IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

SQUARE D COMPANY, POWER MEASUREMENT, INC., and POWER MEASUREMENT, LTD.,	)	
Plaintiffs	)	No. 06 C 5079
v.	)	
E.I. ELECTRONICS, INC., and INC., E.I. ELECTRONICS, LLC,	)	Magistrate Judge Arlander Keys
Defendants.	)	

MEMORANDUM OPINION AND ORDER

In this patent infringement suit, Square D Company has sued E.I. Electronics, alleging that several of its products infringe various patents held by Square D. All told, in its complaint, Square D claimed infringement of 11 different patents: U.S. Patent No. 7,006,934 (the '934 Patent); U.S. Patent No. 6,983,211 (the '211 Patent); U.S. Patent No. 6,792,364 (the '364 Patent); U.S. Patent No. 6,792,337 (the '337 Patent); U.S. Patent No. 6,751,562 (the '562 Patent); U.S. Patent No. 6,745,138 (the '138 Patent); U.S. Patent No. 6.737,855 (the '855 Patent); U.S. Patent No. 6,611,922 (the '922 Patent); U.S. Patent No. 6,186,842 (the '842 Patent); U.S. Patent No. 6,185,508 (the '508 Patent); and U.S. Patent No. 5,831,428 (the '428 Patent). All of the patents relate to electrical power meters and revenue meters, their structure, their operation, and their interaction with users and the power distribution networks to which they are connected. Square D has dismissed its infringement claims with regard to

three of the patents (the '337, '855, and '922 patents), leaving eight patents remaining in suit.

The case is before the Court for construction of disputed claim language in these eight patents. The parties initially filed extensive briefs on claim construction, and the Court held a *Markman* hearing on December 3, 2009, *see Markman v. Westview Instruments, Inc.*, 52 F.3d 967 (Fed. Cir. 1995), at which time the parties presented their respective positions concerning what claim terms are disputed and how each should be construed. In short, the parties have briefed the claim construction issues fully and exhaustively.

Discussion

The first step in any infringement case is to construe the claims of the patents-in-suit. *See K-2 Corp. V. Salomon S.A.*, 191 F.3d 1356, (Fed. Cir. 1999). The construction of a patent's claims is a questions of law to be determined by the Court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-78 (Fed. Cir. 1995).

To determine the meaning of the terms of the claims, the Court considers "intrinsic" evidence, which consists of the language of the claims, the specification of the patents, and the prosecution history. *Markman*, 52 F.3d at 979; *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). If the meaning of the claim terms is unambiguous and can be determined

from the intrinsic evidence, the Court may not rely on extrinsic evidence in rendering its claim construction, although the Court may hear the evidence to educate itself about the relevant technology and to ensure that the construction to which it is tending is not inconsistent with widely held understandings in the pertinent technical field. *Vitronics*, 90 F.3d at 1583; *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1309 (Fed. Cir. 1999).

"When construing claims, however, the intrinsic evidence and particularly the claim language are the primary resources"; "extrinsic evidence such as expert testimony is 'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Kara Technology Inc. v. Stamps.com Inc.*, 582 F.3d 1341, 1348 (Fed. Cir. 2009)(quoting Phillips v. AWH Corp., 415 F.3d 1303, 1317 (Fed. Cir. 2005)). "While helpful, extrinsic sources like expert testimony cannot overcome more persuasive intrinsic evidence. A 'court should discount any expert testimony that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.'" *Kara*, 582 F.3d at 1348 (quoting *Phillips*, 415 F.3d at 1318).

"The words of a claim 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." *Kara Technology*, 582 F.3d at 1345(citing *Phillips*, 415 F.3d at 1312-13. "[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments." *Phillips*, 415 F.3d at 1323. In particular, the Federal Circuit 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." *Id.*

As noted, Square D initially claimed infringement of 11 patents; recently, Square D dismissed its claims with regard to three of those patents. Thus, as of this moment, Square D is asserting eight patents in this suit, and each contains disputed claim terms. Recognizing that, before any infringement decision may be issued, the Court must construe the dispute claim language, the parties submitted lists of what they each contend are the disputed claim terms in need of construction. Based upon those lists, the Court finds that the following claim terms are in dispute and in need of construction:

from the '428 Patent, "metering logic programmed by a user"; and "plurality of integral metering cycles";

from the related '934 and '364 Patents, "harmonic frequencies"; "fundamental frequency"; "provide power to said meter"; "a second power supply"; "one first capacitor . . .

operative to store electrical energy; and one second capacitor . . . operative to store electrical energy"; "a power supply"; and "bayonet terminals";

from the '508 Patent, "a fundamental frequency detector"; "in real time"; "means for continuously adjusting a sampling rate of the converting means to be near synchronous with the voltage and current signals"; and "means adapted to receive the output signal from the receiving means and provide a modified output signal representative of a fundamental frequency";

from the '211 and '842 Patents, "bayonet"; "a circuit board"; "vias"; surrounding"; and "around";

from the '562 Patent, "security module"; and "at least one application operative to punch through a firewall"; and

from the '138 Patent, "working data code"; "boot portion"; "program portion"; "data portion"; and "periodic save code."

The Court will consider the disputed claim terms patent by patent, beginning with the earliest issued patent.

The '428 Patent

The '428 Patent, issued November 3, 1998, is entitled "Metering Unit with Integrated User Programmable Logic"; it generally relates "to techniques and arrangements for measuring, communicating and analyzing parameters associated with electrical distributed power networks." U.S. Patent 5,831,428, col. 1, lines 7-11. "More particularly, the present invention relates to

a metering unit with integrated user programmable logic." *Id.*, col. 1, lines 11-12. According to the "Summary of the Invention" section of the specification, "[a] general object of the present invention is to provide a metering unit which incorporates application-specific programmable logic into the metering unit itself to customize metering unit operation." U.S. Patent No. 5,831,428, col. 2, lines 2-5.

Square D argues that only one term in this patent needs to be construed: "metering logic programmed by a user." According to EI, one additional term requires construction: "plurality of integral metering cycles." Both claim terms appear in claim 1, which discloses:

> 1. A metering unit for monitoring a power line in a distributed power network carrying a power-related waveform from a non-residential load-center to powered equipment, the metering unit using a sensor for sending power-related parameters associated with the power-related waveform over a plurality of integral metering cycles, said metering unit comprising:
>
> a generator, responsive to said sensor, for generating data representative of the power-related waveform during each of said metering cycles; and
>
> a programmable non-volatile memory having stored therein metering logic programmed by a user via a communications port of the metering unit and executable by said generator during each of said metering cycles, said metering logic directing said generator in each of said metering cycles to perform power-related computations and logic evaluations on said data representative of the power-related waveform.

U.S. Patent No. 5,831,428, col. 12, lines 37-56 (emphasis added).

(1) "Plurality of Integral Metering Cycles"

Square D argues that the term "plurality of integral metering cycles" should be construed consistent with its ordinary meaning to mean "two or more metering cycles where a 'metering cycle' is a 'series of recurring events that occur on a meter.'" EI contends that the term should be defined as "two or more consecutive cyclic firmware[1] loops, executing during each loop, calculations, metering logic, and secondary functions, all using coincident data."

As EI correctly notes, the specification does seem to define what is meant by a "metering cycle." The patent states:

> [t]he metering logic is executed by the processor 130 in each metering cycle of the metering unit 104. Without the metering logic, each metering cycle generally includes the step sequence of obtaining data, performing metering calculations, and performing secondary functions. These three steps are repeated for each metering cycle. In the preferred embodiment, application-specific metering logic is programmed in the metering unit **104** to be performed as part of the metering cycle. Thus, the metering cycle includes the step sequence of obtaining data, performing metering calculations, performing metering logic, and performing secondary functions.

