IN THE UNITED STATES DISTRICT COURT

FOR THE WESTERN DISTRICT OF WISCONSIN

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WATSON INDUSTRIES, INC.,

OPINION AND ORDER

Plaintiff,

02-C-0524-C

v.

MURATA ELECTRONICS NORTH AMERICA, INC. and MURATA MANUFACTURING CO., LTD.,

Defendants.

- -

This civil case for declaratory, injunctive and monetary relief is before the court following an August 29, 2003 hearing on the construction of disputed claims in the two patents at issue, both of which relate to vibration gyroscopes: U.S. Patent No. 5,430,342, held by plaintiff Watson Industries, Inc. and U.S. Patent No. 5,922,954, held by defendants Murata Electronics North America, Inc. and Murata Manufacturing Co., Ltd.

Conventional gyroscopes are rigid bodies or wheels that spin around an axis of rotation mounted in a movable frame that permits the spinning wheel to tilt freely in any direction and rotate about any axis. Their purpose is to provide angular rate information.

8 Wiley Encyclopedia of Electrical and Electronics Engineering at 545 (John Wiley & Sons, Inc. 1999). Vibration gyroscopes look nothing like the conventional gyroscope. They use a vibrating element to measure rotational velocity by employing the Coriolis principle, id., that a body moving relative to a rotating frame of reference is accelerated in that frame in a direction perpendicular both to its direction of motion and to the axis of rotation of the frame. They are far less expensive to produce than conventional gyroscopes and can be made in sizes small enough to fit inside global positioning systems and other small electronic products.

Presently before the court are defendants' motion to submit previously unavailable evidence on claim construction and plaintiff's motion to strike evidence submitted after the discovery and briefing deadline. Plaintiff wishes to strike 1) the surrebuttal report of Craig Rogers submitted on August 22, 2003; 2) the declaration of Richard Wulff for patent '342 submitted on September 3, 2003; 3) the declaration of Richard Wulff for patent '954 submitted on September 3, 2003; and 4) defendants' motion to submit previously unavailable evidence on claim construction submitted on September 12, 2003. Regardless of the timing of defendants' submissions, I find them irrelevant. Consideration of the submissions would not change the claim construction decision. Therefore, I will deny defendants' motion to submit previously unavailable evidence on claim construction and grant plaintiff's motion to strike evidence submitted after the discovery and briefing

deadline.

Taking into consideration the language of the '342 patent, its prosecution history and the arguments made by the parties in their briefs and at the hearing, I construe (1) "base electrode" to mean "a conductor through which an electric charge is transferred and that is located between at least two layers of piezoelectric material"; (2) "inner conductive layer" to mean "a conductive layer between the base electrode and a layer of piezoelectric material"; (3) "angular rate sensor system" as "components configured to determine an angular rate, which includes both a vibratory sensing element and a single processing circuit"; (4) "disposed on" to mean "placed relative to something"; (5) "being suspended proximate to the pair of natural acoustic nodes" as "being suspended next to the pair of natural acoustic nodes, where acoustic is not limited to the audible frequency range"; (6) "signal processing circuit discriminating the angular rate from the sensing signals" to mean "circuit configured to process electrical current conveying information, such as sensing information, and to distinguish the angular rate from the sensing information"; and (7) "electrically connected" as "electrically joined."

For the '954 patent, I construe the following terms in light of the patent language, prosecution history and arguments presented by both parties in their briefs and at the hearing: (1) "characteristics" means "measurable properties of a device"; (2) "desired

relationship between temperature and sensitivity change rate" means "the desired relationship between temperature in degrees and sensitivity change rate. The sensitivity change rate is calculated by dividing the percentage change in voltage by the change in temperature in degrees"; (3) "detecting elements" and "detectors" mean "elements that utilize or transform energy to produce an associated signal"; (4) "impedance" is defined as "an electric parameter, expressed in units of 'ohms,' which is a measure of the total opposition to current flow in an electric element or circuit resulting from a combination of resistance, capacitance, and inductance. Further, in anything except a purely resistive element or circuit, impedance is a function of frequency"; (5) "loads" means "devices that absorb, convert or consume energy or power"; (6) "matching condition" means "a load impedance is hooked up to, or corresponds to, each associated detector element"; and (7) "resistors" means "a device having a specified electrical resistance, and which thereby opposes the flow of electric current. There are both fixed-value resistors and adjustable, or variable, resistors."

OPINION

A. General Rules of Claim Construction

Since 1996, when the Supreme Court affirmed the Federal Circuit's decision in

Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996), it has been clear that judges, not juries, have the responsibility to construe disputed terms in patent claims. Markman, 517 U.S. at 388-90. The responsibility is a heavy one. In practice, the determination of the scope of the invention is often the end game.

"The language of the claim defines the scope of the protected invention." Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 619 (Fed. Cir. 1995) (citing Yale Lock Manufacturing Co. v. Greenleaf, 117 U.S. 554, 559 (1886)). The language serves to delineate the virtual metes and bounds of the invention, letting competitors know what they can and cannot do in the way of making and selling similar products in litigation.

