

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WESTERN DIGITAL TECHNOLOGIES, INC.,

Petitioner,

v.

SHAMROCK INNOVATIONS, INC.,

Patent Owner.

Case No. IPR2023-00842

U.S. Patent No. 9,535,454

PATENT OWNER'S SUR-REPLY

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PATENT OWNER'S EXHIBIT LIST

Ex. 2001	CV of Terry R. Lee
Ex. 2002	Declaration of Terry R. Lee
Ex. 2003	File History of U.S. Patent Appl. 09/130,058, filed August 6, 1998
Ex. 2004	'454 Patent Family Tree
Ex. 2005	U.S. Patent 5,613,141 (Szatkowski)
Ex. 2006	U.S. Patent 6,192,422 (Daines)
Ex. 2007	C. J. Georgiou and C. . -S. Li, "Scalable protocol engine for high-bandwidth communications," Proceedings of ICC'97 - International Conference on Communications, Montreal, QC, Canada, 1997, pp. 1121-1126 vol.2, doi: 10.1109/ICC.1997.610064.
Ex. 2008	Network World - July 31, 1995 - Page 64
Ex. 2009	The RS232 STANDARD. A Tutorial with Signal Names and Definitions. (renamed the "EIA232 Standard" in the early 1990's) Copyright © 1993-1997 by CAMI Research
Ex. 2010	Phil Storrs PC Hardware book The SCSI Interface (Small Computer Systems Interface) Copyright © Phil. Storr, last updated December 4 1998
Ex. 2011	Phil Storrs PC Hardware book The PC and Interrupts Copyright © Phil. Storr, last updated December 26 1998
Ex. 2012	An Introduction to Fibre Channel by M Primmer · October 1996 Hewlett-Packard Journal 1.
Ex. 2013	AMENDED COMPLAINT for Patent Infringement against Lenovo (United States), Inc., filed by Shamrock Innovations, LLC. 5:22cv102, Shamrock Innovations, Llc V. Lenovo (United States), Inc.
Ex. 2014	Joint Claim Construction Statement by Shamrock Innovations, LLC 5:22cv102, Shamrock Innovations, Llc V. Lenovo (United States), Inc.

Ex. 2015	Joint Claim Construction Statement Exhibit A by Shamrock Innovations, LLC 5:22cv102, Shamrock Innovations, LLC v. Lenovo (United States), Inc.
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I. INTRODUCTION

The Reply highlights the deficiencies in the Petition by relying on a new reference (Tachyon) to meet one claim limitation, and falsely claiming that Patent Owner (PO) admitted (expressly and through waiver) that Vangemert met another limitation. Petitioner has failed to demonstrate that Vangemert's buffer credit control words avoid transmission through the second buffer, or that Copeland and Vangemert would have been combined. With respect to the combination of Dobson and Copeland, Petitioner has failed to demonstrate that either reference teaches a flow control signal carried by the same serial link that carries the serialized data.

II. PETITIONER CANNOT USE A NEW REFERENCE TO FILL THE GAP IN VANGEMERT

A. The Petition Failed To Show That Vangemert's Flow Control Signal Does Not Pass Through The Second Buffer

With respect to the limitation in Claim 1 requiring transmission of the flow control signal "through the serial link and the connector without passing the flow control signal through the second buffer," the Petition alleged that this limitation was taught by Vangemert alone. From the Petition:

Vangemert teaches that the transmit controller 412 transmits buffer credit control words received directly from the buffer credit manager 418 and passes them directly to the encoder 402, which sends them to the transmitter 312. EX. 1003, ¶ 77. The transmitter 312 then outputs the buffer credit signal (i.e., flow control signal) to other devices via the serial link. *Id.* Vangemert does not disclose or suggest that the buffer credit signal or associated buffer credit control words are

ever stored in or passed through the transmit buffer 410 (second buffer). *Id.* Rather, Vangemert teaches that when the buffer credit manager is enabled in response to a request to transmit data from a remote device, “the transmit controller 412 begins transmitting buffer credit control words in response to a credit signal from buffer credit manager.” EX. 1005, col. 4:11-16. This teaches that the transmit controller 412 outputs data directly upon receiving it from the bit credit manager 418. EX. 1003, ¶¶ 77-78. This efficient transfer of the bit credit signal from the bit credit manager 418 through the transmit controller 412 aids in maintaining the minimum latencies Vangemert desires. EX. 1003, ¶ 79. Pet.,30-31 (emphasis added).

Patent Owner responded as follows:

The Petitioner erroneously alleges that “Vangemert does not disclose or suggest that the ... buffer credit control words are ever stored in or passed through the *transmit buffer 410* (second buffer).” (Petition, 31). Vangemert says the opposite: “A transmit controller 412 retrieves control words and data frames from transmit buffer 410 and forwards them to encoder 402.” (Ex. 1005, 3:49-52) Vangemert similarly states: “Transmit controller 416 creates or updates exchange information in exchange tables 416 in response to commands and data from the node’s i/o bus, generates control words and data frames in transmit buffer 410, and forwards them to encoder 402”. (Ex. 1005, 3:57-61). Furthermore, “Vangemert clearly explains that the transmit controller transmits credit control words to devices connected to the I/O bus via the transmit buffer (410) in response to the internal credit control signal generated by the comparator (502).” (Ex. 1005, 4:11-16, Ex. 2002, 103). Accordingly, Vangemert teaches that the control words pass through the transmit buffer 410. POR, 34 (emphasis added).

