

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HP INC., DELL TECHNOLOGIES INC., DELL INC.,
LENOVO (UNITED STATES) INC.,
Petitioners,

v.

UNIVERSAL CONNECTIVITY TECHNOLOGIES, INC.,
Patent Owner.

IPR2024-01428
U.S. Patent No. 7,154,905

**PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104**

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PETITIONERS' EXHIBIT LIST

Ex. 1001	U.S. Patent No 7,154,905 (“’905 Patent”)
Ex. 1002	Prosecution History of U.S. Patent No. 7,154,905 (U.S. Patent Application Number 10/035,911)
Ex. 1003	Declaration of Dr. Andrew Wolfe
Ex. 1004	U.S. Patent No. 5,557,608 to Calvignac <i>et al.</i> (“Calvignac”)
Ex. 1005	United Kingdom Patent Application No. GB 2344029 to Banes (“Banes”)
Ex. 1006	U.S. Patent No. 5,974,464 to Shin <i>et al.</i> (“Shin ’464”)
Ex. 1007	European Patent Application 0582537 to Cidon (“Cidon”)
Ex. 1008	U.S. Patent No. 5,999,571 (“Shin ’571”)
Ex. 1009	U.S. Patent No. 4,486,739 to Franaszek (“Franaszek”)
Ex. 1010	U.S. Patent No. 5,304,996, to Hsu et al. (“Hsu”)
Ex. 1011	<i>Commands for Host-Processed and Host-Controlled Modems, Reference Manual</i> , Conexant Systems, Inc. (April 5, 2001)
Ex. 1012	<i>IEEE Standard 802.3, Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications</i> , The Institute of Electrical and Electronics Engineers (1998) (“802.3”)
Ex.1013	U.S. Pat. No. 6,229,859 to Jeong (“’859 patent”)
Ex.1014	“8b/10b encoding,” located at https://en.wikipedia.org/wiki/8b/10b_encoding
Ex.1015	“High-Level Data Link Control,” located at https://en.wikipedia.org/wiki/High-Level_Data_Link_Control
Ex.1016	C.V. of Andrew Wolfe, Ph.D.
Ex.1017	<i>IEEE Standard Amendment 802.3ae</i> , The Institute of Electrical and Electronics Engineers (August 30, 2002) (“802.3ae”)

I. INTRODUCTION

HP Inc., Dell Technologies Inc., Dell Inc., and Lenovo (United States) Inc. (“Petitioners”) respectfully request that the Board institute *inter partes* review of and cancel claims 1-3, 5, 7-10, 12, 14-17, 20-23, and 26 (“the Challenged Claims”) of U.S. Patent No 7,154,905 (“the ’905 Patent,” Ex.1001). The ’905 Patent generally relates to systems and methods for packet preemption, a technique that was well-known before the earliest possible priority date of the ’905 Patent. The ’905 Patent describes a system for transmitting a first packet over a communications link between two endpoints. When a second packet arrives, the first packet is paused or preempted using a preempt indicator, which can be an out-of-band symbol, and the second packet is transmitted. When transmission of the second packet is complete, the system transmits a continue indicator, which can be another out-of-band symbol, to signal resumption of transmission of the first packet. Because such systems and methods were already known in the art, Petitioners respectfully request that the Board institute *inter partes* review and cancel the Challenged Claims.

II. GROUNDS FOR STANDING

Petitioners certify that the ’905 Patent is eligible for IPR and that Petitioners are not barred or estopped from requesting IPR with respect to the Challenged Claims. 37 C.F.R. § 42.104(a). This petition is timely because Petitioners were each

served respective complaints asserting the '905 Patent less than one year ago. 35 U.S.C. § 315(b).

III. NOTE

Petitioners cite to original exhibit page numbers. **Emphasis** in quoted material has been added. Claim terms are presented in *italics*.

IV. SUMMARY OF THE '905 PATENT

The '905 Patent, Ex.1001, is titled “Method and system for nesting of communications packets.” The patent relates to the transmission of data packets, including, “a serial communications architecture for communicating between hosts and data store devices.” Ex.1001, 6:43-44. The communications architecture is for transmitting “packets” of data (units of data transmitted over a communications link), in this case between hosts (“computers, CPUs, or any logic for accessing a data store device”) and data store devices (disk drives or high-speed memory devices, for example). *Id.*, 1:59-63, 8:17-21. The packets can include a “header section” to specify the source, type, and destination of the data, as well as a “payload section” with blocks of source data. *Id.*, 8:47-50.

To attempt to address performance issues caused by the “speed and capacity of the data store devices” being greater than the “speed of communications between hosts and data store devices,” at the time, as well as limits on how many devices could access memory devices at a given time, the '905 Patent describes systems and

methods of packet preemption. *Id.*, 1:54-59, 1:66-2:5, 3:15-33. In particular, a “communications node may preempt or interrupt the transmission of a packet [to another node] when a packet with a higher priority is to be transmitted on the same communications link.” *Id.*, 19:62-65. One communications node can be a “host,” which “may be a computer system,” and another can be a “data store device,” which may be a storage area network device, such as a disk drive or a high-speed memory device. Ex.1001, 1:59-63, 8:17-21, 8:27-32, 21:61-62, Fig. 1. Figure 1 depicts hosts 110 on the left that can communicate via links 140 with data store devices 120 on the right, as shown below:

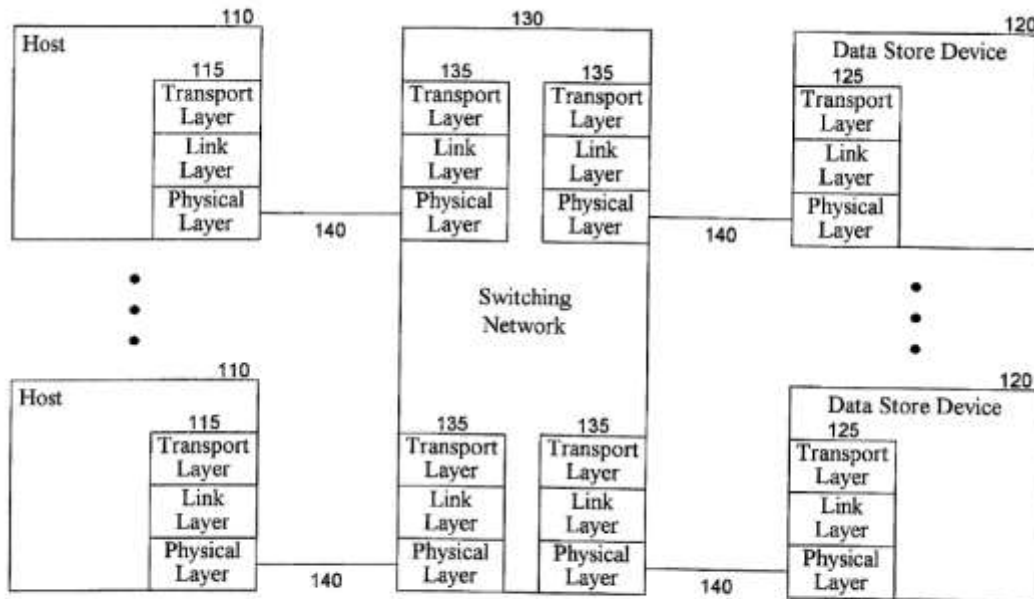


Fig. 1

Ex.1001, Fig. 1.

In an embodiment depicted below in Figure 13, a communications node transmits a first packet (“data packet 1301”). *Id.*, 20:30-31, Fig. 13. When the system receives a second, higher-priority packet (“control packet 1303”), the communications node signals interruption of the first packet with a preempt indicator (“preempt primitive 1302”) that includes out-of-band symbols. *Id.*, 11:54-60, 20:2-9, 20:31-33, 26:35-36, 26:42-43, Fig. 13. The communications node then transmits the second packet (“control packet 1303”) over the communications link. *Id.* at 20:33-35, Fig. 13. When the control packet 1303 is complete, the node transmits a continue indicator (“continue primitive 1304”) including out-of-band symbols to signal that transmission of the first packet should be resumed. *Id.*, 11:54-60, 20:9-23, 20:33-39, 26:35-36, 26:42-43, Fig. 13. The communications node then transmits the remainder of the first packet (“data packet (cont’d) 1305”). *Id.*, 20:9-14. Figure 13 illustrates this embodiment below, including the preemption of data packet 1301 with control packet 1303:

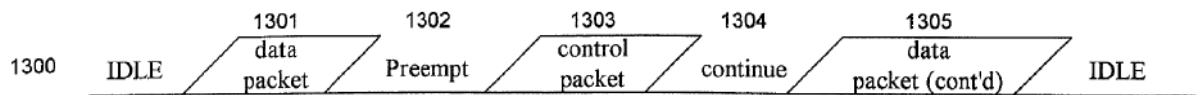


Fig. 13

Id., Fig. 13, 20:27-30.

As explained below, however, such packet preemption as claimed in the Challenged Claims, was already known in the art. Ex.1003, ¶¶48, 60, 62, 64.

V. PROSECUTION HISTORY

The application that matured into the '905 Patent was filed on November 7, 2001, and claims priority to U.S. Provisional Application No. 60/252,724, filed November 22, 2000. The Board does not need to determine whether the '905 Patent is entitled to the filing date of this provisional application because Petitioners' prior art pre-dates this date.

During prosecution, the Applicant faced one rejection over European Patent Application 0582537 to Cidon ("Cidon") (Ex.1007). Ex.1002, 252-54. The Examiner found that Cidon taught preempting a first "low priority data packet" with a "second, high-priority packet" using "a preempt indicator" such as an "SP flag" and an "end preempt indicator" that the Examiner found to be "equivalent of the continue indicator as claimed." *Id.* The Examiner rejected claims 1, 2, 6, 9-10, 14, 17-18, and 24-25 as anticipated by Cidon and rejected claims 5, 7-8, 13, 15-16, 21-23, and 28-30 as obvious over Cidon. *Id.*, 252-53. The Examiner objected to claims 3-4, 11-12, 19-20, and 26-27 as being dependent on rejected independent claims, but noted that they would be allowable if rewritten to include the limitation of "wherein the packets include in-band symbols and the indicators include one or more out-of-band symbols." *Id.*, 253, 422-25. The Applicant thus amended the independent claims to add the limitation "wherein the packets include in-band symbols and the indicators include one or more out-of-band symbols." *Id.*, 24-28. In response, the

Examiner allowed the claims. *Id.*, 14. However, the use of in-band symbols within a first packet and a second, preempting packet and the use of out-of-band symbols with respect to preempt indicators and continue indicators for packet preemption was also already known in the art. Ex.1003, ¶¶87-99, 220-226.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) of the ’905 Patent in November of 2000 would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or equivalent training, and three years of experience with data communications systems or interfaces, including at least some experience with serial or display data communications systems or interfaces. Additional education can substitute for less work experience, and vice versa. Ex.1003, ¶29.

VII. CLAIM CONSTRUCTION

Petitioners submit that no terms require construction for this proceeding but reserve the right to propose a construction if the need arises, such as if Patent Owner proposes a construction.

VIII. RELIEF REQUESTED AND THE REASONS FOR THE REQUESTED RELIEF

Petitioners ask that the Board institute *inter partes* review and cancel the Challenged Claims in view of the analysis below.

IX. IDENTIFICATION OF HOW THE CLAIMS ARE UNPATENTABLE

A. Challenged Claims

Petitioners challenge claims 1-3, 5, 7-10, 12, 14-17, 20-23, and 26.

B. Statutory Grounds for Challenges

Grounds	Claim(s)	Basis
#1	1, 3, 5, 7, 8, 10, 12, 14, 15, 17, 20, 21, 23, 26	35 U.S.C. § 102; these claims are anticipated by Banes
#2	1, 3, 5, 7, 8, 10, 12, 14, 15, 17, 20, 21, 23, 26	35 U.S.C. § 103; these claims are obvious over Banes
#3	1, 2, 5, 8, 9, 12, 15, 16, 20, 21, 22	35 U.S.C. § 102; these claims are anticipated by Calvignac
#4	1, 2, 5, 8, 9, 12, 15, 16, 20, 21, 22	35 U.S.C. § 103; these claims are obvious over Calvignac

U.S. Patent No. 5,557,608 to Calvignac *et al.* (“**Calvignac**,” Ex.1004) was filed on May 22, 1995, and issued on September 17, 1996. Calvignac is thus prior art under at least pre-AIA 35 U.S.C. §102(b) and (e).

United Kingdom Patent Application No. GB 2344029 to Banes (“**Banes**,” Ex.1005) was published on May 24, 2000. Banes is thus prior art under at least pre-AIA 35 U.S.C. § 102(a).

Banes was not cited or substantively discussed during prosecution of the '905 Patent. Calvignac was cited on the face of the '905 Patent but was not substantively discussed by the examiner.

C. Ground 1 and Ground 2: Claims 1, 3, 5, 7-8, 10, 12, 14-15, 17, 20-21, 23, and 26 are anticipated by Banes and are obvious over Banes

1. Summary of Banes

Banes is titled “transmission of data packets of different size and priority.” Ex.1005, code (54). According to Banes, transmission of data using existing networks “may cause unacceptable delays between packets” and “unduly delay[]transit of smaller or more important data packets.” Ex.1005, 2:2-8. Banes purports to improve upon existing methods of packet transmission through packet preemption. Ex.1005, 1:2, 2:9-13, 3:3-7.

Banes’ packets include a “header 10,” indicating routing, priority, and packet type information, as well as a “data portion 20,” as shown in Figure 1 below:

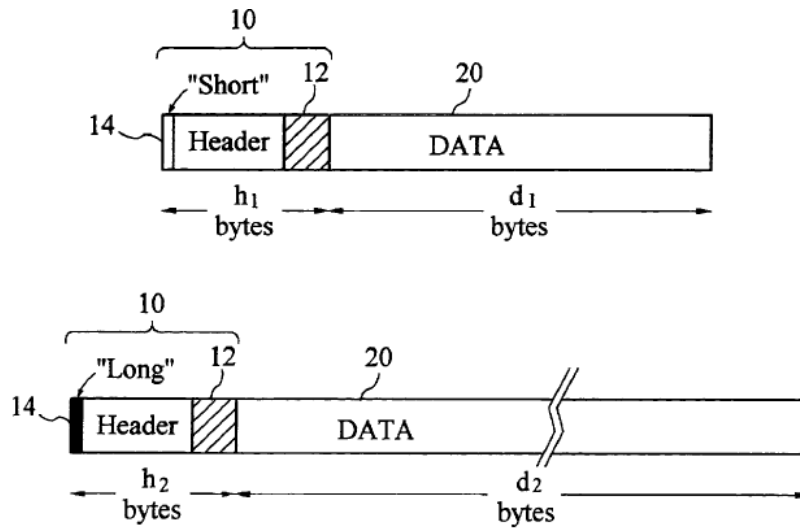


Fig. 1

Ex.1005, Fig. 1.

As described in Banes, a first data packet is transmitted, which includes a “data portion 102a.” *Id.*, 11:18-22. If a higher priority packet arrives during the transmission of the first packet, an “interrupt code 110 is inserted in the data portion 102a,” which signals to the transmitter that the first packet has been interrupted. *Id.*, 11:25-28, 12:8-13. The interrupt code is “used to flag an interruption” and can be a “spare” or “unused code,” such as when “10 bit coding is used to carry 8 bit data.” Ex.1005, 2:17-20, 12:8-13 (“a pre-determined ‘spare’ code from the 10bit coding scheme”), 12:18-19 (“otherwise unused 10 bit code”). The higher priority packet is then sent, followed by a “resume code” or “resumption code 111,” which signals to

the transmitter to continue transmitting the remainder of the first packet. *Id.*, 11:28-30, 12:13-17.

Figure 4 below illustrates Banes' packet preemption, including the first portions of the first data packet 102a, the interrupt code 110, the second, higher-priority data packet 122, the resumption code 111, and the remaining portion of the first data packet 102b:

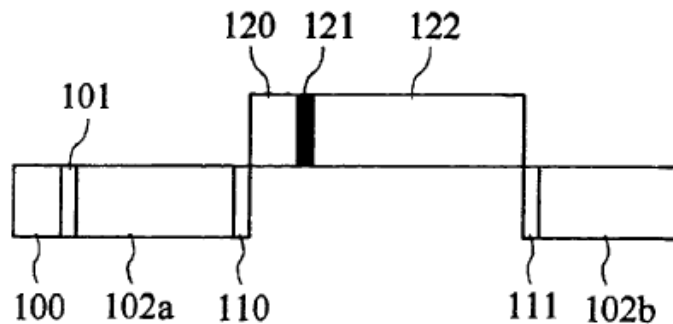


Fig. 4

Id., Fig. 4.

