IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC, Plaintiff, v. TOYOTA MOTOR CORPORATION, a Japanese Corporation, TOYOTA MOTOR NORTH AMERICA, INC., and TOYOTA MOTOR SALES, U.S.A., INC., Defendants.	Case No.: 2-04CV-211 (DF)

PLAINTIFF PAICE LLC'S CLAIM CONSTRUCTION BRIEF

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Cases

Plaintiff PAICE LLC ("Paice") hereby submits its brief on the proper construction of certain disputed terms in U.S. Patent No. 5,343,970 ("the '970 patent," attached hereto as Exhibit A); U.S. Patent No. 6,209,672 ("the '672 patent," attached hereto as Exhibit B); and U.S. Patent No. 6,554,088 ("the '088 patent," attached hereto as Exhibit C). For the reasons that follow, Paice respectfully requests that this Court adopt its proposed claim constructions in their entirety.

I. INTRODUCTION

A. Technological Overview

Hybrid electric vehicles are powered by both a traditional internal combustion engine (ICE) and at least one electric motor. Such vehicles have become increasingly attractive alternatives to traditional automobiles powered solely by ICEs or straight electric vehicles because they combine the advantages from each and minimize their shortcomings. Namely, hybrid electric vehicles provide the potential for maximum fuel efficiency, lower emissions, and increased driveability in a wide range of vehicles, without limiting travel distance and performance based on the electric motor alone.

Hybrid electric vehicles are generally categorized as one of a number of types: a series hybrid, a parallel hybrid, or a parallel-series hybrid. In a series hybrid system, the engine runs a generator that powers the electric motor in order to provide torque[1] to the wheels to propel the vehicle. In a parallel hybrid system, the engine and the electric motor are both connected to the drive wheels of the vehicle, and either can impart torque to the wheels to propel the vehicle. A parallel-series hybrid, as the name implies, can operate as a series or a parallel hybrid; the engine can run a generator to power a motor to impart torque to the wheels to propel the vehicle (series), or the engine and motor can themselves directly impart torque to the wheels to propel the vehicle (parallel). To maximize efficient use of the battery energy, each type of hybrid provides for

[1] "Torque" is a measure of rotational force.

recovery of torque from the wheels during braking to drive a generator, which charges the battery.

Because hybrid electric vehicles are equipped with more than one source of torque, a microprocessor typically is employed to control the various components of the hybrid system, including determining the source of propulsive torque in a given driving condition. This determination is critically important, as hybrid systems that do not make such determinations properly or use the most efficient source of torque ultimately fail to realize the significant benefits of hybrids.

The salient issues in this case revolve around the novel topology of Paice hybrid electric vehicles, and the superior methods invented by Paice to select modes of operation (e.g., motor-only), together with the method of operation of key components to maximize utility of such vehicles.

B. The Parties

Paice is in the business of developing superior hybrid electric vehicle technology that, when implemented, promotes better fuel efficiency, lower emissions, superior driving performance and fuel efficient operation of internal combustion engines. Formed in 1992, Paice has been at the forefront of development of economical hybrid electric vehicle control systems and related technologies. As a result of its inventive endeavors, Paice owns a number of patents directed to hybrid vehicle technology. The technological superiority of Paice's technology as a cost-effective alternative to other hybrid vehicle designs has been recognized in the industry.

Defendants Toyota Motor Corporation of Japan, Toyota Motor North America, Inc., and Toyota Motor Sales U.S.A., Inc. (collectively "Toyota") are in the business of designing, developing, manufacturing, marketing, and selling automobiles worldwide, including hybrid electric vehicles within the United States. Toyota's present hybrid electric vehicle sold in the United States, the Prius, was named Motor Trend's 2004 Car of the Year, and had year-end sales in 2004 in excess of 53,000 units. In addition to the Prius, Toyota also has offered for sale or

announced the imminent release of three other hybrid electric vehicles: the Lexus 400h, the Lexus GS 450h, and the Highlander Hybrid.

C. Legal Background

Paice instituted this action for patent infringement against Toyota for infringement of the '970 patent, the '672 patent, and the '088 patent (collectively, "the asserted patents") on June 8, 2004. Toyota answered on July 30, 2004, asserting counterclaims of non-infringement and invalidity. The court entered a Scheduling Order on November 22, 2004 which, among other things, required that the parties exchange claim terms they believed require construction by February 22, 2005.[2] Paice identified five claim terms that it believed required construction. *See* 2/22/2005 Davis Ltr to Grasso (Exhibit D). Toyota identified over 30 claim terms requiring construction, including those identified by Paice. *See* 2/22/2005 Gerchick Ltr to Cordell (Exhibit E). Paice's proposed construction for each of the disputed terms is discussed in further detail below. Paice remains convinced that the Court need construe only a handful of terms; however, Paice here presents its analysis of all of the terms Toyota urges for construction.

II. THE PAICE PATENTS

Paice is the owner by assignment of each of the asserted patents. As discussed in further detail below, each of these patents is directed to various aspects of hybrid electric vehicle technology, including novel designs and control systems for hybrid electric vehicles.

A. United States Patent No. 5,343,970

The '970 patent, entitled "Hybrid Electric Vehicle," issued on September 6, 1994, from an application that was filed on September 21, 1992. The '970 patent generally discloses and claims a novel hybrid electric vehicle, including an internal combustion engine and electric

[2] The Scheduling Order did not set a page limit for these claim construction briefs. Pursuant to their March 4, 2005 Joint Motion to Extend Page Limit of Claim Construction Briefs, the parties have jointly sought a 35-page limit.

motor, both of which can provide torque to the wheels of the vehicle through a controllable torque transfer unit.

At the time the application that became the '970 patent was filed, hybrid electric vehicles were known in the art, but suffered from substantial deficiencies that prohibited them from being competitive with traditional automobiles. For example, hybrid vehicles known in the prior art taught or required that the vehicle operator control the transition between operating modes. '970 patent, col. 3:16-25; col. 4:12-18. Similarly, many of the hybrids in the prior art required multiple-speed, manual, or automatic transmissions — which added complexity, cost, and size to the vehicles. '970 patent, col. 3:31-59. Further, because the electric motors in the prior art rarely provided sufficient torque to propel the vehicle at low speeds, a variable-speed transmission was often required. '970 patent, col. 4:22-26.

To overcome these deficiencies in the prior art, the '970 patent teaches employing an innovative parallel hybrid system containing a relatively powerful alternating current electric motor that is run at high voltage and low current, and an internal combustion engine that is operated in its fuel efficient range. The microprocessor controls the direction of torque transfer responsive to the mode of operation to provide highly efficient operation of the vehicle over a wide range of operating conditions. In particular, the transition between modes in this system is transparent to the operator. The arrangement of a preferred embodiment is shown in Figure 3 of the '970 patent, reproduced below.

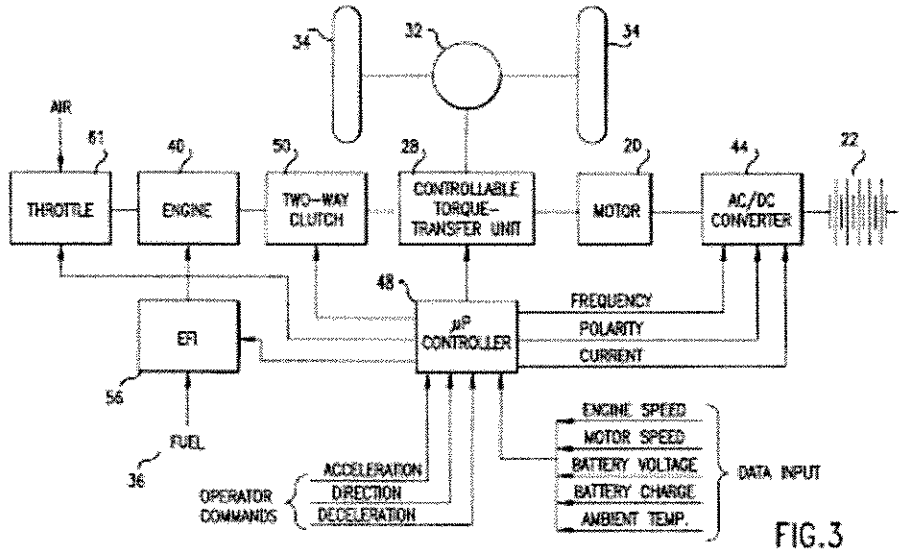


FIG.3

In the preferred embodiment shown in Figure 3, an internal combustion engine 40 and an alternating current (AC) motor 20 are connected to the drive wheels of the vehicle through a controllable torque transfer unit 28. The torque transfer unit receives torque from the engine 40 or motor 20 and transmits this torque to drive wheels 34. A battery 22 provides direct current (DC) power to a bi-directional solid state AC/DC power converter 44, which converts the DC power from the battery to AC power, which then powers motor 20. '970 patent, col. 9:61-68. The battery is charged by power generated by the motor 20 when it receives torque from the wheels (sometimes called "regenerative braking") or the engine, through the torque transfer unit. '970 patent, col. 9:68-col. 10:4.

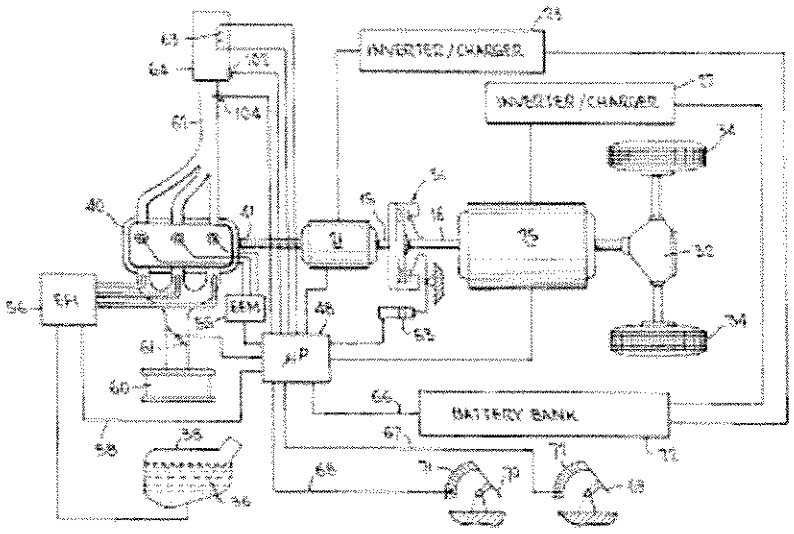
Control of the engine and motor is accomplished by microprocessor controller 48, which controls the rate of supply of fuel to engine 40; the throttle opening by which the engine receives air for combusting fuel; the operation of two-way clutch 50 and torque transfer unit 28; and the bi-directional flow of power between battery 22 and motor 20. This control is responsive to control signals received from the vehicle operator (e.g., depressing accelerator or brake pedals) and external system elements, such as engine speed, motor speed, and battery voltage. '970 patent, col. 10:4-24.

These input parameters are indicative of the overall driving condition, which is used to select the operating mode of the vehicle. Thus, for example, when the vehicle is operating in low-speed circumstances, such as in stop-and-go city driving, the microprocessor may determine that all torque should be supplied from the electric motor. '970 patent, col. 10:52-68. Likewise, when the vehicle is operating in a high-speed acceleration or hill climbing mode, the microprocessor may determine that torque should be supplied to the drive wheels from both the engine and the electric motor. '970 patent, col. 14:22-34.

B. United States Patent No. 6,209,672

The '672 patent, entitled "Hybrid Vehicle," issued on April 3, 2001 from an application with a priority date of September 14, 1998. Although the '672 patent is not related to the '970 patent, it builds substantially on the teachings of the '970 patent. *See, e.g.*, '672 patent, col. 18:18-64. In particular, the '672 patent discloses and claims a novel hybrid electric vehicle, including an internal combustion engine and a first (starter/generator) motor that are connected to the drive wheels of the vehicle through a clutch, as well as a second (traction) motor connected to the drive wheels. Both (or either of) the traction motor and the starter/generator motor may be used to recharge the battery during regenerative braking, or from the engine. Additionally, a microprocessor is employed to arbitrate between operating modes based on the vehicle's instantaneous torque requirements (also called "road load"), state of charge of the battery bank, and other variables. '672 patent, col. 28:4-19.

A preferred embodiment of the hybrid vehicle claimed in the '672 patent is shown in Figure 3, reproduced below.



As shown, a traction motor 25 is connected to the road wheels 34 through a differential 32. A starter motor 21 is connected directly to the internal combustion engine 40. The motors 21 and 25 are functional as either motors or generators, depending on the operation of the corresponding inverter/charger units 23 and 27, which connect the motors to the battery bank 22. Engine 40 and traction motor 25 are controllably connected to each other through a clutch 51. '672 patent, col. 19:20-33.

These components are controlled by a microprocessor 48, or any controller capable of examining input parameters and signals and controlling the mode of operation of the vehicle according to a stored program. '672 patent, col. 18:65-col. 19:9. For example, control of engine 40 is accomplished by way of control signals provided by the microprocessor to the electronic fuel injection (EFI) unit 56 and electronic engine management (EEM) unit 55. Control of (1) starting of the engine 40; (2) usage of motors 21 and 25 to provide propulsive torque; or (3) usage of motors as generators to provide regenerative recharging of battery bank 22, is accomplished through control signals provided by the microprocessor to the inverter/charger units 23 and 27. '672 patent, col. 19:31-39, col. 21:39-49, col. 22:49-54.

The hybrid vehicle may be operated in a number of modes based on the vehicle's instantaneous torque requirements, the engine's maximum torque output, the state of charge of

the battery, and other operating parameters. In the preferred embodiment of the '672 patent, the microprocessor causes the vehicle to operate in one of four principal modes in response to a control strategy.

During low-speed operation (mode I), the hybrid vehicle is operated as a simple electric car, with the traction motor providing all torque to propel the vehicle. '672 patent, col. 28:50-55; Fig. 8(a). As the vehicle continues to be propelled in electric only mode, the state of charge of the battery may become depleted, and need to be recharged. During this battery recharge mode (mode II), the vehicle operates as in mode I, with the engine running the starter/generator motor to provide electrical energy to operate the traction motor and recharge the battery. '672 patent, col. 28:58-col. 29:5; Fig. 8(b). During highway cruising (mode IV),[3] which is when the internal combustion engine operates in its fuel efficient range, the hybrid vehicle is operated essentially as a traditional automobile, with the engine providing all torque to propel the vehicle. '672 patent, col. 29:6-22; Fig. 8(c). If, while operating the vehicle in mode IV, the operator calls for additional power, then the vehicle will enter acceleration/hill-climbing operation (mode V), where the traction motor provides additional torque to propel the vehicle beyond that already provided by engine 40. '672 patent, col. 29:23-39; Fig. 8(d).

In addition to the topology and control system described in the '672 patent, it also discloses a novel configuration of the source of energy used to power the electric motors. In particular, because the hybrid electric vehicle of the '672 patent is preferably operated at high voltages, there is a substantial need to subdivide this voltage for safety reasons. Accordingly, the '672 patent teaches separating the battery bank with normally-open switching devices that will isolate the batteries from one another in the event power is cut off from those devices. '672 patent, col. 27:49-57.

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[3] Mode III, an emergency mode of operation not relevant to the asserted claims, allows the vehicle to operate in electric-only mode in the case of engine or battery fault. '672 patent, col. 30:10-14.

C. United States Patent No. 6,554,088

The '088 patent, entitled "Hybrid Vehicles," issued on April 29, 2003, and claims priority to two provisional applications dated March 1, 1999, and September 14, 1998, respectively. As a continuation-in-part of the '672 patent, the entire disclosure of the '672 patent is contained in the '088 patent specification. Because the only asserted claim in the '088 patent, claim 1, does not involve any new matter, the relevant disclosure in the '088 patent has been described above.

III. LEGAL STANDARDS OF CLAIM INTERPRETATION

A. Principles of Claim Construction

Claim interpretation is a question of law decided before proceeding to an infringement or invalidity analysis. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995), *aff'd* 517 U.S. 370 (1996); *see also Rockwell Int'l Corp. v. United States*, 147 F.3d 1358, 1362 (Fed. Cir. 1998). "In determining the meaning of disputed claim language, a court looks first to the intrinsic evidence of record, examining, in order, the claim language itself, the specification, and the prosecution history." *Alza Corp. v. Mylan Lab., Inc.* 391 F.3d 1364, 1370 (Fed. Cir. 2004); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

"To properly construe a claim term, a court first considers the intrinsic evidence, starting with the language of the claims." *Merck & Co., Inc. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1369-70 (Fed. Cir. 2005). "While in some cases there is a presumption that favors the ordinary meaning of a term, *Tex. Digital Sys. v. Telegenix Inc.*, 308 F.3d 1193, 1202 (Fed. Cir. 2002), the court must first examine the specification to determine whether the patentee acted as his own lexicographer of a term that already has an ordinary meaning to a person of skill in the art." *Id.* at 1370. To act as his own lexicographer and deviate from ordinary meaning, the patentee "must clearly express that intent in the written description" with "sufficient clarity to put one reasonably skilled in the art on notice that the inventor intended to redefine the claim term." *Id.*

More specifically, this requires that "the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Gemstar-TV Guide Int'l, Inc. v. ITC*, 383 F.3d 1352, 1364 (Fed. Cir. 2004); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002).

Absent such clear intent, there is a heavy presumption in favor of the ordinary meaning of claim language. *Tex. Digital*, 308 F.3d at 1202. Accordingly, "[u]nless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art." *Gemstar-TV*, 383 F.3d at 1364; *Tex. Digital*, 308 F.3d at 1202. "[D]ictionaries, encyclopedias and treatises are particularly useful resources to assist the court in determining the ordinary and customary meanings of claim terms." *Tex. Digital*, 308 F.3d at 1202. If a claim term has no ordinary and accustomed meaning, then its meaning must be found elsewhere in the patent. *Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004) (citing *J.T. Eaton & Co. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1570 (Fed. Cir. 1997)).

"Consulting the written description and prosecution history as a threshold step in the claim construction process, before any effort is made to discern the ordinary and customary meanings attributed to the words themselves, invites a violation of . . . precedent counseling against importing limitations into the claims." *Id.* at 1204. "For example, if an invention is disclosed in the written description in only one exemplary form or in only one embodiment, the risk of starting with the intrinsic record is that the single form or embodiment so disclosed will be read to require that the claim terms be limited to that single form or embodiment." *Id.*

Precedent teaches that in construing disputed claim terms, courts should exercise due care to avoid limiting the claims solely to the disclosed embodiments, even where there may be only

one. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("[T]his court has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.") Rather, in the absence of a manifest intention by the patentee to limit claim scope, either in the written description or prosecution history, such a restrictive reading of the claims would constitute legal error. *Id.* at 906-908 (citing cases).

Finally, courts also may consult extrinsic evidence, such as expert testimony, but must not rely on it to construe the claims unless the analysis of the intrinsic evidence leaves the claim language unclear. *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 855, 862 (Fed. Cir. 2004).

B. Construction of Means-Plus-Function Claim Elements

A patentee may claim his invention as a means for performing a specified function without the recital of structure, material, or acts in support thereof. 35 U.S.C. § 112 ¶ 6. "Whether claim language should be interpreted as a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6 is a question of law." *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1318 (Fed. Cir. 2004).

"[A] claim limitation that employs the language 'means ... for' invokes a rebuttable presumption that § 112, ¶ 6 applies." *Gemstar-TV*, 383 F.3d at 1361. "While the use of the word 'means' gives rise to a presumption that § 112, paragraph 6 applies, the presumption is overcome by the recitation of the structure needed to perform the recited function." *TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1135 (Fed. Cir. 2004).

"The determination of the claimed function and corresponding structure of a means-plus-function claim limitation is a question of law. . . ." *Gemstar-TV*, 383 F.3d at 1361 (quoting *ACTV Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1087 (Fed. Cir. 2003)). The court must first

identify the recited function within the means-plus-function limitation and, then, determine the structure that corresponds to that function by examining the written description. *Id.*

IV. PROPOSED INTERPRETATION OF DISPUTED CLAIM TERMS

A. '970 Patent

PAICE has asserted '970 patent claims 1-5, 7, 9, 11, 15-22, 32, 38, and 39 against Toyota.

1. Claim 1

Claim 1, directed generally to hybrid vehicles, reads as follows (disputed terms italicized here and below):

> 1. A hybrid electric vehicle, comprising:
>
> two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying *drive torque* to said output shaft, said power unit comprising:
>
> a *controllable torque transfer unit* adapted to receive torque from two sources via first and second *input shafts* and transmit said torque to said output shaft;
>
> an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;
>
> an electric motor adapted to receive electricity from a battery and supply torque to said torque transfer unit, said motor also being adapted to be operated as a generator, whereupon said motor receives torque and generates electric energy;
>
> a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator; and
>
> *a controller for controlling the operation of* said engine, said electric motor, and said torque transfer unit, such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor via said first and second input shafts and transmits torque therefrom to said drive wheels by way of said output shaft, *and for controlling the relative contributions of* the internal combustion engine and electric motor to the torque driving the wheels;
>
> wherein the relative ratios of the rates of rotation of said engine and said electric motor to said input shafts, and the relative ratio of the rate of rotation of an *output member* of said torque transfer unit to the rate of rotation of said driven wheels, are fixed.

a. "Drive torque"

PAICE's proposed construction: This term means the torque transmitted to the wheels to propel the vehicle.

The ordinary meaning of this phrase, *i.e.*, Paice's proposed definition, is supported by the claim language and the specification. Claim 1 requires "two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft." This means that the wheels receive torque to propel the vehicle from the output shaft, and the torque transmitted to the output shaft is the drive torque. Drive torque must therefore be the torque transmitted to the wheels to propel the vehicle. This is evident in the specification's description of both electric-only and engine-only modes. '970 patent, col. 10:63-68; col. 13:65-col. 14:3.

b. "Controllable torque transfer unit"

PAICE's proposed construction: This term means a multi-input device or component that is controlled to transfer variable amounts of torque.

The '970 patent specification clearly supports Paice's proposed definition. For example, "both the engine 40 and the motor 20 provide torque to the drive wheels 34 by way of the controllable torque transfer unit 28 [, and] the microprocessor 48 controls the flow of torque between the motor 20, the engine 40, and the wheels 34 responsive to the mode of operation of the vehicle." '970 patent, col. 10:24-30.

c. "Input shafts"

PAICE's proposed construction: This term means the mechanical components that transfer torque between the engine and motor, respectively, and the controllable torque transfer unit.

The term "input shafts" is a simple, non-technical term, and should be governed by its ordinary meaning. In describing Figure 11, the specification refers to "the input shaft 86 for receiving torque from the engine 40 via clutch 50" and the "motor shaft 26 for receiving torque from the electric motor 20." '970 patent, col. 15:38-41. Further, the specification explicitly refers to the shafts connecting the motor and engine, respectively, to the controllable torque transfer unit, as "input shafts 86 and 26." '970 patent, col. 16:9, 20.

d. "A controller for controlling the operation of . . . and for controlling the relative contributions of . . . ."

PAICE's proposed construction: This phrase means a computerized control device.

The '970 patent specification clearly supports Paice's proposed definition. The '970 patent specification identifies item 48 in Figure 3 as a "microprocessor controller." '970 patent, col. 10:4-5. Because this controller "controls the opening of a throttle 61 by which the engine 40 receives intake air from the atmosphere for combusting fuel, controls the operation of the two-way clutch 50, controls the operation of the torque transfer unit 28, and controls the bi-directional flow of power between the battery 22 and the motor 20 through frequency, current, and polarity signals passed to the bi-directional AC/DC power converter 44," it must be properly-configured in order to perform such operational controls. '970 patent, col. 10:6-14.

e. "Output member"

PAICE's proposed construction: This term means a mechanical component that transfers the drive torque out of the controllable torque transfer unit.

"Output member" is a simple, non-technical term, and should be governed by its ordinary meaning. In Figure 11, for example, it is the combination of the housing 92 and the teeth 104 that transfer torque out of the controllable torque transfer unit: "When housing 92 rotates about its axis, torque is transmitted from housing 92 to wheels 34 by drive shaft 30, as

indicated schematically by pinion 102 on drive shaft 30 mating with teeth 104 formed on the outer circumference of housing 92." '970 patent, col. 15:43-47.

2. Claim 2

Claim 2, which depends from claim 1, specifies how the controller operates. It reads:

> 2. The vehicle of claim 1, wherein said *controller means* controls flow of combustible fuel to said engine and of electrical energy to said motor, whereby said vehicle may be operated in a variety of *operating modes* selected dependent on desired vehicle performance.

a. "Controller means"

PAICE's proposed construction: This term means a computerized control device.

The term "controller means" should be construed just as the controller of claim 1, from which claim 2 depends.

b. "Operating mode"

PAICE's proposed construction: This term means mode or state of operation.

"Operating modes" is clearly a simple non-technical term and should be given its ordinary and accustomed meaning. "Mode" is defined as "a particular functioning arrangement or condition: status" and "operating" as "performing a function: exerting power or influence." *See* Merriam-Webster's On-line Dictionary, www.m-w.com, visited March 7, 2005 (Exhibit F). In other words, an "operating mode" is simply a functional status, or state of operation.

3. Claim 9

Claim 9 depends from claim 7, further reciting solid-state switching means. It reads:

> 9. The vehicle of claim 7, wherein said electric motor is an AC motor, said vehicle further comprises *solid state switching means*, and said battery provides DC to said

switching means, said switching means comprising *means for converting said DC supplied by said battery to AC for supply to said electric motor*, and further comprising *means for rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery.*

a. "Solid state switching means . . .means for converting . . . [and] means for rectifying"

PAICE's proposed construction: This term means a solid-state circuit for converting DC to AC and rectifying AC to DC.

An issue as to whether 35 U.S.C. § 112, ¶ 6 applies is triggered by the words "means for" in this term. Here, any suggestion that § 112, ¶ 6 applies is rebutted because sufficient structure is recited in the claims to remove this claim term from 35 U.S.C. § 112 ¶ 6. *See TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1135 (Fed. Cir. 2004). Accordingly, solid-state switching means is governed by its ordinary and plain meaning.

4. Claim 11

Claim 11 is directed to a hybrid vehicle that employs a solid-state switching apparatus. It reads:

11. A hybrid electric vehicle, comprising:

two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft, said power unit comprising:

a controllable torque transfer unit adapted to receive torque from two sources and transfer said torque to said output shaft;

an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;

an AC electric motor adapted to receive electric energy from a battery and supply torque to said torque transfer unit, said motor being further adapted to be operable as a generator;

a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator;

solid state switching means for converting DC supplied by said battery to AC for supply to said electric motor, and for rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery; and

a controller for controlling the operation of said engine, said electric motor, said solid state switching means, and said torque transfer unit, such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor and transmits torque therefrom to said drive wheels by way of said output shaft, and for controlling the relative contributions of the internal combustion engine and electric motor to the torque driving the wheels.

a. "Solid state switching means"

PAICE's proposed construction: This term means a solid-state circuit for converting DC to AC and rectifying AC to DC.

An issue as to whether 35 U.S.C. § 112, ¶ 6 applies is triggered by the words "means for" in this term. Here, the suggestion that § 112, ¶ 6 applies is rebutted because sufficient structure is recited in the claims to remove this claim term from 35 U.S.C. § 112 ¶ 6. *See TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1135 (Fed. Cir. 2004). Accordingly, solid-state switching means is governed by its ordinary and plain meaning.

5. Claim 32

Claim 32 is directed to a hybrid electric vehicle controlled to operate in a plurality of modes responsive to certain commands. It reads:

32. A hybrid electric vehicle, comprising:

a controllable torque transfer unit, operable to transfer torque in three modes: (a) from either or both of two input shafts to an output member, said output member transmitting torque to drive wheels of said vehicle; (b) between said input shafts; and (c) from said output member to one or both of said input shafts;

an electric motor adapted to apply torque to a first of said input shafts responsive to supplied electrical energy, said motor further being operable in a generator mode, to provide electrical energy when driven by torque transferred thereto via said first input shaft;

a combustible-fuel-burning internal combustion engine adapted to apply torque to a second of said input shafts;

a battery adapted to supply electrical energy to and store energy received from said electric motor; and

a controller adapted to receive input commands from a driver of said vehicle to monitor operation of said vehicle and to control operation of said controllable torque transfer unit, said motor, and said internal combustion engine, wherein said controller comprises *means for performing the following functions responsive to input commands and monitored operation of said vehicle:*

selecting an appropriate mode of operation of said vehicle from at least the following possible modes of operation:
low speed running;
steady state running;
acceleration or hill climbing;
battery charging;
braking; and
engine starting;

selecting the appropriate flow paths of electrical energy and/or combustible fuel and of torque to effectuate the selected mode of operation; and

controlling operation of said controllable torque transfer unit, said electric motor and said internal combustion engine in accordance with said selected appropriate flow paths and selected mode of operation.

a. "Means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation . . . ."

PAICE's proposed construction: This phrase means a computerized control device and associated components for selecting an operating mode and controlling the engine, motor, and battery to implement that mode.

A rebuttable presumption that 35 U.S.C. § 112, ¶ 6 applies is triggered by the words "means for" in this term without qualifying structure. The first step is to identify the recited function of the means-plus-function limitation. The function is "selecting an appropriate mode of operation of said vehicle."

The second step is to identify the structure(s) in the written description which correspond to this recited function. As detailed in the specification, "a microprocessor controller 48 controls

the rate of supply of fuel to engine 40 as indicated at 56, controls the opening of a throttle 61 by which the engine receives intake air from the atmosphere for combusting fuel, controls the operation of the two-way clutch 50, controls the operation of the torque transfer unit 28, and controls the bi-directional flow of power between the battery 22 and the motor 20 through frequency, current, and polarity signals passed to the bi-directional AC/DC power converter 44." '970 patent, col. 10:4-14. "[M]icroprocessor 48 is provided with all information relevant to the performance of the system, and appropriately controls torque transfer unit 28, internal combustion engine 40, switching unit 28, and electric motor 20 to ensure that appropriate torque is delivered to the wheels 34 of the vehicle." '970 patent, col. 12:64-col. 13:2. While not stated explicitly, the microprocessor selects the mode of operation because it controls the stated structural components of the system, and it is the state of operation of those components that defines the various operating modes of the system.

The specification statements as to individual modes confirm this construction. For example, the specifications states "[u]nder the control of microprocessor 48, the regenerative braking/coasting mode can be entered whenever the driver removes his foot from an accelerator pedal and depresses a brake pedal." '970 patent, col. 14:41-45. Thus, a computerized control device and its associated components are necessary to perform the recited functions of the means-plus-function limitation.

b. "Low speed running" [mode]

PAICE's proposed construction: This term means the vehicle is powered by the motor.

This term is expressly defined in the '970 patent, and that definition governs. The low-speed running mode is the operating mode in which the vehicle is powered by the motor. '970 patent, col. 14:34-35.

c. "Steady state running" [mode]

PAICE's proposed construction: This term means the vehicle is powered by the engine.

This term is expressly defined in the '970 patent, and that definition governs. Steady state running mode, which is also described as the highway cruising mode, is the operating mode in which the vehicle is powered by the engine. '970 patent, col. 13:66-col. 14:3.

d. "Acceleration or hill climbing" [mode]

PAICE's proposed construction: This term means the vehicle is powered by the motor and the engine.

This term is expressly defined in the '970 patent, and that definition governs. The acceleration or hill-climbing mode is the mode in which the vehicle is powered by the motor and the engine. '970 patent, col. 14:22-25.

e. "Battery charging" [mode]

PAICE's proposed construction: This term means energy is generated by the engine to recharge the battery.

This term is expressly defined in the '970 patent, and that definition governs. The battery charging mode is the mode in which the battery is recharged by the engine. '970 patent, col. 15:1-10.

f. "Braking" [mode]

PAICE's proposed construction: This term means energy is generated by the motor to recharge the battery.

This term is expressly defined in the '970 patent, and that definition governs. The braking mode is the mode in which kinetic energy from the wheels drives the motor as a generator to recharge the battery. '970 patent, col. 14:37-41.

g. "Engine starting"

PAICE's proposed construction: This term means the motor is used to start the engine.

This term is expressly defined in the '970 patent, and that definition governs. The engine starting mode is the mode in which the motor supplies torque to start the internal combustion engine from rest. '970 patent, col. 14:53-57.

6. Claim 38

Claim 38 is directed to a hybrid electric vehicle wherein the inverter is comprised of a solid state switching network. It reads:

> 38. The vehicle of claim 32, wherein said battery supplies DC electrical energy, said electric motor operates on AC energy, said vehicle further comprising a *solid state switching network* for conversion of DC to AC for powering said motor, and wherein said controller controls operation of said switching network such that said DC is converted to AC of appropriate characteristics to effectuate the mode of operation thus determined.

a. "Solid state switching network"

PAICE's proposed construction: This phrase means a solid-state circuit for converting DC to AC and rectifying AC to DC.

The '970 patent specification clearly supports the proposed definition of "solid state switching network." The specification states, "[t]he motor receives power from a bi-directional AC/DC power converter 44 comprising a solid-state switching network connected in turn to a battery 22." '970 patent, col. 9:65-68. The bi-directional AC/DC power converter is a circuit that converts DC current from the battery to AC current for the motor and AC current from the motor used as a generator to DC for the battery. '970 patent, col. 11:38-52. Thus, the proper definition for the term is a solid-state circuit for converting DC to AC and rectifying AC to DC.

B. '672 Patent

Paice has asserted '672 patent claims 1-3, 13, 15, and 30 against Toyota.

1. Claim 1

Claim 1 is directed to a hybrid vehicle of novel topology. It reads:

1. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine;

a first electric starting motor electrically coupled to said battery bank for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, and said first motor being mechanically coupled to said internal combustion engine, the combination of said internal combustion engine and said first electric motor being mechanically coupled to a *clutch* controlled by said controller for controllable torque-transmitting connection between said combination and road wheels of said vehicle,

said first motor being responsive to commands from said controller, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, (2) accept energy from said battery bank to apply torque to said engine for starting said engine, (3) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (4) accept torque from said road wheels to charge said battery bank; and

a second electric traction motor, electrically coupled to said battery bank, such that said second electric motor can be controlled for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, said second motor being *directly coupled* to road wheels of said vehicle, without a *controllable clutch* disposed therebetween, such that said second motor is permanently connected to said road wheels for torque transmission therebetween, and said second motor being responsive to commands from said controller in order to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank.

a. "Clutch"

PAICE's proposed construction: This term means a device that selectively permits or inhibits transfer of torque and rotation.

