United States District Court,
D. Minnesota.

MICROSOFT CORPORATION,
Plaintiff.
v.
MULTI-TECH SYSTEMS, INC,
Defendant.
MULTI-TECH SYSTEMS, INC,
Plaintiff.
v.
NET2PHONE, INC,
Defendant.

Nos. Civ. 00-1412ADMRLE, Civ. 00-1627ADMRLE

Aug. 16, 2002.

David T. Pritikin, Richard A. Cederoth, and Douglas I. Lewis, Sidley, Austin, Brown & Wood, Chicago, IL, and Douglas B. Greenswag, Leonard, Street and Deinard, P.A., Minneapolis, MN, appeared for and on behalf of Microsoft Corporation.

Ronald J. Schutz, Ken R. Hall, and Misti Nelc, Robins, Kaplan, Miller & Ciresi L.L.P., Minneapolis, MN, and Dr. Milena Higgins, appeared for and on behalf of Multi-Tech Systems, Inc.

Richard D. Kelly, and Michael R. Casey, Ph.D., Oblon, Spivak, McClelland, Maier & Neustadt, P.C., Arlington, VA, and Madge S. Thorsen, Kelly & Berens, P.A., Minneapolis, MN, appeared for and on behalf of Net2Phone, Inc.

MEMORANDUM OPINION AND ORDER

MONTGOMERY**, J.**

I. INTRODUCTION

On April 25, 2002, the undersigned United States District Judge heard evidence and argument on the claim construction of United States Patent No. 5,452,289 ("the '289 Patent"), United States Patent No. 5,471,470 ("the '470 Patent"), United States Patent No. 5,600,649 ("the '649 Patent"), United States Patent No. 5,764,627 ("the '627 Patent"), and United States Patent No. 5,790,532 ("the '532 Patent"). The '289 Patent is the parent patent from which the five patents at issue in this case followed. As such, each of the five patents share the same specification. The five patents are thus not patentably distinct. All five patents share the '289 Patent's disclosure and priority date of January 8, 1993, and all expire on the same date. Therefore, the '289 Patent and its specification are the heart of this claim construction analysis. Although the parties are

involved in two separate lawsuits, the relevant patents and claims in dispute are substantially the same. All parties presented evidence at the same hearing, and this Order is applicable to both cases.

II. BACKGROUND

Multi-Tech Systems, Inc. ("Multi-Tech"), accuses Microsoft Corporation ("Microsoft") of infringing all five patents, and Net2Phone, Inc. ("Net2Phone"), of infringing four of the patents. The patents relate to personal computing based systems and methods used to simultaneously transmit both voice and data information using a modem connected to a standard telephone line. Multi-Tech charges that the software applications of Microsoft and Net2Phone, which utilize computer networks, infringe its patents. Claim construction is necessary prior to trial at which issues of patent infringement will be determined.

III. DISCUSSION

A. Legal Standard

Claim construction, the interpretation of the patent claims that define the scope of a patentee's rights under a patent, is a matter of law exclusively for the court. Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-971 (Fed.Cir.1995), *aff'd* 517 U.S. 370 (1996). FN1 The language of the claims is the starting point for all claim construction analysis, because it frames and ultimately resolves all issues of claim interpretation. Robotic Vision Sys., Inc. v. View Eng'g, Inc., 189 F.3d 1370, 1375 (Fed.Cir.1999); Abtox, Inc. v. Exitron Corp., 122 F.3d 1019, 1023 (Fed.Cir.1997). Claims must be read in view of the specification of which they are a part. Markman, 52 F.3d at 979. The description of the invention given in the specification may serve as a dictionary to define terms used in the claims. *Id*. A patentee acting as his own lexicographer FN2 must clearly define any special definitions in the specification.FN3 *Id*. at 980.

FN1. Federal Circuit decisions on claim construction have "national *stare decisis* effect." Key Pharms, v. Hercon Labs. Corp., 161 F.3d 709, 716 (Fed.Cir.1998).

FN2. While patentees can define terms of a claim contrary to their ordinary meaning, "nothing in any precedent permits judicial redrafting of claims." Becton Dickinson and Co. v. C.R. Bard, Inc ., 922 F.2d 792, 799 (Fed.Cir.1990); Process Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1357 (Fed.Cir.1999).

FN3. A court should generally not use non-scientific dictionaries for defining technical words, as general usage dictionaries may fail to provide satisfactory constructions of technical claim terms in dispute. AFG Indus., Inc. v. Cardinal IG Co., 239 F.3d 1239, 1247-1248 (Fed.Cir.2001).

A court should also consider the patent's prosecution history, as it is "of primary significance in understanding the claims." *Id*. Prosecution history should be used to understand the language in the claims, but not to enlarge, diminish or vary the limitations in the claims. *Id*.

Claims speak to those skilled in the art. Budde v. Harley-Davidson, Inc., 250 F.3d 1369, 1376 (Fed.Cir.2001); Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc., 34 F.3d 1048, 1054 (Fed.Cir.1994). When the meaning of words in a claim is disputed, the specification and prosecution history can provide relevant information about the scope and meaning of the claim. Electro, 34 F.3d at 1054. However, "claims

are not to be interpreted by adding limitations appearing only in the specification." Id. (emphasis added); Laitram Corp. v. Cambridge Wire Cloth Co., 863 F.2d 855, 865 (Fed.Cir.1989) ("References to a preferred embodiment [in a specification] are not claim limitations."). Particular embodiments appearing in a specification are not read into claims if the claim language is broader than the embodiment. Id. Therefore, a specification must *require* a limitation in order to read the limitation into the claims. Id. "If everything in the specification were required to be read into the claims, or if structural claims were to be limited to devices operated precisely as a specification-described embodiment is operated, there would be no need for claims." SRI Int'l v. Matsushita Electric Corp. of America, 775 F.2d 1107, 1121 (Fed.Cir.1985). "It is the *claims* that measure the invention." Id. (emphasis in original).

1. Intrinsic and Extrinsic Evidence

The interpretation of a term can ultimately be determined and confirmed only with "a full understanding of what the inventors actually invented and intended to envelop with the claim." Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998). "The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." Id. A claim construction does not become persuasive by following a certain rule, but by defining terms in the context of the whole patent. Id. The intrinsic evidence of record (the claims, the specification, and the prosecution history) is the most significant source of the legally operative meaning of disputed claim language, and in most situations will resolve any ambiguity in a disputed claim term. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). In such circumstances, "it is improper to rely on extrinsic evidence." Id. However, " *Vitronics* does not prohibit courts from examining extrinsic evidence, even when the patent document is itself clear." Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1308 (1999). "Rather, *Vitronics* merely warned courts not to *rely* on extrinsic evidence ... to contradict the meaning of claims discernable from ... the intrinsic evidence." Id. (emphasis in original); Key Pharms., 161 F.3d at 716 (disapproving of using extrinsic evidence to arrive at a claim construction "clearly at odds with" the claim construction mandated by the intrinsic evidence).

Thus, while "reliance" on extrinsic evidence is only proper when claim language remains genuinely ambiguous after consideration of the intrinsic evidence, it is "entirely appropriate, perhaps even preferable, for a court to consult trustworthy extrinsic evidence to ensure that the claim construction ... is not inconsistent with clearly expressed, plainly apposite, and widely held understandings in the pertinent technical field." Pitney Bowes, 182 F.3d at 1308; Key Pharms., 161 F.3d at 716 ("[T]rial courts generally can hear expert testimony for background and education on the technology implicated by the presented claim construction issues...."). Extrinsic evidence including expert testimony may assist to align the court's understanding of the technical aspects of the patent with the understanding of one skilled in the art. Pitney Bowes, 182 F.3d at 1308; U.S. Indus. Chems. v. Carbide & Carbon Chems. Corp., 315 U.S. 668, 678 (1942). However, "if the meaning of a disputed claim term is clear from the intrinsic evidence ... it cannot be altered or superseded by witness testimony or other external sources simply because one of the parties wishes it were otherwise." Key Pharms., 161 F.3d at 716. The role of extrinsic evidence is to enhance the court's understanding of the patent language, not to vary or contradict the terms of the claims. Markman, 52 F.3d at 981.

B. Disputed Apparatus Claims

Multi-Tech asserts ten claims from the five patents, eight of which are independent claims, and two of which are dependent claims. The ten claims divide into two categories: method claims ('627, claims 7 and 13; '649, claim 1; '532, claim 11) and apparatus claims ('289, claim 1; '470, claim 1; '532, claim 1; and '627,

claims 1, 2 and 5). The text of each disputed claim is lengthy, however, there are specific claim elements that are recurrent throughout. Construing the claim elements and their terms individually will assist in construction of the claims as a whole. The claim elements are analyzed below.

1. '289 Patent, **Claim 1**

a. A Multifunction Communication System for use with a Personal Computer, the Personal Computer Having a Processor, Memory, and a Peripheral Data Store, Comprising:

The parties agree that this preamble is a claim limitation. *See* Lewis Decl. Ex. 12 Tab A at 1; Id. Ex. 13 Tab A at 2. The "multifunction communication system" includes the communication module hardware, as well as its control software, for use with a personal computer. '289, Abstract; '289, claim 1.a; '289, col. 1:37-40 ("The subject of the present multiple inventions is a personal communications system which includes components of software and hardware operating in conjunction with a personal computer."). The hardware components include "telephone communication equipment, digital signal processors, and hardware to enable both fax and data communication with a hardware components [sic] at a remote site connected through a standard telephone line. The functions of the hardware components are controlled by control software operating within the hardware component and from the software components operating within the personal computer." Id. at col. 1: 46-54. The claim language and the specification establish this element requires the multifunction communication system to be separate from the personal computer. '289, col. 8: 3-11; id. at col. 36: 66-68. The disclosure describes a "complex computer assisted communications system" consisting of multiple component parts. '289, col. 1: 35-37. The term "personal computer" means a stand-alone computer (not sharing the processing or disk resources of another computer) designed for use by one person at a time, and excludes mainframe computers or mini-computers. Multi-Tech Br.App. I Ex. 19 (Microsoft Computer Dictionary 4th Ed. 339 (1999)). The personal computer must have a processor, memory and peripheral data store.

b. A Communications Module Connected to the Personal Computer, the Module Comprising:

This element is literally met by a separate hardware module linked to a personal computer that contains the items in the sub-elements that follow in '289, claim 1, elements 1.a(1)-1.a(7).FN4 *See* Lewis Decl. Ex. 13 Tab A at 5. The specification states that "[a] personal communications system is described which includes components of software and hardware operating in conjunction with a personal computer. The user interface control software operates on a personal computer, preferably within the Microsoft Windows environment." '289, Abstract. "The hardware components of the [communications module] are designed to be controlled by an external computing device such as a personal computer." Id. at col. 36: 66-68. The specification describes that the inventions "are embodied in a commercial product by the assignee, Multi-Tech Systems, Inc. The software component operating on a personal computer ..., while the hardware component ... is sold under the commercial name of MultiModemPCA ...." '289, col. 6: 21-28. Therefore, the hardware component, the "communications module," is separate from, but connected to, the "personal computer."

