United States District Court,
E.D. California.

INTEL CORPORATION,
Plaintiff.
v.
ALTIMA COMMUNICATIONS INC,
Defendant.

No. CV S-99-2488 GEB/GGH

May 20, 2003.

Patent holder brought infringement action against competitor over patent on repeater management technology. In *Markman* proceeding, the District Court, Burrell, J., held that: (1) claim preamble was essential to understand limitations or terms in claim body, limiting scope of claim; (2) presumption that "repeater management means" element was written in means plus function form was not rebutted; (3) use of words "means for" triggered presumption that "bridging support means" element was written in means plus function format; (4) media access controller (MAC) managed access to repeater data interface using media access management algorithms set forth in particular Institute for Electrical and Electronic Engineers (IEEE) standard; (5) repeater management means controlled bridging support means; (6) repeater management means included at least two registers for storing attributes relating to repeater functions; and (7) repeater data interface included inter-repeater backplane.

Claims construed.

5,742,603. Construed.

Richard Pachter, Stevens and O'Connell, Sacramento, CA, Brian R Nester, Fish and Richardson PC, Washington, DC, for Plaintiff.

Dale A Stern, Kahn Soares and Conway, Sacramento, CA, James Francis Curran, Matheny Sears Linkert and Long, Sacramento, CA, Scott R Mosko, Finnegan Henderson Farabow Garrett and Dunner, Palo Alto, CA, E Patrick Ellisen, Oppenheimer Wolff and Donnelly, Palo Alto, CA, Wayne Lee Ordos, Kahn Soares and Conway, Sacramento, CA, for Defendant.

Markman Patent Claim Construction Order

BURRELL**, District Judge.**

On March 24, 25 and 26, 2003, a hearing was held under Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), during which expert witness testimony was admitted on the

repeater management technology involved in United States Patent 5,742,603 (" '603 patent"). This order construes the claims of the '603 patent. FN1

FN1. An order concerning the *Markman* hearing stated that the allowed "witness testimony [was] that perceived to meet 'the objective test of what one of ordinary skill in the art at the time of the invention would have understood [the '603 patent claim terms] to mean,' and [which] would assist the judge in understanding the technology of the invention." (Order filed February 24, 2003, citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 986 (Fed.Cir.1995).

Background and Procedural History

Level One Communications, Inc. ("Level One") filed suit against Altima Communications, Inc. ("Altima") for patent infringement of the '603 patent on December 17, 1999. On May 8, 2000, Altima's motion under 28 U.S.C. s. 1659 was granted which stayed the action because of a proceeding before the United States International Trade Commission ("ITC"). The stay was dissolved on February 12, 2002. On November 27, 2002, a motion was granted substituting Intel Corporation ("Intel") as plaintiff in place of Level One.

Technology Background

The invention in the '603 patent "relates in general to [a] repeater management device, and in particular, to a method and apparatus for integrating repeater management, media access control, and bridging support functions into a single device." ('603 patent at col. 1:9-12.) The technology field involves data communications and resource sharing among computers within a network.

Computers may be connected to each other in various ways, one of which is Ethernet. Ethernet allows computers to communicate with each other through cables. The Institute for Electrical and Electronic Engineers ("IEEE") defines Ethernet in IEEE Standard 802.3.

"[T]o propagate data signals along lengthy networks, repeaters are used to amplify and to recondition the signals along the network." ('603 patent at col. 2:5-7.) An Ethernet repeater, which is defined in the IEEE 802.3 specification, receives data in the form of packets or frames on one port and re-transmits it to all other ports, without regard to the destination address. The repeater "has no notion of address, it has no notion of what the content is in the messages it's transmitting, so it just passes the messages automatically on to the other computers when it receives them." (Testimony of Dr. Mick from Reporter's Transcript of *Markman* Hearing ("RT") vol. I at 13.) Repeaters can be "managed" by a person watching over the network's operation. A network administrator may change the configuration or operation of a repeater in response to network conditions.

"An Ethernet bridge is a device with two or more physical ports that is capable of forwarding a packet received on any port to any other single port based on the destination address of the packet. A packet that is not forwarded to a port is considered filtered." ('603 patent at col. 1:52-56.)

"A Media Access Control (MAC) function converts digital information, typically stored in memory in the form of a packet, into an actual Ethernet frame which can be transmitted on an Ethernet connection, or a frame received from the network connection which is stored in memory as a packet." (Id. at col. 1:57-62.) The IEEE 802.3 specification defines an Ethernet MAC. (Id. at col. 1:45-48.)

Legal Standard

[1] The parties present conflicting interpretations of disputed terms in the patent. Claim construction is a matter of law that is "exclusively within the province of the court." Markman, 517 U.S. at 372, 116 S.Ct. 1384.

The "analytical focus must begin with and remain centered on the language of the claim[ ] [itself]." Storage Tech. Corp. v. Cisco Sys., Inc., 329 F.3d 823, 830 (Fed.Cir.2003). "[I]n interpreting an asserted claim, the court should look first to the intrinsic evidence of record, i.e., the patent itself, including the claims, the specification and, if in evidence, the prosecution history. Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). FN2 The claim construction process is begun "by considering the words of the claim itself," Optical Disc Corp. v. Del Mar Avionics, 208 F.3d 1324, 1334 (Fed.Cir.2000), "both asserted and nonasserted, to define the scope of the patented invention." Vitronics, 90 F.3d at 1582. "Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history." *Id*.

FN2. The prosecution history "contains the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims." *Id*.

"Thus, ... it is always necessary to review the specification to determine whether the inventor ... used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." *Id*. "[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id*.

"If the meaning of the claim limitations is apparent from the totality of the intrinsic evidence, then the claim has been construed. If however a claim limitation is still not clear, [the court] may look to extrinsic evidence to help resolve the lack of clarity." Interactive Gift Exp., Inc. v. Compuserve Inc., 256 F.3d 1323, 1332 (Fed.Cir.2001). Extrinsic evidence is "all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." Markman, 52 F.3d at 980. "Relying on extrinsic evidence to construe a claim is 'proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence.' " Interactive Gift Exp., Inc., 256 F.3d at 1332 (quoting Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys., 132 F.3d 701, 706 (Fed.Cir.1997)). "Extrinsic evidence may always be consulted, however, to assist in understanding the underlying technology." *Id*. "But extrinsic evidence may never be used 'for the purpose of varying or contradicting the terms in the claims.' " *Id*. (quoting Markman, 52 F.3d at 981).