The ordinary meaning controls the definition of "clutch," and PAICE's proposed definition is supported by the meaning of the term "clutch" that would be understood by those of skill in the art. The '672 patent teaches that the preferred embodiment of the hybrid vehicle has power sources that are controllably connected by a clutch for transfer of torque. '672 patent, col.

13:25-26. Engine 40 and traction motor 25 are controllably connected to each other through a clutch 51. '672 patent, col. 19:20-56.

The '672 patent does not limit the claimed invention to using a particular type of clutch:

> Accordingly, clutch 51 need not be an ordinary automotive friction clutch . . . as conventionally provided to allow extensive relative slipping before the shafts are fully engaged. More particularly, as slipping of clutch 51 is not required to propel the vehicle initially from rest, as is the case in a conventional vehicles, clutch 51 need not allow for extensive slipping when being engaged. In some cases, it may be satisfactory to provide [a clutch] as a simple, self-aligning mechanical interlock . . ., wherein positive mechanical connection is made between the shafts 15 and 16 upon engagement. Such a mechanical interlock is much simpler and less expensive than a friction clutch.

'672 patent, col. 19:39-52.

Thus, the clutch performs the function of controlling the transfer of torque and rotation from the input power source to the wheels, as instructed by the microprocessor, to propel the vehicle. '672 patent, col. 12:62-66.

b. "Controllable clutch"

PAICE's proposed construction: This term means a clutch that is capable of being controlled by a controller.

This claim term should be construed in accordance with its ordinary meaning. Thus, a controllable clutch is simply a clutch that is capable of being controlled by a controller.

c. "Directly coupled"

PAICE's proposed construction: The claim term "directly coupled" means mechanically connected without a clutch in between.

This claim term is best defined by reference to intrinsic record statements made during the prosecution history to obtain allowance of the patent.

Initially, the Examiner rejected claim 1 as obvious in view of certain prior art. In response to the Examiner's rejection, the applicant and the Examiner held an interview and

discussed the potential patentability of claim 1. The Examiner's Summary of that meeting in the file history indicates that certain "new limitations of claim 1 define over [the prior art] with additional recitation that traction motor is connected to wheels . . . and claims 31 & 32 will be amended with language of claim 1 re: direct connection." September 19, 2000 Interview Summary (Exhibit G). In amending claim 1 to conform to the agreement reached in the Interview, the applicant explained:

> "As amended, claim 1 recites a hybrid vehicle [where] the traction motor is connected directly and permanently to the road wheels for torque transmission therebetween, i.e., without a clutch therebetween."

'672 File History, September 27, 2000 Amendment (Exhibit H) at 8. This direct coupling does not prohibit a differential between the motor and the wheels. As shown in the disclosed embodiments, a differential is part of direct coupling between the motor and the road wheels. '672 patent, col. 19:19-21.

2. Claim 2

> 2. The hybrid vehicle of claim 1, wherein said controller is provided with signals indicative of the *instantaneous road load* experienced by said vehicle and of the state of charge of said battery bank, and controls operation of said engine, said clutch, and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals.

a. "Instantaneous road load" / "RL"

PAICE's proposed construction: These terms mean the instantaneous torque required for propulsion of the vehicle.

The phrase road load is expressly defined in claim 15 of the '672 patent, and that definition controls. The phrases "road load" and the symbol "RL" are further defined in the '672 patent specification and file history, and that definition governs. For example, the specification teaches that "[w]hile operating at low speeds, e.g., when the vehicle's torque requirements ("road

load" or "RL") are less than 30% of the engine's maximum torque output ("MTO"), engine 40 is run only as needed to charge battery bank 22." '672 patent, col. 28:58-61.

Although both the specification and the claims refer alternatively to "road load" and "instantaneous road load," these terms should be construed in the same fashion. First, because the term road load is, by definition, an instantaneous quantity — instantaneous torque requirement — the phrase "instantaneous road load" is partially redundant. Second, the patent specification supports the conclusion that the patentee considered the term "instantaneous" as surplusage; road load is defined as *both* the vehicle's torque requirements and the vehicle's *instantaneous* torque requirements. *Compare* '672 patent, col. 28:58-61 *with* col. 31:14-17.

3. Claim 3

Claim 3, which depends from claim 2, reads as follows:

> 3. The hybrid vehicle of claim 2 wherein said signal indicative of the instantaneous road load experienced by said vehicle is determined by said controller at least in part by *monitoring commands provided by the vehicle operator.*

a. "Monitoring commands provided by the vehicle operator"

PAICE's proposed construction: This phrase means determining the vehicle operator's input commands.

The phrase "monitoring commands . . . ." should be given its ordinary meaning as reflected in Paice's proposed definition. The '672 patent specification teaches that a microprocessor is provided with operator input commands, such as acceleration, direction, and deceleration commands. '672 patent, col 20:27-32. The specification further teaches that the microprocessor monitors these input commands, such as the rate at which the pedals are depressed, as well as the cruise control function, to control operation of the vehicle. '672 patent, col. 20:37-47. For example, "when a sensed increase in the road load (e.g., by a continued operator request for more power) indicates that the preferred operating mode is changing . . . the

microprocessor controls starting motor 21 by way of inverter/charger 23 to start engine 40." '672 patent, col. 29: 10-15.

4. Claim 13

Claim 13, which depends from claim 1, reads as follows:

> 13. The hybrid vehicle of claim 1, wherein the *total torque available at the road wheels from said engine* is no greater than the total torque available from said first and second motors combined.

a. "Total torque available at the road wheels from said engine"

PAICE's proposed construction: This phrase means the maximum torque that the engine delivers to the wheels.

The ordinary meaning of "total torque available at the road wheels from said engine" controls. In the context of the '672 patent, one of ordinary skill in the art would understand it to mean the maximum torque that the engine can provide under normal operating conditions.

The '672 patent teaches that the total torque provided by the traction and starter/generator motors should be at least equal to that produced by the internal combustion engine, "in order to provide adequate low-speed performance under motor alone." '672 patent, col. 24: 11-13. The torque available at the road wheels thus refers to that torque maximally available to propel the vehicle from a given source. Thus, the total torque available at the road wheels is the maximum torque output of the internal combustion engine.

5. Claim 15

Claim 15 discloses a method of operating a hybrid vehicle based on road load. It reads:

> 15. A method for controlling the operation of a hybrid vehicle operable in a plurality of differing modes, comprising the steps of:
>
> providing a hybrid vehicle comprising an internal combustion engine for providing torque up to a maximum torque output (MTO), said engine being controllably coupled to road wheels of said vehicle by a clutch, a traction motor being coupled to road wheels of

said vehicle, a starting motor coupled to said engine, both said motors being operable as generators, a battery bank for providing electrical energy to and accepting energy from said motors, and a controller for controlling operation of said engine, clutch, and first and second motors, and controlling flow of electrical energy between said motors and said battery bank,

and *operating said controller to control selection of the operational mode of said vehicle between a low-speed mode I, a cruising mode IV, and an acceleration mode V,* wherein torque to propel said vehicle is provided by said traction motor, said engine, and both, respectively, in response to *monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL).*

a. "Operating said controller to control selection of the operational mode of said vehicle between a low-speed mode I, a cruising mode IV, and an acceleration mode V"

PAICE's proposed construction: This phrase means operating the computerized control device in a manner such that it controls whether torque to propel the vehicle is provided by the motor, the engine, or the motor and the engine.

This term is controlled by the plain meaning. The '672 patent teaches in numerous places that the controller arbitrates between operating modes. As noted earlier, for example, the '672 patent specification teaches that "when a sensed increase in the road load . . . indicates that the preferred operating mode is changing from low-speed [mode I] to highway cruising [mode IV] operation, the microprocessor controls starting motor 21 by way of inverter/charger 23 to start engine 40." '672 patent, col. 29, lines 10-15. Moreover, the patent teaches that exemplary Figure 6 illustrates that "the mode of vehicle operation as controlled by microprocessor 48 is a function of the state of charge of the battery bank, the instantaneous road load, and time." '672 patent, col. 29, lines 34-37. It further states that in another exemplary embodiment, "the microprocessor tests sensed and calculated values for system variables, such as the vehicle's instantaneous torque requirement, i.e. the 'road load' RL, the engine's instantaneous torque output ITO, both being expressed as a percentage of the engine's maximum torque output MTO, and the state of charge of the battery bank BSC, expressed as a percentage of its full charge, against setpoints, and uses the results of the comparisons to control the mode of vehicle operation." '672 patent, col. 32:63 – col. 33:4.

b. "Monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL)"

PAICE's proposed construction: This phrase means determining the instantaneous torque requirements required for propulsion of the vehicle.

This phrase, too, is controlled by plain meaning. As used here, "monitoring" is "check[ing] on or regulat[ing] the performance of (a machine, airplane, etc)." WEBSTER'S NEW WORLD COLLEGE DICTIONARY 930 (2001) (Exhibit I). A preferred embodiment in the '672 patent specification teaches that the microprocessor monitors the instantaneous torque requirement through an exemplary control program shown at Fig. 9. '672 patent, col. 32:60-col. 33:18. In that example, the microprocessor determines whether the road load is less than a predetermined value of the engine's MTO, and then makes mode switching and implementing determination based on its responses. The specification teaches, for example, that "providing differing mode switching points depending on the direction of the change in road load can be accomplished readily by monitoring the road load RL as a function of time, and taking appropriate control action." '672 patent, col. 36: 34-37.

c. "Operating mode"

PAICE's proposed construction: This term means mode or state of operation.

This claim term should be construed in accordance with its ordinary meaning, in the same manner it was construed in the '970 patent.

6. Claim 30

Claim 30 is directed to a topology and design of the hybrid electric power source. It reads:

> 30. A hybrid vehicle operable in a plurality of differing modes, said vehicle comprising an internal combustion engine for providing torque up to a maximum torque output (MTO) and *at least one traction motor being coupled to road wheels of said vehicle*, said at least one motor being operable as a generator, a battery bank for providing electrical

energy to and accepting energy from said motor, *a controller for controlling operation of said engine and said at least one motor, and controlling flow of electrical energy between said motor and said battery bank*, and at least one controllable inverter/charger connected between said motor and said battery bank, said controllable inverter/charger comprising a plurality of pairs of elements controllably switched in response to commands from said controller for operating said motor to supply propulsive torque to said road wheels in response to energy from said battery bank, and for converting torque transmitted from said road wheels to said motor into energy for recharging said battery bank,

wherein said battery bank is *configured as a number of batteries connected by normally-open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices.*

a. "At least one traction motor being coupled to road wheels of said vehicle"

PAICE's proposed construction: This phrase means at least one electric motor capable of imparting torque to the road wheels.

This claim phrase is a simple and non-technical phrase, and therefore should be governed by its ordinary meaning. Notably, it requires only that the traction motor be coupled to the road wheels, not *directly* to the road wheels as in '672 patent claim 1. The traction motor imparts torque to propel the vehicle in electric-only mode, for example, and optionally may be directly coupled to the road wheels or may be connected through a an intervening torque transfer device such as a clutch. '672 patent, col. 19:58-64; Figs. 3, 4.

b. "A controller for controlling operation . . . and controlling flow"

PAICE's proposed construction: This phrase means a computerized control device.

The '672 patent expressly defines the controller as follows:

[T]he term microprocessor is . . . to be understood [to] includ[e] various types of computerized control devices not always referred to as 'microprocessors' per se, such as computers themselves incorporating microprocessors, digital signal processors, fuzzy logic controllers, analog computers, and combinations of these. In short, any controller capable of examining input parameters and signals and controlling the mode of operation of the vehicle according to a stored program . . . is considered to be a 'microprocessor' as used herein.

'672 patent, col. 18:65-col. 19:9. This definition controls, and is consistent with the term "controller" that appears in the '970 patent.

c. "Configured as a number of batteries connected by normally-open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices"

PAICE's proposed construction: This phrase means at least two batteries connected through switches that open if power is cut off.

The '672 patent does not expressly define this phrase. However, the patent specification provides clear guidance regarding the ordinary meaning of this language to those of ordinary skill. This ordinary meaning supports Paice's proposed claim construction.

First, the specification teaches that the battery bank 22 that powers the electric motors is comprised of a number of batteries connected in series. '672 patent, col. 27:31-37. In the preferred embodiment, these batteries "are connected to each other by normally-open relays 87, so that the batteries 85 are isolated from one another under fail-safe conditions." '672 patent, col. 27:49-53. Each exemplary "fail-safe condition" disclosed in the specification involves a power-ending event that cuts off power to the relays, thereby causing the relays to open. '672 patent, col. 27:53-57.

C. '088 Patent

Paice has asserted only claim 1 of the '088 patent against Toyota. It reads:

> 1. In a method of controlling an internal combustion engine of a hybrid vehicle, said engine being operatively connected to drive wheels of said vehicle through a clutch, said vehicle further comprising a traction motor operatively connected to drive wheels of said vehicle, a starter/generator motor operatively connected to said engine for starting said engine and for providing electrical power in response to torque from said engine, a battery bank adapted to store electrical energy to power said traction motor and to start said engine, at least one inverter/charger adapted to cooperate with said traction motor and said starter/generator such that said traction motor can be operated to provide torque to said road wheels responsive to electrical power from said battery bank, or to provide

electrical power to said battery bank responsive to torque from said road wheels, and such that said starter/generator can be operated to provide torque to start said engine, or to provide electrical power to said battery bank responsive to torque provided by said engine, and a microprocessor adapted to control operation of said engine, said traction motor, said starter/generator, and said at least one inverter/charger, so as to control flow of torque and electrical power therebetween in response to sensed parameters, the improvement comprising:

establishing at least four vehicle *operating modes,* including:

a mode I, wherein said engine is not operated and said vehicle is propelled by torque from said traction motor in response to electrical power drawn from said battery bank;

a mode II, wherein said vehicle is propelled by torque from said traction motor in response to electrical power drawn from said battery bank, and said starter/generator is driven by torque provided by said engine to provide electrical power to recharge said battery bank;

a mode IV, wherein said vehicle is propelled by torque from said engine; and

a mode V, wherein said vehicle is propelled by torque from said engine and from said traction motor in response to electrical power drawn from said battery bank;

wherein *said microprocessor controls operation of said V engine, said traction motor, said starter/generator, and said at least one inverter/charger so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL)* of said vehicle, and *said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined minimum value of its maximum torque output.*[4]

a. "Instantaneous torque demands (RL)"

PAICE's proposed construction: This term means the instantaneous torque required for propulsion of the vehicle.

This claim term is expressly defined in the '088 patent as "road load": "The vehicle operating mode is determined by a microprocessor responsive to the 'road load,' that is, the vehicle's instantaneous torque demands." '088 patent 11:60-62. This is synonymous with the

[4] The final limitation of '088 claim 1 recites a "microprocessor controls operation of said V engine." The Roman numeral "V" appearing before the word engine in this limitation is plainly a typographical error, and has no bearing on the construction of this claim.

definition of road load in the '672 patent, i.e., "the instantaneous torque requirements." '088 patent, col. 35:20-27.

b. "Said microprocessor controls operation...so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle"

PAICE's proposed construction: This phrase means operating the computerized control device such that it determines the mode of operation based on the instantaneous torque requirements required for propulsion of the vehicle.

This claim limitation is essentially a combination of claim terms for which Paice has already proposed a construction. In particular, Paice has already proposed the correct construction for a microprocessor controller arbitrating between mode I, mode IV, and mode V, as well as for RL (road load) in the '672 patent specification. Because the '088 patent is related to the '672 patent, these terms should be construed consistently.

c. "Operating mode"

PAICE's proposed construction: This phrase means mode or state or operation.

This claim term should be construed in accordance with its ordinary meaning, in the same manner it was construed in the '970 and '672 patents.

d. "Said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined minimum value of its maximum torque output"

PAICE's proposed construction: This phrase means selecting an operating mode in which the engine is operated only when the load on the engine exceeds a predetermined amount of the engine's maximum torque output.

The ordinary meaning of this phrase supports Paice's proposed construction. The '088 patent specification discloses that in a preferred embodiment, the engine is used to propel the

vehicle only when it is efficient to do so, such as when the torque needed to propel the vehicle is above 30% of the engine's MTO. '088 patent, col. 20:55-63. In this embodiment, the control program for initiating mode-switching has a transition point where the load on the engine exceeds 30% of its MTO, but the predetermined setpoint is based on a number of characteristics of the internal combustion engine and therefore can be set over a wide range of values. '088 patent, col. 40:47-55.

V. CONCLUSION

For the foregoing reasons, Paice respectfully requests that this Court adopt its proposed construction of the disputed claim terms as set forth herein.

Respectfully submitted,

Dated: March 8, 2005

By: /s/ Sam Baxter

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was served on all counsel of record via ECF or U.S. Mail on this 8th day of March, 2005.

/s/ Sam Baxter
Sam Baxter

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC,

Plaintiff,

v.

TOYOTA MOTOR CORPORATION, a Japanese Corporation, TOYOTA MOTOR NORTH AMERICA, INC., and TOYOTA MOTOR SALES, U.S.A., INC.,

Defendants.

Case No.: 2-04CV-211 (DF)

PLAINTIFF PAICE LLC'S CLAIM CONSTRUCTION REPLY BRIEF

March 29, 2005

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TABLE OF CONTENTS

TABLE OF AUTHORITIES

Plaintiff Paice LLC ("Paice") hereby submits its reply brief in support of its proposed construction of certain disputed terms in the asserted patents.

I. INTRODUCTION

In its opening *Markman* brief, Paice offered proposed constructions for each of the claim terms that it identified, as well as the over 30 claim terms Toyota claimed required construction. Paice's proposed constructions were true to the ordinary meaning of the terms as they would be understood by one of ordinary skill in the art and, where the intrinsic record compelled a construction different from the ordinary meaning, Paice scrupulously adhered to the well-known canons of claim construction.

Toyota, by contrast, did not offer proposed constructions for many of the claim terms ***for which it, and not Paice, specifically said construction was necessary.*** Of the claim constructions it did propose, many fly in the face of well-established case law. Toyota's proposed constructions are flawed because they forsake the plain meaning of terms without justification, improperly import limitations into the claims, read out disclosed preferred embodiments, and seek to impose limitations under 35 U.S.C. § 112 ¶ 6 where none are required. For the few claim terms about which the parties generally agree, Toyota has made them unduly and unnecessarily complex, when a simpler construction was sufficient.

As a result, for the reasons stated below and in Paice's opening *Markman* Brief, Paice's proposed constructions set forth the correct interpretations of the disputed terms.[1]

[1] For the Court's convenience, Paice has attached hereto as Appendix 1 a table comparing each party's proposed claim construction.

II. RESPONSE TO TOYOTA'S PROPOSED INTERPRETATION OF DISPUTED CLAIM TERMS

Paice offers below its response to Toyota's proposed claim constructions. For uniformity and clarity, Paice has maintained the format of its opening *Markman* brief and addressed the disputed terms in the order in which they appear in the asserted claims.

A. '970 Patent

1. Claim 1

a. "Drive torque"

Paice's proposed construction: the torque transmitted to the wheels to propel the vehicle

Toyota's proposed construction: the rotary force generated by the power unit of a hybrid electric vehicle for use in moving the drive wheels of that vehicle

As explained in Paice's initial brief, Paice's construction of the term "drive torque" represents the ordinary meaning of the term. Although Toyota's construction is similar, it is less precise and incorporates unsupported limitations outside of the ordinary meaning.

In particular, the term "drive torque" is not unique to hybrid vehicles. In a traditional automobile with only an internal combustion engine, for example, some of the engine's torque powers the alternator and air conditioning compressor, so not all engine torque becomes drive torque. Accordingly, Toyota's inclusion of "generated by the power unit of a hybrid electric vehicle" in its proposed definition is unnecessarily limiting and therefore inappropriate.

Moreover, it is unnecessary to further define the word torque within the term "drive torque" because torque has an exact and well-understood meaning. While the use of the term "rotary force" is generally correct, it is unnecessary since "rotary force" is torque. *See* Paice's

Opening *Markman* Brief (hereafter *Paice Opening Br.*) at 1 n.1. Therefore, Paice respectfully requests that the Court adopt its proposed construction of "drive torque."

b. "Controllable torque transfer unit"

Paice's proposed construction: a multi-input device or component that is controlled to transfer variable amounts of torque

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, four constantly-meshing bevel gears, housing having teeth formed on its outer circumference, and locking devices of Fig. 11 of the '970 patent when used to controllably transfer torque

Toyota argues, unpersuasively, that this claim term should be construed as a means-plus-function limitation under 35 U.S.C. § 112, ¶ 6. "'[A] claim term that does not use 'means' will trigger the rebuttable presumption that § 112 ¶ 6 does not apply.'" *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004) (quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1369 (Fed. Cir. 2002)). "The presumption that a limitation lacking the term 'means' is not subject to section 112 ¶ 6 can be overcome if it is demonstrated that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function [but] the presumption . . . is a strong one that is not readily overcome." *Id.* (internal quotations and citations omitted). Toyota's conclusory statement that the claim "does not recite sufficient structure adequate to interpret the limitation for use in the hybrid electric vehicle" is not sufficient to carry Toyota's heavy burden.[2]

[2] To the contrary, the phrase "controllable torque transfer unit" calls to mind substantial structure. A brief search of automaker websites reveals numerous examples of controllable torque transfer units which are described and treated as structural elements. For example, Acura describes its controllable torque transfer unit as a "VTM-4 torque transfer unit" which is "a compact cast-aluminum housing bolted directly to MDX's transaxle." *See* Exhibit J (http://www.hondanews.com/CatID3025?mid=2004083154264&mime=asc) at 2. Similarly, a Mitsubishi sold in Europe is described as "featur[ing] a constant mesh torque transfer unit and centre differential with planetary gears and a . . . Viscous Coupling Unit." *See* Exhibit K (http://www.carpages.co.uk/mitsubishi/mitsubishi_2003_shogun_part_5_22_12_02.asp) at 2.

Lighting World supports Paice's position. In that case, the Federal Circuit described its treatment of this issue in *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996), where the term "detent mechanism" was *not* treated as a term covered by § 112 ¶ 6:

> [In *Greenberg*, we] explained that the fact that a particular mechanism ... is defined in functional terms is not sufficient to convert a claim element containing that term into a means for performing a specified function within the meaning of section 112(6). We noted that the definitions made clear that the noun 'detent' denotes a type of device with a generally understood meaning in the mechanical arts, even though the definitions are expressed in functional terms. Moreover, we rejected the claim that because a term does not bring to mind a particular structure, it invokes section 112 ¶ 6. Specifically, we said, 'It is true that the term 'detent' does not call to mind a single well-defined structure, but the same could be said of other commonplace structural terms such as 'clamp' or 'container.'

382 F.3d at 1360 (internal citations and quotations omitted).

The Federal Circuit has similarly held that such broad terms as "digital detector," "eyeglass hanger member," "sealingly connected [joints]" and "reciprocating member" do not trigger section 112 ¶ 6. *Personalized Media Comm., LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 704 (Fed. Cir. 1998); *Al-Site Corp. v. VSA Int'l, Inc.*, 174 F. 3d 1308, 1318 (Fed. Cir. 1999); *Watts v. XL Sys., Inc.*, 232 F.3d 877, 881 (Fed. Cir. 2000); and *CCS Fitness v. Brunswick Corp.*, 288 F.3d 1359, 1369 (Fed. Cir. 2002). Thus, Toyota's attorney argument that the term "controllable torque transfer unit" recites inadequate structure is not factually correct and misstates the law.

Toyota has not overcome the strong presumption that the term "controllable torque transfer unit" is not subject to § 112 ¶ 6. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

c. "Input shafts"

Paice's proposed construction: the mechanical components that transfer torque between the engine and motor, respectively, and the controllable torque transfer unit

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

d. "A controller for controlling the operation of . . . and for controlling the relative contributions of . . . ."

Paice's proposed construction: a computerized control device

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a microprocessor programmed to receive operating commands and data input, and to be responsive to a determined mode of operation of the hybrid electric vehicle, for controlling operation of the engine, the electric motor, and the torque transfer unit

Like the term "controllable torque transfer unit," Toyota argues that this claim term should be subject to 35 U.S.C. § 112, ¶ 6. Again, however, this phrase does not use the term "means" and Toyota has not presented any persuasive argument to rebut the presumption that § 112, ¶ 6 does not apply. The fact that the term may have a functional aspect does not mean that it lacks sufficient structure. *See Apex, Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1372 (Fed. Cir. 2003). To the contrary, a "controller" has a generally understood meaning to one of skill in the art. *See* The American Heritage Dictionary of the English Language, Houghton Mifflin Co., 2000, 4th Ed. (Exhibit L) at 400 ("**Controller** [def. #3]: a regulating mechanism, as in a vehicle or electric device"). Therefore, Paice respectfully requests that the Court adopt its proposed construction.

e. "Output member"

Paice's proposed construction: a mechanical component that transfers the drive torque out of the controllable torque transfer unit

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

2. Claim 2

a. "Controller means"

Paice's proposed construction: a computerized control device

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a microprocessor programmed to receive operating commands and data input, and to be responsive to a determined mode of operation of the hybrid electric vehicle, for controlling operation of the engine, the electric motor, and the torque transfer unit

Toyota's argument that the word "means" invokes 35 U.S.C. § 112, ¶ 6 is unsupported. The "controller means" of dependent claim 2 refers back to the controller identified in claim 1. *See* '970 patent, col. 22:35-36 ("The vehicle of claim 1, wherein said controller means controls flow . . . ."). As a canon of claim construction, these terms should be construed consistently. *Frank's Casing Crew & Rental Tools, Inc. v. Weatherford Int'l, Inc.*, 389 F.3d 1370, 1377 (Fed. Cir. 2004). Because the controller of claim 1 is not subject to § 112 ¶ 6, the use of "means" in dependent claim 2 is surplusage.

In any event, Toyota's position is untenable because, like the term controller, the term "controller means" calls to the mind of one of ordinary skill in the art a specific structure. *See, e.g., TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1121 (Fed. Cir. 2001). Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

b. "Operating mode"

Paice's proposed construction: mode or state of operation

Toyota's proposed construction: mode of operation that is determined by the selection of torque needed to propel the (claimed) vehicle

As explained in Paice's initial brief, Paice's construction of the term "operating mode" represents the ordinary meaning of the term. In contrast, Toyota's proposed construction includes not only the operating mode, but ***how*** that mode is determined. This is yet another improper attempt to import limitations from other claim language and the specification. "[O]perating modes" in claim 2 are "selected dependent on desired vehicle performance." '970 patent, col. 22:38-39. If Toyota's proposed construction was correct, the additional language describing how the operating mode is selected would be completely redundant.

Furthermore, even if a narrower construction of the term than Paice's proposed construction were called for, Toyota's proposed construction contradicts the specification. Describing the battery charging mode in a preferred embodiment, for example, the specification teaches that "[i]nternal combustion engine 40 charges battery 22 by rotating motor 20, providing AC rectified by switching unit 44 to DC suitable for charging battery 22. If this mode is entered during driving, internal combustion engine 40 also supplies torque to road wheels 34 . . . ." '970 patent, col. 15:5-10. In this case, the mode of operation is determined by the selection of torque needed to propel the vehicle and by the torque needed to power the motor to charge the battery. Toyota's proposed construction would therefore read out a preferred embodiment.

Accordingly, Paice respectfully requests that the Court adopt the ordinary meaning of this term in accordance with Paice's proposed construction.

3. Claim 9

a. "Solid state switching means . . .means for converting . . . [and] means for rectifying"

Paice's proposed construction: a solid-state circuit for converting DC to AC and rectifying AC to DC

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a solid-state switching AC/DC converter/motor controller, which consists of a three-phase bridge circuit comprising six solid state devices connected in parallel with six flyback diodes and a microprocessor for controlling operation of AC/DC converter/microcontroller

As explained in Paice's initial brief, 35 U.S.C. § 112, ¶ 6 does not apply here because the term recites sufficient structure to perform the claimed function. *See TI Group Auto. Sys. (N. Am.), Inc. v. VDO N. Am.*, L.L.C., 375 F.3d 1126, 1135 (Fed. Cir. 2004); *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524, 531 (Fed. Cir. 1996) ("perforation means . . . for tearing" not subject to § 112 ¶ 6 because it described the structure supporting the tearing function (i.e., perforations)."). Similarly the term "solid state switching" device sufficiently describes to those of ordinary skill the structure to perform the functions of converting and rectifying. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

Even should the Court decide to extend means plus function treatment to this term, the construction proposed by Toyota is incorrect. The structure corresponding to this term disclosed in the specification is simply a solid state AC to DC and DC to AC converter. *See, e.g.*, '970 patent, col. 5:60-69. Toyota's proposed construction attempts to import additional structure and even functions beyond that recited by the claim. This is plain error.

4. Claim 11

a. "Solid state switching means"

Paice's proposed construction: a solid-state circuit for converting DC to AC and rectifying AC to DC

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6 applies) a solid-state switching AC/DC converter/motor controller, which consists of a three-phase bridge circuit comprising six solid state devices connected in parallel with six flyback diodes and a microprocessor for controlling operation of AC/DC converter/microcontroller

The parties agree that this term from claim 11 should be construed consistently with the same term in claim 9. As discussed above, the Toyota's suggestion that 35 U.S.C. § 112, ¶ 6 applies is overcome by the recitation of sufficient structure to perform the stated functions. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

5. Claim 32

a. "Means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation . . . ."

Paice's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a computerized control device and associated components for selecting an operating mode and controlling the engine, motor, and battery to implement that mode

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a microprocessor programmed to receive operating commands and data input for determining the mode of operation of the hybrid electric vehicle from a group of available operating modes, selecting the appropriate flow paths of electrical energy and/or combustible fuel and of torque to effectuate the selected mode of operation, and controlling the controllable torque transfer unit, electric motor and internal combustion engine in accordance with the selected flow path

The parties agree that this phrase is a means-plus-function term governed by § 112 ¶ 6. Although the parties' proposed constructions are largely similar, Paice's proposal is preferable.

First, Toyota's proposed definition improperly incorporates a requirement that the controller "receive operating commands and data input." This limitation is not present in the

stated functions of the means-plus-function language and therefore should be excluded from the definition. Second, Toyota's proposed definition simply restates the claim language (excluding its improperly imported limitations) and does little to clarify the term. Third, Toyota's proposed construction implies that the operating modes that may be selected according to this function are limited solely to those appearing in the remainder of the claim. As an open-ended claim using the transition "comprising," however, such a limitation is unwarranted.

Accordingly, Paice respectfully requests that the court adopt its construction.

b. "Low speed running" [mode]

Paice's proposed construction: the vehicle is powered by the motor

Toyota's proposed construction: a mode of operation employed when the claimed hybrid electric vehicle is used in city traffic or in reverse, wherein the flow of energy in the vehicle is from the battery to the electric motor and all torque directed to the road wheels of the vehicle is provided by the electric motor

Toyota's proposed construction improperly imports limitations from the specification into the claim. Specifically, the section of the specification quoted by Toyota in its opening brief refers to "operation in low speed circumstances, ***e.g. [for example]***, in city traffic or reversing." '970 patent, col. 10:52-53 (emphasis added). Adoption of Toyota's proposed construction would lead to an absurd result: driving a car forward in electric only mode outside of a city would not be "low speed running" mode because the vehicle is not "in city traffic or in reverse."

As the specification sections referenced by both parties in their opening briefs demonstrate, it is the fact that the vehicle is powered by the electric motor that defines "low speed running" mode. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

c. "Steady state running" [mode]

Paice's proposed construction: the vehicle is powered by the engine

Toyota's proposed construction: a mode of operation employed when the hybrid vehicle is used at normal highway speeds, wherein the flow of energy is from the fuel tank to the engine and all torque directed to the road wheels is provided by the internal combustion engine

Here again, Toyota's proposed construction is overly narrow and imports limitations from the specification into the claim. Specifically, Toyota seeks to impose a negative limitation on the claims wherein no other system element may be active, requiring that "all torque" directed to the road wheels be provided by the engine. However, the '970 patent expressly contemplates that the electric motor may, in some instances, be on during steady state running:

> FIGS. 5-9 show operation of the system in other modes. FIG. 5 depicts operation of the system in a highway cruising mode wherein, as indicated above, all torque required to drive the vehicle at normal highway speeds (e.g. above about 45 mph) is provided by the internal combustion engine 40 supplied with combustible fuel 36 via EFI unit 56 . . . . As the desired cruising speed may vary somewhat, and as the engine output power required to attain and maintain a given road speed will vary with prevailing wind conditions, road grading and the like, the output torque of internal combustion engine 40 may be directly variable responsive to the operator's control inputs. Microprocessor 48 monitors the operator's inputs and the vehicle's performance, ***and activates electric motor 20 when torque in excess of the capabilities of engine 40 is required.*** Conversely, if excess engine torque is available (see the discussion of FIG. 7 below) it can be transformed into electrical energy in motor 20 and stored by battery 22.

'970 patent, col. 13:65 — col. 14:22 (emphasis added).

Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

d. "Acceleration or hill climbing" [mode]

Paice's proposed construction: the vehicle is powered by the motor and the engine

Toyota's proposed construction: a mode of operation employed when the hybrid vehicle is used for high speed acceleration or hill climbing, wherein the flow of energy is from both the battery to the electric motor and the fuel tank to the engine and both the engine and motor provide torque to the road wheels

Yet again, Toyota places undue emphasis on the exemplary description in the specification in proposing a definition for the claim term. While the specification describes this mode as normally being used for high speed acceleration or hill climbing, this mode is defined by the sources of torque that are used to power the vehicle, i.e. the motor and the engine. *See* '970 Patent, Fig. 6; col. 14:22-25. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

e. "Battery charging" [mode]

Paice's proposed construction: energy is generated by the engine to recharge the battery

Toyota's proposed construction: a mode of operation employed when the state of charge of the battery is determined to be low, wherein the flow of energy is from the fuel tank to the engine and from the motor to the battery and torque is directed from the engine to at least the motor

Toyota's proposed construction improperly imports another temporal limitation from the specification into the claim. As described in Paice's opening *Markman* brief, this mode allows that charging takes place "responsive to monitoring the state of charge of the battery." '970 patent, col. 15:3-4. There is no requirement, as in Toyota's proposed definition, that the mode be entered when the "state of charge of the battery is determined to be low." Thus, Paice respectfully requests that the Court adopt Paice's proposed construction and reject Toyota's proposed definition.

f. "Braking" [mode]

Paice's proposed construction: energy is generated by the motor to recharge the battery

Toyota's proposed construction: a mode of operation employed when the brakes of the hybrid vehicle are being applied or the vehicle is coasting, wherein kinetic energy is transferred from the road wheels to the motor to generate energy for storage in the battery

The parties' proposed definitions for this term are essentially the same. However, Paice's proposed construction is simpler and more straightforward. Thus, Paice respectfully requests that the Court adopt Paice's proposed construction instead of Toyota's proposed definition.

g. "Engine starting"

Paice's proposed construction: the motor is used to start the engine

Toyota's proposed construction: a mode of operation employed when the hybrid vehicle is being started from rest, wherein energy flows from the battery to the motor and torque is provided by the motor to both the road wheels and the engine

Toyota's proposed construction improperly imports another temporal limitation from the specification into the claim. It also either misquotes the specification or miscomprehends how the claimed vehicle operates.

