voltage level;

8[b.1] means for providing signals at the input terminal of the voltage regulator for selecting a voltage for operating the processor in a computing mode and a voltage of a level less than that for operating the processor in a computing mode,

8[b.2] wherein the level less than that for operating the processor in a computing mode is sufficient to maintain state of the processor; and

8[c.1] means for changing the voltage regulator from a mode in which power is dissipated during a voltage transition that reduces said selectable voltage

8[c.2] to a mode in which power is saved during said voltage transition.

E. Alleged Grounds of Unpatentability

Petitioner asserts that claims 8–18 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
8–11, 14	103	Helms, ¹ Maxim-165X-Datasheet, ² MAX1711-Kit, ³
12, 13, 15–18	103	Helms, TI-TPS5210-Datasheet, ⁴ Nilsson ⁵

II. ANALYSIS

A. Level of Ordinary Skill in the Art

In determining the level of skill in the art, we consider the type of problems encountered in the art, the prior art solutions to those problems, the rapidity with which innovations are made, the sophistication of the technology, and the educational level of active workers in the field. *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986); *Orthopedic Equip. Co. v. U.S.*, 702 F.2d 1005, 1011 (Fed. Cir. 1983).

¹ US 6,748,545 B1, June 8, 2004. Ex. 1010 (“Helms”).

² Maxim Integrated Inc., “High-Efficiency, PWM, Step-Down DC-DC Controllers in 16-Pin QSOP, MAX1652–MAX1655,” Rev. 1, July 1998. Ex. 1011 (“Maxim-165X-Datasheet”).

³ Maxim Integrated, Inc., “MAX1711 Voltage Positioning Evaluation Kit,” Rev. 1, June 2000. Ex. 1012 (“MAX1711-Kit”).

⁴ Texas Instruments, Inc., “TPS5210 Programmable Synchronous-Buck Regulator Controller,” May 1999. Ex. 1008 (“TI-TPS5210-Datasheet”).

⁵ James W. Nilsson, “Electronic Circuits,” Addison Wesley, 4th ed., 1993. Ex. 1013 (“Nilsson”).

Petitioner contends a person of ordinary skill in the art at the time of the invention would have been a person with “at least a bachelor’s degree in electrical engineering, computer engineering, or computer science, with at least two years of experience in computer system development, including experience developing power/voltage regulation systems for portable devices.” Pet. 5. Petitioner also states that a person may qualify as a person of ordinary skill with more formal education and less experience or vice versa. Pet. 5–6 (citing Ex. 1002 ¶¶ 42–44, 45–89).

B. Ground 1: Helms, Maxim-165X-Datasheet, and MAX1711-Kit

The Petition includes a limitation-by-limitation comparison of the combination of Helms, Maxim-165X-Datasheet, and MAX1711-Kit to claims 8–11 and 14. Pet. 22–62. Petitioner also presents arguments for combining the references. Pet. 63–67.

Petitioner cites Helms’s disclosures of a DC/DC voltage converter that provides an adjustable voltage to a processor, and Petitioner states that the voltage converter can be a voltage regulator such as MAXIM MAX1711 or its equivalent providing a regulated voltage to the processor. Pet. 22. Petitioner proposes combining Helms with the combined teachings of Maxim-165X-Datasheet and MAX1711-Kit such that “in the PFM [pulse-frequency modulation] mode, the voltage regulator would sink current in the load (e.g., the CPU) and dissipate/waste power during a voltage transition, and that setting **SKIP high** would force or change the operation mode of the voltage regulator from PFM mode to the PWM [pulse-width modulation] mode, where the power is generally not dissipated in the load and is saved.” Pet. 38.

As Petitioner recognizes, though, Maxim-165X-Datasheet states that PWM mode is preferred under heavy load conditions and that PFM may be

more efficient under light load conditions. Pet. 64. MAX1711-Kit suggests a similar approach, but MAX1711-Kit also suggests a “clever approach” to sink current by using PWM mode only during transitions (Ex. 1012, 3–4), and Petitioner proposes implementing the latter approach from MAX1711-Kit in the voltage regulator taught by Maxim-165X-Datasheet to replace the voltage regulator taught by Helms. Pet. 38, 41–44, 64–67.

It is unclear, though, why a person of ordinary skill would have combined Maxim-165X-Datasheet with Helms and MAX1711-Kit. Helms identifies a MAXIM MAX1711 controller as an example of a programmable voltage converter (Ex. 1010 3:18–19), and MAX1711-Kit describes a MAX1711 evaluation kit (Ex. 1012). Maxim-165X-Datasheet, though, describes MAX1652–MAX1655 controllers which have their own “Evaluation Kit Available” and Maxim-165X-Datasheet does not mention MAX1711 controllers or their evaluation kit. Ex. 1011.