"Throughout the construction process, ... the viewing glass through which the claims are construed is that of a person skilled in the art," *id.,* "unless 'it appears from the patent and the prosecution history that the inventor used [a] term with a different meaning.' " Phillips Petroleum Co. v. Huntsman Polymers Corp., 157 F.3d 866, 871 (Fed.Cir.1998) (citation omitted). One of the inventors, Mr. Mark Feuerstraeter, testified at the *Markman* hearing that all terms in the patent were given the ordinary meaning those skilled in the art would understand at the time the patent was filed. (RT vol. I at 182.)

Conflicting testimony was given at the *Markman* hearing as to what those skilled in the art opined certain patent terms meant. Given the dispute "by those skilled in the art at the time the application was filed, we turn to the written description and prosecution history for clarification as to the patentee's intended meaning." *Id*. "But a dispute over the ordinary and accustomed meaning does not imply that such a meaning does not exist.... [C]laim construction is not philosophy; we need not wring our hands when considering the implications of a metaphysical analysis of claim terms. Instead, we need only recognize that claim construction is firmly anchored in reality by the understanding of those of ordinary skill in the art." K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1365 (Fed.Cir.1999). Even where a "[o]nce ... disputed claim term is identified by the parties and its plain meaning to the ordinarily skilled artisan is ascertained by the court, the next step is to examine the written description and the drawings to confirm that the patentee's use of the disputed terms is consistent with the meaning given to it by the court." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir.2001).

The specification must enable a hypothetical person having ordinary skill in the art to make and use the invention, and so is typically drafted in some sense as an interpretive guide in reading the claims....

[T]he claims themselves ... delimit the right of the inventor to exclude others from practicing the invention. [Therefore], neither the specification nor the [prosecution history] may be used to enlarge, diminish, or vary the terms of the claims.

MediaCom Corp. v. Rates Tech., Inc., 4 F.Supp.2d 17, 25-26 (D.Mass.1998) (citations omitted).

Discussion

[2] The '603 patent contains ten claims. The parties vigorously dispute how Claim 1 should be construed. The parties take different positions on the construction of the remaining claims but some of those differences are minor.

I. Claim 1:

Claim 1 reads:
A repeater management device for communication networks, the repeater management device controlling repeaters and routing data packets between a receiving port and a destination port, comprising:

repeater management means for controlling and monitoring repeater functions related to the retransmission of the data packets and for providing status of and control over repeater functions via an external repeater management interface;

bridging support means, coupled to the repeater management means, for receiving data packets on the receiving port and for forwarding the received data packets to the destination port in accordance with a destination address; and

media access controller, coupled to the repeater management means, for providing signal framing of the data packets and for controlling access to a repeater data interface.

A. Preamble: "A repeater management device for communication networks, the repeater management device controlling repeaters and routing data packets between a receiving port and a destination port,

comprising;"

[3] The parties agree that the preamble of Claim 1 should be construed as a claim limitation because it is essential to understand the invention and the claimed elements. "No litmus test defines when a preamble limits the claim scope." Catalina Mktg. Int'l Inc. v. Coolsavings.com Inc., 289 F.3d 801, 808 (Fed.Cir.2002). "Whether to treat a preamble as a claim limitation is determined on the facts of each case in light of the claim as a whole and the invention described in the patent." Storage Tech. Corp., 329 F.3d at 831.

[4] [5] "In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality to the claim.' " FN3 Catalina Mktg. Int'l Inc., 289 F.3d at 808 (citation omitted). "[T]hus, [it must be] determine[d] whether the preamble breathes life and meaning into the claim, and is incorporated by reference because of language appearing later in the claim, making it a limitation of the claim." General Elec. Co. v. Nintendo Co., Ltd., 179 F.3d 1350, 1361 (Fed.Cir.1999).

FN3. "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.' " Catalina Mktg. Int'l Inc., 289 F.3d at 808 (citation omitted).

The words in the preamble, "A repeater management device" recite essential structure by requiring the inclusion of repeater management, bridging support and media access controller functions in a single device. These words in conjunction with the term "comprising" evince that the inventors relied on the preamble phrase to breathe life into the claim. "[T]he word 'comprising' is an open transition phrase," which means that the claim's "scope may cover [a] device[ ] that employ[s] additional, unrecited elements." AFG Indus., Inc. v. Cardinal IG Co., 239 F.3d 1239, 1244 (Fed.Cir.2001). Since the preamble to claim 1 is "essential to understand limitations or terms in the claim body," it limits the scope of the claim. *Id*.

The preamble describes a repeater management device ("RMD") as a single device that controls more than one repeater and routes data packets between a receiving port and a destination port. The patent's "summary of the invention" states "the present invention discloses a system which combines the functions of repeater management, ethernet MAC, and network bridging support into a single device." ('603 patent at col. 2:31-33.) Intel argues that "device" should be interpreted to mean "a chip or a circuit board." (Level One Proposed Claim Construction para. 1.) However, no particular physical manifestation is articulated in the claim or the specification; therefore, the term "device" is not limited to these physical manifestations.

B. Claim Element One: "Repeater management means for controlling and monitoring repeater functions related to the retransmission of the data packets and for providing status of and control over repeater functions via an external repeater management interface;"

[6] [7] [8] The parties dispute whether "repeater management means" is written in means-plus-function form. Title 35, section 112, paragraph 6 of the United States Code provides: "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.

Such limitations are generally known as "means-plus-function" or "step-plus-function" limitations. Through use of means-plus-function limitations, patent applicants are allowed to claim an element of a combination functionally, without reciting structures for performing those functions.

It is well settled that "[a] claim limitation that actually uses the word 'means' invokes a rebuttable presumption that s. 112, para. 6 applies...."

[W]hen a claim uses the term "means," the focus is on whether the claim term recites no function corresponding to the means or recites sufficient structure or material for performing that function.

"To help determine whether a claim term recites sufficient structure, we examine whether it has an understood meaning in the art." As an aid in making this determination, this court inquires into whether the "term, as the name for the structure, has a reasonably well understood meaning in the art," keeping in mind that a claim term "need not call to mind a single well-defined structure" to fall within the ambit of s. 112, para. 6.

Apex Inc. v. Raritan Computer, Inc., 325 F.3d 1364, 1371-72 (Fed.Cir.2003) (citations omitted).

This presumption is especially strong if the phrase "means for" is used. *Al-* Site Corp. v. VSI Int'l, Inc., 174 F.3d 1308, 1318 (Fed.Cir.1999). Since the claim element states "Repeater management *means for* controlling and monitoring ...and *for* providing status of and control over ...," the element is presumed to be written in means-plus-function form. (Emphasis added.)