The '970 patent specification refers to the ***internal combustion engine*** being started "from rest," not the "hybrid vehicle . . . being started from rest" as in Toyota's proposed definition. '970 patent, col. 14:56. Moreover, according to the specification, "internal combustion engine 40 will typically be started when the vehicle is already under power." '970 patent, col. 14:57-59.

Toyota's proposed construction therefore is unduly limiting. Accordingly, Paice respectfully requests that the Court adopt its proposed construction.

6. Claim 38

a. "Solid state switching network"

Paice's proposed construction: a solid-state circuit for converting DC to AC and rectifying AC to DC

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

B. '672 Patent

1. Claim 1

a. "Clutch"

Paice's proposed construction: a device that selectively permits or inhibits transfer of torque and rotation.

Toyota's proposed construction: a mechanism for engaging or disengaging the transmission of power between two axial shafts; it cannot be a planetary gearset that cannot be locked.

The parties essentially agree that the term "clutch" as used in the '672 patent means a device that selectively permits or inhibits the transfer of torque and rotation (speed), i.e. power. However, Toyota seeks to import a additional negative limitation purportedly from the specification: that the claimed clutch not include a planetary gearset that cannot be locked. According to Toyota, the patentee "manifestly disavowed" this structure from being included in the 'clutch' of the '672 patent. *Toyota Opening Br.* at 30. The patent law is clear, however, that in order to modify the claims by importing a limitation, a disavowal of claim scope must be "clear and unambiguous." *See, e.g., Innova/Pure Water, Inc. v. Safari Water Filtration Sys.*, 381 F.3d 1111, 1123-1124 (Fed. Cir. 2004). No "clear and unambiguous" disavowal was made here.

What Toyota argues was a "manifest disavow[al]" of claim scope was, in fact, merely an acknowledgement that a planetary gearset can be used as a clutch when used properly. *See* '672 patent, col. 9:37-50 ("It will be appreciated by those of skill in the art that there are significant limitations inherent in the use of planetary gearsets as a means for connecting

different sources . . . . [T]he principal advantage of the parallel hybrid drivetrain . . . is only available when the planetary gearset is locked."). This is far from a "clear and unambiguous" statement that the word "clutch" was to be understood to exclude a planetary gearset. Indeed, what this means is that a planetary gearset includes among its functions the ability to act as a clutch. Toyota cannot redefine the term "clutch" to exclude subject matter clearly within the scope of the invention in order to suit its litigation goals in this case.

In fact, elsewhere in the specification, the patentee makes clear that planetary gearsets are within the scope of the invention, without limitation:

> It is within the scope of the invention to provide motors coaxial with the engine shaft, as illustrated in Fig. 3, but to provide a planetary gearset(s) between the shafts of either or both of traction motor 25 and starting motor 21 and the output shaft to permit differing engine and motor speeds.

'672 patent, col. 22:4-9.

Thus, the statement relied upon by Toyota does not reflect the unmistakable disavowal of planetary gearsets that do not lock. Accordingly, the Court should adopt Paice's proposed construction and reject Toyota's proposed construction.

b. "Controllable clutch"

PAICE's proposed construction: a clutch that is capable of being controlled by a controller.

Toyota's proposed construction: a mechanism for engaging or disengaging the transmission of power between two axial shafts; it cannot be a planetary gearset that cannot be locked.

The parties agree that this claim term should be construed consistent with the term "clutch" discussed above.

c. "Directly coupled"

PAICE's proposed construction: mechanically connected without a clutch in between

Toyota's proposed construction: connected without any intervening structural elements

Nowhere is Toyota's effort to improperly limit the scope of the claim terms more evident than in its proposed construction of the term "directly coupled." According to Toyota, "directly coupled" should be construed to mean "connected without any intervening structural elements." This construction finds no support whatsoever in the intrinsic record and in fact contradicts the very portion of the specification upon which Toyota relies.

As Toyota itself notes, *Toyota Opening Br.* at 28, the patentee distinguished over the prior art by amending '672 patent claim 1 to claim a "traction motor [that] is connected directly to the wheels [*sic*] permanently to the road wheels for torque transmission therebetween, that is, without a clutch or variable-ratio transmission ***(it being understood, of course, that a conventional differential, permitting variation of the speed of the individual road wheels as the vehicle rounds a curve, will normally be provided.)***" *Toyota Opening Br.*, Exhibit H at 8 (emphasis added); *see also* '672 patent, col. 19:19-21 and col. 26:17-21.

Thus, the patentee ***expressly contemplated*** intervening structural elements between the traction motor and the road wheels. Indeed, Figure 3 shows a differential 32 between the traction motor and the road wheels, and Figure 4 shows both a differential 32 and a drive 54 connecting the traction motor to the wheels. *See* '672 patent, Figs. 3, 4. Thus, Toyota's proposed construction would read out not one, but two preferred embodiments expressly disclosed in the patent. This proposed construction should be rejected, as a claim construction that excludes a preferred embodiment is "rarely, if ever" correct. *On-Line Tech. v. Bodenseewerk Perkin-Elmer*,

386 F.3d 1133, 1138 (Fed. Cir. 2004) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996)).

Accordingly, the Court should adopt Paice's proposed construction and reject Toyota's proposed construction.

2. Claim 2

a. "Instantaneous road load" / "RL"

Paice's proposed construction: the instantaneous torque required for propulsion of the vehicle.

Toyota's proposed construction: the amount of torque required to propel the vehicle at a desired speed; it should be specifically construed to exclude systems that determine road load (or an analogous parameter) based solely on information concerning vehicle speed, shift position, brake state, accelerator position, battery state of charge, and/or previously determined relationships laid out in a "map."

The parties agree that the terms "road load," "instantaneous road load" and "RL" should be similarly construed, and the parties' proposed meanings generally agree: "road load" as used in the asserted patents is the amount of torque necessary to propel the vehicle. What remains in dispute is Toyota's effort once again to import significant negative limitations into this plain meaning term from the patent specification and file history. In particular, according to Toyota, the patentee "further defined and clarified the phrase 'road load' during the prosecution of the '672 patent as depending on inputs different from those disclosed in the prior art." *Toyota Opening Br.* at 25. Therefore, says Toyota, the definition should "exclude systems that determine 'road load' (or an analogous parameter) based solely on information concerning vehicle speed, shift position, brake state, accelerator position, battery state of charge, and/or previously determined relationships laid out in a map." *Id.* at 27.

Because Toyota has begun with a faulty premise, it naturally reaches an erroneous conclusion. Specifically, Toyota conflates "road load," which is simply a number representing the vehicle's instantaneous torque requirement, with the measured parameters that may be used to derive road load. As a result of its confusion, Toyota presses to exclude systems wherein the operational mode is determined using certain parameters or any kind of "map." However, the claims contain no limitation on how road load is determined or derived. The Court should reject this further invitation by Toyota to import limitations into the claims.

Toyota specifically tries to limit the parameters that determine road load, however, nowhere in the patent specification or prosecution history has the patentee ever said that road load depends on data inputs unique from those used in the prior art. (Indeed, the universe of inputs available to a vehicle operator are quite limited.) To the contrary, the patentee has consistently stated that the inputs may be the same as those used in the prior art:

> FIG. 4 also shows additional signals provided to microprocessor 48 in both the FIG. 3 and the FIG. 4 embodiments. ***These include operator input commands, typically acceleration, direction, and deceleration commands, as shown.*** The acceleration and deceleration commands may be provided by position-sensing encoders 71 and 72 (which could be configured as rheostats, Hall-effect sensors, or otherwise) connected to microprocessor 48 by lines 67 and 68, ***to inform the microprocessor of the operator's commands responsive to motion of accelerator and brake pedals 69 and 70 (FIG. 3) respectively. The microprocessor monitors the rate at which the operator depresses pedals 69 and 70 as well as the degree to which pedals 69 and 70 are depressed.*** The operator may also provide a "cruise model" [*sic*] signal, as indicated, when a desired cruising speed has been reached. ***The microprocessor uses this information, and other signals provided as discussed herein, in accordance with the operational strategy discussed in detail below in connection with FIGS. 6-9, to properly control operation of the vehicle according to the invention*** by appropriate control signals provided to its various components.

'672 patent, col. 20:27-47 (emphasis added).

A distinguishing feature of the invention is that the road load RL (and not simply the inputs which are part of the RL determination) is used to control determination of operational

mode. Thus, for example, the patentee has distinguished art that determines the operational mode based on vehicle speed. *See* '088 patent, col. 12:61-66. It has also distinguished road load from a quantity referred to in other prior art as "vehicle load." *See* '088 patent, col. 14:1-19. The unifying principle has always been, and remains, that road load (however calculated) must be the actual torque required to propel the vehicle, and must be used as a part of the mode-switching determination:

> [R]oad load as noted is a continuous variable, capable of negative as well as positive values, and is used according to applicants' invention (together with other variables, such as battery state of charge, and the time during which RL has exceeded MTO, as above, in some cases) to make the operational mode determination.

See File History of United States Patent No. 6,338,391, 4/23/01 Amendment (Exhibit M) at 14.[3]

Thus, the defining issue is not how road load is ***calculated***, but how it is ***used***. The patentee's statements relied upon by Toyota certainly do not reflect a "clear and unmistakable disavowal" of the use of the listed input parameters to determine road load.

In discussing Egami (United States Patent No. 6,018,694), for example, the patentee begins by noting that Egami cannot show selection of an operation mode in response to road load because it does not teach supply of propulsive torque from the engine. Therefore, the discussion of Egami's mode-switching is, at best, tangential. Similarly, the discussion of Koide in the prosecution history focuses not on the fact that Koide uses vehicle speed as an input parameter, but rather that Koide ***performs mode switching*** based on vehicle speed and not based on road load. *Paice Opening Br.*, Exhibit H at 12. Thus, in both cases, the representations made by the

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[3] Although the '391 patent has not been asserted in this litigation, its file history is relevant to claim construction here because the '088 patent is a continuation-in-part of the '391 patent. *See Adv. Cardiovascular Sys., Inc. v. Medtronic, Inc.*, 265 F.3d 1294, 1305 (Fed. Cir. 2001) ("The prosecution history of a related patent can be relevant if, for example, it addresses a limitation in common with the patent in suit.").

patentee were directed to how the mode switching determinations were made rather than the overall parameters that are system inputs.

With this understanding, it is clear that the statements relied upon by Toyota do not amount to a clear disavowal of road load being determined using a map or of the inputs identified by Toyota. Accordingly, Paice respectfully requests that the Court should adopt its proposed construction and reject Toyota's proposed construction.

3. Claim 3

a. "Monitoring commands provided by the vehicle operator"

Paice's proposed construction: determining the vehicle operator's input commands.

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

4. Claim 13

a. "Total torque available at the road wheels from said engine"

Paice's proposed construction: the maximum torque that the engine delivers to the wheels.

Toyota's proposed construction: the maximum rotary force generated by the internal combustion engine that can be applied to the road wheels of the claimed hybrid vehicle.

This claim term, and the limitations of Toyota's proposed claim construction,[4] are similar to the discussion of "drive torque" in the '970 patent. *See supra* at 2-3. Accordingly, Paice respectfully requests that the Court should adopt its proposed construction and reject Toyota's proposed construction.

5. Claim 15

a. "Operating said controller to control selection of the operational mode of said vehicle between a low-speed mode I, a cruising mode IV, and an acceleration mode V"

PAICE's proposed construction: operating the computerized control device in a manner such that it controls whether torque to propel the vehicle is provided by the motor, the engine, or the motor and the engine.

Toyota's proposed construction: NONE

In its identification of claim terms that it believed required construction, Toyota identified the entire claim phrase that appears above. However, it did not offer any construction for this phrase. Instead, it limited its argument in its opening *Markman* brief to the specific modes of operation, to which Paice now responds below.

i. Low-speed operation mode I

According to Toyota, "low speed mode I" should be construed to mean "a mode of operation employed when the vehicle is operating at low speeds, wherein the clutch of the vehicle is disengaged and the engine is operated as a generator to charge the vehicle's battery." *Toyota Opening Br.* at 24. Apparently, Toyota has misread the patent; its proposed construction for low speed mode I more closely (but not fully accurately) describes mode II.

[4] Although Toyota requested that this claim term be construed, it offered no proposed construction and no discussion of the term in its brief. However, in the chart attached to the brief as Exhibit 2, Toyota proposed (without discussion) that the term be construed to mean "the maximum rotary force generated by the internal combustion engine that can be applied to the road wheels of the claimed hybrid vehicle."

Low-speed mode I is expressly defined in the '672 patent at column 28, lines 50-55:

> As noted, during low-speed operation, such as in city traffic, the vehicle is operated as a simple electric car, where all torque is provided to the road wheels 34 by traction motor 25 operating on electrical energy supplied from battery bank 22. This is referred to as 'mode I' operation, and is illustrated in FIG. 8(a).

This description of low speed mode I is similar to the description of "low speed running" in the '970 patent, and therefore should be construed the same: "low speed mode I" means "the vehicle is powered by the motor."

ii. Cruising mode IV

According to Toyota, "cruising mode IV" should be construed to mean "a mode of operation employed when an operator makes continued requests for more power, wherein the clutch is engaged and the engine is the sole provider of torque to the vehicle's road wheels." *Toyota Opening Br.* at 24. With this proposed definition, Toyota again attempts to import unnecessary limitations — that the engine be the "sole provider of torque" and that the mode be entered only "by continued operator requests for more power" — from the specification into the claims. Neither is proper.

First, cruising mode IV of the '672 patent, like "steady state running" in the '970 patent, simply requires that the vehicle be powered by the engine, but does not preclude the motor from ever running. The specifications teaches, for example, that the motors may be controlled "to absorb or add torque to that provided by an associated internal combustion engine [or] to damp out vibration caused by fluctuation of" engine torque. '672 patent, col. 23:7-10. That the motors may contribute torque during operation of mode IV is confirmed in '672 patent Figure 7(a).

As explained in the specification, that figure shows that the engine's output torque is constrained to the range of efficient operation, i.e., between about 30% and 100% of its maximum torque output (MTO). *See* '672 patent, col. 31:27-37. Figure 7(a) also shows that

motor torque is used to compensate for the lag in engine torque during acceleration in mode IV, as shown by the cross-hatched area between 30% and 100% of the engine output torque as a function of road load.

Likewise, Toyota seeks to improperly read in a limitation that cruising mode IV requires that the operator makes continued requests for more power. Such a construction is unduly limiting, as the specification plainly states that this is an ***example*** of when cruising mode IV might be entered. *See* '672 patent, col. 29:10-15 ("Therefore, when a sensed increase in the road load ***(e.g., by a continued operator request for more power)*** indicates that the preferred operating mode is changing from low-speed to highway cruising operation, the microprocessor controls starting motor 21 by way of inverter/charger 23 to start engine 40.") (emphasis added).

Accordingly, Paice respectfully requests that the Court should adopt its proposed construction and reject Toyota's proposed construction.

iii. Acceleration mode V

According to Toyota, this mode should be construed to mean "a mode of operation when an operator requires extra torque beyond that available from the engine, wherein torque flows to the road wheels from either or both motors and the engine." *Toyota Opening Br.* at 25.

Acceleration mode V in the '672 patent, like "acceleration/hill climbing mode" in the '970 patent, is the mode in which the vehicle always is powered by the traction motor and the engine. The specification teaches operation in mode V if extra torque is needed. *See* '672 patent, col. 29:23-26 ("If extra torque is needed during highway cruising, e.g., for acceleration or hill-climbing, either or both of motors 21 and 25 can be powered. This 'mode V' operation is illustrated in FIG. 8(d) . . . ."). Accordingly, Paice respectfully requests that the Court should adopt its proposed construction and reject Toyota's proposed construction.

b. "Monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL)"

PAICE's proposed construction: determining the instantaneous torque requirements required for propulsion of the vehicle.

Toyota's proposed construction: NONE

Toyota identified this phrase as one it believed required construction, but did not address it in its opening *Markman* brief. Instead, it indicated in Exhibit 2 attached to its brief that the phrase "torque requirements required for propulsion of the vehicle (RL)" should be construed similarly to "instantaneous road load" and "RL."

Paice agrees. Accordingly, Paice respectfully requests that "torque requirements required for propulsion of the vehicle (RL)" be construed similarly to Paice's proposed construction for "instantaneous road load" and "RL." *See supra* at 17-20.

c. "Operating mode"

Paice's proposed construction: mode or state of operation.

Toyota's proposed construction: mode of operation that is determined by the selection of torque needed to propel the (claimed) vehicle

The parties agree that the phrase "operating mode" should be construed in the same manner in all of the asserted patents. *See supra* at 7.

6. Claim 30

a. "At least one traction motor being coupled to road wheels of said vehicle"

PAICE's proposed construction: at least one electric motor capable of imparting torque to the road wheels

Toyota's proposed construction: a traction motor directly and permanently coupled to the road wheels

Once again, Toyota improperly seeks to import an unnecessary limitation — "directly and permanently" — into the claim. By its express language, which controls, this claim term requires that the traction motor be "coupled" to the road wheels. Nevertheless, Toyota proposes that the term be so limited because that limitation appears in ***other*** claims.

Paice's proposed construction is the correct one, as it is firmly supported by plain meaning and by the doctrine of claim differentiation. That is, because other claims (most notably claim 1) in the patent require that the traction motor be directly coupled, a presumption exists that such a requirement does not exist in other claims. *Clearstream Wastewater Sys.. v. Hydro-Action, Inc.*, 206 F.3d 1440, 1446 (Fed. Cir. 2000) ("Under the doctrine of claim differentiation, it is presumed that different words used in different claims result in a difference in meaning and scope for each of the claims.").

Toyota acknowledges that claims 15, 29, and 30 do not expressly require the "direct" or "permanent" connection that is required by claim 1 and (unasserted) claims 31 and 32. Nevertheless, it argues that the presumption supporting the doctrine of claim differentiation is overcome because Paice argued to the PTO that the second traction motor is directly and permanently connected to overcome a prior art rejection. *See Toyota Opening Br.* at 29 n.14. However, the amendment adding the "direct connection" feature was only made to overcome a prior art rejection with respect to asserted claim 1, but not the other claims.

First, it was not necessary to overcome prior art with respect to claims 29 and 30; those claims were so novel that they were allowed in a First Office Action allowance. *See* '672 Patent File History, 6/30/00 Office Action (Exhibit N) at 8. Second, although claim 15 was amended to overcome prior art, the distinguishing amendment related to road load, not "direct connection" of the traction motor and the wheels. *See Paice Opening Br.,* Exhibit G ("New limitations of claim

1 define over Koide et al. ***with additional positive recitation that traction motor is connected to wheel; claim 15 w/language of road load to propel vehicle define over Koide***; claim 27 will be amended similarly to 15; claims 31 & 32 will be amended with language of claim 1 re :direct connection.") (emphasis added). Thus, the Examiner did not require recitation of "direct" connection between the traction motor and wheels in claims 15, 29, and 30 as a condition to their allowance.

Accordingly, Paice respectfully requests that the Court should adopt its proposed construction and reject Toyota's proposed construction.

b. "A controller for controlling operation . . . and controlling flow"

PAICE's proposed construction: a computerized control device

Toyota's proposed construction: means plus function (35 U.S.C. § 112, ¶ 6) applies, a microprocessor having a stored control program that dictates (1) operation of said engine, clutch, and first and second motors and (2) flow of electrical energy between said motors and said battery bank in the manner disclosed in Fig. 9 of the '672 patent

According to Toyota, the term "a controller for controlling operation . . . and controlling flow . . . ." should be construed under 35 U.S.C. § 112 ¶ 6 because the controller is described "solely on the basis of the function it performs, and does not disclose any structure." *Toyota Opening Br.* at 21. Because this claim phrase does not use the term "means," Toyota bears the burden of overcoming the presumption that § 112 ¶ 6 does not apply. *Apex, Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1372 (Fed. Cir. 2003). It has failed to carry its burden.

As an initial matter, Toyota misstates the law: the appropriate inquiry is not simply whether the claim limitation "disclose[s] any structure," but whether "the term, as the name for the structure, has a reasonably well understood meaning in the art." *Id.* Moreover, "the fact that

a particular claim term is defined in functional terms is not sufficient to convert a claim limitation into a 'means for performing a specified function within the meaning of 112(6)." *Id.* (citing *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996)). As explained earlier with respect to the '970 patent, *supra* at 5, the term "controller" connotes definite structure to those of ordinary skill in the art.

Even if this claim phrase is construed as a means-plus-function term, which it should not be, the scope of the claim still would not be so limited as Toyota suggests. In particular, there is no basis to limit the term to a microprocessor "having a stored program that operates in the manner disclosed in Figure 9 of the '672 patent." *Toyota Opening Br.* at 22 (citing *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339 (Fed. Cir. 1999)). According to Toyota, *WMS Gaming* stands for the proposition that, "in a means-plus-function claim in which the disclosed structure is a microprocessor programmed to perform a function, the disclosed structure is the special purpose microprocessor programmed to perform the function and not the microprocessor alone." *Toyota Opening Br.* at 22.

WMS Gaming is readily distinguishable from the present case, however, as it turned on a specific set of facts not present here. First, and most importantly, the scope of equivalent structures was limited in that case because the teaching of the written description was minimal. *See* 184 F.3d at 1348 ("The written description of the [asserted] patent is almost completely devoid of any structure to support [the challenged] limitation of the claim."). Moreover, the prosecution history also provided little guidance. *See id.* ("The algorithm that controls the assignment of numbers to stop positions is disclosed in Figure 6 of the [asserted] patent . . . . The prosecution history reinforces the teachings of Figure 6."). Thus, the Federal Circuit limited the

structure of the microprocessor accordingly. *Id.* ("The structure of a microprocessor programmed to carry out an algorithm ***is limited by the disclosed algorithm***.") (emphasis added).

The '672 patent, unlike the patent at issue in *WMS Gaming*, discloses many possible implementations of the control algorithm used by the controller. *See* '672 patent, col. 32:60 — col. 37:33. The flowchart shown in Figure 9 is merely one of many examples. '672 patent, col. 33:16-18 ("Specific alternatives are provided below for steps set forth in Fig. 9 that implement certain of these alternatives."). As a result, even if this claim phrase is construed under § 112 ¶ 6, it would be improper to limit it to the flowchart disclosed in Fig. 9. *See Itron, Inc. v. Benghiat*, 169 F. Supp. 2d 1073, 1091-1092 (D. Minn. 2001) (distinguishing *WMS Gaming* for similar reasons).

c. "Configured as a number of batteries connected by normally-open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices"

PAICE's proposed construction: at least two batteries connected through switches that open if power is cut off.

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

C. '088 Patent

a. "Instantaneous torque demands (RL)"

Paice's proposed construction: the instantaneous torque required for propulsion of the vehicle.

Toyota's proposed construction: The amount of torque required to propel the vehicle at a desired speed; it should be specifically construed to exclude systems that determine road load (or an analogous parameter) based solely on information concerning vehicle speed, shift position, brake state, accelerator position, battery state of charge, and/or previously determined relationships laid out in a "map."

The parties agree that the phrase "instantaneous torque demands (RL)" appearing in the '088 patent should be construed in the same manner as "instantaneous torque requirements" and "RL" from the '672 patent, discussed *supra* at 17-20, 23.

b. "Said microprocessor controls operation...so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle"

PAICE's proposed construction: operating the computerized control device such that it determines the mode of operation based on the instantaneous torque requirements required for propulsion of the vehicle.

Toyota's proposed construction: NONE

Although Toyota is the party that identified this claim term as one requiring construction, it failed to offer a construction in its opening *Markman* brief. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

c. "Operating mode"

Paice's proposed construction: mode or state or operation.

Toyota's proposed construction: mode of operation that is determined by the selection of torque needed to propel the (claimed) vehicle

The parties agree that the phrase "operating mode" should be construed in the same manner in all of the asserted patents. *See supra* at 7, 24.

d. "Said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined minimum value of its maximum torque output"

PAICE's proposed construction: This phrase means selecting an operating mode in which the engine is operated only when the load on the engine exceeds a predetermined amount of the engine's maximum torque output.

Toyota's proposed construction: NONE

Toyota identified this phrase as one it believed required construction, but did not address it in its opening *Markman* brief. Instead, it simply argued that the term "load" as used herein must refer to "road load." However, the intrinsic record does not support that position.

The '088 patent specification clearly teaches that it is the load on the engine, and not the road load, that determines when the engine will be operated:

> An important aspect of the invention as described by the present continuation-in-part application as well as the predecessor applications and the '970 patent lies in controlling the operation of the internal combustion engine of a hybrid vehicle so that it is only operated at high efficiency, that is, only when it is loaded to require a substantial fraction, e.g. 30% of its maximum torque output.

'088 patent, col. 20:55-61 (emphasis added); *see also id.*, col. 13:20-28 ("[I]n order to provide maximum efficiency in use of fuel, it is essential to operate the [engine] only under circumstances where the engine will be loaded so as to require at least 30% of its maximum torque output (MTO) . . . .").

This proposed construction makes sense, and is further confirmed by the fact that '088 patent claim 1 expressly claims battery recharge mode II, which is entered whenever the battery needs to be recharged, irrespective of road load. Thus, for example, the engine may come on to charge the battery while the vehicle is not moving (i.e., road load is zero). Toyota's proposed

construction would read this embodiment out of the claim. Therefore, Paice respectfully requests that the Court adopt its proposed construction.

III. CONCLUSION

For the foregoing reasons, as well as the reasons expressed in Paice's opening *Markman* brief, Paice respectfully requests that this Court adopt its proposed construction of the disputed claim terms as set forth herein.

Respectfully submitted,

Dated: March 29, 2005

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing document was served on all counsel of record via ECF or U.S. Mail on this 4th day of March, 2005.

/s/ Sam Baxter
Sam Baxter

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC,	§	
	§	
Plaintiff,	§	
	§	
v.	§	**2:04-CV-211-DF**
	§	
TOYOTA MOTOR CORP., et al.,	§	
	§	
Defendants.	§	
	§	

CLAIM CONSTRUCTION ORDER

CONSTRUING U.S. PATENT NOS. 5,343,970,

6,209,672, & 6,554,088

TABLE OF CONTENTS

I. Background

Plaintiff Paice LLC ("Paice") brings this cause of action against Defendants Toyota Motor Corporation, Toyota Motor North American, Inc., and Toyota Motor Sales, U.S.A., Inc. ("Toyota") alleging infringement of U.S. Patent No. 5,343,970 ("the '970 patent"), U.S. Patent No. 6,209,672 ("the '672 patent"), and U.S. Patent No. 6,554,088 ("the '088 patent") (collectively, the "patents-in-suit"). These patents are entitled "Hybrid Electric Vehicle," "Hybrid Vehicle," and "Hybrid Vehicles," respectively. Toyota generally denies any infringement and asserts the affirmative defenses of non-infringement and invalidity. Additionally, Toyota asserts counterclaims for declaratory judgment of non-infringement and of invalidity for the patents-in-suit.

Now before the Court is the claim construction of the respective patents. Paice filed its claim construction brief on March 8, 2005 (Dkt. No. 21) to which Toyota responded on March 28, 2005 (Dkt. No. 28). Toyota filed its claim construction brief on March 9, 2005 (Dkt. No. 22) to which Paice responded on March 29, 2005 (Dkt. No. 27). The Court conducted a claim construction hearing on April 19, 2005. The parties provided the Court with copies of slides used during the hearing. Additionally, on May 4, 2005, the parties submitted a letter to the Court restating each party's proposed claim construction and reflecting that the parties had reached agreement on several previously disputed terms. 5/4/05 Letter from N. Patton to the Court ("5/4/05 Letter"); *see also* 5/13/05 letter from A. Davis to the Court regarding the same ("5/13/05 Letter"). After considering the patents, the parties' submissions, arguments of counsel, and all other relevant pleadings and papers, the Court finds that the claims of the patents-in-suit should be construed as set forth herein.

II. The Legal Principles of Claim Construction

A determination of patent infringement involves two steps. First, the patent claims are construed, and, second, the claims are compared to the allegedly infringing device. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1455 (Fed. Cir. 1998) (*en banc*).

The legal principles of claim construction were recently reexamined by the Federal Circuit in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). Reversing a summary judgment of non-infringement, an *en banc* panel specifically identified the question before it as: "the extent to which [the court] should resort to and rely on a patent's specification in seeking to ascertain the proper scope of its claims." *Id.* at 1312. Addressing this question, the Federal Circuit specifically focused on the confusion that had amassed from its recent decisions on the weight afforded dictionaries and related extrinsic evidence as compared to intrinsic evidence. Ultimately, the court found that the specification, "informed, as needed, by the prosecution history," is the "best source for understanding a technical term." *Id.* at 1315 (quoting *Multiform Dessicants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998)). However, the court was mindful of its decision and quick to point out that *Phillips* is not the swan song of extrinsic evidence, stating:

> [W]e recognized that there is no magic formula or catechism for conducting claim construction. Nor is the court barred from considering any particular sources or required to analyze sources in any specific sequence, as long as those sources are not used to contradict claim meaning that is unambiguous in light of the intrinsic evidence.

Phillips, 415 F.3d at 1324 (citations omitted). Consequently, this Court's reading of *Phillips* is that the Federal Circuit has returned to the state of the law prior to its decision

in *Texas Digital Sys. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002), allotting far greater deference to the intrinsic record than to extrinsic evidence.

Additionally, the Federal Circuit in *Phillips* expressly reaffirmed the principles of claim construction as set forth in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996), *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576 (Fed. Cir. 1996), and *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111 (Fed. Cir. 2004). Thus, the law of claim construction remains intact. Claim construction is a legal question for the courts. *Markman*, 52 F.3d at 979. The claims of a patent define that which "the patentee is entitled the right to exclude." *Innova*, 381 F.3d at 1115. And the claims are "generally given their ordinary and customary meaning" as understood by "a person of ordinary skill in the art in question at the time of the invention, *i.e.*, as of the effective filing date of the patent application." *Vitronics*, 90 F.3d at 1582. However, the Federal Circuit stressed the importance of recognizing that the person of ordinary skill in the art "is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips*, 415 F.3d at 1313.

Advancing the emphasis on the intrinsic evidence, the *Phillips* decision explains how each source, the claims, the specification as a whole, and the prosecution history, should be used by courts in determining how a skilled artesian would understand the disputed claim term. *See, generally, id.* at 1314-17. The court noted that the claims themselves can provide substantial guidance, particularly through claim differentiation. Using an example taken from the claim language at issue in *Phillips*, the Federal Circuit

observed that "the claim in this case refers to 'steel baffles,' which strongly implies that the term 'baffles' does not inherently mean objects made of steel." *Id.* at 1314. Thus, the "context in which a term is used in the asserted claim can often illuminate the meaning of the same term in other claims." *Id.* Likewise, other claims of the asserted patent can be enlightening, for example, "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." *Id.* at 1315 (citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004).

Still, the claims "must be read in view of the specification, of which they are part." *Markman*, 52 F.3d at 978. In *Phillips*, the Federal Circuit reiterated the importance of the specification, noting that "the 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.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics*, 90 F.3d at 1582). To emphasize this position, the court cited extensive case law, as well as "the statutory directive that the inventor provide a 'full' and 'exact' description of the claimed invention." *Id.* at 1316 (citing *Merck & Co., v. Teva Pharms. USA, Inc.*, 347 F.3d 1367, 1371 (Fed. Cir. 2003)), *see also* 35 U.S.C. § 112, ¶ 1. Consistent with these principles, the court reaffirmed that an inventor's own lexicography and any express disavowal of claim scope is dispositive. *Id.* at 1316. Concluding this point, the court noted the consistency with this approach and the issuance of a patent from the Patent and Trademark Office and found that "[i]t is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims." *Id.* at 1317.

Additionally, the *Phillips* decision provides a terse explanation of the prosecution history's utility in construing claim terms. The court simply reaffirmed that "the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.* (citing *Vitronics*, 90 F.3d at 1582-83). It is a significant source for evidencing how the patent office and the inventor understood the invention. *Id.*

Finally, the Federal Circuit curtailed the role of extrinsic evidence in construing claims. In pointing out the less reliable nature of extrinsic evidence, the court reasoned that such evidence (1) is by definition not part of the patent, (2) does not necessarily reflect the views or understanding of a person of ordinary skill in the relevant art, (3) is often produced specifically for litigation, (4) is far reaching to the extent that it may encompass several views, and (5) may distort the true meaning intended by the inventor. *See id.* at 1318. Consequently, the Federal Circuit expressly disclaimed the approach taken in *Texas Digital*. While noting the *Texas Digital* court's concern with regard to importing limitations from the written description, "one of the cardinal sins of patent law," the Federal Circuit found that "the methodology it adopted placed too much reliance on extrinsic sources such as dictionaries, treatises, and encyclopedias and too little on intrinsic sources, in particular the specification and prosecution history." *Id.* at 1320. Thus, the court renewed its emphasis on the specification's role in claims construction.

Many other principles of claims construction, though not addressed in *Phillips*, remain significant in guiding this Court's charge in claim construction. The Court is

mindful that there is a "heavy presumption" in favor of construing claim language as it would be plainly understood by one of ordinary skill in the art. *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 989 (Fed. Cir. 1999). Words in patent claims are given their ordinary meaning in the usage of the field of the invention, unless the text of the patent makes clear that a word was used with a special meaning. *See Multiform Desiccants, Inc.*, 133 F.3d at 1477. Though a patentee may choose to act as his own lexicographer, the intrinsic evidence must 'clearly set forth' or 'clearly redefine' a claim term so as to put one reasonably skilled in the art on notice that the patentee intended to so redefine the claim term. *Bell Atl. Network Servs., Inc. v. Covad Communs. Group, Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) (internal citations omitted).