FN4. These elements are comprised of communications interface means, telephone line interface means, telephone voice interface means, full-duplex conversion means, compression means and main control means. '289, claim 1, elements 1.a(1)-1.a(7). The '532 Patent also includes a digital signal processor means in place of the compression means. '532, claim 1, element 1.e.

Multi-Tech argues that this element can also be met under the doctrine of equivalents where the

functionality of the items in sub-elements 1.a(1)-1.a(7) is provided by the hardware or software of a current personal computer. Lewis Decl. Ex. 13 Tab A at 5. Such an argument raises an issue of infringement rather than claim construction. Dayco Prods., Inc. v. Total Containment, Inc., 258 F.3d 1317, 1328 (Fed.Cir.2001); Bai v. L & L Wings, Inc., 160 F.3d 1350, 1354 (Fed.Cir.1998). Infringement issues will not be addressed in this Order.

c. Communications Interface Means Connected for Communicating to the Personal Computer for Transferring Data Between the Personal Computer and the Communications Module

The parties dispute whether three claim elements within claim 1 of the '289 Patent are subject to a means-plus-function form of construction governed by 35 U.S.C. s. 112, para. 6. The first of these appears here: communications interface means. The "communications interface means" claim element appears in the '289 Patent, claim 1, element 1.a(1), the '470 Patent, claim 1, element 1.a, and the '532 Patent, claim 1, element 1.a. The other two disputed elements, telephone line interface means and telephone voice interface means are discussed below.

i. Application of s. 112, para. 6

A claim element expressed in means-plus-function terminology is interpreted under 35 U.S.C. s. 112, para. 6:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. s. 112, para. 6 (2001). Whether or not a claim limitation falls under s. 112, para. 6 is a question of law. Personalized Media Communications, LLC v. Int'l Trade Comm'n, 161 F.3d 696, 702 (Fed.Cir.1998).

A claim element containing the word "means" that recites a function is presumed to be a means-plus-function element subject to s. 112, para. 6. Envirco Corp. v. Clestra Cleanroom, Inc., 209 F.3d 1360, 1364 (Fed.Cir.2000). However, this presumption is overturned "if the claim itself recites sufficient structure to perform the claimed function." *Id*. If a claim does not qualify for s. 112, para. 6 treatment, "it is not limited to the structure corresponding to the claimed function as 'described in the specification and equivalents thereof." ' *Id*. at 1365 (citing 35 U.S.C. s. 112, para. 6). In such a case, the specification merely informs the claim construction, while the claim language itself governs the meaning of the claim. *See id*.

ii. Communications Interface Means

The first question is whether or not the claim element "communications interface means" is a means-plus-function element. Multi-Tech argues s. 112, para. 6 does not apply because the term "interface" denotes structure. The claimed function for this element is to connect the personal computer to the communications module for transferring data. The claim recites the communications interface as the structure accomplishing this connection. An "interface" is the point at which a connection is made between two elements so that they can work with one another. Lewis Decl. Ex. 6 (Microsoft Press Computer Dictionary 192 (1991)). "In hardware, interfaces are cards, plugs, and other devices that connect pieces of hardware with the computer so that information can be moved from place to place." *Id*.

Microsoft FN5 argues that the term "interface," standing alone, is not a sufficiently definite structure to overcome the presumption that s. 112, para. 6 applies, relying on IMS Tech., Inc. v. Haas Automation, Inc., 206 F.3d 1422, 1430 (Fed.Cir.2000) (holding that the claim element "interface means for transferring ... and for recording ..." was subject to the s. 112, para. 6 presumption). However, unlike *IMS,* Multi-Tech directly challenges the means-plus-function status of the claim, and, furthermore, the term "interface" does not stand alone, but is modified. The term "communications interface" identifies a structure sufficient to perform the claimed function. This claim element is not a means-plus-function element requiring interpretation under s. 112, para. 6; it will be construed under the ordinary rules of claim construction.

FN5. For purposes of brevity, it is understood that Net2Phone joins Microsoft in its arguments regarding claim construction in this case. Net2Phone Br. at 1.

The parties agree that this claim element is literally met where the communications interface means is an RS232 serial interface. Lewis Decl. Ex. 13 Tab A at 6; *Id.* Ex. 12 Tab A at 3. This is supported by the language in the specification that "[t]he interface between the main controller circuit 313 and the personal computer is through SIO circuit 314 and RS232 serial interface 315." '289, col. 18: 46-48. The specification also indicates that the RS232 connection is "used to generate and receive the appropriate RS232 standard signals for a serial communications interface with a personal computer." *Id.* at col. 18: 50-55.

Multi-Tech asserts that because '289, claim 6, refers to a "bus," the communications interface must also be defined to include a bus. However, claim 6 of the '289 Patent does not state that the communications interface *itself* is a bus, but rather extends the claimed system to include instances where the communications interface means is *connected to* a bus of the personal computer. Id. at col. 50: 50-51. Therefore, while the claim language does not exclude a bus from the types of possible interfaces, the construction of the term "communications interface" is not required to include a bus simply based on the language of '289, claim 6.

Multi-Tech also argues that under the doctrine of equivalents, this element is met where the physical interface is a bus, and that the communications module need not be physically separate from the personal computer because various portions of the hardware and software of a modern personal computer perform the same functions. Lewis Decl. Ex. 13 Tab A at 6-7. Again, this raises infringement issues not relevant to claim construction, because whether an accused device performs the identical function "or an equivalent thereof" is a question of fact. IMS, 206 F.3d at 1430; *see also* Dayco, 258 F.3d at 1328; Bai, 160 F.3d at 1354.

d. Telephone Line Interface Means for Connection to a Telephone Line and for Full Duplex Digital Communications Over the Telephone Line

i. Telephone Line Interface Means

The parties dispute whether this claim element is in means-plus-function format. As above, the reference to "telephone line interface" is a specific reference to a type of interface, namely a "telephone line" interface, that identifies a structure sufficient to perform the claimed function of connecting the invention to a telephone line. Therefore, this claim element is not a means-plus-function element requiring interpretation under s. 112, para. 6, and will be construed under the ordinary rules for claim construction.

"[A]s a general rule, all terms in a patent claim are to be given their plain, ordinary and accustomed

meaning to one of ordinary skill in the relevant art." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir.2001). A "telephone line" means a standard telephone line, or a POTS (plain old telephone service) line. The specification supports this construction. "Hardware components 20 communicate over a standard telephone line 30 to one of a variety of remote sites.... Those skilled in the art will readily recognize the wide variety of communication interconnections possible with the present system by reading and understanding the following detailed description." '289, col. 5: 62-col. 6:11. The telephone line interface means is a physical interface for connecting to a telephone line. "The telephone line interface circuit 309 seizes the telephone line to make the telephone connection." '289, col. 10: 16-18. This distinguishes the telephone line interface from the telephone line itself. Claim 1 indicates that the interface is an element that comprises the "communications module," and therefore must be a part of the module. The specification explains that the invention's functions are "all implemented in the hardware components of FIG. 3." '289, col. 9: 21-23. "A telephone connection is established through the telephone line interface circuit 309 and communication is enabled." *Id*. at col. 9: 37-39.

Microsoft argues that because incoming information is "received through the telephone line interface circuit 309 and passed to the main controller circuit 313 via data pump DSP circuit 311," the telephone line interface means cannot be a telephone jack alone. *Id*. at col. 13: 29-32. Microsoft suggests the interface means must be both "a data pump modem *and* a jack." Microsoft Br. at 32 (emphasis in original). Multi-Tech argues that the telephone line interface circuit 309 is "distinctly separate" from the data pump circuit 311. Multi-Tech Reply Br. at 21. The claim language identifies a "telephone line interface means," which is shown in the specification in Figure 3 to be separate from the data pump DSP circuit 311. '289 FIG. 3. While the data pump modem may work in conjunction with the telephone line interface, the interface itself is distinct from the modem.

ii. Full Duplex Digital Communications

This claim element appears in the '289 Patent, claim 1, element 1 .a(2), '470 Patent, claim 1, '627 Patent, claim 1, and '532 Patent, claim 1. The '532 Patent, claim 11, also includes the substantially similar language "full duplex transmission of voice and video data information."

Full-duplex, standing alone, means a "*simultaneous* two-way independent *transmission* in both directions." Lewis Decl. Ex. 8 (American National Dictionary for Information Processing Systems 43 (1982)) (emphasis in original). That is, a full-duplex transmission involves communication between the sender and receiver simultaneously, in both directions *at once,* as opposed to one direction at a time. *See* id. Ex. 6 (Microsoft Press Computer Dictionary 119 (1991)) (emphasis added). The prosecution history of Multi-Tech's '627 Patent reveals "[f]ull-duplex, packetized voice communications as claimed ... requires simultaneous bi-directional independent asynchronous transmission of voice packets between two modems." Lewis Decl. Ex. 11 at 5 (November 4, 1997, Amendment & Response Under 37 C.F.R. s. 1.116). "[T]hrough statements made during prosecution ... an applicant for a patent ... may commit to a particular meaning for a patent term, which meaning is then binding in litigation." CVI/Beta Ventures, Inc. v. Tura LP, 112 F.3d 1146, 1158 (Fed.Cir.1997).

Full-duplex digital communication, therefore, is the ability to bi-directionally transmit and receive digital information simultaneously.

iii. Communications Over the Telephone Line

Microsoft asserts that claim 1 of the '289 Patent requires an end-to-end direct telephone line connection

across the entire length of the connection between the local user's communication module and the corresponding system at a remote site, where information does not travel through any intermediate nodes, such as other computers, routers, or networks. Microsoft Br. at 13; Lewis Decl. Ex. 12 Tab A at 5. The claim language describes full-duplex digital communication as occurring "over the telephone line," which initially suggests that the communication utilizes the telephone line from end to end. '289, claim 1, element 1.a(2).