2. Claim 1

[1(pre)] A method for transmitting packets, the method comprising:

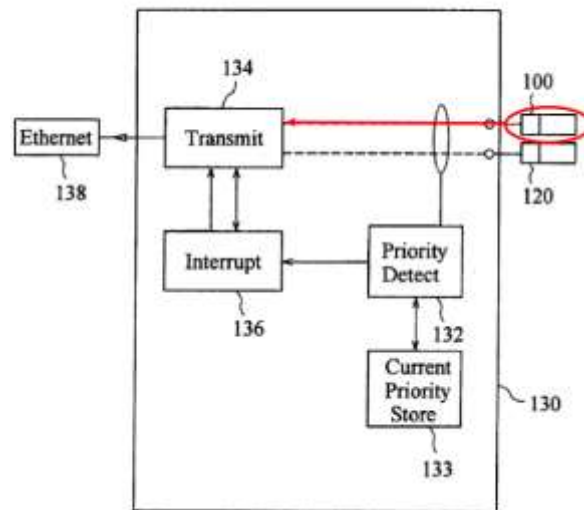
To the extent the preamble is limiting, Banes discloses it. Banes describes “a method of communicating data over a network comprising transmitting a first data packet, receiving a higher priority data packet, interrupting transmitting the first data

packet to transmit the higher priority data packet, and resuming transmission of the first data packet.” Ex.1005, 2:9-13; *see also* Abstract, Figs. 4-5.

[1(a)] receiving a first packet;

Banes discloses this limitation. Banes teaches that its “network interface 130 is arranged to **receive data packets** for onward transmission” (*i.e., receiving a first packet*). Ex.1005, 12:2-3, 12:3-5 (“**[r]eceived packets** pass by priority detector 132 which determines whether interruption is required”), 12:6-7. A first data packet having a header 100 is shown being received by network interface 130 and then by transmitter 134 for onward transmission over ethernet network 138 in Figure 5 below.

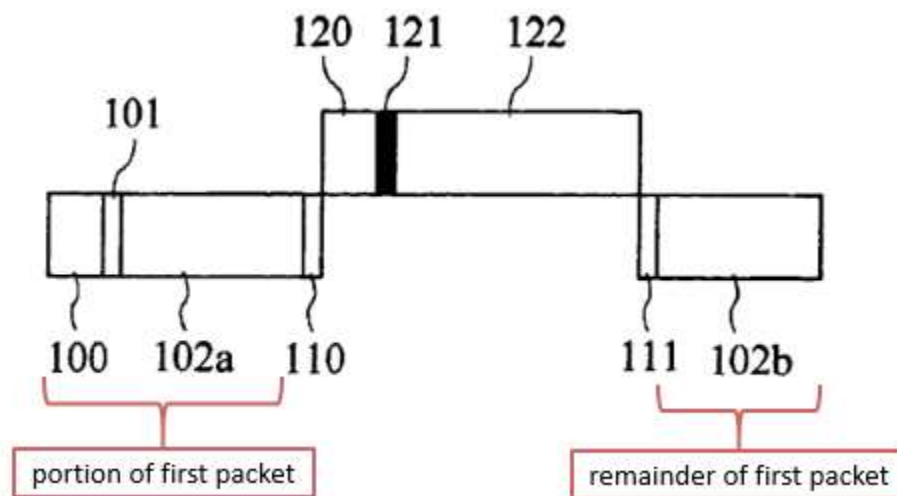
Fig. 5



Ex.1005, Fig. 5 (annotated).

[1(b)] transmitting a portion of the received first packet;

Banes discloses this limitation. As explained above for limitation ***[1(a)]***, Banes teaches receiving a first data packet having a header 100 (i.e., *a first packet*). Banes further teaches transmitting an initial portion of this first data packet because Banes describes “interrupting transmitting the first data packet to transmit the higher priority data packet.” *Id.* at 2:9-13, 11:20-28. That is, “[a] first, lengthy, data packet is transmitted as a header 100 including a priority flag 101 and an initial data portion 102a” (i.e., *transmitting a portion of the received first packet*). *Id.* at 11:20-22. As is illustrated in Figure 4 below, only a portion of this first data packet is transmitted before the higher-priority packet is received and sent. *Id.*; *see also* 11:25-30.

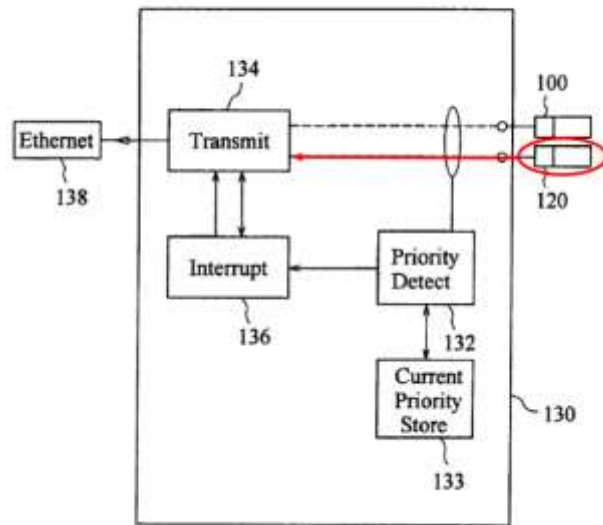


Id. at Fig. 4 (annotated).

[1(c)] receiving a second packet;

Banes discloses this limitation. Banes teaches that, “[d]uring transmission of the initial data portion 102a, **a higher priority packet is received** for sending along the same path” (i.e., *receiving a second packet*). *Id.* at 11:22-23, 12:2-13, 13:2-5 (“receiving a higher priority data packet”). This higher priority packet (*second packet*) includes a header and data portion. *Id.* at 11:23-25. The receipt of this higher priority packet containing a header portion 120 by network interface 130 and transmitter 134 is illustrated below in Figure 5:

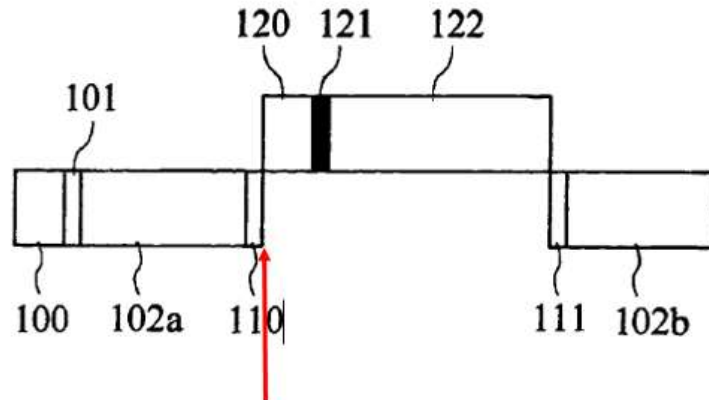
Fig. 5



Id., Fig. 5 (annotated).

[1(d)] upon receiving the second packet, stopping the transmitting of the first packet so that not all of the first packet has been transmitted;

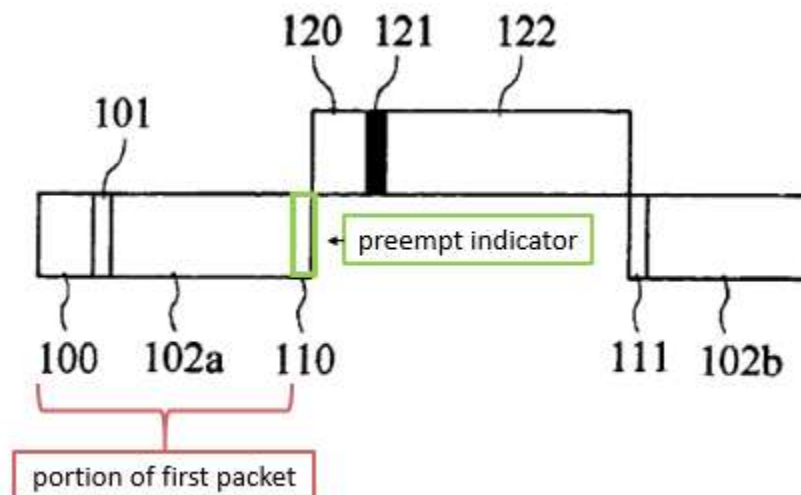
Banes discloses this limitation. Banes teaches that a “priority detector 132” monitors received packets to “determine[] whether interruption is required[.]” Ex.1005, 12:3-5. When the priority detector determines that a higher-priority packet has been received, “an interrupt code 110 is inserted in the [initial] data portion 102a, which signals to an appropriately configured receiver that sending of the first packet has been interrupted” (i.e., *upon receiving the second packet, stopping the transmitting of the first packet*). Ex.1005, 11:22-28. After the interruption, the transmission of the first packet is stopped such that only a portion of the first packet (initial portion 102a) has been transmitted (i.e., *so that not all of the first packet has been transmitted*). *Id.*, 11:20-30. The second packet is transmitted while transmission of the first packet is paused. *Id.*, Fig. 4, 12:8-13. The point where the transmitting of the first packet is stopped upon receipt of the second packet, so that not all of the first packet has been transmitted is annotated with the red line in Figure 4 of Banes below:



Ex.1005, Fig. 4 (annotated).

[1(e)] transmitting a preempt indicator;

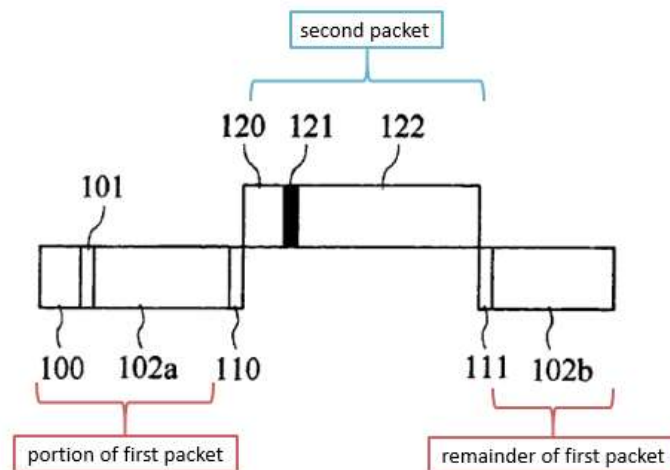
Banes discloses this limitation. Banes teaches that an interrupt code (*preempt indicator*) is transmitted by “insert[ing] [it] in the [initial] data portion 102a, which signals to an appropriately configured receiver that sending of the first packet has been interrupted.” *Id.*, 11:25-28; *see also id.*, 2:17-20 (“sending a special code to signify interruption”), 12:8-13.



Id. at Fig. 4 (annotated).

[1(f)] transmitting the second packet; and

Banes discloses this limitation. Banes teaches that a “higher priority data packet” (*second packet*) is transmitted after transmission of the preempt indicator. Ex.1005, 2:9-13, 11:23-30, 12:8-13. Banes teaches “interrupting transmitting the first data packet to **transmit the higher priority data packet**” (i.e., *transmitting the second packet*). *Id.*, 2:9-13. Figure 4 shows that after interruption of the transmission of the first data packet, “[t]he higher priority packet is then sent[.]” *Id.*, 11:28-30; see also *id.*, 12:8-13.

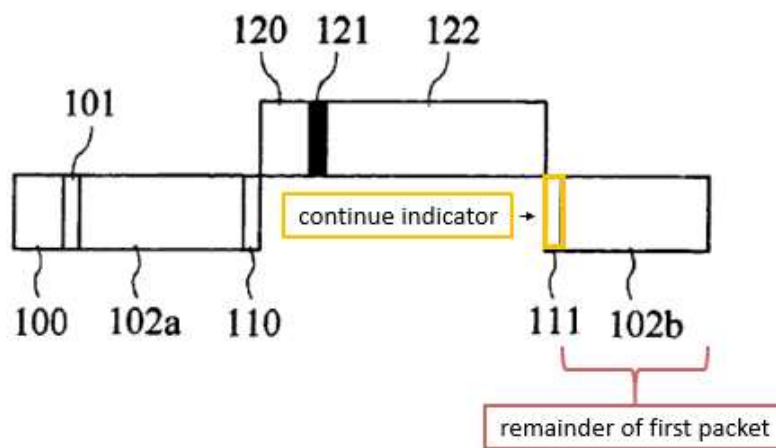


Id., Fig. 4 (annotated).

[1(g)] upon completion of transmitting the second packet, transmitting a continue indicator; and

Banes discloses this limitation. Banes describes a “resume code” or “resumption code 111” (*continue indicator*). *Id.* at 11:28-30, 12:13-17. Specifically,

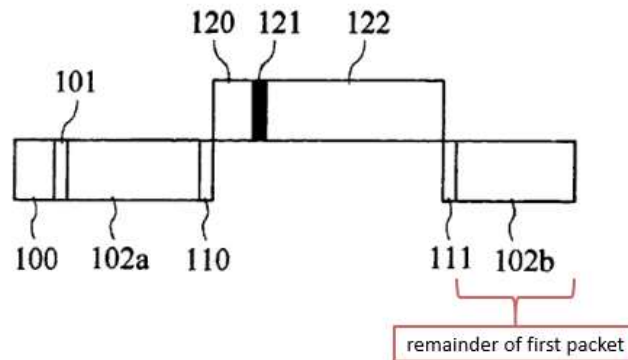
Banes teaches that “[t]he higher priority packet is then sent, followed by a resumption code 111” (i.e., *upon completion of transmitting the second packet, transmitting a continue indicator*). *Id.* at 11:28-30; *see also id.* at 12:13-17. Figure 4 below depicts the resumption code 111 (i.e., *continue indicator*) being transmitted upon completion of transmitting the second packet:



Id. at Fig. 4 (annotated).

[1(h)] transmitting the portion of the first packet that has not yet been transmitted;

Banes discloses this limitation. Banes teaches that the transmission of the resumption code (*continue indicator*) is “followed by the remainder 102b of the data of the first packet” (*transmitting the portion of the first packet that has not yet been transmitted*). *Id.* at 11:28-30; *see also id.* at 12:13-17, Fig 4. This transmission of the remainder 102b of the first packet is shown in Figure 4 below:



Id. at Fig. 4 (annotated).

[1(i)] wherein the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Banes discloses and renders obvious this limitation. The '905 Patent describes that an “out-of-band symbol” can be “a symbol that does not normally appear within a packet because it may not have the same desirable characteristic as an in-band symbol[.]” Ex.1001, 11:56-60. Consequently, “in-band symbols” can be symbols that “typically” make up “[a] packet that is transmitted on a serial communications link.” Ex.1001, 11:49-50. The '905 Patent describes that it “use[s] [] out-of-band symbols to transmit control information.” *Id.*, Abstract; *see also id.* at 7:5-6 (same), 29:17-18. Specifically, the patent explains that the out-of-band symbols encode “control information” and “can be inserted into a sequence of in-band symbols and readily detected as control symbols when received.” *Id.*, 12:3-6. These out-of-band symbols, which encode control information, “can be interspersed with the transmission of symbols of a packet [i.e., in-band symbols].” *Id.*, 12:6-11.

A POSITA would have understood that the patent distinguishes these “control symbols” containing control information from the “data symbols” containing the ordinary or normal data being transmitted. *Id.* at 9:58-10:8; *see also id.* at 9:23-51 (contrasting “control symbols” from “data” being transmitted); Ex.1003, ¶88.

First, Banes discloses and renders obvious that *the packets include in-band symbols*. Specifically, Banes teaches that the first packet may be “a lower priority **data packet**” that gets interrupted. Ex.1005 at Code (57) (Abstract), 13:3-5, 2:14-16 (“large **blocks of data** can be efficiently transmitted...without creating a bottleneck and holding up more urgent data.”). And Banes teaches that the second packet may be “a **data packet** of higher priority,” such as a “smaller or more important **data packet[]**” that contains “more urgent **data**.” Ex.1005 at Code (57) (Abstract), 2:4-8, 2:14-16; *see also id.* at Ex.1005 at 13:3-5. Thus, Banes discloses that both its first packet (the interrupted packet) and its second packet (the higher priority packet) can be “data packets,” which comprise “data,” which is the type of information that normally appears in packets. Ex.1003, ¶¶90-91.

Banes further discloses that its disclosure applies to ATM or Ethernet networks, which use data packets in the form of ATM cells and Ethernet frames. Ex.1005, 2:17-20, 3:27-4:1, 12:5-13, Abstract (“Application is to ATM or Ethernet networks.”); *see also* 6:11-21. A POSITA would have understood that such data packets, including ATM cells and Ethernet frames, would have included symbols, at

least because Ethernet uses 8b/10b encoding, which uses symbols. Ex.1005, 2:17-20; Ex.1003, ¶¶91-92. Thus, a POSITA would have understood that Banes' first packet (the interrupted packet) and second packet (the preempting packet), which Banes teaches can be "data packets," would have included "in-band-symbols," because Banes discloses that these packets can be 8b/10b encoded Ethernet frames, which comprise symbols, and because these data packets include "data" (as opposed to control information), which is the type of information that typically appears in packets. Ex.1003, ¶¶90, 93. At a minimum, it would have been obvious to a POSITA to include in-band symbols within the first and second packets, because it was well-known to include such symbols in data packets so as to distinguish data or payload information from control information. Ex.1003, ¶94.