Indeed, Petitioner acknowledges that Helms teaches supplying operating and sleep voltages to a processor in the operating and sleep modes to reduce power consumption and that Helms suggests the MAXIM MAX1711 as a voltage regulator. Pet. 22, 63. But Petitioner and Dr. Alpert offer the conclusory statement that “a [person of ordinary skill] would have considered using a voltage regulator such as those that Maxim-165X-Datasheet describes.” Pet. 66; *accord* Ex. 1002 ¶ 411 (mirroring language from the Petition). Further, Helms describes a 5-bit digital signal to control its DC/DC converter, which is consistent with the MAX1711 controller (Ex. 1010 3:21–56; *accord* Pet. 46), but the MAX165X controllers depict only a single input voltage converted into a stepped-down output voltage (Ex. 1011, 5–6).

In sum, based on the evidence of record, we determine Petitioner has not adequately supported its proposed combination of references with a sufficient rationale. Rather, we determine Petitioner's proposed combination of references is guided by improper hindsight. Accordingly, Petitioner has not shown a reasonable likelihood of success in its challenge to claims 8–11 and 14 as presented in Ground 1.

C. Ground 2: Helms, TI-TPS5210-Datasheet, Nilsson

The Petition includes a limitation-by-limitation comparison of the combination of Helms, TI-TPS5210-Datasheet, and Nilsson to claims 12, 13, and 15–18. Pet. 68–101. Petitioner also presents arguments for combining the references. Pet. 102–106.

Petitioner cites Helms for its disclosure of a DC/DC voltage converter that provides adjustable voltage to a processor, and rather than using the MAXIM MAX1711 voltage regulator identified by Helms, Petitioner proposes using the TI-TPS5210 regulator controller as the DC/DC converter, arguing the TI-TPS5210 is equivalent to the MAX1711. Pet. 103–104.

But Petitioner contends a person of ordinary skill would have modified the TI-TPS5210 regulator to arrive at the claimed invention. Pet. 71–84, 104. Specifically, Petitioner contends a person of ordinary skill “would have been motivated to modify the resistor-voltage-divider feedback network that TI-TPS5210-Datasheet discloses according to a design that Nilsson discloses because such a modification would allow regulating the output voltage according to a difference between two input voltages.” Pet. 104. According to Petitioner, the only functional different between TI-TPS5210-Datasheet and Nilsson's circuitry “is that [TPS5210-Datasheet] lacks the voltage source v_a coupled between the resistor R3 and GROUND,” and Petitioner proposes coupling a voltage source between R3 and

GROUND, arguing that such a modification would have been a text-book configuration as disclosed in Nilsson and a straightforward addition to the TI-TPS5210 regulator. Pet. 78. Petitioner contends adding voltage source v_a would allow raising and lowering the output voltage relative to the reference voltage, allowing fine control of the output voltage. Pet. 78.

But contrary to Petitioner's arguments, Nilsson does not suggest adding a voltage source to circuits such as those in TI-TPS5210-Datasheet. Voltage source v_a in Nilsson is simply one of the two input voltages supplied to Nilsson's operational amplifier. Ex. 1013, 3. Taking Nilsson's voltage source v_a out of Nilsson's operational-amplifier circuit would remove the context of Nilsson's circuit, rendering v_a essentially a generic voltage source removed from the teachings of Nilsson. Petitioner purports to support the proposed addition of Nilsson's voltage source v_a to TI-TPS5210-Datasheet with conclusory statements regarding what a person of ordinary skill would have understood, with Dr. Alpert mirroring those statements from the Petition. Pet. 78–80; Ex. 1002 ¶¶ 596–599.

Based on the evidence of record, we determine Petitioner has not adequately shown that a person of ordinary skill would be motivated to combined the references as proposed to arrive at the invention of claims 12, 13, and 15–18. Rather, we determine Petitioner's proposed selection of different elements from each reference is guided by improper hindsight. Petitioner has therefore not demonstrated a reasonable likelihood of prevailing with respect to its challenge of claims 12, 13, and 15–18 in Ground 2.

III. CONCLUSION

For the reasons set forth above, we determine that Petitioner has not demonstrated a reasonable likelihood that it will prevail with respect to at

least one claim of the '731 patent. Accordingly, we do not institute *inter partes* review. Because we deny institution on the merits, we do not reach the parties' arguments regarding discretionary denial under 35 U.S.C. § 314(a).

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314(a), the Petition for institution of *inter partes* review of claims 8–18 of U.S. Patent No. 7,260,731 is denied.

IPR2021-01421
Patent 7,260,731 B1

PETITIONER:

Sanjeet Dutta
Suhrid Wadekar
GOODWIN PROCTER LLP
sdutta@goodwinlaw.com
swadekar@goodwinlaw.com

PATENT OWNER:

Justin Oliver
Sarah Brooks
Seth Boeshore
VENABLE LLP
joliver@venable.com
ssbrooks@venable.com
sboeshore@venable.com