# United States Court of Appeals for the Federal Circuit

03-1305,-1306

DYNACORE HOLDINGS CORPORATION
and DYNACORE PATENT LITIGATION TRUST,

Plaintiffs-Appellants,

v.

U.S. PHILIPS CORPORATION,

and

STMICROELECTRONICS, INC.,

and

MATSUSHITA ELECTRIC CORPORATION OF AMERICA, and
JVC AMERICAS CORP.,

and

COMPAQ COMPUTER CORPORATION, GATEWAY, INC.,
HEWLETT-PACKARD CORPORATION, and SONY ELECTRONICS, INC.,

and

EPSON AMERICA, INC.,

and

FUJITSU PC CORPORATION, FUJITSU MICROELECTRONICS AMERICA, INC.,
and FUJITSU COMPUTER PRODUCTS OF AMERICA, INC.,

and

TEXAS INSTRUMENTS INCORPORATED, and WESTERN
DIGITAL CORPORATION,

and

DELL COMPUTER CORPORATION and DELL MARKETING CORPORATION,

and

APPLE COMPUTER, INC.,

and

NEC COMPUTERS INC.,

and

NIKON INC.,

and

ADAPTEC, INC.,

and

SMARTDISK CORPORATION,

and

ADS TECHNOLOGIES, INC.,

and

LUCENT TECHNOLOGIES, INC.,

Defendants-Appellees,

and

EVERGREEN TECHNOLOGIES, INC., and QUADMATION INCORPORATED,

Defendants.

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Appealed from: United States District Court for the Southern District of New York.

Judge Laura Taylor Swain

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EVERGREEN TECHNOLOGIES, INC., and QUADMATION INCORPORATED,

Defendants.

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DECIDED: March 31, 2004

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Before RADER, BRYSON, and GAJARSA, Circuit Judges.

GAJARSA, Circuit Judge.

Dynacore Holdings Corp. and Dynacore Patent Litigation Trust (collectively, "Dynacore") appeal the February 13, 2003 grant of defendants' motion for summary judgment of noninfringement of United States Patent No. 5,077,732 ("the '732 Patent"). Dynacore Holdings Corp. v. U.S. Philips Corp., 243 F. Supp. 2d 31 (S.D.N.Y. 2003). Because Dynacore has not identified any circumstances under which the accused products, which incorporate technology that facilitates the design of networks compliant with an explicitly hierarchical industry-standard architecture, infringe the parallel network architecture required to meet numerous limitations of the '732 Patent claims, the defendants may not be held liable for either direct or indirect infringement. We therefore affirm.

## BACKGROUND

### A. Dynacore's Allegations of Infringement

The '732 Patent for a "LAN with Dynamically Selectable Multiple Operational Capabilities" issued on December 31, 1991, and was assigned to Datapoint Corp. ("Datapoint"), the predecessor in interest to Dynacore. The '732 Patent contains sixty-six claims. Claims 1, 31, 57, 59, and 65 are independent. All of the other claims are dependent.

All five of the independent claims share some common limitations: they address a "local area network," ("LAN") with "at least three nodes" sharing a "common communication (or operating) capability," at least two of which also share an "enhanced communication (or operating) capability," that are all interconnected as "equal peers in a single network configuration." In somewhat less technical terms, the '732 Patent teaches network designers how to design a LAN connecting computer devices with differing capabilities such that devices with an "enhanced" communication capability can take advantage of those enhancements without disrupting the operation of devices possessing only "common" capabilities.

Dynacore alleges that companies whose products incorporate technology that facilitates the implementation of LANs compliant with the IEEE[1] 1394 Standard for a High Performance Serial Bus ("IEEE 1394") infringe the '732 Patent. Dynacore's legal assertions, as submitted to this court, appear to be incomplete. It is undisputed that the '732 Patent teaches the design of a specific type of LAN requiring at least three connected devices, and that the defendants' products are not LANs, but rather individual devices containing technology conforming to the IEEE 1394 Standard. In order for Dynacore to prevail under a theory of direct infringement, Dynacore must demonstrate that the defendants have used their devices to implement infringing LANs.

Dynacore's gravamen, although not clearly articulated in its brief to this court, appears to be that networks conforming to the IEEE 1394 Standard also conform to the teachings of the '732 Patent, and that manufacturers whose devices incorporate technology explicitly designed to facilitate the construction of IEEE 1394 compliant networks are thus liable for direct infringement, as well as for contributory infringement under 35 U.S.C. § 271(c) or inducement of infringement under 35 U.S.C. § 271(b). At oral argument, Dynacore stated that its primary theories of liability were for indirect infringement—other than possible liability arising from directly infringing LANs in the headquarters of "some" of the defendants, an allegation that, as noted, remains unsupported speculation.