It is clear that the Petition failed to demonstrate by a preponderance of the evidence that Vangemert alone teaches the limitation in question. Petitioner’s assertion that “Vangemert does not disclose or suggest that the buffer credit signal or associated buffer credit control words are ever stored in or passed through the transmit buffer 410 (second buffer)” (Pet., 31), misapprehends the burden of proof.

Even if the assertion was accurate (it is not), in order to meet the negative¹ limitation in question, it was Petitioner's burden to demonstrate that *Vangemert does disclose or suggest* that the buffer credit signal or associated buffer credit control words are *not stored in or passed* through the transmit buffer 410 (second buffer). To the extent Vangemert is silent or ambiguous as to whether or not the flow control signal passes through the second buffer, Vangemert does not meet the claim limitation. *Dynamic Drinkware, L.L.C. v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378-79 (Fed. Cir. 2015) ("If the fact trier of the issue is left uncertain, the party with the burden loses").²

¹ The claim limitation recites "wherein the module is further configured to transmit the flow control signal through the serial link and the connector without passing the flow control signal through the second buffer."

² See also, *Google LLC v. Geoscope Technologies*, IPR2023-01214, Paper #12 (P.T.A.B. February 24 2024)(non-precedential)("Petitioner bears the burden of demonstrating a reasonable likelihood of prevailing in demonstrating that Almgren discloses or teaches all the claim limitations at issue, and, specifically, the burden extends to negative limitations"); *Snap, Inc. v. Vaporstream, Inc.*, IPR2018-00416, 2019 Pat. App. LEXIS 13646 (2019) (P.T.A.B. August 1, 2019) (non-precedential) (quoting *IBM v. Iancu*, 759 F. App'x 1002 (Fed. Cir. 2019)) ("the fact that the reference was silent on the matter would not alone support a finding that there was no user authentication action ... Nor would that burden be met merely by adding a finding that [the patent owner] did not prove the opposite.")

B. Petitioner Is Not Using The Tachyon Article To “Interpret” Vangemert

Recognizing that it failed to carry its burden of proof in the Petition, the Reply seeks to fill the gap with a new reference, i.e., “Tachyon” (Ex. 1014). While the Reply states that it is using Tachyon to show how “a PHOSITA would understand Vangemert” (Reply,14), Tachyon does not disclose an implementation of the aspects of Vangemert supposedly being “interpreted,” i.e., Vangemert’s “buffer-credit manager 18” and Vangemert’s functionality that transmits “buffer credit control words in response to a credit signal from buffer credit manager 418.” Ex. 1005, 4:15-16. Given that this functionality is entirely absent from Tachyon, it strains credulity that a POSITA would look to Tachyon to “interpret” what Vangemert intended for such functionality.

Given Tachyon’s lack of disclosure of Vangemert’s buffer credit control words, the Reply tries to substitute an ACK from Tachyon for Vangemert’s buffer credit control words. From the Reply:

The Tachyon article teaches that an ACK signal increments an end-to-end count, which “determines the number of frames that Tachyon can send to the remote designation without receiving an ACK.” Ex. 1014102. Thus, the ACK signal corresponds to the Vangemert BCCW. Ex. 1013, ¶ 36.

An “ACK signal” is an acknowledgement that is sent after a previous transmission was received that confirms receipt³ -- which is indisputably different from Vangemert’s “buffer credit control word,” which a node must receive before it can transmit. The Reply attempts to analogize these different signals from Tachyon and Vangemert, referring to them as “corresponding.” Reply, 13 (“the ACK signal corresponding to Vangemert’s BCCW.”) In doing so, the Reply crosses the line from using Tachyon to “interpret” what Vangemert meant, to using Tachyon to fill a hole in Vangemert. In this respect, the Reply reads like a classic obviousness rejection seeking to combine references with different architectures based on various motivations or suggestions:

... Vangemert makes clear the transmit controller is configured to begin transmitting the BCCW upon receipt of a buffer credit signal (rather than subsequently routing it through the transfer buffer). The HP Journal—especially the Tachyon article—shows Fibre Channel systems’ flow control signals bypass all data buffers. ... Such illustrates that one of skill would have recognized issues relating to latency, system integrity and system failure dictate a design bypassing data buffers, such as the Vangemert transfer buffer. While Vangemert does not expressly show a “low-latency, high-priority path” with a separate BCCW buffer like the Tachyon article ACK buffer, the words used in Vangemert suggest the BCCW is sent promptly without entanglement with the transfer buffer. While the logic blocks in the HP Journal differ from those in Vangemert ... (Reply, 13-16)(emphasis added).

³ See, e.g., Ex. 2012, 100 (“if this is class 1 service, after sending the first frame, Tachyon waits until it receives the ACK for the first frame of the sequence before continuing.”)

While the Reply states that “issues relating to latency, system integrity and system failure dictate a design bypassing data buffers,” the Reply does not state that it is inherent in Vangemert that Tachyon’s ACK functionality must necessarily be used to implement Vangemert’s buffer credit control word transmissions. Nor could Petitioner take such a position. Tachyon represents but one implementation of the Fibre Channel protocol, and the record is devoid of evidence that Tachyon’s specific buffer architecture is necessarily required by that protocol. The lack of an inherency argument underscores that Petitioner is not “interpreting” Vangemert -- rather, Petitioner is arguing that the specific implementation of the Fibre Channel protocol in Tachyon together with Vangemert renders the limitation at issue obvious.