Claim construction is not meant to change the scope of the claims but only to clarify their meaning. *Embrex, Inc. v. Service Eng'g Corp.*, 216 F.3d 1343, 1347 (Fed. Cir. 2000) ("In claim construction the words of the claims are construed independent of the accused product, in light of the specification, the prosecution history, and the prior art. . . . The construction of claims is simply a way of elaborating the normally terse claim language[] in order to understand and explain, but not to change, the scope of the claims.")(citations and internal quotations omitted).

During claim construction, a court may be required to determine whether 35 U.S.C. § 112, ¶ 6 applies to any claim limitations. Under this section, an element in a claim may be expressed as a "means" for performing a specified function without the recital of structure, material, or an act in support:

> 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.

To determine whether a § 112, ¶ 6 applies to a claim limitation, the court must first look to the claim limitation itself to see if the word "means" is used. Use of the word "means" gives rise to a presumption that § 112, ¶ 6 applies, and the absence of the word "means" gives rise to a presumption that § 112, ¶ 6 does not apply. *York Prods., Inc. v. Cen. Tractor*, 99 F.3d 1568 (Fed. Cir. 1996); *Personalized Media Comm'n, LLC v. Int'l Trade Comm'n*, 161 F.3d 696 (Fed. Cir. 1998); *Apex, Inc. v. Raritan Computer, Inc.*, 325 F.3d 1364, 1372 (Fed. Cir. 2003). The presumptions can be overcome by a preponderance of the evidence. *Apex, Inc.*, 325 F.3d at 1372.

In order to avoid the application of § 112, ¶ 6, a claim element need not define a structure so specific as to imply an actual implementation of the structure. The question is whether the phrase "connotes sufficient structure to one of ordinary skill in the art to perform the functions identified by the limitation." *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996).

Where a court determines that § 112, ¶ 6 applies, the means-plus-function claim elements are construed by first "determining what the claimed function is" and then determining what "structures disclosed in the written specification correspond to the 'means' for performing that function." *Kemco Sales, Inc. v. Control Papers Co.*, 208 F.3d 1352, 1360 (Fed. Cir. 2000); *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1113-14 (Fed. Cir. 2002). "A means-plus-function claim encompasses all structure in a specification corresponding to that element and equivalent structures." *Micro Chem., Inc. v. Great Plains Chem. Co., Inc.*,194 F.3d 1250, 1258 (Fed. Cir. 1999). Whether or not a disclosed structure can be construed as "corresponding structure" depends upon

whether one of ordinary skill in the art would associate the structure in the specification with the claimed functions and whether the associated structure performs the claimed functions. *Cardiac Pacemakers, Inc.*, 296 F.3d at 1113-14. Only where disclosed structure is both associated with and performs the claimed functions can it be corresponding structure under the requirements of §112, ¶6.

III. The Patents-in-Suit Generally

The patents at issue are directed to particular features of electric/combustion engine hybrid drive systems. The '970 patent issued on September 6, 1994 from an application filed on September 21, 1992. The patent generally discloses and claims a hybrid vehicle, including an internal combustion engine and one electric motor, both of which can provide torque to the wheels of the vehicle through a controllable torque transfer unit, and that can recharge storage batteries for the motor. The direction of torque transfer is controlled by a microprocessor responsive to the mode of operation of the vehicle.

> The '970 patent abstract:
> An improved hybrid electric vehicle includes an internal combustion engine and an electric motor. Both the motor and the engine provide torque to drive the vehicle directly through a controllable torque transfer unit. Typically at low speeds or in traffic, the electric motor alone drives the vehicle, using power stored in batteries; under acceleration and during hill climbing both the engine and the motor provide torque to drive the vehicle; and in steady state highway cruising, the internal combustion engine alone drives the vehicle. The internal combustion engine is sized to operate at or near its maximum fuel efficiency during highway cruising. The motor is operable as a generator to charge the batteries as needed and also for regenerative braking. No transmission is employed. The motor operates at significantly lower currents and higher voltages than conventionally and has a rated power at least equal to that of the internal combustion engine. In this manner a cost efficient vehicle is provided, suffering no performance disadvantage compared to conventional vehicles.

The ‘672 patent issued on April 3, 2001 from an application with a priority date of September 14, 1998. Although the ‘672 patent is not related to the ‘970 patent, it builds substantially on the teachings of the ‘970 patent. The ‘672 patent claims further improvements over the parallel hybrid electric vehicle claimed in the ‘970 patent. It discloses a “topology” for a hybrid vehicle, wherein an internal combustion engine and a first electric “starting” motor are connected to the road wheels of the vehicle through a clutch. A second “traction” motor is connected to the road wheels to propel the vehicle. The vehicle operating mode is determined by a microprocessor responsive to the “road load.”

> The ‘672 patent abstract:
> A hybrid vehicle comprising an internal combustion engine controllably coupled to road wheels of the vehicle by a clutch, a traction motor coupled to road wheels of said vehicle, a starting motor coupled to the engine, both motors being operable as generators, a battery bank for providing electrical energy to and accepting energy from said motors, and a microprocessor for controlling these components is operated in different modes, depending on its instantaneous torque requirements, the state of charge of the battery bank, and other operating parameters. The mode of operation is selected by the microprocessor in response to a control strategy.

The ‘088 patent issued on April 29, 2003, and claims priority to two provisional applications dated March 1, 1999, and September 14, 1998, respectively. The ‘088 patent is a continuation-in-part of the application from which the ‘672 patent issued and claims several distinct improvements over the hybrid vehicles claimed in the '970 and ‘672 patents. The only asserted claim in the ‘088 patent, claim 1, does not involve any matter not included in the ‘672 patent. The patent discloses the determination of the vehicle’s operating mode as a function of the determined “road load” at a given time.

The ‘088 patent abstract:

A hybrid vehicle comprises an internal combustion engine, a traction motor, a starter motor, and a battery bank, all controlled by a microprocessor in accordance with the vehicle’s instantaneous torque demands so that the engine is run only under conditions of high efficiency, typically only when the load is at least equal to 30% of the engine’s maximum torque output. In some embodiments, a turbocharger may be provided, activated only when the load exceeds the engine’s maximum torque output for an extended period; a two- speed transmission may further be provided, to further broaden the vehicle’s load range. A hybrid brake system provides regenerative braking, with mechanical braking available in the event the battery bank is fully charged, in emergencies, or at rest; a control mechanism is provided to control the brake system to provide linear brake feel under varying circumstances.

IV. Claim Construction

The parties request the Court to construe a number of terms appearing in the patents-in-suit. In their respective briefing and during the claims construction hearing, the parties focused their arguments on claims 1, 2, 9, 11, 32, and 38 of the ‘970 patent, claims 1-3, 13, 15, and 30 of the ‘672 patent, and claim 1 of the ‘088 patent. The asserted claims are repeated below, patent by patent, followed by their respective construction:

The ‘970 Patent, Claim 1:

A hybrid electric vehicle, comprising:

two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft, said power unit comprising:

a controllable torque transfer unit adapted to receive torque from two sources via first and second input shafts and transmit said torque to said output shaft;

an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;

an electric motor adapted to receive electricity from a battery and supply torque to said torque transfer unit, said motor also being adapted to be operated as a generator, whereupon said motor receives torque and generates electric energy;

a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator; and

a controller for controlling the operation of said engine, said electric motor, and said torque transfer unit, such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor via said first and second input shafts and transmits torque therefrom to said drive wheels by way of said output shaft, and for controlling the relative contributions of the internal combustion engine and electric motor to the torque driving the wheels;

wherein the relative ratios of the rates of rotation of said engine and said electric motor to said input shafts, and the relative ratio of the rate of rotation of an output member of said torque transfer unit to the rate of rotation of said driven wheels, are fixed.

The '970 Patent, Claim 2:

The vehicle of claim 1, wherein said controller means controls flow of combustible fuel to said engine and of electrical energy to said motor, whereby said vehicle may be operated in a variety of operating modes selected dependent on desired vehicle performance.

The '970 Patent, Claim 7[1]:

A hybrid electric vehicle comprising:

two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft, said power unit comprising:

a controllable torque transfer unit adapted to receive torque from two sources and transfer said torque to said output shaft;

an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;

an electric motor adapted to receive electricity from a battery and supply torque to said torque transfer unit, said motor also being adapted to be operable as a generator;

a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator; and

a controller for controlling the operation of such engine, said electric motor, and said torque transfer unit such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor and transmits and for controlling the relative contributions of the internal combustion engine and electric motor to the torque driving the wheels, and

wherein said battery provides a maximum current of no more than about 75 amperes at a voltage selected responsive to the characteristics of said motor.

The '970 Patent, Claim 9:

[1] Although the parties have not requested construction of any term in claim 7, the claim is set forth as claim 9, for which claim construction has been requested, depends from claim 7.

The vehicle of claim 7, wherein said electric motor is an AC motor, said vehicle further comprises solid state switching means, and said battery provides DC to said switching means, said switching means comprising means for converting said DC supplied by said battery to AC for supply to said electric motor, and further comprising means for rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery.

The '970 Patent, Claim 11:

A hybrid electric vehicle, comprising:

two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft, said power unit comprising:

a controllable torque transfer unit adapted to receive torque from two sources and transfer said torque to said output shaft;

an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;

an AC electric motor adapted to receive electric energy from a battery and supply torque to said torque transfer unit, said motor being further adapted to be operable as a generator;

a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator;

solid state switching means for converting DC supplied by said battery to AC for supply to said electric motor, and for rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery; and

a controller for controlling the operation of said engine, said electric motor, said solid state switching means, and said torque transfer unit, such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor and transmits torque therefrom to said drive wheels by way of said output shaft, and for controlling the relative contributions of the internal combustion engine and electric motor to the torque driving the wheels.

The '970 Patent, Claim 32:

A hybrid electric vehicle, comprising:

a controllable torque transfer unit, operable to transfer torque in three modes: (a) from either or both of two input shafts to an output member, said output member transmitting torque to drive wheels of said vehicle; (b) between said input shafts; and (c) from said output member to one or both of said input shafts;

an electric motor adapted to apply torque to a first of said input shafts responsive to supplied electrical energy, said motor further being operable in a generator mode, to provide electrical energy when driven by torque transferred thereto via said first input shaft;

a combustible-fuel-burning internal combustion engine adapted to apply torque to a second of said input shafts;

a battery adapted to supply electrical energy to and store energy received from said electric motor; and

a controller adapted to receive input commands from a driver of said vehicle to monitor operation of said vehicle and to control operation of said controllable torque transfer unit, said motor, and said internal combustion engine, wherein said controller comprises means for performing the following functions responsive to input commands and monitored operation of said vehicle:

selecting an appropriate mode of operation of said vehicle from at least the following possible modes of operation:

low speed running;

steady state running;

acceleration or hill climbing;

battery charging;

braking; and

engine starting;

selecting the appropriate flow paths of electrical energy and/or combustible fuel and of torque to effectuate the selected mode of operation; and

controlling operation of said controllable torque transfer unit, said electric motor and said internal combustion engine in accordance with said selected appropriate flow paths and selected mode of operation.

The '970 Patent, Claim 38:

38. The vehicle of claim 32, wherein said battery supplies DC electrical energy, said electric motor operates on AC energy, said vehicle further comprising a solid state switching network for conversion of DC to AC for powering said motor, and wherein said controller controls operation of said switching network such that said DC is converted to AC of appropriate characteristics to effectuate the mode of operation thus determined.

A. "torque"

The term "torque" appears throughout the claims of the patents-in-suit. Although neither party identified the term as requiring construction, both parties offered a definition of the term in their briefing: "rotary force." Paice's Opening Br., Dkt. No. 21, at 1 ("P. Br."); Paice Reply Br., Dkt. No. 27, at 2 ("P. Resp. Br."); Toyota Resp. Br., Dkt.

No., 28, at 5 ("D. Resp. Br."). Paice argues that a definition is unnecessary as the term has a well-understood meaning. P. Resp. Br. at 2.

The Court finds that, although the term "torque" has a plain and ordinary meaning to persons of skill in the art, it will be formally construed for clarification. The patent indicates the term was used in accordance with its plain meaning. Therefore, the term **"torque"** will be construed as **"rotary force."**

B. "drive torque"

The term "drive torque" appears in claim 1 of the '970 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 13 and T. Resp. Br. at 5, they now agree that the term should be construed as: "torque transmitted to the wheels to propel the vehicle." 5/4/05 Letter. The Court finds this definition is consistent with the use of the term in the patent. The construction, however, will be amended to include the Court's definition of "torque."

Therefore, the claim term **"drive torque"** will be defined as **"rotary force transmitted to the wheels to propel the vehicle."**

C. "controllable torque transfer unit"

The claim term "controllable torque transfer unit" first appears in claim 1 of the '970 patent and then is used throughout the asserted claims. Paice argues that the term should be construed as "a multi-input device or component that is controlled to transfer variable amounts of torque." P. Br. at 13, citing '970 patent at 10:24-30; Claim Construction Hr. Tr. at 17-22; Paice Claim Construction Slide 16.

Toyota argues that the claim term is void of adequate structure because the only recited noun, "unit," fails to denote structure and because one of ordinary skill in the art

would not generally understand the term to have a structural meaning. Toyota's Opening Br., Dkt. No. 22, at 8 ("T. Br."); T. Resp. Br. at 5-7; Claim Construction Hr. Tr. 55-67. Therefore, the term must be construed under the requirements of 35 U.S.C. §112, ¶6. T. Br. at 8-9. This entails an identification of the claimed function and then an identification of the corresponding structure disclosed in the patent specification to perform that function. T. Br. at 8-9.

Toyota argues that the recited functions for this term, are "receiv[ing] torque from two sources [] and transmit[ing] said torque to said output shaft" in claims 1, 7, and 11 and "transfer[ring] torque in three modes (a) from either or both of two inputs shafts to an output member, said output member transmitting torque to drive wheels of said vehicle; (b) between said input shafts; and from said output member to one or both of said input shafts" in claims 15 and 32. In support of the recited functions in claims 1, 7, and 11, Toyota cites the '970 patent at 22:5-7, 22:64-66, 23:41-43 and in support for the recited functions in claims 15 and 32, Toyota cites the '970 patent at 24:42-48 and 26:40-46. T. Br. at 9-10. Toyota then identifies the corresponding structure as: "[f]our constantly-meshing bevel gears, housing having teeth formed on its outer circumference, and locking devices of Fig. 11 of the '970 patent when used to controllably transfer torque and the equivalents of this disclosed structure." T. Br. at 9-10, citing the '970 patent, 15:32-63 and Figure 11.

Paice responds that the term does not invoke the "means-plus-function" requirements of §112, ¶6 because those of skill in the art at that time of the invention would understand this term as structure. P. Resp. Br. at 3-4. Paice also points out that the claim does not include the term "means" and notes that there is a strong presumption

against invoking the §112, ¶6 requirements absent this term. *Id.* Toyota, Paice argues, has not overcome that strong presumption. *Id.*

Toyota argues that Paice fails to demonstrate that the term is structural – and that Paice merely seeks to import limitations from the specification into the claim language. T. Resp. Br. at 5. Paice's attempts to have the Court construe "unit" broadly enough "to cover every conceivable way or means for controlling the transfer of torque" must fail, argues Toyota. T. Resp. Br. at 6, citing *Mas-Hamilton Group v. LaGard, Inc.,* 156 F.3d 1206 (Fed. Cir. 1998). Thus the term should be construed as invoking the requirements of §112, ¶6 and construed as Toyota proposes.

The term "controllable torque transfer unit" is used both in the patent claims and specification as indicative of structure. As the word "means" is not recited in the claim term, Toyota bears the burden to demonstrate, by clear and convincing evidence, that the claim term is insufficient to connote structure to one of skill in the art at the time of the invention if it is to be construed as a means-plus-function term. Merely defining a claim term with functional language is insufficient to invoke §112, ¶6 requirements. *Greenberg,* 91 F.3d at 1583. It is a rare case where a claim term not including the word "means" is found to be a means-plus-function limitation. *See Lighting World, Inc. v. Birchwood Lighting, Inc.,* 382 F.3d 1354, 1362 (Fed. Cir. 2004) (noting that *Mas-Hamilton* is the only post-*Greenberg* case in which a claim term not using the word "means" was properly construed as a means-plus-function term).

Toyota has presented only attorney argument in an effort to overcome the presumption. In doing so, it falls short of its burden. In support of its efforts, Toyota cites the *Mas-Hamilton Group v. LaGard, Inc.* wherein the term "leaver moving element"

was construed under the means-plus-function provisions. There, the Federal Circuit upheld this construction finding that the district court properly concluded that one of skill in the art would not generally understand the term as structure. 156 F.3d at 1213. Toyota has presented no evidence in this case, however, from which this Court can draw such a conclusion for the term "controllable torque transfer unit."

For these reasons, the claim term **"controllable torque transfer unit"** is defined as **"a multi-input device or component that is controlled to transfer variable amounts of torque [rotary force]."**

D. "input shafts"

The term "input shafts" appears throughout the claims of the '970 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 13-14, P. Resp. Br. at 4-5, T. Resp. Br. at 8, they now agree that the term should be construed as: "the mechanical components that transfer torque between the engine and motor, respectively, and the controllable torque transfer unit." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"input shafts"** as **"the mechanical components that transfer torque between the engine and motor, respectively, and the controllable torque transfer unit."**

E. "a controller for controlling the operation of …and for controlling the relative contributions of…"

This claim term appears in claims 1 and 2 of the '970 patent. Paice argues that the term should be construed as "a computerized control device." P. Br. at 14, citing the '970 patent, 10:4-5 and Figure 3; P. Resp. Br. at 5. Toyota initially offered a construction requiring the invocation of §112, ¶6, T. Br. at 10 and T. Resp. Br. at 8-10, but has since

offered a revised construction: "a computerized control device that performs all of the recited functions." 5/4/05 Letter.

Having considered the claim language and the patent specification, it appears that claim term plainly refers to a computerized control device. *See* '970 patent, 10:4-5 and Figure 3. The parties agree on this much. Toyota's proffered construction also requires that the device "perform[] all of the recited functions." The Court finds that the device is necessarily required to perform the recited functions and that it is unnecessary to state this requirement in the claim construction.

Therefore, the claim term **"a controller for controlling the operation of …and for controlling the relative contributions of…"** is construed as **"a computerized control device for controlling the operation of …and for controlling the relative contributions of…"**

F. "output member"

The term "output member" appears in claim 1 of the '970 patent. The parties agree that the term should be construed as: "A mechanical component that transfers the drive torque out of the controllable torque transfer unit." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"output member,"** consistent with the Courts previous constructions, as **"a mechanical component that transfers the drive torque [rotary force] out of the controllable torque transfer unit [a multi-input device or component that is controlled to transfer variable amounts of torque (rotary force)]."**

G. "controller means"

The claim term "controller means" first appears in claim 2 of the '970 patent, which depends from claim 1. The term is used to refer to the same controller as set forth in the above construction of the term "a controller for controlling the operation of …and for controlling the relative contributions of…." The parties' proposed constructions for this term in claim 2 are identical to those proposed for the related term in claim 1. P. Br. at 15; P. Resp. Br. at 6; 5/4/05 Letter.

For the reasons set forth above, the Court construes **"controller means"** as **"a computerized control device."**

H. "operating mode"

"Operating mode" first appears in claim 2 of the '970 patent; the related term "mode of operation" also appears in claims 32 and 38. The terms are used interchangeably and therefore the same claim construction applies. *See* T. Br. at 12, fn. 8; T. Resp. Br. at 11, fn. 4.

Paice argues that the term is a "simple non-technical term and should be given its ordinary and accustomed meaning." P. Br. at 15. Paice proposes construing the term as a "mode or state of operation." *Id.*; Claim Construction Hr. Tr. at 23-26; Paice Claim Construction Slide 25.

Toyota argues that the term should be construed as: "a discreet type of operation that differs from other types of operation by the source and/or direction of the flow of energy and torque in the system." 5/4/05 Letter. This proposal is different from the initial construction Toyota proposed: "a mode of operation that is determined by the selection of torque needed to propel the vehicle." T. Br. at 12-13 and 22-23. Toyota

argues that Paice's proposed construction is overly broad, failing to reflect the particularized meaning with which the term is used in the patent claims and specification and insufficiently discrete to be selective. T. Resp. Br. at 11-12; Claim Construction Hr. Tr. at 71.

Upon review of the claims and the patent as a whole, it is apparent that the inventor used the term to refer specifically to different states of operation characterized by the source and/or direction of the flow of energy and/or torque in the system. *See* '970 patent at 6:26-30 ("Typically, the electric motor operates under battery power during low speed operation… In this mode of operation, the energy transfer efficiency from the batteries to the wheels is very high."); 10:44-51 ("FIGS. 4-9 are schematic illustrations of the operation of the parallel hybrid vehicle of the invention… [and the] flow of potential energy--either electrical energy, or combustible fuel--is shown in dot-dash lines, while flow of mechanical energy, that is, torque, is shown by dashed lines."); 10:63-11:2; 11:61-68; 13:66-14:3; 14:22-26; 14:37-42; 14:54-56; 15:1-10; 15:66-163; 16:11-16; 16:39-42; 16:43-47; 16:55-61; 17:1-3; 17:34-37; 18:36-40; Figures 4-9; *see also* claim 3 (defining "modes" by the supply of energy and torque).

The common criteria with which the patentee consistently describes each mode of operation demonstrates that the patentee intended that each mode account for the flow of energy and torque. *See Renishaw PLC V. Marposs Societa' Per Azioni, et al.*, 158 F.3d 1243, 53 (Fed. Cir. 1998) (relying on a patentee's "extremely detailed account of his invention in the written description" as demonstrative of patentee's narrow use of a claim term). Thus, considering the patent as a whole, it is apparent that the patentee acted as his own lexicographer imparting a particularized meaning to the term "operational

mode." *Digital Biometrics, Inc. v. Identix, Inc.*,149 F.3d 1335, 1344 (Fed. Cir. 1998) ("The written description is considered, in particular to determine if the patentee acted as his own lexicographer, as our law permits, and ascribed a certain meaning to those claim terms."); *see also DeMarini Sports, Inc. v. Worth, Inc.*, 239 F. 3d 1314, 1327028 (Fed. Cir. 2001). Where, as in the claims of the '970 patent, a patentee specifically defines a term, that definition controls.

Therefore, the term **"operating mode"** and **"mode of operation"** are defined as **"mode or state of operation determined by the source and/or direction of the flow of energy and/or torque [rotary force] in the system."**

I. "solid state switching means" and "solid state switching means for converting…[and means] for rectifying"

The claim term "solid state switching means for converting…[and means] for rectifying" appears in claim 11 of the '970 patent and the term "solid state switching means" appears in claim 9 of the '970 patent. The same construction is applicable to both of these terms. *See* P. Resp. Br. at 9; T. Br. at 13 and 18.

Paice argues that the term should be construed as "a solid-state circuit for converting DC to AC and rectifying AC to DC." P. Br. at 16; P. Resp. Br. at 8; Paice Claim Construction Slide 29; Claim Construction Hr. Tr. at 26-29. Paice argues that this is the plain meaning of the term.

Toyota argues that the claim term is void of adequate structure and, therefore, must be construed under the requirements of §112, ¶6. T. Br. at 18-20; *see also* Claims Construction Hr. Tr. at 67-70. Toyota argues that the recited functions for this term are "converting said DC supplied by said battery to AC for supply to said electric motor" and "rectifying AC generated by said motor when operated in a regenerative mode to provide

DC to charge said battery." T. Br. at 18-19. Toyota argues that the corresponding structure for these functions is "a solid-state switching AC/DC converter/motor controller, which consists of a three-phase bridge circuit comprising six solid state devices connected in parallel with six flyback diodes and a microprocessor for controlling the operation of AC/DC converter/microcontroller." *Id.* at 19-20, citing '970 patent, 10:4-14, 18:43-55, and Figure 12.

Paice responds that, despite the use of "means" in the claim term, §112, ¶6 is not invoked because the claim "sufficiently describes to those of ordinary skill the structure to perform the functions of converting and rectifying." P. Resp. Br. at 8; *see also* P. Br. at 16-17. Paice notes, however, that if this term is construed as invoking §112, ¶6, its corresponding structure is "a solid state AC to DC and DC to AC converter." P. Resp. Br. at 8, citing '970 patent, 5:60-69.

Having examined the language of both claims 9 and 11 and the patent as a whole, it is apparent that the claims themselves do not disclose adequate structure for performing the claimed functions. Additionally, the claims use the term "means" followed by a description of the function to be performed. Thus, the requirements of §112, ¶6 are invoked. The functions recited for the "solid state switching means" are "converting said DC supplied by said battery to AC for supply to said electric motor" and "rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery."

After identifying the functions, the Court looks to the patent specification to identify the corresponding structure. This structure is found in the '970 patent, 5:60-69:

> It is a further object of the invention to provide a solid- state switching power converter for converting DC power provided by the batteries of a

> parallel hybrid electric vehicle to AC power of higher frequency than conventionally employed for supply to an AC induction motor for powering the vehicle as needed, and for converting mechanical energy provided to the induction motor when operated as a generator to DC energy for charging the batteries as required.

See, e.g. Signtech USA, Ltd. v. Vutek, Inc., 174 F.3d 1352, 1355-56 (Fed. Cir. 1999) (affirming the construction of a means-plus-function limitation where the summary of the invention disclosed the corresponding structure). This disclosed structure, a solid state switching power converter, performs both of the recited functions.

Therefore, the claim terms **"solid state switching means"** and **"solid state switching means for converting…[and means] for rectifying"** are construed **"a solid-state switching power converter for converting DC to AC and rectifying AC to DC"** and equivalents therefore.

J. "means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation…"

The term "means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation…" appears in claim 32 of the '970 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 18-19, P. Resp. Br. at 9, T. Br. at 13-14, they now agree that the term should be construed as: "Means plus function: A computerized control device and associated components for selecting an operating mode and controlling the engine, motor, and battery to implement that mode." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"means for performing the following**

functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation…" as **"Means plus function: A computerized control device and associated components for selecting an operating mode [mode or state of operation determined by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor, and battery to implement that mode."**

K. "low speed running [mode]"

Paice argues that the term "low speed running [mode]" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the motor." P. Br. at 19; P. Resp. Br. at 10; Claim Construction Hearing Tr. at 29-40. Toyota argues that the term should be construed as "a mode of operation in which energy is provided solely by the battery and torque to the drive wheels is provided solely by the motor." 5/4/05 Letter.

The term "low speed running [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. The term "mode of operation" in claim 32 is used in the same way the term is used in claims 9 and 11, construed above. Thus, the same claim construction is applicable, a "mode or state of operation determined by the source and/or direction of the flow of energy and/or torque in the system." The construction of "low speed running [mode]" must account for the source and/or direction of the flow of energy and/or torque. This is described in the '970 patent at 10:52-66 and Figure 4.

Therefore, the term **"low speed running [mode]"** is construed as **"the mode of operation in which energy flows from the battery to the motor and torque [rotary force] flows from the motor to the road wheels."**

L. "steady state running [mode]"

Paice argues that the term "steady state running [mode]" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the engine." P. Br. at 19-20; P. Resp. Br. at 11; Claim Construction Hr. Tr. at 31-40. Toyota argues that the term should be construed as "a mode of operation in which energy and torque to the drive wheels are provided solely by the engine." 5/4/05 Letter.

The term "steady state running [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low speed running [mode]" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "steady state running [mode]." This is described in the '970 patent at 13:66-14:7 and Figure 5.

Therefore, the term **"steady state running [mode]"** is construed as **"the mode of operation in which energy flows from the tank into the engine and torque [rotary force] flows from the engine to the road wheels."**

M. "acceleration or hill climbing [mode]"

Paice argues that the term "acceleration or hill climbing [mode]" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the motor and the engine." P. Br. at 19-20; P. Resp. Br. at 11; Claim Construction Hr. Tr. at 31-40. Toyota argues that the term should be construed as "a mode of operation in which

energy is provided by both the engine and the battery and torque to the drive wheels is provided by both the engine and the motor." 5/4/05 Letter.

The term "acceleration or hill climbing [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low speed running [mode]" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "acceleration or hill climbing [mode]." This is described in the '970 patent at 14:22-32 and Figure 6.

Therefore, the term **"acceleration or hill climbing [mode]"** is construed as **"the mode of operation in which energy flows from the battery to the motor and from the fuel tank to the engine and both the motor and the engine supply torque [rotary force] to the road wheels."**

N. "battery charging [mode]"

Paice argues that the term "battery charging [mode]" is expressly defined in the patent and therefore should be construed as "energy is generated by the engine to recharge the battery." P. Br. at 20; P. Resp. Br. at 12. Toyota argues that the term should be construed as "a mode of operation in which energy and torque are provided by the engine to drive the motor as a generator to charge the battery." 5/4/05 Letter.

The term "battery charging [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low speed running [mode]" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "battery charging [mode]." This is described in the '970 patent at 15:1-10 and Figure 9.

Therefore, the term **"battery charging [mode]"** is construed as **"the mode of operation in which energy flows from the fuel tank to the engine and the engine drives the motor to generate energy to charge the battery and in which the engine may supply torque [rotary force] to the road wheels."**

O. "braking [mode]"

Paice argues that the term "braking [mode]" is expressly defined in the patent and therefore should be construed as "energy is generated by the motor to recharge the battery." P. Br. at 20; P. Resp. Br. at 12-13. Toyota argues that the term should be construed as "a mode of operation in which energy and torque are provided by the drive wheels to drive the motor as a generator to charge the battery." 5/4/05 Letter.

The term "braking [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low speed running [mode]" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "braking [mode]." This is described in the '970 patent at 14:37-53 and Figure 7.

Therefore, the term **"braking [mode]"** is construed as **"the mode of operation in which energy from the vehicle flows back from the road wheels to the motor to generate energy for storage in the battery."**

P. "engine starting [mode]"

Paice argues that the term "engine starting [mode]" is expressly defined in the patent and therefore should be construed as "the motor is used to start the engine." P. Br. at 20-21; P. Resp. Br. at 13. Toyota argues that the term should be construed as "a mode

of operation in which energy is provided by the battery and torque is provided by the motor to the engine to start the engine." 5/4/05 Letter.

The term "engine starting [mode]" appears in claim 32 of the '970 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low speed running [mode]" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "engine starting [mode]." This is described in the '970 patent at 14:53-64 and Figure 8.

Therefore, the term **"engine starting [mode]"** is construed as **"the mode of operation in which energy flows from the battery to the motor and the motor supplies torque [rotary force] to the engine and to the road wheels."**

Q. "solid state switching network"

The term "solid state switching network" appears in claim 38 of the '970 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 21; P. Resp. Br. at 13-14; T. Resp. Br. at 17-18, they now agree that the term should be construed as: "A solid-state circuit for converting DC to AC and rectifying AC to DC." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"solid state switching network"** as **"a solid-state circuit for converting DC to AC and rectifying AC to DC."**

The '672 Patent, Claim 1:

A hybrid vehicle, comprising:
a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;
a battery bank;
an internal combustion engine;
a first electric starting motor electrically coupled to said battery bank for (a)

accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, and said first motor being mechanically coupled to said internal combustion engine, the combination of said internal combustion engine and said first electric motor being mechanically coupled to a clutch controlled by said controller for controllable torque-transmitting connection between said combination and road wheels of said vehicle,

said first motor being responsive to commands from said controller, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, (2) accept energy from said battery bank to apply torque to said engine for starting said engine, (3) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (4) accept torque from said road wheels to charge said battery bank; and

a second electric traction motor, electrically coupled to said battery bank, such that said second electric motor can be controlled for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, said second motor being directly coupled to road wheels of said vehicle, without a controllable clutch disposed therebetween, such that said second motor is permanently connected to said road wheels for torque transmission therebetween, and said second motor being responsive to commands from said controller in order to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank.

The ‘672 Patent, Claim 2:

The hybrid vehicle of claim 1, wherein said controller is provided with signals indicative of the instantaneous road load experienced by said vehicle and of the state of charge of said battery bank, and controls operation of said engine, said clutch, and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals.

The ‘672 Patent, Claim 3:

The hybrid vehicle of claim 2 wherein said signal indicative of the instantaneous road load experienced by said vehicle is determined by said controller at least in part by monitoring commands provided by the vehicle operator.

The ‘672 Patent, Claim 13:

The hybrid vehicle of claim 1, wherein the total torque available at the road wheels from said engine is no greater than the total torque available from said first and second motors combined.

The ‘672 Patent, Claim 15:

A method for controlling the operation of a hybrid vehicle operable in a plurality of differing modes, comprising the steps of:

providing a hybrid vehicle comprising an internal combustion engine for

providing torque up to a maximum torque output (MTO) , said engine being controllably coupled to road wheels of said vehicle by a clutch, a traction motor being coupled to road wheels of said vehicle, a starting motor coupled to said engine, both said motors being operable as generators, a battery bank for providing electrical energy to and accepting energy from said motors, and a controller for controlling operation of said engine, clutch, and first and second motors, and controlling flow of electrical energy between said motors and said battery bank,

and operating said controller to control selection of the operational mode of said vehicle between a low-speed mode I, a cruising mode IV, and an acceleration mode V, wherein torque to propel said vehicle is provided by said traction motor, said engine, and both, respectively, in response to monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL).

The '672 Patent, Claim 30:

A hybrid vehicle operable in a plurality of differing modes, said vehicle comprising an internal combustion engine for providing torque up to a maximum torque output (MTO) and at least one traction motor being coupled to road wheels of said vehicle, said at least one motor being operable as a generator, a battery bank for providing electrical energy to and accepting energy from said motor, a controller for controlling operation of said engine and said at least one motor, and controlling flow of electrical energy between said motor and said battery bank, and at least one controllable inverter/charger connected between said motor and said battery bank, said controllable inverter/charger comprising a plurality of pairs of elements controllably switched in response to commands from said controller for operating said motor to supply propulsive torque to said road wheels in response to energy from said battery bank, and for converting torque transmitted from said road wheels to said motor into energy for recharging said battery bank,

wherein said battery bank is configured as a number of batteries connected by normally-open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices.