Second, Banes discloses and renders obvious that *the indicators include one or more out-of-band symbols*. Banes teaches that the interrupt code (*preempt indicator*) can be a "spare" or "unused code," such as when "10 bit coding is used to carry 8 bit data." Ex.1005, 2:17-20, 12:8-13. For example, "a pre-determined 'spare' code from the 10 bit coding scheme used for [E]thernet" may be used for the interrupt code. *Id.*, 12:8-13; *see also id.* at 12:18-19. Further, Banes teaches that the interrupt code can be "inserted in the [initial] data portion 102a" of the first packet, indicating that it is inserted and does not normally appear in packets. Ex.1005, 11:26-28. Because Banes teaches using a "spare" or "unused" code from a 8b/10b

encoding scheme for the interrupt code, a POSITA would have understood that such a code included one or more symbols (because 8b/10b encoding is used) and also that such one or more symbols would have been out-of-band symbols, because they are “spare” or “unused” and also “inserted” into the first packet, which all demonstrates they do not normally appear within a packet. Ex.1003, ¶95.

Further, Banes discloses that its “[s]ignaling of interruption is preferably implemented at the physical layer, for example by using an otherwise unused 10 bit code in the case of Ethernet,” which a POSITA would have understood to apply to both the interrupt code, as well as Banes’ “resume code”/“resumption code” because i) the resume/resumption code is part of the collective “signaling” that is used to complete interruption in Banes and ii) because it is termed a “code,” and used to transmit control information, not data, indicating it also occupies an otherwise unused code (i.e., not used to encode data) that is available in Banes’ 8b/10b coding scheme, just like the interrupt code. Ex.1003, ¶96.

At a minimum, Banes’ disclosure of using a “spare” or “unused” code for its interrupt code would have motivated a POSITA to use the same for its resume/resumption code, because they are both similarly described as “codes” and because they serve similar purposes in that they respectively pause and resume transmission of the first packet. Ex.1003, ¶97.

3. Claim 3

[3] The method of claim 1 wherein the in-band symbols are transition optimized and the out-of-band symbols are not transition optimized.

Banes discloses and renders obvious that *the in-band symbols are transition optimized and the out-of-band symbols are not transition optimized*. The '905 Patent describes a “transition” “as a bit value of 1 followed by a bit value of 0 or a bit value of 0 followed by a bit value of 1.” Ex.1001, 23:53-55. Optimizing transitions, therefore, can be to either “maximize or minimize the number of transitions.” Ex.1001, 23:50-53. According to the '905 Patent, when the number of transitions in a data block is maximized, “clock information may be more accurately derived from the transmitted symbols.” Ex.1001, 23:55-57. The '905 Patent also describes that the data characters and control characters can have a different number of transitions—for example, “in-band symbols” may have “at least four transitions” whereas “out-of-band symbols” may have “three or less transitions.” Ex.1001, 41:41-46.

Banes discloses transition optimized data blocks, and thus, *in-band symbols [that] are transition optimized*, because it discloses that the packets may be “Ethernet data packets,” which use an 8b/10b coding scheme. Ex.1005, Abstract, 2:17-20, 9:21-24, 12:5-13, 12:18-19. In an 8b/10b coding scheme, in-band symbols are transition optimized. Ex.1003, ¶102. Specifically, 8b/10b encoding maximizes the number of data transitions in a serial data stream, helping the receiver stay in

sync with the transmitter. *Id.* In addition, a POSITA would have understood from Banes that the “spare” or “unused” Ethernet codes used for the “interrupt” and “resume” codes must be distinguishable from the regular data blocks in order to trigger the preemption protocol. *See* Ex.1005, 12:5-19, 12:2-4. Ex.1003, ¶103. Because Banes’ in-band data is transition optimized, its out-of-band codes (*out-of-band symbols*) would have been understood to be *not transition optimized* for them to be distinguishable by the system from the in-band data. Ex.1003, ¶¶104-107.

In addition, a POSITA also would have found it obvious and would have been motivated to use in-band symbols that are transition optimized and out-of-band symbols that are not transition optimized, because this was well known in the art at the time of the ’905 patent. Ex.1003, ¶¶104-105. Transition optimization of in-band symbols is an objective of 8b/10b encoding. Ex.1003, ¶102. The ’905 Patent specification admits as much, as it incorporates by reference a prior art coding technique from U.S. Patent No. 5,999,571 (“Shin ’571”), filed in 1995, which the ’905 Patent admits discloses a “[t]ransition control coding technique.” Ex.1001, 24:50-55; *see also* Ex.1006, 2:40-45, 8:54:59; Ex.1008, Abstract; Ex.1003, ¶101.

Second, a POSITA would have also been motivated to use non-transition-optimized out-of-band symbols, because such was well known in the art at the time of the ’905 patent for providing the benefit of allowing such out-of-band symbols to

be distinguishable from in-band symbols as taught by Shin '571 and Shin '464. Ex.1003, ¶¶104-105; *see also* Ex.1008, 5:15-27; Ex.1006, 9:66-10:8.

As discussed for limitation [1(i)], a POSITA would have understood that Banes' interrupt and resume codes are out-of-band symbols because they can use “spare” symbols or “unused” symbols not used in a coding scheme, such as an 8b/10b scheme used for Ethernet. *See, e.g.*, Ex.1005, 2:17-20, 12:8-13, 12:18-19. Because transition-optimized in-band data symbols would be used for such an 8b/10b scheme in Banes, a POSITA would have known that Banes' out-of-band interrupt and resume codes would need to be distinguishable from the in-band data to be able to perform their function of indication interruption and resumption, and, as such, would have been motivated to use the well-known technique of using out-of-band symbols that are not transition optimized to provide the well-known benefit of making such out-of-band symbols distinguishable from such transition-optimized in-band symbols. Ex.1003, ¶¶106-108.

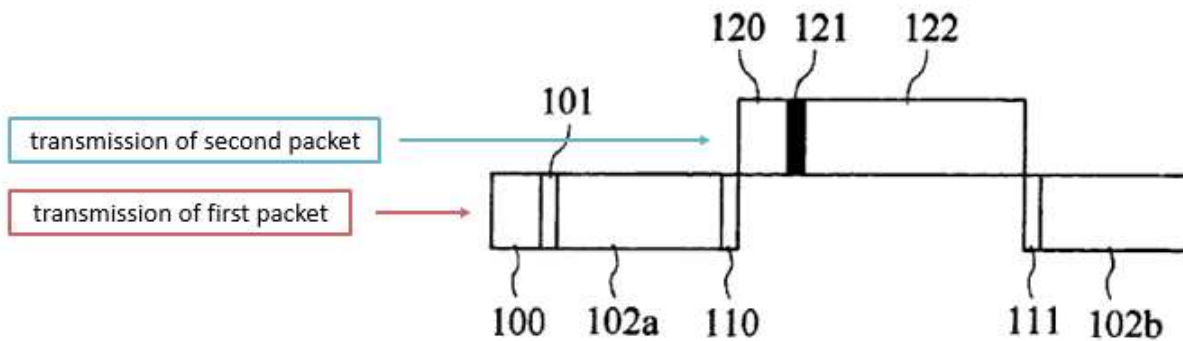
4. Claim 5

[5] The method of claim 1 wherein the first and second packets are transmitted through the same communications link.

Banes discloses this limitation. Specifically, Banes teaches that “[d]uring transmission of the initial data portion 102a [of the first data packet], a higher priority packet is received **for sending along the same path**” (i.e., to be *transmitted via the*

same communications link). Ex.1005, 11:22-23. A POSITA would have understood this “same path” to be the *same communications link*. Ex.1003, ¶¶109-111.

Further, Banes teaches that its system is applicable “to ATM or Ethernet networks” (Ex.1005, Abstract) and that “both types of packet [ATM cells and Ethernet frames] may be packaged and efficiently transported over a **common medium**, and readily separated for transmission over dedicated networks.” Ex.1005, 4:1-3. These statements would have been understood by a POSITA to refer to transmitting such packets *via the same communications link* and to separating such packets after they are *received*. Ex.1003, ¶110. Further, Figure 4 and its accompanying description teach transmitting the first and second packets *via the same communications link*, because a POSITA would have understood that the need to interrupt transmission arises the transmission of the first packet to allow the second packet to be transmitted arises from the packets being transmitted over the same link as both could be transmitted at the same time via two different communications links, if two or more such links were used rather than the same link. Ex.1005, Fig. 4, 11:18-30; Ex.1003, ¶111.

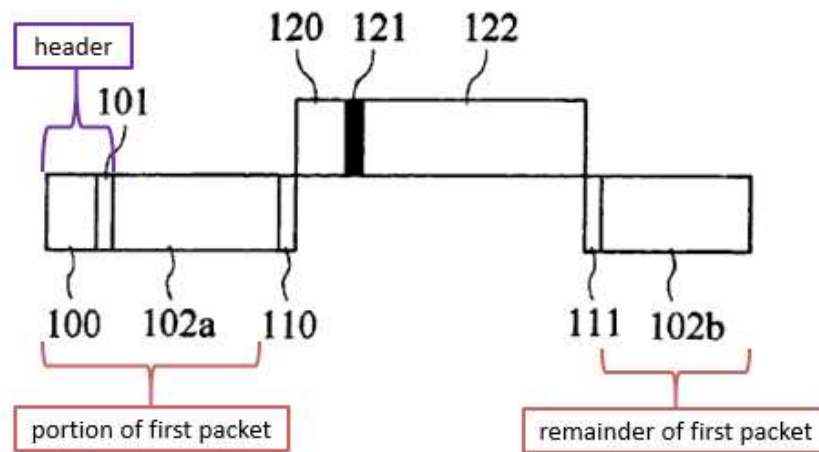


Ex.1005, Fig. 4 (annotated).

5. Claim 7

[7] The method of claim 1 wherein the first packet includes a header that is transmitted only once.

Banes discloses this limitation. Specifically, Banes discloses “a data packet according to the invention comprises a header 10 and a data portion 20. The header comprises routing information 12 and a length or type field 14, which in this embodiment comprises a single bit signifying ‘long’ or ‘short’. The header may also contain information such as priority information.” Ex.1005, 5:23-25; Fig 1. Figure 4 below illustrates that the “header 100 including a priority flag 101” of the first packet is transmitted only once with “data portion 102a,” but not transmitted again with the “remainder 102b of the data of the first packet.” *Id.*, 11:20-22, 11:28-30; Ex.1003, ¶¶113-114.



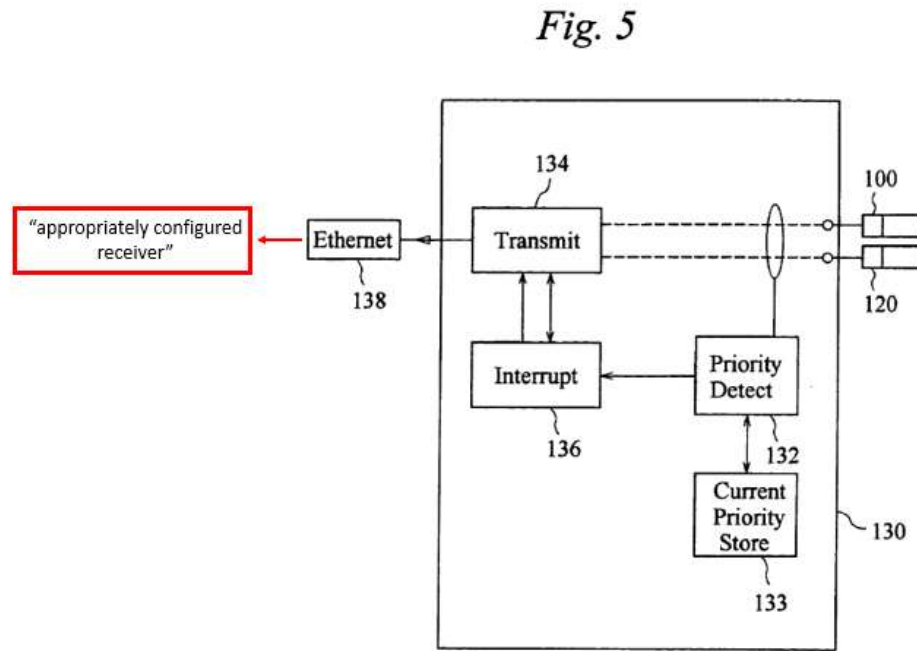
Ex.1005, Fig. 4 (annotated).

6. Claim 8

[8(pre)] A method for receiving packets, the method comprising:

To the extent this preamble is limiting, Banes discloses it because Banes discloses an “appropriately configured receiver” that received transmitted packets at the receiving end of Banes’ “method of communicating data over a network” (*method for receiving packets*). Ex.1005, 11:25-30, 2:9-10, 3:3-4; Ex.1003, ¶116. Banes teaches that its packets are transmitted by a transmitter 134 “over a network, here a 1Gbit/s Ethernet 138,” which demonstrates the packets received by this “appropriately configured receiver” are received from this transmitter 134 over this Ethernet network, because for the data to be “**communicated** over a network” (i.e., Ethernet network 138) as taught by Banes (Ex.1005, 2:9-10, 3:3-4), the packets must be “received” by the receiver. Ex.1005, 12:1-7; Ex.1003, ¶117. This “appropriately

configured receiver,” which is not depicted in Figure 5, would have been understood to be positioned as annotated below:



Ex.1005, Fig. 5 (annotated); 12:1-7; Ex.1003, ¶116.

Further, Banes also discloses *a method for receiving packets* for the same reasons set forth above for [1(pre)] regarding how Banes discloses *a method for transmitting packets*, because Banes teaches “a method of communicating data over a network,” which means such transmitted packets must be received for such data to be “communicated” over a network. Ex.1005 at 2:9-10, 3:3-4; Ex.1003, ¶117. Banes also discloses that “the fragmented packets” undergo “reassembly,” which further demonstrates that they are received because receipt is required for reassembly. Ex.1005, 12:13-17; Ex.1003, ¶118.

[8(a)] receiving a first portion of symbols of a first packet;

Banes discloses this limitation. For the same reasons set forth above for [1(b)] regarding how Banes discloses *transmitting a portion of the received first packet*, Banes also discloses *receiving a first portion of...a first packet*, because, as discussed above for [8(pre)], Banes discloses an “appropriately configured receiver” for receiving packets, including a first portion of a first packet (Ex.1005 at 11:25-30) and Banes discloses “a method of communicating data over a network,” which means the transmitted packets (and portions thereof) are received in order for such data to be “communicated” over a network. Ex.1005 at 2:9-10, 3:3-4; Ex.1003, ¶120.

In addition, a POSITA would have understood that the packets in Banes can be comprised of *symbols* because Banes teaches the packets may be Ethernet packets (Ex.1005 at Abstract, 12:5-13) and Banes teaches that Ethernet packets use 8b/10b encoding, which a POSITA would have understood maps 8-bit data to 10-bit “symbols.” Ex.1005, 2:17-20 (“in the case of high speed Ethernet, 10 bit coding is used to carry 8 bit data”); Ex.1003, ¶123. As such, when the receiver receives a first portion of the first packet in Banes, a POSITA would have understood that the receiver receives a first portion of *symbols* of a first packet. *Id.*

[8(b)] receiving a preempt indicator indicating that a second packet of symbols is to be received;

Banes discloses this limitation. For the same reasons set forth above for [1(e)] regarding how Banes discloses *transmitting a preempt indicator*, Banes also discloses *receiving a preempt indicator indicating that a second packet...is to be received*, because Banes teaches “a method of communicating data over a network,” which means such a transmitted preempt indicator is received for such to be communicated over a network. Ex.1005 at 2:9-10, 3:3-4. Banes further discloses that when a higher-priority packet (*second packet*) is detected, “an interrupt code 110 is inserted” in the data portion of the first packet that “signals to an appropriately configured **receiver** that sending of the first packet has been interrupted.” Ex.1005, 11:22-28, 12:8-13. As such, a POSITA would have understood from this that the receiver receives the interrupt code 110 (*preempt indicator*), which indicates that an interrupting higher priority packet (*a second packet*) is to be received. Ex.1003, ¶¶125-126. Further, a POSITA would have understood that this higher priority packet (*second packet*) would have been comprised of *symbols* because Banes’ packets are comprised of symbols for the same reasons set forth above for [8(a)]. Ex.1003, ¶127.