[9] This presumption may be rebutted in two ways. It collapses if the claim recites sufficient structure or material for performing the claimed function. *Id.* "[And], even if a claim element does not, on its face, recite definite structure, it may still call to mind definite structure to one skilled in the art and therefore avoid falling under s. 112, para. 6." Rackman v. Microsoft Corp., 102 F.Supp.2d 113, 124 (E.D.N.Y.2000). Further the presumption is rebutted if the claim fails to recite any corresponding function. Id. at 119. Since claim 1 recites corresponding function, only the first method of rebutting the presumption is relevant.

Although the "external repeater management interface" is structure that corresponds to the listed repeater management functions, this alone is "[in]sufficient structure ... for performing the claimed function[s]." *Al-* Site Corp., 174 F.3d at 1318. Therefore, the presumption is not rebutted.

Intel argues it is rebutted because "repeater management" is a known, structural element, the particulars of which were specified in IEEE Standard 802.3u, clause 30.FN4 (Level One Opp'n to Altima's Opening Claim Construction ("Level One Opp'n") at 8.) However, Intel acknowledges that the IEEE considers the referenced standard to be "behavioral" in contrast to "structural." (*Id.* at 9.) Altima's expert witness Mr. Frazier explained that IEEE standards "do not define implementation, they describe required behavior and functions." (RT vol. II at 350.) Likewise, IEEE Standard 802.3 provides, "The managed objects within this standard are defined in terms of behavior, attributes, actions, notifications, and packages in accordance with IEEE 802.1 and ISO standards for network management .... This specification is defined to be independent of any management application or management protocol." IEEE Standard 802.3, clause 30.1.1. Since the presumption has not been rebutted, s. 112, para. 6 applies to the "repeater management means" element.

FN4. IEEE Standard 802.3u is a supplement to IEEE Standard 802.3 that was "approved in June 1995 and was published shortly thereafter;" the patent incorporates IEEE Standard 802.3 by reference. (RT vol. I at 29-30; *see* '603 patent at col. 1:45-48.) IEEE Standard 802.3u was available to individuals skilled in the art at the time the patent was filed.

"Once a court establishes that a means-plus function limitation is at issue, it must construe that limitation, thereby determining what the claimed function is and what structures disclosed in the written description correspond to the 'means' for performing that function." Kemco Sales, Inc. v. Control Papers Co., 208 F.3d 1352, 1360 (Fed.Cir.2000). "Precise claim construction is vital because excessive generality can lead to encompassing too much within the patent's folds and a grant to the inventor of more than rights over his own invention." Rackman, 102 F.Supp.2d at 119-20 (citations and quotations omitted).

[10] "The first step is a determination of the function of the means-plus-function limitation." Globetrotter Software, Inc. v. Elan Computer Group, Inc., 236 F.3d 1363, 1368 (Fed.Cir.2001) (citations omitted). Two functions are recited in this element of claim 1:(1) controlling and monitoring repeater functions related to the retransmission of data packets, and (2) providing status of and control over repeater functions via an external repeater management interface. These functions are similarly described in IEEE Standard 802.3 as follows:

There are two distinct aspects of Repeater Management.

The first aspect provides the means to monitor and control the functions of a repeater. These functions include, but are not limited to: identifying a repeater, testing and initializing a repeater, and enabling/disabling a port. This is encompassed by the mandatory Basic Control Capability.

The second aspect provides the means to monitor traffic from attached segments, and to measure traffic sourced by DTEs connected to these segments. This is done by gathering statistics on packets that enter a repeater and maintaining those statistics on a per port basis. This is encompassed by the optional Performance Monitor Capability.

IEEE Std. 802.3, clause 30.2.5. Because the specification incorporates by reference the IEEE 802.3 Standard, the functions articulated in the mandatory Basic Control Capability must be performed in order to satisfy the relevant IEEE 802.3 Standard for repeater management.FN5 ('603 patent at col. 1:45-48.)

FN5. "Incorporation by reference provides a method for integrating material from various documents into a host document-a patent or printed publication in an anticipation determination-by citing such material in a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein. To incorporate material by reference, the host document must identify with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents.... Further, the standard of one reasonably skilled in the art should be used to determine whether the host document describes the material to be incorporated by reference with sufficient particularity." Advanced Display Sys., Inc. v. Kent State Univ., 212 F.3d 1272, 1282-83 (Fed.Cir.2000) (citations omitted).

The second step in determining the means-plus-function limitation identifies the structure corresponding to the recited function. Rackman, 102 F.Supp.2d at 125. "A structure in the specification will only be deemed a 'corresponding structure' 'if the specification clearly links or associates that structure to the function recited in the claim.' " Id. at 125 (citations omitted). "The duty to link or associate structure in the specification to the recited function is the quid pro quo for the convenience of employing s. 112, paragraph 6." Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1208-09 (Fed.Cir.2002).

1. Structure corresponding to the function: "controlling and monitoring repeater functions related to the retransmission of data packets"

A "repeater data interface" provides structure corresponding to the repeater management means functions. To one skilled in the art, an interface is the location at which information passes from one physical/operational/systemic domain to another. (Witness Statement of Nicholas Bambos at 7.) An interface is on the boundary between two or more distinct systems or domains. (*Id*.) The repeater data interface corresponds to repeater data interface 116 in Figure 1 and LXT914 Inter Repeater Bus (Data Interface) 210 in Figure 2. The RMD connects to repeaters and transfers data to and from repeaters through the repeater data interface. The specification explains, "A MAC function 112 receives data packets from the inter repeater backplane 116 (also known as a repeater data interface)." ('603 patent at col. 3:40-42.) The prosecution history supports this construction by explaining, "Note that the Applicants' invention is an external management device for a repeater via the repeater data interface, e.g., a inter-repeater backplane, rather than a repeater having some additional management functionality added thereon." (Mosko Decl. Ex. 5 at 7.) At the hearing, Mr. Feuerstraeter, one of the inventors, acknowledged that repeater data interface 210 in Figure 2 "could connect to a repeater." (RT vol. I at 167.)

The specification explains, "A repeater data interface is used by the management and tracking function as well as with the MAC, DMA controller, and FIFOs for snooping the inter repeater bus." FN6 ('603 patent at col. 4:24-28.) "Snooping" means "to observe packets on the network." (RT vol. II at 285.) Altima argues this monitoring is accomplished by an Ethernet Management Information Base ("MIB") which is a collection of registers and counters that identify and classify Ethernet messages. (Altima's Opening Claim Construction Br. at 16.) The specification states "MIB and RMON counters 220 are provided per port for tracking repeater port status." FN7 ('603 patent at col. 4:38-39.) Altima's expert Mr. Frazier explained at the hearing,

FN6. FIFO means "First In First Out." (Decl. of Frazier at 26.) DMA means direct memory access.

FN7. RMON means "remote monitoring." (Decl. of Frazier at 9.)