The '289 Patent, claim 1, states that the communications system "initiat[es] a telephone call to a remote site." FN6 '289, claim 1, element 1.b. Claim 7 of the '627 Patent also describes that the system sends outgoing information "to a remote site over a telephone line using a modem." '627, claim 7, element 7.d. Microsoft argues that the requirement of initiating a call to the remote user cannot include a dial-up Internet connection where the call is initiated to the Internet Service Provider (ISP). Microsoft Br. at 14.

FN6. Significantly, this limitation appears only in the '289 Patent, not in any of the other Patents.

Essential to this argument is an understanding of the difference between packet switched networks and the Public Switched Telephone Network ("PSTN"). The PSTN is the worldwide voice telephone network accessible to anyone with a telephone. Lewis Decl. Ex. 7 (Newton's Telecom Dictionary 724 (1992)). It is a common carrier network providing circuit switching between public users; it is a circuit-switched network where a telephone line connection over a circuit is established from one user to the other where "the users have exclusive and full use of the circuit until the connection is released." Id. at 190, 724. This process creates a physical link between the users where an open line is maintained until abandoned. Lewis Decl. Ex. 6 (Microsoft Press Computer Dictionary 63 (1991)). Standard telephone lines utilize the PSTN.

The Internet and most local area networks (LANs) are packet-switched networks. A packet-switched network does not leave open a circuit connection between users on a dedicated basis as does a circuit-switched network. Lewis Decl. Ex. 7 (Newton's Telecom Dictionary 191 (1992)). The packets, small units of information broken down from long messages, include both data and a header containing an identification number, and, source and destination addresses. Lewis Decl. Ex. 6 (Microsoft Press Computer Dictionary 253 (1991)). Packets are relayed through stations on a computer network where each packet may travel a different path and arrive at the destination at different times and out of order. Id. Because each packet has its own unique identification and destination address, the data is reassembled in proper sequence at its destination. Lewis Decl. Ex. 7 (Newton's Telecom Dictionary 656 (1992)). A user may connect to a packet-switched network like the Internet using a circuit-switched dial-up telephone line.

Microsoft relies in part on representations made by Multi-Tech to the Patent Office explaining the functionality of the '627 Patent. Multi-Tech stated that its invention sends information "directly from the communications system through the POTS line to a receiving communications system at the other end of the line." Lewis Decl. Ex. 10 at 2-3 (May 12, 1997, Amendment and Response, '627 Patent file history). This characteristic distinguished its invention from U.S. Patent No. 5,341,374 (the "Lewen Patent"), which disclosed an invention using a local area network (LAN) to integrate voice, data and image information over a single transition link, where the information packets circulated around the LAN. Id. at 2. By contrast, Multi-Tech described its invention as establishing "point-to-point links." Id. at 3.

During the prosecution of the '627 Patent, Multi-Tech described the communications system as operating over a standard telephone line. It stated:

Such a telephone line is commonly referred to in the art as a 'plain old telephone service' (POTS) line and establishes a point-to-point connection between telephone equipment on each end of the line.... Applicants' invention converts analog speech signals received through a local speaker phone to digital voice signals, packages the digital voice signals into packets, and transmits the packets across a POTS line to a remote site where the process is performed in reverse.

Lewis Decl. Ex. 10 at 1-2. Multi-Tech reiterated in a subsequent letter to the Patent Office that the invention as stated in the '627 patent, claims 38, 44, 48 and 50, sends information "through a point-to-point modem connection between sites," where "[s]uch a point-to-point link is not comparable to Lewen's LAN." Lewis Decl. Ex. 11 at 5 (Amendment & Response Under 37 C.F.R. s. 1.116, '627 Patent file history). The specification states that the hardware components enable communication with another hardware component "at a remote site connected through a standard telephone line." '289, col. 1: 49-50. The hardware components enable communication "over standard telephone lines." '289, col. 2: 45-46. Microsoft argues that this language requires a direct connection via a telephone line from end to end.

Multi-Tech now argues the type of network is not a claim limitation and that the telephone line can be connected from the module to a communications network. Lewis Decl. Ex. 13 Tab A at 9. Multi-Tech avers that the claims describe a connection to a telephone line, and transmission or communication over a telephone line at each end, but not the telephone line itself. Multi-Tech Reply Br. at 8. Multi-Tech argues that the statements made during the prosecution of the '627 Patent are consistent with this understanding because: (1) Lewen does not use a telephone line to connect to a network, (2) Multi-Tech did not disclaim connecting to a packet-switched network, (3) Lewen transmits voice only to the telephone line, (4) Lewen transmits analog voice to the telephone line, and (5) "telephone line" is not limited to a direct physical connection between the local and remote sites. Multi-Tech Reply Br. at 10. In short, Multi-Tech argues that "[w]hen distinguishing over Lewen, Multi-Tech gave up connecting its system to a token-ring LAN, which is subsequently connected to a telephone line. Multi-Tech did not give up connecting its system to a telephone line, which is subsequently connected to a network." Id. at 11. Multi-Tech asserts that its statements to the Patent Office describe only the components of its invention functioning before or up to the point where the connection to the telephone line is made. Id. at 12. However, in its November 4, 1997, Amendment & Response Under 37 C.F.R. s. 1.116, Multi-Tech describes its invention as sending voice packets "through a point-to-point modem connection between sites." Lewis Decl. Ex. 11 at 5. Multi-Tech also distinguishes its Patent by attributing to it "packetized voice transmission between modems." Id. at 6. This language describes the nature of the connection between both the sending and receiving ends of the communication, not simply the transmission of information from inside the module to the start of the telephone line at the sending end, or from the end of the telephone line at the receiving end.

Multi-Tech claims that the previous explanations were to distinguish Lewen on the basis of the information path between the computer and voice apparatus and the telephone line, not what happened to the data once it reached the telephone line. Multi-Tech Br. at 23. The Lewen Patent discloses a LAN that integrates voice, data and image information over a single transmission link using a IEEE 802.5 token-ring standard specification, which defines a distributed packet switching system. Lewen Patent, col. 6: 45-61. Packets circle around the local ring of nodes, and the LAN connects to an external telephone network through a gateway attached to the LAN as a node. Id. at col. 6: 67-68, col. 16: 33-35. Multi-Tech explained to the Patent Office during prosecution that, unlike Lewen, where the voice packets exchanged between a telephone on the external network and a node on the LAN must still circulate around the LAN until reaching either the gateway or the node, its invention instead sends voice packets through a point-to-point

modem connection. Lewis Decl. Ex. 11 at 5 (November 4, 1997, Amendment & Response).FN7 Multi-Tech illustrates that in Lewen, information must circulate around a token ring LAN and pass through a gateway *before* ever reaching a telephone line, whereas the present invention sends information directly to a telephone line from the hardware module. Multi-Tech Br. at 22.

FN7. Multi-Tech argues that the arguments made during prosecution of the '627 Patent do not apply to the other patents-in-suit. However, because the identical specification for the '627 Patent was used for the others, Multi-Tech's explanations of the invention are applicable to each of the patents.

After Multi-Tech added the requirement that its invention operate by using a modem connected to a telephone line, the claims were allowed by the examiner. Multi-Tech conceded during oral argument that use of a modem is the critical element in distinguishing its patents from Lewen, and that use of a modem is a limit that is strictly required for the '627 Patent. However, Multi-Tech asserts the type of communications network through which information travels after it reaches the telephone line connected to the modem is not a claim limitation, and that Lewen is compatible with all of its other patents, except '627. More simply put, Multi-Tech argues it disclaimed Lewen's token ring network before the information reaches the telephone line, but not any network after the telephone line. This is partially supported by the claim language stating that the telephone line interface is a means "for connection *to* a telephone line." '289, claim 1, element 1.a(2) (emphasis added).

Multi-Tech further relies on the illustration of Figure 1 of the specification. The illustration shows a straight line connecting the computer terminal to the communications module, and a jagged line connecting the communications module to a variety of possible destinations. '289, FIG. 1. Multi-Tech argues that the straight line from the computer to the module is intended to represent a direct connection, while the jagged line, labeled 30, is something other than a direct connection. The specification identifies 30 as the "standard telephone line." '289, col. 6: 6-7. Microsoft argues that the standard telephone line 30 constitutes a direct connection. The specification identifies four alternative hardware components for the remote site: a fax machine, a like-configured communications module, a personal computer with a remote modem, and a standard telephone. '289, col. 5: 64-6: 7. The specification describes the module as "communicat[ing] over a standard telephone line" in each of the four possible connections. Id. Microsoft argues that Figure 1 does not allow for the communications module to connect to an ISP or the Internet, or for the remote site to be a communications network. Microsoft relies on Multi-Tech's statement that the invention "transmits the packets across a POTS line to a remote site...." Lewis Decl. Ex 10 (May 12, 1997, Amendment and Response at 2); *see* Ballard Med. Prods. v. Allegiance Healthcare Corp., 268 F.3d 1352, 1359 (Fed.Cir.2001) (holding that a particular claim interpretation disclaimed by the patentee during prosecution can estop an inconsistent assertion by the patentee during litigation).

Claim 1.a(2) calls for full-duplex digital communications "over the telephone line." '289, claim 1. Multi-Tech argues that this does not mean exclusively over the telephone line, because the specification describing transmission of packets of digital data "over the telephone line interface" indicates that data can travel over the telephone line interface and then to other types of connections to another interface, but that the data need not travel exclusively over the telephone line interface. *Id*. at col. 12: 54, 57. That is, Multi-Tech asserts that the claims only require that the communication system *connects to* a telephone line, not that it utilize the telephone line exclusively end-to-end. Multi-Tech Br. at 62. Multi-Tech argues that its claims cover both telephone calls made over a circuit-switched network such as the PSTN, as well as telephone calls made over a packet-switched network such as the Internet, as long as the system first connects to a standard

telephone line. Multi-Tech Reply Br. at 15. Finally, Multi-Tech argues that because "point-to-point" is not a claim term, it does not limit the claims.