Claim construction must adhere carefully to the precise language of the claims that the patent officer has allowed. Autogiro Co. of America v. United States, 384 F.2d 391, 396 (Ct. Cl. 1967) ("Courts can neither broaden nor narrow the claims to give the patentee something different than what he set forth [in the claim]."). For this reason, "'resort must be had in the first instance to the words of the claim,' words to which we ascribe their ordinary meaning unless it appears the inventor used them otherwise." Vitalink, 55 F.3d at 619 (quoting Envirotech Corp. v. Al George, Inc., 730 F.2d 753, 759 (Fed. Cir. 1984)). It

is equally "fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention." United States v. Adams, 383 U.S. 39, 49 (1966); see also Markman, 52 F.3d at 979 ("Claims must be read in view of the specification, of which they are a part. . . . For claim construction purposes, the [specification's] description may act as a sort of dictionary, which explains the invention and may define terms used in the claims."). The specification is "'necessary to give life, meaning, and vitality'" to the terms of a claim. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1306 (Fed. Cir. 1999) (quoting Kropa v. Robie, 187 F.2d 150, 152 (C.C.P.A. 1951)).

In recent cases, the Court of Appeals for the Federal Circuit has reminded district courts of the usefulness of dictionaries, treatises and encyclopedias in determining the ordinary and customary meanings of claim terms. See, e.g., Inverness Medical Switzerland GmbH v. Princeton Biomeditech Corp., 309 F.3d 1365, 1369 (Fed. Cir. 2002) ("It is well settled that dictionaries provide evidence of a claim term's 'ordinary meaning.' Such dictionaries include dictionaries of the English language, which in most cases will provide the proper definitions and usages, and technical dictionaries, encyclopedias and treatises, which may be used for established specialized meanings in particular fields of art."). At the same time, the court has advised trial judges that they must examine the intrinsic record to be sure that the patent applicant used words consistent with the dictionary definition because an applicant can act as his or her own lexicographer or may have disavowed or disclaimed

aspects of a definition "by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." Id. at 1204 (citing Teleflex, Inc. v. Ficosa North American Corp., 299 F.3d 1313, 1324 (Fed. Cir. 2002)).

B. The '342 Patent

Plaintiff's '342 patent is directed to an angular rate sensor system or gyroscope. According to the patent abstract, the system contains a vibratory sensing element, preferably "a polymorphic rectangular bar fabricated from two layers of piezoceramic material," and a signal processing circuit. The inventor filed his application on April 27, 1993; the patent issued on July 4, 1995, with 74 claims, seven of which are alleged to have been infringed by a gyroscope that defendants manufacture. Two of these claims, 43 and 67, are independent; the remaining five, claims 44, 47, 48, 51, and 52, depend on claim 43. Of the claims in issue, the parties dispute ten terms.

1. "Base electrode" and "inner conductive layer"

Disputed claims 43 and 67 of the '342 patent contain the term "base electrode." The parties agree that this term is not common in the relevant art and that it has no express definition in either claims 43 or 67. Plaintiff proposes to define "base electrode" as "a

conducting element located between at least two layers of piezoelectric material." Defendants offer the following definition:

> In the context of the '342 patent, a structural and electrical member used as a foundation, sometimes referred to as a shim, which provides elastic mechanical support or reinforcement and has a connection used to conduct an electric current into or away from the vibratory sensing element. Such an element is typically fabricated from brass, Kovar®, stainless steel or other conductive material.

According to the claims, "at least two layers of piezoelectric material are located on opposing sides of the *base electrode*." From this, defendants argue that the base electrode is equivalent to a shim and therefore, the word "base" should be defined as a "foundation," or "support" structure. Defendants' argument fails on two grounds. First, as plaintiff points out, the patentee used "base" interchangeably with "center" and used it throughout the patent as a reference to the location of the corresponding electrode in the invention. For example, in describing figure 2, the specification states that the "vibratory sensing element 12 consists of a *center or base* electrode 20" (emphasis added). It is "fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention." Adams, 383 U.S. at 49; see also Markman, 52 F.3d at 979 ("Claims must be read in view of the specification, of which they are a part. . . . For claim construction purposes, the [specification's] description may act as a sort of dictionary, which explains the invention and may define terms used in the claims."). It is immaterial that no

dictionary defines "base" as meaning "center." "Patent law permits the patentee to choose to be his or her own lexicographer by clearly setting forth an explicit definition for a claim term that could differ in scope from that which would be afforded by its ordinary meaning." Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed. Cir. 2001) (citing Mycogen Plant Science v. Monsanto Co., 243 F.3d 1316, 1327 (Fed. Cir. 2001)); see also Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("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").

Second, the base electrode in the '342 patent functions as more than a mere foundation. At the claims construction hearing, plaintiff's expert, Robert E. Carter, testified that the term shim would be covered by the term base electrode, but that the term should not be limited to that definition. He agreed that shims function primarily as reinforcement material but he noted that although conductive shims are common, not all shims conduct electricity. For example, a plastic shim would not be conductive. The base electrode in the '342 patent serves a conductive purpose. In the patent specification the patentee describes the base electrode as being "grounded," implying that the base electrode is part of a circuit. See, e.g., '342 Pat., col. 9, lns. 20-22; Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1305 (Fed. Cir. 1999) (noting that patent specification is "necessary to give life,

meaning and vitality" to claim terms).

There is nothing in the claim or specification language that indicates the base electrode serves a foundational purpose. In fact, the specification refers to the base electrode as a "thin center electrode." The thickness of an electrode is important to determine its ability to function as a physical support mechanism. See, e.g., Robert Carter Dep., dkt. #98, at 62-65. Defendants equate shims with "reinforcement material." Dfts.' Br., dkt. #83, at 14. In their brief, defendants state that when a shim is present, "it provides elastic and mechanical support to a biomorph." Dfts.' Br., dkt. #83, at 14. Plaintiff's base electrode serves a broader purpose than what is known as a shim, if for no other reason than the term includes the word "electrode," which implies that it is used for a conductive purpose, rather than just a supporting or reinforcing one.