U.S Patent No. 5,831,428, col. 6, lines 53-64. The specification goes on to state:

> If the programmed logic is verified and the processor

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[1]When code is in a computer, it's called "software"; when code is in a power meter it is called "firmware."

> **130** executes the user programmed initialization logic, metering is performed in a cyclic loop in which the processor **130** obtains data and performs metering updates/calculations (step 210), completely executes the user programmed metering loop logic (step 212), and then continues execution of the main functionality firmware to perform secondary functions (step 214). The processor **130** repeats these steps 210, 212, and 214 in each metering cycle.

Id., col. 7, lines 51-60. Although EI's proposed construction is certainly appropriate with respect to the preferred embodiment, it need not be true for all embodiments, and it would be inappropriate for the Court to read the additional limitations urged by EI into claim 1. Having said that though, the Court is persuaded that Square D's construction is too broad: a metering cycle is more than just a series of recurring events; it's a series of readily defined categories of recurring events that happen in a particular order - namely, first data is obtained; then metering updates/calculations are performed; then use programmed metering logic is completed; then secondary functions are performed. Thus, the Court construes "plurality of integral metering cycles" to mean "two or more metering cycles" where a "metering cycle" is "a series of recurring events that occur on a meter, including, in this order, the collection of data, the performance of updates/calculations, the execution of user programmed metering logic, and the performance of secondary functions."

(2) "Metering Logic Programmed By a User"

Square D argues that the term "metering logic programmed by a user" should be construed to mean "a configurable, user definable program, more sophisticated than simply threshold values or calibration information, that is executed apart from the core metering functions for the purpose of evaluating measured parameters." EI argues that the term should be construed to mean "code written by a user and executed every metering cycle." At the *Markman* hearing, Square D offered an "alternative construction": "program or procedure written by a user to perform functions other than those included by the meter manufacturer." EI conceded that, with the addition of the requirement that the program or procedure be "executed every metering cycle," it could accept the proposed alterative construction. The Court adopts this construction. First, nothing in the specification or the claims specifically requires "code"; to the extent a program or procedure can be achieved without the use of "code" (as EI would define that term), it would be included within the claim language.

Square D does not seem to quarrel with EI's inclusion of language requiring that the program or procedure is executed every metering cycle. And rightly so. The language of the specification makes clear that this is so in all embodiments. *See* U.S Patent No. 5,831,428, col. 6, lines 53-54 ("The metering

logic is executed by the processor 130 in each metering cycle of the metering unit 104."); *Id.*, col. 6, line 64 - col. 7, line 2 ("Since the metering logic is incorporated within the metering unit **104** itself and is performed in each metering cycle, the processor **130** is able to access the metering logic and perform calculations with the metering logic on coincident data. In addition, data from every metering update cycle is used."); *Id.*, col. 7, lines 59-60 ("The processor **130** repeats these steps 210, 212, and 214 in each metering cycle."); *Id.*, col. 9, lines 57-60 ("the foregoing process in FIG. 5 is programmed into the main functionality firmware located in the flash EEPROM 124, 126 of the metering unit **104**, and is executed by the processor **130** during each metering cycle."). Reading the patent as a whole makes clear that execution during each metering cycle is an important feature of the invention. Accordingly, the Court is persuaded that this aspect is appropriately incorporated into the construction of this language.

In its presentation at the *Markman* hearing, Square D did not really say much about the "executed every metering cycle" aspect of EI's proposed construction; instead, Square D focused on EI's use of the word "code" (as opposed to "program or procedure"). The Court agrees with Square D that "metering logic programmed by a user" need not require "code" but is more appropriately construed to mean a program or procedure. The Court accepts

Square D's proposed alternative construction, and construes "metering logic programmed by a user" to mean "program or procedure written by a user to perform functions other than those included by the meter manufacturer."

The '934 and '364 Patents

The '934 and '364 patents respectively relate to switchboard and socket-based revenue meters that have power quality detection capabilities. According to Square D, the '934 and '364 patents describe a revenue meter that includes power quality detection circuitry previously only found in laboratory instruments or in specialized portable equipment. The abstracts to both patents state:

> Power quality detection, monitoring, reporting, recording and communication in a revenue meter is disclosed. Transient events are detected by monitoring the wave shape of the electrical power and comparing deviations to a known threshold. Sags and swells are detected by computing root mean square value over a rolling window and comparing the computed value with a known threshold. Harmonic frequencies and symmetrical components are quantified by a known algorithm and compared with a known threshold. Incoming waveforms are stored to memory. All recorded and computed data is moved to non-volatile storage via direct memory access transfer in the event that power quality event jeopardizes the operating power of the meter. Further, the meter provides a power supply utilizing high and low capacitive storage banks to supply sufficient energy to survive short duration power quality events which jeopardize the meter's operating power.

The disclosed inventions "relate[] to revenue meters of the type used by energy suppliers to accurately measure electrical energy delivered to consumers for the purposes of billing and/or

collecting revenue and more particularly, [these] invention[s] relate[] to revenue meters having power quality monitoring, detection, quantification and reporting capabilities." U.S. Patent No. 6,792,364, B2, col. 2, lines 19-24; U.S. Patent No. 7,006,934 B2, col. 2, lines 21-26. The specifications identify a problem associated with revenue power meters - namely, the fact that "various distribution system and environmental factors can distort the fundamental frequency" and "greatly affect the quality of power received by the power consumers at its facility or residence [and] make accurate determination of the actual energy delivered to the consumer very difficult." U.S. Patent No. 6,792,364, B2, col. 2, line 67 - col. 3, line 8; U.S. Patent No. 7,006,934 B2, col. 3, lines 2-10. Accordingly, the patents explain, "there is a need for a revenue accuracy meter that is capable of monitoring, reporting and quantifying the quality of power with a high level of detail and accuracy" and "a need for a revenue accuracy meter that can continue to monitor and quantify data throughout the duration of a power quality event and prevent loss of recorded power quality information in the event of a catastrophic power quality event such as a complete power failure." U.S. Patent No. 6,792,364, B2, col. 3, lines 52-59; U.S Patent No. 7,006,934 B2, col 3, lines 54-61. The inventions covered by the '364 and the '934 Patents are intended to address these needs.

There are a total of 7 disputed claim terms in the '364 and '934 patents: "harmonic frequencies"; "fundamental frequency"; "provide power to said power meter"; "a second power supply"; "one first capacitor . . . operative to store electrical energy; and one second capacitor . . . operative to store electrical energy"; "a power supply"; and "bayonet terminals."

(1) Harmonic Frequencies

The term "harmonic frequencies" appears in both the '364 and the '934 patents. Claim 1 of the '364 patent discloses:

> 1. A revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electric circuit, said meter comprising:
>
> bayonet terminals disposed on said meter mateable with matching jaws of a detachable meter mounting device;
>
> a seal connected between said meter and said detachable meter mounting device, said seal operative to prevent removal of said meter and indicate tampering with said meter;
>
> a first sensor coupled with said electric circuit and operative to sense the voltage in said electric circuit and generate a first analog signal indicative of said voltage;
>
> a second sensor coupled with said electric circuit and operative to sense the current in said electric circuit and generate a second analog signal indicative of said current;
>
> an analog to digital convertor coupled with said first and second sensors and operative to convert said first and second analog signals to one or more digital samples;
>
> a memory coupled with said analog to digital converter and operative to receive and store said digital samples; and

a calculator coupled with said memory and operative to compute one or more harmonic frequencies of said voltage and said current from said stored digital samples.