The intrinsic evidence as a whole limits Multi-Tech's invention to utilizing a direct point-to-point telephone line connection. Multi-Tech's argument that its explanation to the Patent Office regarding the distinction between the '627 Patent and Lewen was meant solely to describe "the complex system of hardware components existing *between* the computer and the *external* telephone network," is not consistent with the language used in Multi-Tech's letters to the Patent Office. Multi-Tech Br. at 63. Multi-Tech's letters identify the element of Lewen's invention that occurs prior to a telephone line connection, namely the token ring LAN. However, Multi-Tech did not narrowly state to the Patent Office that the distinction was simply that its invention did not require packets to travel through multiple intermediate components (a node adapter, a token ring LAN, and a gateway) before connecting to a telephone line, as it now argues. Id. Instead, Multi-Tech repeatedly stated in the prosecution history that its invention is made distinctive by its sending information "through a point-to-point modem connection between sites." Lewis Decl. Ex. 11 at 5; *see also* Id. Ex. 10 at 2-3 ("Applicant's voice packets do not circulate around a LAN but proceed directly from the communications system through the POTS line to a receiving communications system at the other end of the line. Such point-to-point links are not comparable to LANs, as evidenced by Lewen's use of a complex gateway to connect an external network to his LAN...."). This language unambiguously references more than the function of Multi-Tech's invention limited to the connection of the hardware module directly *to* a telephone line; it encompasses the entirety of the point-to-point connection *through* a standard telephone line from *end to end*, as well as its transmission of information through the POTS line. A "point-to-point connection between telephone equipment on each end of the line" is not established where the hardware module connects via a telephone line to a packet-switched network and then back to a telephone line for connection to the remote site. Lewis Decl. Ex. 10 at 2. As such, the transmission of information through a packet-switched network is disclaimed.

(1). Prosecution History

Multi-Tech contests the use of statements made during the prosecution history of the '627 Patent to interpret the disputed claim. Pall Corp. v. PTI Techs. Inc., 259 F.3d 1383 (Fed.Cir.2001), suggests that "statements made during the prosecution history are used to interpret the scope and meaning of the patent claims." Id. at 1392. "Even where the ordinary meaning of the claim is clear, it is well-established that '[t]he prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." ' *Id*. (citation omitted); *see also* Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1304 (Fed.Cir.1997) (in the context of claim construction, stating that "by distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover, he is by implication surrendering such protection"); Standard Oil Co. v. American Cyanamid Co., 774 F.2d 448, 452-53 (Fed.Cir.1983) (noting that "the prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance" and that "[b]y making this disclaimer or concession, [the patentee] surrendered any interpretation of its claim that would include [the subject matter urged to be outside of the scope of the claims]").

However, *Pall* was vacated by PTI Techs. Inc. v. Pall Corp., 122 S.Ct. 2324 (2002), after the Supreme Court's ruling in Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 122 S.Ct. 1831 (2002). In its original analysis of *Pall,* the Federal Circuit relied on its holding from the case underlying the recent *Festo* Supreme Court case, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558, 574

(Fed.Cir.2000), that "application of the doctrine of equivalents is completely barred for a claim limitation that has been narrowed for reasons related to patentability." Pall, 259 F.3d at 1390. The Supreme Court in *Festo* rejected this principle and ruled that prosecution history estoppel is not a complete bar. Festo, 122 S.Ct. at 1840.

Prosecution history estoppel requires that the claims of a patent be interpreted in light of the proceedings in the PTO during the application process. Estoppel is a 'rule of patent construction' that ensures that claims are interpreted by reference to those 'that have been cancelled or rejected.'

Id. at 1838 (citation omitted). A patentee's decision to submit an amended claim "is taken as a concession that the invention as patented does not reach as far as the original claim." *Id*. Prosecution history estoppel arises from any amendment to a claim that "is made to secure the patent and the amendment narrows the patent's scope." *Id*. The amendment may be made in order to avoid prior art, address a concern such as obviousness, or to satisfy any requirement of the Patent Act. *Id*. at 1839. The Supreme Court held that the reach of prosecution history estoppel "requires an examination of the subject matter surrendered by the narrowing amendment." *Id*. at 1840. A narrowing amendment should not relinquish unforeseeable equivalents, or "foreclose claims of equivalence for aspects of the invention that have only a peripheral relation to the reason the amendment was submitted." *Id*. at 1841. Instead of "complete bar" estoppel, the Court held that "the patentee should bear the burden of showing that the amendment does not surrender the particular equivalent in question" in order to "overcome the presumption that prosecution history estoppel bars a finding of equivalence." *Id*. at 1842. The original decision in *Pall* relied on the complete bar rule and was later vacated in the wake of *Festo*'s holding.

Festo does not change the fact that "prosecution history is relevant to construing ... claims." *Id*. "When a patentee ... narrow[s] his claims, ... prosecution history estops him from later arguing that the subject matter covered by the original, broader claim was nothing more than an equivalent." *Id*. at 1835. "The inventor who chooses to patent an invention and disclose it to the public ... bears the risk that others will devote their efforts toward exploiting the limits of the patent's language." *Id*. at 1837. Competitors may rely on the estoppel because "the purpose of applying the estoppel in the first place [is] to hold the inventor to the representations made during the application process and to the inferences that may reasonably be drawn from the amendment." *Id*. at 1840.

Here, the claim language itself was not altered to narrow the claim scope. However, "[p]rosecution history is relevant not only for purposes of prosecution history estoppel but also for construing the meaning and scope of the claims." Alpex Computer Corp. v. Nintendo Co., 102 F.3d 1214, 1220 (Fed.Cir.1996), *reh'g denied,* Jan. 15, 1997, *cert. denied* 521 U.S. 1104 (1997). In analyzing a patent infringement case involving the well-known Rubik's Cube puzzle, the Federal Circuit held that "[w]hile it is true that the effect of prosecution history arises as an estoppel when applying infringement analysis under the doctrine of equivalents, the prosecution history can and should, where relevant, be assessed (along with, e.g., claim language and specification) in properly interpreting claim language." Moleculon Research Corp. v.. CBS, Inc., 793 F.2d 1261, 1270 (Fed.Cir.1986) (citations omitted). Put simply, "[a] patentee who narrows a claim as a condition for obtaining a patent disavows his claim to the broader subject matter...." Festo, 122 S.Ct. at 1840.

Applied to the instant facts, although Multi-Tech's statements regarding the point-to-point nature of the telephone connection do not relate directly to the fact that the device uses a modem to connect to the telephone line, they nevertheless are properly considered in defining the limits of the claim. This claim

element requires the invention to use a direct point-to-point telephone line connection.

(2). Protocols

Microsoft further argues that the communication protocols cited in the specification confirm that the disclosure is limited to communicating over the PSTN. Microsoft Ex. 1 Tab H. The specification states that "the input data from the attached computer is transmitted using the error control protocol like ... V.42," and the "transmission of the digital data follows the CCITT V.42 standard," which is incorporated by reference. '289, col. 3: 2-4; *id*. at col. 13: 12-18; *see also id*. at col. 35: 43-45. The specification also states that data packets are "transmitted by the HDLC protocol in which data is transmitted in synchronous mode and checked by CRC error checking." *Id*. at col. 35: 35-38.

The declaration of Joseph A. Konstan, a multimedia systems expert learned in the art, is helpful in understanding the context of these specification references. He explains that "HDLC ('high level data link control') protocol is a standard set by the International Standards Organization (ISO)," which "may be incorporated into several other protocols." Mandernach Decl. Ex. L at 9 (Konstan Decl .). HDLC can be incorporated into the V.42 protocol, as well as the X .25 protocol. *Id*. The V.42 protocol standard operates solely over the public switched telephone network, while the X.25 protocol is a network protocol for use with packet-switched networks. *Id*. That is, "V.42 is a standard for communication between two modems over the PSTN, while X.25 is a standard for packet-based communications between nodes on a network." *Id*. at 10. The specification discloses use of the HDLC protocol with the V.42 protocol, but does not include any references to the X.25 protocol. The HDLC protocol disclosure does not convey to one of skill in the art that the invention is usable with a packet-switched network simply because the HDLC protocol can be used with the X.25 packet-switching protocol. The references in the specification to the use of the HDLC protocol with the V.42 protocol over the public switched telephone network are consistent with the above construction of this claim element.

e. Telephone Voice Interface Means for Receiving Local Voice Signals from a Local User and for Conveying Remote Voice Signals from a Remote User to the Local User

i. Telephone Voice Interface Means

The parties also dispute whether this claim element is in means-plus-function format. As explained above, the reference to "telephone voice interface" identifies a structure sufficient to perform the claimed function of receiving local voice signals and conveying remote voice signals. Therefore, this claim element is not a means-plus-function element requiring interpretation under s. 112, para. 6, and is instead construed under the ordinary rules for claim construction. Claim 1 of the '470 Patent and claim 1 of the '532 Patent require a "voice interface means" that is substantially similar, therefore construction of that element in those Patents should comport with the following analysis.

Like the telephone line interface means, the telephone voice interface means is described in the claim as an element comprising the communications module. It is separate from the computer. Microsoft argues that this preempts the voice interface means from being a speaker and microphone plugged directly into the personal computer, because such an interface is not disclosed in the patent. However, because s. 112, para. 6 does not apply to this claim element, the type of interface is not limited only to the corresponding structures disclosed in the specification.

The specification identifies that the telephone voice interface means may include a "telephone handset 301, a

telephone headset 302, and a hands-free microphone 303 and speaker 304." '289, col. 8: 19-21. The specification makes clear that these alternatives relate to the preferred embodiment, thus other alternatives are not excluded by the specification language. However, the specification states that any of the listed telephone interfaces "connect to the digital telephone coder-decoder (CODEC) circuit 305," which is an internal component of the communications module. Id. col. 8: 21-24; id. FIG. 3. Likewise, on the receiving end, the CODEC enables the handset, microphone and speaker operation, and "trans[mits] to" the telephone interface directly. Id. at col. 9: 34-37, 51-55. Reading the claim in light of the specification, the telephone voice interface means is not meant to be connected directly to the personal computer, which is instead connected to the serial interface circuit 315. Id. at col. 8: 65-66.

Multi-Tech argues that the claim also covers a microphone and speaker plugged directly into a personal computer, because the claim language does not state any requirement identifying into where the telephone voice interface means must be plugged. However, the claim itself does list the telephone voice interface means as a component part of the communications module. '289, claim 1.

ii. Local User and Remote User

A local user is the human being at the local end of the telephone line, and a remote user is the human being at the remote end of the telephone line.

iii. Receiving Local Voice Signals

Receiving local voice signals is receiving a voice signal by a microphone, headset or handset.FN8 These voice signals are analog signals representing the audio received from the local user. '289, col. 12: 22-26; id. at col. 26: 31-34.