However, plaintiff's proposed definition is not without its own flaws. First, plaintiff's definition of "base electrode" encounters problems when considered alongside the term "inner conductive layer." Plaintiff defines "inner conductive layer" as "a conductive layer between the base electrode and a layer of piezoelectric material." Although the term "inner conductive layer" is not found in any disputed claims, it becomes relevant because defendants argue that plaintiff's definition for base electrode could also be used to define "inner conductive layer." Thus, it is necessary to decide whether to include in plaintiff's

definition for electrode the location of the base electrode relative to the inner conductive layers. I hesitate to limit it in this way, because the disputed claims are silent on the base electrode's location in relation to the inner conductive layers and inclusion of language relating to location would have the effect of limiting the disputed claims. See, e.g., Intervet America, Inc. v. Kee-Vet Laboratories, Inc., 887 F.2d 1050, 1053 (Fed. Cir. 1989) ("[T]his court has consistently adhered to the proposition that courts cannot alter what the patentee has chosen to claim as his invention, that limitations appearing in the specification will not be read into claims, and that interpreting what is meant by a word in a claim is not to be confused with adding an extraneous limitation appearing in the specification, which is improper.").

It should be noted that defendants' proposed definition for base electrode would have the same effect of encompassing the term "inner conductive layer." However, their proposal contains no description of the inner conductive layers' relationship to the base electrode. In claim 37 (an undisputed claim) and in the specification, the patentee discusses the inner conductive layers in relation to the base electrode. See, e.g., '342 Pat., col. 8, lns. 43-45. Defendants admit that "inner conductive layer" is not a common term in the art, but fail to look to the patent language to help define the term. "It is well-settled that, in 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." See Vitronics, 90 F.3d at 1582. Plaintiff's definition for "inner conductive layer" describes the location of the inner conductive layer relative to the base electrode, differentiating between the terms "inner conductive layer" and "base electrode." Therefore, I will adopt plaintiff's proposed definition for "inner conductive layer."

Plaintiff's proposed definition for the "electrode" portion of the "base electrode" term is incomplete. In proposing a definition for base electrode as a "conductive element" between at least two layers of piezoelectric electric material, plaintiff has not supplied a sufficient description of an electrode. Plaintiff cites to the New IEEE Standard Dictionary (5th ed., 1993) to support its definition of electrode as "a conducting element." It "is well settled that dictionary definitions provide evidence of a claim term's 'ordinary meaning.'" Inverness Medical Switzerland v. Warner Lambert Co., 309 F.3d 1373, 1378 (Fed. Cir. 2002); see also Vanguard Products Corp. v. Parker Hannifin Corp., 234 F.3d 1370, 1372 (Fed. Cir. 2000) ("A dictionary is not prohibited extrinsic evidence, and is an available resource of claim construction."). However, plaintiff omits the part of the definition that describes what an electrode does. According to the IEEE Standard Dictionary of Electrical and Electronics Terms (IEEE Std 100 - 1992), "electrode" is an "electric conductor for the transfer of charge between the external circuit and the electroactive species in the electrolyte." The Illustrated Dictionary of Electronics, (7th Edition 1997) defines electrode as "a body, point or terminal in a device or circuit that delivers electricity, or to which

electricity is applied." Both of these definitions describe the function of an electrode as carrying electricity, which is more than serving as a mere "conductive element." Plaintiff argues that the claims do not require the base electrode to conduct electricity in certain directions. At the same time, plaintiff argues that the base electrode does not serve a structural purpose either. The base electrode must serve some purpose. Because I have already found that the base electrode serves a conductive purpose, I will incorporate the idea of transferring charge into the definition of base electrode. The final definition of base electrode will be "a conductor through which an electric charge is transferred and that is located between at least two layers of piezoelectric material."

2. "Angular rate sensor system"

This term is found in all disputed claims of the '342 patent. Plaintiff argues that this term should be construed according to its ordinary meaning, as defined in the '342 patent: "components configured to determine an angular rate, which includes both a vibratory sensing element and a single processing circuit." Defendants propose the following definition derived from the McGraw Hill Dictionary of Scientific & Technical Terms (6th ed. 2003):

> A device or arrangement of components which is able to detect the magnitude of the angular velocity vector and produce a relative electric signal. The

> magnitude of the angular velocity vector, also known as the "singular speed" or "angular velocity" is typically expressed as radians per second or degrees per second.

Defendants' proposal illustrates the potential mismatches that can occur when using definitions from dictionaries without tying them to the claims of the patent. Throughout the patent, the inventor refers to an angular rate sensor system that includes both a vibratory sensing element and a single processing circuit and is configured to determine an angular rate. See, e.g., ' 342 Pat. abstract, claim 1; claim 43. Defendants have not shown why a person of ordinary skill in the art would not understand from plaintiff's proposed definition what plaintiff means by an angular rate sensor system. I see no reason to vary plaintiff's definition or add to it simply because a dictionary may provide another definition.