U.S. Patent No. 6,792,364 B2, col. 39, lines 20-47. Similarly, claim 31 of the '934 patent discloses:

31. A revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electrical circuit, said meter comprising:

a draw-out chassis coupled with said meter and operative to fit within a switchboard enclosure;

terminals disposed on said chassis for engaging matching terminals within said enclosure;

a display;

a meter cover operative to enclose said meter and said display within said enclosure;

a seal connected with said meter cover and operative to prevent removal of said meter cover and indicate tampering with said meter;

a first sensor coupled with said electric circuit and operative to sense the voltage in said electric circuit and generate a first analog signal indicative of said voltage;

a second sensor coupled with said electric circuit and operative to sense the current in said electric circuit and generate a second analog signal indicative of said current;

an analog to digital converter coupled with said first and second sensors and operative to convert said first and second analog signals to one or more digital samples;

a memory coupled with said analog to digital converter and operative to receive and store said digital samples; and

a calculator coupled with said memory and operative to

compute one or more harmonic frequencies of said voltage and said current from said stored digital samples.

U.S. Patent No. 7,006,934 B2, col. 46, lines 21-52.

Square D contends that the term "harmonic frequencies" should be construed to mean "the computed harmonic content of given harmonics"; EI contends that it should be construed to mean "integer multiples of the fundamental frequency."

The construction proposed by EI is used in the specification to define the term. The patent specifically states: "The expected frequency of the AC voltage, e.g., 50 Hertz ("Hz"), 60 Hz, or 400 Hz, is usually referred to as the 'fundamental' frequency. Integer multiples of this fundamental frequency are usually referred to as harmonic frequencies." U.S. Patent No. 6,792,364 B2, col. 2, lines 61-65. Where the specification "expressly defines terms used in the claims or when it defines terms by implication," that is the definition to be used. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). "[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Id.* Given that the specification provides a definition for this disputed claim term, the Court will adopt that definition for claim construction purposes.

(2) Fundamental Frequency

The term "fundamental frequency" appears in both the '934 and the '364 patents. Claim 4 of the '364 patent discloses "[t]he revenue meter of claim 1, said voltage in said electric circuit having a fundamental frequency, wherein said analog to digital converter converts said first and second analog signals to said one or more digital samples at a rate synchronous to said fundamental frequency." U.S. Patent No. 6,792,364 B2, col. 39, lines 53-57. Claim 34 of the '934 patent discloses "[t]he revenue meter of claim 31, said voltage in said electric circuit having a fundamental frequency, wherein said analog to digital converter converts said first and second analog signals to said one or more digital samples at a rate synchronous to said fundamental frequency." U.S. Patent No. 7,006,934 B2, col. 46, lines 58-62.

Square D contends that the claim "fundamental frequency should be construed to mean "the frequency at which the electrical energy is expected to be delivered to the consumer." EI contends that it should be construed to mean the "frequency, without harmonics, at which the delivered electrical energy oscillates." Again, the Court looks to the specification for a definition: the patent states that "[t]ypically, the electrical energy is delivered to consumers as an alternating current ("AC") voltage that approximates a sine wave over a time period. . . .

The expected frequency of the AC voltage, e.g., 50 Hertz ("Hz"), 60 Hz, or 400 Hz, is usually referred to as the "fundamental" frequency." U.S. Patent No. 6,792,364 B2, col. 2, lines 53-63. Because Square D's proposed construction is the one given in the specification, the Court adopts that construction. *See Vitronics*, 90 F.3d at 1582 (when the specification "expressly defines" a term used in the claims, that definition is "dispositive.").

(3) Provide Power to Said Power Meter

The parties next dispute the appropriate construction of the phrase "provide power to said power meter," which appears in both the '364 and the '934 patents. The '364 patent claims, among other things,

> 41. A revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electric circuit, said meter comprising:
>
> bayonet terminals disposed on said meter mateable with matching jaws of a detachable meter mounting device;
>
> a seal connected between said meter and said detachable meter mounting device, said seal operative to prevent removal of said meter and indicate tampering with said meter;
>
> a first power supply coupled with said electric circuit and operative to provide power to said meter from said electric circuit under normal operating conditions;
>
> a second power supply operative to provide power to said meter when a power quality event occurs on said electric circuit, said second power supply including:

at least one first capacitor coupled with said electric circuit and operative to store electrical energy from said electric circuit; and

at least one second capacitor coupled with said at least one first capacitor and said meter and operative to store electrical energy from said electric circuit;

said first and second capacitors further operative to provide said energy to said meter when said power quality event occurs.

U.S. Patent No. 6,792,364 B2, col. 43, lines 21-45.

Square D contends that the phrase "provide power to said power meter" should be construed to mean "provide power to the power meter"; EI argues that the phrase should be construed to mean "provide operating power to said meter sufficient to meet the energy requirements of the meter to continue monitoring and data storage." The dispute thus centers on whether the plain language of the claim requires a specific, or threshold, amount of power. The Court finds that it does not. To be sure, the patentee knew how to include claim language specifying a particular threshold of power; indeed, in claim 41 of the '364, the patentee did just that: the plain language of the claim discloses a first power supply, which must provide enough power to run the meter under normal operating conditions, and a second power supply, which must provide enough power to operate the meter when a power quality event occurs. U.S. Patent No. 6,792,364 B2, col. 43, lines 31-37. Here, he chose not to do so.

Accordingly, the Court will not limit the claim language "provide power to said meter" to require a specific or threshold amount or level of power, other than as specified in the plain language of the claims.

(4) A Second Power Supply

The parties next dispute the meaning of "a second power supply," which also appears in claim 41 of the '364 patent. Square D argues that the phrase should be construed to mean simply "a second source of power"; EI argues that it should be construed to mean "a second, independent source of power distributed to the meter by executing a algorithm." Again, the claim language is clear and unambiguous, and nothing in the claims or the specification limits this second source of power as EI seeks to limit it. Indeed, the specification itself suggests that the first power supply and the second power supply need not be independent:

> The power supply **715** supplies operating power to the revenue meter **700**. . . . the power supply **715** is also designed to provide short term isolation of the meter operation from the power quality event. This is known as "Ride-Thru" and enables the revenue meter **700** to continue to quantify and/or record and report the power quality event throughout the duration of the event and before losing operating power due to extended power quality events.

U.S. Patent No., 6,792,364 B2, col. 12, lines 29-42. Significantly, figure 715 shows a single power supply, not two independent power supplies. The Court adopts Square D's

construction and construes "a second power supply" to mean "a second source of power."

(5) One First Capacitor ... and One Second Capacitor ...

The parties next dispute the claim language concerning "one first capacitor" and "one second capacitor." This language also appears in claim 41 of the '364, quoted above, and in claim 71 of the '934 Patent, which discloses:

> 71. A revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electric circuit, said meter comprising:
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> a draw-out chassis coupled with said meter and operative to fit within a switchboard enclosure;
>
> terminals disposed on said chassis for engaging matching terminals within said enclosure;
>
> a display;
>
> a meter cover operative to enclose said meter and said display within said enclosure;
>
> a seal connected with said meter cover and operative to prevent removal of said meter cover and indicate tampering with said meter;
>
> a first power supply coupled with said electric circuit and operative to provide power to said meter from said electric circuit under normal operating conditions; and
>
> a second power supply operative to provide power to said meter when a power quality event occurs on said electric circuit, said second power supply including:
>
> at least one first capacitor coupled with said electric circuit and operative to store electrical energy from said electric circuit; and

at least one second capacitor coupled with said at least one first capacitor and said meter and operative to store electrical energy from said electric circuit;

said first and second capacitors further operative to provide said energy to said meter when said power quality event occurs.