We accept this statement, and consider Dynacore's allegations of liability as not only for direct infringement, but also for contributory infringement and/or for inducement to infringe. We read the district court's grant of summary judgment as a ruling that, as a matter of law, the defendants are neither directly liable nor vicariously liable for infringement by customers who may use the defendants' products. Dynacore, 243 F. Supp. 2d at 42. In order to prevail in this appeal, Dynacore must demonstrate factual disputes sufficient to render its direct and indirect infringement theories legally tenable.

**B. Litigation History**

In 1996, Datapoint brought four separate actions in the Eastern District of New York against numerous technology companies, alleging that these companies, by incorporating technology into their products that facilitates the implementation of the IEEE 802.3u ("802.3u" or "Fast Ethernet") Standard, infringed the '732 Patent and the related United States Patent No. 5,088,879 ("the '879 Patent"). Neither the 802.3u Standard nor the '879 Patent are included in Dynacore's allegations in the present case. Dynacore's current allegations concern only the IEEE 1394 Standard (unrelated to 802.3u) and the '732 Patent.[2]

In addressing Datapoint's allegations concerning the 802.3u Standard, the district court appointed a Special Master, who conducted a Markman hearing to construe the claims. Cf. Markman v. Westview Instruments, Inc., 517 U.S. 370 (1996). The Special Master issued a detailed report construing certain claim terms in the '732 and the '879 Patents (the "Master's Report"). The district court subsequently adopted the Master's Report. Datapoint stipulated that under the Special Master's claim construction, the defendants would be entitled to summary judgment of non-infringement, and appealed the district court's judgment to this court. We affirmed the Special Master's claim construction, Datapoint Corp. v. Std. Microsystems Corp., 31 Fed. Appx. 685 (Fed. Cir. 2002), and it remains binding upon Dynacore in the present matter. See, Del Mar Avionics, Inc. v. Quinton Instrument Co., 836 F.2d 1320, 1324 (Fed. Cir. 1987).

Meanwhile, in May 2000, Datapoint filed for bankruptcy. Dynacore purchased certain of Datapoint's patents, including the '732 Patent and the '879 Patent. Given the Special Master's claim construction, and while the appeal was pending, Dynacore asked the PTO to reexamine the '732 Patent in light of a 1987 article on network design by Michael Teener, a member of the IEEE board that subsequently recommended adoption of the IEEE 1394 Standard. On August 14, 2001, following several rounds of correspondence in which the PTO raised and Dynacore addressed issues relating to patentability, the PTO issued a Reexamination Certificate requiring no amendments to the ‘732 Patent.

Dynacore filed the present actions in the Southern District of New York against two groups of defendants: the “Philips defendants,” Dynacore Holdings Corp. v. U.S. Philips Corp., on July 5, 2001; and the “Sony defendants,” Dynacore Holdings Corp. v. Sony Corp. of America, Inc., on January 22, 2003. All of the defendants manufacture devices that incorporate a digital interface to the IEEE 1394 Standard. The IEEE 1394 Standard, like the ‘732 Patent, teaches network designers how to connect devices with differing capabilities to a single LAN without sacrificing enhanced or optimized capabilities possessed by some but not all devices.

## C. LAN Technology

A LAN is a collection of computers and/or peripheral devices in close geographic proximity interconnected to allow communication. Like most aspects of computer technology, LANs combine physical characteristics with software capabilities. The geometry describing a LAN’s physical layout is referred to as its “topology.” A LAN’s defining software embodies its “communication protocols.”

In order for two devices to communicate, signals must traverse a sequence of connections between the devices.[3] Many different topologies are possible. Consider the simple example of sending a print request from desktop computer D1 to printer P1 along an office LAN containing at least two additional desktop computers (D2 and D3), and possibly other devices. Diagrams 1, 2, and 3 illustrate three basic topologies that can help to clarify the issues in this dispute. In each of the three diagrams, boxes represent devices (or in network theoretic terms, “nodes”), straight lines represent direct connections between nodes, and dashed lines represent potential connections to other parts of the network.

Diagram 1 illustrates a serial network topology, of the sort most commonly associated with a serial string of Christmas lights. D1's print request must pass through D2, D3, and possibly the rest of the network before reaching P1. If any link in that chain is disabled, D1 will be unable to communicate with P1—and thus unable to print.

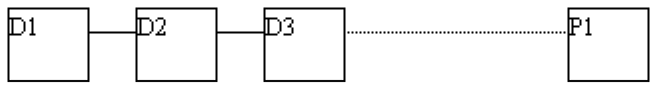



Diagram 1: A Serial Network

Diagram 2 illustrates a parallel network topology. No two devices on the network are connected directly to each other. Instead, all devices connect to a single "bus." All communication flows along that bus. D1's print request thus flows from D1, along the bus, to P1. As long as D1, P1, and the bus are all working, P1 will be able to process D1's request, without regard to the status of any other devices on the network.