[T]he MIB and RMON counters, for instance, are counters associated with monitoring repeater functions related to the retransmission of data packets.... To get at the data packets and monitor the data packets-- and RMON means remote monitoring. In order to monitor the data packets, you've got to be connected to the data interface. And the RMON counters are connected to the data interface via the management and address tracking, it goes through the management address tracking and then to the data interface.
(RT vol. II at 356.)
A central processing unit ("CPU") interface provides access to the MIB and RMON counters. As stated in the specification, "The port status and control 204, DMA controller 214 and the MIB and RMON counters have access to the CPU interface 222." ('603 patent at col. 4:29-31.) These structures correspond to the recited function and are illustrated in Figure 2 as repeater data interface 210, MIB and RMON counters 220, and CPU interface 222, and the structures connecting these elements.

2. Structure corresponding to the function: "providing status of and control over repeater functions via an external repeater management interface"

[11] Structure corresponding to the function in this aspect of the claim element includes an "external

repeater management interface." Intel argues this is "an interface used for repeater monitoring and control that is separate from the data channel." (Level One's Proposed Claim Construction at 2.) Intel contends "external repeater management interface" requires that the RMD manage repeaters only through "out-of-band" communication, which refers to conveying management information other than by using Ethernet data packets and data channels. (Level One's Opening *Markman* Br. at 26.) But the intrinsic evidence does not support this construction; neither claim 1 nor the patent specification teaches that the RMD manages repeaters only through "out-of-band" communication. The only reference to "out-of-band" in the patent is in the "Background of the Invention" section, where it is explained: "A secondary out-of-band port that is not part of the repeater domain is *desirable* for management of traffic because it does not utilize any bandwidth from the repeater domain." ('603 patent at col. 2:14-17 (emphasis added).)

Intel suggests the patentees used the term "external" to mean something other than its ordinary usage. But this is not supported by the specification. The word "external" is used in at least four other places in the specification connoting its ordinary meaning. First, the specification explains, "A bridge port 104 is provided which is external to the device." ('603 patent at col. 3:59-60.) Figure 1, which corresponds to this particular description, shows bridge port 104 outside or on the exterior of a box encompassing management function, bridge function and MAC function. Second, the specification states, "Either condition [, a transmit FIFO underflow or a receive FIFO overflow,] requires an external device to re-initialize the rings and re-start the operation." (Id. at col. 6:22-25.) When Intel's expert Dr. Mick was asked whether this language was "referring to a device outside of the repeater management device," he responded, "In their description it's saying it's an external device." (RT vol. I at 67.) Third, the specification discloses, "The system directly provides two compatible modes of bus operation, with either 16-bit or 32-bit bus width. These modes are selected using external pins." ('603 patent at col. 6:46-49.) At the hearing Dr. Mick was asked, "Those are pins or connectors that extend outside of the device, is that true?" Dr. Mick responded, "Pins that would pass to external, I think." (RT vol. I at 68.) Fourth, the specification states, "Preferably the IRB [, Inter Repeater Backplane,] interface runs in a synchronous mode (i.e. 10 and 20 MHz supplied by external clock drivers and not by the repeaters." ('603 patent at col. 6:52-54.) Dr. Mick explained, this "text indicates that the clocks that are being used within the inter-repeater backplane are being driven by a clock that is external." (RT vol. I at 68.) Since nothing in the specification indicates that the patentees were using the word external to mean anything other than its ordinary meaning, use of the term "external" does not mean "out-of-band."

Intel also argues the repeater management interface "is 'external' in the sense that it allows external access by a user (e.g., via a CPU)...." (Level One's Proposed Claim Construction at 2.) At the *Markman* hearing Intel's counsel argued, "We believe, and believe that the record proves, that this path from access port 102 [in Figure 1] down through the management function 108, to the repeater management interface 114, this whole thing is the external repeater management interface.... It is external to the system administrator who controls all of this." (RT vol. III at 527.)

External access by a user (e.g. via a CPU) is discussed in the specification as accomplished through access port 102:

The repeater management function 108 maintains attributes relating to Ethernet repeater functions as defined in any commonly accepted industry standard and provides accessibility to these attributes. The management function provides access to these functions through an access port 102. The current status of all monitored repeater function are maintained in the internal registers at all times. These registers may be accessed at will through the access port 102.

('603 patent at col. 3:29-39.) Figure 1 illustrates that the "repeater management interface 114" is different from "access port 102." An access port is specifically claimed in claim 2.

Furthermore, Intel's explanation that the term "external" means the repeater management interface is external in the sense that the person operating the system (i.e. the system administrator) is external to the RMD is inconsistent with the specification and the prosecution history. The specification teaches "repeater management function 108 uses a repeater management interface 114 to control and monitor repeater functions." ('603 patent at col. 3:29-31.) Figure 1, which corresponds to this portion of the specification, shows management function 108 within a box which includes bridge function 110 and MAC function 112, revealing the RMD is represented by the box. A repeater management interface 114 is illustrated as being outside of the box. A repeater connecting to the repeater management interface would also be outside and therefore external to the RMD.

The "external repeater management interface" also corresponds to "serial interface 204" illustrated in Figure 2. The specification teaches, "[t]he RMD 200 uses a serial interface 204 connecting with the repeaters to route information pertaining to port status and control." ('603 patent at col. 4:20-22.) Figure 2 reinforces the construction that the repeaters are external to the RMD. ('603 patent at col. 3:1-3.) "Serial interface 204" is "external" in the sense that it is depicted as located on the outer boundary of the RMD. The claim language and the specification imply that the repeaters are external to the RMD because they must connect to the "repeater management interface" which is external.

The prosecution history confirms this interpretation. The United States Patent and Trademark Office ("PTO") rejected the applicants' first patent application stating that claims 1-13 were anticipated by United States Patent 5,414,694 ("Crayford patent"). (Mosko Decl. Ex. 3 at 3.) In response, the applicants traversed the rejection and sought to distinguish the Crayford patent from their invention by filing an amendment in which they canceled claims 3 and 7-13, amended claims 1 and 2 and added new claims 14-18. (Mosko Decl. Ex. 5 at 1.) Applicants explained, "Crayford et al. teach an integrated multiport repeater *device* having hardware implemented management information base *device* (HIMIB). The repeater/HIMIB provides monitoring for network activities detected by the repeater." (Id. Ex. 5 at 6 (emphasis added).) Although the Crayford patent discloses two devices, an IMR+ (a repeater) and an HIMIB, the applicants characterized the patent as disclosing one device by using the term "repeater/HIMIB" to describe the invention and distinguish it from their own invention. In distinguishing their patent, applicants stated:

[The] Crayford patent [does not teach] bridging functions included with a repeater manager for controlling and monitoring repeater functions related to the retransmission of the data packets *and for providing status of and control over repeater functions via an external repeater management interface* and the media access controller.