Claim 72, which depends from claim 71, also discusses the first and second capacitors; it discloses "[t]he revenue meter of claim 71 wherein said at least one second capacitor has a higher capacitance than said at least one first capacitor." U.S. Patent 7,006,934 B2, col. 50, line 39 - col. 51, line 3. Claim 42 of the '364 Patent, which depends from claim 41 of the '364 Patent, is identical. *See* U.S. Patent No. 6,792,364 B2, col. 43, lines 46-48.

Square D argues that this language means "a first capacitor operative to store electrical energy, and a second capacitor operative to store electrical energy." EI contends that the "first capacitor" language should be construed to mean "a low energy capacitor bank to provide dc ripple filtering energy storage sufficient to meet the energy requirements of the meter electronics for event detection and data storage;" and that the "second capacitor" language should be construed to mean "a high energy capacitor bank to provide dc ripple filtering and energy storage sufficient to meet the energy requirements of the meter electronics for event detection and data storage."

To support its proposed construction, EI argues that the

distinction between the one low energy capacitor bank and the second high energy capacitor bank is "fundamental to the successful operation of the revenue meter." Opening Claim construction Brief, p. 25 (quoting U.S. Patent No. 7,006,934, col. 18, lines 36-38; U.S. Patent No. 6,792,364, col. 14, lines 42-44. And, to be sure, there is language in the specification to this effect. The specifications of both patents state that "[t]he division of energy storage into two separate high and low energy capacity banks **930** and **935** is fundamental to the successful operation of the revenue meter, particularly when the meter is being powered by the end use in calibration test fixtures as is typically done in utility company meter shops." U.S. Patent No. 6,796,364 B2, col. 14, lines 42-47; U.S Patent No. 7,006,934 B2, col. 18, lines 36-41. But the specification also makes clear that this language refers to the power supply of the preferred embodiment, and that it need not be true of all embodiments. Accordingly, it would be inappropriate to read this limitation into the claims.

The doctrine of claim differentiation bolsters this conclusion. This doctrine, which is admittedly more a guide than a rigid rule, instructs that "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." *Phillips*, 415 F.3d at 1315, *quoted in Halliburton Energy*

Services, Inc. v. M-I LLC, 514 F.3d 1244, 1252 n.3 (Fed. Cir. 2008))(citing *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004)). Claims 42 and 72, which depend, respectively, from claims 41 and 71, disclose a second capacitor with a "higher capacitance" than the first capacitor. This is strong evidence that no limitation concerning capacitance should be read into the independent claims. Accordingly, the Court adopts Square D's construction of "one first capacitor . . . and one second capacitor . . . ."

(6) A Power Supply

The parties next dispute the meaning of "a power supply," which appears in claim 73 of the '934 patent and in claim 44 of the '364 patent. Claim 44 discloses

> [a] revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electric circuit, said electric circuit carrying high voltage electrical energy, said meter comprising: . . . a power supply coupled between said electric circuit and said switching regulator and operative to store said high voltage electrical energy and provide power to said meter when a power quality event occurs on said electric circuit.

U.S. Patent No. 6,792, 364 B2, col. 43, line 53 - col. 44, line 5. Square D argues that the term "a power supply" should be construed to mean simply "a source of power"; EI argues that it should be construed to mean "a second, independent source of power distributed to the meter by executing an algorithm." The Court finds that "a power supply" is clear and unambiguous on its

face and need not be specially construed. Accordingly, the Court adopts Square D's construction of this term.

(7) Bayonet Terminals

The term "bayonet terminals" appears in claims 1 and 41 of the '364 Patent, both of which are quoted above; both disclose "[a] revenue meter for measuring the delivery of electrical energy from an energy supplier to a consumer through an electric circuit, said meter comprising: bayonet terminals disposed on said meter mateable with matching jaws of a detachable meter mounting device . . . ."

Square D argues that "bayonet terminals" should be construed to mean "solid metal blade-type terminal connector that plugs into the jaws of the meter socket on one end and is connected to a circuit board on the other." EI contends that the term should be construed to mean "blade that electrically conducts and mates with the matching jaws of a meter mounting device"; not insignificantly, EI proposes the same construction for "bayonet." And, interestingly, the '364 does not use the term "bayonet," except as part of the phrase "bayonet terminals." But it does incorporate by reference the specification of the '842 Patent. The Court finds that it, therefore, makes sense to consider the construction of both terms together, and will consider the construction of "bayonet terminals" in conjunction with its discussion of the term "bayonet" in the context of the '842

Patent.

The '508 Patent

The '508 Patent relates to a power meter that can synchronize its sampling rate to the line frequency through the use of hardware-based frequency detection. According to the abstract, the patent discloses a power meter

> for determining power parameters for power lines having periodic 3-phase voltage and current signals distributed to a plurality of power equipment. The 3-phase voltage and current signals have a fundamental frequency. The power lines are connected to at least one transducer which generates analog signals representing the voltage and current signals. The power meter includes receiving circuitry and conver5s the voltage and current signals to digital data representing the analog signals. A processor receives the digital data and includes logic for calculating the power parameters. The power meter compensates for errors caused by not sampling synchronous to the fundamental frequency of the signals.

See also U.S Patent 6,185,508 B1, col. 2, lines 27-42. The goal of the invention disclosed in the '508 is to "provide a power monitoring device which can determine the quality of the power flowing within a power system" and do so with "high accuracy." *Id.*, col. 2, lines 13-17. To this end, the patent claims, in relevant part:

> 1. A power meter for determining power parameters for power lines having periodic 3-phase voltage and current signals distributed to a plurality of power equipment, the power lines having connected thereto at least one transducer generating analog signals representing the voltage and current signals, the power meter comprising:
>
> . . .
>
> a fundamental frequency detector operatively adapted to

receive the output signal from the receiving circuitry and provide a modified output signal representative of the fundamental frequency to said processor where said modified output signal is used by said logic for continuously adjusting the sampling rate.

2. The power meter of claim 1, wherein the processor further comprises:

logic for converting the digital data to a frequency domain representation of the digital data in real time.

16. A power meter for determining power parameters for power lines having periodic 3-phase voltage and current signals distributed to a plurality of power equipment, the power lines having connect3d thereto at least one transducer generating at least one analog signal representing the voltage and current signals, the power meter comprising:

means for receiving the at least one analog signal from the at least one transducer and generating an output signal therefrom;

means for converting the at least one analog signal to a digital signal operatively connected to receive the output signal from the receiving means;

means for continuously adjusting a sampling rate of the converting means to be near synchronous with the voltage and current signals; and

a means adapted to receive the output signal from the receiving means and provide a modified output signal representative of a fundamental frequency wherein said modified output signal is used by said continuously adjusting means to continuously adjust said sampling rate of said converting means.

17. The power meter of claim 16 further comprising: means for converting the digital signal to a frequency domain representation in real time.

U.S Patent No. 6,185,508 B1, col. 9, lines 31-59; col. 12, lines

9-34.