D1
D2
D3
P1

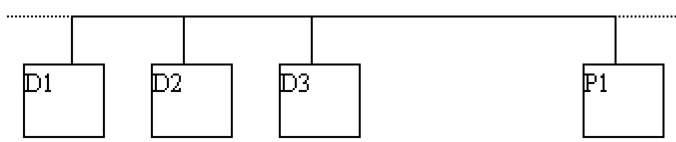



Diagram 2: A Parallel Network

Diagram 3 illustrates a tree network topology. Any discussion of trees invariably implicates two sets of terminology—arboreal and genealogical—that lead to mixed metaphors of the sort inevitable when discussing family trees. The node at the top of the tree, here D1, is called the "root." D1 is also the "parent" of its two "children," D2 and D3, both reachable by traversing "branches" from D1. P1 is D2's child (and D1's grandchild). P1, D2, and D3 are all "descendants" of D1, and D1 is their "ancestor." Nodes without children are "leaves." If the potential connections shown beneath D3 in fact do not connect to anything, then D3 is a leaf.

D1
D2
D3
P1

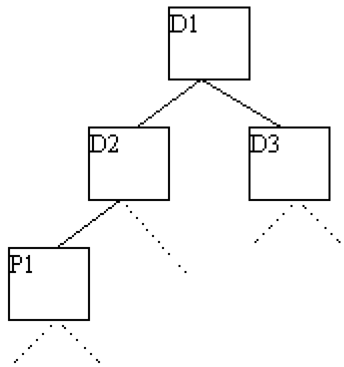



**Diagram 3: A Tree Network**

Though trees are invaluable to many parts of computer science, including network design, they also present various challenges. In particular, tree topologies are inherently serial. D1's print request must pass through D2 on its way to P1; a print request from D3 would have to pass through both D1 and D2. As with any serial topology, any disabled node along the path between the two devices trying to communicate will preclude effective communication.

Connections between devices, in and of themselves, are insufficient to enable meaningful communication. In computer networks, as in the physical world, effective communication requires a minimum of three components: a common language, a delivery mechanism, and an addressing mechanism. The existence of a common language is an obvious prerequisite for the communication to be understood; a message delivered in an incomprehensible language is only so much noise. Network topology addresses the second of these concerns; a connection between devices allows messages to be delivered. Communication protocols refer to the addressing mechanisms necessary to route messages appropriately.

Two categories of protocols are particularly important—and both are fairly common. The first is a "private" communication intended for a specific recipient, such as a named e-mail box or printer. Private messages must be routed appropriately across the network. They thus incorporate two types of information: the "header" contains addressing, and possibly routing, information that every device on the network can see; the "body" contains the specific message intended only for the recipient. The header may also contain information describing the language in which the body is written, though, depending on the communication protocol adopted for the network in question, responsibility for ensuring a common language may also rest with the devices attempting a private communication. The second is a "public" or a broadcast message, intended for all devices capable of understanding it. Headers for broadcast messages must include some sort of language information to alert incompatible devices not to bother trying to understand the body.

LAN designers often possess potentially valuable information that the designers of larger networks lack. They know the configuration and the capabilities of every device on their networks, including their communication capabilities. While all devices on a network must share some common language for communication to be possible, some devices may also possess "enhanced" communication capabilities—the most obvious example of which is the ability to transmit and/or to process information at a higher speed. To return to our simple example of the office LAN, suppose that we now add a high-speed desktop (D*) and a high-speed printer (P*). The technical challenge facing the LAN designer is to design the network to allow D* to send high-speed requests to P* without "confusing" any of the other devices with this message whose body they cannot understand. Solutions to this technical challenge define both the '732 Patent and the IEEE 1394 Standard.

## D. The '732 Patent

The '732 Patent teaches network designers how to design a LAN connecting computer devices with differing capabilities that allows devices with an "enhanced" capability to take advantage of their enhancements without disrupting the operation of devices lacking those enhancements. The key to these LANs lies in understanding the claim term "equal peers," which is repeated in all five independent claims.

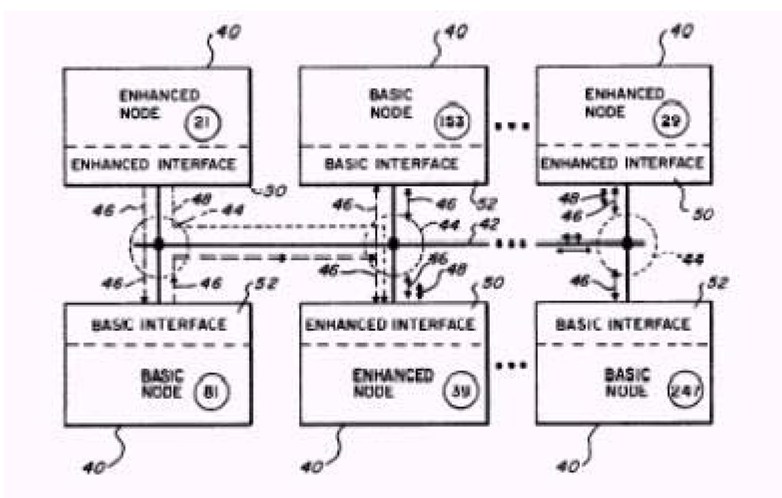
According to the Special Master's construction:

> the phrase "equal peers in a single network configuration" in a bus-type LAN requires that the nodes have direct access to all other nodes in the network so that all data frames transmitted by each node are heard by all other nodes, and that all nodes have the same right of access to each and every other node in the network through a single logical point.

Dynacore, 243 F. Supp. 2d at 36 (citing Master's Report at 32). This construction is consistent not only with the way that one of ordinary skill in the art would interpret "equal peers," but with the context set in the '732 Patent's written description:

> The present invention applies to a local area network (LAN or "network") having a single network configuration such as that shown in FIG. 1. The LAN comprises a plurality of nodes 40 which are all commonly interconnected to a communication medium 42. The communication medium 42 includes means by which signals are transmitted between the nodes 40 . . . . The LAN illustrated in FIG. 1 is a bus-type LAN, meaning that all of the nodes 40 are connected to a single logical point (the medium 42) and logically in parallel with one another. An essential characteristic of a bus-type LAN is that each transmission by any node is communicated directly to the receivers of all other nodes.

'732 Patent, col. 4, ll. 27-47.




'732 Patent FIG. 1

Stated somewhat less technically, the "equal peers" limitation is inconsistent with any type of hierarchy among nodes. The most straightforward way to implement an "equal peers" structure is through a parallel topology, as illustrated in Figure 1 of the '732 Patent and as discussed throughout the patent's entire written description. In a parallel topology, all nodes place their outgoing communications on the bus, where all other nodes can access them equally (subject to the rules of the communication protocols). Serial topologies are ill suited to implementing the equal peers limitation because each node communicates directly only with its immediate neighbors.[4] Other nodes can access those communications only if those neighbors pass them along. If the communication protocol gives nodes any discretion about whether or not to retransmit a received message, the nodes are not equal peers and the network does not meet the equal peers limitation. The fundamental purpose of tree topologies is to incorporate such discretionary decision-making.

### E. The IEEE 1394 Standard

In 1986, the IEEE set out to unify its various existing standards for serial busses. This effort culminated in 1995, when the IEEE adopted the 1394 "Standard for a High Performance Serial Bus." This standard, as its name suggests, teaches network designers how to set up a serial connection as a low-cost alternative to parallel busses. The standard's preferred topology is not merely serial; it is a tree. The standard includes a set of algorithms that optimize the tree's configuration to ease communication—particularly across devices with differing capabilities.

The IEEE 1394 Standard's communication protocols take advantage of the tree topology and its ability to ease the implementation of discretionary decision-making. To cite just one example, message headers incorporate a tag known as a "speed code," which specifies the speed capabilities necessary to understand the message body. Every node that receives a message looks to its children to see if they can understand a message requiring the specified speed code. If they can, the parent transmits the message. If they cannot, the parent transmits only a "data prefix," which essentially serves as a "dummy" signal blocking the transmission of the incomprehensible message. Nodes receiving only this dummy signal are obviously unable to transmit the entire message to their own children—even if those children possess the enhanced capabilities needed to understand the message. These slower nodes serve as "speed blocks" capable of impeding communication.

### F. The District Court Decision

The district court ruled that Dynacore was collaterally estopped from arguing against the Special

Master's claim construction that we affirmed in Datapoint. Dynacore has not appealed this ruling, and the defendants have not raised any issues of claim construction. The district court adopted the Special Master's claim construction.

In light of the undisputed claim construction, the only infringement issue remaining is whether the manufacturers of the accused products are liable for direct or indirect infringement of the '732 Patent. See Caterpillar, Inc. v. Deere & Co., 224 F.3d 1374, 1379 (Fed. Cir. 2000). Indirect infringement, whether inducement to infringe or contributory infringement, can only arise in the presence of direct infringement, though the direct infringer is typically someone other than the defendant accused of indirect infringement. See, e.g., Jansen v. Rexall Sundown, Inc., 342 F.3d 1329, 1334 (Fed. Cir. 2003) (defendant vendor was accused of indirect infringement based upon allegations that its customers directly infringed plaintiff's patent).