In contrast to Crayford et al., the Applicants' invention is a repeater manager for controlling and monitoring repeaters *and for providing status of and control over repeater functions via an external repeater management interface ....*

Note that the Applicants' invention is an external management device for a repeater via the repeater data interface, e.g., a inter-repeater backplane, rather than a repeater having some additional management functionality added thereon.

(Id. Ex. 5 at 6-7, emphasis added.)

The applicants treated the Crayford patent as a single device, which means it was characterized as having an internal repeater management interface between the IMR+ and the HIMIB. This characterization was made to overcome the PTO's prior art rejection of their patent. Since the applicants added the word "external" to their patent application to distinguish their claimed invention from the Crayford prior art, they cannot now take the inconsistent position that the term "external interface" really means "internal interface." The prosecution history connotes that the claimed device and the repeater are distinct structures which are connected via the repeater data interface and via the repeater management interface. The applicants' claims were only allowed after the applicants used the amendment language distinguishing their patent from the Crayford patent. *See* Southwall Technologies, Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.1995) (The prosecution history may "limit the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."). The language in the claim, specification and prosecution history reveal that the "external repeater management interface" is a connection between the RMD and external repeaters.

Other structures "providing status of and control over repeater functions" include "internal registers" and an "access port." The specification states, "The current status of all monitored repeater function are [sic] maintained in internal registers at all times. These registers may be accessed at will through the access port." ('603 patent at col. 3:36-39.) Therefore, the structure corresponding to the function includes an external repeater management interface, internal registers, an access port, structures interconnecting these elements.

C. Claim Element Two: "bridging support means, coupled to the repeater management means, for receiving the data packets on the receiving port and for forwarding the received data packets to the destination port in accordance with a destination address;"

[12] [13] The parties agree that the bridging support means must be coupled to the repeater management means. However, they dispute whether "bridging support means" is written in means-plus-function form. The use of the words "means for" in connection with the functions "receiving the data packets on the receiving port" and "forwarding the received data packets to the destination port in accordance with a destination address" triggers the presumption that this claim element is written in means-plus-function format.

Intel argues "bridging support" is a known, structural element which is not subject to the limitations of s. 112, para. 6. (Level One's Proposed Claim Construction Order at 2.) Intel contends "bridging support" is understood by one skilled in the art to mean "a standard two-port IEEE 802.1d bridge used to connect two network collision domains." (*Id*.) Intel's witness Mr. Feurstraeter testified at the *Markman* hearing, "bridging support is not in IEEE, bridging is." (RT vol. I at 160.) Intel's interpretation renders the word "support" meaningless. "[M]eaning [must be given] to all the words in [the] claims." Exxon Chem. Patents, Inc. v. Lubrizol Corp., 64 F.3d 1553, 1557 (Fed.Cir.1995). Altima's expert Ian Crayford explained in his witness statement that the term "bridging support" does not "suggest any structure to engineers of ordinary skill." (Altima's Witness Statement of Crayford para. 28.) Since this element of claim 1 does not recite "definite structure in support of its function[s]," the presumption that the claim is written in means-plus-function form is not rebutted. Medtronic, Inc. v. Advanced Cardiovascular Systems, Inc., 248 F.3d 1303, 1310 (Fed.Cir.2001).

The question to be determined is whether structure is disclosed in the specification that corresponds to these functions. Intel argues that "bridging support simply means that the bridge supports the rest of the claimed

device by providing bridging." (Level One's Opp'n at 23.) Altima retorts that the "bridging support" requirement "limits the claimed RMD to a device that supports bridging using those structures, and their equivalents, disclosed in the specification ... in contrast to any device that has an IEEE 801.2d bridge." (Altima's Opening Claim Construction Br. at 60.) Altima contends "bridging support" "is achieved using a CPU interface 222, a remote access channel/bridge port 226 for access to a memory, direct memory access (DMA) structure 214 (for control of the memory using semaphoring), FIFO registers 216, a media access controller 212, a repeater data interface 210, address tracking 208, and structures interconnecting these elements." (*Id*. at 64.)

Intel's only support for its interpretation is the ITC judge's conclusion that "bridging support" is a "known, structural element." (Level One's Opening *Markman* Br. at 29.) But the term "bridging support" is not defined in IEEE 801.2d and does not connote structure to one skilled in the art.

The specification explains, "The bridge support functions support bridging of data between the MAC function and the bridge port." ('603 patent at col. 2:45-46.) It also provides, "The bridge function 110 has two ports [:] bridge port 104 ... which is external to the device ... [and a] port from the MAC function 112 ...." ('603 patent at col. 3:59-62.) "A MAC function 112 receives data packets from the inter repeater backplane 116 (also known as a repeater data interface)." (Id. at col. 3:40-42.) The specification reveals that "a repeater management device (RMD) 200" (*id*. at 4:19-20) receives packets on the repeater data interface 210 (*id*. at col. 4:24-25) which are then transferred to the MAC 212. (*See id*., Figure 2.) The "MAC in a bridging network will have a unique address to facilitate the bridging function 110." (Id. at col. 3:58-59.) The management and address tracking function 208 is illustrated in Figure 2. Only packets "that do not match the MAC address or any local source address" are forwarded. (Id. col 6:37-39.)

"The system DMA's packets directly to and from memory with low CPU overhead. [This reveals use of direct memory access to transfer packets.] [Figure] 4 illustrates a dual-ring structure 400 for the MAC traffic and the Bridge traffic 404." (Id. at col. 5:5-8.) The specification explains that "[a] MAC port 224 and a bridge port 226 are provided between the CPU interface 222 and the DMA controller 214." (Id. at col. 4:31-33.) Thus, direct memory access and semaphoring are used to support the bridging function. This construction is also supported by the prosecution history. During the prosecution of the patent, the applicants explained the "invention also provides additional advantages including a processor interface for providing direct memory access and semaphoring capability to facilitate MAC and bridging functions with low CPU overhead." (Mosko Decl. Ex. 5 at 7.) As illustrated in Figure 2, the FIFO is a link connecting the MAC to the DMA. Mr. Frazier explained, "what this FIFO is doing is it provides ... an elastic connection between ... the DMA function ... and the MAC." FN8 (RT vol. II at 401.)

FN8. Mr. Frazier provided additional detail on FIFOs explaining:
As data passes from the MAC to the DMA engine, well, it's arriving from the network at a constant rate.... But the rate at which the RMD, or the DMA controller inside the RMD, can access the memory is not a constant rate. Why? Because it's sharing memory with a CPU and it's on a shared bus. So, at any given instant the DMA may not be able to access the memory.