EI contends that the following claim terms require construction: "a fundamental frequency detector"; "means for continuously adjusting a sampling rate of the converting means to be near synchronous with the voltage and current signals"; "means adapted to receive the output signal from the receiving means and provide a modified output signal representative of a fundamental frequency"; and "in real time." Square D argues that each of these claim terms should be construed consistent with its ordinary meaning. The Court considers each claim term below.

(1) A Fundamental Frequency Detector

Square D contends that the term "a fundamental frequency detector" should be construed to mean "a mechanism that receives an input signal and generates a modified output signal representative of the fundamental frequency." EI contends that the term should be construed to mean "a frequency to square wave converter in which the high frequency components are eliminated by a low-pass filter." At the *Markman* hearing, Square D offered an alternative construction: "a device that detects the fundamental frequency." Thus, the real dispute here centers on whether the proper construction should require that the fundamental frequency detector must include a low pass filter device.

Based upon the plain language of the specification, the

Court finds that it does. The specification states that "[i]n the present invention, the high frequency components in the signal are eliminated through the use of a low pass filter before attempting to measure the signal's fundamental frequency." *Id.*, col. 7, lines 27-30. Square D argues that this language merely requires that a low pass filtering effect be achieved; but that is not what the specification says. Moreover, elsewhere, the patentee used other phrases to make clear that the particular description might apply to one or more embodiments, but should not be read to limit the claim language, *see, e.g.*, col. 4, line 1 ("[i]n the illustrated embodiment"); col. 5, line 43 ("[i]n an exemplary embodiment"); col. 6, line 6 "[i]n an exemplary embodiment"); significantly, here, the patentee chose not to use such language, demonstrating that the limiting language requiring the use of a low pass filter would apply to every embodiment of the present invention.

Square D argues that the Court may not construe the claim language in a manner that would preclude a preferred embodiment. And this is certainly true. *See, e.g., Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276-77 (Fed. Cir. 2008)(ordinarily, absent a clear disclaimer in the specification or prosecution history, it is inappropriate to interpret claim terms in a way that excludes embodiments disclosed in the specification). *See also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed Cir. 1996).

But Square D has not demonstrated that construing "fundamental frequency detector" in this manner does preclude a preferred embodiment. At the *Markman* hearing, Square D argued that the specification discusses a preferred embodiment which discloses as "[a] suitable fundamental frequency to square wave converter . . . the LM311D available from National Semiconductor." *See* U.S. Patent No. 6,185,508 B1, col. 4, lines 46-48. According to counsel for Square D, the LM311D does not use a low pass filter, which necessarily means that a low pass filter is not required. But the language of the specification that identifies the LM311D as an option also says that it should be "configured in a manner known in the art." The Court does not read this language as being inconsistent with the requirement that the device use a low-pass filter to eliminate harmonics. To the extent it is, Square D should have demonstrated as much, and it did not.

The conclusion concerning the necessity of a low pass filter is consistent with the prosecution history, which distinguishes prior art that "does not teach or suggest" that the errors associated with harmonic distortion "can be removed by the low pass filtering effect of a fundamental frequency to square wave converter." *See* EI's Memorandum in Support of Claim Construction, Exhibit D.

Having said all of this, the Court also rejects EI's proposed construction. EI has equated "fundamental frequency

detector" with a frequency to square wave converter. But that limitation is unsupported in the claims. Claim 9, which depends from claim 1, discloses "[t]he power meter of claim 1 wherein said detector converts said fundamental frequency to a square wave." U.S. Patent No. 6,185,508 B1, col. 10, lines 21-22. Under the doctrine of claim differentiation, claim 1 is presumptively broader than this, including fundamental frequency detectors that do not convert frequency to square wave. *See, e.g., Halliburton Energy Services, Inc. V. M-I LLC,* 514 F.3d 1244, 1252 n.3 (Fed. Cir. 2008)("Under the doctrine of claim differentiation, '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.'")(quoting *Phillips,* 415 F.3d at 1315).

In light of all of the above, and having considered the language of the claims and the specification, the Court construes "fundamental frequency detector" to mean "a mechanism that receives an input signal and, using a low-pass filter, generates a modified output signal representative of the fundamental frequency."

(2) Means for Continuously Adjusting a Sampling ...

As quoted above, claim 16 of the '508 Patent discloses a power meter comprising, among other things: "means for continuously adjusting a sampling rate of the converting means to

be near synchronous with the voltage and current signals . . . ." Claim terms in the means-plus-function format are construed in a two-step process: first, the Court identifies the claim function based on the claim language and limitations; second, the Court ascertains the corresponding structures disclosed in the specification for performing that function. *Restaurant Technologies, Inc. v. Jersey Shore*, No. 2009-1176, 2010 WL 28226, at *4 (Fed. Cir. Jan. 6, 2010)(citing *Omega Engineering, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1322 (Fed. Cir. 2003); *Cardiac Pacemakers, Inc. v. St. Jude Medical, Inc.*, 296 F.3d 1106, 1113 (Fed. Cir. 2002)). "The claim 'shall be construed to cover the corresponding structure ... described in the specification and equivalents thereof.'" *Restaurant Technologies*, 2010 WL 28226, at *4 (quoting 35 U.S.C. §112 ¶6).

The parties agree that this phrase is a means-plus-function limitation, which is governed by 35 U.S.C. §112 ¶6; they also agree that, in construing this phrase, the Court should look to the specification to find the corresponding structure that performs the claims function. And, at least according to Square D, they even agree on the function: continuously adjusting the sampling rate to be near synchronous with the voltage and current signals. The dispute here centers on what structure within the invention performs the specific function.

Square D argues that this language should be construed to

mean "a microcontroller configured to receive a signal from a fundamental frequency detector, and generate a corresponding signal, updated on a repeating basis, to direct the analog to digital converters when to sample." EI argues that this language means "program logic for executing equations P_s = SC x n and x = ROUND(P_s - P_n/SC)."

The Court adopts Square D's construction. First, figures 3 and 4 make clear that the function disclosed in claim 6 is performed by the microcontroller. And the language of the specification is consistent; the specification states that "[t]he Microcontroller **35** performs many functions within the IED," and it explains that the microcontroller receives the data from the digital signal processor, then uses the TPU housed within the microcontroller to measure the frequency and "provide the ability to create a signal at a desired frequency"; "the microcontroller then reads the information using the synchronous serial communications bus **38** before performing calculations on the values received through the dual port RAM **27** from the DSP **28**." U.S. Patent No. 6,185,508 B1, cols. 4-5. Moreover, EI's proposed construction relates not to the structure that performs the disclosed function, but to the manner in which that function is performed (i.e., using the given equations).

(3) Means Adapted to Receive the Output Signal ...

The power meter disclosed in claim 16 also comprises "a

means adapted to receive the output signal from the receiving means and provide a modified output signal representative of a fundamental frequency wherein said modified output signal is used by said continuously adjusting means to continuously adjust said sampling rate of said converting means." *Id.*, col. 12, lines 25-30. Square D argues that this means "a comparator, such as the LM311D, configured to receive a voltage signal, and generate a square wave representative of the fundamental frequency of the incoming voltage signals." EI contends that this language means "a low-pass filter with cutoff frequency of 75 Hz and a fundamental frequency to square wave converter LM311D." At the *Markman* hearing, Square D offered an alternative construction: "the comparator LM311D, and its equivalents" or "a fundamental frequency to square wave converter with a low pass filter having a cutoff frequency of 75 Hz, and its equivalents."