All of Dynacore's allegations are premised on the assertion that networks complying with the IEEE 1394 Standard directly infringe the '732 Patent. To establish this requisite underlying direct infringement, Dynacore is required to show that IEEE 1394 compliant networks meet each limitation of the '732 Patent claims, either literally or under the doctrine of equivalents. See Deering Precision Instruments, L.L.C. v. Vector Distrib. Sys., 347 F.3d 1314 (Fed. Cir. 2003). Dynacore restricted its proof to issues relating to literal infringement. The district court ruled that IEEE 1394 compliant networks do not directly infringe the '732 Patent, leaving implicit Dynacore's consequent failure to prove its allegations of the defendant's indirect infringement. Dynacore, 243 F. Supp. 2d at 42.

In reaching this conclusion, the district court compared the claims of the '732 Patent to networks designed according to the specifications of the IEEE 1394 Standard. The district court noted that the defendants submitted three arguments to establish that the '732 Patent's "equal peers" limitation, as construed by the Special Master, failed to read on IEEE 1394 compliant networks: (1) The serial nature of 1394 Networks requires nodes to relay messages to each other, and is therefore inconsistent with the Special Master's requirement that each node has "direct access to all other nodes in the network;" (2) The tree topology imposes a necessary hierarchy that is fundamentally inconsistent with the "equal peers" limitation; and (3) IEEE 1394 Networks fail to meet the Special Master's requirement that "all data frames transmitted by each node are heard by all other nodes" because there are circumstances in which such data frames are not transmitted to all of the other nodes on the IEEE 1394 Network. The district court considered only the third of these arguments:

> [T]he IEEE 1394 Standard itself makes clear that compliant devices in network configuration do not satisfy the "equal peers" limitation of Claim 31. There are no material issues of fact in dispute because there is no need to go beyond the Datapoint claim construction and the clear language of the IEEE 1394 standard.

Id. at 38. The district court further noted that Dynacore's expert affidavits did little but contradict the plain language of the IEEE 1394 Standard, and did not raise a dispute over material facts for trial. The district court granted the defendants' motion for summary judgment of noninfringement, thereby holding the defendants not liable for either direct or indirect infringement. Dynacore appealed. We have jurisdiction of this appeal pursuant to 28 U.S.C. § 1295(a)(1).

## DISCUSSION

### A. Standard of Review

This court reviews the grant of summary judgment de novo, Genzyme Corp. v. Transkaryotic Therapies, Inc., 346 F.3d 1094, 1096 (Fed. Cir. 2003); Ethicon Endo-Surgery, Inc. v. United States Surgical Corp., 149 F.3d 1309, 1315 (Fed. Cir. 1998); Blouin v. Spitzer, 356 F.3d 348, 356 (2nd Cir. 2004), construing all facts in the light most favorable to the non-movant, Id.; Mazzari v. Rogan, 323 F.3d 1000, 1005 (Fed. Cir. 2003). Summary judgment is appropriate when there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Fed. R. Civ. P. 56; Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 247-48 (1986).

A determination of patent infringement requires a two-step analysis. The court must first interpret the claims to determine their scope and meaning. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc). It must then compare the properly construed claims to the allegedly infringing device. Id. The first step, claim construction, is a matter of law that we review de novo. Id. at 1451. The second step is a factual question that we review following a trial for clear error. Bai v. L & L Wings, Inc., 160 F.3d 1350, 1353 (Fed. Cir. 1998). When conducting a de novo review of a district court's grant of summary judgment, however, we construe the facts in the light most favorable to the non-movant. Mazzari, 323 F.3d at 1005. To prove infringement, the patentee must show that the accused device meets each claim limitation, either literally or under the doctrine of equivalents. Deering, 347 F.3d at 1324. See also Cole v. Kimberly-Clark Corp., 102 F.3d 524, 532 (Fed. Cir. 1996).

In order to prove vicarious liability for indirect infringement, a plaintiff who demonstrates direct infringement must also establish that the defendant possessed the requisite knowledge or intent to be held vicariously liable. Hewlett-Packard Co. v. Bausch & Lomb, 909 F.2d 1464, 1469 (Fed. Cir. 1990); Moba v. Diamond Automation, 325 F.3d 1306, 1318 (Fed. Cir. 2003).[5] Determinations of knowledge or of intent relevant to patent law issues pose challenging factual determinations that we review after a trial to ascertain whether the trial court misapplied the law, made clearly erroneous findings of fact, or abused its discretion. See Molins PLC v. Textron, 48 F.3d 1172, 1182 (Fed. Cir. 1995). When we review such factual determinations de novo following a summary judgment, we construe all facts in the light most favorable to the non-movant. Mazzari, 323 F.3d at 1005.

### G. Claim Construction

Dynacore is collaterally estopped from challenging the Special Master's claim construction that we affirmed in Datapoint, 31 Fed. Appx. at 687. Del Mar Avionics, 836 F.2d at 1324. The entire analysis of direct infringement therefore rests on the factual comparison of each of the claim limitations to the accused device. See Bai, 160 F.3d 1350; Deering, 347 F.3d at 1324.