3. "Disposed on"

"Disposed on" is found in disputed claims 43 and 67. Plaintiff proposes "placed relative to something" as the ordinary meaning of "disposed on." Defendants argue that it means "attached to in a particular order." Defendants concede, however, that according to lay dictionaries, the term "dispose" connotes a deliberate placement of something and that it can mean "to put in place" or to put in a particular or proper order or arrangement. They argue that a review of the '342 patent shows that the term should be read as "attached,"

because "in all embodiments, the layers of piezoelectric material are, in fact, 'attached to' the base electrode and that the outer electrodes are 'attached to' the base electrode and that the outer electrodes are 'attached to' the vibratory sensing element." Dfts.' Br., dkt. #83, at 22.

It is basic patent law that the claims measure the invention. The embodiments merely illustrate possible ways in which the invention may be practiced; they do not limit the scope of the claims. SRI Int'l v. Matsushita Electric Corp. of America, 775 F.2d 1107, 1121 (Fed. Cir. 1985) (en banc) ("[I]f structural claims were to be limited to devices operated precisely as a specification-described embodiment is operated, there would be no need for claims."). Even if the law were otherwise, it would be a mistake to read "disposed on" as "attached" in light of figure 2 of the '342 patent, which shows that the inner conductive layers separate the base electrode from the piezoelectric layers.

Requiring the term to mean "attachment" would narrow the scope of the term unnecessarily. Nothing in claims 43 and 67 requires attachment. In general, in reading the claims, I see no indication that the piezoelectric material must be placed on the vibratory sensing element in a particular order. Accordingly, I will adopt the construction proposed by plaintiff because it conforms with the fair reading of the claims.

4. "Being suspended proximate to the pair of natural acoustic nodes"

This term is found in disputed claims 43 and 67. The parties agree on the meaning of most of the words in this phrase, with one critical exception. They agree that proximate means "next to" or "near to," that ""suspended" and "natural" are common words that need no further definition and that "nodes" describes points or lines that are free from vibration on an otherwise vibrating element. The dispute arises over the definition of "acoustic." Plaintiff argues that it is not confined to sounds audible to humans; defendants maintains that if it were not so confined, plaintiff would have used different words to refer to the nodes, such as "fluctuant" (moving in waves) or "normal."

Defendants propose the construction for "proximate to the pair of acoustic nodes":

> To be close or near to the two lines of the vibrating sensing element, when vibrating at a resonance within the audible frequency range, where the vibration of the vibratory sensing element produces no transverse motion.

Plaintiff objects to defendants' restriction of acoustic as the "audible frequency range," saying that it results in the conclusion that the claimed device must vibrate at frequencies only in the audible range. According to plaintiff, nothing in the '342 patent or file history identifies any sort of frequency operating range for the claimed devices or sets any limit on the frequency range of the invention. Plaintiff proposes to define the term as "next to the pair of natural acoustic nodes."

At the outset I note that the technical dictionaries differ as to the definition of acoustic. For example, The Illustrated Dictionary of Electronics (7th ed. 1997) defines "acoustic" to mean "pertaining to audible sound disturbances, usually in air," while the McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed. 2003) defines "acoustic" as "relating to, containing, producing, arising from, actuated by, or carrying sound." The latter dictionary defines "sound" as "an alteration of properties of an elastic medium, such as pressure, particle displacement or density that propagates through the medium or a superposition of such alterations; sound waves having frequencies above the audible (sonic) range are termed ultrasonic; those with frequencies below the sonic range are called infrasonic waves. Also known as acoustic wave; sound wave." The dictionaries are not very useful in determining whether acoustic includes only audible sound. Therefore, I must resort to the patent specification and information contained in the record.

Defendants support their conclusion that plaintiff's use of the word "acoustic" means "audible" by referring to a part in the '342 patent specification that discusses the Tehon '195 patent. According to defendants, because plaintiff discusses the Tehon '195 patent acoustic nodes, plaintiff's acoustic nodes must be similar. Defendants point out that the Tehon '195 patent device "has an output resonant frequency of 959 cycles per second (Hertz), which is well within the audible range of human hearing." Dfts.' Br., dkt. # 83, at 23. Defendants are correct that 959 Hertz is within audible range. The McGraw-Hill Dictionary of

Scientific and Technical Terms (6th ed. 2003) defines "audio frequency" as "a frequency that can be detected by the average young adult, approximately 15 to 20,000 hertz." "Frequency" is measured in "hertz" or cycles per second.

Defendants fail to reveal the full context of the Tehon '195 patent discussion within the '342 patent. It is clear that the patentee described the Tehon '195 patent in order to contrast it with his invention. In the specification the patentee highlights the problems with the Tehon '195 patent. Specifically, the patentee states that matching the resonant driving and sensing frequencies, as the Tehon '195 patent does, increases the sensitivity of the system, but also makes the system more "susceptible to bias error and scale factor shift caused by temperature changes." '342 Pat., col. 3, lns. 15-30. However, the patentee argues that his invention is designed to facilitate using *independent* drive and sensing frequencies, "thus permitting a drive frequency high enough to substantially eliminate systemic noise . . ." '342 Pat., col. 6, lns. 15-20 (emphasis added). According to the McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed. 2003), "drive" in the electronics industry means "excitation," which means "application of a signal power to a transmitting antenna." Thus, I understand the patentee's invention to respond to frequencies higher than the prior art. This could be outside the audible range. Again, it is "fundamental that claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention." United States v. Adams, 383 U.S. 39, 49 (1966); see also

Markman, 52 F.3d at 979 ("Claims must be read in view of the specification, of which they are a part. . . . For claim construction purposes, the [specification's] description may act as a sort of dictionary, which explains the invention and may define terms used in the claims."). As a result, I find that "acoustic" is not limited to the audible frequency range in the '342 patent. I will adopt plaintiff's proposed definition for "being suspended proximate to the pair of natural acoustic nodes" with the following modification: "next to the pair of natural acoustic nodes, where acoustic is not limited to the audible frequency range."