[8(c)] receiving the second packet of symbols;

Banes discloses this limitation. For the same reasons set forth above for [1(f)] regarding how Banes discloses *transmitting the second packet*, Banes also discloses *receiving the second packet*, because Banes teaches “a method of communicating data over a network,” which means such a transmitted second packet is received for it to be communicated over a network. Ex.1005 at 2:9-10, 3:3-4. Further, as described above for limitation [8(a)], in Banes’ system, packets are received by an “appropriately configured **receiver**.” Ex.1005, 11:25-3. As such, a POSITA would have understood that the receiver receives the transmitted higher priority packet (*second packet*). Ex.1005 at 11:22-23; Ex.1003, ¶¶129-130. As explained above for limitation [8(a)], a POSITA would have understood Banes’ packets to include symbols. Ex.1003, ¶130.

[8(d)] receiving a continue indicator indicating that a second portion of symbols of the first packet is to be received; and

Banes discloses this limitation. For the same reasons set forth above for [1(g)] regarding how Banes discloses *transmitting a continue indicator*, Banes also discloses *receiving a continue indicator*, and for the same reasons set forth above for [1(h)] regarding how Banes discloses *transmitting the portion of the first packet that has not yet been transmitted*, Banes discloses *receiving a second portion...of the first packet*. This is because Banes teaches “a method of communicating data over

a network,” which means such a transmitted continue indicator and transmitted portion is received for such to be communicated over a network. Ex.1005 at 2:9-10, 3:3-4; Ex.1003, ¶132.

As described above for limitation [8(a)], packets are received by an “appropriately configured receiver.” Ex.1005, 11:25-30. Further, Banes discloses that “the fragmented packets,” including the remainder 102b (*second portion*) of the first packet, undergo “reassembly,” which demonstrates that such fragmented packets, including *the second portion...of the first packet*, are received. Ex.1005, 12:13-17. A POSITA would have understood that the “resume code” or “resumption code 111” (*continue indicator*) would also be received by said “appropriately configured receiver” to indicate to the receiver that transmission of the first packet is being resumed and that the second portion of the first packet is to be received. Ex.1003, ¶133; *see also* Ex.1005, 11:28-30 (“The higher priority packet is then sent, ***followed by a resumption code 111***, followed by the remainder 102b of the data of the first packet.”), 12:13-17 (“a resume code is sent...followed by the remainder of the first packet”). As explained above for limitation [8(a)], a POSITA would have understood Banes’ packets, including the portions thereof, include symbols. Ex.1003, ¶133.

[8(e)] receiving the second portion of symbols of the first packet;

For the same reasons set forth above for [1(h)] regarding how Banes discloses *transmitting the portion of the first packet that has not yet been transmitted*, Banes discloses receiving *the second portion...of the first packet*, because Banes teaches “a method of communicating data over a network,” which means such a transmitted portion is received for such to be communicated over a network. Ex.1005 at 2:9-10, 3:3-4; Ex.1003, ¶135. As described above for limitation [8(a)], in Banes’ system, packets are received by an “appropriately configured receiver.” Ex.1005, 11:25-30. Further, Banes discloses that “the fragmented packets,” including the remainder 102b (*second portion*) undergo “reassembly,” which demonstrates that such fragmented packets, including *the second portion...of the first packet*, are received. Ex.1005, 12:13-17. As such, a POSITA would have understood that *the second portion...of the first packet* (remainder 102b) is also received by the receiver. Ex.1003, ¶136; Ex.1005, 11:28-30, 12:13-17. As further explained above for limitation [8(a)], a POSITA would have understood Banes’ packets, including the portions thereof, to include *symbols*. Ex.1003, ¶137.

[8(f)] wherein the symbols of the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Banes discloses and renders obvious this limitation for the reasons set forth above for limitation [1(i)]. Ex.1003, ¶139.

7. **Claim 10**

[10] The method of claim 8 wherein the in-band symbols are transition optimized and the out-of-band symbols are not transition optimized.

Banes discloses and renders obvious this limitation for the reasons set forth above for claim [3]. Ex.1003, ¶140.

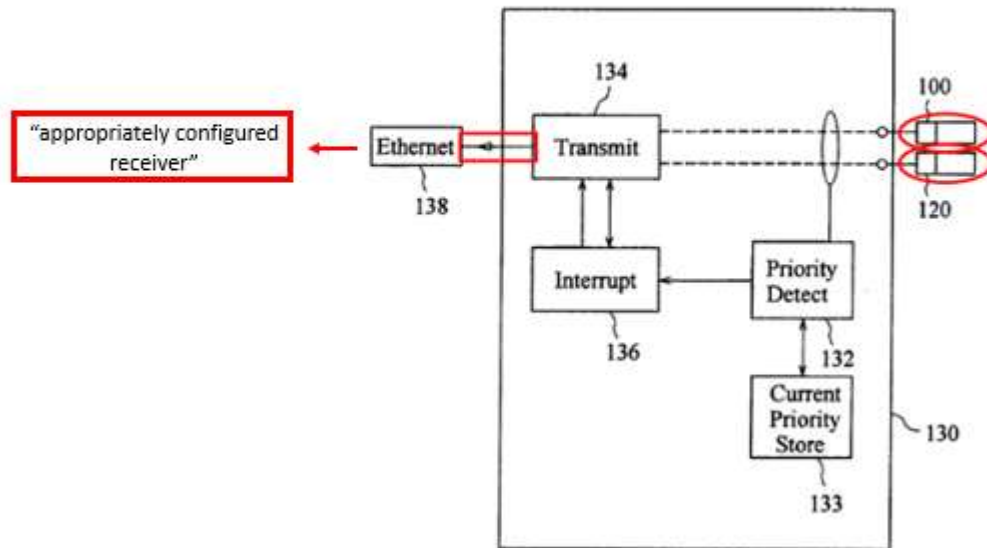
8. **Claim 12**

[12] The method of claim 8 wherein the first and second packets are received via the same communications link.

Banes discloses this limitation for the reasons set forth above for claim [5]. Ex.1003, ¶141.

In addition, Banes discloses that the “first data packet” (*first packet*) and “higher priority data packet” (*second packet*) are *received via the same communications link*. Banes teaches that “[d]uring transmission of the initial data portion 102a [of the first data packet], a higher priority packet is received **for sending along the same path**” (i.e., to be *received via the same communications link*). Ex.1005, 11:22-23. For example, Banes’ Figure 5 below shows both the first data packet containing header 100 and the higher priority packet containing header 120 (each circled in red) being received by and then transmitted by the transmitter 134 along the same path (boxed in red) over “a 1 Gbit/s ethernet 138,” to the “appropriately configured receiver” that receives these packets:

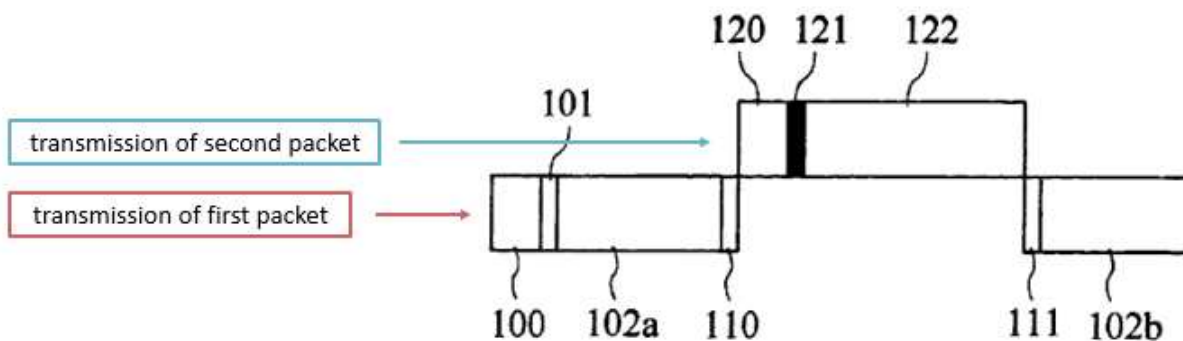
Fig. 5



Ex.1005, Fig. 5 (annotated), 12:5-7, 11:25-30; Ex.1003, ¶143.

A POSITA would have understood this “same path” to be the *same communications link*. Ex.1003, ¶142. Further, Banes teaches that its system is applicable “to ATM or Ethernet networks” (Ex.1005, Abstract) and that “both types of packet [ATM cells and Ethernet frames] may be packaged and efficiently transported over **a common medium**, and readily separated for transmission over dedicated networks.” Ex.1005, 4:1-3. Such “packag[ing]” and “transport[] over a common medium,” followed by subsequent “separat[ion]” would have been understood by a POSITA to refer to transmitting such packets *via the same communications link* and to separating such packets after they are *received*. Ex.1003,

¶144. Further, Figure 4 and its accompanying description teach transmitting (and then receiving) the first and second packets *via the same communications link*, because a POSITA would have understood that the need to interrupt the transmission of the first packet to allow the second packet to be transmitted arises from the packets being transmitted over the same link as both could be transmitted at the same time via two different communications links, if two or more such links were used rather than the same link. Ex.1005, Fig. 4, 11:18-30; Ex.1003, ¶145.



Ex.1005, Fig. 4 (annotated).

9. Claim 14

[14] The method of claim 8 wherein the first packet includes a header that is received only once.

Banes discloses this limitation for the reasons set forth above for claim [7].

Ex.1003, ¶147.

10. Claim 15

[15(pre)] A method for transmitting packets via a communications link, the method comprising:

Banes discloses this limitation for the reasons set forth above for limitations [1(pre)] and [12]. Ex.1003, ¶148.

[15(a)] transmitting a first portion of a first packet;

Banes discloses this limitation for the reasons set forth above for limitation [1(b)]. Ex.1003, ¶149.

[15(b)] transmitting a preempt indicator indicating that a second packet is to be transmitted;

Banes discloses this limitation for the reasons set forth above for limitation [1(e)] regarding *transmitting a preempt indicator* and for the reasons set forth above for limitation [8(b)] regarding *indicating that a second packet is to be transmitted*. Ex.1003, ¶150.

[15(c)] transmitting the second packet;

Banes discloses this limitation for the reasons set forth above for limitation [1(f)]. Ex.1003, ¶151.

[15(d)] transmitting a continue indicator indicating that a second portion of the first packet is to be transmitted; and

Banes discloses this limitation for the reasons set forth above for limitation [1(g)] regarding *transmitting a continue indicator* and for the reasons set forth above

for limitation [8(d)] regarding *indicating that a second portion of the first packet is to be transmitted*. Ex.1003, ¶152.

[15(e)] transmitting the second portion of the first packet

Banes discloses this limitation for the reasons set forth above for limitation [1(h)]. Ex.1003, ¶153.

[15(f)] wherein the first and second packets and the preempt and continue indicators are transmitted via the same communications link and

Banes discloses *the first and second packets...are transmitted via the same communications link* for the reasons set forth above for claim [5]. Ex.1003, ¶154. Further, *the preempt and continue indicators* would have been understood to also be *transmitted via the same communications link* as the first and second packets for the same reasons as set forth above for claim [5], including because they are transmitted via the same link to ethernet 138 shown in Figure 5 and because they are inserted into the first packet, as shown in Figure 4, that is transmitted via the same link as the second packet. *Id.*

[15(f.1)] further the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Banes discloses and renders obvious this limitation for the reasons set forth above for limitation [1(i)]. Ex.1003, ¶155.

11. Claim 17

[17] The method of claim 15 wherein the in-band symbols are transition optimized and the out-of-band symbols are not transition optimized.

Banes discloses and renders obvious this limitation for the reasons set forth above for claim [3]. Ex.1003, ¶156.

12. Claim 20

[20] The method of claim 15 wherein the first packet includes a header that is transmitted only once.

Banes discloses this limitation for the reasons set forth above for claim [7]. Ex.1003, ¶157.

13. Claim 21

Patent Owner has proposed in the co-pending litigation against Dell that the *transmission component* and *preemption component* limitations of claim 21 should be construed according to their plain and ordinary meaning and are not governed by 35 U.S.C. 112(6). Petitioners adopt this position for purposes of this proceeding only.¹

¹ Petitioners reserve the right to argue in co-pending litigations that either of these limitations is a means-plus-function limitation that lacks disclosed corresponding structure and is, therefore, indefinite.

[21(pre)] A communications device for transmitting packets via a communications link, comprising:

Banes discloses this limitation for the reasons set forth above for limitations [1(pre)] and [12]. Ex.1003, ¶158.

[21(a)] a transmission component that transmits a first packet; and

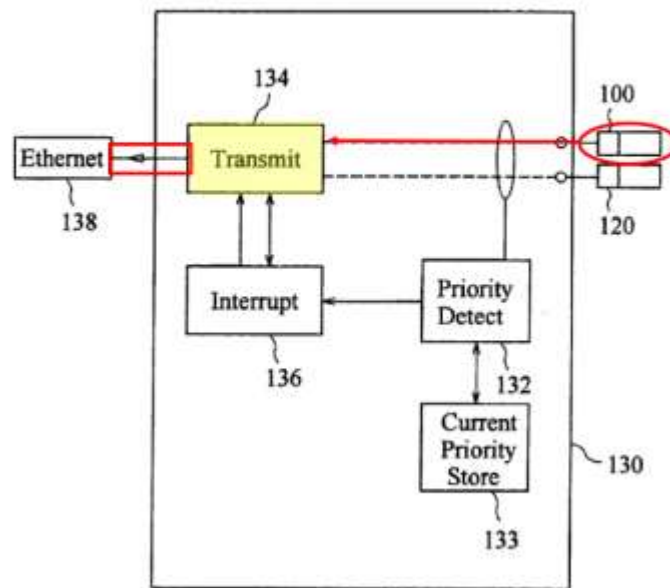
Banes discloses *transmit[ting] a first packet* for the reasons set forth above for limitation [1(b)]. Ex.1003, ¶159.

Further, to the extent that the *transmission component* and the *preemption component* of claim 21 do not need to be separate physical structures, as contended by Patent Owner in the parallel district court litigation, then Banes discloses a “network interface 130” that constitutes a *transmission component* and a *preemption component*. The network interface 130 constitutes *a transmission component that transmits a first packet* because it includes a “transmitter 134” that transmits received data packets for onward transmission, including the first, lower priority data packet (*a first packet*). Ex.1005, 4:23-28, 11:18-23, 12:2-7, 13:17-21, 14:11-16, Fig. 5; Ex.1003, ¶¶160-161.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “transmitter 134” in Banes constitutes *a transmission component that transmits a first packet* and the “interrupt device 136” constitutes a *preemption component* (as set forth in [21(b)]-[21(b.3)])

below). The “transmitter 134” in Banes constitutes *a transmission component that transmits a first packet* because it transmits received data packets for onward transmission, including the first, lower priority data packet (*a first packet*). Ex.1005, 12:2-7, 11:18-23, Fig. 5. Figure 5 depicts the first, lower priority packet (with header 100) being transmitted by the transmitter 134 to Ethernet 138, as shown below:

Fig. 5



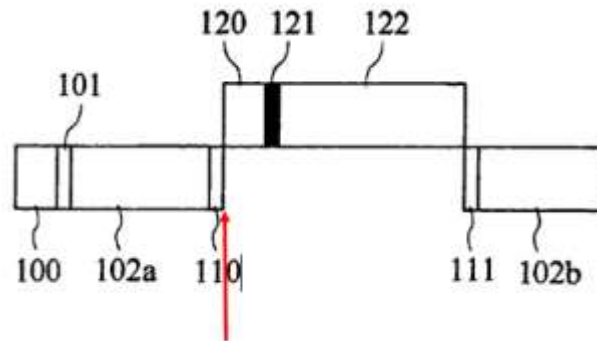
Ex.1005, Fig. 5 (annotated); Ex.1003, ¶¶164-165.

[21(b)] a preemption component that signals the transmission component to stop transmitting the first packet,

Banes discloses *stop[ping] transmitting the first packet* for the reasons set forth above for limitation [1(d)]. Ex.1003, ¶165.

Further, if the *transmission component* and *preemption component* need not be separate structures, then the “network interface 130” constitutes a *preemption component that signals the transmission component to stop transmitting the first packet* because it includes an “interrupt device 136” that inserts an interrupt code which “signals...that sending of the first packet has been interrupted.” Ex.1005, 12:1-13, 11:25-28; Ex.1003, ¶166. The network interface 130’s interrupt device 136 “buffers the remainder of the [first] packet in transit” and “instructs the transmitter [134] [of the network interface 130] to commence output of the higher priority packet” (*signals the transmission component to stop transmitting the first packet*). *Id.*, 12:8-13.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “interrupt device 136” in Banes constitutes a *preemption component that signals the transmission component to stop transmitting the first packet* for the reasons mentioned immediately above. Figure 4 illustrates that when “interrupt code 110” is inserted by the interrupt device, the transmitter stops transmission of the first packet at the point annotated by the red arrow below. *Id.*, Fig. 4, 11:25-28; Ex.1003, ¶¶167-168.