### H. Vicarious Liability and Indirect Infringement

To prevail under a theory of indirect infringement, Dynacore must first prove that the defendants' actions led to direct infringement of the '732 Patent. Met-Coil Sys. Corp. v. Korners Unlimited, Inc., 803 F.2d 684, 687 (Fed. Cir. 1986). Dynacore's briefs evince confusion about how to demonstrate direct infringement as the first step towards establishing a defendant's vicarious liability. Dynacore asserts, for example, that "[t]he district court's decision rests on one network configuration. That configuration is a non-optimum configuration where a common node may rest between enhanced nodes[.]" Appellant Br. at 39. Dynacore similarly complains that "[t]he district court disregarded a configuration where all nodes are enhanced or where the common node is at the end of the physical network." Id. at 39 n.3. Dynacore thus seeks to establish the defendants' broad vicarious liability by showing that a particular configuration of the defendants' products, compliant with the IEEE 1394 Standard, would directly infringe the '732 Patent. In other words, Dynacore alleges that a hypothetical direct infringement suffices to establish the defendants' broad vicarious liability across the entire category of IEEE 1394 compliant networks.

This argument conflates two distinct requirements for establishing vicarious liability for indirect infringement. A defendant's liability for indirect infringement must relate to the identified instances of direct infringement. Plaintiffs who identify individual acts of direct infringement must restrict their theories of vicarious liability—and tie their claims for damages or injunctive relief—to the identified act. See, e.g., Dow Chem. Co. v. Mee Indus., 341 F.3d 1370 (Fed. Cir. 2003) (plaintiff alleged direct infringement of its method patent by defendant Florida Power Corp., and induced or contributory infringement by defendant Mee Industries, who supplied the equipment used in the direct infringement); RF Del., Inc. v. Pac. Keystone Techs., Inc., 326 F.3d 1255 (Fed. Cir. 2003) (holding that if plaintiff could establish, on remand, that defendant's customers had used defendant's products to directly infringe plaintiff's method patent, defendant could be held liable for either inducement to infringe or contributory infringement). Plaintiffs who identify an entire category of infringers (e.g., the defendant's customers) may cast their theories of vicarious liability more broadly, and may consequently seek damages or injunctions across the entire category. See, e.g., Anton/Bauer, Inc. v. PAG, Ltd., 329 F.3d 1343 (Fed. Cir. 2003) (plaintiff whose patent covered a two-component system who sold the components separately alleged that the vendor of a single unpatented component was vicariously liable under either § 271(b) or (c) for direct infringement by consumers who assembled the patented system from one of the plaintiff's components and one of the defendant's components); Alloc, Inc. v. ITC, 342

F.3d 1361 (Fed. Cir. 2003) (domestic producers filed an ultimately unsuccessful complaint under 19 U.S.C. § 1337 asserting that the importation of goods allegedly without a substantial noninfringing use constituted contributory infringement and/or inducement to infringe).

Perhaps the clearest articulation of the error inherent in Dynacore's allegations arose not in the context of patent law, but rather in a complex question of copyright law. Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417 (1984). Sony's Betamax allowed home users to tape copyrighted programs from their televisions. The copyright owners sued Sony for contributory infringement. Id. at 419. The parties conceded that consumers could use the Betamax to tape programs for both infringing and non-infringing purposes. The Supreme Court found that concession fatal to the contributory infringement claim: "The Betamax is, therefore, capable of substantial noninfringing uses. Sony's sale of such equipment to the general public does not constitute contributory infringement of respondents' copyrights." Id. at 456.

The Supreme Court's reasoning derived from patent law because "[t]here is no precedent in the law of copyright for the imposition of vicarious liability. . . . The closest analogy is provided by the patent law cases to which it is appropriate to refer because of the historic kinship between patent law and copyright law." Id. at 439. "In the Patent Act both the concept of infringement and the concept of contributory infringement are expressly defined by statute." Id. at 440. Nevertheless, the Patent Act does not suggest "that one patentee may object to the sale of a product that might be used in connection with other patents. Moreover, the Act expressly provides that the sale of a 'staple article or commodity of commerce suitable for substantial noninfringing use' is not contributory infringement." Id. (citations omitted).

Of more direct relevance to Dynacore, however, was the Supreme Court's explanation that the statutory theories of indirect patent infringement, as developed through case law, "deny the patentee any right to control the distribution of unpatented articles unless they are unsuited for any commercial noninfringing use," id. at 441 (citation omitted), because the "sale of an article which though adapted to an infringing use is also adapted to other and lawful uses, is not enough to make the seller a[n indirect] infringer. Such a rule would block the wheels of commerce." Id. at 442 (citations omitted).