Well, the data is coming from the network at a constant rate, so it has to be held somewhere until the DMA controller can access the memory and place the data in memory. That's the purpose of having this 32-byte FIFO, to adjust for the fact that data comes to and from the network at a constant rate, but as it's transferred

to and from memory it will be a variable rate....

So, the FIFO acts as an elasticity buffer, in a sense, to adjust for the fact that you have a constant rate at the network and a varying rate at the memory. If you didn't have that adjustment in the FIFO, you would lose the data.

(RT vol. II at 401-402.)
Therefore the structure corresponding to the function articulated in the element is illustrated in Figure 2 as CPU interface 222, a remote access channel/bridge port 226 for access to a memory, direct memory access (DMA) structure 214 (for control of the memory using semaphoring), FIFO registers 216, a media access controller 212, a repeater data interface 210, address tracking 208, and structures interconnecting these elements.

D. Claim Element Three: "and media access controller, coupled to the repeater management means, for providing signal framing of the data packets and for controlling access to a repeater data interface."

[14] Both parties agree the media access controller ("MAC") is an Ethernet MAC as defined by IEEE 802.3, which the specification incorporates by reference. ('603 patent at col. 1:45-48.) The MAC must be coupled to the repeater management means, perform signal framing of the data packets, and control access to a repeater data interface. Intel argues the MAC is "used for bridging," "[and] serves as a connector between the repeater and the bridge." (Level One's Opp'n at 26.) Intel relies on the International Trade Commission's interpretation as support for this argument, which is unpersuasive conclusory extrinsic evidence.

Altima replies that the IEEE Std. 802.3 definition of a MAC includes specific structures to perform signal framing. (Altima's Reply to Level One's Opp'n ("Altima's Reply") at 40.) "Signal framing has a well-known definition as being the 'Transmit Data Encapsulation' function of the IEEE Std. 802.3." Id. This function includes cyclical redundancy check ("CRC") generation. (Id.) IEEE Std. 802.3 provides:

Frame transmission includes data encapsulation and Media Access management aspects:

a) Transmit Data Encapsulation includes the assembly of the outgoing frame (from values provided by the MAC client) and frame check sequence generation.

b) Transmit Media Access Management includes carrier deference, interframe spacing, collision detection and enforcement, collision backoff and retransmission, carrier extension, and frame bursting.

IEEE Std. 802.3, clause 4.2.3. The specification supports this interpretation by stating, "the MAC function has a transmit function ..." ('603 patent at col. 3:45) and "[t]he MAC provides preamble and cyclic redundancy check (CRC) generation and detection...." (Id. at col. 3:48-49.) "Signal framing" in the context of the MAC is defined by the IEEE 802.3 standard, clauses 3 and 4.

The MAC also controls access to the repeater data interface, which is the location at which data passes between a repeater and the RMD. Altima argues the MAC manages access to the repeater data interface using "the media access management algorithms set forth in, e.g., the IEEE 802.3 standard." (Altima's

Opening Claim Construction Br. at 69.) This construction is supported since the specification incorporates by reference the definition of an Ethernet MAC contained in the IEEE 802.3 specification. ('603 patent at col. 1:45-48.)

II. Claim Two: "The repeater management device of claim 1 wherein the repeater management means further comprises an access port for providing access to attributes relating to repeater functions."

[15] Since Claim 2 is dependent on claim 1, it must be construed as having all of claim 1's limitations. 35 U.S.C. s. 112. Claim 2 requires the repeater management means of claim 1 to have a physical access port "for providing access to attributes relating to repeater functions." The parties agree that this access port is used to connect an external terminal, computer, or CPU to the RMD. (Altima's Opening Claim Construction Br. at 71; Level One's Opening *Markman* Br. at 30.) The access port could be used to access information in the RMD and to direct the RMD's operation. ('603 patent at col. 2:37-42; Altima's Opening Claim Construction Br. at 71.)

III. Claim Three: "The repeater management device of claim 1 wherein the bridging support means are controlled by the repeater management means."

[16] Claim 3 is dependent on claim 1 and provides that the repeater management means controls operation of the bridging support means.

IV. Claim Four: "The repeater management device of claim 1 wherein the management means further comprises a plurality of counters for traffic control."

[17] Claim 4 is dependent on claim 1 and provides that management means includes at least two counters for traffic control.

V. Claim Five: "The repeater management device of claim 1 wherein the media access controller further comprises means for generating preambles and error correcting codes, means for detecting error correcting codes, means for handling deferrals and collisions, means for controlling and handling backoff conditions, and means for retrying data transmission."

[18] Claim 5 is dependent on claim 1. Claim 5 requires a MAC that generates and detects error correcting codes. One skilled in the art would perceive "error correction coding [as] 'an encoding of data and redundant check bits that enables decoding hardware to reconstruct the original data in the presence of a data-bit or check-bit error.' " (Witness Statement of Howard Frazier at 23 (quoting IEEE Dictionary 395 (7th ed.2000)).) Altima's expert Mr. Frazier explained:

An error correcting code adds additional information to data that is being transmitted. You transmit the data that you want to send and then you generally append some redundant bits, some additional bits, to that data which would enable hardware at the receiving or decoding end to recreate, reconstruct the original data, and correct it in the presence of noise or byte errors. So, if error had been introduced in the data during transmission, the error correcting code information can be used to reconstruct the data and restore it.

(RT vol. II at 375-76.) "[E]rror detection coding" is " 'an encoding of data and redundant check bits, such that in the presence of a data-bit or check-bit error decoding hardware can detect the error, but cannot reconstruct the original data.' " (Witness Statement of Howard Frazier at 23 (quoting IEEE Dictionary 395 (7th ed.2000)).) Altima's expert Mr. Frazier explained in his witness statement, "Typical industry standard

MACs do not generate or detect error *correcting* codes but they do generate error *detection* codes." (Id. (emphasis added).)

Intel argues that the patentees acted as their own lexicographers in Claim 5 and the phrase "generating ... error correcting codes" refers to CRC generation. (Level One's Reply at 39.) As such, the claim specifies a MAC that uses "a particular cyclic redundancy code designed for error detection and not error correction." (Id.) However, this construction is not supported by the prosecution history. Application claim 6 required the MAC to comprise "means for generating preambles and error correcting codes, means for detecting error correcting codes...." Application claim 13, which was expressly canceled, required the MAC to comprise "means for generating preambles and cyclic redundancy checks (CRCs) for the data packets...." These two claims used different terms to require different functions. The prosecution history reveals that the patentees did not mean CRC generation when they used the phrase "generating ... error correcting codes."