Ex.1005, Fig. 4 (annotated).

[21(b.1)] transmits a preempt indicator indicating that a second packet is to be transmitted,

Banes discloses *transmit[ing] a preempt indicator* for the reasons set forth above for limitation [1(d)]. Ex.1003, ¶170.

Further, if the *transmission component* and *preemption component* need not be separate structures, then the “network interface 130” constitutes a *preemption component that...transmits a preempt indicator indicating that a second packet is to be transmitted*, because, as explained above for limitation [21(b)], Banes discloses that the “network interface 130” includes an interrupt device 136 that “inserts an interrupt code” (*preempt indicator*) which “instructs the transmitter to commence output of the higher priority packet” (*indicating that a second packet is to be transmitted*). Ex.1005, 12:5-13, 11:25-28, Figs. 4-5; Ex.1003, ¶171.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “interrupt device 136” in

Banes constitutes *a preemption component that...transmits a preempt indicator indicating that a second packet is to be transmitted*. Ex.1005, 12:5-13, 11:25-28, Figs. 4-5; Ex.1003, ¶172.

[21(b.2)] transmits the second packet, and

Banes discloses *transmit[ting] the second packet* for the reasons set forth above for limitation [1(f)]. Ex.1003, ¶174. Further, Banes discloses and renders obvious *a preemption component that...transmits the second packet*.

If the *transmission component* and *preemption component* need not be separate structures, then the “network interface 130” constitutes *a preemption component that...transmits the second packet* because the “network interface 130” contains a transmitter 134 that transmits the higher priority packet (*the second packet*) after “an interrupt code” (*preempt indicator*) is inserted and the transmitter is “instruct[ed]...to commence output of the higher priority packet.” Ex.1005, 12:5-13, 11:28-30, Figs. 4-5; Ex.1003, ¶175.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then Banes renders obvious *a preemption component that...transmits the second packet*. It would have been obvious to a POSITA for the “interrupt device 136” (*preemption component*) to participate in the *transmit[ting] of the second packet* for the reasons set forth below. Ex.1003, ¶176. As described above for limitation [21(b.1)], Banes teaches that the

“interrupt device 136” transmits an “interrupt code” (*preempt indicator*) and “instructs the transmitter to commence output of the higher priority packet,” but is silent as to whether the interrupt device participates in transmitting the higher-priority packet. Ex.1005, 12:1-13; Ex.1003, ¶¶176-177.

However, it would have been obvious to a POSITA for the interrupt device 136 in Banes to participate in the transmitting of the higher priority packet (*the second packet*). Ex.1003, ¶178. Banes teaches that its interrupt device 136 already includes a “buffer[]” that can store “the remainder of the [first] packet in transit as necessary.” Ex.1005, 12:8-13. Further, Banes teaches that its priority detector 132 determines whether an incoming packet has priority over the first packet in transit and needs to preempt it by referring to the priority of the first packet in transit stored in the current priority store 133 and comparing that priority with the priority read from the header of the incoming packet. Ex.1005, 12:3-13, 11:20-25; Fig. 5. A POSITA would have understood that it would have been necessary to at least temporarily store the incoming higher priority packet (*second packet*) to be able to read its priority flag from its header and perform this comparison with the stored priority of the first packet. Ex.1003, ¶178. As such, a POSITA would have been motivated to use the interrupt device 136’s buffer to temporarily store the second packet, because this would have been understood to be necessary to allow its priority flag to be analyzed and compared, because Banes already teaches this buffer can

temporarily store packets including the portion of the interrupted first packet, and because it would have been efficient to use this buffer to temporarily store the second packet in addition to the portion of the first packet so that an additional buffer is unnecessary. *Id.* And because a POSITA would have been motivated to temporarily store the second packet in the interrupting device 136's buffer, a POSITA would have also been motivated to have the interrupting device 136 participate in the transmission of the second packet by transmitting it from its buffer to the transmitter 134 for onward transmission. *Id.* A POSITA would have appreciated that such a design would have furthered Banes' goal of detecting packet priority and performing interruption of lower priority packets with high priority packets by allowing the incoming second packet to be temporarily stored in a buffer for analysis. Ex.1003, ¶179. And a POSITA would have had a reasonable expectation of success because it would have used Banes' existing hardware (interrupt device 136 and its buffer), and to the extent any modification was necessary, it would have only involved a small change to software. *Id.* Further, the '905 patent contemplates that "[o]ne skilled in the art" would have "appreciate[d]" that a "serial communications architecture" like that disclosed in the '905 patent could "be implemented using different combinations of logic circuits and/or firmware," which demonstrates that it would have been within the level of ordinary skill at the time to implement such a software modification. Ex.1001 at 7:67-8:2; Ex.1003, ¶180.

[21(b.3)] signals the transmission component to continue transmitting the first packet;

Banes discloses *continu[ing]* to *transmit[t]* the first packet for the reasons set forth above for limitation [1(h)].

Further, if the *transmission component* and *preemption component* need not be separate structures, then the “network interface 130” constitutes a *preemption component that...signals the transmission component to continue transmitting the first packet*, because Banes describes that its “network interface 130” contains an interrupt device 136 that inserts an interrupt code, which signals to the transmitter 134 of the network interface 130 to continue the transmission of the first packet: “[a]fter the higher priority packet has been sent, a resume code is sent...followed by the remainder of the first packet.” Ex.1005, 12:13-17, 11:28-30, Figs. 4-5; Ex.1003, ¶182.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “interrupt device 136” constitutes a *preemption component that...signals the transmission component to continue transmitting the first packet*, as it inserts a resume/resumption code, which signals the “transmitter 134” (*transmission component*) to continue transmitting the first packet. Ex.1005, 12:5-17, 11:28-30; Figs. 4-5; Ex.1003, ¶183.

[21(c)] wherein packets include in-band symbols and the indicators include one or more out-of-band symbols.

Banes discloses and renders obvious this limitation for the reasons set forth above for limitation [1(i)]. Ex.1003, ¶185.

14. Claim 23

[23] The communications device of claim 21 wherein the in-band symbols are transition optimized and the out-of-band symbols are not transition optimized.

Banes discloses and renders obvious the limitation for the reasons set forth above for claim [3]. Ex.1003, ¶186.

15. Claim 26

[26] The communications device of claim 21 wherein the first packet includes a header that is transmitted only once.

Banes discloses this limitation for the reasons set forth above for claim [7]. Ex.1003, ¶187.

D. Ground 3 and Ground 4: Claims 1-2, 5, 8-9, 12, 16, and 20-22 are anticipated by Calvignac and are obvious over Calvignac

1. Summary of Calvignac

Calvignac is titled “Method And Apparatus for Transmission of High Priority Traffic on Low Speed Communication Links.” It relates to the transmission of data packets between a transmitter and a receiver. Ex.1004, 3:23-27, 8:6-8, 9:4-8, Figs. 13-14. According to Calvignac, at the time of the invention, transmission on existing networks caused delays transmitting high-priority packets “incurred by having first to complete transmission of a low-priority traffic.” Ex. 2:25-30, 3:51-52. Like the

'905 Patent, Calvignac purports to improve upon existing methods of packet transmission through packet preemption. Ex.1004, 1:8-10, 2:31-35, Figs. 2, 5; Ex.1003, ¶¶63-64.

To implement its preempt/resume protocol, Calvignac uses a transmitter 40 to transmit packets from packet source 41 through a communication link 48. Ex.1004, 8:6-10. Within the transmitter 40, packets from the packet source are routed to either a high priority buffer 42 or low priority buffer 43. *Id.*, 8:13-15. If there are no packets in the high priority buffer and a packet arrives in the low priority buffer, the low priority packet is routed from low priority buffer 43 to the communications communication link for transmission. *Id.*, 8:21-34; Ex.1003, ¶66.

If a packet arrives in the high priority buffer 42 while the low priority packet is transmitting, a flag generator 46 signals that the low priority packet is preempted by inserting a trailer byte and X'7E' flag, which signals to the buffer to stop transmission of the low priority packet and begin transmission of the high-priority packet. Ex.1004, 8:41-53. After the high-priority packet is transmitted, the flag generator 46 generates another trailer byte and an idle flag, and the remaining portion of the low priority packet is released from the buffer to be transmitted over the communication link. *Id.*, 8:59-65. Figure 5 below illustrates a transmit sequence wherein a low priority "non-real-time" ("NRT") data packet is preempted by a high priority "real time" ("RT") data packet:

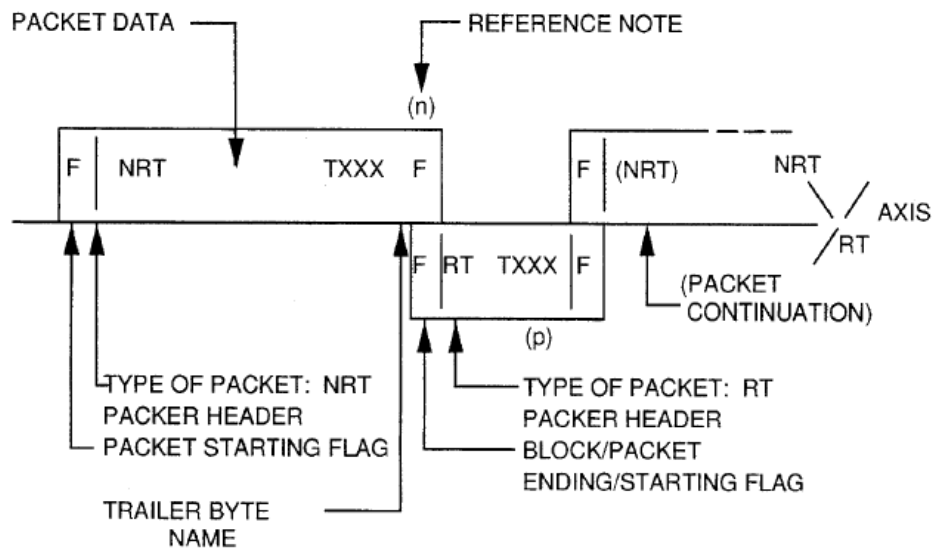


Figure 5

Id., Fig. 5, 2:65; Ex.1003, ¶¶65-68.

The trailer byte and X‘7E’ flags used as preempt and resume indicators in Calvignac are symbols which are not normally found in the packet data (i.e., they are inserted into the packet data by flag generator 46), so they may be easily distinguished from packet data to effectuate the preempt and resume functions. Ex.1004, 2:5-13, 9:14-18, 9:39-42, 2:5-13, 24:44-46; Ex.1003, ¶¶65.

2. Claim 1

[1(pre)] A method for transmitting packets, the method comprising:

To the extent this preamble is limiting, Calvignac discloses it. Calvignac teaches a “packet switched communications system” (Ex.1004, Abstract) wherein packets are transmitted through “transmit/receive adapters connected to the communication links.” *Id.*, 3:13-17; Ex.1003, ¶188.

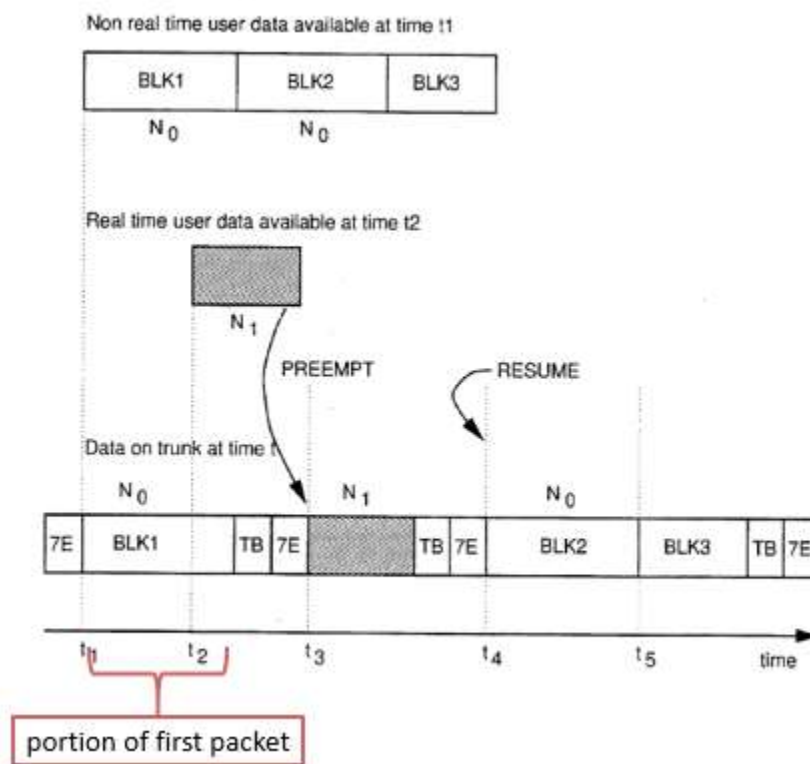
[1(a)] receiving a first packet;

Calvignac discloses this limitation. Calvignac discloses a first type of data packet in the form of “non-real-time traffic” or a “low priority packet” (*first packet*), which is of a lower priority than “real-time traffic” or a “high priority packet” (*second packet*). Ex.1004, 2:31-35, 4:4-4:10, 4:52-67, 5:43-55, Fig. 2, Fig. 5. Calvignac discloses “nodes” which are linked through “one or more communication links.” *Id.*, 3:13-17. “At each node, incoming data packets are selectively routed to one or more of the outgoing communication links terminated at another node.” *Id.*, 3:17-20. Calvignac discloses that the packets are “**received** from the switch are stored in one of the buffers, according to their class” before they are “forward[ed]” to the output trunk (*id.*, 3:44-46) and that packets “**arrive**” (*i.e.*, *receiving a first packet*) before they are “served.” *Id.*, 3:57-59. Calvignac also specifically discloses receiving and storing low priority packets (*receiving a first packet*) in the low priority buffer, because it teaches serving/transmitting low priority packets from the low priority buffer. *Id.*, 4:4-10; Ex.1003, ¶¶190-192.

[1(b)] transmitting a portion of the received first packet;

As described above for limitation [1(a)], Calvignac discloses a non-real-time packet or low priority packet (*first packet*) for which transmission begins at time t_1 . Ex.1004, 4:52-53; *see also id.* at 1:50-56, 9:25-26. Calvignac further discloses that a portion of the received low priority packet (*first packet*) is transmitted, stating, “If

a low-priority packet is being transmitted from low priority buffer 43 and a high-priority packet arrives in the high priority buffer 42, **then the transmission of the low-priority packet is preempted.**” *Id.*, 8:41-44. Figure 2 below illustrates that a portion, BLK1, of a non-real-time packet (*a portion of the received first packet*) is transmitted before it is preempted:



Id., Fig. 2 (annotated); Ex.1003, ¶¶194-195. Figure 5 also depicts a portion, “PACKET DATA” of a non-real-time packet, “NRT,” that is transmitted (*transmitting a portion of the received first packet*) before it is preempted by a real-time packet, “RT,” as shown below:

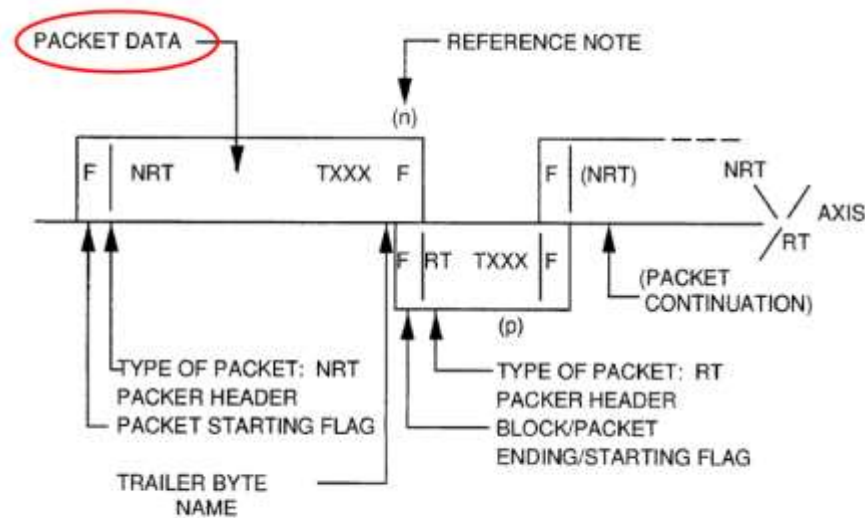
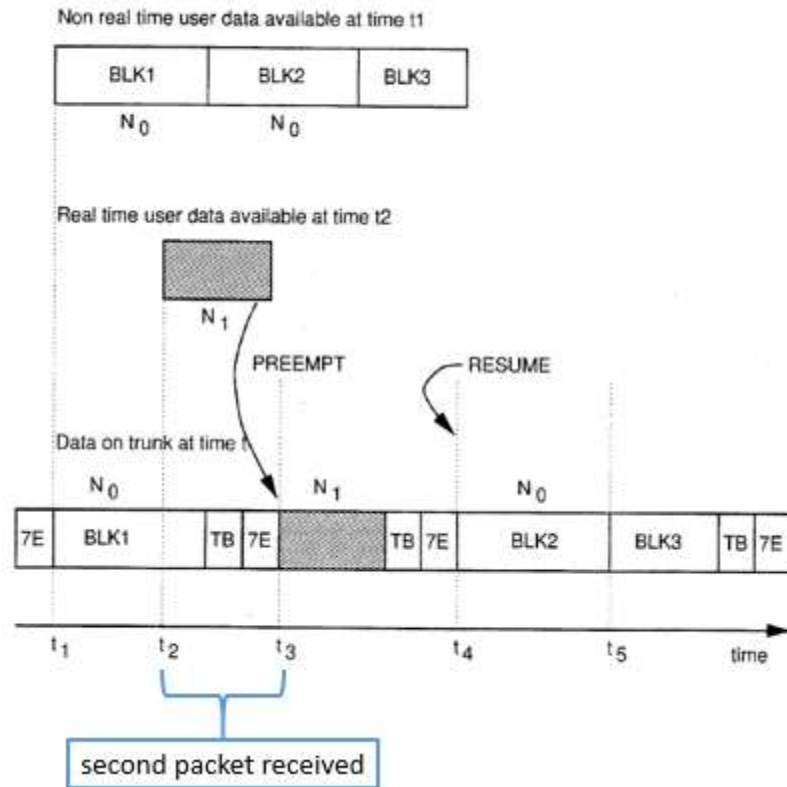


Figure 5

Ex.1004, Fig. 5 (annotated); Ex.1003, ¶196.