R. "clutch"

The term "clutch" first appears in claim 1 of the '672 patent but is used in several of the '672 patent claims. Paice argues that "clutch" should be construed as "a device that selectively permits or prohibits transfer of torque and rotation." P. Br. at 22; P. Resp. Br. at 14-15; Claim Construction Hr. Tr. at 41-46; Paice Claim Construction Slides 54-55. The term is used according to its plain meaning, Paice argues, and this proposed

construction sets forth that meaning. P. Br. at 22-23, citing '672 patent, 13:25-26, 19:20-56, 19:39-52, and 12:62-66.

Toyota argues that the term should be construed as: "A mechanical device that selectively engages to transfer torque or rotation and disengages to stop the transfer of torque or rotation. The device cannot be an unlockable planetary gear set used as a continuously variable ratio transmission." 5/4/05 Letter. Toyota cites the '672 patent at 9:38-50 and at 8:57-65 arguing that, in these discussions of prior art, the inventor excluded certain structural devices, such as a planetary gearset that cannot be locked, from the definition of "clutch" as used in the patent. T. Br. at 30-31; T. Resp. Br. at 18; *see also* Claim Construction Hr. Tr. at 84. Toyota argues that the inventor excluded these devices from the invention in order to claim over the prior art and that Paice cannot recapture in claim construction what was excluded during prosecution. *Id.* To now construe "clutch" as including planetary gearsets that cannot be locked, Toyota argues, would render the patent invalid in light of the prior art. T. Resp. Br. at 19. Because patents are to be construed to maintain their validity, Toyota argues, "clutch" must be construed to exclude the disclaimed devices. *Id.* at 19-20.

Paice responds that there is no clear and unambiguous disavowal of structure and that, instead, the passages Toyota cites for this proposition amount to "an acknowledgement that a planetary gearset can be used as a clutch when used properly." P. Resp. Br. at 14. Paice further argues that other passages in the specification demonstrate that the inventor contemplated the use of planetary gearsets within the scope of the invention. P. Resp. Br. at 15, citing '672 patent, 22:4-9.

The parties essentially agree, as Paice notes, on the plain meaning of "clutch." P. Resp. Br. at 14. Their disagreement stems from the alleged disclaimer of certain of potential "clutches."

There is "a 'heavy presumption' that claim terms carry their full ordinary and customary meaning unless the patentee unequivocally imparted a novel meaning to those terms or expressly relinquished claim scope during prosecution." *Omega Eng'g, Inc., v. Raytek Corp.,* 334 F.3d 1314, 1323 (Fed. Cir. 2003). In order to modify the claims by importing a limitation, a disavowal of claim scope must be "clear and unambiguous." *See Innova/Pure Water, Inc., v. Safari Water Filtration Sys.,* 381 F.3d 1111, 1123-1124 (Fed. Cir. 2004).

It is in the following passages that Toyota argues the inventor manifestly disavowed coverage of a planetary gearset that does not lock from the "clutch" in the '672 patent:

> According to the Wilson article, Toyota describes this vehicle as a "series-parallel hybrid"; regardless of the label applied, its powertrain appears to be similar to that of the Berman patents described above, that is, torque from either or both of an internal combustion engine and an electric motor are controllably combined in a "power-split mechanism" and transmitted to the drive wheels through a planetary gearset providing the functionality of a variable-ratio transmission.
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> ***
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> It will be appreciated by those of skill in the art that there are significant limitations inherent in the use of planetary gearsets as a means for connecting different sources, e.g., an internal combustion engine and an electric motor, to the drive wheels of a vehicle, namely, that unless the planetary gearset is effectively locked (anathematic to its use as a continuously-variable transmission, e.g., in the Toyota vehicle) it is capable of additive combination of shaft speeds, but not of output torque. Hence, the principal advantage of the parallel hybrid drivetrain, additive combination of the output torque of both the electric motor and the internal combustion engine, is only available when the planetary gearset is locked. This fact is acknowledged by Lateur, for example, at col. 6, line 27.

'672 patent, 8:57-65 and 9:38-50.

These passages do not amount to clear and unambiguous disavowal of claim scope. It appears, at least from the second passage, that the inventor acknowledged that a planetary gearset includes the ability to act as a clutch. Without a stronger showing of disavowal, the claim is presumed to carry its ordinary meaning.

Therefore, the term **"clutch"** is construed as **"a device that selectively permits or prohibits transfer of torque [rotary force] and rotation."**

S. "controllable clutch"

The term "controllable clutch" first appears in claim 1 of the '672 patent. Paice argues that the term should be construed in accordance with its plain meaning, as "a clutch that is capable of being controlled by a controller." P. Br. at 23; *see also* P. Resp. Br. at 15. Toyota agrees with Paice's construction, provided the term "clutch" is construed as Toyota argued for above. 5/4/05 Letter.

In accordance with plain meaning of the term, the Court will construe the term **"controllable clutch"** as "**a clutch [device that selectively permits or prohibits transfer of torque (rotary force) and rotation] that is capable of being controlled by a controller."**

T. "directly coupled"

The term "directly coupled " first appears in claim 1 of the '672 patent. Paice argues that the term should be construed as "mechanically connected without a clutch in between." P. Br. at 22-23. Paice argues that the prosecution history supports this definition as, after an obviousness rejection, the inventor amended the proposed claim language to indicate that the traction motor in the claimed vehicle is "directly and

permanently" connected to the road wheels without a clutch therebetween. *Id.* citing '672 File History, September 27, 2000 Amendment at 8; *see also* Paice Claim Construction Slides 62-63; Claim Construction Hr. Tr. at 45-46. Paice cites passages in the patent to demonstrate that the patentee expressly contemplated embodiments of the claimed vehicle including intervening structural elements between the traction motor and road wheels. P. Resp. Br. at 16-17, citing '672 patent, Figures 3 and 4.

Toyota argues that the proper construction for "directly coupled" is "mechanically coupled without any intervening clutch or gear train components other than differential." 5/4/05 Letter. Toyota first argued in favor of construing the term as "connected without any intervening structural elements," based upon the same prosecution history amendment cited by Paice. T. Br. at 28-29. Toyota opposed Paice's proffered definition as overly broad, contrary to the ordinary meaning of the term, and without support: "Paice bases its construction on the false belief that one of ordinary skill in the art would understand the phrase 'directly connected' to mean that any component in a vehicle drivetrain that impacts how torque is directed within the claimed vehicle, except for the clutch, can be disposed between the traction motor and the road wheels." T. Resp. Br. at 20 (emphasis supplied). Though Toyota's proposed definition has broadened somewhat, it is clear Toyota seeks a construction that requires a direct and permanent connection of the traction motor to the road wheels as this limitation was added to overcome prior art. T. Br. at 29.

The claim language itself is clear that the coupling between the traction motor and road wheels must be permanent and that no clutch can be placed between the two: "said second motor being directly coupled to road wheels of said vehicle, without a

controllable clutch disposed therebetween, such that said second motor is permanently connected to said road wheels for torque transmission therebetween…." The claim language, however, supports no further limitations.

An examination of the patent specification demonstrates that there is a "direct connection" between the traction motor and the road wheels even where a differential and drive are placed between the two:

> A relatively high-powered "traction" motor is *connected directly* to the output shaft of the vehicle; the traction motor provides torque to propel the vehicle in low-speed situations, and provides additional torque when required, e. g., for acceleration, passing, or hill-climbing during high-speed driving.
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> ***
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> In the FIG. 3 embodiment, a traction motor 25 is *connected directly* to the vehicle differential 32, and thence to the road wheels 34. A starting motor 21 is *connected directly* to the internal combustion engine 40.
>
> ***
>
> In [Fig. 4], the output shaft of starting motor 21 is shown connected to that of engine 40 by spur gears and traction motor 25 is *connected* to the output shaft 55 by drive indicated at 54. Numerous other arrangements will occur to those of skill in the art. However, *in each case there is no variable-ratio transmission between the sources of torque--that is, the motors 21 and 25, and the engine 40--and the road wheels 34.*

'672 patent, 13:2-7, 19:19:21, and 22:11-19 (all emphasis added). The claim language, specification, and figures demonstrate that the "direct coupling" in claim 1 requires a connection between the traction motor and the road wheels that is permanent and that cannot be disengaged. *See also* '672 File History, September 27, 2000 Amendment at 8 ("According to applicant's invention, only the starter motor and engine need to be disconnectible from the wheels for smooth starting, while the traction motor can be connected to the road wheels at all times."). It does not, however, include the limitation that no gear train components other than a differential can be placed between these structural elements.

Therefore, the term **"directly coupled"** is construed as **"mechanically and permanently connected without a clutch [a device that selectively permits or prohibits transfer of torque (rotary force) and rotation] or other structural elements that disengage the connection between the motor and road wheels."**

U. "instantaneous road load," "road load," and "RL"

The term "instantaneous road load" first appears in claim 2 of the '672 patent and then in several other claims in the patent. The parties agree that the term should be construed consistently throughout the claims. P. Br. at 24; T. Br. at 25. Further, "instantaneous road load," "road load," and the symbol "RL" are used interchangeably in the patent and its claims and will be construed with the same definition. *See* P. Br. at 25; T. Br. at 25.

Paice argues that the term should be construed as "instantaneous torque required for propulsion of the vehicle." P. Br. at 24; Claim Construction Hr. Tr. at 46-48; Paice Claim Construction Slide 65. Paice argues that this definition is expressly set forth in claim 15 and, as such, this definition should control.

Toyota argues that the term should be construed as "an input parameter based on the instantaneous amount of torque required to propel the vehicle, which cannot be determined solely by detecting a combination of vehicle speed, accelerator pedal position, shift position, braking state, battery charge and/or previously determined relationships laid out in a multi-dimensional 'map' of sorted values." 5/4/05 Letter. Toyota agrees that the '672 patent uses "road load" to refer to the vehicle's "instantaneous torque requirements" but maintains that Paice's construction is incorrect. T. Br. at 25; *see also* P. Resp. Br. at 17. Its definition, Toyota argues, accounts for the

patentee's disclaimer during prosecution. In order to distinguish the invention of the '672 patent over prior art, the patentee "defined and clarified the phrase… as depending on inputs different from those disclosed in the prior art." T. Br. at 25; T. Resp. Br. at 21-22. Toyota argues that the inventor, in distinguishing the '672 invention from the prior art, "disclaimed any system in which 'road load' is determined only using [the] parameters set forth in the prior art (i.e., vehicle speed, accelerator position, brake state, and shift position)." T. Br. at 26-27; *see also* Claim Construction Hr. Tr. at 84-88; T. Resp. Br. at 21-22.

Paice responds that Toyota conflates the term "road load" with the measured parameters that may be used to derive road load. Paice argues that the passages Toyota cites from the prosecution history are only representations by the patentee regarding how the mode switching determinations were made in certain prior art and is not a disavowal of road load calculated using certain input parameters. P. Resp. Br. at 18-20. Instead of having to disclaim parameters used in the prior art to determine road load, Paice argues, a distinguishing feature of the '672 invention is that road load is used to control determination of operational mode. P. Resp. Br. at 18-19.

Claim 15 of the '672 patent defines "road load" as "instantaneous torque required for propulsion of the vehicle." The use of the term in the patent specification does not conflict with this definition. *See* '672 patent, 28:58-61. The parties agree that the term means at least this much.

The prosecution history cited by Toyota in support the additional limitations it seeks – "which cannot be determined solely by detecting a combination of vehicle speed, accelerator pedal position, shift position, braking state, battery charge and/or previously

determined relationships laid out in a multi-dimensional 'map' of sorted values" – does not amount to the clear and unambiguous disavowal necessary for inclusion of these limitations in claim construction. In discussing the Koide reference, the patentee acknowledges the input parameters used to control the vehicle's operating mode. '672 File History, September 27, 2000 Amendment at 12. The patentee then distinguishes the invention of the '672 patent from the Koide and Schmidt-Brüken prior art references because those references "explicitly teach controlling the vehicle operating mode in response to vehicle speed, not road load." *Id.* This does not amount to disavowing the use of those same parameters found in the prior art to calculate "road load."

Therefore, the term **"road load," "instantaneous road load,"** and **"RL"** are construed as **"instantaneous torque [rotary force] required for propulsion of the vehicle."**

V. "monitoring commands provided by the vehicle operation"

The term "monitoring commands provided by the vehicle operation" appears in claim 3 of the '672 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 25, P. Resp. Br. at 20, T. Resp. Br. at 22, they now agree that the term should be construed as: "determining the vehicle operator's input commands." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent, but that changing the term "monitoring" to "determining" is unnecessary. "Monitoring" is a plainly understood term and does not need further construction. Therefore, the Court construes the term **"monitoring commands provided by the vehicle operation"** as **"monitoring the vehicle operator's input commands."**

W. "total torque available at the road wheels from said engine"

The term "total torque available at the road wheels from said engine" appears in claim 13 of the '672 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 26, P. Resp. Br. at 20-21, T. Resp. Br. at 22, they now agree that the term should be construed as: "The maximum torque that the engine delivers to the wheels." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"total torque available at the road wheels from said engine"** as **"the maximum torque [rotary force] that the engine delivers to the wheels."**

X. "operating said controller to control selection between a low-speed mode I, a cruising mode IV, and an acceleration mode V"

The term "operating said controller to control selection between a low-speed mode I, a cruising mode IV, and an acceleration mode V" appears in claim 15 of the '672 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 27, P. Resp. Br. at 21, T. Resp. Br. at 23, they now agree that the term should be construed as: "operating the computerized control device such that it controls whether torque to propel the vehicle is provided by the motor, the engine or the motor or engine." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore construes the term **"operating said controller to control selection between a low-speed mode I, a cruising mode IV, and an acceleration mode V"** as **"operating the computerized control device such that it controls whether torque**

[rotary force] to propel the vehicle is provided by the motor, the engine or the motor or engine."

Y. "low-speed mode I"

Paice argues that the term "low-speed mode I" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the motor." P. Resp. Br. at 21-22. Toyota agrees that the term is expressly defined in the patent, but argues that the it should be construed as "a mode of operation in which the clutch is disengaged, energy is provided solely by the battery and torque to drive the wheels is provided solely by the motor." 5/4/05 Letter; *see also* T. Br. at 23-25, citing '672 patent, Figure 8(b).

The term "low-speed mode I" appears in claim 15 of the '672 patent as one of the modes of operation of the claimed vehicle. The term "mode of operation" is construed as "mode or state of operation determined by the source and/or direction of the flow of energy and/or torque in the system." *See* construction *infra*. The construction of "low-speed mode I" must account for the source and/or direction of the flow of energy and/or torque. This is described in the '672 patent at 28:50-57 and Figure 8(a).

Therefore, the term **"low-speed mode I"** is construed as **"the mode of operation in which energy flows from the battery bank to the traction motor and torque [rotary force] flows from the traction motor to the road wheels."**

Z. "cruising mode IV"

Paice argues that the term "cruising mode IV" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the engine." P. Resp. Br. at 22-23. Toyota argues that the term should be construed as "a mode of operation in

which the clutch is engaged and energy and torque to drive the wheels are provided solely by the engine." 5/4/05 Letter; see also T. Br. at 23-25 citing Figure 8(c).

The term "cruising mode IV" appears in claim 15 of the '672 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low-speed mode I" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "cruising mode IV." This is described in the '672 patent at 29:6-29:22 and Figure 8(c).

Therefore, the term **"cruising mode IV"** is construed as **"the mode of operation in which energy flows from the tank into the engine and torque [rotary force] flows from the engine to the road wheels."**

AA. "acceleration mode V"

Paice argues that the term "acceleration mode V" is expressly defined in the patent and therefore should be construed as "the vehicle is powered by the motor and the engine." P. Resp. Br. at 23. Toyota agrees that the term is expressly defined in the patent, but argues that the it should be construed as "a mode of operation in which the clutch is engaged, energy is provided by the engine and battery and torque to drive the wheels is provided by the engine and motor." 5/4/05 Letter; *see also* T. Br. at 23-25, citing '672 patent, Figure 8(d).

The term "acceleration mode V" appears in claim 15 of the '672 patent as one of the modes of operation of the claimed vehicle. For the same reasons that the construction of "low-speed mode I" had to account for the source and/or direction of the flow of energy and/or torque, so must the construction of "acceleration mode V." This is described in the '672 patent at 29:23-29 and Figure 8(d).

Therefore, the term **"acceleration mode V"** is construed as **"the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque [rotary force] flows from the engine and at least one motor to the road wheels."**

BB. "monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL)"

Claim 15 of the '672 patent contains the term "monitoring the instantaneous torque requirements required for propulsion of the vehicle (RL)." Paice argues that the term should be construed, according to its plain meaning, as "determining the instantaneous torque requirements required for propulsion of the vehicle." P. Br. at 28.

Toyota argues the term should be construed as "monitoring an input parameter which reflects the instantaneous amount of torque required to propel the vehicle, but the monitoring must detect some input other than or an [SIC] addition to the combination of vehicle speed, accelerator pedal positions, shift position, braking state, battery charge and/or previously determined relationships laid out in a multi-dimensional 'map' of stored values." 5/4/05 Letter. Toyota's proposed construction reflects its position regarding the construction for "instantaneous road load" discussed above.

The Court finds it need look no further than the claim itself to arrive at the plain and ordinary meaning of this claim term and finds that no construction is required.

CC. "operating mode"

The term "operating mode" appears in claim 15 of the '672 patent. The parties are in agreement that the term should be construed the same way in the '672 patent as in the '970 patent and, after a review of the '672 patent claims and specification, the Court agrees. P. Br. at 28; T. Resp. Br. at 24. Therefore, the term **"operating mode"** is

construed as **"mode or state of operation determined by the source and/or direction of the flow of energy and/or torque [rotary force] in the system."**

DD. "at least one traction motor being coupled to road wheels of said vehicle"

The claim term "at least one traction motor being coupled to road wheels of said vehicle" appears in claim 30 of the '672 patent. Paice argues that the term should be construed as "at least one electric motor capable of imparting torque to the road wheels." P. Br. at 29; P. Resp. Br. at 24-26; *see also* Paice Claim Construction Slide 72.

Toyota initially argued that the claim term should be construed to require that the traction motor be "directly coupled" to the road wheels of the vehicle. T. Br. at 28-29; T. Resp. Br. at 25. Toyota now argues that the claim should be construed as "at least one motor mechanically coupled to the road wheels without any intervening clutch or gear train components other than a differential," but cites no support and makes no argument in favor of this construction. 5/4/05 Letter.

The Court finds it need look no further than the claim itself to arrive at the plain and ordinary meaning of this claim term and finds that no construction is required.

EE."a controller for controlling operation… and controlling flow"

The term "a controller for controlling operation… and controlling flow" appears in claim 30 of the '672 patent. The parties are in agreement that the term should be construed the same way in the '672 patent as the terms "a controller for controlling the operation of …and for controlling the relative contributions of…" and "control means" in claims 1 and 2 of the '970 patent. P. Br. at 30; T. Resp. Br. at 25. Having reviewed the '672 patent claims and specification, the Court agrees.

Therefore, the term **"a controller for controlling operation… and controlling flow"** is construed as **"a computerized control device for controlling operation… and controlling flow."**

FF. "configured as a number of batteries connected by normally open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices"

The claim term "configured as a number of batteries connected by normally open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices" appears in claim 30 of the '672 patent.

Paice argues the term should be construed as "at least two batteries connected through switches that open if power is cut off." P. Br. at 30. Paice arrives at this construction stating that the patent does not expressly define the term but that the specification provides "clear guidance regarding the ordinary meaning of this language to those of ordinary skill." P. Br. at 30, citing '672 patent, 27:31-37 and 27:49-53. Paice argues that "[e]ach exemplary 'fail-safe condition' disclosed in the specification involves a power ending event that cuts off power to the relays, thereby causing the relays to open." P. Br. at 30 citing '672 patent, 27:53-57.

Though Toyota initially offered no construction for this term, Toyota now proffers "a configuration of batteries with normally open switches between every battery that open if power is cut off" as the construction. 5/4/05 Letter. Toyota provides no support or argument in favor of this construction. *Id.*; *see also* 5/13/05 Letter.

The Court finds that Paice's position is consistent with the claim language and the patent specification. Therefore, the claim term **"configured as a number of batteries**

connected by normally open switching devices, such that said batteries are electrically isolated from one another in the event power is cut off from said switching devices" is construed as **"at least two batteries connected through switches that open if power is cut off."**

The '088 claim at issue:

1. In a method of controlling an internal combustion engine of a hybrid vehicle, said engine being operatively connected to drive wheels of said vehicle through a clutch, said vehicle further comprising a traction motor operatively connected to drive wheels of said vehicle, a starter/generator motor operatively connected to said engine for starting said engine and for providing electrical power in response to torque from said engine, a battery bank adapted to store electrical energy to power said traction motor and to start said engine, at least one inverter/charger adapted to cooperate with said traction motor and said starter/generator such that said traction motor can be operated to provide torque to said road wheels responsive to electrical power from said battery bank, or to provide electrical power to said battery bank responsive to torque from said road wheels, and such that said starter/generator can be operated to provide torque to start said engine, or to provide electrical power to said battery bank responsive to torque provided by said engine, and a microprocessor adapted to control operation of said engine, said traction motor, said starter/generator, and said at least one inverter/charger, so as to control flow of torque and electrical power therebetween in response to sensed parameters, the improvement comprising:

establishing at least four vehicle operating modes, including:

a mode I, wherein said engine is not operated and said vehicle is propelled by torque from said traction motor in response to electrical power drawn from said battery bank;

a mode II, wherein said vehicle is propelled by torque from said traction motor in response to electrical power drawn from said battery bank, and said starter/generator is driven by torque provided by said engine to provide electrical power to recharge said battery bank;

a mode IV, wherein said vehicle is propelled by torque from said engine; and

a mode V, wherein said vehicle is propelled by torque from said engine and from said traction motor in response to electrical power drawn from said battery bank;

wherein said microprocessor controls operation of said V engine, said traction motor, said starter/generator, and said at least one inverter/charger so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle, and said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined minimum value of its maximum torque output.

GG. "instantaneous torque demands" and "RL"

The term "instantaneous torque demands" appears in claim 1 of the '088 patent. The parties are in agreement that the term should be construed the same way in the '088 patent as the terms "instantaneous road load," "road load," and "RL" in the '672 patent and, after a review of the '088 patent claims and specification, the Court agrees. P. Resp. Br. at 28-29; T. Resp. Br. at 27.

Therefore, the term **"instantaneous torque demands"** is construed as **"instantaneous torque [rotary force] required for propulsion of the vehicle."**

HH. "said microprocessor controls operation… so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle"

The term "said microprocessor controls operation… so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle" appears in claim 1 of the '088 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 32, P. Resp. Br. at 29, T. Br. at 32, T. Resp. Br. at 28, they now agree that the term should be construed as: "operating the computerized control device such that it determines the mode of operation based on instantaneous torque requirements for propulsion of the vehicle." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"said microprocessor controls operation… so as to operate said vehicle in a selected one of said operating modes in response to the instantaneous torque demands (RL) of said vehicle"** as **"operating the**

computerized control device such that it determines the mode of operation based on instantaneous torque [rotary force] requirements for propulsion of the vehicle."

II. "operating mode"

The term "operating mode" appears in claim 1 of the '088 patent. The parties are in agreement that the term should be construed the same way in the '088 patent as in the '970 and '672 patents and, after a review of the '088 patent claims and specification, the Court agrees. P. Br. at 32; T. Br. at 24 and 28.

Therefore, the term **"operating mode"** is defined as **"mode or state of operation determined by the source and/or direction of the flow of energy and/or torque [rotary force] in the system."**

JJ. "said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined value of its maximum torque output"

The term "said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a predetermined value of its maximum torque output" appears in claim 1 of the '088 patent. Though the parties initially disagreed regarding the appropriate construction of the term, P. Br. at 32-33, P. Resp. Br. at 30, T. Resp. Br. at 28, they now agree that the term should be construed as: "selecting an operating mode in which the engine is operated only when the load on the engine's exceeds a predetermined amount of the engine's maximum torque output." 5/4/05 Letter.

The Court finds that this definition is consistent with the use of the term in the patent and therefore will construe the term **"said selected operating mode being selected such that said engine is operated only in response to a load equal at least to a**

predetermined value of its maximum torque output" as **"selecting an operating mode in which the engine is operated only when the load on the engine's exceeds a predetermined amount of the engine's maximum torque [rotary force] output."**

V. Conclusion

Accordingly, the Court hereby ORDERS the disputed claim terms construed consistent herewith.

SIGNED this 28th day of September, 2005.

DAVID FOLSOM
UNITED STATES DISTRICT JUDGE

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC, Plaintiff, v. TOYOTA MOTOR CORPORATION, a Japanese Corporation, TOYOTA MOTOR NORTH AMERICA, INC., and TOYOTA MOTOR SALES, U.S.A., INC., Defendants.	Case No.: 2-07-cv-180-DF

PLAINTIFF PAICE LLC'S OPENING BRIEF ON CLAIM CONSTRUCTION

Dated: June 25, 2008

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Plaintiff PAICE LLC ("Paice") hereby submits its brief on the proper construction of certain disputed terms in U.S. Patent No. 5,343,970 ("the '970 patent," attached hereto as Exhibit A); U.S. Patent No. 7,104,347 ("the '347 patent," attached hereto as Exhibit B); and U.S. Patent No. 7,237,634 ("the '634 patent," attached hereto as Exhibit C). For the reasons that follow, Paice respectfully requests that this Court adopt its proposed claim constructions in their entirety.

I. INTRODUCTION

A. Technological Overview[1]

Hybrid electric vehicles are powered by both a traditional internal combustion engine (ICE) and at least one electric motor. Such vehicles have become increasingly attractive alternatives to traditional automobiles powered solely by ICEs or straight electric vehicles because they combine the advantages from each and minimize their shortcomings. Namely, hybrid electric vehicles provide the potential for maximum fuel efficiency, lower emissions, and increased driveability in a wide range of vehicles, without limiting travel distance and performance based on the electric motor alone.

Hybrid electric vehicles are generally categorized as one of a number of types: a series hybrid, a parallel hybrid, or a parallel-series hybrid. In a series hybrid system, the engine runs a generator that powers the electric motor in order to provide torque to the wheels to propel the vehicle. In a parallel hybrid system, the engine and the electric motor are both connected to the drive wheels of the vehicle, and either can impart torque to the wheels to propel the vehicle. A parallel-series hybrid, as the name implies, can operate as a series or a parallel hybrid; the engine can run a generator to power a motor to impart torque to the wheels to propel the vehicle (series), or the engine and motor can themselves directly impart torque to the wheels to propel the vehicle

[1] Although the Court is familiar with hybrid vehicle technology, Paice presents an overview for other readers who might be new to this field.

(parallel). To maximize efficient use of the battery energy, each type of hybrid provides for recovery of torque from the wheels during braking to drive a generator, which charges the battery. Because hybrid electric vehicles are equipped with more than one source of torque, a control scheme is required to control the various components of the hybrid system, including determining the source of propulsive torque in a given driving condition. This determination is critically important, as hybrid systems that do not make such determinations properly or use the most efficient source of torque ultimately fail to realize the significant benefits of hybrids.

The salient issues in this case revolve around the novel topology of Paice hybrid electric vehicles, and the superior methods invented by Paice to select modes of operation (e.g., motor-only), together with the method of operation of key components to maximize utility of such vehicles.

B. The Parties

Paice is in the business of developing superior hybrid electric vehicle technology that, when implemented, promotes better fuel efficiency, lower emissions, superior driving performance and fuel efficient operation of internal combustion engines. Formed in 1992, Paice has been at the forefront of development of economical hybrid electric vehicle control systems and related technologies. As a result of its inventive endeavors, Paice owns a number of patents directed to hybrid vehicle technology. The technological superiority of Paice's technology as a cost-effective alternative to other hybrid vehicle designs has been recognized in the industry.

Defendants Toyota Motor Corporation of Japan, Toyota Motor North America, Inc., and Toyota Motor Sales U.S.A., Inc. (collectively "Toyota") are in the business of designing, developing, manufacturing, marketing, and selling automobiles worldwide, including hybrid electric vehicles within the United States. Toyota's presently manufactures, sells, and distributes

in the United States the Toyota Prius II, Toyota Camry hybrid, Lexus RX400h, Lexus GS450h and Lexus LS600h. Toyota has been a market leader for hybrid electric vehicles.

C. Legal Background

Paice filed its first lawsuit against Toyota in June 2004, alleging, among other things, that Toyota was infringing the '970 patent by offering for sale and selling in the United States its hybrid Toyota Prius II, Toyota Highlander SUV, and Lexus RX400h SUV (hereinafter referred to as "*Paice I*"). The case proceeded to trial in December 2005 and the jury returned a verdict that the '970 patent was infringed and not invalid, and awarded past damages. The parties' cross-motions for JMOL subsequently were denied and Paice's motion for entry of a permanent injunction also was denied in view of the Supreme Court's *eBay* decision handed down after trial. Final Judgment was entered in August 2006 on the jury's findings and imposing a compulsory license under which Toyota would pay $25 per vehicle on ongoing sales of each infringing vehicle over the remaining life of the '970 patent. Toyota appealed only the infringement finding of the '970 patent. Paice cross-appealed, *inter alia*, the imposition of the compulsory license. In October 2007, the Federal Circuit affirmed the liability finding and affirmed this Court's imposition of a compulsory license, but remanded for further proceedings on the proper determination of ongoing royalties under the facts of this particular case.

Paice instituted this action for patent infringement against Toyota for infringement of the '970 patent by Toyota's new hybrid electric vehicles, and the '347 patent and '634 patent by all of Toyota's hybrid electric vehicles on May 8, 2007. Paice filed an amended complaint on July 3, 2007. Toyota answered on August 14, 2007, asserting counterclaims of non-infringement and invalidity. The court entered a Scheduling Order on November 27, 2007 which was modified by an Order issued on February 20, 2008. Under the modified scheduling order, the parties were required to exchange proposed claim constructions on April 3, 2008. Because this case involves

many of the same claim terms as the *Paice I* litigation, Paice identified only one claim term that it believes requires construction here. *See* 4/3/2008 Davis Ltr to Badenoch (Exhibit D). Toyota identified over 16 claim terms requiring construction, including the one identified by Paice. *See* 4/3/2008 Defendants Proposed Terms and Claim Elements Requiring Construction (Exhibit E). Paice's proposed construction for each of the disputed terms is discussed in further detail below. Paice remains convinced that the Court need construe only one additional term beyond what was determined in the first proceeding; however, Paice here presents its analysis for the terms Toyota urges for construction.

II. THE PAICE PATENTS

Paice is the owner by assignment of each of the asserted patents. As discussed in further detail below, each of these patents is directed to various aspects of hybrid electric vehicle technology, including novel designs and control systems for hybrid electric vehicles.

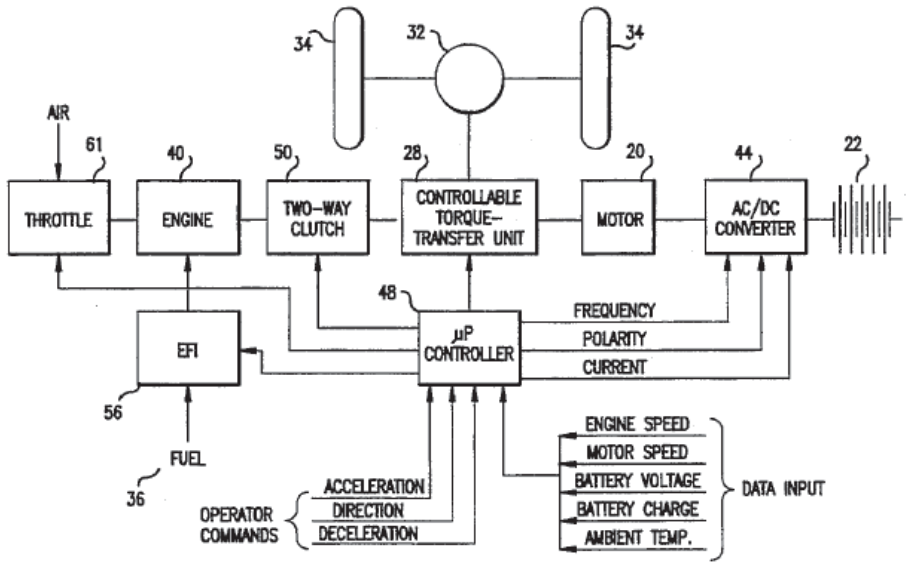
A. United States Patent No. 5,343,970

The '970 patent, entitled "Hybrid Electric Vehicle," issued on September 6, 1994, from an application that was filed on September 21, 1992. The '970 patent generally discloses and claims a novel hybrid electric vehicle, including an internal combustion engine and electric motor, both of which can provide torque to the wheels of the vehicle through a controllable torque transfer unit.

At the time the application that became the '970 patent was filed, hybrid electric vehicles were known in the art, but suffered from substantial deficiencies that prohibited them from being competitive with traditional automobiles. For example, hybrid vehicles known in the prior art taught or required that the vehicle operator control the transition between operating modes. '970 patent, col. 3:16-25; col. 4:12-18. Similarly, many of the hybrids in the prior art required multiple-speed, manual, or automatic transmissions which added complexity, cost, and size to

the vehicles. '970 patent, col. 3:31-59. Further, because the electric motors in the prior art rarely provided sufficient torque to propel the vehicle at low speeds, a variable-speed transmission was often required. '970 patent, col. 4:22-26.

To overcome these deficiencies in the prior art, the '970 patent teaches employing an innovative parallel hybrid system containing a relatively powerful alternating current electric motor that is run at high voltage and low current, and an internal combustion engine that is operated in its fuel efficient range. The microprocessor controls the direction of torque transfer responsive to the mode of operation to provide highly efficient operation of the vehicle over a wide range of operating conditions. In particular, the transition between modes in this system is transparent to the operator. The arrangement of a preferred embodiment is shown in Figure 3 of the '970 patent, reproduced below.



In the preferred embodiment shown in Figure 3, an internal combustion engine 40 and an alternating current (AC) motor 20 are connected to the drive wheels of the vehicle through a controllable torque transfer unit 28. The torque transfer unit receives torque from the engine 40 or motor 20 and transmits this torque to drive wheels 34. A battery 22 provides direct current

(DC) power to a hi-directional solid state AC/DC power converter 44, which converts the DC power from the battery to AC power, which then powers motor 20. '970 patent, col. 9:61-68. The battery is charged by power generated by the motor 20 when it receives torque from the wheels (sometimes called "regenerative braking") or the engine, through the torque transfer unit. '970 patent, col. 9:68-col. 10:4.