5. "Signal processing circuit discriminating the angular rate from the sensing signals"

This term appears in disputed claims 43, 44, 48, 51, 52, and 67. Plaintiff proposes a construction of "signal processing circuit" as "circuit configured to process electrical current conveying information." Defendants object to the lack of any definition for "processing." They propose the definition:

> The portion of an electrical circuit devoted to manipulating or modifying an electrical characteristic or quantity, such as a voltage or current, in a prescribed or definitive manner.

Both parties agree that "signal processing circuit" is a term used in the relevant art, but defendants attempt to further define the term by defining each individual word. Defendants reason that plaintiff's definition is not helpful to a jury. However, claim terms

must be defined to reflect their ordinary meaning known to one skilled in the relevant art. See, e.g., Generation II Orthotics Inc. v. Medical Technology Inc., 263 F.3d 1356, 1366 (Fed. Cir. 2001) ("We recognize that it is important to bear in mind that the viewing glass through which the claims are construed is that of a person skilled in the art."). Since the parties agree that "signal processing circuit" is a known term in the relevant art, I find plaintiff's proposed definition to be sufficient.

The parties also dispute the use of the term "discriminating." Defendants contend that the ordinary meaning, "to constitute a difference between, distinguish," does not explain the meaning of the term because it is not clear what things are to be distinguished. They propose "calculate" as the best construction of discrimination in this instance. Plaintiff proposes "determine the angular rate from the sensing information."

I find that "calculate" is too restrictive a definition for a process that simply determines a difference between two things, such as between two signals. Defendant supports its argument for the word "calculate" by referring to the patent specification language that states "the difference between the output signals from the pairs of outer electrodes E1-E4 is used by the second op amp 214 to produce an output signal whose amplitude is proportional to the angular rate of the vibratory sensing element." Craig Rogers Expert Rpt., dkt. # 61, at 33 (citing to '342 Pat., col. 14, lns. 64-68). Defendants assert that

determining the difference between the output signal from the pairs of outer electrodes is equivalent to calculating the angular rate. I am unpersuaded by defendants' argument. Calculating is a much more conclusive and involved process than merely distinguishing things from one another, such as the angular rate from the sensing signals.

I agree with plaintiff that "discriminating" has an ordinary meaning in the electronic arts, but disagree with its proposed definition of "determining." The McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed. 2003), defines a "discriminator" as "a circuit in which magnitude and polarity of the output voltage depend on how an input signal differs from a standard or from another signal." This definition implies that discriminating refers to "distinguishing" or "determining" a difference. However, the word "determining" alone, as plaintiff uses it in its proposed definition, could be interpreted to mean "calculating," which plaintiff argues is too restrictive. Plt.'s Br., dkt. # 82, at 16. The Oxford English Dictionary Online defines "determine" as "to ascertain definitely by observation, examination, *calculation*, etc. (a point previously unknown or uncertain)." (Emphasis added.) Furthermore, plaintiff's own citation used to support its definition of "discriminate" does not support plaintiff's proposed construction. Plaintiff cites Websters 9th New Collegiate Dictionary, which defines "discriminate" to mean "to make a distinction;" the word "determine" is not part of the definition. Therefore, I will adopt plaintiff's proposed definition for "signal processing circuit discriminating the angular rate

from the sensing signals" with the following modifications: "circuit configured to process electrical current conveying information, such as sensing information, and to distinguish the angular rate from the sensing information."

6. "Electrically connected"

"Electrically connected" is found in disputed claims 44, 47, 48, 51, and 52. Plaintiff objects to construing this term because it is obvious what it means, but proposes "electrically joined," if a construction is necessary. Defendants argue that the term means "joined through a conducting path," a definition from the Modern Dictionary of Electronics 235 (7th ed. 1999). Plaintiff objects, pointing out that the '342 patent never uses the term "conducting path." Defendants offer no convincing reason why this term requires further definition, that is, why one of ordinary skill in the art would not immediately understand this term as it is used in disputed claims 44, 47, 48, 51 and 52. Hence, I find no reason to define this term as defendant suggests. I will adopt plaintiff's proposed definition. See, e.g., Johnson Worldwide Associates, Inc. v. Zebco Corp., 175 F.3d 985, 990 (Fed. Cir. 1999) ("Our case law demonstrates two situations where a sufficient reason exists to require the entry of a definition of a claim term other than its ordinary and accustomed meaning. The first arises if the patentee has chosen to be his or her own lexicographer by clearly setting forth an explicit definition for a claim term. The second is where the term or terms chosen

by the patentee so deprive the claim of clarity that there is no means by which the scope of the claim may be ascertained from the language used.").

B. '954 Patent

Defendants filed an application for the '954 patent on November 21, 1996. It was issued on July 13, 1999, for a "vibration gyroscope and method for adjusting vibration-gyroscope characteristics." According to defendants, "the '954 application claimed priority to a prior Japanese patent application, which was filed in the Japanese Patent Office on November 22, 1995." Dfts.' Br., dkt. # 84, at 2. There are a total of nine claims in the '954 patent, all of which are in dispute. Claim numbers 1 and 6 are independent claims, the rest are dependent. The parties dispute seven terms.