The Sony standard for vicarious infringement liability, which the Supreme Court imported into copyright law from the narrow patent law reference to "a staple article or commodity of commerce suitable for substantial noninfringing use," 35 U.S.C. § 271(c) (emphasis added), remains a valid articulation of patent law even beyond staple articles and commodities: The mere sale of a product capable of substantial noninfringing uses does not constitute indirect infringement of a patent. See, e.g., Jansen, 342 F.3d at 1332; Anton/Bauer, 329 F.3d at 1349.

Dynacore must therefore either demonstrate that LANs compliant with the IEEE 1394 Standard necessarily infringe the '732 Patent, or point to a specific instance of direct infringement and restrict its suit to liability stemming from that specific instance. We must therefore determine whether all LANs compliant with the IEEE 1394 Standard directly infringe the '732 Patent, or whether there may also be substantial noninfringing configurations of IEEE 1394 compliant networks. We do not reach the defendant's liability under § 271(b) or (c) if there are substantial noninfringing uses of the defendants' products and there is no evidence of active and willful inducement.[6]

## I. Infringement Analysis

The comparison of '732 LANs to IEEE 1394 LANs raises questions parallel to those raised in Datapoint, 31 Fed. Appx. at 689-91, alleging infringement of the '732 Patent by technology companies whose products could be configured as networks compliant with the IEEE 802.3u Standard. The principal argument both here and in Datapoint is that the court "erred by limiting the claims to the preferred embodiment disclosed in the specification." Id. at 689. We explained in Datapoint that because the only connectivity pattern of LANs taught in the patents is a bus-type LAN, (and though we were not explicit in Datapoint, it is a parallel bus-type LAN), the Special Master's construction of the "equal peers" limitation as restricting the '732 Patent to LANs embodying the illustrated parallel bus was correct. Id.

Dynacore's next argument is that the court erred in requiring nodes to have direct access to all other nodes in the network so that all data frames transmitted by each node are "heard" by all other nodes. Id. at 690. But as we explained in Datapoint:

> [The] 732 patent specification makes quite clear that (1) all data being sent over the network have a source and destination address, and (2) all nodes review the data to determine whether they are the intended recipient of the transmitted message. . . . Thus, the Master's construction requiring that each node "hear" (as opposed to process or otherwise manipulate) every communication, simply reflects the inherent fact that each node must "hear" a communication before it can "recognize and accept only those transmissions addressed to it…."

Id. at 691.

The substantive difference between the two cases is that Datapoint asked the court to compare the '732 Patent to an IEEE standard that combines serial star topologies and serial bridges,[7] while Dynacore now asks the court to compare the '732 Patent to an IEEE standard based upon a serial tree topology. Though Datapoint conceded that the Special Master's restriction of the '732 Patent to the parallel structures of its written description warranted a summary judgment of noninfringement for LANs compliant with the inherently serial IEEE 802.3u Standard, id. at 689, Dynacore now alleges that a tree architecture in which a hierarchy of serially-connected nodes can block communications from reaching all of their descendants infringes its patent for a parallel bus architecture in which all nodes must be "equal peers" capable of "hearing" all communications. This comparison answers the infringement analysis. The IEEE 1394 Standard and the '732 Patent teach two fundamentally different network architectures.

There is nothing in the IEEE 1394 Standard implying that compliant networks will meet the "equal peers" limitation that is central to every claim in the '732 Patent. To the contrary, the requirements of the IEEE 1394 Standard suggest that most if not all compliant networks will not meet the "equal peers" limitation.[8] Dynacore has not pointed to even a single network that both complies with the IEEE 1394 Standard and meets the "equal peers" limitation, nor has Dynacore presented anything other than speculation that such a network might actually exist. Dynacore has raised little other than "a theoretical possibility or 'metaphysical doubt,' which is insufficient to create a genuine issue of material fact." Jansen, 342 F.3d at 1334 (citing Anderson, 477 U.S. at 261; Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574 (1986)).

Dynacore's failure to prove direct infringement by any IEEE 1394 compliant network necessarily dooms its allegations of indirect infringement, because "[a]bsent direct infringement of the claims of a patent, there can be neither contributory infringement nor inducement of infringement." Met-Coil, 803 F.2d at 687. Dynacore therefore cannot even reach the question of the defendants' vicarious liability for indirect infringement because the defendants have shown that their products will allow LAN designers to configure a substantial number of noninfringing networks. We hold that the defendants are not liable for direct infringement of the '732 Patent because their products are not LANs with at least three connected devices, and are not vicariously liable for indirect infringement of the '732 Patent under either § 271(b) or § 271(c) because their products are all capable of substantial noninfringing uses.