Under the facade of “interpreting” Vangemert, Petitioner is attempting to amend the instituted ground of obviousness over only Vangemert and Copeland to one alleging obviousness over Vangemert, Copeland and the Tachyon. Unlike *Cisco Sys., Inc. v. Crossroads Sys.*, No. IPR2014-01463, Paper No. 49 (P.T.A.B. Mar. 16, 2016)⁴ -- where Petitioner included Tachyon as part of the grounds in the original

⁴ Petitioner's expert states his understanding "that Patent Owner and Mr. Lee relied on the Tachyon article." Ex. 1013, ¶33. That understanding is incorrect. Neither Patent Owner nor Mr. Lee even mentioned the Tachyon article. Relatedly, the Reply seeks to tie together Ex. 2012 and the Tachyon article because both were in the same journal. However, the Reply does not suggest (nor could it) that Petitioner is using the Tachyon article to "reply" to Patent Owner's use of Ex. 2012. Ex. 2012 was not even cited in the POR; rather, it was relied on solely in the Declaration of Mr. Lee, who used it solely as support for undisputed background facts such as the Fibre Channel protocol being "a high-speed network technology primarily used for storage

IPR Petition -- the present Petitioner seeks to add the reference to the instituted grounds by way of a Reply. Petitioner's reliance on Tachyon must be rejected as outside the scope of the instituted grounds. *Henny Penny Corp. v. Frymaster L.L.C.*, 938 F.3d 1324, 1330 (Fed. Cir. 2019) ("it is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge.'")

III. THE PETITION NEVER ALLEGED THAT VANGEMERT GENERATED "A FLOW CONTROL SIGNAL IN RESPONSE TO THE AMOUNT OF DATA STORED IN THE FIRST BUFFER EQUALING OR EXCEEDING THE FILL AMOUNT," AS CLAIMED

Claim 1 recites a system that generates a flow control signal in response to the amount of stored data of a first buffer reaching or crossing a threshold. These features are captured in the final clause of Claim 1, which provides:

wherein the module is operable to generate a flow control signal in response to the amount of data stored in the first buffer equaling or exceeding the fill amount, ...

The claim language uses the "in response to" language to specify the trigger for generating the flow control signal. By reciting the "in response to" trigger together with "equaling or exceeding" which are gerunds (nouns), the last clause of the claim makes clear that it is the action of reaching or crossing the threshold (fill amount) that triggers generation of the flow control signal.

networking." See, Ex. 2002, ¶99. The Reply does not use the Tachyon article to dispute these background facts.

As explained in the POR, Vangemert makes buffer overflow impossible by continually⁵ assessing the unoccupied buffer space and generating advanced permission⁶ signals authorizing transmission of data if the unoccupied space is larger than a certain amount -- rather than generating a flow control signal in response to the action of reaching or crossing a threshold, as claimed. POR, 21. In other words, as a result of Vangemert's continual assessment mechanism, the generation of flow control signals occurs continually in Vangemert rather than being triggered by stored data in the buffer reaching or crossing a threshold, as claimed.

The Petition did not allege that Vangemert "generate[d] a flow control signal in response to the amount of data stored in the first buffer equaling or exceeding the fill amount," as claimed. Before arguing that this limitation was met by Copeland, the Petition characterized Vangemert as follows:

k. wherein the module is operable to generate a flow control signal in response to the amount of data stored in the first buffer equaling or exceeding the fill amount,

Vangemert teaches generating a flow control signal in the form of a buffer credit signal when the buffer has sufficient space for a new

⁵ POR, 21 ("Vangemert's method to prevent receiver buffer overflow ... continually assesses the additional buffer space that is committed but not yet occupied by calculating the number of received and transmitted flags. It then generates a credit signal by comparing")

⁶ Pet., 28 ("Vangemert teaches generating a flow control signal in the form of a buffer credit signal when the buffer has sufficient space for a new data frame. EX. 1003, ¶ 68. Because *the buffer credit must be provided to an initiating node before that node can transmit data* ...")

data frame. EX. 1003, ¶68. Because the buffer credit must be provided to an initiating node before that node can transmit data, the buffer credit signal is a flow control signal that controls data flow from the initiating device to the receive device. *Id.* ¶ 69; EX. 1005, col. 4:9-11. Thus, the bit credit signal is generated when the available buffer space is sufficient (equal to the fill amount) to accept the data word to be transmitted. EX 1003, ¶ 69 (emphasis added). (Pet.,28)(emphasis added). ...

The table below compares the Petition’s characterization of Vangemert with respect to Element “k” and the actual claim language:

Petitioner’s Characterization of Vangemert	Claim Language
the bit credit signal is generated <u>when the available buffer space is sufficient</u> (equal to the fill amount) to accept the data word to be transmitted (emphasis added).	the module is operable to generate a flow control signal <u>in response to the amount of data stored</u> in the first buffer <u>equaling or exceeding</u> the fill amount (emphasis added).