FN8. The handset is not encompassed by the '627 Patent, because the '627 Patent is limited to a full-duplex speaker phone, which does not require a handset. This requirement is not present in the other patents.

iv. Conveying Remote Voice Signals

Conveying remote voice signals, or playing the remote analog voice signals, also expressed in the '627 Patent, 1.a, 2 & 5 preambles, & 7.h, is playing a voice signal by a speaker, headset or handset.FN9 These voice signals are analog signals representing audio received from the remote user.

FN9. Again, the handset is not encompassed by the '627 Patent.

f. Full-Duplex Conversion Means for Converting the Local Voice Signals Into Outgoing Digital Voice Data and for Converting Incoming Digital Voice Data Into the Remote Voice Signals

i. Means-Plus-Function Analysis under s. 112, para. 6

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. s. 112, para. 6 (2001). Claim construction of a s. 112, para. 6 limitation, referred to as a means-plus-function limitation, requires (1) identification of the claimed function and (2) identification of the corresponding structure in the specification which performs the recited function. IMS, 206 F.3d at 1429-1430; Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1257 (Fed.Cir.1999). These identifications are both questions of law, while whether an accused device performs the identical function "or an equivalent thereof" is a question of fact. IMS, 206 F.3d at 1430. A means-plus-function claim encompasses all structure in the specification corresponding to that element and equivalent structures. Micro Chem., 194 F.3d at 1258. The scope of the claim is not expanded by s. 112, para. 6; rather, s. 112, para. 6 "operates to *cut back* on the types of *means* which could literally satisfy the claim language." Johnston v. IVAC Corp., 885 F.2d 1574, 1580 (Fed.Cir.1989) (emphasis in original) (holding that s. 112, para. 6 "restricts the scope of the literal claim language"). However, means-plus-function claims are not limited to a particular means set forth in the specification, because they are construed to cover equivalents as well. D.M.I., Inc. v. Deere & Co ., 755 F.2d 1570, 1574 (Fed.Cir.1985).

The parties agree that three of the claim elements within claim 1 of the '289 Patent are means-plus-function elements to be interpreted under s. 112, para. 6. The first of these elements occurs here: full-duplex conversion means. The other two, compression means and main control means, are discussed below.

ii. Full-Duplex Conversion Means

(1). The Function

The function of this claim element is to perform the conversion of voice signals from analog-to-digital (A/D) and digital-to-analog (D/A). '289, col. 26: 30-34 ("In operation, the speech or analog voice signal ... is digitized by the digital telephone CODEC circuit 305."); id. at col. 2: 3; id. at col. 23: 27-29; id. at col. 6: 56-58.

This conversion process must comply with the construction of full-duplex given above, such that both A/D and D/A conversion occur simultaneously. '289, col. 11: 29-12: 2 ("[F]ull duplex data transmission may be accomplished simultaneously with the voice communication between both sites."). "The uncompressed digital voice information is passed to digital telephone CODEC circuit 305 where it is reconverted to an analog signal and retransmitted through the telephone line interface circuits. In this fashion, full-duplex voice and data transmission and reception are accomplished through the hardware components of FIG. 3...." Id. col. 13: 40-48.

(2). The Structure

The corresponding structure disclosed in the Patent specification is "CODEC circuit 305." '289, col. 23: 28-30; id. FIG. 3. A "codec," short for coder/decoder, is hardware that can convert signals between analog and digital formats. Newton's Telecom Dictionary 203 (1992). "[T]he actual D/A and A/D functions for the telephone interface occur in digital telephone CODEC chip U12 (corresponding to digital telephone CODEC circuit 305 of FIG. 3)." Id. at col. 17: 39-42; *see also* id. col. 9: 51-55. "The CODEC for circuit 305 is a commanding F-law CODEC." Id. at col. 26: 33-34; *see also* id. at col. 26: 51-54.

iii. Local and Remote Voice Signals

The analog signals representing the audio received from the local user or remote user are the local and remote voice signals, respectively.

iv. Outgoing and Incoming Digital Voice Data

The digital signals representing the audio received from the local user or remote user are the outgoing and incoming digital voice signals, respectively.

The proper interpretation of this claim is: the simultaneous bi-directional conversion of outgoing and incoming voice signals (or data) from analog-to-digital (A/D) and digital-to-analog (D/A) by the CODEC circuit 305 or an equivalent thereof.

g. Compression Means for Compressing the Outgoing Digital Voice Data Into Compressed Outgoing Digital Voice Data Packets and for Decompressing Compressed Incoming Digital Voice Data Packets Into the Incoming Digital Voice Data, Each of the Compressed Outgoing Digital Voice Data Packets Having Headers and Each of the Compressed Incoming Digital Voice Data Packets Having Headers

i. Compression Means

This claim element is also stated in means-plus-function language and will be interpreted under 35 U.S.C. s. 112, para. 6.

(1). The Function

The function of this claim element is compressing the outgoing digital voice data, packetizing the compressed data into compressed outgoing digital voice data packets, depacketizing incoming packets into incoming digital voice data, and decompressing the incoming digital voice data. '289, claim 1, element 1.a(5).

(2). The Structure

The corresponding structure disclosed in the Patent specifications is the "voice control circuit 306," which is "a combined digital signal processor [DSP] and a linear CODEC in a single chip." '289, col. 23: 30-36; id. at col. 26: 50-51. The DSP of the voice control circuit 306 is programmed to perform the voice compression algorithm; it compresses the speech and places the compressed digital representations of the speech into special packets. Id. at col. 23: 30-38. Specifically, the "voice control DSP/CODEC of circuit 306 correspond[s] to the single integrated circuit U8 shown in FIGS. 9A and 9B as a WE DSP16C Digital Signal Processor/CODEC from AT & T Microelectronics." Id. at col. 26: 46-51. The received compressed voice data packets are also uncompressed and reconstructed by the DSP/CODEC circuit 306. Id. at col. 27: 19-26. "Thus the voice-control DSP/CODEC circuit 306 is processing the voice data in both directions in a full-duplex fashion." Id. at col. 27: 30-32.

Like the remaining component parts of the communications module, the compression means is separate from the personal computer. A "structure disclosed in the specification is [a] 'corresponding' structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim. This duty to link or associate structure to function is the *quid pro quo* for the convenience of employing s. 112, para. 6." B. Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1424 (Fed.Cir.1997) (emphasis in original). The DSP/CODEC circuit 306 is the only structure identified in the specification for performing the claimed function of this claim element. All structural equivalents are covered by this claim as well, however, determining qualifying equivalent structures under s. 112, para. 6 is a question of fact.

"In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." WMS Gaming, Inc. v. Int'l Gaming Tech., 184 F.3d 1339, 1349 (Fed.Cir.1999). Therefore, the corresponding structure DSP includes the programmed algorithm. The specification identifies the algorithm as "a unique Vector Quantization (VQ) speech compression algorithm." '289, col. 24: 30-32.

Multi-Tech argues that the VQ algorithm cannot be a part of claim 1 of the '289 Patent because an algorithm is specifically included in the language of two dependent claims, giving claim 1 a broader scope under the doctrine of claim differentiation.

(a) Claim Differentiation

Under the doctrine of claim differentiation, it is presumed that different words used in different claims result in a difference in meaning and scope for each of the claims. Clearstream Wastewater Sys., Inc. v. Hydro-Action, Inc., 206 F.3d 1440, 1446 (Fed.Cir.2000). Claim differentiation applies where a court interprets the scope of two different claims to be identical by importing the limitations of the dependent claim into the independent claim. Globetrotter Software, Inc. v. Elan Computer Group, Inc., 236 F.3d 1363, 1369 (Fed.Cir.2001). This doctrine cannot broaden a claim beyond what is contained in the written description, but it prevents the narrowing of broad claims by reading into them the limitations of narrower claims.FN10 Clearstream, 206 F.3d at 1446; D.M.I., 755 F.2d at 1574 ("Where some claims are broad and others are narrow, the narrow claim limitations cannot be read into the broad whether to avoid invalidity or to escape infringement ."). "Claim differentiation is a [judicially developed] guide, not a rigid rule." FN11 Laitram Corp. v. Rexnord, Inc., 939 F.2d 1533, 1538 (Fed.Cir.1991); *see also* Karlin Technology, Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 972 (Fed.Cir.1999). A means-plus-function limitation "is not made open-ended by the presence of another claim specifically claiming the disclosed structure which underlies the means clause or an equivalent of that structure." Laitram, 939 F.2d at 1538.

FN10. "It is settled law ... that independent claims containing means-plus-function limitations do not have the same literal scope as dependent claims reciting specifically the structure that performs the stated function." Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc., 248 F.3d 1303, 1313 (Fed.Cir.2001). What matters is the conviction one skilled in the art would have as to what is disclosed after reading the specification. Id. at 1312.

FN11. *But see* D.M.I., 755 F.2d at 1574 (stating the doctrine of claim differentiation is a "well established" and "fixed" rule that "enjoys an immutable and universally applicable status comparatively rare among rules of law," and that without it "the entire statutory and regulatory structure governing the drafting, submission, examination, allowance, and enforceability of claims would crumble").

Multi-Tech argues that non-asserted dependent claim 7 of the '470 and '532 Patents recites a specific compression algorithm, and that therefore the independent claims reciting merely the "compressing" limitation should not be construed to include a specific algorithm. Multi-Tech Br. at 33. However, corresponding limitations between claims may be differently worded while still subject to the same interpretation. Kraft Foods, Inc. v. Int'l Trading Co., 203 F.3d 1362, 1368 (Fed.Cir.2000). "[T]he stringencies of a means-plus-function limitation are not to be avoided by the mere addition of a dependent

claim that recites the corresponding structure disclosed in the specification." Wenger Mfg., Inc., v. Coated Mach. Sys., Inc., 239 F.3d 1225, 1234 (Fed.Cir.2001). Because these claim elements are interpreted in accordance with the requirements of s. 112, para. 6, which mandate that a disclosed structure programmed to execute a particular algorithm is comprised of the identified algorithm as part of the structure, the DSP/CODEC 306 is construed to use the VQ algorithm. WMS, 184 F.3d at 1349.