[1(c)] receiving a second packet;

Calvignac discloses that “a high priority packet” can “**arrive[]**” (*receiving a second packet*) at the high priority class buffer “before the end of” transmission of a low priority packet (Ex.1004, 4:4-10), and Calvignac also discloses “a real-time packet [*a second packet*] **arrives** at the output trunk at time t_2 before the end of the transmission of the non-real-time packet” (*receiving a second packet*) *Id.*, 4:53-55; *see also* 8:41, 2:42-44; Ex.1003, ¶198. Figure 2 below illustrates the time t_2 at which the real-time packet N_1 is “available” (i.e., when it is *receiv[ed]*):

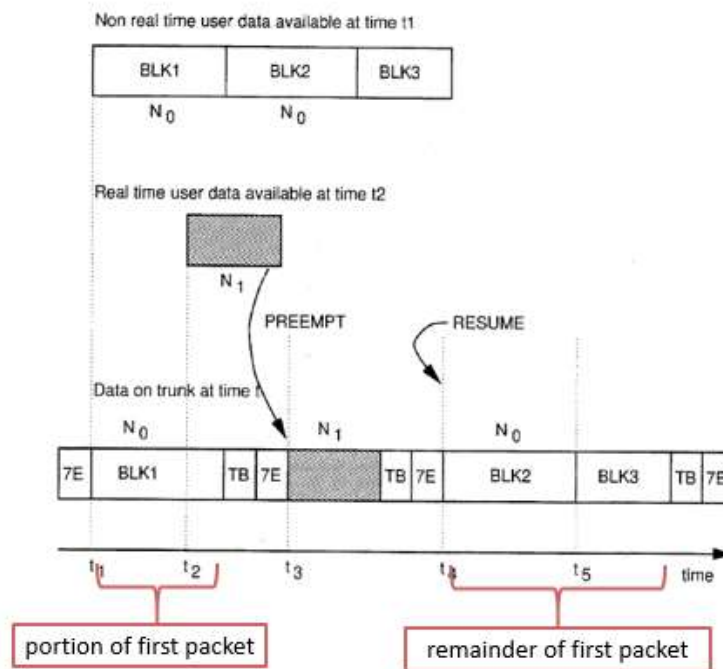


Ex.1004, Fig. 2 (annotated); Ex.1003, ¶199.

[1(d)] upon receiving the second packet, stopping the transmitting of the first packet so that not all of the first packet has been transmitted;

Calvignac discloses this limitation. Calvignac discloses that the real-time packet (*second packet*) arrives “at time t_2 before the end of the transmission of the non-real-time packet” (*upon receiving the second packet, stopping the transmitting of the first packet*). Ex.1004, 4:53-55. Upon receipt of the real-time packet, the transmission of the non-real-time packet (*first packet*) is preempted, such that “the service of the low priority packets is interrupted when a high priority packet arrives before the end of the service.” *Id.*, 4:4-10. Calvignac discloses that when the packet

is preempted, the transmission of the first packet stops at the next “block” of data, and “a block always references a **part of** a NRT packet.” Ex.1004, 7:10-11; Ex.1003, ¶¶200-202. Figure 2 below illustrates that the first “block” of data (BLK1) of the first packet is transmitted before the receipt of the second packet is completed, while transmission of the remaining blocks of data (BLK2, BLK3) in the first packet is stopped (so that not all of the first packet has been transmitted) until the full real-time packet (N1) (second packet) has been transmitted:



Ex.1004, Fig. 2 (annotated); see also 5:56-64; Ex.1003, ¶202.

[1(e)] transmitting a preempt indicator;

Calvignac discloses this limitation. Calvignac discloses transmitting a “1-byte trailer” (or “trailer byte”) as well as an “X‘7E’ flag” at the end of a block, BLK1, of

a non-real-time packet, and this byte and flag together (*preempt indicator*) indicate that a particular non-real-time packet is to be preempted. Calvignac teaches that this first portion of the packet “is transmitted along with at least a 1-byte trailer which is used to indicate whether the packet is preempted. Each preempt/resume transition is marked by the transmission of a X‘7E’ flag preceded by a 1-byte trailer” (*transmitting a preempt indicator*). Ex.1004, 5:34-35; *see also* 5:43-49. The trailer byte includes “three state control bits that are used by the preempt/resume protocol; one reserved bit; and four other bits used for protection.” *Id.*, 5:65-67. The X‘7E’ flag inserted after the trailer byte can have the format ‘01111110’ (seven “1’s”) to indicate the start of preemption. *Id.*, 4:47; Ex.1003, ¶¶204-205. Figure 8 below “represents a [non-real time] NRT packet preempted once with one inserted [real-time] RT packet” and depicts a *preempt indicator* comprised of a X‘7E’ flag denoted “F” and a trailer byte having its last three bits denoted as “T110.” Ex.1004, 6:55-59, 6:37.

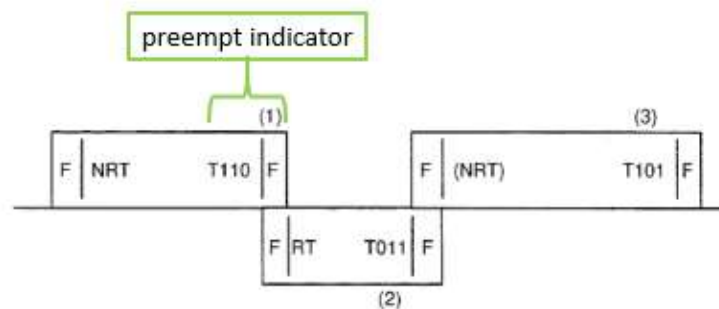
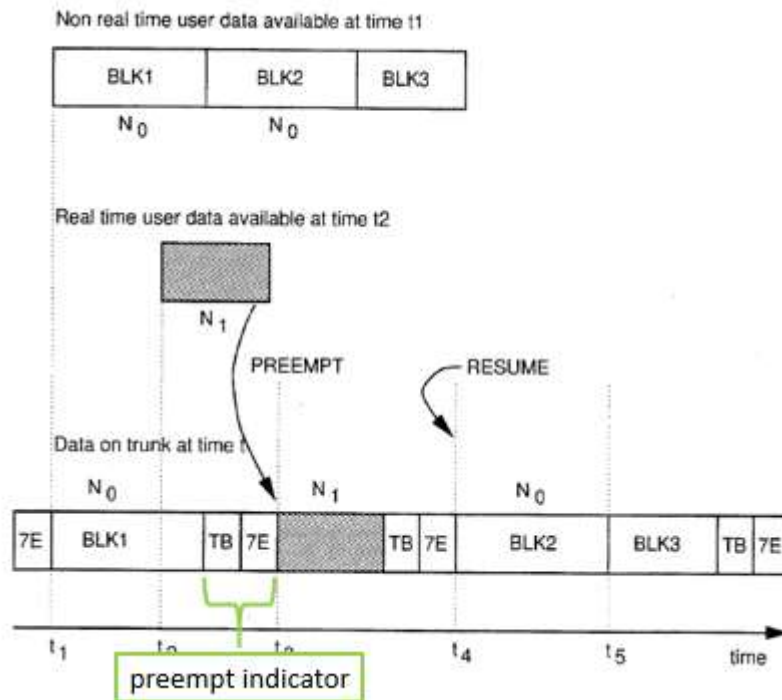


Figure 8

Id., Fig. 8 (annotated); *see also* 6:31-49; Ex.1003, ¶206. Figure 2 also depicts transmitting a preempt indicator comprised of a X'7E' flag (denoted “7E”) and a trailer byte (denoted “TB”):

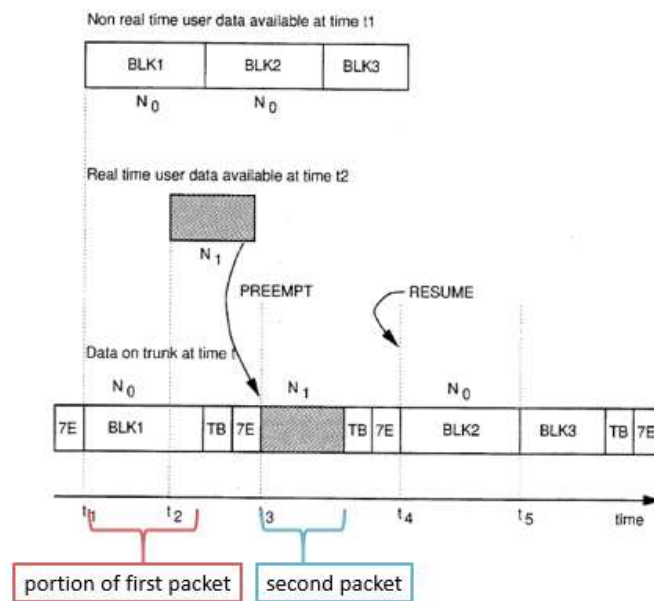


Ex.1004, Fig. 2 (annotated), 5:37-38, 6:34; Ex.1003, ¶207.

[1(f)] transmitting the second packet; and

Calvignac discloses this limitation. Calvignac discloses the transmission of the high priority or real-time (or RT) packet (*second packet*). Ex.1004, 4:4-10 (transmission of the low-priority packet is resumed “after the high-priority packet has been served.”), 5:43-53 (referring to “transmit[ing]” the “RT packet”). Specifically, “if a RT [real-time] packet arrives after the transmission of a NR or NRT packet has started, the scheduler notices the presence of the RT packet at the

next inter-block checking. It then inserts a 1-byte trailer into the current NR or NRT packet which indicates that this packet is going to be preempted by at least one RT packet, triggers the transmission of a X'7E' flag and inserts the RT packet” (*transmitting the second packet*). *Id.*, 5:43-49; Ex.1003, ¶209. Figure 2 below illustrates that the real-time packet (labeled N_1) is transmitted after the first block (BLK1) of the non-real-time packet:

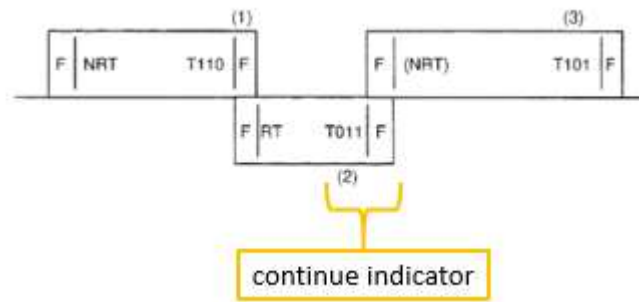


Ex.1004, Fig 2; *see also* 5:56-64; Ex.1003, ¶210.

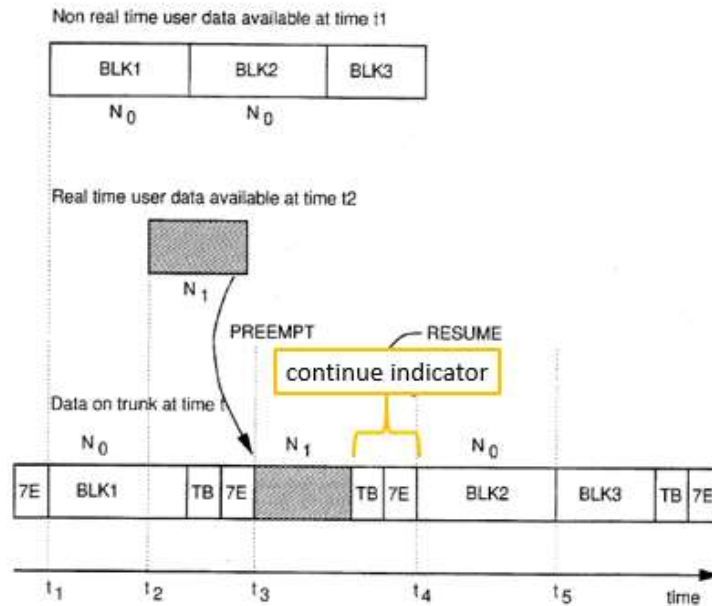
[1(g)] upon completion of transmitting the second packet, transmitting a continue indicator; and

Calvignac discloses that a specific “1-byte trailer” (or “trailer byte”) plus an “X'7E' flag” can be encoded with different values (together, *a continue indicator*) and inserted at the end of the real-time packet (*second packet*) to indicate that the

transmission of the real-time packet has been completed and that transmission of the non-real-time packet may be resumed (*upon completion of transmitting the second packet, transmitting a continue indicator*). See Ex.1004, 2:45-49, 5:34-38, 5:50-56, 6:55-59; Ex.1003, ¶212. As shown in Figure 8 below, Calvignac teaches that the trailer byte can be encoded with its last three bits being “T011” to signal that the “RT packet [is] inserted, followed by a NRT block,” indicating that the next block of the non-real-time packet may be transmitted. *Id.*, 6:55-59; *see also* 5:50-56; Ex.1003, ¶213. The *continue indicator* also includes a X’7E’ flag (denoted “F”), which can have the sequence “011111110” (eight “1’s”) to indicate the end of preemption. Ex.1004, 4:48; *see also id.*, 2:5-13. Thus, Calvignac teaches use of a different *preempt indicator* and *continue indicator* because it teaches different bit values and sequences are used for the trailer byte (i.e., T110 for the *preempt indicator* and T011 for the *continue indicator*) and X’7E’ flag (i.e., 011111110 having seven “1’s” for the *preempt indicator* and 0111111110 having eight “1’s” for the *continue indicator*), respectively, to indicate the start of preemption and the end of preemption. Ex.1003, ¶214.



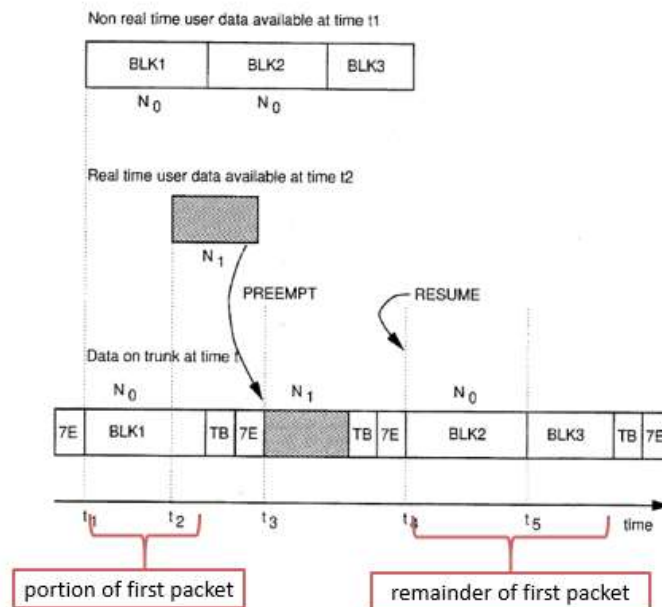
Ex.1004, Fig. 8 (annotated); see also 6:31-49; Ex.1003, ¶213. Figure 2 below also depicts *transmitting a continue indicator* comprised of the trailer byte (“TB”) and the X‘7E’ flag (“7E”) *upon completion of transmitting the second packet* (real-time packet “N₁”):



Ex.1004, Fig. 2 (annotated); Ex.1003, ¶215.