Significantly, the Petition lacked any allegation that Vangemert met the actual claim language, which requires that a flow control signal be generated “in response to the amount of data stored in the first buffer equaling or exceeding the fill amount.” Instead, the Petition alleged that “the bit credit signal [in Vangemert] is generated when the available buffer space is sufficient. ...” In this context, there is a critical difference between generating a flow control signal “in response to” the action of stored data “equaling or exceeding the fill amount” and generating a flow control signal “when the available buffer space is sufficient ...” While Vangemert continually assesses the unoccupied buffer space and may generate advanced

permission signals “when” (at a time that) the unoccupied space equals a certain amount, in Vangemert, the generation of such signals is not triggered by the action of stored data in the buffer reaching or crossing a threshold, as claimed. This point was borne out in the prosecution history, where the Examiner found that claims patentable over, *inter alia*, Szatkowski which, for purposes of the claim limitation in question, is no different from Vangemert. POR,26-28. Since the Petition failed to allege that Vangemert mapped to the actual claim language, Petitioner’s waiver argument is without merit.⁷

The Reply alleges “PO agreed this limitation is satisfied by Vangemert alone” (Reply, 3) and “PO does not dispute Vangemert teaches this limitation.” (Reply, 5). Not so. None of Petitioner’s citations to the POR or PO’s expert include the critical phrase “in response to” when characterizing Vangemert. *Henny Penny Corp.*, 938 F.3d 1324, ¶ 69, citing POR, 9, 22 and 36, and Ex. 2002, ¶107.

⁷ The Reply quotes a statement from its expert to the effect that Vangemert discloses the “in response” to limitation. Reply, 4, citing Ex. 1003, ¶69. However, the Petition itself did not recite the same statement. Patent Owner was not required to respond to a position espoused by Petitioner’s expert that was not in the Petition itself.

IV. Petitioner Has Failed To Meet Its Burden Of Showing That Vangemert And Copeland Render The Claims Obvious

Petitioner has the burden to submit facts showing “[w]hether the prior art discloses a claim limitation.” *Univ. of Strathclyde v. Clear-Vu Lighting L.L.C.*, 17 F.4th 155, 160 (Fed. Cir. 2021). “[T]hat burden never shifts to the patentee.” *Dynamic Drinkware, L.L.C.*, 800 F.3d at 1378-79. Here, Petitioner failed to meet its burden of showing what Vangemert teaches and has tried to shift the burden to Patent Owner to prove what Vangemert does not teach.

A. Petitioner Has Failed To Show That Vangemert’s BCCW Are Treated Differently Than Other “Control Words”

Petitioner alleged that “[n]othing in Vangemert suggests the BCCW is treated the same as other, more general “control words” associated with data frames.” Reply, 9. However, Petitioner adduced no evidence that they are necessarily treated differently. Vangemert never creates a distinction between the transmission of control words in general and buffer credit control words. For example, Vangemert states that it “is sufficient to stipulate that the fabric switch 114 transports data frames and control words from the transmit channel of a source node to the receive channel of a destination node.” (Ex. 1005 2:65-3:1). There is no evidence in Vangemert of how the buffer credit control words get transmitted on the serial link (transmit and receive channel) unless they are included in the “control words” described in Vangemert.

B. Petitioner Impermissibly Attempts To Fill The Gap In Vangemert By Conclusory Expert Statements

Petitioner recognized that Vangemert does not teach the missing element of how BCCW is transmitted. In the Reply, Petitioner’s expert attempts to fill this gap by making conclusory assumptions about the operation of Vangemert that are not grounded in the reference or any other exhibit. The first conclusory assumption is that “[a] POSITA would have understood that the Vangemert transmit buffer was a FIFO buffer. Ex. 1013, ¶25. That assertion lacks any citation or supporting reasoning and is, therefore, by definition, conclusory. Among other alternatives, Petitioner’s expert does not address why Vangemert’s transmit buffer could not have been implemented using, for example, a *priority queue* where control signals like buffer credit control words are given a higher priority, causing them to be inserted into the buffer queue ahead of other data.⁸ Such an approach would have solved the problems identified by Petitioner’s expert (e.g., “unbounded times for control signals to be delivered” (see, Ex. 1013, ¶25)) without use of a FIFO buffer. An “expert’s “conclusory statements and unspecific expert testimony d[o] not qualify as substantial evidence that could support the Board’s conclusions regarding obviousness.” *TQ Delta, L.L.C. v. Cisco Sys.*, 942 F.3d 1352, 1360-61 (Fed. Cir. 2019).

⁸ Further alternatives are discussed in Section IV(C), *infra*.

The conclusion of Petitioner's expert that it would have been "illogical to interpret Vangemert to require the BCCW to pass through the transmit buffer" (ex. 1013, ¶13) is based not only on the unsupported assumption that Vangemert's transmit buffer is a FIFO buffer, but also on the unsupported assumption that the FIFO buffer would be so large as to cause "unbounded times for control signals to get delivered" and/or result in "deadlock."⁹ Ex. 1013, ¶¶ 25, 29-30. Again, Petitioner's expert cites no evidence for these statements. Nor does he explain why, even if Vangemert used a FIFO buffer, the buffer would necessarily need to be sized so large as to cause "unbounded times for control signals to get delivered." For example, Petitioner's expert fails to explain why simply using a smaller FIFO buffer wouldn't solve that problem.