Initially, the Court notes that Square D's proposed alternative construction would seem to be somewhat inconsistent with its arguments above that the fundamental frequency detector need not incorporate a low pass filter. As a practical matter, Square D's proposed alternative construction would seem to be substantively the same as EI's proposed construction, except that it allows for equivalents. This is consistent with the Court's findings above and with the language of the specification, which offers the LM311D as one option, not the

only option. The specification is even less specific: in terms of the structure that performs this function, it states that "the fundamental frequency to square wave converter **43** receives the phase A voltage signal as input, feeds the signal through a low pass filter **60** which has a cutoff frequency "f", such as of 75 Hz, and generates a square wave output signal whose frequency exactly matches the fundamental frequency of the input signal." U.S Patent No. 6,185,508 B1, col. 7, lines 30-33. Rather than relying on either of the parties' proposed constructions, the Court will go straight to the horse's mouth, so to speak; the Court construes "means adapted to receive the output signal from the receiving means and provide a modified output signal representative of a fundamental frequency" to mean "a fundamental frequency to square wave converter with a low pass filter having a cutoff frequency 'f' such as of 75 Hz."

(4) In Real Time

Although the parties initially identified "in real time" as a disputed claim term, they now agree that this phrase means "without intentional delay." The Court agrees that this construction makes sense and is consistent with the use of this phrase in the claim and the specification. Accordingly, the Court adopts the parties' construction of "in real time."

The '211 and '842 Patents

The '842 Patent, issued February 13, 2001, is entitled "Revenue Meter Bayonet Assembly and Method of Attachment"; the '211 Patent, issued almost five years later on January 3, 2006, shares the same title. Both patents deal with the hardware or the connections in socket meters. The '211 Patent generally relates to through-hole bayonet mounting for socket-based power meters, while the '842 Patent generally relates to the use of vias (i.e., holes in the circuit board) to increase the stability of through-hole mounted bayonets in socket-based power meters. These inventions overcame several practical problems that were encountered when trying to design an easily manufactured, reliable digital revenue meter that could receive signals through traditional socket-based bayonets.

According to Square D, only two terms in these related patents require construction: "bayonet" and "a circuit board." According to EI, in addition to the terms "bayonet" and "a circuit board," the Court must also construe "vias"; "surrounding"; and "around."

(1) Bayonet/Bayonet Terminal

The '211 Patent claims:

> 1. An electric meter for sensing electrical parameters from an electric circuit, the meter including bayonets disposed on the meter, the bayonets mateable with matching jaws of a detachable meter mounting device, the bayonets being used to receive voltage and current signals from the electric circuit

to the meter, and one or more sensors coupled with the electric circuit and operative to sense one or more the electrical parameters in the electric circuit and generate one or more analog signals indicative of the electrical parameters, the meter comprising:

a circuit board with a plurality of openings each adapted to receive the bayonet;

a plurality of electrically conducting bayonets mounted on the circuit board through the openings to provide at least one of a first voltage bayonet and a first current bayonet, wherein a gap is provided between the openings and the bayonets;

solder passing through the gap and extending to both sides of the circuit board; and

a sensor coupled with the electric circuit and operative to assess at least one electrical parameter from the electric circuit and generate an analog signal indicative of the electrical parameters.

U.S. Patent No. 6,983,211 B2, col. 42, lines 14-35.

The '842 Patent has 48 claims, and the term "bayonet" appears in 22 of those claims. Interestingly, unlike the '211 Patent, the '842 also uses the term "bayonet terminals," but that term appears in just one claim, claim 39, which discloses the following:

39. In an electrical meter for sensing electrical parameters from an electric circuit, said meter including bayonet terminals disposed on said meter mateable with matching jaws of a detachable meter mounting device, said bayonet terminals used to receive signals from the electric circuit to the meter, and one or more sensors coupled with said electric circuit and operative to sense one or more electrical parameters in said electric circuit and generate one or more analog signals indicative of said electrical parameters, said meter comprising:
a circuit board with at least one opening adapted to

receive a bayonet;
at least one electrically conduct bayonet mounted on the circuit board through said at least one opening wherein a gap is defined between said at least one opening and said bayonet;
a plurality of vias formed around said opening;
solder passing through said vias an extending to both sides of said circuit board through said vias and passing through said gap and extending to both sides of said circuit board through said gap and said solder extending to said bayonet; and
an electrical sensor connected to said at least one electrically conducting bayonet.

U.S. Patent No. 6,186,842 B1, col. 9, line 38 - col. 10, line 15.

The parties seem to use the terms "bayonet" and "bayonet terminals" interchangeably, to mean the same thing. And, indeed, so do the patents. The '842 Patent, for example, as shown above, uses both terms in the claims (though one with much greater frequency than the other); the same is true of the specification. Indeed, the specification's "overview" paragraph discusses "bayonet or blade terminals," then "bayonets," then "bayonet terminals," all seemingly interchangeably. *Id.*, Col 3, lines 49-64. The '211 Patent, which incorporates by reference the '842 Patent, uses "bayonets" exclusively, and the '364 discusses "blade type terminals" and "blades" in the specification and "bayonet terminals" in the claims. Yet they all seem to be talking about the same physical structure or piece. The Court will treat these terms similarly for construction purposes.

Square D initially argued that the claim term "bayonet" means "an electrically conducting blade-type terminal connector

that plugs into the jaws of the meter socket on one end and is connected to a circuit board on the other end." EI argued that "bayonet" should be construed to mean "a blade that electrically conducts and mates with the matching jaws of a meter mounting device." At the *Markman* hearing, Square D offered an alternative construction: "an electrically conducting blade," and EI represented that it did not have any real issue with this alternative definition, though it also opined that this definition would not do much to advance the litigation. Certainly, that is everyone's goal: to advance the litigation. But the Court will not read limitations into claims to do so.

The term "bayonet" is defined in the '211 Patent's specification: "S-base meters feature electronically-conducting bayonets (blade type terminals) disposed on back side of the meter. These electronically-conducting bayonets are designed to align with the matching jaws of a detachable meter mounting device such as a revenue meter socket." U.S. Patent No., 6,983,211 B2, col. 2, lines 49-53. This definition is dispositive. *See Vitronics*, 90 F.3d at 1582 (when the specification "expressly defines" a term used in the claims, that definition is "dispositive.").. Accordingly, the Court construes "bayonet" to mean "a blade type terminal."

Reading the remainder of the proposed constructions would render much of the relevant claim language redundant, which would

be inappropriate. See *Merck & Co v. Teva Pharmaceuticals USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005)("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.")(citing *Elekta*, 214 F.3d at 1307 and *Gen. Am. Transp. Corp. v. Cryo-Trans, Inc.*, 93 F.3d 766, 770 (Fed. Cir. 1996)). Construing "bayonet" to mean simply "an electrically conducting blade type terminal" gives meaning to all of the language in the claim, and ensures that limiting language such as "mateable with matching jaws of a detachable meter mounting device" is not just excess verbiage.

(2) A Circuit Board

Square D argues that "a circuit board" means "one or more circuit boards"; there is no intent, Square D argues, to limit the term to mean one, and only one, single circuit board. EI argues that the term "a circuit board" means just one circuit board.

The Federal Circuit "has repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.'" *Baldwin Graphic Systems, Inc. v. Siebert, Inc.*, 512, F.3d 1338, 1342 (Fed. Cir. 2008)(citing *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000)). The notion that "a" or "an" means "one or more" "is best described as a rule, rather than merely as a presumption or

even a convention. The exceptions to this rule are extremely limited: a patentee must 'evince[]a clear intent' to limit 'a' or 'an' to 'one.'" *Id.* (citing *KCJ Corp.*, 223 F.3d at 1356). Claim 1 of the '211 Patent, quoted above, quite clearly falls into this category, and, just as clearly, "a circuit board" must be construed to mean "one or more circuit boards."