1. "Characteristics"

The term "characteristics" is found in disputed claims 6, 7, 8, and 9. Plaintiff proposes the definition "measurable properties of a device"; defendant wants to define the term as "inherent and measurable properties, features, attributes, distinguishing qualities, relationships, or ensembles of related values." I find that plaintiff's proposal captures the essential aspects of the term within the context of the claim language. Defendants' wordier

construction adds complexity without clarity. In particular, defendants do not explain why a jury would need to know about "relationships" or "ensembles of related values" in order to understand the scope of the '954 patent. In the absence of any such explanation, I will adopt plaintiff's briefer construction.

2. Desired relationship between temperature and sensitivity change rate

This term is used in disputed claims 2 and 7. The primary dispute centers on "sensitivity change rate." Plaintiff's proposed definition is "the desired relationship between temperature in degrees and sensitivity change rate [, where] The sensitivity change rate is calculated by dividing the percentage change in voltage by the change in temperature in degrees." Defendants propose as the definition, "the parametric correspondence between the detector sensitivity and the ambient temperature, where that correspondence is wanted by the designer of the gyroscope."

Defendants do not explain either why it is necessary to define anything in the term other than sensitivity change rate when the other terms are well known or why they think including the term "parametric correspondence" will assist the jury in understanding the meaning of the word "relationship." Furthermore, defendant ignores the word "rate" in its proposed definition. Although claim 7 omits the word "rate," defendants' expert David

Hughes states that the word "rate" was omitted inadvertently. David Hughes Rpt., dkt. # 62, at 4. Yet, even after recognizing the omission of the word "rate" in claim 7, defendants offer no definition for the term. "Sensitivity change rate" is a different measure from "detector sensitivity." For example, the specification uses "sensitivity change rate" and "detecting sensitivity" differently. Specifically, it states:

> In the vibration gyroscope shown in Fig. 5, with the impedances of resistors 18a and 18b which serve as the loads of piezoelectric elements 16a and 16b acting as detecting elements being set appropriately, the desired relationship between the temperature and *sensitivity change rate* is obtained and the response is improved . . . . In addition, the *detecting sensitivity* of the vibrator increases and the S/N ratio is improved. '954 Pat., col. 6, lns. 10-19 (emphasis added).

If the patentee meant "sensitivity change rate" and "detector sensitivity" to be synonymous, it would have been unnecessary for him to distinguish the improvements between the sensitivity change rate and the detecting sensitivity when the loads of detecting elements 16a and 16b are set appropriately. See, e.g., Forest Laboratories, Inc. v. Abbott Laboratories, 239 F.3d 1305, 1310 (Fed. Cir. 2001) ("Where claims use different terms, those differences are presumed to reflect a difference in the scope of the claims.").

Plaintiff cites figure 2, among other things, in the '954 patent to help define "sensitivity change rate." Defendants cite a specification section that refers to fig. 2 to support its proposed definition. Figure 2 addresses the relationship between temperature

in degrees Celsius and the sensitivity change rate expressed as a percent. Defendants failed to use their supporting citation when crafting their definition. Defendants state that there is nothing in the '954 patent that requires the sensitivity change rate to be calculated as plaintiff suggests in its definition. However, defendants do not offer any other method for calculating the sensitivity change rate and do not assert that plaintiff's suggested method is wrong. Therefore, I will adopt plaintiff's proposed definition for this term: "The desired relationship between temperature in degrees and sensitivity change rate. The sensitivity change rate is calculated by dividing the percentage change in voltage by the change in temperature in degrees."

3. "Detecting elements" and "detectors"

These terms are found in disputed claims 1, 3, 4, 6, 8, and 9. Plaintiff proposes "parts of a detector" as the construction of the term "detecting elements" and "detection devices made up of detecting elements as the construction of the term "detectors." Defendants propose just one definition for the two terms: "elements that utilize or transform energy to produce an associated signal."

Defendants argue that the terms are meant to be synonymous, although both terms are used in the patent. Claim 1 reads:

1. A vibration gyroscope comprising:

a vibrator having first and second detecting elements for obtaining a signal corresponding to a rotation angular velocity, each of the first and second detectors having an impedance; and . . . .

Ordinarily, when a patent uses two different terms, the presumption is that the terms have different meanings. Defendants maintain that the presumption does not apply in this instance. They explain the apparent use of two different terms as mere compliance with the drafting rule that an element of a claim is referred to as *the* element only after it has been identified in the claim. Thus, someone reading claim 1 would understand from the use of the definite article preceding "first and second detectors" that the term refers back to "first and second detecting elements" and would not understand "detecting elements" to be a component of a larger "detector." I agree. In the specification, fig. 1 in particular, the patentee discusses the preferred embodiment of the invention. Piezoelectric elements 16a and 16b of fig. 2 are used for "feedback and detection." These same detectors also have impedances that are differentiated from resistors 18a and 18b (which serve as loads) in a matching condition to achieve the desired relationship between temperature and sensitivity change rate. '954 Pat., col. 4, lns. 24-67. The specification and corresponding diagram do not present the detecting elements 16a and 16b as part of a larger detector. Therefore, the specification sheds light on the scope of disputed claim 1 because, like the language in the

specification, claim 1 assigns impedances to the detectors and the impedances of the detecting elements are different from the impedances of the loads in a matching condition. Thus, I find that detecting elements and detectors are synonymous. I adopt defendants' proposed definition for the terms.