Petitioner's expert is claiming that a POSITA would have understood that Vangemert's transmit buffer would have been implemented using a fatally flawed large FIFO buffer, and that a POSITA would have understood that Vangemert intended to compensate for this fatal flaw by bypassing that buffer even though Vangemert says no such thing. The more plausible explanation is that a POSITA would have understood that Vangemert's transmit buffer would have been

⁹ Deadlock is not mentioned in the challenged patent or Vangemert. Petitioner's expert cites no evidence that "deadlock" was a known problem, or that the deadlock behavior scenario conjured in his declaration was an example of such. See, Ex. 1013, ¶29.

implemented in the first place using a design that was not fatally flawed and that the “transmit controller 412 retrieves control words and data frames from transmit buffer 410 and forwards them to encoder 402” as explained in Vangemert. Ex. 1005, 3:49-52.

In lieu of substantial evidence, Petitioner offers conclusory statements of its expert, which copies, word-for-word, Petitioner’s conclusory assertions about Vangemert’s buffer. *Compare*, Reply, 10 with Ex 1013, ¶25. In *Xerox Corp. v. Bytemark, Inc*, IPR2022-00624, Paper 9 (August 24, 2022) and Paper 12 (February 10, 2023) (designated Precedential) the PTAB rejected similar conclusory expert gap filing. There, like in the present case, Petitioner offered a declaration that “copies, word-for-word, Petitioner’s conclusory assertions” and “sets forth Petitioner’s conclusory assertions as though they are facts, rather than setting forth facts and evidence in support of Petitioner’s assertions.” Therefore, the PTAB held, and Director Vidal affirmed, that “the cited declaration testimony is conclusory and unsupported ...and is entitled to little weight.”

Here, Petitioner’s leaps (e.g., Vangemert’s transmit buffer is FIFO, and the BCCW bypasses the FIFO Buffer) to span the gap of the missing elements in Vangemert are unsupported by Vangemert or anything other than Ex 1013. Therefore, Petitioner has only offered conclusory statements and no substantial evidence that could support a finding of obviousness.

C. Vangemert's Transmit Buffer Is Not Inherently FIFO

With respect to whether Vangemert's transmit buffer 410 is inherently FIFO, Petitioner hasn't even offered a conclusory statement that that is the case. "[T]he use of inherency ... must be carefully circumscribed in the context of obviousness" and "[t]he mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." *Par Pharm., Inc. v. TWi Pharms., Inc.*, 773 F.3d 1186, 1194-95 (Fed. Cir. 2014) (internal markings and citations omitted); *see also Southwire Co. v. Cerro Wire L.L.C.*, 870 F.3d 1306, 1310-11 (Fed. Cir. 2017). Inherency cannot be established by the fact that something may happen. Instead, the alleged feature must necessarily be present in the reference.

Here, Petitioner has offered no evidence or argument for why Vangemert's transmit buffer is not, e.g., an addressable buffer would allow different classes of service levels as supported by Fibre Channel (*see*, Ex. 2012, 6), a random access memory¹⁰ that is used to provide a shared buffer of control words, including BCCW and data frames, or a priority queue (*see*, Section IV(B)). Since Petitioner has failed to explain why a POSITA would not understand these as other possible

¹⁰ Petitioner offers a red hearing of "deadlock." Deadlock is not mentioned in Vangemert, nor any other evidence in the record. Further, if Vangemert's transmit buffer were implemented as a random access buffer or a priority queue, Petitioner's example deadlock condition would not occur.

implementations of Vangemert's transmit buffer, Petitioner has failed to show that Vangemert's transmit buffer is inherently a FIFO buffer.

V. A POSITA WOULD NOT HAVE BEEN MOTIVATED TO COMBINE VANGEMERT AND COPELAND

A. Petitioner Relied Upon Copeland For More Than The Fact That Serial Ports Utilize Serial Connectors

Petitioner's allegation that Copeland was only relied upon for connectors is puzzling because the Petition relied on Copeland, *inter alia*, to cure the fact that Vangemert does not teach the claimed control signal. As discussed above, the Petition did not even allege that Vangemert "generate[d] a flow control signal in response to the amount of data stored in the first buffer equaling or exceeding the fill amount," as claimed.

Instead, the Petition relied upon Copeland (See Pet., 28-29) to compensate for the fact that Vangemert does the reverse of the claimed invention and stops generating BCCWs when the alleged threshold is crossed. Therefore, the proper question is whether a POSITA would have been motivated to combine Vangemert's BCCW with Copeland's overflow protection.

B. Copeland Is Relied Upon For The Same Flow Control Mechanism As Szatkowski

Petitioner alleges that "Copeland specifically discloses a connector, and the Petition combines the connector from Copeland with the teachings of Vangemert," and Vangemert-Copeland is therefore not cumulative to Szatkowski-Daines. Reply,

20. Significantly, Petitioner does not dispute that Copeland is cumulative of the flow control taught in Daines, and that the rationale for combining Copeland with Vangemert in these proceedings is the same as the rationale for combining Daines with Szathkowski advanced and overcome during prosecution. *See*, POR, 26-28.