Control of the engine and motor is accomplished by microprocessor controller 48, which controls the rate of supply of fuel to engine 40; the throttle opening by which the engine receives air for combusting fuel; the operation of two-way clutch 50 and torque transfer unit 28; and the hi-directional flow of power between battery 22 and motor 20. This control is responsive to control signals received from the vehicle operator (e.g., depressing accelerator or brake pedals) and external system elements, such as engine speed, motor speed, and battery voltage. '970 patent, col. 10:4-24.

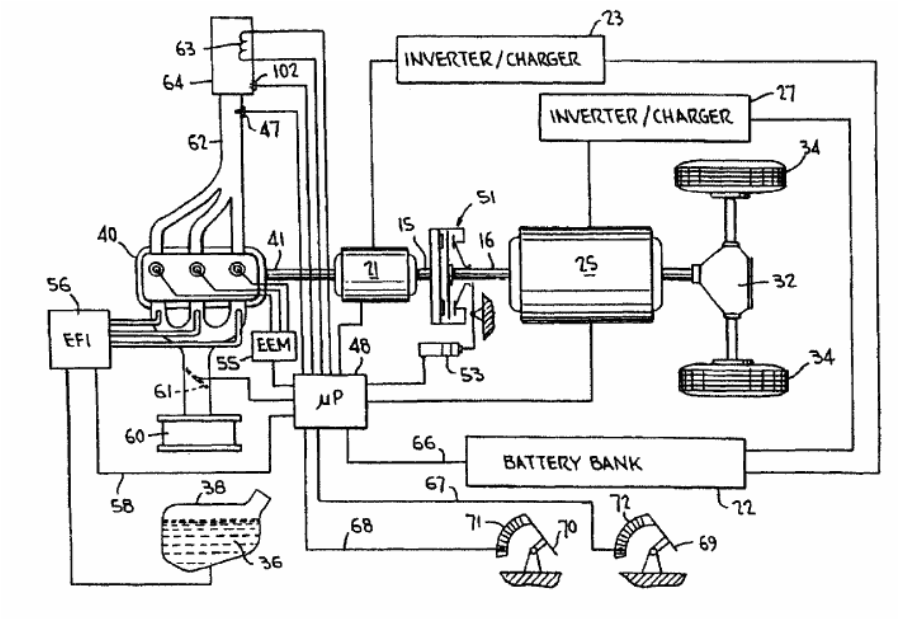
These input parameters arc indicative of the overall driving condition, which is used to select the operating mode of the vehicle. Thus, for example, when the vehicle is operating in low-speed circumstances, such as in stop-and-go city driving, the microprocessor may determine that all torque should be supplied from the electric motor. '970 patent, col. 10:52-68. Likewise, when the vehicle is operating in a high-speed acceleration or hill climbing mode, the microprocessor may determine that torque should be supplied to the drive wheels from both the engine and the electric motor. '970 patent, col. 14:22-34.

B. United States Patent No. 7,104,347

The '347 patent, entitled "Hybrid Vehicles," issued on September 12, 2006 from an application with a priority date of September 14, 1998. Although the '347 patent is not related to

the '970 patent, it builds substantially on the teachings of the '970 patent.[2] See, e.g.,'347 patent, col. 25:29-52. In particular, the '347 patent discloses and claims a novel hybrid electric vehicle, including an internal combustion engine and two motors. One of the motors may be used to recharge the battery. Additionally, a microprocessor is employed to arbitrate between operating modes based on the vehicle's instantaneous torque requirements (also called "road load"), state of charge of the battery bank, and other variables. '347 patent, col. 35:20-35.

A preferred embodiment of the hybrid vehicle claimed in the '347 patent is shown in Figure 3, reproduced below:



As shown, a traction motor 25 is connected to the road wheels 34 through a differential 32. A starter motor 21 is connected directly to the internal combustion engine 40. The motors 21 and 25 are functional as either motors or generators, depending on the operation of the corresponding inverter/charger units 23 and 27, which connect the motors to the battery bank 22. '347 patent, col. 26:13-27.

[2] The '347 patent is a continuation of U.S. Patent No. 6,554,088, which was asserted as part of *Paice I* but upon which the jury did not find infringement.

These components are controlled by a microprocessor 48, or any controller capable of examining input parameters and signals and controlling the mode of operation of the vehicle according to a stored program. '347 patent, col. 25:53-col. 26:3. For example, control of engine 40 is accomplished by way of control signals provided by the microprocessor to the electronic fuel injection (EFI) unit 56 and electronic engine management (EEM) unit 55. Control of (1) starting of the engine 40; (2) usage of motors 21 and 25 to provide propulsive torque; or (3) usage of motors as generators to provide regenerative recharging of battery bank 22, is accomplished through control signals provided by the microprocessor to the inverter/charger units 23 and 27. '347 patent, col. 28:25-49; col. 29:57-64.

The hybrid vehicle may be operated in a number of modes based on the vehicle's instantaneous torque requirements, the engine's maximum torque output, the state of charge of the battery, and other operating parameters. In the preferred embodiment of the '347 patent, the microprocessor causes the vehicle to operate in one of four principal modes pursuant to its control strategy.

During low-speed operation (mode I), the hybrid vehicle is operated as a simple electric car, with the traction motor providing all torque to propel the vehicle. '347 patent, col. 35:66-36:4; Fig. 8(a). As the vehicle continues to be propelled in electric only mode, the state of charge of the battery may become depleted, and need to be recharged. During this battery recharge mode (mode II), the vehicle operates as in mode I, with the engine running the starter/generator motor to provide electrical energy to operate the traction motor and recharge the battery. '347 patent, col. 36:8-22; Fig. 8(a). During highway cruising (mode IV), which is when the internal combustion engine operates in its fuel efficient range, the hybrid vehicle is operated essentially as a traditional automobile, with the engine providing all torque to propel the vehicle.

'347 patent, col. 36:23-39; Fig. 8(c). If, while operating the vehicle in mode IV, the operator calls for additional power, then the vehicle will enter acceleration or hill-climbing operation (mode V), where the traction motor provides additional torque to propel the vehicle beyond that already provided by engine 40. '347 patent, col. 36:40-46; Fig. 8(d).

In addition to the topology and control system described in the '347 patent, it also discloses a novel configuration of the energy used to power the electric motors. In particular, because the hybrid electric vehicle of the '347 patent is preferably operated at high voltages, there is a substantial need to subdivide this voltage for safety reasons. Accordingly, the '347 patent teaches separating the battery bank with normally-open switching devices that will isolate the batteries from one another in the event power is cut off from those devices. '347 patent, col. 34:42-50. Mode III; an emergency mode of operation not relevant to the asserted claims, allows the vehicle to operate in electric-only mode in the case of engine or battery fault. '347 patent, co1. 37:40-44.

C. United States Patent No. 7,237,634

The '634 patent, entitled "Hybrid Vehicles," issued on July 3, 2007, and claims priority to two provisional applications dated March 1, 1999, and September 14, 1998, respectively. As a division of the '347 patent, much of the relevant disclosure of the '347 patent is contained in the '634 patent specification.

III. LEGAL STANDARDS OF CLAIM INTERPRETATION

A. Principles of Claim Construction

Claim interpretation is a question of law decided before proceeding to an infringement or invalidity analysis. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967,979 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996); *see also Rockwell Corp. v. United States*, 147 F.3d 1358, 1362 (Fed. Cir. 1998). "The construction that stays true to the claim language and most naturally aligns

with the patent's description of the invention will be, in the end, the correct construction." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (*en banc*). Claim terms "do not stand alone. Rather, they are part of a fully integrated written instrument," and therefore "must be read in view of the specification." *Id.* at 1315.

"To properly construe a claim term, a court first considers the intrinsic evidence, starting with the language of the claims." *Merck & Co., Inc. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1369-70 (Fed. Cir. 2005). "[T]he interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented." *Phillips*, 415 F.3d at 1316. As such, "the 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*. at 1315 (internal quotations omitted).

"While in some cases there is a presumption that favors the ordinary meaning of a term, *Tex. Digital Sys. v. Telegenix Inc.*, 308 F.3d 1193, 1202 (Fed. Cir. 2002), the court must first examine the specification to determine whether the patentee acted as his own lexicographer of a term that already has an ordinary meaning to a person of skill in the art." *Merck*, 395 F.3d at 1370. To act as his own lexicographer and deviate from ordinary meaning, the patentee "must clearly express that intent in the written description" with "sufficient clarity to put one reasonably skilled in the art on notice that the inventor intended to redefine the claim term." *Id.* More specifically, this requires that "the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Gemstar-TV Guide Int'l, Inc. v. ITC*, 383 F.3d 1352, 1364 (Fed. Cir. 2004); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002).

Absent such clear intent, there is a heavy presumption in favor of the ordinary meaning of claim language. *Tex. Digital*, 308 F.3d at 1202. Accordingly, "[u]nless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art." *Gemstar-TV*, 383 F.3d at 1364; *Tex. Digital*, 308 F.3d at 1202.

Precedent teaches that in construing disputed claim terms, courts should exercise due care to avoid limiting the claims solely to the disclosed embodiments, even where there may be only one. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("[T]his court has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment.") Rather, in the absence of a manifest intention by the patentee to limit claim scope, either in the written description or prosecution history, such a restrictive reading of the claims would constitute legal error. *Id.* at 906-908 (citing cases). A claim construction should also proceed "without regard to the accused device." *Optical Disc. Corp. v. Del Mar Avionics*, 208 F.3d 1324, 1333 (Fed. Cir. 2000) ("claim scope is determined without regard to the accused device"); *Young Dental Mfg. Co., Inc. v. Q3 Special Prods., Inc.*, 112 F.3d 1137, 1141 (Fed.Cir. 1997) ("First, the claim scope is determined without regard for the accused device.").

Importantly, district courts are not required to construe every limitation present in a patent's asserted claims. *See, e.g., Biotec Biologische Naturverpackungen GmbH & Co. KG v. Biocorp, Inc.*, 249 F.3d 1341, 1349 (Fed. Cir. 2001) (application of the claim term was the proper disputed issue, not construction); *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997) (claim construction "is not an obligatory exercise in redundancy"). "Claim construction is a matter of resolution of disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims, for use in the

determination of infringement." *U.S. Surgical*, 103 F.3d at 1568. When the patent claim term is clear and can be properly applied by a jury then a redundant construction is unnecessary. *Id.* at 1567. ("We doubt that *Markman* requires the trial judge to instruct as to an undisputed 'claim construction' for every term, by simply parroting the words of the claim....").

The doctrine of collateral estoppel prevents reconstruction of claim limitations that were fully and fairly litigated in *Paice I*. Because the doctrine of collateral estoppel does not implicate any issues unique to the patent law, the law of the regional circuit applies. *See Dana v. E.S. Originals, Inc.*, 342 F.3d 1320, 1323 (Fed. Cir. 2003); *Bayer AG v. Biovail Corp.*, 279 F.3d 1340, 1345 (Fed. Cir. 2002). In the Fifth Circuit, application of collateral estoppel depends on three elements: (1) the issue at stake must be identical to the one involved in the prior action; (2) the issue must have been actually litigated in the prior action; and (3) the determination of the issue in the prior action must have been a necessary part of the judgment in that earlier action. *Pace v. Bogalusa City School Bd.*, 403 F.3d 272, 291 (5th Cir. 2005); *Recoveredge L.P. v. Pentecost*, 44 F.3d 1284, 1291 (5th Cir. 1995). Toyota is collaterally estopped from rearguing construction of claim terms that were construed by the Court in *Paice I*, fully and fairly litigated before the jury, and necessary to the judgment in the prior action. Toyota is further estopped from arguing constructions it waived by not asserting in *Paice I*, if those claim terms were fully and fairly litigated before the jury, and necessary to the judgment in the prior action. *See Duffy & McGovern Accommodation Services v. QCI Marine Offshore, Inc.*, 448 F.3d 825, 829-830 (5th Cir. 2006) (collateral estoppel applies to any issue of law or fact).

B. Construction of Means-Plus-Function Claim Elements

A patentee may claim his invention as a means for performing a specified function without the recital of structure, material, or acts in support thereof. 35 U.S.C. § 112 ¶ 6. "Whether claim language should be interpreted as a means-plus-function limitation under 35

U.S.C. § 112 ¶ 6 is a question of law." *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1318 (Fed. Cir. 2004).

"[A] claim limitation that employs the language 'means for' invokes a rebuttable presumption that § 112 ¶ 6 applies." *Gemstar-TV*, 383 F.3d at 1361. "While the use of the word 'means' gives rise to a presumption that § 112, paragraph 6 applies, the presumption is overcome by the recitation of the structure needed to perform the recited function." *TI Group Auto. Sys. (N. Am.), Inc. v. VDON. Am., L.L.C.*, 375 F.3d 1126, 1135 (Fed. Cir. 2004).

"The determination of the claimed function and corresponding structure of a means-plus-function claim limitation is a question of law." *Gemstar-TV*, 383 F.3d at 1361 (quoting *ACTV Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1087 (Fed. Cir. 2003)). The court must first identify the recited function within the means-plus-function limitation and, then, determine the structure that corresponds to that function by examining the written description. *Id.*

IV. PROPOSED INTERPRETATION OF DISPUTED CLAIM TERMS

A. '970 Patent

Paice has asserted '970 patent claims 11 and 39 against Toyota. Paice believes there is no need to construe any terms of the '970 patent because this Court already construed those terms in *Paice I*. There is no justification for altering a claim construction was correct in the first instance and that Toyota has already had a full and fair opportunity to litigate.

1. Claim 11

Claim 11 is directed to a hybrid vehicle that employs a solid-state switching apparatus. It reads:

> 11. A hybrid electric vehicle, comprising:
>
> two or more drive wheels receiving torque for propelling said vehicle from an output shaft, and a power unit supplying drive torque to said output shaft, said power unit comprising:

> a controllable torque transfer unit adapted to receive torque from two sources and transfer said torque to said output shaft,
>
> an engine adapted to consume combustible fuel and supply torque to said torque transfer unit;
>
> an AC electric motor adapted to receive electric energy from a battery and supply torque to said torque transfer unit, said motor being further adapted to be operable as a generator;
>
> a battery for supply of stored electric energy to said motor, and for receiving and storing electric energy from said motor when operated as a generator; solid state switching means for converting DC supplied by said battery to AC for supply to said electric motor, and for rectifying AC generated by said motor when operated in a regenerative mode to provide DC to charge said battery; and
>
> a controller for controlling the operation of said engine, said electric motor, said solid state switching means, and said torque transfer unit, such that said torque transfer unit receives torque from either or both of said internal combustion engine and said electric motor and transmits torque therefrom to said drive wheels by way of said output shaft, and for controlling the relative contributions of the internal combustion engine and electric motor to the torque driving the wheels.

a. "Controllable torque transfer unit"

Paice's proposed construction: This term means a multi-input device or component that is controlled to transfer variable amounts of torque [rotary force].

Toyota persists in urging that this term be reconstrued, but collateral estoppel holds that no further construction is possible. This term was not only hotly debated before the Court in *Paice I*, it formed the focus of Toyota's unsuccessful appeal to the Federal Circuit and petition for certiorari to the U.S. Supreme Court. Moreover, the '970 patent specification clearly supports Paice's proposed definition taken from the *Paice I* Claim Construction Order at 17. For example, "both the engine 40 and the motor 20 provide torque to the drive wheels 34 by way of the controllable torque transfer unit 28 [, and] the microprocessor 48 controls the flow of torque between the motor 20, the engine 40, and the wheels 34 responsive to the mode of operation of the vehicle." '970 patent, col. 10:24-30.

2. Claim 39

Claim 39 is directed to a hybrid electric vehicle controlled to operate in a plurality of modes responsive to certain commands. It depends from claim 38 which depends from claim 32. The only term in dispute is contained in claim 32, which reads:

> 32. A hybrid electric vehicle, comprising:
>
> a controllable torque transfer unit, operable to transfer torque in three modes: (a) from either or both of two input shafts to an output member, said output member transmitting torque to drive wheels of said vehicle; (b) between said input shafts; and (c) from said output member to one or both of said input shafts;
>
> an electric motor adapted to apply torque to a first of said input shafts responsive to supplied electrical energy, said motor further being operable in a generator mode, to provide electrical energy when driven by torque transferred thereto via said first input shaft;
>
> a combustible-fuel-burning internal combustion engine adapted to apply torque to a second of said input shafts;
>
> a battery adapted to supply electrical energy to and store energy received from said electric motor; and
>
> a controller adapted to receive input commands from a driver of said vehicle to monitor operation of said vehicle and to control operation of said controllable torque transfer unit, said motor, and said internal combustion engine, wherein said controller comprises means for performing the following functions responsive to input commands and monitored operation of said vehicle:
>
> selecting an appropriate mode of operation of said vehicle from at least the following possible modes of operation:
>
> low speed running;
> steady state running;
> acceleration or hill climbing;
> battery charging;
> braking; and
> engine starting;
>
> selecting the appropriate flow paths of electrical energy and/or combustible fuel and of torque to effectuate the selected mode of operation; and

controlling operation of said controllable torque transfer unit, said electric motor and said internal combustion engine in accordance with said selected appropriate flow paths and selected mode of operation.

a. "Means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation..."

Paice's proposed construction: This phrase means a computerized control device and associated components for selecting an operating mode [mode or state of operation determine by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor, and battery to implement that mode.

The '970 patent specification clearly supports Paice's proposed definition as applied by the Court in *Paice I*. *See Paice I* Claim Construction Order at 24. No other aspects of this limitation require further construction as the Court already construed the "means for performing the following functions" limitation in *Paice I*, however, Paice again sets forth its argument for the appropriate construction previously used by the Court. Toyota should be estopped from raising new arguments regarding the Court's construction of this previously construed and litigated claim term.

A rebuttable presumption that 35 U.S.C. § 112 ¶ 6 applies is triggered by the words "means for" in this term without qualifying structure. The first step is to identify the recited function of the means-plus-function limitation. The functions are "selecting an appropriate mode of operation of said vehicle," "selecting the appropriate flow paths," and "controlling operation of said controllable torque transfer unit."

The second step is to identify the structure(s) in the written description which correspond to this recited function. As detailed in the specification, "a microprocessor controller 48 controls the rate of supply of fuel to engine 40 as indicated at 56, controls the opening of a throttle 61 by which the engine receives intake air from the atmosphere for combusting fuel, controls the operation of the two-way clutch 50, controls the operation of the torque transfer unit 28, and

controls the hi-directional flow of power between the battery 22 and the motor 20 through frequency, current, and polarity signals passed to the hi-directional AC/DC power converter 44." '970 patent, col. 10:4-14.

The specification also teaches that "both the engine 40 and the motor 20 provide torque to the drive wheels 34 by way of the controllable torque transfer unit 28. As will be detailed below, the microprocessor 48 controls the flow of torque between the motor 20, the engine 40, and the wheels 34 responsive to the mode of operation of the vehicle." '970 patent, col. 10:24-30. "[M]icroprocessor 48 is provided with all information relevant to the performance of the system, and appropriately controls torque transfer unit 28, internal combustion engine 40, switching unit 28, and electric motor 20 to ensure that appropriate torque is delivered to the wheels 34 of the vehicle." '970 patent, col. 12:64-col. 13:2. The microprocessor selects the mode of operation by controlling the stated structural components of the system, and it is the state of operation of those components that defines the various operating modes of the system. The specification statements as to individual modes confirm this construction. For example, the specifications states "[u]nder the control of microprocessor 48, the regenerative braking/coasting mode can be entered whenever the driver removes his foot from an accelerator pedal and depresses a brake pedal." '970 patent, col. 14:41-45. Thus, a computerized control device and its associated components are necessary to perform the recited functions of the means-plus-function limitation.

B. '347 Patent

Paice has asserted '347 patent claim 7, which depends from claim 1, against Toyota. Paice believes that most of the terms identified by Toyota for construction were either already construed in *Paice I*, as the '347 patent is a continuation of the '088 patent that was at issue in the previous case, or need not be construed because their plain and ordinary meaning would be

readily understood by those of ordinary skill in the art. Paice believes that only the new term "setpoint" requires construction by this Court. Toyota urges construction of the additional terms "controllably coupled" and "normally aspirated." Paice maintains that these terms do not require construction and reserves the right to respond to arguments advanced by Toyota if they persist in seeking construction of the terms.

1. Claim 7

Claim 7 is directed to a hybrid electric vehicle controlled to operate in a plurality of operating modes responsive to values and depends from claim 1, which reads:

> 1. A hybrid vehicle, comprising:
>
> an internal combustion engine controllably coupled to road wheels of said vehicle;
>
> a first electric motor connected to said engine and operable to start the engine responsive to a control signal;
>
> a second electric motor connected to road wheels of said vehicle, and operable as a motor, to apply torque to said wheels to propel said vehicle, and as a generator, for accepting torque from at least said wheels for generating current;
>
> a battery, for providing current to said motors and accepting charging current from at least said second motor; and
>
> a controller for controlling the flow of electrical and mechanical power between said engine, first and second motors, and wheels,
>
> wherein said controller starts and operates said engine when torque required to be produced by said engine to propel the vehicle and/or to drive either one or both said electric motor(s) to charge said battery is at least equal to a setpoint (SP) above which said engine torque is efficiently produced, and wherein the torque produced by said engine when operated at said setpoint (SP) is substantially less than the maximum torque output (MTO) of said engine.

Claim 7 reads:

> 7. The vehicle of claim 1, wherein said vehicle is operated in a plurality of operating modes responsive to the value for the road load (RL) and said setpoint SP, both expressed as percentages of the maximum torque output of the engine when normally-aspirated (MTO), and said operating modes include:

a low-load mode I, wherein said vehicle is propelled by torque provided by said second electric motor in response to energy supplied from said battery, while RL<SP,

a highway cruising mode IV, wherein said vehicle is propelled by torque provided by said internal combustion engine, while SP<RL<MTO, and

an acceleration mode V, wherein said vehicle is propelled by torque provided by said internal combustion engine and by torque provided by either or both electric motor(s) in response to energy supplied from said battery, while RL>MTO.

a. "Controllably coupled"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

b. "Setpoint" and/or "SP"

Paice's proposed construction: This term means a defined, but potentially variable, value at which a transition between modes of operation may occur.

The terms "setpoint" and "SP" are expressly defined in the claims of the '347 patent and this definition controls. For example, the claims demonstrate the use of the term setpoint to indicate the transition point between modes of operation. Claim 1 indicates that the "controller starts and operates said engine when torque require[d] to be produced by said engine to propel the vehicle and/or to drive either one or both said electric motors(s) to charge said battery is at least equal to a setpoint (SP)...." '347 patent, col. 58:29-33. Claim 7 states that the "vehicle is operated in a plurality of operating modes responsive to the value for the road load (RL) and said setpoint SP...." '347 patent, col. 58:58-60.

The claims further demonstrate that the setpoint can potentially vary over time. For example, claim 2 states that the "controller monitors patterns of vehicle operation over time and

varies said setpoint SP accordingly." '347 patent, col. 58:38-40. Claim 5 states that "said setpoint SP may be varied by said controller as function of engine speed." *Id.* at col. 58:53-54.

The terms "setpoint" and the symbol "SP" are further clarified in the '347 patent specification and file history. For example, "the microprocessor tests sense and calculated values for system variable, such as the vehicle's instantaneous torque requirement, i.e., the "road load" RL, the engine's instantaneous torque output ITO, both being expressed as a percentage of the engine's maximum torque output MTO, and the state of charge of the battery bank BSC, expressed as a percentage of its full charge, against setpoints, and uses the results of the comparisons to control the mode of vehicle operation." '347 patent, col. 40:22-32.

c. "Road load" and/or "RL"

Paice's proposed construction: These terms mean the instantaneous torque [rotary force] required for propulsion of the vehicle.

Collateral estoppel bars reconstruction of this term. "Road load" was a disputed term in *Paice I*, and this Court entered the construction urged by Paice and repeated above. The phrase "road load" is expressly defined in claim 15 of related U.S. Patent No. 6,209,672, and nothing here changes the meaning of the term. Moreover, the '347 patent specification clearly supports the definition applied by the Court in *Paice I*. *See Paice I* Claim Construction Order at 38. The phrases "road load" and the symbol "RL" are further defined in the '347 patent specification and file history, and that definition governs. For example, the specification states that "[t]he vehicle operating mode is determined by a microprocessor responsive to the 'road load', that is, the vehicle's instantaneous torque demands." '347 patent, col. 11:60-62. The specification further states that "when the vehicle's torque requirements ('road load', or 'RL') are less than 30% of the engine's maximum torque output ('MTO'), engine 40 is run only as needed to charge battery bank 22." *Id.* at col. 36:8-11.

d. "Normally aspirated"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

e. "Low-load mode I"

Paice's proposed construction: This term means the mode of operation in which energy flows from the battery bank to the traction motor and torque [rotary force] flows from the traction motor to the road wheels.

Collateral estoppel bars reconstruction of this term. Moreover, the '347 patent claims clearly support Paice's proposed definition that was applied by the Court in *Paice I*. *See Paice I* Claim Construction Order at 40. This term is expressly defined in the '347 patent claims, and that definition governs. The low-load mode I is the operating mode in which the vehicle is propelled by torque provided by the motor in response to energy supplied from the battery. '347 patent, col. 58:64-67.

f. "Highway cruising mode IV"

Paice's proposed construction: This term means the mode of operation in which energy flows from the tank into the engine and torque [rotary force] flows from the engine to the road wheels.

Collateral estoppel bars reconstruction of this term. Moreover, the '347 patent claims clearly support Paice's proposed definition that was applied by the Court in *Paice I*. *See Paice I* Claim Construction Order at 41. This term is expressly defined in the '347 patent claims, and that definition governs. The highway cruising mode IV is the operating mode in which the vehicle is propelled by torque provided by the internal combustion engine. '347 patent, col. 59:1-3.

g. "Acceleration mode V"

Paice's proposed construction: This term means the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque [rotary force] flows from the engine and at least one motor to the road wheels.

Collateral estoppel bars reconstruction of this term. Moreover, the '347 patent claims clearly support Paice's proposed definition that was applied by the Court in *Paice I*. *See Paice I* Claim Construction Order at 42. This term is expressly defined in the '347 patent claims, and that definition governs. The acceleration mode V is the operating mode in which the vehicle is propelled by torque provided by the internal combustion engine and by torque provided by either or both motor(s) in response to energy supplied by the battery. '347 patent, col. 59:4-8.

C. '634 Patent

Paice has asserted '634 patent claims 215, 216, 295, 298, 303, 305, and 306 against Toyota. Paice believes that most of the terms identified by Toyota for construction were either already construed in *Paice I*, as the '634 patent is a continuation of the '088 patent that was at issue in the previous case, or need not be construed because their plain and ordinary meaning would be readily understood by those of ordinary skill in the art. Paice believes that only the term "setpoint" requires construction by this Court.

1. Claim 215

Claim 215 is directed to a method for controlling a hybrid electric vehicle to operate in a plurality of operating modes responsive to values and reads:

> 215. A method for controlling a hybrid vehicle, comprising:
>
> determining instantaneous road load (RL) required to propel the hybrid vehicle responsive to an operator command;
>
> operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP);
>
> operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque

output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO; and

operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO; and regeneratively charging a battery of the hybrid vehicle when instantaneous torque output of the engine>the RL, when the RL is negative, and/or when braking is initiated by an operator of the hybrid vehicle.

a. "Road load" or "RL"

Paice's proposed construction: These terms mean the instantaneous torque [rotary force] required for propulsion of the vehicle.

This claim term should be construed in the same manner it was construed in the '347 patent.

b. "Setpoint" and/or "SP"

Paice's proposed construction: This term means a defined, but potentially variable, value at which a transition between modes of operation may occur.

This claim term should be construed in the same manner it was construed in the '347 patent.

c. "Operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"

Paice's proposed construction: This phrase means operating at least one electric motor to propel the vehicle when the RL [instantaneous torque required for propulsion of the vehicle] required to do so is less than a setpoint (SP) [a defined, but potentially variable, value at which a transition between modes of operation may occur].

This claim phrase is controlled by the plain meaning and does not require construction. The '634 patent teaches in numerous places that at least one motor is used to propel the vehicle when the road load is less then a setpoint. For example, the '634 patent specification teaches that, "initially the vehicle is operated only at road loads below 30% of MTO, that is, in traffic, as

indicated at A. Accordingly, all the torque required is provide by the traction motor 25...." '634 patent, col. 38:63-65; *see also* Fig. 7.

d. "Operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"

Paice's proposed construction: This phrase means operating an engine to propel the vehicle when the RL [instantaneous torque required for propulsion of the vehicle] required to do so is between the SP [a defined, but potentially variable, value at which a transition between modes of operation may occur] and a maximum torque output (MTO) of the engine.

This claim phrase is controlled by the plain meaning and does not require construction. The '634 patent teaches in numerous places that an engine is used to propel the vehicle when the road load is between a setpoint and a maximum torque output. For example, the '634 patent specification teaches that "At point B, the road load exceeds 30% of MTO for the first time on this particular trip. When this is detected by microprocessor 48, starting motor 21 spins the engine 40...." '634 patent, col. 39:5-8; *see also* Fig. 7.

e. "Operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"

Paice's proposed construction: This phrase means operating both the at least one motor and the engine to propel the vehicle when the torque RL [instantaneous torque required for propulsion of the vehicle] required to do so is more than the MTO.

This claim phrase is controlled by the plain meaning and does not require construction. The '634 patent teaches in numerous places that both at least one electric motor and an engine are used to propel the vehicle when the road load is more than the maximum torque output. For example, the '634 patent specification teaches that "when the vehicle's torque requirement exceeds the instantaneous engine output torque, as at points E-G and P, one or both of the

traction and starting motors 25 and 21 are powered to provide additional torque to the road wheels...." '634 patent, col. 39:19-23; *see also* Fig. 7.

2. Claim 295

Claim 295, directed generally to hybrid vehicles, reads:

295. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1.

a. "Energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

3. Claim 298

Claim 298, directed generally to hybrid vehicles, reads:

298. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes.

a. "Wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amps"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

4. Claim 305

Claim 305, directed generally to hybrid vehicles, reads:

305. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:
provide current to the first and/or the second electric motors; and
accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts; and

wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

a. "Energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

5. Claim 306

Claim 306, directed generally to hybrid vehicles, reads:

306. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:
provide current to the first and/or the second electric motors; and
accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein power originating at the battery is supplied to the second motor at a peak current no greater than about 150 amperes; and

wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

a. "Power originating at the battery is supplied to the second motor at a peak current no greater than about 150 amps"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

V. CONCLUSION

For the foregoing reasons, Paice believes that the claim constructions this Court previously announced in *Paice I* should control in this case. To the extent that there are claim terms at issue here that were not at issue in *Paice I*, Paice respectfully requests that its proposed constructions above be adopted in their entirety.

Respectfully submitted,

Dated: June 25, 2008

By: s/ Ahmed J. Davis

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the above and foregoing document has been served, via the Court's ECF system, upon at least counsel of record identified below on June 25, 2008:

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IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC,

Plaintiff,

v.

TOYOTA MOTOR CORPORATION, a Japanese Corporation, TOYOTA MOTOR NORTH AMERICA, INC., and TOYOTA MOTOR SALES, U.S.A., INC.,

Defendants.

Case No.: 2-07-cv-180-DF

PLAINTIFF PAICE LLC'S REPLY BRIEF ON CLAIM CONSTRUCTION

Dated: August 1, 2008

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STATUTES

Paice submits this reply brief on the proper claim construction of certain disputed terms in the '970, the '347, and the '634 patents. For the reasons that follow and for the reasons stated in its Opening Brief, Paice respectfully requests that this Court maintain its claim constructions from *Paice I*. To the extent that any further construction is necessary, Paice requests that the Court adopt Paice's proposed claim constructions in their entirety.

I. LEGAL STANDARDS OF CLAIM INTERPRETATION

Paice responds below to Toyota's section entitled "The Applicable Law." Insofar as the law cited and quoted by Toyota states general principles of claim construction, it has precedential value so far as it goes. However, Toyota misapplies that law to the facts here to reach claim construction proposals that are fundamentally flawed.

A. Collateral Estoppel Applies To The Claim Construction In This Case

Toyota contends that collateral estoppel does not apply here, *see* Toyota *Markman* Br. at 8, but cites no law to support its assertions. Toyota is wrong. The doctrine of collateral estoppel bars Toyota from rearguing claim terms that were fully and fairly litigated in *Paice I*.

On the issue of collateral estoppel, the law of the regional circuit applies. *See RF Delaware, Inc. v. Pacific Keystone Techs., Inc.*, 326 F.3d 1255, 1261 (Fed. Cir. 2003). In the Fifth Circuit, collateral estoppel depends on three elements: (1) the issue at stake must be identical to the one involved in the prior action; (2) the issue must have been actually litigated in the prior action; and (3) the determination of the issue in the prior action must have been a necessary part of the judgment in that earlier action. *E.g., RecoverEdge L.P. v. Pentecost*, 44 F.3d 1284, 1290 (5th Cir. 1995). These elements are satisfied here—and Toyota does not contend otherwise. Instead, Toyota argues only that it is not estopped because the Federal Circuit did not rule on certain claim construction issues raised in Toyota's appeal.

The application of issue preclusion (i.e., collateral estoppel) is barred only where the law prevents appellate review. *See Rambus Inc. v. Hynix Semiconductor Inc.*, Nos. C-05-00334 RMW, C-05-02298 RMW, C-06-00244 RMW, 2008 WL 2754805, at *15 (N.D. Cal. July 10, 2008). Here, no law prevented appellate review. Therefore, Toyota is estopped from rearguing construction of claim terms that were construed by the Court in *Paice I*, fully and fairly litigated before the jury, and necessary to the judgment in the prior action. *See Novartis Pharms. Corp. v. Abbott Labs.*, 375 F.3d 1328, 1332-33 (Fed. Cir. 2004). Collateral estoppel in patent suits is premised on principles of fairness, and "the Supreme Court held that where a patent has been declared invalid in a proceeding in which the patentee has had a full and fair chance to litigate the validity of his patent, the patentee is collaterally estopped from relitigating the validity of the patent." *Texas Instruments, Inc. v. Linear Technologies Corp.*, 182 F.Supp.2d 580, 585 (5th Cir. 2002) (quotation and citation omitted). The same result obtains here, where Toyota once before has briefed and argued a previous *Markman* hearing before this Court, tried liability to a jury, appealed to the Federal Circuit and lost. Under the circumstances, fairness dictates that Toyota be collaterally estopped from rearguing claim construction of the same or similar terms here.