4. "Impedance"

"Impedance" is found in all disputed claims of the '954 patent. Plaintiff proposes the construction, "a material's opposition to the flow of electric current." Defendant proposes:

> An electric parameter, expressed in units of "ohms," which is a measure of the total opposition to current flow in an electric element or circuit resulting from a combination of resistance, capacitance, and inductance. Further, in anything except a purely resistive element or circuit, impedance is a function of frequency.

Plaintiff argues that impedance is a well known term of art in the electronics industry and that it is unnecessary to use the lengthy definition that defendant has proposed. Defendants argue that plaintiff's proposal fails to capture the complexity of this term of art and could be used as easily to define "resistance" as "impedance." I agree with defendants' argument that plaintiff's proposed definition could be confused with the term "resistance." The McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed. 2003), defines "resistance" as "the opposition that a device or material offers to the flow of direct current,

equal to the voltage drop across the element divided by the current through the element." The IEEE Standard Dictionary of Electrical and Electronics Terms, (IEEE Std. 100 - 1992), defines "resistance" as "the *real* part of impedance" (emphasis added). Therefore, resistance measures actual opposition to a flow of current, whereas impedance factors in "reactance," which the McGraw-Hill Dictionary of Scientific and Technical Terms defines as the "*imaginary* part of the impedance of an alternating-current circuit" (emphasis added). It is easy to understand how one would confuse impedance with resistance if the latter term is the *real* part of impedance. However, the cited dictionaries imply that impedance is more than just resistance. Although plaintiff notes that defendants' proposed definition is lengthy and confusing, it does not argue that the definition is technically wrong. Therefore, I will adopt defendants' proposed definition for impedance because it offers a more comprehensive explanation of the term.

5. "Loads"

This term appears in all disputed claims of the '954 patent. Plaintiff proposes to define the term as "structures opposing the flow of electric current"; defendant proposes "devices that absorb, convert or consume energy or power," explaining that this definition captures the more complex meaning of "load" as a person of ordinary skill in the art would

understand it. Plaintiff maintains that its proposal is more apt because neither of the terms "power" nor "energy" appears in the '954 patent. However, defendants assert that plaintiff's definition could also be used for the definition of a "resistor," which the McGraw-Hill Dictionary of Scientific and Technical Terms, 6th Edition (2003), states are "used in circuits to limit current flow or to provide a voltage drop." I agree that plaintiff's proffered definition for "load" could be confused with the term "resistor."

It is clear from the specification that resistors have a different meaning from loads. For example, the specification indicates that "resistors 18a and 18b serve as the loads of the piezoelectric elements." '954 Pat., col. 4, lns. 28-30. I understand this statement to imply that a resistor can function as a load, but in such a situation the resistor would do more than limit current flow. Furthermore, just because the terms "energy" or "power" do not appear in the '954 patent, as plaintiff asserts, it does not mean that such terms are irrelevant to the patent. The term "electric current," conceivably a type of "energy" or "power," does not appear anywhere in the '954 patent, yet plaintiff has no problem using the term in its proposed definition. As a result, I will adopt defendants' proposed definition for "loads."

6. "Matching condition"

Claims 1, 3, 4, 6, 8, and 9 use the phrase "matching condition," which both parties agree is not a phrase with a common meaning in the technology field. Claim 1 uses the phrase in the following context:

> Wherein the impedances of said first and second loads are different than the impedances of said first and second detecting elements in a matching condition, respectively.

Plaintiff proposes construing "matching condition" to mean that "the detecting elements have equal impedances" and looks to the '954 patent's specification language for support. See, e.g., '954 Pat., col. 5, lns. 3-5, 8-10 (describing assignment of equal resistance measure (ohms) to both detecting elements). Defendants define the term to mean "that a load impedance is hooked up to, or corresponds to, each associated detector element." Defendants state that the term "impedance matching" coincides with plaintiff's definition and that it is a term that would be known to one of ordinary technical skill in the art, but do not agree that the term is an accurate construction of "matching condition," as that term is used in the '954 patent. According to defendants, there are three possible situations in which impedance matching could occur. The first is when the impedance of load 1 (L1) is equal to that of detecting element 1 (D1) and the impedance of load 2 (L2) is equal to that of detecting element 2 (D2). However, defendants argue, the patentee has disavowed this construction under the patent. See '954 Pat., col. 2, lns. 51-53 ("the impedance of the load

is *different than* the impedance of the detecting element in a matching condition and has a value commensurate with a desired response") (emphasis added.)

The second situation occurs when the impedance of L1 equals the impedance of L2. However, defendants assert that the prosecution history shows that the patentee did not intend to refer to this situation in the patent at issue. In the Amendment after Final Action at 4, the patentees advised the examiner that "a person skilled in the art would understand that the present invention can be practiced even if the impedances of the two loads are not the same."