In *Gardner Denver v. Utex Indus., Inc.*, No. IPR2020-00333, Paper No. 12 (P.T.A.B. Aug. 5, 2020) (cited in the Reply, 19), the PTAB denied the institution of the IPR. In *Gardener*, like in the present case, the “Examiner did not provide express reasons for allowance, and therefore the reasons that ultimately convinced Examiner to allow the claims are not known.” The PTAB found in *Gardner* that, while the newly cited reference (Kohl) “was not disclosed to the Office during prosecution, the Office already considered references that disclosed similar teachings,” and as a result, the newly cited references “are no more relevant than, and cumulative to, references that were presented during prosecution.” Here, like in *Gardner*, Copeland is cumulative of the flow control taught in Daines, and the rationale for combining Copeland with Vangemert is cumulative of the rationale advanced during prosecution for combining Daines with Szathkowski. (*See*, POR, 26-28).

To the extent that Petitioner is alleging that the Examiner allowed the present case because he could not locate a reference that taught a serial port with a serial connector, this is dubious. Applicant did not dispute that serial connectors existed but only that “A connector is not inherently a part of a serial link.” Ex. 1002, 25.

Had the Examiner not been convinced of the flaws in combining Szatkowski-Daine, all the Examiner would have had to do was locate a reference, such as the R232 standard, that taught that serial ports have serial connectors. Clearly, the Examiner allowed the case because the Examiner was convinced that the rationale for combining the references was flawed.

C. A POSITA Would Not Have Been Motivated To Combine Vangemert's Credit System And Copeland's Overflow System

Petitioner again has attempted to shift the burden to the PO to prove that a POSITA would not have been motivated to combine the references as proposed by Petitioner. Specifically, Petitioner alleges that "PO has provided no evidence or arguments to the contrary except to state that Vangemert would make any possible buffer overflow impossible." Reply, 22-23. However, in the present case, it is the burden of Petitioner to educe evidence that overflow was possible in Vangemert and that a POSITA would have been motivated to use Copeland to stop Vangemert's overflow.

All Petitioner offers is the conclusory speculation from its expert that "the predetermined flow control threshold of Copeland may be set such that if there is miscalculation, or some sort of timing issue with the bit credit system of Vangemert such that the buffer begins to reach its maximum capacity, the flow control system of Copeland may instruct the transmitting device to stop transmitting to prevent a potential loss of data due to buffer overflow." Ex 1003, [0073]. However, since

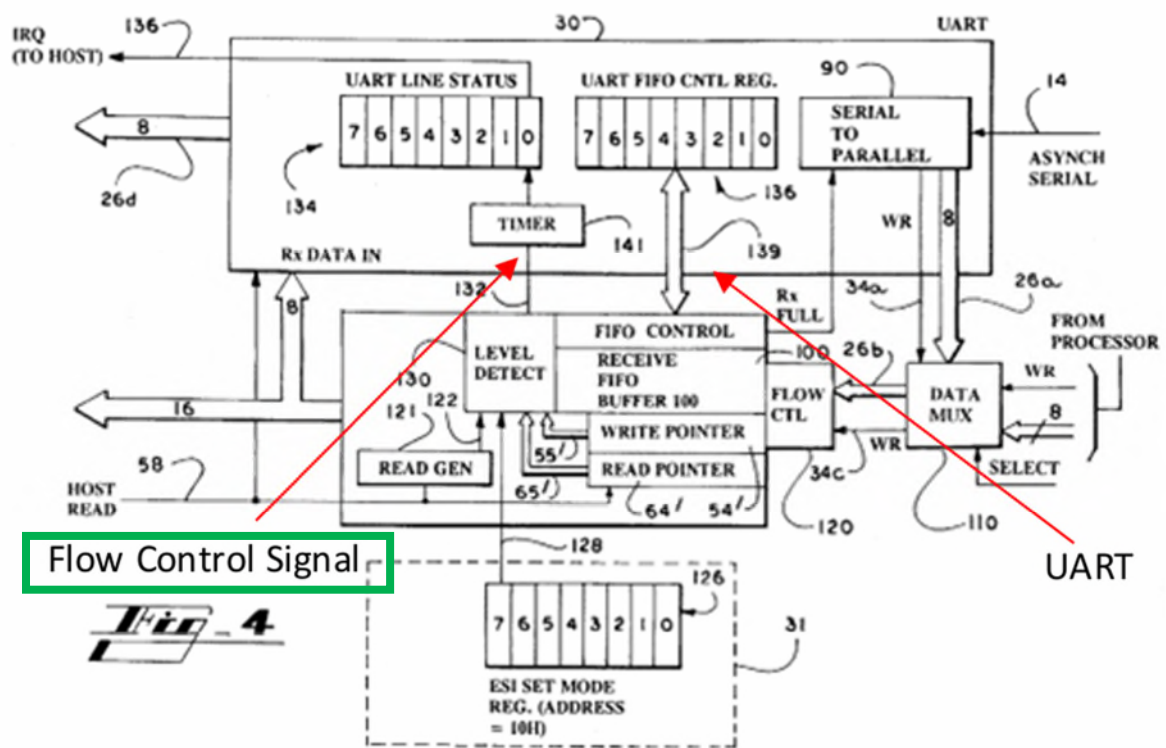
Vangemert requires that a buffer credit be received in advance by the sending node *before* transmission, it is simply impossible for there to be a buffer overflow. See Ex. 1005, 1:49-54 and Ex. 2002, ¶84. Petitioner's expert provides no explanation how "miscalculations" or "timing issues" in Vangemert could lead to an overflow scenario, or how a POSITA would have recognized such a problem based on the disclosure in Vangemert. Nor does Petitioner's expert provide any citations to authorities that identify even the possibility of "miscalculations" or "timing issues" in Vangemert leading to an overflow scenario. Instead, all that is offered is unsupported speculation.