B. Application of Means-Plus-Function is Improper

"[A] claim term that does not use 'means' will trigger the rebuttable presumption that § 112 ¶ 6 does not apply." *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004) (quoting *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1369 (Fed. Cir. 2002)). "The presumption that a limitation lacking the term 'means' is not subject to section 112 ¶ 6 can be overcome if it is demonstrated that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function [but] the presumption . . . is a strong one that is not readily overcome." *Id.* Therefore, even if the proper question is whether the claim limitation has a generally understood structural meaning

to one of ordinary skill in the art, the burden is on *Toyota* to prove that the claim term lacks sufficient structure.

C. Ordinary Meaning Applies and Written Description Cannot Limit Claims

In the absence of the inventor's express intent to deviate from the ordinary meaning of claim terms, the claim phrase is controlled by the plain meaning. *See, e.g., York Prod., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1572 (Fed.Cir.1996) ("Without an express intent to impart a novel meaning to claim terms, an inventor's claim terms take on their ordinary meaning."). The scope of the claim is defined by the language of the claim, and "[i]t is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)); *see also York Prod.*, 99 F.3d at 1572.

Specifications cannot limit claims because "[t]he written description part of the specification itself does not delimit the right to exclude . . . [t]hat is the function and purpose of claims." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995). However, "[t]he descriptive part of the specification aids in ascertaining the scope and meaning of the claims inasmuch as the words of the claims must be based on the description." *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452 (Fed.Cir.1985) (quotation and citation omitted). Although it is helpful to look at the specifications to interpret a claim if it lacks an ordinary meaning, the specification cannot be read to limit the scope of the claim. But that is precisely what Toyota is attempting to do here.

Disclosed embodiments are just examples and cannot be read to limit claims. "We do not import limitations into claims from examples or embodiments appearing only in a patent's written description, even when a specification describes very specific embodiments of the

invention or even describes only a single embodiment . . . ." *JVW Enterprises, Inc. v. Interact Accessories, Inc.*, 424 F.3d 1324, 1335 (Fed. Cir. 2005). "Even if the specification describes a very specific embodiment, the claims are not confined to the embodiment described." *Arthrex, Inc. v. Depuy Mitek, Inc.*, No. 2:04-cv-328-FtM-99DNF, 2006 U.S. Dist. LEXIS 95465, at *3 (M.D. Fla. Oct. 16, 2006) (citing *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 433 F.3d 1373, 1377 (Fed.Cir. 2006)); *see also Varco, L.P. v. Panson Sys. USA Corp.*, 436 F.3d 1368, 1373 (Fed. Cir. 2002) ("In examining the specification for proper context, however, this court will not at any time import limitations from the specification into the claims." (quotation and citation omitted)).

"To avoid importing limitations from the specification into the claims, it is important to keep in mind that the purposes of the specification are to teach and enable those of skill in the art to make and use the invention and to provide a best mode for doing so." *Phillips*, 415 F.3d at 1323. The only exception to this rule is "[a]n embodiment may serve to limit a claim only if it is clear that the patentee intends the claims and embodiments to be strictly coextensive . . . ." *First Years, Inc. v. Munchkin, Inc.*, No. 07-cv-558-bbc, 2008 U.S. Dist. LEXIS 31826, at *39-40 (W.D. Wis. Apr. 15, 2008)). Despite Toyota's arguments in response, it has done nothing to demonstrate a legitimate basis to depart from the general rule in this case.

II. RESPONSE TO TOYOTA'S PROPOSED INTERPRETATION OF DISPUTED CLAIM TERMS

A. '970 Patent

The only disputed term in the '970 patent is "controllable torque transfer unit."

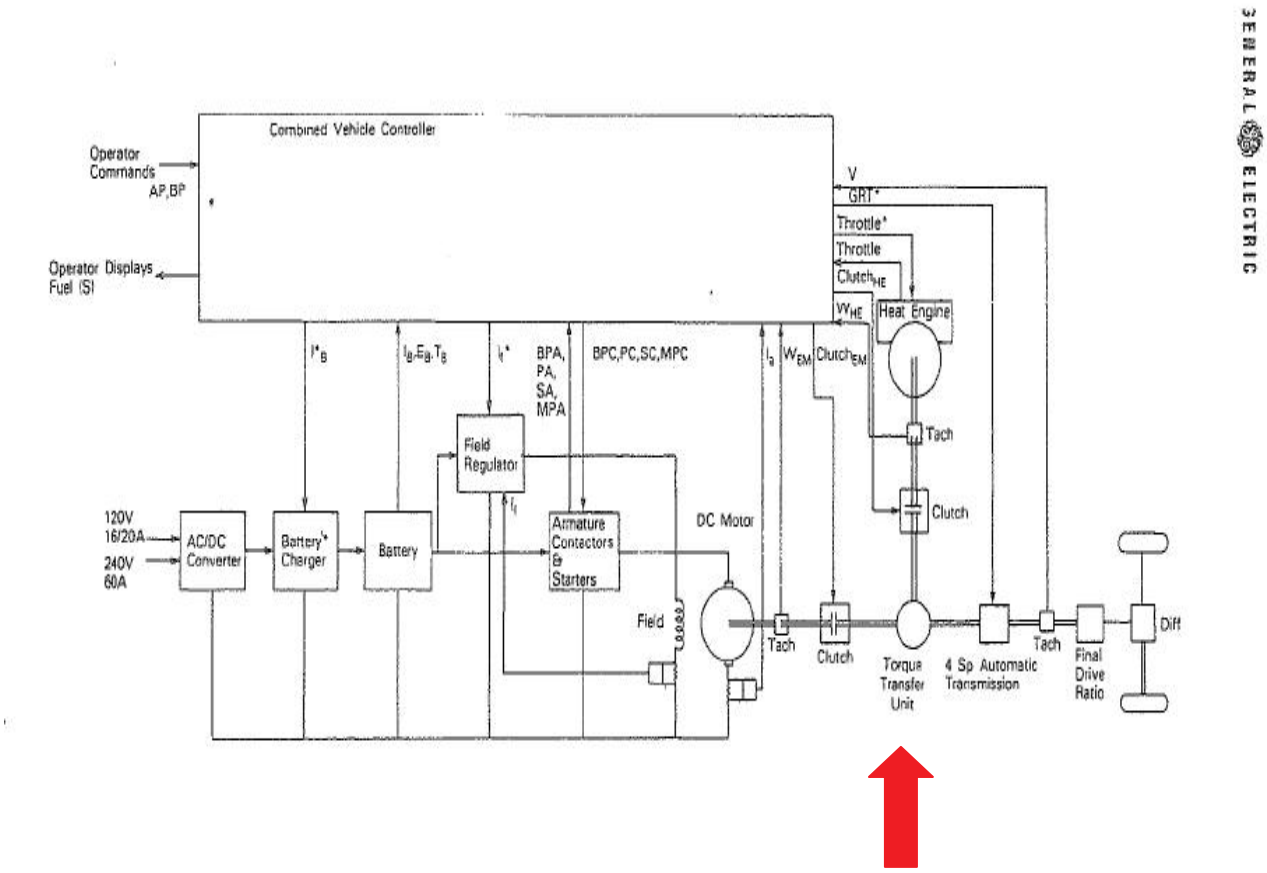
1. "Controllable torque transfer unit"

Paice's proposed construction: This term means a multi-input device or component that is controlled to transfer variable amounts of torque [rotary force].

Toyota's proposed construction: Construed under 35 U.S.C. § 112 ¶ 6 as "reading on the structure shown in Figure 11 of the '970 patent, and equivalents thereof, performing the indicated function." Toyota *Markman* Br. at 8.

The Court has already construed this term in *Paice I* and Toyota is estopped from challenging that construction in this case. *See generally Amgen v. Hoffman-LaRoche Ltd.*, 494 F. Supp. 2d 54, 58-61 (D. Mass. 2007) (citing cases). Even if Toyota was not estopped, however, there is no basis to depart from that original construction. Because Toyota's arguments on this issue essentially are identical to those made in the first case, Paice incorporates herein its arguments against application of § 112 ¶ 6 made in its briefs and at the *Markman* hearing in *Paice I*. *See* Paice's March 29, 2005 Claim Construction Reply Br. (D.I. 27) at 3-6; *see also* April 19, 2005 *Markman* Hrg. Tr. at 17-22 and 91-92.

With respect to the means-plus-function issue, Toyota contends that the "only evidence" Paice ever offered that the term was structural was two references it found on the Internet that identified a torque transfer unit, but that alone does not convey to ordinarily skilled artisans sufficient structure for a torque transfer unit or a controllable torque transfer unit. Of course, as Paice argued at the first *Markman* hearing, it need not offer any evidence on this point. The law is clear that the burden rests on *Toyota* to overcome the presumption that § 112 ¶ 6 does not apply, and Toyota has not done so here. In fact, Toyota unwittingly has demonstrated the very thing it is trying to disprove by relying upon prior art that shows one of ordinary skill in the art that a torque transfer unit is a structural component. A 1979 publication by General Electric entitled "Near-Term Hybrid Vehicle Program, Phase 1," marked at trial as DTX-704 in *Paice-Toyota I*, clearly shows a *torque transfer unit* (identified below by the red arrow) that combines torque from two sources (and electric motor and an internal combustion engine) for output to the wheels of a hybrid vehicle:



DTX-704 (excerpt attached hereto as Exhibit F) at TPR183536.

To be sure, the unit disclosed in DTX-704 is not identical to the controllable torque transfer unit of the '970 patent. Nevertheless, Toyota's suggestion that one of ordinary skill in the art in 1992 would not recognize a "torque transfer unit" as structural—when Toyota has relied on prior art from 13 years earlier disclosing a "torque transfer unit"—should be rejected out of hand. The fact that the '970 patent discloses a particular torque transfer unit that is also "controllable" does not move a structural limitation into the functional purview of § 112 ¶ 6.

2. "Means for performing the following functions responsive to input commands and monitored operation of said vehicle: selecting an appropriate mode of operation..."

This claim term arises in '970 patent claim 39. Toyota originally proposed construing this claim term but in its responsive brief withdrew its opposition to Paice's construction. *See*

Toyota *Markman* Br. at 8-9. Accordingly, for the reasons set forth in Paice's opening Markman brief, the Court should adopt Paice's proposed construction.

B. '347 Patent

The disputed claim terms for the '347 patent are: "controllably coupled," "road load," "set point," and the definitions of certain modes of operation. Because many of these terms appear in both the '347 and the '634 patents (which have common disclosures), the parties agree the same construction should apply to both patents.

1. "Controllably coupled"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

Toyota's proposed construction: This term means "connected through a clutch that is controlled to selectively connect or disconnect the engine from the road wheels." Toyota *Markman* Br. at 10.

Paice has asserted '347 patent claim 7, which depends from claim 1, against Toyota. Paice contends the claim phrase "controllably coupled" is controlled by the plain meaning and does not require construction. Toyota argues in response that "controllably coupled" was not in the original claims, and therefore can be understood only by reference to the intrinsic evidence. *See* Toyota *Markman* Br. at 11. Toyota then attempts to use the intrinsic evidence to add a connection "through a clutch" to perform specific functions. Toyota's argument fails for two reasons. *First*, the words "controllably coupled" do not reference to a "clutch" or any specific function. As a result, Toyota's construction departs from the plain meaning of the words. *Second*, the intrinsic evidence supports Paice's construction, not Toyota's.

The prosecution history of the '347 patent supports a broad construction of the term "controllable coupled." The phrase "controllably coupled" was not in the claims but was added

to three claims by preliminary amendment on August 18, 2003. Of the three claims containing the term "controllably coupled," two recited "by a clutch" but one expressly did not. '347 file history, 8/18/03 Preliminary Amendment, (attached as Exhibit G) at 2, 20-21, 14 (claims 17, 78, and 56). In a further preliminary amendment filed on May 20, 2004, the words "by a clutch" were deleted from the two claims, and new claim was added that used "controllably coupled" without a clutch. '347 file history, 5/20/04 Preliminary Amendment (attached as Exhibit H) at 2-3, 23-24, 26-27 (claims 17, 78, 82). The amendments clearly demonstrate that the applicant never intended the phrase "controllably coupled" to be limited to "controllably coupled through a clutch."

If there were any doubt whether Toyota is reading the claim language in an improperly narrow manner—reading every occurrence of "controllably coupled" as if "through a clutch" were present—the doubt is removed entirely when one considers '347 patent claim 33, which claims a turbocharger that is "controllably coupled" to the internal combustion engine. Figure 11 of the '347 patent shows a turbocharger 100 that is *directly* coupled to the engine 40, *i.e.*, it is not connected through clutch 51. Thus, Toyota's proposed construction would read out the preferred embodiment disclosed in Figure 11. Accordingly, the canons of claim construction prevent "controllably coupled" from meaning coupled "through a clutch."

The only legal support Toyota identifies for its argument, *Schering Corp. v. Amgen Inc.*, 222 F.3d 1347 (Fed. Cir. 2002), is inapt and readily distinguishable. The relevant question in that case was whether the original specification supported a particular claim term that the patentee inserted during prosecution. The term did not appear anywhere in the specification or the claims, but was added to the claims and the specification because during the pendency of the application a scientific committee determined that the particular term of art (which the patentee

had used in his claims) was no longer scientifically acceptable and should be replaced with a more appropriate term. *See Schering Corp.,* 222 F.3d at 1352. The district court determined that the patentee's substitution of new language into the specification and claims of the pending application of the newly-minted term advanced the art and therefore violated the rule against introduction of new matter. *Id*. The Federal Circuit disagreed, concluding the substitution of the new language did not broaden the scope of the claims to ordinarily skilled artisans. *Id*. at 1353.

The *Schering* case is not relevant to the issue presently before this Court regarding the term "controllably coupled". Unlike *Schering*, there has been no change in the understanding of persons of ordinary skill in the meaning of the disputed claim term, and the originally-filed claims in this case were never amended to raise a new matter question under 35 U.S.C. § 132.[1] Moreover, as discussed above, Toyota cannot seriously dispute that the patent discloses controllable coupling without expressly reciting a clutch. Accordingly, Toyota's attempt to read additional limitations from the specification into the claims should be rejected.

2. "Setpoint" and/or "SP"

Paice's proposed construction: This term means a defined, but potentially variable, value at which a transition between modes of operation may occur.

Toyota's proposed construction: This term means "a value of torque that defines the transition point between low-load mode I operating mode and the highway cruising mode IV." Toyota *Markman* Br. at 12.

Toyota's proposed construction of the term "setpoint" is based upon an improperly narrow reading of the specification and therefore should be rejected, for at least three separate reasons.

[1] The appropriate test for new matter is whether "the scope of a claim has been changed by amendment in such a way as to justify an assertion that it is directed to a different invention than was the original claim . . . ." *In re Wright*, 866 F.2d 422, 424 (Fed. Cir. 1989).

First, Toyota argues incorrectly that the term setpoint is limited to that point at which a transition occurs between low-load mode I operation and highway cruising mode IV operation. *See* Toyota *Markman* Br. at 12. While the section of the '347 patent specification that Toyota relies upon to support its argument describes an *embodiment* wherein the setpoint is for the mode I-to-mode IV transition that Toyota identifies, the specification does not limit setpoint to just that transition. For example, the patent uses the terms "setpoint," "SP," and "transition point" interchangeably. *See* '347 patent, col. 40, lines 50-54 ("This setpoint, referred to in the appended claims as 'SP' and sometimes referred to hereinafter as the transition point (i.e., between operation in modes I and IV) is obviously arbitrary and can vary substantially . . . ."). Later in the specification, "transition point" is used expressly to describe transitions to other modes, including at least mode V:

> Further, as noted above the transition points [setpoints] ***between modes I, IV, and V in particular*** may vary in accordance with the operator's commands . . . .

'347 patent, col. 44, lines 32-34 (emphasis added).

Thus, the specification gives specific examples of setpoints involving a mode of operation other than modes I or IV. In fact, it is this disclosure in the specification that supports asserted claim 7, which claims *inter alia* a vehicle "operated in a plurality of operating modes responsive to the value for the road load (RL) ***and said setpoint SP*** . . . said operating modes includ[ing] a low-load mode I . . . a highway cruising mode IV . . . ***and an acceleration mode V*** . . . ." (emphasis added). Thus, Toyota's proposed construction clearly cannot be correct.

Second, Toyota argues that the setpoint is required to be the point at which a transition must occur. *See* Toyota *Markman* Br. at 13. This plainly is not required by the '347 patent. The specification teaches, for example, that in some instances it may be appropriate to have a time-

dependent setpoint. '347 patent, col. 41, lines 41-46 ("[F]or example, mode IV might be entered from mode I only after the road load exceeded a first, lower setpoint SP for an extended period of time . . . ."). In such a case, if the vehicle was operated for less than the period of time set by the microprocessor, the setpoint (which is not itself a time-dependent value) would be reached but no transition actually would occur. This transition point also can be overridden by the operator setting cruise-control operation. *See* '347 patent, col. 44, lines 40-59. The setpoint therefore is a point at which a transition may occur, but it need not necessarily occur.

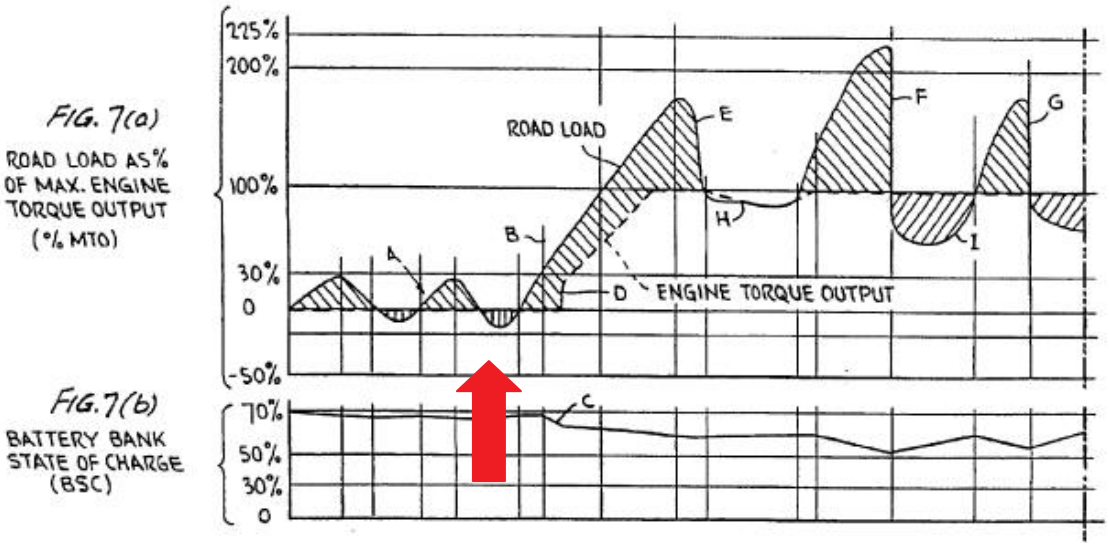
Third, Toyota demands that the setpoint be limited to a torque value. *See* Toyota *Markman* Br. at 13. In particular, Toyota asserts that because road load is defined to be a torque value and setpoint is measured against road load, it too must be a torque value. Toyota's analogy to road load in this instance is apt, but ultimately leads to a different conclusion than that Toyota proposes. As discussed at length in *Paice I*, road load must have at least a torque component but it can be comprised of other variables. The same is true for the setpoint: "It is also within the scope of the invention to make setpoint SP. . . somewhat 'fuzzy' so that SP may vary *from one comparison of road load to MTO to the next depending on other variables*." '347 patent, col. 41, lines 10-14 (emphasis added). Thus, the claims can be satisfied so long as the setpoint and the road load are measured using comparable variable units, e.g., torque or power. The patent specification and claims do not mandate that setpoint be a value set exclusively in torque.

3. "Road load" and/or "RL"

Paice's proposed construction: These terms mean the instantaneous torque [rotary force] required for propulsion of the vehicle.

Toyota's proposed construction: This term means either Toyota's proposed construction in *Paice-Toyota I* or it means the instantaneous torque requirements of the vehicle [which] has to be capable of being positive or negative. *See* Toyota *Markman* Br. at 15-16.

The Court has already construed this term in *Paice I* and Toyota is estopped from challenging that construction in this case. *See generally Amgen v. Hoffman-LaRoche Ltd.*, 494 F. Supp. 2d 54, 58-61 (D. Mass. 2007) (citing cases). Nevertheless, Toyota argues that the Court should augment its previous construction to make clear that the instantaneous torque values that comprise road load "are not just quantitative amounts, but directional values that can go either way." Toyota *Markman* Br. at 15. Toyota further contends that it is not enough that road load can "just be positive, or just negative" but that it has to be "capable of being either." *Id.* at 16. Paice does not disagree that road load can be positive or negative—the intrinsic record makes that clear. *See, e.g.*, '347 patent, col. 47, lines 15-18 ("Negative road load, occurring during descents or under braking . . . is discussed in connection with Fig. 7, below.")



Paice does disagree, however, with Toyota's assertion that the Court did not take this into account in its previous construction. The notion that the term road load can be positive or negative is necessarily implied in the Court's definition that road load is the *instantaneous* torque required to propel the vehicle. Therefore, the Court need not adjust its earlier construction.

4. "Normally aspirated"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction. Paice reserves the right to address in its reply brief any arguments Toyota makes regarding why this claim term should be construed beyond its ordinary meaning.

Toyota's proposed construction: Toyota withdraws its designation for this term for construction by the Court. *See* Toyota *Markman* Br. at 16.

Because Toyota has withdrawn its proposed construction and Paice believes that the claim does not require construction, the Court need not construe this term.

5. "Low-load mode I," "Highway cruising mode IV," and "Acceleration mode V"

The dispute over the definition for these three terms can be treated together. In each instance, the essential difference between the parties' competing proposals lies in Toyota attempt to insert a negative limitation to require that "all torque" flow from a given source in modes of operation I and IV.

Low-Load Mode I:

Paice's proposed construction: This term means the mode of operation in which energy flows from the battery bank to the traction motor and torque [rotary force] flows from the traction motor to the road wheels.

Toyota's proposed construction: "An operating mode in which all torque is provided to the road wheels by the traction motor operating on electrical energy supplied by the battery bank." Toyota *Markman* Br. at 16 (emphasis added).

Highway cruising mode IV:

Paice's proposed construction: This term means the mode of operation in which energy flows from the tank into the engine and torque [rotary force] flows from the engine to the road wheels.

Toyota's proposed construction: "An operating mode in which all torque is provided to the road wheels by the ICE and the traction motor is depowered." Toyota *Markman* Br. at 16 (emphasis added).

Acceleration mode V:

Paice's proposed construction: This term means the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque [rotary force] flows from the engine and at least one motor to the road wheels.

Toyota's proposed construction: "An operating mode in which either or both motors can be powered and torque flows from either or both motors in [*sic*, and] the ICE to the road wheels." Toyota *Markman* Br. at 17.

The Court has already construed these terms in *Paice I* and Toyota is estopped from challenging that construction in this case. *See generally Amgen v. Hoffman-LaRoche Ltd.*, 494 F. Supp. 2d 54, 58-61 (D. Mass. 2007) (citing cases). There can be no real dispute that these same terms appear in the '672 and '088 patent, and therefore should be construed identically. In fact, the very arguments that Toyota makes here were considered and rejected in the first case. Toyota attempts to circumvent this reality by suggesting that the terms mode I and mode IV in the '347 patent "are slightly different in [this] new patent and are expressly defined in the specification." Toyota *Markman* Br. at 18. There is no evidence, and Toyota has pointed to none, that the mode definitions in the '347 patent are in any way different than in the '672 and '088 patents at issue in *Paice I*. To the contrary, because the '347 patent is a divisional application from the '088 patent, the specifications are identical and the so-called "express definitions" Toyota points to here were in play before.

Because Toyota's arguments on this issue essentially are identical to those made in the first case, Paice incorporates herein its arguments made in its claim construction briefs and at the *Markman* hearing in *Paice I*. *See* Paice's March 29, 2005 Claim Construction Reply Br. (D.I. 27) at 21-23; *see also* April 19, 2005 *Markman* Hrg. Tr. at 29-40 and 95-97. For the reasons

stated therein and in Paice's Opening Claim Construction Brief in this case, Toyota's proposals should be rejected and Paice's proposed constructions should be adopted.

C. '634 Patent

As mentioned earlier, many of the claim terms in dispute in the '634 patent are identical to those in the '347 patent and so will rise or fall together. The remaining issue in dispute for the '634 patent are whether the patent requires that various terms that relate to measured variables must occur at all points within the vehicle's electrical system.

1. "Road load"/"RL" and "Setpoint"/"SP"

The parties agree that the term "Road Load" or "(RL)" should be construed the same in the '634 patent as it is in the '347 patent, discussed above. Likewise, the parties agree that the term "Setpoint" and/or "(SP)" should be construed the same in the '634 patent as it is in the '347 patent, discussed above.

2. "Operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"

Paice's proposed construction: This phrase means operating at least one electric motor to propel the vehicle when the RL [instantaneous torque required for propulsion of the vehicle] required to do so is less than a setpoint (SP) [a defined, but potentially variable, value at which a transition between modes of operation may occur].

Toyota's proposed construction: This term means "operating only one or more electric motors to propel the vehicle when the determined RL is less than SP." Toyota *Markman* Br. at 19.

Like the dispute regarding the modes of operation in the '347 patent, the parties' dispute here boils down to whether a negative limitation—the term "only"—should be read into the claim language as Toyota suggests, when the claim does not say "only." For the reasons discussed in its Opening Brief and above with respect to the modes of operation, Paice believes that its proposed construction is the most appropriate and should be adopted.

3. "Operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"

Paice's proposed construction: This phrase means operating an engine to propel the vehicle when the RL [instantaneous torque required for propulsion of the vehicle] required to do so is between the SP [a defined, but potentially variable, value at which a transition between modes of operation may occur] and a maximum torque output (MTO) of the engine.

Toyota's proposed construction: This term means "operating only the ICE to propel the vehicle when the determined RL is between the SP and the MTO of the engine." Toyota *Markman* Br. at 22.

Like the dispute regarding the modes of operation in the '347 patent, the parties' dispute here boils down to whether a negative limitation—the term "only"—should be read into the claim language as Toyota suggests, when the claim does not say "only." For the reasons discussed in its Opening Brief and above with respect to the modes of operation, Paice believes that its proposed construction is the most appropriate and should be adopted.

4. "Operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"

Paice's proposed construction: This phrase means operating both the at least one motor and the engine to propel the vehicle when the torque RL [instantaneous torque required for propulsion of the vehicle] required to do so is more than the MTO.

Toyota's proposed construction: This term means "operating both one or more electric motors and the ICE to propel the vehicle when the determined RL is more than MTO." Toyota *Markman* Br. at 24.

The parties do not appear to have any significant dispute regarding the construction of this term. Paice contends, however, that its proposed construction is cleaner and should be adopted over Toyota's, which uses the unnecessary term "determined" to modify RL.

5. "Energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction.

Toyota's proposed construction: This term means "the ratio of battery voltage to current at every point in the system from the battery to the solid state inverter is at least 2.5 or more." Toyota *Markman* Br. at 24.

As expressed in its Opening Brief, Paice contends that this claim term does not require construction. Those of ordinary skill in the art reading the patent and the file history would recognize that the patentee has not acted as his own lexicographer and imparted special meaning to the term, and there is no special meaning within the art to be ascribed to this term. Simply put, it says what it means and means what it says. As with other claim terms, however, Toyota would read in an additional limitation—here, the requirement that the voltage-to-current ratio referenced in the claim exist "at every point in the system." Neither the claims nor the specification requires such a restrictive reading of this claim language.

The only support in the intrinsic record Toyota points to in aid of its proposed construction relates to the preferred sizing of the components of the hybrid drivetrain to achieve the claimed voltage-to-current ratio—not where within the system that ratio is measured or should be determined. *See* Toyota *Markman* Br. at 24 (citing '634 patent col. 50, lines 44-50 and col. 51, lines 13-17). At bottom, Toyota is attempting to limit the claim term to the sole disclosed embodiment, because it believes "the ratio of voltage to current is the same everywhere between the battery bank and the inverters." *Id*. at 24. But the scope of the claims is not so constricted. *See, e.g., Arthrex, Inc. v. Depuy Mitek, Inc.*, No. 2:04-cv-328-FtM-99DNF, 2006 U.S. Dist. LEXIS 95465, at *3 (M.D. Fla. Oct. 16, 2006) ("Even if the specification describes a very specific embodiment, the claims are not confined to the embodiment described." (citing

LizardTech, Inc. v. Earth Resource Mapping, Inc., 433 F.3d 1373, 1377 (Fed.Cir. 2006))). Absent a specific teaching that the claims should be limited to that embodiment, Toyota's construction cannot be correct. *See First Years, Inc. v. Munchkin, Inc.*, No. 07-cv-558-bbc, 2008 U.S. Dist. LEXIS 31826, at *39-40 (W.D. Wis. Apr. 15, 2008)) ("An embodiment may serve to limit a claim only if it is clear that the patentee intends the claims and embodiments to be strictly coextensive. . . ."). Because Toyota has identified no such teaching, its proposal should be rejected and the ordinary meaning adopted.

6. "Wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amps"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction.

Toyota's proposed construction: This term means "the current measured at any point between the battery and the solid state inverter cannot exceed 150 amps." Toyota *Markman* Br. at 25.

Toyota's argument here is the same as its argument described above for the voltage-to-current ratio. However, for the reasons discussed above, Toyota's position should be rejected as an improper attempt to limit a claim term to a disclosed embodiment without basis.

7. "Energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction.

Toyota's proposed construction: This term means "the voltage measured at any point between the battery and the second motor must sometimes rise to a peak of at least 500 volts." Toyota *Markman* Br. at 25.

Toyota's argument here is the same as its argument described above for the voltage-to-current ratio and the 150A limitation. However, for the reasons discussed above, Toyota's

position should be rejected as an improper attempt to limit a claim term to a disclosed embodiment without basis.

8. "Power originating at the battery is supplied to the second motor at a peak current no greater than about 150 amps"

Paice's proposed construction: This claim phrase is controlled by the plain meaning and does not require construction.

Toyota's proposed construction: This term means "the current measured at any point between the battery and the second motor cannot exceed 150 amps." Toyota *Markman* Br. at 26.

Toyota's argument here is the same as its argument described above for the voltage-to-current ratio and the 150A limitation. However, for the reasons discussed above, Toyota's position should be rejected as an improper attempt to limit a claim term to a disclosed embodiment without basis.

III. CONCLUSION

For the foregoing reasons and the reasons stated in its Opening Claim construction brief, Paice requests that its proposed constructions be adopted in their entirety.

Respectfully submitted,

Dated: August 1, 2008

By: s/ Ahmed J. Davis (w/ permission SFB)

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the above and foregoing document has been served, via the Court's ECF system, upon at least counsel of record identified below on August 1, 2008:

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s/ Ahmed J. Davis
Ahmed J. Davis

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

PAICE LLC,	§	
	§	
Plaintiff,	§	
	§	
v.	§	
	§	**CIVIL ACTION NO. 2:07-CV-180 (DF)**
TOYOTA MOTOR CORP., TOYOTA	§	
MOTOR NORTH AMERICA, INC. and	§	
TOYOTA MOTOR SALES U.S.A., INC.	§	
	§	
Defendants	§	

CLAIM CONSTRUCTION ORDER

Construing Terms in U.S. Patent Nos. 5,343,970, 7,104,347, and 7,237,634

Before the Court are Paice's Opening Brief on Claim Construction (Dkt. No. 46), Toyota's Responsive Claim-Construction Brief (Dkt. No. 47), and Paice's Reply Brief on Claim Construction (Dkt. No. 51). Also before the Court are the Local Patent Rule (LPR) 4-3 Joint Claim-Construction and Prehearing Statement (Dkt. No. 45) and the LPR 4-5 Joint Claim-Construction Chart (Dkt. No. 55). A claim-construction hearing, in accordance with *Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996), was held in Texarkana on September 10, 2008. *See* Dkt. No. 58 (hearing transcript). After hearing argument of counsel and reviewing the relevant pleadings, presentation materials, other papers, and case law, the Court finds the disputed terms of the patents-in-suit should be construed as set forth herein.

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I. BACKGROUND

This is the second lawsuit between these parties over the same technology, which relates to hybrid vehicles. *See* Civil Action No. 2:04-CV-211. In the previous lawsuit, Paice asserted claims from U.S. Patent Nos. 5,343,970 ('970 Patent), 6,209,672 ('672 Patent), and 6,554,088 ('088 Patent) against Toyota for infringement by certain Toyota's vehicles. *Id.*; Dkt. No. 1.

In the present lawsuit, Paice contends certain new hybrid vehicles made by Toyota infringe claims of the '970 Patent and that all Toyota hybrid vehicles infringe two other patents, U.S. Patent Nos. 7,104,347 ('347 Patent) and 7,237,634 ('634 Patent) (collectively, the "patents-in-suit"). These patents are entitled "Hybrid Electric Vehicle," "Hybrid Vehicles," and "Hybrid Vehicles," respectively. The '347 Patent issued from a division of the application that became the '088 Patent, and the'634 Patent issued from a division of the application that became the'347 Patent. '347 Patent, at [60] (filed Mar. 7, 2003); '634 Patent, at [60] (filed Jan. 13, 2006).

The claim construction in this case involves analyzing terms that have never been construed as well as terms that have been previously construed by this Court in the first lawsuit. Because of the technology overlap and the divisional nature of the patents-in-suit, there are also terms that have been previously construed in a different patent but that now appear in claims of the newly-asserted Paice patents. For additional background on the previous lawsuit, see Dkt. No. 91, Civil Action No. 2:04-CV-211 (claim-construction order).

II. LEGAL PRINCIPLES

A determination of patent infringement involves two steps: first, the patent claims are construed, and, second, the claims are compared to the allegedly infringing device. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1455 (Fed. Cir. 1998) (en banc). The legal principles of claim construction were reexamined by the Federal Circuit in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). The Federal Circuit in *Phillips* expressly reaffirmed the

principles of claim construction as set forth in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996), *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576 (Fed. Cir. 1996), and *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111 (Fed. Cir. 2004). Claim construction is a legal question for the courts. *Markman*, 52 F.3d at 979.