(3) Vias

The parties next dispute the meaning of the term "vias," which appears in, among other claims, claim 1 of the '842 Patent, which discloses:

> 1. A connector device for a circuit board comprising:
> a circuit board with at least one opening adapted to receive a bayonet;
> at least one electrically conducting bayonet mounted on the circuit board through said at least one opening;
> a plurality of vias surrounding said at least one opening solder passing through said vias and extending to both sides of;
> said circuit board and to said at least one bayonet.

U.S. Patent No. 6,186,842 B1, col. 7, lines 9-17. EI contends that "via" should be construed to mean "a channel extending through said circuit board filled with solder forming a structural bond between said circuit board and said bayonet." Square D initially argued that "via" should be construed to mean "a thru hole, preferably plated, that is typically used to provide an electrical connection between layers on a printed circuit board." At the *Markman* hearing, Square D offered a simpler, alternative construction: "a thru hole." The term

"vias" is defined in the specification, and the Court adopts that definition; specifically, "[v]ias are thru-holes, preferably plated, that are typically used to provide an electrical connection between layers on a printed circuit board"; for purposes of the invention disclosed in the '842 Patent, "the vias extend through the board forming a passage between the surfaces of the board." U.S. Patent No. 6,186,842 B1, col. 4, lines 20-25.

(4) Surrounding and Around

The parties next dispute the meaning of the claim terms "surrounding" and "around" as used in the '842 and the '211 patents. Claim 1 of the '842, quoted above, uses the term "surrounding"; claim 13 of the '842 uses the term "around"; claim 13 discloses:

> [a] method of attaching a current or voltage bayonet to a circuit board, comprising:
> providing a circuit board with at least one opening adapted to receive a bayonet;
> forming a plurality of vias around said at least one opening;
> placing an electrically conducting bayonet in said at lest one opening; and
> applying solder on one surface of the circuit board, through the vias to the opposite surface of the circuit board and extending to said bayonet.

U.S. Patent No. 6,186,842 B1, col. 7, lines 52-62.

Square D contends that "surrounding" and "around" both mean "located on the perimeter of" and EI contends that they both mean "completely enclosing all sides." As Square D correctly pointed

out at the *Markman* hearing, construing these terms as EI suggests would actually preclude at least one of the preferred embodiments described in the specification. That is not appropriate. *See, e.g., Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1276-77 (Fed. Cir. 2008)(ordinarily, absent a clear disclaimer in the specification or prosecution history, it is inappropriate to interpret claim terms in a way that excludes embodiments disclosed in the specification). *See also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed Cir. 1996). Accordingly, the Court rejects EI's construction, and adopts Square D's construction, which is consistent with the specification, as well as the ordinary meanings of these words. The Court construes "surrounding" and "around" to mean "located on the perimeter of."

The '562 Patent

The '562 Patent generally relates to a power meter with onboard email alert capabilities. The invention of the '562 Patent helped further the goal of having all meters in a network transmit data to a central source; the invention configured the meters to send power management data, such as billing, measurement, or event data, over existing computer networks such as the Internet, thereby allowing for many simultaneous connections at fast data transfer speeds, permitting one control station to monitor meters spread across a large geographical region.

The '562 Patent discloses

> [a] power management architecture for an electrical power distribution system, or portion thereof . . . The architecture includes multiple intelligent electronic devices ("IED's") distributed throughout the power distribution system to mange the flow and consumption of power from the system. The IED's are linked via a network to back-end servers. Power management application software and/or hardware components operate on the IED's and the back-end servers and inter-operate via the network to implement a power management application. The communications between the IED's and the back-end servers are facilitated through network security devices such as firewalls. The architecture provides a scalable ad cost effective framework of hardware and software upon which such power management applications can operate to manage the distribution and consumption of electrical power by one or more utilities/supplie5rs and/or consumers which provide and utilize the power distribution system.

Square D has identified two terms from the '562 Patent that need construction: "security module" and "operative to punch through a firewall." EI has identified an additional five claim terms in need of construction: "power management function"; "power management command"; "power management data"; "a protocol stack"; and "a power management application." Although "security module" appears in several claims, both terms appear in claim 53, which discloses:

> 53. An electrical power management architecture for managing an electrical power distribution system comprising:
> a network;
> at least one intelligent electronic device ("IED") coupled with a portion of said electrical power distribution system and further coupled with said network, each of said at lest one IED operative to implement a power management function I conjunction with said portion of said electrical

power distribution system, said power management function operative to respond to at least one power management command and generate power management data, each of said at lest one IED comprising:

a first network interface operative to couple said at least one IED with said network and facilitate transmission of said power management data and receipt of said at least one power management command over said network;

a security module coupled with said first network interface and operative to prevent unauthorized access to said power management data; and

a protocol stack, said protocol stack including an application layer comprisi8ng at least one application operative to punch through a firewall to facilitate said transmission of said power management data;

at least one sensor coupled with said portion of said electrical power system and further operative to sense at least one electrical parameter in said portion of said electrical power distribution system, said IED being operative to generate said power management data related thereto;

said architecture further comprising:

a power management application coupled with said network and operative to receive and process said power management data from said at least one IED and generate said at least one power management command to said at least one IED to implement said power management function.

U.S. Patent No. 6,751,562 B1, col. 33, lines 29-67. Square D argues that both of the disputed claim terms should be construed consistent with their ordinary meaning.[2]

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[2]At the *Markman* hearing, EI represented that the Patent Office had issued a final rejection of claim 53 of the '562 (the claim in which both disputed claim terms appear). Nothing more was said by either side about the issue, and the Court has seen

(1) Security Module

Square D argues that "security module," should be construed to mean "a module that performs the task of preventing access to data, such as by authenticating users through passwords, data encryption, or firewalls." EI contends that the term should be construed to mean "a module including encryption and authentication components." At the Markman hearing, Square D offered an alternative construction: "module including encryption, authentication *or* firewall components." The emphasis on "or" is Square D's. The dispute, therefore, is whether the term security module" necessarily includes both encryption and authentication components. The Court finds that it does not.

First, the plain language of the claim does not require authentication and encryption; it merely requires that the module be "operative to prevent unauthorized access to said power management data." col. 33, lines 49-50. Second, the specification uses "or" - not "and" when discussing these measures. See, e.g., U.S. Patent No., 6,751,562 B1, col. 15, lines 65-67 ("[i]n an alternate embodiment the Security Sub-layer 321a includes authentication or encryption . . ."). The Court construes the term "security module" to mean "a module that performs the task of preventing unauthorized access to data,

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nothing to document any action by the PTO. Thus, as far as the Court is aware, Square D is still asserting the claim.

including encryption, authentication or firewall components."

(2) Operative to Punch Through a Firewall

The term "operative to punch through a firewall" also appears in claim 53 of the '562 patent. According to Square D, this language should be construed to mean "an application that can initiate the transmission of data from the IED using a trusted, standard application protocol, such as SMTP (email), HTTP (wed), or FTP." EI contends that it should be construed to mean that "at least one application that encapsulates or reconfigures power management data contained in a protocol that is blocked by a firewall into a protocol that is not blocked by said firewall." At the *Markman* hearing, Square D offered an alternative construction: "an application that has the ability to communicate through a firewall."