[1(h)] transmitting the portion of the first packet that has not yet been transmitted;

Calvignac discloses this limitation. Calvignac discloses that after the real-time packet (*second packet*) has been transmitted, “the scheduler inserts a 1-byte trailer which indicates that this packet was a RT packet, triggers the transmission of a X’7E’ flag, and checks again the RT queue,” and then, “the scheduler **resumes the transmission of the NRT (or NR) packet.**” Ex.1004, 5:50-56; *see also* 5:61-64, 10:8-22, 11:4-11; Ex.1003, ¶217. Figure 2 below illustrates that the remaining blocks of the non-real-time packet (*first packet*), BLK2 and BLK3, are transmitted after the real-time packet (*second packet*) is transmitted (*transmitting the portion of the first packet that has not yet been transmitted*):



Ex.1004, Fig 2; *see also* 5:62-64; Ex.1003, ¶218.

[1(i)] wherein the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Calvignac discloses and renders obvious this limitation. As explained above in Section IX.C.2, the '905 Patent describes that “in-band symbols” can be symbols that “typically” make up “[a] packet that is transmitted on a serial communications link” (Ex.1001, 11:49-52) and that in-band symbols can be symbols “with at least four transitions.” Ex.1001, 24:41-43. The '905 Patent describes that an “out-of-band” symbol can be “a symbol that does not normally appear within a packet” (*id.* at 11:56-60) and can be “symbols with three or less transitions.” *Id.*, 24:44-46; Ex.1003, ¶220.

First, Calvignac discloses that the symbols included in its non-real-time packets (*first packet*) and real-time packets (*second packet*) include in-band symbols. Calvignac discloses that its communications network uses the HDLC protocol. Ex.1004, 2:36-39, 4:16-17, 4:38-44. HDLC packets include in-band symbols, because they include an “Information” field that contains the normal payload data that typically appears in a packet, consistent with the '905 Patent. Ex.1003, ¶221.

Second, Calvignac discloses that its *preempt and continue indicators* include a pair of out-of-band symbols (*one or more out-of-band symbols*). Specifically, “on trunks that support preempt/resume protocol, each packet is transmitted along with at least a 1-byte trailer which is used to indicate whether the packet is preempted.”

Ex.1004, 5:34-38. Calvignac indicates that these “trailer bits” include *one or more out-of-band symbols*, because they are “insert[ed] [] into the current NR or NRT packet” (*id.*, 5:43-49), meaning they are not normally contained within the packet, and because a “flag detector” which “continuously monitors the bit stream received from a communications link 51” is able to detect the trailer byte as separate from the packet data to facilitate potential preemption or resumption of transmission. Ex.1004, 9:14-18, 9:39-42; Ex.1003, ¶¶222-223. Calvignac also discloses that the X‘7E’ flag *includes one or more out-of-band symbols*, because it can be “insert[ed]” in the RT packet along with the new 1-byte trailer, which means it is not normally contained within the packet. *Id.* at 5:55-56. In addition, the X‘7E’ flag can have a sequence of “011111110” (seven “1’s”) when forming part of a *preempt indicator* to indicate the start of preemption and can have a sequence of “0111111110” (eight “1’s”) when forming part of a *continue indicator* to indicate the end of preemption. *Id.* at 4:47-48. Both of these sequences has “three or less transitions” and therefore both *include out-of-band symbols* in a manner described by the ’905 Patent. Ex.1004, 4:48; *see also* 2:5-13; Ex.1001, 24:44-46; Ex.1003, ¶¶222-224 .

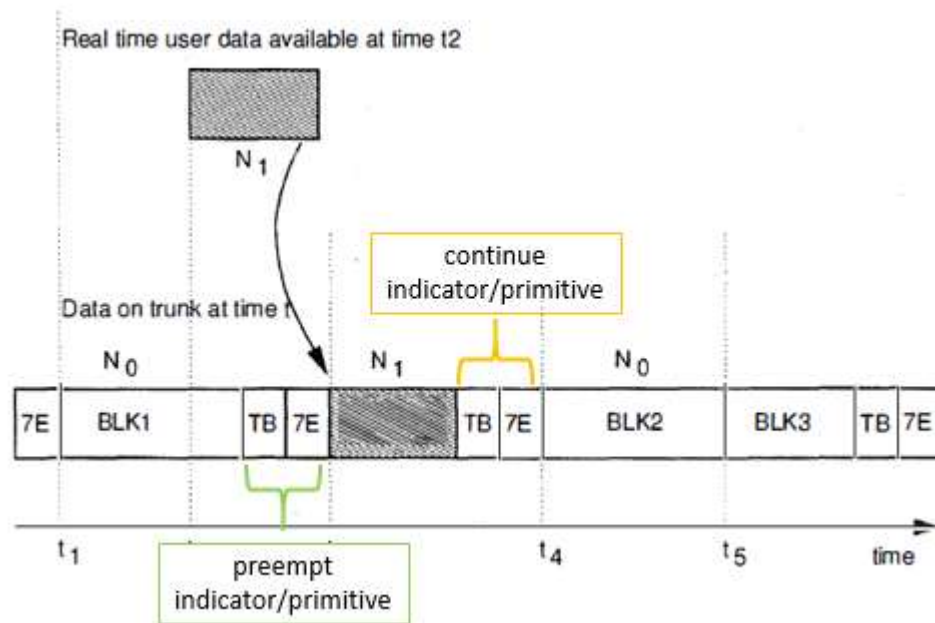
To the extent it is argued that Calvignac does not disclose *wherein the packets include in-band symbols and the indicators include one or more out-of-band symbols*, this would, at a minimum, have been obvious to a POSITA over Calvignac. Ex.1003, ¶225. Specifically, it would have been obvious to a POSITA to include in-

band symbols within the first and second packets and to include one or more out-of-band symbols within the indicators, because it was well-known to include such in-band symbols in data packets and to include such out-of-band symbols in control indicators to obtain the well-known benefit of allowing data or payload information to be readily distinguished from control information. *Id.*

3. Claim 2

[2] The method of claim 1 wherein the transmitted indicators are primitives.

Calvignac discloses this limitation. Calvignac discloses that its *preempt* and *continue* indicators are *primitives*. The '905 Patent describes that “primitives” can be a “sequence of two” or “pair” of “out-of-band symbols.” Ex.1001 at 11:67-12:3, 15:39-40, 26:35-41. As explained above for limitation ***[1(i)]***, Calvignac discloses and renders obvious that the “preempt” and “continue” indicators can each be a sequence of two out-of-band symbols: (1) an out-of-band “trailer byte”; and (2) an out-of-band “X'7E’ flag.” Ex.1004, 4:48, 5:34-38; Ex.1003, ¶¶227-228. These primitives are illustrated in Figure 2 below:



Id., Fig. 2 (annotated); Ex.1003, ¶229.

4. Claim 5

[5] The method of claim 1 wherein the first and second packets are transmitted through the same communications link.

Calvignac discloses and renders obvious this limitation. Calvignac’s receiver transmits the first and second packets via *the same communications link* (“communication link 51”). Ex.1004, 9:4-17, Fig. 14; Ex.1003, ¶¶231-232. Transmitter 40 transmits these packets over a communication link 48, the packets are then received by receiver 50 over a communication link 51 coupled to link 48, and these packets include both the “low-priority packet”/“non-real-time traffic” (*first packet*) and “high-priority packet”/“real-time traffic” (*second packet*). Ex.1004, 8:6-10, 8:25-34, 8:51-53, 8:62-65, Fig. 13; Ex.1003, ¶¶231-232. Further,

Calvignac discloses that its nodes can use “one or more communication links,” like any packet-switching network, to transmit packet data, which means one link can be used. Ex.1004, 3:13-18.

To the extent it is argued that Calvignac does not explicitly disclose this limitation, this limitation is obvious over Calvignac. Ex.1003, ¶232. Calvignac describes that the purpose of its invention is to efficiently regulate the transfer of high-priority packets “without a delay incurred by having first to complete transmission of a low-priority traffic.” Ex.1004, 2:25-30. If these high and low priority packets were sent and received over two different communications links, then there would be no need to preempt the first packet in order to send the second packet, as both could be sent at the same time. Ex.1003, ¶232.

5. Claim 8

[8(pre)] A method for receiving packets, the method comprising:

To the extent the preamble is limiting, Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(pre)]***. Ex.1003, ¶234.

In addition, Calvignac discloses a method for receiving packets, as it discloses a “receiver” which it calls a “HDLC receiver” or “receiver 50” that “receive[s] whole packets” and passes the packets to a “destination for the received packets.” (i.e., a method for receiving packets). Ex.1004, 4:23-29, 9:4-13, Fig. 14, Fig. 15; Ex.1003, ¶235.

[8(a)] receiving a first portion of symbols of a first packet;

Calvignac discloses this limitation for the reasons set forth above for limitations [1(a)] and [1(b)]. Ex.1003, ¶237.

Calvignac further discloses that the receiver 50 receives a “low-priority, non-real-time packet” (*first packet*). See Ex.1004, 9:26-31; 10:35 (describing a receiver logic including detection logic “for identifying data currently being received”). Figure 12b further illustrates the first block of non-real-time data being received (“Receive NRT Block”) (*first portion*):

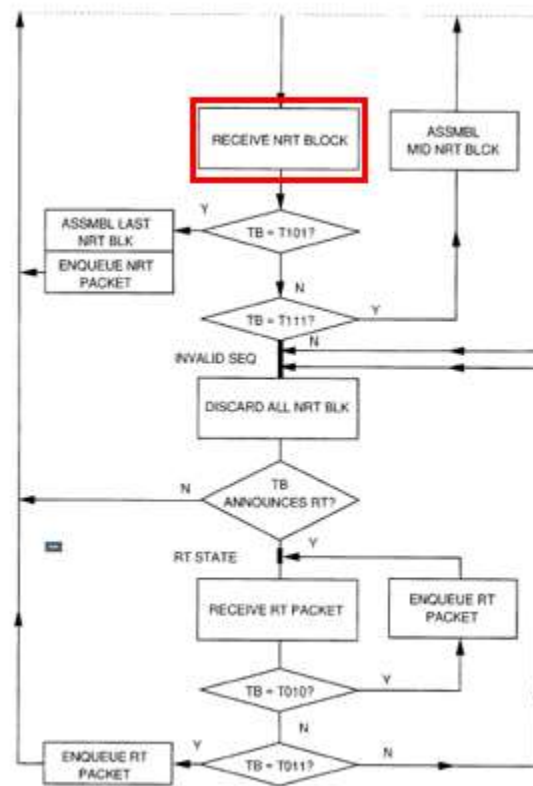


Figure 12B

Ex.1004, Fig. 12b (*annotated*), 7:8-18; 7:43-45; Ex.1003, ¶239. This first block of non-real-time data is received by the receiver via a communication link 51 that receives the first block from the communication link 48 over which the transmitter 40 transmits it. Ex.1004, 8:6-10, 9:4-17, Fig. 13, Fig. 14; Ex.1003, ¶239. A POSITA would have understood that the packets in Calvignac are made up of symbols because its packets can be HDLC packets, which are made up of symbols. Ex.1003, ¶240; Ex.1004, 2:36-38, 4:16-17, 4:38-44. As such, when the receiver receives a first portion of the packet transmitted by the transmitter as described above for limitation **[1(a)]**, a POSITA would have understood that the receiver *receives a first portion of symbols of a first packet*. Ex.1003, ¶240.

[8(b)] receiving a preempt indicator indicating that a second packet of symbols is to be received;

Calvignac discloses this limitation for the reasons set forth above for limitation **[1(e)]**. Ex.1003, ¶242.

Calvignac further discloses that a flag detector 52 within the receiver 50 “continuously monitors the bit stream received from a communication link 51 [for] trailer byte and idle flags” and receives the contents of the trailer byte which “indicates the beginning of a high-priority preempting packet and therefore the beginning of preempt mode” (*receiving a preempt indicator indicating that a second packet...is to be received*). Ex.1004, 9:14-15, 9:31-34, Fig. 12b; Ex.1003, ¶243. And,

as discussed above for [8(a)], Calvignac's packets may be HDLC packets, which are comprised of *symbols*. Ex.1003, ¶243.

[8(c)] receiving the second packet of symbols;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(f)]***. Ex.1003, ¶245.

Calvignac further discloses that after “preempt mode” begins, the “bit stream” of the high-priority preempting packet (*second packet*) is received by the receiver 50 to be “passed through the serial/parallel converter 53[.]” Ex.1004, 9:31-38. For the same reasons given above for limitation ***[8(a)]***, a POSITA would have understood that receiving the code or “bit stream” of the second packet includes receiving the *symbols* of the second packet. Ex.1003, ¶¶246-247.

[8(d)] receiving a continue indicator indicating that a second portion of symbols of the first packet is to be received; and

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(g)]***. Ex.1003, ¶249.

Calvignac further discloses that the receiver receives “a trailer byte indicating the end of preemption” which “resum[es] reception of the preempted low priority packet.” Ex.1004, 9:45-50, Fig. 12b; Ex.1003, ¶250.

[8(e)] receiving the second portion of symbols of the first packet;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(h)]***. Ex.1003, ¶252.

Calvignac further discloses that after preempt mode is ended, the receiver “resum[es] reception of the preempted low priority packet.” Ex.1004, 9:45-50, Fig. 12b. For the same reasons given above for limitation **[8(a)]**, this *second portion* of the *first* packet would have been comprised of would have been understood to be comprised of symbols. Ex.1003, ¶¶253-254.

[8(f)] wherein the symbols of the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Calvignac discloses and renders obvious this limitation for the reasons set forth above for limitation **[1(i)]**. Ex.1003, ¶256.

6. Claim 9

[9] The method of claim 8 wherein the received indicators are primitives.

Calvignac discloses this limitation for the same reasons as set forth above for claim [2]. Ex.1003, ¶257.

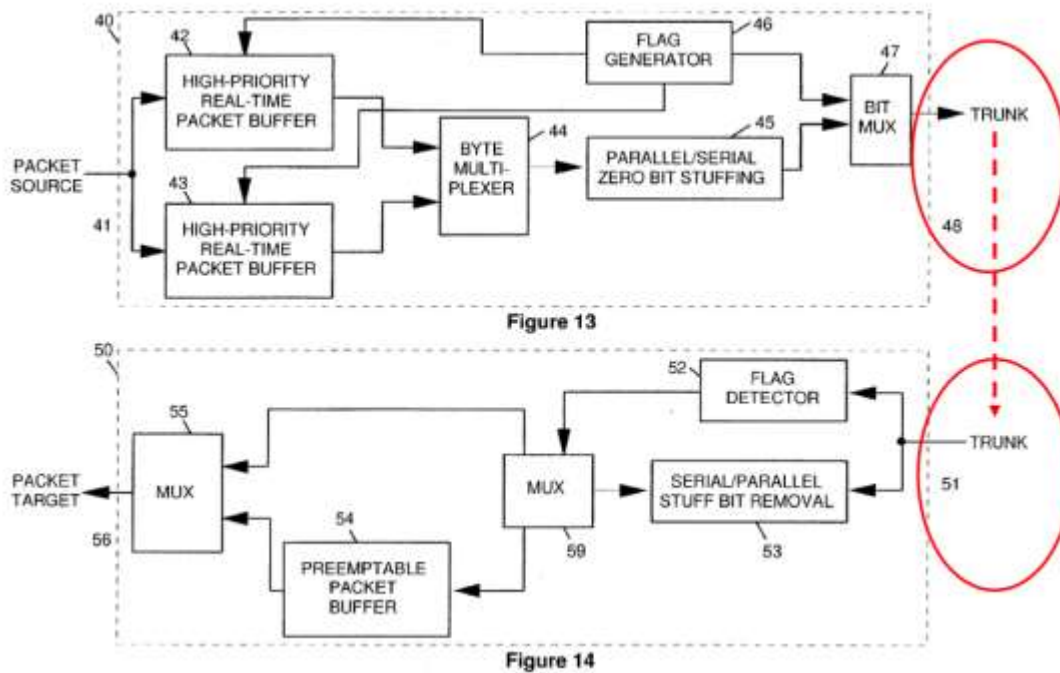
7. Claim 12

[12] The method of claim 8 wherein the first and second packets are received via the same communications link.

Calvignac discloses and renders obvious this limitation for the same reasons as set forth above for claim [5]. Ex.1003, ¶¶258-262.