The Court, in accordance with the doctrines of claim construction which it has outlined in the past, will construe the claims of the Paice Patents below. *See Pioneer v. Samsung*, No. 2:07-CV-170, Dkt. No. 94, at 2-8 (E.D. Tex. filed Mar. 10, 2008) (claim-construction order).

III. PATENTS-IN-SUIT

The patents-in-suit are directed to particular features of electric/combustion engine hybrid drive systems. The '970 Patent issued on September 6, 1994 from an application filed on September 21, 1992. The patent generally discloses and claims a hybrid vehicle, including an internal combustion engine and one electric motor, both of which can provide torque to the wheels of the vehicle through a controllable torque transfer unit, and that can recharge storage batteries for the motor. The direction of torque transfer is controlled by a microprocessor responsive to the mode of operation of the vehicle. The '970 Patent abstract reads:

> An improved hybrid electric vehicle includes an internal combustion engine and an electric motor. Both the motor and the engine provide torque to drive the vehicle directly through a controllable torque transfer unit. Typically at low speeds or in traffic, the electric motor alone drives the vehicle, using power stored in batteries; under acceleration and during hill climbing both the engine and the motor provide torque to drive the vehicle; and in steady state highway cruising, the internal combustion engine alone drives the vehicle. The internal combustion engine is sized to operate at or near its maximum fuel efficiency during highway cruising. The motor is operable as a generator to charge the batteries as needed and also for regenerative braking. No transmission is employed. The motor operates at significantly lower currents and higher voltages than conventionally and has a rated power at least equal to that of the internal combustion engine. In this manner a cost efficient vehicle is provided, suffering no performance disadvantage compared to conventional vehicles.

'970 Patent, at [57].

The '347 Patent issued September 12, 2006 from an application filed on March 7, 2003. '347 Patent, at [22], [45]. The patent generally discloses and claims a hybrid electric vehicle that includes an internal combustion engine and two separate electric motors, both of which may be used as traction motors to drive the wheels or generators to charge the battery as appropriate. '347 Patent, col. 17, ll. 20-35. A microprocessor, or other controller, controls the torque transfer to provide "highly efficient operation over a wide variety of operating conditions, and while providing good performance." *Id.* at col. 17, ll 9-14. This microprocessor also controls the flow of energy, whether electrical energy from the battery bank or chemical energy stored as combustible fuel. *Id.* at col. 17, ll. 14-17. The abstract from the '347 Patent reads:

> A hybrid vehicle comprises an internal combustion engine, a traction motor, a starter motor, and a battery bank, all controlled by a microprocessor in accordance with the vehicle's instantaneous torque demands so that the engine is run only under conditions of high efficiency, typically only when the load is at least equal to 30% of the engine's maximum torque output. In some embodiments, a turbocharger may be provided, activated only when the load exceeds the engine's maximum torque output for an extended period; a two-speed transmission may further be provided, to further broaden the vehicle's load range. A hybrid brake system provides regenerative braking, with mechanical braking available in the event the battery bank is fully charged, in emergencies, or at rest; a control mechanism is provided to control the brake system to provide linear brake feel under varying circumstances.

'347 Patent, at [57].

The '634 Patent issued July 3, 2007 from an application filed January 13, 2006. '634 Patent, at [22], [45]. The '634 Patent is subject to a terminal disclaimer. *Id.* The '634 Patent is a division of the application that became the '347 Patent; therefore, the '634 Patent disclosure is substantially similar to that contained in the '347 Patent. The abstracts are identical and thus won't be repeated. *Compare* '347 Patent, at [57] *with* '634 Patent, at [57].

IV. U.S. PATENT NO. 5,343,970

A. Overview

Paice has asserted claims 11 and 39 of the '970 Patent against Toyota in this lawsuit. Dkt. No. 46, at 18. Only one term, "controllable torque transfer unit" (CTTU) [1] remains in dispute. *See* Dkt. No. 55-2, at 4-5.

B. Claim Construction

1. "controllable torque transfer unit"

a. Parties' Positions

The parties propose the following constructions for "controllable torque transfer unit," which is present in claims 11 and 39. Dkt. No. 55-2, at 2, 4. Claim 39 depends from claim 38, which depends from claim 32. *Id.* at 4.

Paice	Toyota
A multi-input device or component that is controlled to transfer variable amounts of torque.	Means-plus-function term, having: **Function**: to control the transfer of torque from two inputs to an output. **Structure**: gear box illustrated in Fig. 11

Paice contends this term needs no construction because it has already been construed by this Court in the previous litigation. *Id.* Paice further argues there is no justification for the Court to deviate from its prior construction because (1) the Court was correct in the first instance, and (2) Toyota has already had a full and fair opportunity to litigate the meaning of the term. *Id.*

Toyota admits that this Court previously construed the CTTU term but contends collateral estoppel does not apply in this instance because the Federal Circuit did not reach the construction of the terms when the previous litigation was on appeal. Dkt. No. 47, at 13.

[1] To avoid duplicity, the Court refers the parties to the Court's prior claim-construction order for the specific claim language and analysis regarding the '970 Patent and more specifically, the CTTU term. *See* Dkt. No. 91, Civil Action No. 2:04-CV-211, at 15-20.

b. Court's Construction

Regardless of whether collateral estoppels applies to the construction of this term, the Court finds no reason to deviate from its previous construction. Accordingly, as the Court previously ruled, the term **"controllable torque transfer unit"** means **"a multi-input device or component that is controlled to transfer variable amounts of torque (rotary force)".** *See* Dkt. No. 91, at 17-20, Civil Action No. 2:04-CV-211.

2. "means for performing the following functions responsive to input commands and monitored operation of said vehicle"

The parties have agreed on a meaning for this term, which appears in claim 39. The proposed construction is:

> A computerized control device and associated components for selecting an operating mode [mode or state of operation determined by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor and battery to implement that mode.

Dkt. No. 55-2, at 5. **The Court has no reason to disagree and therefore adopts the parties' construction.**

V. U.S. PATENT NO. 7,104,347

A. Overview

Paice has asserted claim 7, which depends from claim 1, against Toyota. Dkt. No. 46, at 22. Claim 7 depends from claim 1. For reference, the asserted claims read (disputed terms emphasized):

1. A hybrid vehicle, comprising:

   an internal combustion engine **controllably coupled** to road wheels of said vehicle;

   a first electric motor connected to said engine nd [sic] operable to start the engine responsive to a control signal;

   a second electric motor connected to road wheels of said vehicle, and operable as a motor, to apply torque to said wheels to propel said vehicle, and

as a generator, for accepting torque from at least said wheels for generating current;

a battery, for providing current to said motors and accepting charging current from at least said second motor; and

a controller for controlling the flow of electrical and mechanical power between said engine, first and second motors, and wheels,

wherein said controller starts and operates said engine when torque require [sic] to be produced by said engine to propel the vehicle and/or to drive either one or both said electric motor(s) to charge said battery is at least equal to a **setpoint (SP)** above which said engine torque is efficiently produced, and wherein the torque produced by said engine when operated at said **setpoint (SP)** is substantially less than the maximum torque output (MTO) of said engine.

7. The vehicle of claim 1, wherein said vehicle is operated in a plurality of operating modes responsive to the value for the **road load (RL)** and said **setpoint SP**, both expressed as percentages of the maximum torque output of the engine when normally-aspirated (MTO), and said operating modes include:

a **low-load mode I**, wherein said vehicle is propelled by torque provided by said second electric motor in response to energy supplied from said battery, while RL<SP,

a **highway cruising mode IV**, wherein said vehicle is propelled by torque provided by said internal combustion engine, while SP<RL<MTO, and

an **acceleration mode V**, wherein said vehicle is propelled by torque provided by said internal combustion engine and by torque provided by either or both electric motor(s) in response to energy supplied from said battery, while RL>MTO.

'347 Patent, col. 58, ll. 12-37, col 58, l. 58 – col. 59, l. 8 (emphasis added).

B. Claim Construction

1. "controllably coupled"

a. Parties' Positions

The parties offer the following constructions for "controllably coupled." Dkt. No. 55-2, at 7. The parties' central dispute is whether or not a "clutch" is required.

Paice	Toyota
Plain meaning sufficient. Does not require construction. If construed, should not be	Connected through a clutch that is controlled to selectively connect or disconnect the engine

limited to coupling through a clutch.	from the road wheels.

Paice contends this term's plain and ordinary meaning is sufficient. Dkt. No. 46, at 24. Toyota, however, argues that an "ordinarily skilled artisan" would understand this term, as used in the '347 Patent, to mean "connected through a clutch that is controlled to selectively connect or disconnect the engine from the road wheels." Dkt. No. 47, at 15. The thrust of Toyota's argument is that because every embodiment described in the '347 Patent has the internal combustion engine (ICE) connected to the wheels of the vehicle through a clutch and because the term is not defined in the '347 Patent specification, one must look to the embodiments to define this term. *Id.* Further, argues Toyota, "ordinary meaning" is not applicable if that meaning strays from the scope of the originally-filed application. *Id.* (citing *Schering Corp. v. Amgen Inc.*, 222 F.3d 1347, 1351-54 (Fed. Cir. 2000)).

Paice responds that (1) Toyota's construction not only violates the plain and ordinary meaning of the term but also that (2) the intrinsic record clearly demonstrates the applicant never intended for "controllably coupled" to be limited to "controllably coupled through a clutch." Dkt. No. 51, at 13. Specifically, Paice notes that during prosecution, the term "controllably coupled" was added to three claims by preliminary amendment, two of which additionally recited "by a clutch" and one that did not. *Id.* at 12-13. In later amendments, the words "by a clutch" were explicitly deleted from those two claims and a new claim was added that recited "controllably coupled" without a clutch. *Id.* at 13.

b. Court's Construction

The Court finds the term "controllably coupled" should not be limited to a clutch. Toyota inappropriately seeks to read the "clutch" limitation into claim 1 when the plain language of the claim does not include it. *See Cybor*, 138 F.3d at 1471. Further, claim terms are to be given their plain and ordinary meaning absent a different meaning deliberately set forth in the intrinsic

record. *See K-2 Corp. v. Salomon S.A.*, 191 F.3d 1356, 1362-63 (Fed. Cir. 1999). The Court agrees with Paice that *Schering* is not applicable here because, unlike the term at issue in *Schering* that had a changed meaning in the art, the term "controllably coupled" has not changed in meaning; hence, the originally-filed claims were never amended to raise a new matter question. Finally, the Court finds the doctrine of claim differentiation also indicates that "controllably coupled" should not be limited to a clutch, as dependent claim 21 specifically recites the clutch limitation. *See* '347 Patent, col. 60, ll. 14-16.

However, this term is clearly in dispute; the Court therefore has a duty under *O2 Micro Int'l Ltd v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) to provide a construction. The '347 Patent specification in several places describes a "clutch" as the mechanism by which the ICE is selectively connected to the road wheels. *See, e.g.*, '347 Patent, col. 17, ll. 28-33, col. 17, l. 58 – col. 18, l. 2, col. 26, ll. 25-27, col. 27, ll. 6-20. The claim clearly does not recite a clutch; instead, the claim recites only the "controlled connection" between the ICE and the road wheels. This "controlled connection" refers to the selective connection between the ICE and the road wheels as controlled by a microprocessor or other controller. *See* '347 Patent, col. 25, ll. 53-66. "In each case, the engine is controllably disconnected from the road wheels by control of the clutch. Engagement of the clutch is controlled by the microprocessor." '347 Patent, col. 17, l. 66 – col. 18, l. 2. Thus, what is claimed is the "selective connection/disconnection" and the "control" over that connection/disconnection, not the device (e.g., clutch) through which the selective connection is achieved.

Accordingly, the **Court construes "controllably coupled"** to mean **"selectively connected through a mechanism that is controlled by a microprocessor."** Microprocessor is defined in the patent. *See* '347 Patent, col. 25, ll. 53-66.

2. "setpoint (SP)"

a. Parties' Positions

The parties offer the following constructions for "setpoint (SP)" that appears in asserted claim 7, which depends from claim 1. Dkt. No. 55-2, at 8. The primary disagreement between the parties is whether the setpoint is a value at which a transition between modes *must* occur and whether the setpoint is necessarily a torque value.

Paice	Toyota
A defined, but potentially variable value at which a transition between modes of operation may occur.	A value of torque that defines the transition point between the low-load mode I operating mode and the highway cruising mode IV.

The parties have some agreement on this term. Both parties agree that "setpoint" refers to a variable value that defines the transition point between operating modes. *Compare* Dkt. No. 46, at 24 *with* Dkt. No. 47, at 17.

Beyond that, Paice contends the term setpoint is clearly defined by the patent to be a value that is potentially variable over time that is used to indicate transition points between modes of operation. Dkt. No. 46, at 24-25 (citing '347 Patent, col. 58, ll. 29-33, col. 58, ll. 58-60, col. 58, ll. 38-40, col. 58, ll. 53-54, and col. 40, ll. 22-32). Toyota agrees that setpoint is potentially variable but argues that the specification mandates that the setpoint is expressed in terms of torque and that it must define the transition point between low-load mode I and highway cruising mode IV. Dkt. No. 47, at 17. Toyota cites to the '347 Patent, column 40, lines 47-55 for the basis of its argument.

b. Court's Construction

The Court finds Toyota's arguments unpersuasive. The portion of the patent specification Toyota cites for setpoint discusses a particular embodiment. Although it is possible that a setpoint may always be determined to be a torque value, there is nothing in the claims or specification that indicate a given setpoint value is actually represented in terms of torque. In fact, the specification clearly indicates that the state of charge of the battery bank, "expressed as a percentage of its full charge" is compared against setpoints, the result of the comparisons being used to control the mode of the vehicle. '347 Patent, col. 40, ll. 28-31. Clearly a setpoint based on the battery charge status is not a torque value. *See also* '347 Patent, col. 41, ll. 10-19 ("It is also within the scope of the invention to make setpoint SP . . . somewhat 'fuzzy'").

As for Paice's other argument, that setpoints define where a transition *must* occur between modes, the Court is likewise unconvinced. The specification indicates that the invention embodies buffering setpoints with time such that a setpoint must be exceeded for a certain amount of time before a transition between modes occurs. *See* '347 Patent, col. 41, ll. 41-46 ("for example, mode IV might be entered from mode I only after the road load exceeded a first, lower setpoint SP for an extended period of time, so that the engine would be run for extended low-speed cruising"); *id.* at col. 58, l.. 41-47 (claim 3, including limitation that transition occurs only after setpoint is exceed "for at least a predetermined time"). Thus, the '347 Patent does not mandate that transitions necessarily occur solely because a setpoint is reached. Because there can be other factors, such as time, that determine whether a transition will indeed occur, the "must" limitation should not be read into the claim. Accordingly, the Court construes **"setpoint (SP)"** to mean **"a definite, but potentially variable value at which a transition between operating modes may occur."**

3. "road load (RL)"

a. Parties' Positions

The parties offer the following constructions for "road load (RL)" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 8. This term also appears in claim 215 of the '634 Patent. *Id.* at 10. This term was construed in the previous litigation. *See* Dkt. No. 91, at 41, Civil Action No. 2:04-CV-211. The parties principal dispute is whether the construction should include the notion that instantaneous torque may be positive or negative.

Paice	Toyota
The instantaneous torque required for propulsion of the vehicle.	The instantaneous torque required for propulsion of the vehicle, which must be capable of being either positive or negative.

Paice contends the Court's previous construction is binding on Toyota in this case and that the Court appropriately considered the notion that the term can be positive or negative in the previous litigation by including the modifying term "instantaneous" to torque. Dkt. No. 51, at 17. Toyota argues it is not collaterally estopped from disputing this term because the Federal Circuit did not reach the construction on appeal. Dkt. No. 47, at 19. Toyota contends the Court should adopt Toyota's proposed construction from the previous case or its proposed definition here. *Id.* Importantly, argues Toyota, the construction should include the fact that the value can be positive or negative. *Id.* At the claim-construction hearing, Paice did not dispute that road load could be positive or negative, and Paice had no problem with the positive/negative distinction being added to the construction, although Paice did not feel it was necessary. Dkt. No. 58, at 54-57.

b. Court's Construction

The Court adopts its previous construction but adds the positive/negative distinction in the construction to clarify what is meant by "instantaneous" in the construction. Accordingly,

the Court construes **"road load"** to mean **"the instantaneous torque required for propulsion of the vehicle, which may be positive or negative in value."**

4. "low-load mode I"

a. Parties' Positions

The parties offer the following constructions for "low-load mode I" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, Civil Action No. 2:04-CV-211. The parties' principal dispute is whether *all* torque to drive the road wheels must be provided by the electric traction motor.

Paice	Toyota
The mode of operation in which energy flows from the battery bank to the traction motor and torque flows from the traction motor to the road wheels.	An operating mode in which all torque is provided to the road wheels by the traction motor operating on electrical energy supplied by the battery bank.

Paice contends collateral estoppels bars reconstruction of this term. Dkt. No. 46, at 26. Further, Paice contends the term is clearly defined in the '347 Patent claims and that definition should be used. *Id* (citing '347 Patent, col. 58, ll. 64-67). Toyota makes the same argument it made in the previous case—that embodiment figures from the patent indicate this mode is a "motor-only" mode. Dkt. No. 47, at 22.

b. Court's Construction

The Court rejects Toyota's arguments here for the same reason the Court rejected them in the previous litigation. The '347 Patent claim 7 clearly defines this term. Accordingly, the Court construes **"low-load mode I"** to mean **"the mode of operation in which energy from the battery bank flows to the traction motor and torque (rotary force) flows from the traction motor to the road wheels."**

5. "highway cruising mode IV"

a. Parties' Positions

The parties offer the following constructions for "highway cruising mode IV" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, at 41, Civil Action No. 2:04-CV-211. The parties' principal dispute is whether, in this mode, *all* torque is provided to the road wheels by the internal combustion engine.

Paice	Toyota
The mode of operation in which energy flows from the fuel tank into the engine and torque flows from the engine to the road wheels.	An operating mode in which all torque is provided to the road wheels by the ICE and the traction motor is depowered.

As with the previous term, Paice contends collateral estoppel applies and Toyota claims it does not. Dkt. No. 46, at 26; Dkt. No. 47, at 23. This term, like the previous, is explicitly defined in the '347 Patent and the Court previously rejected Toyota's similar arguments with respect to this term in the prior lawsuit. *See* '347 Patent, col. 59, ll. 1-3; Dkt. No. 91, at 43-44, Civil Action No. 2:04-CV-211.

b. Court's Construction

The Court finds no reason to deviate from its prior construction of this term, albeit from a different—yet related—patent. Accordingly, the Court construes **"highway cruising mode IV"** to mean **"the mode of operation in which energy flows from the fuel tank into the engine and torque (rotary force) flows from the engine to the road wheels."**

6. "acceleration mode V"

a. Parties' Positions

The parties offer the following constructions for "acceleration mode V" that appears in claim 7, which depends from claim 1. Dkt. No. 55-2, at 9. This term was construed in the previous litigation. *See* Dkt. No. 91, at 42, Civil Action No. 2:04-CV-211. The parties do not

appear to have a dispute with this term. *See* Dkt. No. 47, at 23 ("Toyota does not necessarily disagree with Paice's effort to transfer and use the Court's prior definition . . . from the earlier patent.").

Paice	Toyota
The mode of operation in which energy flows from the fuel tank into the engine and from the battery to at least one motor and torque flows from the engine and at least one motor to the road wheels.	An operating mode in which either or both motors can be powered and torque flows from either or both motors and the ICE to the road wheels.

Paice again claims collateral estoppels applies to this term and Toyota says it does not, for the same reason as the two previous terms. Dkt. No. 46, at 27; Dkt. No. 47, at 23.

b. Court's Construction

The Court finds no reason to deviate from its prior construction of this term, albeit from a different—yet related—patent. Accordingly, the Court construes **"acceleration mode V"** to mean **"the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque (rotary force) flows from the engine and at least one motor to the road wheels."**

VI. U.S. PATENT NO. 7,237,634

A. Overview

Paice has asserted claims 215, 216, 295, 298, 303, 305, and 306 against Toyota. Dkt. No. 46, at 27. For reference, the asserted claims that contain disputed terms are reproduced below (disputed terms emphasized):

> 215. A method for controlling a hybrid vehicle, comprising:
>
> determining instantaneous **road load (RL)** required to propel the hybrid vehicle responsive to an operator command;
>
> **operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)**;

operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO; and

operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO; and

regeneratively charging a battery of the hybrid vehicle when instantaneous torque output of the engine>the RL, when the RL is negative, and/or when braking is initiated by an operator of the hybrid vehicle.

295. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1.

298. A hybrid vehicle, comprising:

a controller capable of accepting inputs indicative of vehicle operating parameters and providing control signals in response to a control program;

a battery bank;

an internal combustion engine operable to provide propulsive torque to road wheels of said vehicle;

a first AC electric starting motor electrically coupled to said battery bank and mechanically coupled to said internal combustion engine, and responsive to commands from said controller for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank, such that said first electric motor can be controlled to (1) accept torque from said engine to charge said battery bank, and (2) accept energy from said battery bank to apply torque to said engine for starting said engine;

a second AC electric traction motor, electrically coupled to said battery bank and mechanically coupled to road wheels of said vehicle, and responsive to commands from said controller, for (a) accepting electrical energy from said battery bank and (b) providing electrical energy to said battery bank such that said second electric motor can be controlled to (1) accept energy from said battery bank to apply torque to said road wheels to propel said vehicle, and (2) accept torque from said road wheels to charge said battery bank;

a solid state inverter connected to the second AC motor for converting DC to AC and AC to DC;

wherein said controller is provided with signals responsive to the instantaneous road load experienced by said vehicle and to the state of charge of said battery bank, and controls operation of said engine and said first and second motors so that said vehicle is operated in a plurality of operating modes responsive to said signals; and

wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes.

305. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:

provide current to the first and/or the second electric motors; and

accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts; and

wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

306. A hybrid vehicle, comprising:

one or more wheels;

an internal combustion engine operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a first electric motor coupled to the engine;

a second electric motor operable to propel the hybrid vehicle by providing torque to the one or more wheels;

a battery coupled to the first and second electric motors, operable to:

provide current to the first and/or the second electric motors; and

accept current from the first and second electric motors; and

a controller, operable to control the flow of electrical and mechanical power between the engine, the first and the second electric motors, and the one or more wheels;

wherein power originating at the battery is supplied to the second motor at a peak current no greater than about 150 amperes; and

> wherein the controller is operable to operate the engine when the power required from the engine to satisfy the road load experienced by the vehicle and/or to drive one or more of the first and second motors to charge the battery is at least equal to a minimum value at which power is efficiently produced by said engine but that is substantially less than the maximum power output of the engine.

'347 Patent, col. 79, ll. 10-31 (claim 215), col. 87, ll. 28-67 (claim 295), col. 88, l. 43 – col. 89, l. 14 (claim 298), col. 90, l. 51 – col. 92, l. 24 (claim 305), col. 92, ll. 25-53 (claim 306) (emphasis added).

B. Claim Construction

The Court notes initially that the terms "road load (RL)" and "setpoint (SP)" are disputed with regard to this patent as well as the '347 Patent. The Court finds no reason to deviate from the constructions provided in its analysis of the '347 Patent. Accordingly, **"road load (RL)"** and **"setpoint (SP),"** as used in the '634 Patent, are construed to **have the same meanings as those provided by the Court in its discussion of the '437 Patent.**

1. "operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. As with the modes of operation discussed previously,[2] the primary dispute between the parties is whether this claim requires the electric motor(s) be operated exclusively to propel the vehicle.

Paice	Toyota
Operating at least one electric motor to propel the vehicle when the road load required to do so is less than a setpoint.	Operating only one or more electric motors to propel the vehicle when the determined RL is less than the SP.

Paice contends this term should be given its plain and ordinary meaning; no construction is necessary. Dkt. No. 46, at 28. Toyota argues the '634 Patent specification indicates that the

[2] *See supra* Parts V.B.4 - V.B.6.

motor(s) alone propel the vehicle when the road load is less than a certain setpoint. Dkt. No. 47, at 24 (citing '634 Patent, col. 20, l. 61 – col. 21, l. 1). Toyota further contends Paice's construction impermissibly broadens claim 215 beyond the teachings of the specification. *Id.* at 24-25.

b. Court's Construction

The Court finds Toyota's construction impermissibly reads a limitation into the claim language. Although the specification does envision situations, as discussed with certain embodiments, where the engine may not run at all, the plain claim language, which is not contrary to the teachings of the specification, does not require such a limitation. Thus, the Court finds this term is clear and accordingly construes it to mean exactly what it says, namely: **"operating at least one electric motor to propel the hybrid vehicle when the road load required to do so is less than a setpoint."**[3]

2. "operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. The primary dispute between the parties is whether claim 215 requires that *only* the engine propel the vehicle when the determined road load is between the setpoint and the maximum torque output (MTO) of the engine.

Paice	Toyota
Operating an engine to propel the vehicle when	Operating only the ICE to propel the vehicle

[3] The Federal Circuit has stated that it is the district court's duty to resolve the disputes regarding the scope of a claim term. *O2 Micro*, 521 F.3d at 1362. However, the Federal Circuit has also noted that "district courts are not (and should not be) required to construe every limitation present in a patent's asserted claims." *Id.* While the Court has provided reasoning and findings regarding the subject terms, the Court finds that the actual claim terms are easily discerned by the fact finder and provide better clarity than any proffered alternative.

the road load required to do so is between the setpoint and the maximum torque output of the engine.	when the determined RL is between the SP and the MTO of the engine.

Paice argues this term is clear from its plain and ordinary meaning; no construction is required. Dkt. No. 46, at 29. Toyota contends the patent specification clearly describes that only when the road load exceeds the MTO of the engine should the engine and other motor(s) act collectively. Dkt. No. 47, at 27. That is, when the road load is between the setpoint and the MTO of the engine, it is the engine alone that propels the vehicle. *Id.*

b. Court's Construction

Once again, Toyota attempts to import the "only" limitation into this claim. The Court agrees that the specification discusses situations where the engine may be the only propulsion source for the vehicle, but that is an embodiment and not what is claimed. Further, the claim language is not contrary to the specification's teachings. Therefore, the Court construes **"operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"** to mean **"operating an engine to propel the vehicle when the road load is between the setpoint and the maximum torque output of the engine, where the engine can efficiently produce torque above the setpoint and where the setpoint is substantially less than the maximum torque output of the engine."**

3. "operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 215. Dkt. No. 55-2, at 10. The parties seem to have no real dispute with regard to this term. Rather, Toyota contests this term because it believes "its definition for this claim limitation is consistent

with the specification, and that Paice's claim constructions tend to obscure the differences among the claimed modes." Dkt. No. 47, at 29.

Paice	Toyota
Operating both the at least one motor and the engine to propel the vehicle when the road load required to do so is more than the maximum torque output of the engine.	Operating both the one or more electric motors and the ICE to propel the vehicle when the determined RL is more than the MTO.

b. Court's Construction

Because the Court finds no real dispute between the parties with regard to this term, the Court construes **"operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"** to mean **"operating both the engine and at least one motor to propel the vehicle when the road load is more than the maximum torque output of the engine."**

4. "wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 295. Dkt. No. 55-2, at 13. The central disputes between the parties are whether (1) the ratio of battery voltage to current must be *at least* 2.5 or more and (2) the ratio must hold at *every point in the system*.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed ratio to exist "at every point in the system."	The ratio of battery voltage to current at every point in the system from the battery to the solid state inverter is at least 2.5 or more.

Paice argues the plain and ordinary meaning of the claim should be used here; no construction is necessary. Dkt. No. 46, at 31. Toyota contends the patent specification would lead an ordinarily-skilled artisan to construe the term as requiring the ratio to be at least 2.5 and

that the ratio hold when measured at every point in the system. Dkt. No. 47, at 29 (citing '634 Patent, col. 50, ll. 44-50, col. 51, ll. 13-17).

b. Court's Construction

The Court finds Toyota's arguments unconvincing. The claim language specifically states that the energy to be measured originates at the battery and is supplied *to* the solid state inverter. The claim language further states that this measurement must be at least *about* 2.5 to 1. The citations Toyota provides to the specification refer to "useful" component sizing information and they do not state where in the system the ratio is to be measured. Additionally, the Court notes once again that the claims should not be limited to particular embodiments unless the inventor has indicated such a narrow construction. *See LizardTech, Inc. v. Earth Res. Mapping, Inc.*, 433 F.3d 1373, 1376-77 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1326-27 (construing the term "baffle" broader than the narrower bullet-deflecting embodiments disclosed in the specification)). The Court finds no such narrow indication here.

The Court does find, however, that construction is necessary in order to clarify where the measurement should be taken. Accordingly, the Court construes **"wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"** to mean **"the energy originating at the battery, when measured in terms of voltage and current at the solid state inverter, has a ratio of voltage to current such that voltage is about 2.5 times greater, or more, than current."**

5. "wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 298. Dkt. No. 55-2, at 15. The parties principally disagree about where the current measurement is made.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed amperage to exist "at any point" as Toyota contends, and allows for certain instances (transients, e.g.) of exceeding 150 amps.	The current measured at any point between the battery and the solid state inverter cannot exceed 150 amps.

As with the previous term, Paice contends this term needs no construction; plain and ordinary meaning is sufficient. Dkt. No. 47, at 32. Toyota makes the same argument with respect to this term as it made with regard to the voltage/current ratio term immediately above.

b. Court's Construction

The Court rejects Toyota's arguments for the same reasons discussed with the previous term. The Court construes "**wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes**" to mean "**the energy originating at the battery, when measured at the solid state inverter, has a maximum current of 150 amperes.**"

6. "wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 305. Dkt. No. 55-2, at 16. As with the previous terms, the parties principally disagree about where the current measurement is made. The arguments of the parties are the same as with the previous term so they will not be repeated here.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed voltage to exist "at any point" as Toyota contends.	The voltage measured at any point between the battery and the second motor must sometimes rise to a peak of at least 500 volts.

b. Court's Construction

The Court, for the same reasons recited above, rejects Toyota's argument but believes that the term should be construed to clarify its meaning. Accordingly, the Court construes

"wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts" to mean **"the energy originating at the battery, when measured at the second motor, has a peak voltage of about 500 volts or greater."**

7. "wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes"

a. Parties' Positions

The parties offer the following constructions for this term that appears in claim 305. Dkt. No. 55-2, at 13. As with the previous term, the parties principally disagree about where the current measurement is made. The arguments of the parties are the same as with the previous term so they will not be repeated here.

Paice	Toyota
Controlled by plain meaning. Does not require the claimed current to exist "at any point" as Toyota contends, and allows for certain instances (transients, e.g.) of exceeding 150 amps.	The current measured at any point between the battery and the second motor cannot exceed 150 amps.

b. Court's Construction

The Court, for the same reasons recited above, rejects Toyota's argument but believes that the term should be construed to clarify its meaning. Accordingly, the Court construes **"wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes"** to mean **"the energy originating at the battery, when measured at a second motor, has a peak current of about 150 amperes or less."**

VII. CONCLUSION

The Court hereby **ORDERS** the claim terms addressed herein construed as indicated.

The table below summarizes the Court's constructions:

Term	Court's Construction
'970 Patent	
"controllable torque transfer unit"	**"a multi-input device or component that is controlled to transfer variable amounts of torque (rotary force)"**
"means for performing the following functions responsive to input commands and monitored operation of said vehicle"	**"A computerized control device and associated components for selecting an operating mode [mode or state of operation determined by the source and/or direction of the flow of energy and/or torque (rotary force) in the system] and controlling the engine, motor and battery to implement that mode"**
'437 Patent	
"controllably coupled"	**"selectively connected through a mechanism that is controlled by a microprocessor."**
"setpoint (SP)"	**"a definite, but potentially variable value at which a transition between operating modes may occur."**
"road load (RL)"	**"the instantaneous torque required for propulsion of the vehicle, which may be positive or negative in value."**
"low-load mode I"	**"the mode of operation in which energy from the battery bank flows to the traction motor and torque (rotary force) flows from the traction motor to the road wheels."**
"highway cruising mode IV"	**"the mode of operation in which energy flows from the fuel tank into the engine and torque (rotary force) flows from the engine to the road wheels."**
"acceleration mode V"	**"the mode of operation in which energy flows from the fuel tank to the engine and from the battery bank to at least one motor and torque (rotary force) flows from the engine and at least one motor to the road wheels."**
'634 Patent	
"setpoint (SP)"	Same as above.

Term	Court's Construction
"road load (RL)"	Same as above.
"operating at least one electric motor to propel the hybrid vehicle when the RL required to do so is less than a setpoint (SP)"	**"operating at least one electric motor to propel the hybrid vehicle when the road load required to do so is less than a setpoint."**
"operating an internal combustion engine of the hybrid vehicle to propel the hybrid vehicle when the RL required to do so is between the SP and a maximum torque output (MTO) of the engine, wherein the engine is operable to efficiently produce torque above the SP, and wherein the SP is substantially less than the MTO"	**"operating an engine to propel the vehicle when the road load is between the setpoint and the maximum torque output of the engine, where the engine can efficiently produce torque above the setpoint and where the setpoint is substantially less than the maximum torque output of the engine."**
"operating both the at least one electric motor and the engine to propel the hybrid vehicle when the torque RL required to do so is more than the MTO"	**"operating both the engine and at least one motor to propel the vehicle when the road load is more than the maximum torque output of the engine."**
"wherein energy originating at the battery is supplied to the solid state inverter at a voltage and current such that the ratio of voltage to current is at least about 2.5 to 1"	**"the energy originating at the battery, when measured in terms of voltage and current at the solid state inverter, has a ratio of voltage to current such that voltage is about 2.5 times greater, or more, than current."**
"wherein energy originating at the battery is supplied to the solid state inverter at a maximum current of no more than 150 amperes"	**"the energy originating at the battery, when measured at the solid state inverter, has a maximum current of 150 amperes."**
"wherein energy originating at the battery is supplied to the second motor at a peak voltage of at least about 500 volts"	**"the energy originating at the battery, when measured at the second motor, has a peak voltage of about 500 volts or greater."**
"wherein power originating at the battery is supplied to a second motor at a peak current no greater than about 150 amperes"	**"the energy originating at the battery, when measured at a second motor, has a peak current of about 150 amperes or less."**

IT IS SO ORDERED.