Further, Petitioner's expert does not address the reasons why a POSITA would not implement two potentially contradictory flow control systems. For example, if buffer credits are available, then transmission could occur in one system, but the buffer capacity level flow control signal could terminate transmission, which would reduce the effective transmission bandwidth of a buffer credit system alone. See, Ex. 2002, ¶¶58, 59 and 120. This would be like having a traffic light simultaneously showing both a green and red light. A POSITA would not be motivated to utilize Vangemert's credit control system with Copeland's overflow control because they could send contradictory signals to the network.

VI. THE COMBINATION OF DOBSON AND COPELAND FAILS TO TEACHES ALL OF THE ELEMENTS OF THE CHALLENGED CLAIMS

A. Petitioner Confirms That IRQ Signal Of Dobson's Interrupt Driven Serial Port Controller Is Not The Flow Control Signal Recited In The Challenged Claims

The Reply confirms that Petitioner is not mapping Dobson's IRQ signal to the claimed flow control signal. Reply, 25. However, the Petition did attempt to map the "flow control signal" to reference numeral 132 of Dobson as shown (below) in Petitioner's annotations of Figure 4 of Dobson:



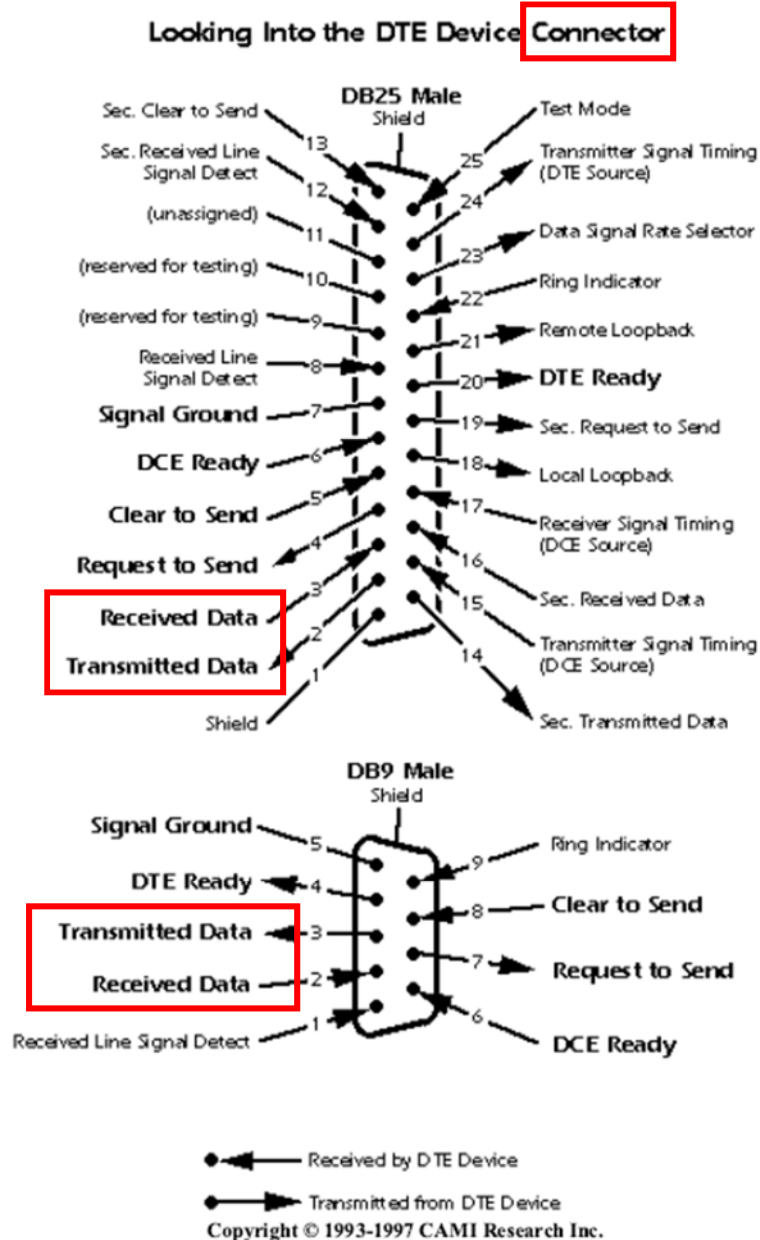
Pet., 63 (green box added by Patent Owner). As explained in the POR (at 38-39), Dobson's internal signal on line 132 cannot be "the flow control signal" because it is not transmitted "through the serial link and the connector."

B. Copeland Does Not Teach Transmitting “The Flow Control Signal Through The Serial Link”

Claim 1 specifies the requirements of “the serial link” as follows:

... a module coupled to the connector, wherein the module is operable to receive first serial data transmitted over the serial link through the connector and transmit second serial data to the serial link through the connector, ...
a receiver operable to receive the first serial data from the serial link ...
a second buffer operable to receive data, wherein the second buffer is in data communication with a second circuit that is configured to serialize data received via the second buffer to generate the second serial data; and
a transmitter operable to transmit the second serial data to the serial link through the connector; ...
wherein the module is further configured to transmit the flow control signal through the serial link and the connector without passing the flow control signal through the second buffer.