Multi-Tech argues that the specification also discloses that "those skilled in the art will readily recognize that the other ID/LI character codes could be defined to allow for ... alternate voice compression algorithm packets such as Codebook Excited Linear Predictive Coding (CELP) algorithm, GSM, RPE, VSELP, etc." '289, col. 19: 49-56. However, "the disclosure identifies only one compression algorithm that meets the compression rate guarantees needed to make the device operable." Mandernach Decl. Ex. L (Konstan Decl. at 20). Joseph A. Konstan, skilled in the art of multimedia systems, opined that the patents-in-suit teach no other algorithms than the VQ algorithm that would be suitable for the disclosed data compression task. *Id.* ("As one of skill in the art, I am not aware of any other data compression algorithms known in January 1993 that would have met the compression rate criteria while still being computable on the specified DSP.")

ii. Compressing and Decompressing

Compressing is reducing the size of digital voice data, so that it can be stored in less space or transmitted with less bandwidth. Decompressing is expanding compressed the digital voice data to return it to a usable form.

iii. Outgoing/Incoming Digital Voice Data

Digital signals representing the audio received from the local user are "outgoing," and digital signals representing the audio received from the remote user are "incoming."

iv. Compressed Outgoing/Incoming Digital Voice Data Packets Having Headers

Microsoft argues Multi-Tech is acting as its own lexicographer in its application of meaning to this claim element. Multi-Tech counters that the words used each have ordinary meanings understood to persons of ordinary skill in the art. "Proper claim construction, however, demands interpretation of the entire claim in context, not a single element in isolation." Hockerson-Halberstadt, Inc. v. Converse Inc., 183 F.3d 1369, 1374 (Fed.Cir.1999). The claim language uses the term "headers" in different contexts, namely with reference to incoming and outgoing digital voice data packets, and incoming and outgoing computer digital data packets. '289, claim 1, elements 1.a(5) & 1.a(7). The term "headers" as it is used in relation to each type of packet must be interpreted in light of the whole claim as read in the context of the specification.

A packet is a unit of information transmitted as a whole from one device to another. Lewis Decl. Ex. 6 (Microsoft Press Computer Dictionary 253 (1991)). A header generally is a unit of information that precedes and identifies the information packet. *See* Multi-Tech Br.App. Vol. I Tab 19 (Microsoft Computer Dictionary Fourth Edition 215 (1999)). While the parties agree that the term packet alone can include reference to both data and a header, the parties dispute the use of the term "header" in this claim element. Multi-Tech argues the claims only require that both the packets and the headers be present, or at most that the headers distinguish voice packets from data packets, while Microsoft asserts that the headers associated with the digital voice data must identify the contents of the packet as containing either voice data or silence data. Multi-Tech Br. at 37; Lewis Decl. Ex. 12 Tab A at 21; Lewis Decl. Ex. 13 Tab A at 19-20. Multi-Tech argues that Microsoft's proposed construction of "header" imports limitations not present in the claim

language and attempts to improperly limit the claims to a preferred embodiment. *See* Karlin, 177 F.3d at 971-72 (holding trial court erred in reading extraneous limitations into a claim term where doing so departed from the ordinary meaning of the terms); Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1187 (Fed.Cir.1998) ("Although the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.") (citation omitted).

(1). Limitations Found in the Specification

Extraneous limitations or embodiments appearing in the specification will not be read into the claims. Enercon v. International Trade Comm'n, 151 F.3d 1376, 1384 (Fed.Cir.1998). "Extraneous" means a limitation read into a claim from the specification "wholly apart from" any need to interpret what the patentee meant by particular words in the claim. E.I. Du Pont de Nemours & Co. v. Phillips Petroleum Co., 849 F.2d 1430, 1433 (Fed.Cir.1988). However, if a specification "requires" a limitation, that limitation should be read from the specification into the claims. *Id*.

(2). Headers

Where a patentee is his own lexicographer and terms are used in a manner other than their ordinary meaning, "the court must determine how a person of experience in the field of this invention would, upon reading the patent documents, understand the words used to define the invention." Toro Co. v. White Consol, Indus., Inc., 199 F.3d 1295, 1299 (Fed.Cir.1999). Microsoft argues that the complete phrase "outgoing digital voice data packets having headers" is a term coined by Multi-Tech to have the meaning revealed by the specification.

The claim language explains that digital voice data packets with headers are created by the compression means, and sent by the compression means to the main control means. '289, claim 1, element 1.a(5)-1.a(6). The structure corresponding to the compression means has been identified as the "voice control circuit 306," which is "a combined digital signal processor [DSP] and a linear CODEC in a single chip." '289, col. 23: 30-36; *id*. at col. 26: 50-51. The main control means "receiv[es] the compressed outgoing digital voice data packets from the compression means" through "dual port RAM circuit 308." '289, claim 1, element 1.a(6); col. 8: 59-61. This main control means is the "main controller circuit 313 of FIG. 3." '289, col. 34: 3-5. The specification states that the DSP 306 sends data to the main controller circuit 313 in the form of blocks of "V-data" (voice data). *Id*. at col. 34: 24-25. "Each V-data block has one sign byte as a header." *Id*. at col. 34: 26-27. This header is transferred from the voice control DSP to the main control means to identify "the contents of the voice packet." *Id* . at col. 34: 65-66. The specification details two types of headers, "00 hex" which identifies that "the following V-data contains silent sound," and "01 hex" which identifies that "the following V-data contains speech information." *Id*. at col. 34: 66-35: 2.

For the preferred embodiment to function as specified, the headers attached to the "digital voice data packets" must identify whether the V-data contains silent sound or speech information. If the headers were interpreted to identify only whether voice or computer data were included in the "digital voice data packets" the headers were attached to, the specification would not make sense, and the preferred embodiment of the invention would not operate as disclosed. This limitation is not extraneous, but rather is required by the language of the specification, and must be read into the language of this claim. Du Pont, 849 F.2d at 1433.

Thus, the proper interpretation of this claim element is: voice control circuit 306, using the VQ algorithm, which compresses outgoing digital voice data, packetizes the compressed data into outgoing digital voice

data packets, depacketizes incoming packets into incoming digital voice data and decompresses the incoming digital voice data, where the digital voice data packets sent and received by voice control circuit 306 have headers identifying whether the attached packets contain silent sound or speech information.

h. Main Control Means for Receiving the Compressed Outgoing Digital Voice Data Packets from the Compression Means, for Receiving Outgoing Computer Digital Data Packets from the Personal Computer Through the Communications Interface Means, for Multiplexing the Compressed Outgoing Digital Voice Data Packets and the Outgoing Computer Digital Data Packets to Produce Multiplexed Outgoing Digital Data and for Sending the Multiplexed Outgoing Digital Data to the Telephone Line Interface Means for Digital Transmission Over the Telephone Line

i. Main Control Means

The means-plus-function expression requires interpretation under 35 U.S.C. s. 112, para. 6.

(1). The Function

The function of this claim element is to receive compressed outgoing digital voice data packets and outgoing computer digital data packets from the compression means and personal computer respectively, for multiplexing to produce multiplexed outgoing digital data, and to send the multiplexed outgoing digital data to the telephone line interface means for digital transmission over the telephone line.

(2). The Structure

The corresponding structure disclosed in the Patent specifications is the main controller circuit 313. '289, col. 8: 55. The disclosed preferred embodiment of the main controller circuit includes a microprocessor, specifically a Z80180 eight-bit microprocessor chip. '289, col. 9: 1-5; col. 16: 9-10. The main controller circuit communicates with the voice control DSP through dual port RAM circuit 308, however the dual port RAM circuit is distinct from the main controller circuit, as shown by Figure 3. *Id*. at col. 8: 59-61; *see id*. at col. 12: 30-32 ("The digitized and compressed voice information is *passed through* dual port RAM circuit 308 to the main controller circuit 313.") (emphasis added). "Structural features that do not actually perform the recited function do not constitute corresponding structure and thus do not serve as claim limitations." Asyst Techs., Inc. v. Empak, Inc., 268 F.3d 1364, 1370 (Fed.Cir.2001). Because the dual port RAM circuit does not actually perform the stated functions of the main controller circuit, it is not a part of the corresponding structure of the main controller circuit. As with each of the elements "comprising" the hardware module, the main control means is separate from the personal computer. '289, claim 1, element 1.a; *id*. at col. 5: 59-62 ("[T]he hardware components 20 include the data communication equipment.").

ii. Outgoing Computer Digital Data Packets

Outgoing computer digital data packets are packets of non-voice data information from the local user's computer, "for such things as text, file transfers, binary data and any other type of information presently being sent through modems." '289, col. 20: 29-33. The headers attached to the computer data packets identify the packet type and packet length. *Id*. at col. 20: 36-37.

iii. Multiplexing

Multiplexing requires interpretation in light of the specification, as it is agreed Multi-Tech acted as its own

lexicographer in using this term.

The specification teaches that multiplexing is relevant to the "show and tell" function of the system, which allows a "data over voice (DOV)" communications session. '289, col. 7: 32-34. "The show and tell component ... enables the operator to simultaneously transmit voice and data communications to a remote site ... over the telephone line." *Id*. at col. 2: 25-30. This DOV function, accomplished in the hardware components of the system,FN12 "multiplexes" digital voice data packets and computer digital data packets in "dynamically changing allocations" in the same transmission. *Id*. at col. 7: 37-42; *id*. at col. 9: 20-23.

FN12. "[T]he internal components of the typically equipped personal computer [in 1992] did not have the hardware necessary to support the inventions." Multi-Tech Br. at 5. The Court "interprets the claim at issue to cover no more than what the specification supported at the time of filing." Schering Corp. v. Amgen, Inc., 222 F.3d 1347, 1353 (Fed.Cir.2000). A term used in a patent claim or specification "could not enlarge the scope of the patent to embrace technology arising after its filing." *Id*.

The allocation of voice and data at a given time is determined by the amount of voice information required to be transferred. "Quiet voice intervals allocate greater space to the digital data transmission." *Id*. at col. 7: 42-45. "Dynamic" allocations are dependent on the quiet times during voice transmissions. Where a silence packet occurs (when there is no speech information being transmitted), a higher volume of digital data information is transmitted by the main controller circuit, in lieu of digitized voice information. *Id*. at col. 12: 47-55. "A silence detection function is used to detect quiet intervals in the speech signal and substitute conventional data packets in lieu of voice data packets to effectively time multiplex the voice and data transmission," therefore the "allocation of time for conventional data transmission is constantly changing depending on how much silence is [present]." *Id*. at col. 24: 1-7; *see also id*. at col. 28: 37-44. Thus, "silence detection" assists "in the time allocation between multiplexed data and voice in the [DOV] mode." *Id*. at col. 32: 66-68.