In addition, Calvignac’s receiver receives the first and second packets via the same communications link (“communication link 51”). Ex.1004, 8:6-10, 8:25-34, 8:51-53, 8:62-65, 9:4-17, Fig. 14; Ex.1003, ¶259. Annotated Figures 13-14 show

how the transmitted packets would be understood by a POSITA to be **received** by the same communications link (link 51):



Ex.1004, Figs. 13-14 (annotated); Ex.1003, ¶261. To the extent it is argued that Calvignac does not explicitly disclose this limitation, the first and second packets being sent over the same communications link, a POSITA would have found this limitation is obvious over Calvignac. Ex.1003, ¶262.

8. Claim 15

[15(pre)] A method for transmitting packets via a communications link, the method comprising:

To the extent the preamble is limiting, Calvignac discloses this limitation for the reasons set forth above for limitation **[1(pre)]**. Ex.1003, ¶264.

[15(a)] transmitting a first portion of a first packet;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(b)]***. Ex.1003, ¶265.

[15(b)] transmitting a preempt indicator indicating that a second packet is to be transmitted;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(e)]***. Ex.1003, ¶266.

[15(c)] transmitting the second packet;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(f)]***. Ex.1003, ¶267.

[15(d)] transmitting a continue indicator indicating that a second portion of the first packet is to be transmitted; and

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(g)]***. Ex.1003, ¶268.

[15(e)] transmitting the second portion of the first packet;

Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(h)]***. Ex.1003, ¶269.

[15(f)] wherein the first and second packets and the preempt and continue indicators are transmitted via the same communications link and

Calvignac discloses and renders obvious this limitation for the reasons set forth above for claim [5]. Ex.1003, ¶270.

[15(f.1)] wherein further the packets include in-band symbols and the indicators include one or more out-of-band symbols.

Calvignac discloses and renders obvious this limitation for the reasons set forth above for limitation ***[1(i)]***. Ex.1003, ¶271.

9. Claim 16

[16] The method of claim 15 wherein the indicators are primitives.

Calvignac discloses this limitation for the same reasons as set forth above for claim [2]. Ex.1003, ¶272.

10. Claim 20

[20] The method of claim 15 wherein the first packet includes a header that is transmitted only once.

Calvignac discloses this limitation for the same reasons as set forth above for claim [7]. Ex.1003, ¶273.

11. Claim 21²

[21(pre)] A communications device for transmitting packets via a communications link, comprising:

To the extent the preamble is limiting, Calvignac discloses this limitation for the reasons set forth above for limitation ***[1(pre)]***. Ex.1003, ¶274.

² As discussed above with regard to Claim 21 in Grounds 1 and 2, Petitioners adopt Patent Owner's plain and ordinary meaning construction of the *component* limitations for purposes of this proceeding only.

In addition, Calvignac discloses a communications device for transmitting packets via a communications link, disclosing a “transmitter 40 portion of the trunk interface of that communications system.” Ex.1004, 8:6-8. At the transmitter 40, “[p]ackets arrive from the communications system’s packet source 41 for transmission on communication link 48.” *Id.*, 8:8-10; Ex.1003, ¶275.

[21(a)] a transmission component that transmits a first packet; and

Calvignac discloses *transmit[ting] a first packet* for the reasons set forth above for limitation ***[1(b)]***. Ex.1003, ¶277.

Further, to the extent that the *transmission component* and the *preemption component* of claim 21 do not need to be separate physical structures, as contended by Patent Owner in the parallel district court litigation, then Calvignac discloses a “transmitter 40” that constitutes a *transmission component* which performs the function of *transmit[ting] a first packet*, because Calvignac discloses that packets arrive at the transmitter 40 “from the communications system’s packet source 41 for transmission on communication link 48.” Ex.1004, 8:8-10. The communications system places “the low-priority packets into a low priority buffer 43.” *Id.*, 8:14-15. Calvignac then describes that the transmitter 40 transmits the “low-priority packet” (*a transmission component that transmits a first packet*) if no high-priority packets are waiting. *Id.*, 8:21-34; Ex.1003, ¶278.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “low priority buffer 43” of Calvignac constitutes a *transmission component* and the “flag generator 46” coupled with its “high-priority buffer 42” collectively constitute a *preemption component*, as will be explained below for [21(b)]. The “low priority buffer 43” (*transmission component*) transmits the low-priority packet (*first packet*). See Ex.1004, 8:41-42 (“If a low-priority packet is being **transmitted from low priority buffer 43 . . .**”); see also *id.*, 8:25-34, Fig. 13; Ex.1003, ¶279.

[21(b)] a *preemption component* that signals the *transmission component* to stop transmitting the first packet,

Calvignac discloses *stop[ping] transmitting the first packet* for the reasons set forth above for limitation **[1(d)]**. Ex.1003, ¶281.

Further, to the extent that the *transmission component* and the *preemption component* of claim 21 do not need to be separate physical structures, as contended by Patent Owner in the parallel district court litigation, then Calvignac’s “transmitter 40” constitutes a *preemption component*. The “transmitter 40” contains a “flag generator 46” which, when a high-priority packet is detected in the “high-priority buffer 42,” sends a trailer byte, as described earlier and an idle flag X‘7E’.” Ex.1004, 8:41-48. As described above for limitation **[1(e)]**, the trailer byte and X‘7E’ flag are what signals to the “low-priority buffer 43” that the “low-priority packet” (*first*

packet) is preempted and to stop transmission at the next block of data (*signals the transmission component to stop transmitting the first packet*). *Id.*, 8:41-51; Ex.1003, ¶¶282-283.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “flag generator 46” coupled with its “high-priority buffer 42” collectively constitute a *preemption component*. Ex.1003, ¶284. The flag generator is what inserts the trailer byte and X‘7E’ flag, signaling to the “low-priority buffer 43” that the “low-priority packet” (*first packet*) is preempted and to stop transmission at the next block of data (*signals the transmission component to stop transmitting the first packet*). Ex.1004, 8:41-51, Figs. 5, 13; Ex.1003, ¶284.

[21(b.1)] transmits a preempt indicator indicating that a second packet is to be transmitted,

Calvignac discloses *transmit[ing] a preempt indicator* for the reasons set forth above for limitation ***[1(d)]***. Ex.1003, ¶286.

Further, if the *transmission component* and *preemption component* need not be separate structures, then the “transmitter 40” constitutes a *preemption component that...transmits a preempt indicator indicating that a second packet is to be transmitted*, because, as explained above for limitation ***[21(b)]***, Calvignac discloses that the “transmitter 40” has a subcomponent, flag generator 46, which “inserts the

trailer byte and X'7E' flag (together, a *preempt indicator*), which transmits them, signaling to the “low-priority buffer 43” that the “low-priority packet” (*first packet*) is preempted by a high priority packet and to stop transmission at the next block of data of the low priority packet (*transmits a preempt indicator indicating that a second packet is to be transmitted*). Ex.1004, 8:41-51, Figs. 5, 13; Ex.1003, ¶287.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “flag generator 46” coupled with its “high-priority buffer 42” collectively constitute a *preemption component that...transmits a preempt indicator indicating that a second packet is to be transmitted*, because, as recited above, the “flag generator 46” inserts (and thereby transmits) the trailer byte and X'7E' flag (together, a *preempt indicator*). Ex.1004, 8:41-51, Figs. 5, 13; Ex.1003, ¶288.

[21(b.2)] transmits the second packet, and

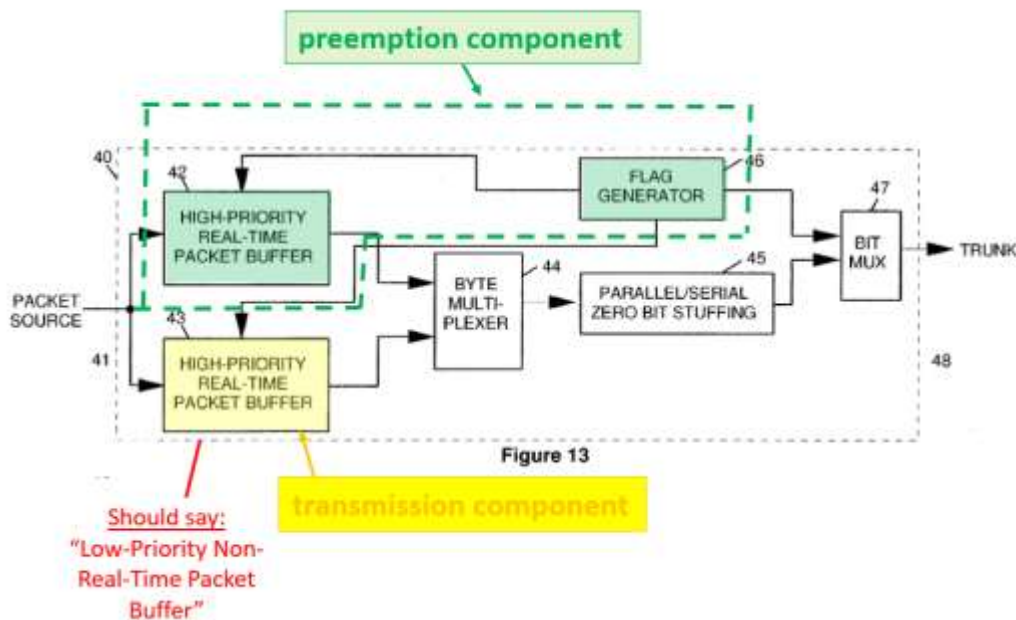
Calvignac discloses *transmit[ting] the second packet* for the reasons set forth above for limitation ***[1(f)]***. Ex.1003, ¶290.

If the *transmission component* and *preemption component* need not be separate structures, then the “transmitter 40” constitutes a *preemption component that...transmits the second packet* because after “flag generator 46” inserts the trailer byte and X'7E' flag (*preempt indicator*), the transmitter 40 begins transmitting the high-priority packet (*second packet*): “Bytes from the high priority buffer 42 are then

transferred through the byte multiplexer 44 to the parallel/serial converter 45 which performs serialization and zero bit stuffing. The resulting high-priority packet is then transferred to the communication link 48.” Ex.1004, 8:47-53, Fig. 13; Ex.1003, ¶291.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, Calvignac discloses this limitation. “Flag generator 46” and “high-priority buffer 42” collectively constitute a *preemption component that...transmits the second packet*. As described above for limitation **[21(b.1)]**, Calvignac discloses that “flag generator 46” transmits the *preempt indicator* which signals the “high priority buffer 42” to begin transmitting the high-priority packet (*second packet*). Ex.1004, 8:47-53, Fig. 13; Ex.1003, ¶292. Further, “flag generator 46” and “high priority buffer 42” (collectively, *preemption component*) are depicted as being separate from the “low priority buffer 43” (*transmission component*), as shown in this annotated version of Figure 13³:

³ Item 43 should be labeled “low-priority non-real-time packet buffer” to align with “low priority buffer 43” repeatedly described in Calvignac. Ex.1003, ¶292.



Ex.1004, Fig. 13 (annotated); Ex.1003, ¶292.

[21(b.3)] signals the transmission component to continue transmitting the first packet;

If the *transmission component* and *preemption component* need not be separate structures, then the “transmitter 40” constitutes a *preemption component* that...signals the *transmission component* to continue transmitting the first packet, because Calvignac describes that the subcomponents of the transmitter 40, in particular the “flag generator 46” signals to the low-priority buffer 43 to continue the transmission: “When the last of the series of high-priority packets has been sent (there are not more packets waiting in the high priority buffer 42), the flag generator 46 sends again a trailer byte and an idle flag.” Ex.1004, 8:59-62. In response, “The remaining bytes from the preempted low-priority packet in the low priority buffer

43 are released to the parallel/serial converter 45 and the communication link 48.”
Id., 8:62-65. As such, this “trailer byte and an idle flag” are a signal to the low priority buffer component 43 of the transmitter 40 to continue transmission of the low priority packet (*first packet*). Ex.1003, ¶294.

Alternatively, to the extent the *transmission component* and *preemption component* must be separate physical structures, then the “flag generator 46” and “high priority buffer 42” collectively constitute a *preemption component that...signals the transmission component to continue transmitting the first packet*, as discussed above, because the flag generator 46 signals the “low priority buffer 43” (*transmission component*) to continue transmitting the “low priority packet” (*first packet*). Ex.1004, 8:59-62; Ex.1003, ¶295.

[21(c)] wherein packets include in-band symbols and the indicators include one or more out-of-band symbols.

Calvignac discloses and renders obvious this limitation for the reasons set forth above for limitation ***[1(i)]***. Ex.1003, ¶297.

12. Claim 22

[22] The communications device of claim 21 wherein the indicators are primitives.

Calvignac discloses this limitation for the same reasons as set forth above for claim [2]. Ex.1003, ¶298.

X. DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

A. Discretionary denial under 35 U.S.C. § 325(d) is not appropriate

The Board has discretion to deny institution where “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). Under the first prong of the *Advanced Bionics* framework, *Becton, Dickinson* factors (a), (b) and (d) are considered to determine whether the same or substantially the same art or arguments were previously presented to the Office.

Under factors (a) and (b), the only reference relied on in Petitioner’s grounds that was cited during prosecution was Calvignac, but it was never substantively discussed by the Examiner. Banes was not cited and is, thus, materially different from the cited art. Factors (a) and (b), therefore, weigh against discretionary denial.

Under factor (d), Calvignac was never substantively discussed by the Examiner, so there is no overlap between arguments made during examination and the manner in which Petitioner relies on Calvignac. As such, factor (d) also weighs against discretionary denial.

Accordingly, the first prong of the *Advanced Bionics* framework is not met, and there is no need to reach the second prong. *See, e.g., Oticon Medical AB et. al. v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019) (precedential). The Board should not discretionarily deny institution under § 325(d).

XI. CONCLUSION

Petitioners respectfully request that the Challenged Claims be cancelled.

Respectfully submitted,

Dated: October 2, 2024

/Jason R. Mudd/

Jason R. Mudd

Lead Counsel

Reg. No. 57,700

XII. MANDATORY NOTICES

A. Real Parties-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Petitioners hereby name Dell Inc., Dell Technologies Inc., HP Inc., and Lenovo (United States) Inc. as real parties-in-interest and, solely because it is named as a defendant in a co-pending district court case listed below, further identify Lenovo Group Ltd. as a real party-in-interest.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), to the best knowledge of Petitioners, the '905 Patent is or was involved in the following cases:

Case Heading	Number	Venue	Filed
<i>Universal Connectivity Technologies Inc. v. HP Inc. f/k/a Hewlett-Packard</i>	1:23-cv-01177	W.D. Tex.	Sep. 28, 2023
<i>Universal Connectivity Technologies Inc. v. HP Inc.</i>	4:24-cv-04097	N.D. Cal.	Jul. 8, 2024
<i>Universal Connectivity Technologies Inc. v. Dell Techs. Inc. et al.</i>	1:23-cv-01506	W.D. Tex.	Dec. 12, 2023
<i>Universal Connectivity Technologies Inc. v. Lenovo Grp. Ltd.</i>	2:23-cv-00449	E.D. Tex.	Sep. 28, 2023

Petitioners are concurrently filing this Petition and IPR petitions for other asserted patents in IPR2024-01429, IPR2024-01478, IPR2024-01479, IPR2024-01480, IPR2024-01481, and IPR2024-01482.

See:

U.S. Patent No.	Case No.
7,187,307	IPR2024-01429
8,680,712	IPR2024-01478
9,232,265	IPR2024-01479
9,852,103	IPR2024-01480
7,746,798	IPR2024-01481
7,856,520	IPR2024-01482

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Petitioners consent to service in this proceeding by e-mail at the addresses above.

CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), Petitioners hereby certify, in accordance with and reliance on the word count provided by the word-processing system used to prepare this Petition, that the number of words in this paper is 13,975. Pursuant to 37 C.F.R. § 42.24(d), this word count excludes the table of contents, table of authorities, mandatory notices under § 42.8, certificate of service, certificate of word count, appendix of exhibits, and any claim listing.

Dated: October 2, 2024

/Jason R. Mudd/

Jason R. Mudd
Lead Counsel
Reg. No. 57,700

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, service was made on Patent Owner at the Correspondence Address of record for the '905 Patent listed in Patent Center as detailed below:

<i>Date of service</i>	October 2, 2024
<i>Manner of service</i>	UPS OVERNIGHT
<i>Documents served</i>	Petition for <i>Inter Partes</i> Review Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104 of U.S. 7,154,905; Petitioners' Exhibit List; and Exhibits 1001-1017.
<i>Persons served</i>	63170 - PERKINS COIE LLP P.O. BOX 1208 SEATTLE, WA 98111-1208 UNITED STATES

With a courtesy copy of the Petition and Exhibits sent on October 2, 2024 via e-mail to Patent Owner's litigation counsel of record:

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