Although one skilled in the art may view the reference to "correcting" instead of "detecting" as an obvious error, the claim cannot be rewritten by the Court to correct this error. *Cf.* Allen Eng'g Corp. v. Bartell Indus., Inc., 299 F.3d 1336, 1349 (Fed.Cir.2002)("It is not [the court's] function to rewrite claims to preserve their validity."). Therefore, claim 5 requires a MAC to generate and detect error correcting codes.

Claim 5 also requires a MAC to generate preambles, handle deferrals and collisions, control and handle backoff conditions, and retry data transmission. These additional details on Ethernet MAC operations are defined in IEEE Standard 802.3, clauses 3 and 4.

VI. Claim Six: "The repeater management device of claim 1 wherein the repeater management means further comprises registers for storing the attributes relating to repeater functions."

[19] Claim 6 is dependent on claim 1 and provides that the repeater management means includes at least two registers for storing the attributes relating to repeater functions. "Attributes" refers to repeater configuration or status values. (Altima's Opening Claim Construction Br. at 74; Level One Opp'n at 30.)

VII. Claim Seven: "The repeater management device of claim 1 further comprising a media access control port for providing data packets received by the media access controller via the repeater data interface to memory."

[20] Claim 7 is dependent on claim 1 and provides that the RMD includes a MAC port for moving data packets received through the repeater data interface to memory.

VIII. Claim Eight: "The repeater management device of claim wherein the media access controller determines whether a data packet is to be sent to the bridge for forwarding to a destination address connected to the bridge port or whether a data packet is to be retransmitted via the repeater data interface."

[21] Claim 8, as issued, does not specify upon which claim it depends. Since "a claim in dependent form shall contain a reference to a claim previously set forth ...," claim 8 was erroneously issued. 35 U.S.C. s. 112, para. 4. Level One recognized this error and on April 2, 2002, requested the PTO to issue a Certificate of Correction pursuant to 35 U.S.C. s. 254. The PTO issued a Certificate of Correction on May 28, 2002, correcting the error. (Altima's Opening Claim Construction Br. at 75.) But that correction does not allow Intel to prosecute claim 8 in this lawsuit because when the lawsuit was commenced the error existed. Southwest Software, Inc. v. Harlequin Inc., 226 F.3d 1280, 1295 (Fed.Cir.2000). Since the present action

was commenced before the issuance of the Certificate of Correction, the Certificate of Correction does not have the effect of curing the error.

IX. Claim Nine: "The repeater management device of claim 1 wherein the repeater data interface comprises an inter-repeater backplane."

[22] Claim 9 is dependent on claim 1 and provides that the repeater data interface includes an inter-repeater backplane. According to the specification "an inter-repeater bus 308 routes information to and from remote repeaters 310." ('603 patent at col. 4:45-46.) Figure 3 which corresponds to the quoted language illustrates "inter-repeater bus 308" as an "inter-repeater backplane." Figure 3 also illustrates that the inter-repeater backplane is outside or external to the RMD.

Intel contends an inter-repeater backplane refers to a high-performance connector, which is not a standard Ethernet cable. (Level One's Proposed Claim Construction para. 9.) Intel's expert Dr. Colin Mick explains in his witness statement, "In ordinary usage in the art, an 'inter-repeater backplane' requires a complex set of proprietary signals supported via a specialized connector and cabling system.... [A]n inter-repeater backplane cable carries more signals (data plane, control plane, and other) [than a standard Ethernet cable]." (Intel's Witness Statement of Dr. Mick at 5-6.) This interpretation is supported by the specification which explains that the inter-repeater backplane "consists of 5 signals." ('603 patent at col. 6:52.) At the hearing, Dr. Mick explained,

A backplane would be a collection of communications channels that are used to perform-make a high performance connection and join together electronic components. The notion of an inter-repeater backplane obviously extends from that. It provides the high performance connection that can be used to connect multiple repeaters together, and it actually goes beyond that. You would probably extend that to say that it means that those repeaters can be connected so that they effectively are joined together and perform as a single logical repeater.

(RT vol. I at 43.) Altima's expert Mr. Frazier explained:

[A]s written, the inter-repeater backplane refers to the repeater data interface.... Inter-repeater backplane is a bus structure shared by a collection of repeaters. You have several repeaters, and they're connected together via an inter-repeater backplane. And it allows you to transfer messages between Ethernet repeaters, and I believe previous testimony from Ian Crayford said it would allow you to treat it as one logical repeater, meeting the timing requirements of one repeater.

(RT vol. II at 381.) The inter-repeater backplane is a high performance connector that routes information to and from remote repeaters in a manner allowing connectedrepeaters to perform as one logical repeater.

Intel also argues claim 9 continues claim 1's requirement of out-of-band management. As discussed earlier, this construction is neither supported by claim 1 nor the specification.

X. Claim Ten: "The repeater management device of claim 1 wherein the repeater management means further comprises a processor interface for providing direct memory access and semaphoring functions to support bridging functions of the bridging support means and media access control functions of the media access controller."

[23] Claim 10 is dependent on claim 1 and provides that the repeater management means includes a

processor interface for providing direct memory access ("DMA") and semaphoring functions, to support bridging functions of the bridging support means and MAC functions of the MAC.

Intel argues that claim 10 "defines mechanisms by which packets are transferred from the repeater data interface via a memory buffer to the bridge for processing." (Level One's Opening *Markman* Br. at 33.) Intel asserts "the packet is transferred to the buffer, and transfer from the buffer to the destination is controlled by a semaphore... [which] is a single memory cell linked to the buffer that is set by the repeater management device based on its analysis of the destination address of the packet." (*Id.*) Intel contends such transfers are accomplished via DMA techniques. (*Id.*) At the hearing, Intel's counsel argued, "Claim 10 ... describes, in more detail, the bridging support of Claim 1. So that is the importance of Claim 10 in our view. Claim 10 is more detail about bridging." (RT vol. III at 559.) Intel's only support for its construction is its argument. This construction is unpersuasive because neither the claim nor the specification mention a "memory buffer."

Furthermore, when asked what processor interface is referenced in Claim 10, Intel's counsel explained:

A bridging interface.... I think its suggested, Your Honor, by bridge port 104. Again ordinary meaning, a port is not quite the same thing as an interface, but they're highly related. The interface is the electrical definition of the physical port. It's part of, but not the entirety of the CPU interface.

(RT vol. III at 559-60.) Intel's construction is unpersuasive because, as Intel's counsel even acknowledged, "interface" and "port" are not synonymous.

The specification does not use the phrase "processor interface;" however, it does reference a CPU interface, which is illustrated in Figure 2. ('603 patent at col. 4:31-33; 6:45-48.) The specification also explains that "[a] MAC port 224 and a bridge port 226 are provided between the CPU interface 222 and the DMA controller 214." (Id. at col. 4:31-33.) This indicates that the "processor interface" is the location at which information passes between a processor or CPU and the RMD.