This multiplexing of voice data (V-data) and conventional data (C-data), or "V-data/C-data multiplexing," is accomplished in the main controller circuit 313. *Id*. 35: 3-5. The main controller circuit detects silence packets and voice packets sent from the DSP 306, and "only provide[s] non-silence V-data to the multiplex control level, while discarding silence V-data packets." *Id*. at col. 35: 20-31. The non-silence V-data packets are multiplexed with C-data packets (received through the RS232 serial interface 315 from the personal computer) for transmission through the same channel. *Id*. at col. 35: 32-35; *id*. at col. 12: 38-41.

During the multiplexing process, "[t]he V-data block has higher priority to be transmitted than C-data to ensure the integrity of the real-time voice transmission." *Id*. 35: 56-58. Thus, C-data packet transmission is terminated whenever more than one V-data packet is available to be sent. *Id*. 36: 4-11.

Multi-Tech stresses the scope of the definition of multiplexing must be broad under the doctrine of claim differentiation, in light of particular iterations of multiplexing identified in several non-asserted dependent claims: '470, claim 8, '649, claims 2, 3 and 4, and '532, claims 8, 12, 13 and 14. However, "that [dependent] claims are presumed to differ in scope does not mean that every limitation must be distinguished from its counterpart in another claim, but only that at least one limitation must differ." Kraft Foods, 203 F.3d at 1368. The dependent claims identified by Multi-Tech include additional limitations, therefore claim differentiation is inapplicable.

Multiplexing is defined by its use and function in the specification to be the combining of voice data (V-data) and conventional data (C-data) for transmission through the same channel by dynamically changing the time allocations for transmission of each type of data such that V-data has higher priority over C-data, and C-data is substituted for silence packets which are detected and discarded.

iv. Multiplexed Outgoing Digital Data

Multiplexed outgoing digital data is a stream of information outgoing from the local user's communication module containing both compressed outgoing digital voice data packets and outgoing computer digital data packets, combined in the manner described as "multiplexing" in the above section. This claim element appears as "multiplexed outgoing data" in '470, claim 1, element 1.f and '532, claim 1, element 1.f.

The proper interpretation of this claim element is: main controller circuit 313, which receives compressed outgoing digital voice data packets and outgoing computer digital data packets, from the compression means and personal computer respectively, for the combining of voice data (V-data) and conventional data (C-data) for transmission through the same channel by dynamically changing the time allocations for transmission of each type of data such that V-data has higher priority over C-data, and C-data is substituted for silence packets which are detected and discarded to produce multiplexed outgoing digital data, and which sends the multiplexed outgoing digital data to the telephone line interface means for digital transmission over the telephone line.

i. The Main Control Means Further For Receiving Multiplexed Incoming Digital Data from the Telephone Line Interface Means from the Telephone Line, the Multiplexed Incoming Digital Data Containing Incoming Computer Digital Data Packets, for Demultiplexing the Incoming Computer Digital Data Packets and the Compressed Incoming Digital Voice Packets, and for Sending the Incoming Computer Digital Data Packets to the Personal Computer Through the Communications Interface Means and for Sending the Compressed Incoming Digital Voice Data Packets to the Compression Means, each of the Incoming Computer Digital Packets Having Headers.

i. Main Control Means

Again, this expression requires interpretation under 35 U.S.C. s. 112, para. 6.

(1). The Function

The function of this claim element is to receive multiplexed incoming digital data containing incoming computer digital data packets multiplexed with compressed incoming digital voice data packets, and to demultiplex them for sending the incoming computer digital data packets to the personal computer and the compressed incoming digital voice data packets to the compression means, where each of the incoming computer digital data packets have headers.

(2). The Structure

The corresponding structure disclosed in the Patent specifications is the main controller circuit 313. '289, col. 8: 55. The disclosed preferred embodiment of the main controller circuit includes a microprocessor, specifically a Z80180 eight-bit microprocessor chip. '289, col. 9: 1-5; col, 16: 9-10.

ii. Multiplexed Incoming Digital Data

Multiplexed incoming digital data is a stream of packets from the remote user's communication module containing both "compressed incoming digital voice data packets" and "incoming computer digital data packets."

iii. Demultiplexing

This process is the reverse of multiplexing, whereby a combined stream of packets containing compressed incoming digital voice data packets and incoming computer digital data packets is separated into separate streams, one V-data and one C-data, where the compressed incoming digital voice data packets are sent to the compression means, and the incoming computer digital data packets are sent to the personal computer through the communications interface means.

iv. Compressed Incoming Digital Voice Data Packets

Compressed incoming digital voice data packets are the remote user's audio information in digital form and compressed to reduce the size of digital voice data.

v. Incoming Computer Digital Data Packets Having Headers

Incoming computer digital data packets are non-voice data packets from the remote user's computer, "for such things as text, file transfers, binary data and any other type of information presently being sent through modems." '289, col. 20: 29-33. The headers attached to the computer data packets identify the packet type and packet length. *Id*. at col. 20: 36-37.

The proper interpretation of this claim element is: main controller circuit 313, which receives through the telephone line and telephone line interface means multiplexed incoming digital voice data packets (V-data) and incoming computer digital data packets (C-data) transmitted through the same channel, separates the V-data and C-data into two separate streams, and sends the resulting compressed incoming digital voice packets to the compression means, and the incoming computer digital data packets, with headers identifying the packet type and packet length, to the personal computer through the communications interface means.

j. The Personal Computer Operable for executing Software to Communicate with the Communications Module Through the Communications Interface and Operable for Initiating a Telephone Call to a Remote Site in Response to the Commands by the Local User and for Causing the Main Control Means of the Communications Module to Perform Multiplexing and Demultiplexing

This claim element is a personal computer equipped with software for controlling the functions of the communications module, including communicating with the communications module through the communications interface, and operable for initiating a telephone call to a remote site in response to the commands by the local user and for causing the main control means of the communications module to perform multiplexing and demultiplexing. This claim element is to be interpreted consistently with the definitions of all the encompassed terms given above.

k. The Personal Computer Further Operable for Receiving and Storing the Incoming Computer Digital Data Packets Received from the Communications Module Over the Communications Interface and for Transmitting the Outgoing Computer Digital Data Packets to the Communications Module Over the Communications Interface

This claim element is to be interpreted consistently with the definitions of all the encompassed terms given above.

2. '470 Patent, **Claim 1 &** '532 Patent, **Claim 1**

These apparatus claims are to be interpreted consistently with the constructions of all the claim elements discussed above in the context of the '289 Patent, claim 1. Additional claim elements requiring construction are addressed below.

a. A Communication Module for Use with a Personal Computer, Comprising:

The parties agree this preamble is not a claim limitation.

b. A Voice Over Video Communications System for Use with a Personal Computer, Comprising:

Claim 1 of the '532 Patent discloses a "voice over video communications system" for use with a personal computer, therefore it describes a narrower invention than the '289 Patent, claim 1.

c. Digital Signal Processor Means

This claim element appears in '470, claim 1, elements 1.e & 1.g, and '532, claim 1, elements 1.e & 1.g in place of the element "compression means" used in the '289 Patent, claim 1. Multi-Tech argues that the digital signal processor means has the same meaning as compression means, while Microsoft argues for a narrower definition. Multi-Tech Br. at 54. The parties agree that this element is not in means-plus-function format and is interpreted under the ordinary rules of claim construction.

The digital signal processor means is a component of the communication module. "The general rule is that terms in the claim are to be given their ordinary and accustomed meaning" unless there is "a different meaning clearly and deliberately set forth in the intrinsic materials" or "the ordinary and accustomed meaning of a disputed term would deprive the claim of clarity." K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1362-63 (Fed.Cir.1999). A digital signal processor, or DSP, is an "integrated circuit designed for high-speed data manipulations, used in audio, communications, image manipulation, and other data-acquisition and data-control applications." Lewis Decl. Ex. 6 (Microsoft Press Computer Dictionary 107 (1991)). The intrinsic materials set forth no alternative meaning for this claim element, nor does the ordinary meaning of DSP deprive the claim of clarity.

d. Outgoing/Incoming Video Data Packets

This claim element appears in '532, claim 1, elements 1.f & 1.g. Video data packets are non-voice data from either the local user's (outgoing) or remote user's (incoming) computer.

3. '627 Patent Claims 1, 2 & 5

These apparatus claims are to be interpreted consistently with the definitions of all the relevant claim elements construed above in the context of the above claims. Additional claim elements requiring construction are addressed below.

a. A Communication System, Comprising:

Claim 1 of the '627 Patent references a "communication system," comprised of four components, construed below.

b. A Hands-Free Speaker Phone Operable For Receiving Local Analog Voice Signals With A Microphone And For Playing Remote Analog Voice Signals Through A Speaker

i. Hands-Free Speaker Phone

This element is a hardware arrangement integrated into the patented system which is a "sophisticated telephone apparatus with its attached handset, headset and a built-in hands-free telephone operation using the integrated microphone and speaker system." '289, col. 2: 58-61. This construction is consistent with the common meaning of "speakerphone," which is "a telephone which has a speaker and microphone for hands-free, two-way conversation." Lewis Decl. Ex. 27 (Newton's Telecom Dictionary 832 (1992)). This limitation to a "speaker phone" appears only in the '627 Patent, therefore the construction here does not apply to the other claims at issue.

ii. Receiving/Playing Local/Remote Analog Voice Signals

Local analog voice signals are audio received from the local user, while remote analog voice signals are audio signals received from the remote user.

c. Codec Means Connected To The Hands-free Speaker Phone For Digitizing The Local Analog Voice Signals To Produce Local Digital Voice Signals And For Decoding Remote Digital Voice Signals To Produce The Remote Analog Voice Signals

i. Codec Means

The parties agree that this element is not a means-plus-function claim. Codec here means "coder/decoder" (as opposed to compressor/decompressor). The codec converts analog voice signals into digitized signals, and vice-versa. '289, col. 26: 30-33. This is accomplished by the digital telephone CODEC circuit 305. Id. The '627 Patent does not designate the codec means as a component of a communication module separate from a computer (as was the full-duplex conversion means element in the '289 Patent). Therefore, this element is not required to be separate from the computer for the same reason that the full-duplex conversion means comprises the communication module. However, the claim language states that the codec means must be "connected to" the speaker phone, which is a hardware element.

d. Means For Placing The Local Digital Voice Signals Into Outgoing Packets Having Headers And For Removing The Remote Digital Voice Signals From Incoming Packets Having Headers

i. Means For Placing

The parties agree that this element is a means-plus-function claim construed under s. 112, para. 6.

(1) The Function

The function of this claim element is to place local digital voice signals into outgoing packets having headers, and to remove the remote digital voice signals from incoming packets having headers.