The third situation can occur when the impedance of the detecting element D1 equals the impedance of the detecting element D2. This is the situation covered by plaintiff's proposed definition for "matching condition." Defendants refer again to the prosecution history to show that this is not the definition the patentee intended. In the amendment after final action, the patentees contrasted their invention to a conventional gyroscope, in which "the impedances of the two resistors are not necessarily the same as long as the impedances of the two load resistors are equal to the impedances of the detecting elements in a matching condition, respectively." Amendment after Final Action, at 4. In a conventional gyroscope, L1=D1 and L2=D2, but L1 does not equal L2. Defendants argue persuasively that in such a scenario, it is impossible for D1 to equal D2. The patentees then

contrasted the situation of a conventional gyroscope with the new invention, stating, "The inventors of the present invention, however, have found that the temperature sensitivity characteristic, the response characteristics and the detection sensitivity can be changed by making the impedances of the two loads different from the impedances of the two detecting elements in a matching condition, respectively." Id. I understand the patentees to be saying that, in the described situation, L1 would not equal D1 and L2 would not equal D2. D1 and D2 could have equal impedances, but not necessarily.

Having shown that the patent and prosecution history do not conform to plaintiff's construction of "matching condition" (because the impedances need not match), defendants argue that the term must mean something else. Reviewing the prosecution history sheds light on what that might be. Read in the context of the '954 patent, the term "matching condition" refers to a connection, rather than an equalization. It means simply that "a load impedance is hooked up to, or corresponds to, each associated detector element." I will construe the term "matching condition" as having this meaning.

7. "Resistors"

This term is found in claim 5 of the '954 patent. Plaintiff proposes a definition of "resistors" as "circuit components made to provide a definite amount of resistance."

Defendants argue that plaintiff's proposed definition may confuse a jury into thinking that the word "definite" implies fixed-value resistors only. Thus, defendants wish to construe the term to mean "a device having a specified electrical resistance, and which thereby opposes the flow of electric current. There are both fixed-value resistors and adjustable, or variable resistors."

The Illustrated Dictionary of Electronics (7th Edition 1997) defines "fixed resistor" as "a nonadjustable resistor (i.e., one having an unalterable value of resistance)" and a "variable resistor" as "a resistor whose value can be varied either continuously or in steps." As I previously noted, The IEEE Standard Dictionary of Electrical and Electronics Terms, (IEEE Std. 100 - 1992), defines "resistance" as "the *real* part of impedance." (emphasis added). Impedance is measured in ohms. The '954 patent specification shows that the impedances of the resistors can vary. For example, the specification sets the impedances of the resistors to 12, 15 or 18 kΩ. See, e.g., 954 Pat., col. 5, lns. 4-20. Therefore, I conclude the resistors in the '954 patent can vary. I will adopt defendants' proposed definition as it encompasses both fixed and variable resistors.

ORDER

IT IS ORDERED that the motion of defendants Murata Electronics North America,

Inc. and Murata Manufacturing Co., Ltd. to submit previously unavailable evidence on claim construction is DENIED and plaintiff Watson Industries, Inc.'s motion to strike evidence submitted after the discovery and briefing deadline is GRANTED.

IT IS FURTHER ORDERED that the disputed claim terms of plaintiff Watson Industries, Inc.'s U.S. Patent No. 5,430,342 are construed as follows:

1. In claims 43 and 67, "base electrode" means "a conductor through which an electric charge is transferred and that is located between at least two layers of piezoelectric material";

2. "Inner conductive layer" means "a conductive layer between the base electrode and a layer of piezoelectric material";

3. In all disputed claims, "angular rate sensor system" is defined as "components configured to determine an angular rate, which includes both a vibratory sensing element and a single processing circuit";

4. In claims 43 and 67, "disposed on" means "placed relative to something";

5. In claims 43 and 67, "being suspended proximate to the pair of natural acoustic nodes" is defined as "being suspended next to the pair of natural acoustic nodes, where acoustic is not limited to the audible frequency range";

6. In claims 43, 44, 48, 51, 52, and 67, "signal processing circuit discriminating the

angular rate from the sensing signals" means "circuit configured to process electrical current conveying information, such as sensing information, and to distinguish the angular rate from the sensing information";

7. In claims 44, 47, 48, 51, and 52, "electrically connected" is defined as "electrically joined."

Further, IT IS ORDERED that the disputed claim terms of U.S. Patent No. 5,922, 954, owned by defendants Murata Electronics North America, Inc., and Murata Manufacturing Co., Ltd. are construed as follows:

1. In claims 6, 7, 8, and 9, the term "characteristics" is defined as"measurable properties of a device";

2. In claims 2 and 7, the term "desired relationship between temperature and sensitivity change rate" is defined as "the desired relationship between temperature in degrees and sensitivity change rate. The sensitivity change rate is calculated by dividing the percentage change in voltage by the change in temperature in degrees";

3. In claims 1, 3, 4, 6, 8, and 9, "detecting elements" and "detectors" mean "elements that utilize or transform energy to produce an associated signal";

4. In all disputed claims, "impedance" is defined as "an electric parameter, expressed in units of "ohms," which is a measure of the total opposition to current flow in an electric

element or circuit resulting from a combination of resistance, capacitance, and inductance. Further, in anything except a purely resistive element or circuit, impedance is a function of frequency";

5. In all disputed claims, "loads" are defined as "devices that absorb, convert or consume energy or power";

6. In claims 1, 3, 4, 6, 8, and 9, the term "matching condition" means "a load impedance is hooked up to, or corresponds to, each associated detector element";

7. In claim 5, the term "resistors" is defined as "a device having a specified electrical resistance, and which thereby opposes the flow of electric current. There are both fixed-value resistors and adjustable, or variable, resistors."

Entered this 29th day of September, 2003.

BY THE COURT:
BARBARA B. CRABB
District Judge