Finally, Dynacore argues that the affidavits of its two experts, Kendyl Roman and Stephen Verderese, create a material factual dispute that renders summary judgment inappropriate. As the district court noted, however, these experts contribute little other than a conclusory opinion that nodes that receive a meaningless "data prefix" signal stripped of message content actually "hear" the communication, thereby meeting the "equal peers" limitation. It is well settled that an expert's unsupported conclusion on the ultimate issue of infringement is insufficient to raise a genuine issue of material fact, and that a party may not avoid that rule simply by framing the expert's conclusion as an assertion that a particular critical claim limitation is found in the accused device. Arthur A. Collins, Inc. v. N. Telecom Ltd., 216 F.3d 1042, 1046 (Fed. Cir. 2000); Zelinski v. Brunswick Corp., 185 F.3d 1311, 1317 (Fed. Cir. 1999); Phillips Petroleum Co. v. Huntsman Polymers Corp., 157 F.3d 866, 876 (Fed. Cir. 1998). Dynacore's expert's opinions are precisely conclusory assertions, reached using words in ways that contradict their plain meaning, that a critical claim limitation is found in the accused device. The district court was correct in ruling that they did not create a material factual dispute for trial. See, Arthur A. Collins, 216 F.3d at 1046. Summary judgment of non-infringement was fully warranted.

**CONCLUSION**

Because the district court correctly identified limitations inherent in the ‘732 Patent’s parallel architecture that are not met in the IEEE 1394 Standard, we affirm its summary judgment of non-infringement.

AFFIRMED

**COSTS**

Costs to Appellees.

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[1] The Institute for Electrical and Electronics Engineers (IEEE) is a professional organization that develops and maintains industry standards. Network design is among the topics addressed by IEEE standards.

[2] The 802.3u and 1394 Standards address different challenges that network designers face. The 802.3u Standard teaches network designers how to facilitate communication between two previously separate networks across a single connecting “bridge.” The 1394 Standard teaches network designers how to connect numerous devices within a single “tree-like” network structure.

[3] For the purposes of this case, we can blur the important technical distinction between physical connections (actual wires, other physical media connecting devices, or wireless connections) and logical connections (the ability to send communication signals from one device to another along those media). This distinction is particularly important when signals can only travel in one direction. In such cases, though a physical connection from A to B necessarily connects B physically to A, it is possible for there to be a logical connection from A to B even in the absence of a logical connection from B to A.

[4] Though “equal peerage” is alien to serial networks, it is often possible to simulate one type of physical topology on a different physical topology. Such simulations, which typically combine the weaknesses of both topologies with the strengths of neither, are generally conducted solely for purposes of experimentation.

[5] But see Manville Sales Corp. v. Paramount Sys., Inc., 917 F.2d 544, 553 (Fed. Cir. 1990).

[6] Though this court has never answered the question definitively, district courts have had occasion to consider "whether [a] defendants' lawful steps to sell [lawful products], which in turn will provide [their customers] access to the [lawful] product for both infringing and noninfringing uses, constitutes inducement of infringement." Organon Inc. v. Teva Pharms., Inc., 244 F. Supp. 2d 370, 378 (D.N.J. 2002). Most have concluded that

[a]lthough a seller of a device that is capable of substantial noninfringing use will not be liable for contributory infringement, liability may still be established under § 271(b) if, in addition to the sale of that product, active steps are taken to encourage direct infringement. See Rich, Infringement

under Section 271 of the Patent Act of 1952, 21 Geo. Wash. L. Rev. 521, 539 (1953). However, the mere sale, without more, of a device capable of such noninfringing use will not establish liability for inducement.

Oak Indus., Inc. v. Zenith Elecs. Corp., 697 F. Supp. 988, 992-93 (N.D. Ill. 1988). See also Wayne Automation Corp. v. R.A. Pearson Co., 790 F. Supp. 1505, 1507 (E.D. Wash. 1991). In other words, "sale of a lawful product by lawful means, with the knowledge that an unaffiliated, third party may infringe, cannot, in and of itself, constitute inducement of infringement." Organon, 244 F. Supp. 2d at 380. We agree with this view of inducement. See also Jansen, 342 F.3d at 1332 (parties raised the question, but the court did not reach it); Fina Research, S.A. v. Baroid Ltd., 141 F.3d 1479, 1481-82 (Fed. Cir. 1998) (dismissing allegations of contributory infringement against a vendor of a "staple article or commodity of commerce suitable for substantial noninfringing use," while holding open the possibility of liability for inducement if plaintiff could demonstrate that the defendant's customers directly infringe.).

[7] A "star" topology serially connects all devices to a single central node. A "serial bridge" serially links two small networks together to form a larger one.

[8] As noted, because it is often possible to simulate one network on another, some network designer, somewhere, could install a LAN that conforms to both the IEEE 1394 Standard and the limitations of the '732 Patent. Because such an installation would be both awkward and inefficient, however, the prospects of an IEEE 1394 compliant network infringing the '732 Patent are remote.