(2) The Structure

The parties agree the corresponding structure disclosed in the Patent specification is a digital signal processor or microprocessor. Microsoft Br. at 52; Multi-Tech Reply Br. at 23. The Patent identifies this as the "digital signal processor (DSP) of the voice control circuit 306," which is "programmed to do the voice compression algorithm." '289, col. 23: 31-33. Under s. 112, para. 6 this structure is construed to cover equivalents. The claim language of '627, claim 1, does not contain language requiring that the "means for placing" be separate from the personal computer.

The DSP of the voice control circuit 306 is programmed to do the voice compression algorithm; it compresses the speech and places the compressed digital representations of the speech into special packets. Id. at col. 23: 30-38. "In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." WMS Gaming, Inc. v. Int'l Gaming Tech., 184 F.3d 1339, 1349 (Fed.Cir.1999). Therefore, the corresponding structure DSP includes the programmed algorithm. The specification identifies the algorithm as "a unique Vector Quantization (VQ) speech compression algorithm." '289, col. 24: 30-32.

As discussed above, a packet is a unit of information transmitted as a whole from one device to another, and a header is an information structure that precedes and identifies the information that follows, such as a packet. The headers as used by voice control circuit 306 identify V-data containing silent sound or speech information. *Id*. at col. 34: 68-35: 2.

The proper interpretation of this claim is: the digital signal processor of voice control circuit 306, using the VQ algorithm, which places local digital voice signals into outgoing packets having headers identifying V-data as containing silent sound or speech information, and removes the remote digital voice signals from incoming packets having headers.

e. A Modem Connected To A Telephone Line For Receiving The Incoming Packets From A Remote Site And For Sending The Outgoing Packets To The Remote Site In Full Duplex Communication Mode

This element is met by a modem connected to a telephone line. A telephone line means a standard telephone line. A modem is a communications device that enables a computer to transmit information over a standard telephone line. Multi-Tech Br.App. I, Ex. 19 (Microsoft Computer Dictionary 4th Ed. 294 (1999)). The modem receives incoming packets and sends outgoing packets over the telephone line with simultaneous bi-directional transmission.

f. '627 Patent **Dependent Claims 2 & 5**

'627, claim 2, describes the communication system of '627, claim 1, with a "deskset microphone" and a "deskset speaker." These elements denote a microphone and speaker which are intended to sit on a desk. '627, claim 5, describes the communication system of '627, claim 1, with a "headset microphone" and a "headset speaker ." These elements denote a microphone and speaker which are intended to be worn on the user's head.

C. Disputed Method Claims

The remaining method claims are to be interpreted consistently with the definitions of all the claim elements

construed above in the context of the above claims. Additional disputed claim elements not previously addressed requiring construction are addressed below.

1. '627 Patent, **Claim 7**

a. A Method Of Operating A Full-Duplex Speaker Phone, Comprising the Steps of:

i. Full-Duplex Speaker Phone

This claim element appears in the preambles of independent method claims 7 & 13 of the '627 Patent. Multi-Tech argues these preambles are claim limitations that limit claims 7 & 13 of the '627 Patent to full-duplex speaker phones. "If the claim preamble, when read in the context of the entire claim, recites limitations of the claim, or, if the claim preamble is 'necessary to give life, meaning, and vitality' to the claim, then the claim preamble should be construed as if in the balance of the claim." Pitney Bowes, 182 F.3d at 1305 (citation omitted). If such is the case, "there is no meaningful distinction to be drawn between the claim preamble and the rest of the claim." *Id*. Here, the reference to a method of operating a speaker phone, comprising the specified steps, does not merely describe the purpose or intended use of the invention, but rather offers a definition of the claimed inventions limitations. *See id*. Therefore, the preamble language functions to limit claims 7 & 13 of the '627 Patent to "full-duplex [hands-free] speaker phone" operation.

Full-duplex here modifies the type of speaker phone referenced. Therefore, a full-duplex speaker phone is a telephone with a speaker that allows two people to talk at the same time, as opposed to only one person at a time, such as an intercom, ham radio, CB radio or walkie-talkie. "The hands-free telephone works in full duplex mode through the use of voice echo cancellation performed by the voice control DSP," using an "integrated microphone and speaker system." '289, col. 2: 58-63.

b. Receiving Local Analog Voice Signals At A Local Site

This step comprises receiving analog signals representing the audio received from the local user who is "talking either through the handset, the headset or the microphone/speaker telephone interface." Id. at col. 23: 25-27; id. at col. 32: 36-38 ("the speech or analog voice signal is received through the telephone interface 301, 302 or 303"). The "handset" is not covered by the '627 Patent, however. Multi-Tech Br. at 27.

c. Digitizing The Local Analog Voice Signals To Produce Local Digital Voice Signals

Digitizing is converting analog voice signals into digital signals. This is the same as "converting the local voice signals into outgoing digital voice data." '627, claim 13, element 13.c; '470, claim 1, element 1.c; '532, claim 11, element 11.c. The "analog voice signal is ... digitized by the digital telephone CODEC circuit 305 in an analog to digital conversion." '289, col. 32: 36-39.

d. Placing The Local Digital Voice Signals Into Outgoing Packets Having Headers

This step is segmenting the local digital voice signals into outgoing packets which have headers identifying the packet as containing silent sound or speech information. '289, col. 34: 68-35: 2.

e. Sending The Outgoing Packets To A Remote Site Over A Telephone Line Using A Modem

As discussed above, this step requires using a direct point-to-point telephone line connection.

f. Receiving Incoming Packets Through The Modem From A Remote Site

This step requires use of a modem to receive the incoming packets from the remote user's site.

g. Removing Remote Digital Voice Signals From The Incoming Packets

This step depacketizes incoming packets into remote digital voice signals representing the audio received from the remote user.

h. Decoding The Remote Digital Voice Signals To Produce Remote Analog Voice Signals

This step converts the voice signals received from the remote site from digital format to analog format. '289, col. 9: 52-53.

i. Playing The Remote Analog Voice Signals At The Local Site

This step is met when a speaker, handset (except for the '627 Patent) or headset plays a voice signal. '289, col. 3: 13-15.

2. '627 Patent, **Claim 13**

This claim is to be interpreted consistently with the definitions of all the claim elements construed above in the context of the above claims. Additional disputed claim elements not previously addressed requiring construction are addressed below.

a. A Method Of Performing Full-Duplex Hands-Free Speaker Phone Operation, comprising the steps of:

The meaning of "Full-Duplex Hands-Free Speaker Phone" here is the same as for "Full-Duplex Speaker Phone" in '627, claim 7, and for the same reasons it also functions as a claim limitation.

b. Compressing The Outgoing Digital Voice Data Into Compressed Outgoing Digital Voice Data

Compressing is using a compression algorithm to reduce the size of digital voice data into a stream of compressed data called compressed outgoing digital voice data. Nothing in the language of this claim or its form requires the use of a particular compression algorithm, unlike the means-plus-function claim element "compression means" in '289, claim 1. "The hardware components ... include circuitry to ... compress [digital voice] data for transfer ." '289, col. 2: 46-49.

c. Decompressing Compressed Incoming Digital Voice Data Into The Incoming Digital Voice Data

Decompressing is using an algorithm to restore compressed digital voice data to its original form of "digital voice data." '289, col. 27: 36-39.

d. Packetizing The Compressed Outgoing Digital Voice Data Into Compressed Outgoing Digital Voice Data Packets

Packetizing is segmenting the compressed outgoing digital voice data into compressed outgoing digital voice data packets. Depacketizing is removing the compressed incoming digital voice data from the compressed incoming digital voice data packets and converting them back into a stream of data.

e. Placing Headers On Each Of The Compressed Outgoing Digital Voice Packets

For the reasons discussed above, the headers attached to digital voice packets, or V-data, must identify the packet as containing silent sound or speech information. '289, col. 34: 68-35: 2.

f. Transmitting The Compressed Outgoing Digital Voice Packets On A Communication Line Using A Modem

For the reasons discussed above, "transmitting on a communication line using a modem" requires use of a standard telephone line from end-to-end.

3. '649 Patent, Claim 1

This claim is to be interpreted consistently with the definitions of all the claim elements construed above. Additional disputed claim elements not previously addressed requiring construction are addressed below.

a. A Method For Communication Of Voice And Data Information, Comprising The Steps Of:

The parties agree this preamble is not a claim limitation.

b. Placing Headers On Each Of The Compressed Outgoing Digital Voice Packets

For the reasons discussed above, the headers attached to digital voice packets, or V-data, must identify the packet as containing silent sound or speech information. '289, col. 34: 68-35: 2.

c. Placing Headers On Each Of The Computer Digital Data Packets

For the reasons discussed above, the headers attached to computer digital data packets identify the packet type and packet length. Id. at col. 20: 36-37.

d. Multiplexing The Compressed Outgoing Digital Voice Data Packets With Outgoing Computer Digital Data Packets To Produce An Outgoing Packet Stream

For the reasons discussed above, Multiplexing is defined by its use and function in the specification to be the combining of voice data (V-data) and conventional data (C-data) for transmission through the same channel by dynamically changing the time allocations for transmission of each type of data such that V-data has higher priority over C-data, and C-data is substituted for silence packets which are detected and discarded. Demultiplexing is separating the incoming computer digital data packets and the compressed incoming digital voice data packers into separate packet streams. Computer Digital Data Packets are segments of non-voice data from the local user's computer.

e. Transmitting The Outgoing Packet Stream

This claim is met when the outgoing packet stream is transmitted over a telephone line to a remote site.

4. '532 Patent, **Claim 11**

This claim is to be interpreted consistently with the definitions of all the claim elements construed above in the context of the above claims. Additional disputed claim elements not previously addressed requiring construction are addressed below.

a. A Method For Full Duplex Transmission Of Voice And Video Data Information, Comprising The Steps Of:

This preamble is a claim limitation limiting this element to full duplex transmission of voice and video data.

b. Multiplexing The Compressed Outgoing Digital Voice Data Packets With Outgoing Video Data Packets To Produce An Outgoing Packet Stream

i. Video Data Packets

Video Data Packets are segments of video (non-voice) data from the local user's (outgoing) or remote user's (incoming) computer.

IV. CONCLUSION

Based on the foregoing, and all the files, records and proceedings herein, IT IS HEREBY ORDERED that the claim constructions of the '289, '470, '649, '627, and '532 Patents are construed as set forth in this Order.

D.Minn.,2002.
Microsoft Corp. v. Multi-Tech Systems, Inc.

Produced by Sans Paper, LLC.