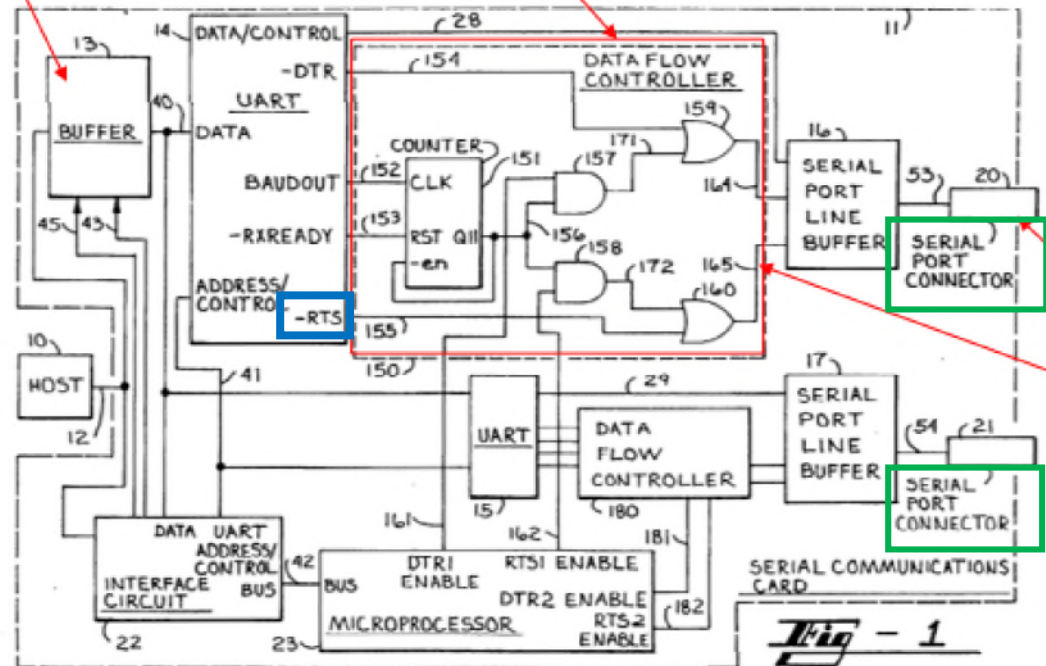
In the context of Claim 1, the “serial link” is the data connection that carries both the serial data and the flow control signal. Ex. 1001, 6:56-58 (describing serial link as a duplex link). For example, in the case of RS232, a bundle of nine physical wires are included in the connector (e.g., DB9). However, only two of the wires carry the serialized data that form the claimed “serial link.” The other seven wires in the bundle that do not carry the serialized data. Specifically, the diagram below depicts the RS232 connectors for DB25 and DB9 which contain 25 and 9 wires, respectively, but only two wires (2 and 3) transmit the serialized data.



Ex. 2009, 4 (emphasis added). It is important to note that in RS232, "connector" and "serial connector" are used interchangeably:

Go to DTE Pinout (looking into the computer's serial connector)
Go to DCE Pinout (looking into the modem's serial connector)

The Reply at 26 depicts Figure 1 of Copeland, shown below. The red markings were included in the Reply, while the green and blue markings are added by Patent Owner:



As explained above, Copeland's references to "serial port connector" (green boxes) refer to the entire bundle of wires in an RS232 connector. The fact that the RTS signal (blue box) is shown passing through the "serial port connector" underscores this point, because the RTS (Request to Send) signal is sent on wires 4

and 7 (in DB25 and DB9, respectively) -- as opposed to wires 2 and 3 which carry the serialized data.

In connection with Copeland, Petitioner has failed to show that the serial link (i.e., the data connection) carrying the serialized data also carries the flow control signal, as claimed. While the claim distinguishes between the “serial link” and the “connector,” Petitioner conflates them. Ex. 2002, ¶117. While the RTS flow control signal is transmitted through the serial port connector -- it is not carried on the wires that form the “serial link” carrying the serialized data. As explained by Terry Lee, a POSITA would know that RTS is a parallel out-of-band handshake signal used in RS-232, which is transmitted on a separate out-of-band connector pin from the serial data signals, RXD or TXD. *Id.* “DTE, DCE, CTS, and RTS are asynchronous level sensitive signals which indicate the status of the equipment based on the voltage level. Level sensitive signals differ from a serial bitstream where the symbol on the line can change sequentially with each symbol time.” Ex 2002, ¶96; POR, 29.

Therefore, Petitioner has failed to show that Copeland, alone or in combination with Dobson, teaches “a module configured to transmit the flow control signal through the serial link and the connector,” as recited in the Challenged Claims.

VII. CONCLUSION

The Board should find that Petitioner has failed to demonstrate the unpatentability of any of the Challenged Claims.

Respectfully submitted,

Dated: May 22, 2024

By: /Brandon R. Theiss/
Brandon R. Theiss (Reg. No. 70,507)
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CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Patent Owner Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 5,552 words, excluding the parts of this Patent Owner's Preliminary Response that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Response.

Respectfully submitted,

Dated: May 22, 2024

By: /Brandon R. Theiss/
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CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S SUR-REPLY** was served via email (as consented to by counsel) on May 22, 2024 to lead and backup counsel of record for Petitioners as follows:

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