Altima argues that DMA refers to the transfer of data, commands, and status between an input-output ("I/O") FN9 device and a memory that is shared with a central processing unit.FN10 (Altima's Opening Claim Construction Br. at 66.) The specification provides: "Those skilled in the art will recognize that the present invention is applicable to any I/O device adapter that has a memory and is not limited to network adapters." ('603 patent col. 6:66-7:1.) Altima contends the RMD must be connected to a shared, external memory. (Altima's Reply at 55.) Altima's expert Mr. Frazier explained:

FN9. I/O is a general acronym used when data is being read (input) or written (output).

FN10. Altima cites to the IEEE Standard Dictionary of Electrical and Electronics Terms to define DMA. According to the IEEE dictionary direct memory access is:
(1) Access to data by which data is transferred directly between main memory and storage devices.

(2) Ability of I/O controller modules to independently access memory. An I/O controller with DMA capabilities can access commands, fetch data, and report status by accessing memory directly.

(3) A method for transferring data between an external device and memory without interrupting program flow or requiring CPU intervention. Note: The interface device takes control of the memory and transfers that data.

(4) This refers to the ability of I/O controller modules to independently access memory. An I/O controller with DMA capabilities can access commands, fetch data, and report status by accessing memory directly.

Institute of Electronic and Electrical Engineers, *IEEE Standard Dictionary of Electrical and Electronics Terms* 297 (6th ed.1997).
I mentioned earlier that external memory would absolutely be required with this RMD. There isn't enough memory disclosed within the structures in the RMD to be able to perform sufficient packet buffering. So, you need external memory, and you need a way of reaching that external memory, a pool of random access memory.
The mechanism of direct memory access with the accompanying mechanism of semaphoring is described as being the manner in which you access that external memory, the manner in which data packets are transferred to and from the RMD, the claimed device, and the pool of external memory.

(RT vol. II at 383-84.)
The specification states, "The system DMA's packets directly to and from memory with low CPU overhead," ('603 patent col. 5:5-6.), which indicates that memory is shared between the RMD and a CPU. However, nothing in the claim or the specification indicates that memory must be external to the RMD.

Altima argues, "Semaphoring occurs when one resource provides another resource with a token that indicates the status and availability of a shared memory." (Altima's Reply at 55.) Altima contends a semaphore in the '603 patent is an ownership bit in a status byte of a packet header. (Id.) Altima's expert Mr. Crayford defined semaphore in the following manner:

Semaphore in the industry ... is used typically to indicate that a signal is passed from one-- from one entity to another to get its attention. So for instance there might be a bit in memory, a location, that a device sits and observes, and the bit is zero, and that means to the device don't do anything, they have no need for your attention at this point.

And then the other entity, let's take this particular example, the CPU would [queue] a message in memory on this transmit location in memory. And then it would set that semaphore bit-- it would set it to one. This device, whether periodically or permanently, will be looking at that bit, that semaphore. And when that bit is set to one it knows it's now got something to do."

(RT vol. II at 232-33.) During closing argument, Intel's counsel stated, "We don't have any dispute with Altima about what semaphoring means...." (Id. vol. III at 559.)

Therefore claim 10 provides that the repeater management means includes a processor interface, which is a

connection between the RMD and a CPU. The processor interface allows the RMD to have direct memory access and semaphoring capabilities. The RMD and a CPU share the memory. Semaphoring occurs when one resource provides the other resource with a token that indicates the status and availability of a shared memory.

Conclusion

For the stated reasons, the claims of the '603 patent are interpreted as follows:

Claim 1:

Preamble:

A repeater management device is a single device for a communications network that controls repeaters and routes data packets between a receiving port and a destination port, and which comprises:

First Element: Repeater Management Means

A repeater management means with recited functions.

The first recited functions of the repeater management means are controlling and monitoring repeater functions related to the retransmission of data packets.

The structures corresponding to these functions are the repeater data interface, the Ethernet Management Information Base, RMON counters, a CPU interface, structures interconnecting these elements, and equivalents thereof.

The second recited functions of the repeater management means are providing status of and control over repeater functions via an external repeater management interface.

The structures corresponding to these functions are the external repeater management interface, internal registers, an access port, and equivalents thereof.

The external repeater management interface is the location at which information passes between the RMD and external repeaters.

Second Element: Bridging Support Means

A bridging support means with recited functions.

The function of the bridging support means is to receive data packets on the receiving port and to forward the received data packets to the destination port in accordance with a destination address.

The structures corresponding to the recited function include a processor interface, a remote access channel/bridge port for access to memory, DMA structure, FIFO registers, a media access controller, a repeater data interface, address tracking, structures interconnecting these elements, and equivalents thereof.

Third Element: Media Access Controller ("MAC")

An IEEE Standard 802.3 MAC for 1) providing signal framing of the data packets and 2) for controlling access to a repeater data interface.

Signal framing is defined by IEEE 802.3 and includes cyclical redundancy check (CRC) generation.

The repeater data interface is the location at which data passes between the RMD and external repeaters.

Claim 2:

The repeater management means of claim 1 includes a physical access port used by an external computer or CPU to access attributes related to repeater functions.

Claim 3:

The repeater management means of claim 1 controls the bridging support means of claim 1.

Claim 4:

The repeater management means of claim 1 includes at least two counters for traffic control.

Claim 5:

The MAC of claim 1 must generate and detect error correcting codes.

The MAC of claim 1 must include means for generating preambles, for handling deferrals and collisions, for controlling and handling backoff conditions, and for retrying data transmission. These details are defined in IEEE Std. 802.3, clauses 3 and 4.

Claim 6:

The repeater management means of claim 1 includes at least two registers for storing the attributes relating to repeater functions.

Attributes refers to repeater configuration or status values.

Claim 7:

The RMD of claim 1 includes a MAC port for moving data packets received through the repeater data interface to memory.

Claim 8:

Claim 8 contains an error because it does not refer to the claim upon which it is dependent.

Claim 9:

The repeater data interface of claim 1 includes an inter-repeater backplane.

The inter-repeater backplane is a high-performance connector that routes information to and from remote

repeaters.

Claim 10:

The repeater management means includes a processor interface.

A processor interface is a connection between the RMD and a processor.

The processor interface allows the RMD to have direct memory access and semaphoring.

The RMD and a CPU share the memory.

Semaphoring occurs when one resource provides another resource with a token that indicates the status and availability of a shared memory.

IT IS SO ORDERED.

E.D.Cal.,2003.
Intel Corp. v. Altima Communications, Inc.