The specification discusses in some detail the issue of firewalls and the importance to the invention of being able to communicate through a firewall. *See* U.S. Patent No. 6,751,562 B1, col. 23, line 22 - col. 29, line 3. And, to be sure, the specification discusses embodiments where data is reconfigured (as email, for example). But the specification also states that the described embodiments are "illustrative" and not "limiting." *Id.*, col. 29, line 49. And the Court does not read the specification as requiring that data be "encapsulated" or "reconfigured," as EI urges in its proposed construction.

Instead, the specification - consistent with the claim language - simply requires that the application be operative to communicate through the firewall. The Court adopts Square D's proposed alternative construction and construes the phrase "at least one application operative to punch through a firewall" to mean "an application that has the ability to communicate through a firewall."

The '138 Patent

The '138 Patent relates to the way memory is structured in a power meter and how that memory is used; it deals with backing up and storing data. EI argues that the following claim terms in the '138 Patent require construction: "working data code"; "boot portion"/"program portion"/"data portion"; and periodic save code." Working data code and boot/program/data portion appear in claims 1 and 2, which disclose:

> 1. [a] method for storing working data code for an IED, the method comprising:
> monitoring a parameter or a portion of a power distribution system and generating an analog signal representative thereof;
> receiving said analog signal and at least one of quantifying and reporting said monitored parameter;
> storing a program code for a processor in a non-volatile memory, wherein said processor comprises said non-volatile memory, a volatile memory and a digital processing core;
> executing said stored program code to implement said quantifying and reporting functions;
> storing with said volatile memory, working data code for said digital processing core during execution of said stored program code, wherein said volatile memory couples with said processing core; and

periodically transferring a portion of said working data from said volatile memory to said non-volatile memory.

2. The method of claim 1, wherein said non-volatile memory further comprises a boot portion, a program portion and a data portion.

U.S. Patent No. 6,745,138 B2, col. 29, lines 11-33.

The term "periodic save code" appears in claim 19, another independent claim, which discloses:

[a]n IED comprising:
a power monitoring circuit operative to monitor a parameter of a portion of a power distribution system and generate an analog signal representative thereof;
a processor coupled with said power monitoring circuit and operative to receive said analog signal and at least one of quantify and report said monitored parameter, said processor further including an integrated circuit, said integrated circuit comprising:
a non-volatile memory operative to store program code for said processor;
a digital processing core coupled with said non-volatile memory and operative to execute said stored program code to implement said quantifying and reporting functions; and
a volatile memory coupled with said processing core and operative to store working data code for said digital processing core during execution of said stored program code;
wherein said non-volatile memory comprises period save code, said periodic save code operative to periodically transfer at least a portion of said working data code form said volatile memory to said non-volatile memory.

U.S. Patent No. 6,745,138 B2, col. 30, lines 22-45.

(1) Working Data Code

Square D argues that the term "working data code" should be construed to mean "the machine representation of information used

by the processor during the execution of its quantifying and reporting functions." At the *Markman* hearing, it offered an alternative construction, which is a bit simpler: "the machine representation of information being worked on." EI argues that "working data code" should be construed to mean "software or firmware that executes using working data."

At the *Markman* hearing, counsel for Square D explained that "the difference is, aside from the exact language, is the working data code we're saying is actually the data itself. It's the working data that is in there. They're saying it's the program that uses the working data. And we're saying that that is just inconsistent with the claim." Transcript of Proceedings from December 3, 2009, pp. 43-44.

The Court agrees with Square D that "working data code" means the data itself, not the code that is run on that data. First, the patent's title - "Intelligent Electronic Device with Assured Data Storage on Powerdown" - makes clear that the invention is concerned with storing data, not storing the codes that will execute on that data. The abstract is consistent with this construction:

> An IED includes a power monitoring circuit operative to monitor a parameter of a portion of a power distribution system and generate an analog signal representative thereof. A processor couples with the power monitoring circuit and operates to receive the analog signal and at lest one of quantify and report the monitored parameter. The processor further includes an integrated circuit, the integrated circuit

> having a non-volatile memory operative to store program code for the processor. A digital processing core couples with the non-volatile memory and operates to execute the stored program code to implement the quantifying and reporting functions. A volatile memory couples with the processing core and operates to store working data code for the digital processing core during execution of the stored program code.

The stored program code is executed; the working data code is not.

Similarly, the language of Claim 1 makes clear that there is a distinction between working data code and program code. Indeed, the claim itself uses "working data code" and "working data" interchangeably: Claim 1 discloses "a method for storing working data code," U.S. Patent No. 6,745,138 B2, col. 29, line 11, and the final step in that method involves the period transfer of "said working data from said volatile memory to said non-volatile memory." *Id.*, col. 29, lines 28-30. It is not a program that's being stored; it is data.

Claim 19 is consistent: it discusses storing working data code for said digital processing core during execution of said stored program code. *Id.*, col. 30, lines 38-40. Again, it is the data that's getting stored, not the program. Accordingly, the Court construes "working data code" to mean "the machine representation of information being worked on."

(2) Boot Portion/Program Portion/Data Portion

Both sides seem to agree that "boot portion," "program portion" and "data portion" all relate to the parts or components

of the non-volatile memory. And rightfully so. The language of the claims makes clear that these three "portions" all relate to the non-volatile memory (claim 2 discloses "[t]he method of claim 1, wherein said non-volatile memory further comprises a boot portion, a program portion and a data portion," *id.*, col. 29, lines 31-33; claim 26 discloses "[t]he IED of claim 19, wherein said non-volatile memory further comprises a boot portion, a program portion and a data portion," *id.*, col. 31, lines 7-9). The dispute about these terms centers on whether they necessarily involve an integrated flash memory.

Square D argues that "boot portion" means that "part of the non-volatile memory containing the boot or startup code"; "program portion" means "a part of the non-volatile memory containing program code"; and "data portion" means "a part of the non-volatile memory containing stored data." On the other hand, EI argues that "boot portion" should be construed to mean "flash memory integrated with the processor that provides storage for code executed by the processor during processor startup"; "program portion" means "flash memory integrated with the processor that provides storage for program code"; and "data portion" means "flash memory integrated with the processor that provides storage for data."

To be sure, the specification does speak in terms of a processor containing "integrated flash memory divided into three

different types . . . Program flash memory **1915** provides storage for the main program code. Boot flash memory **1925** provides storage for the program code that executes during processor startup. Data flash memory 1960 provides storage for data." U.S. Patent No. 6,745,138 B2, col. 11, lines 57-64. But nothing in the specification requires that the non-volatile memory be flash memory. Indeed, the specification specifically instructs that "in the foregoing discussion, flash memory could be replaced with other types of non-volatile memory such as battery backed SRAM, ferro-electric RAM ("FRAM"), etc." *Id.*, col. 28, lines 40-43. Thus the Court will not limit these claims as EI urges. Rather, the Court construes "boot portion" to mean "the part of the non-volatile memory containing the boot or startup code"; "program portion" to mean "the part of the non-volatile memory containing program code"; and "data portion" to mean "the part of the non-volatile memory containing stored data."

(3) Periodic Save Code

Square D contends that "periodic save code" should be construed to mean "code that is operative to periodically transfer at least a portion of the working data from volatile memory to non-volatile memory." EI argues that it means "repeatedly executed firmware for copying data into data flash memory, ensuring erased flash memory blocks, and asserting a flag to prevent a second data save operation."

According to EI, both sides agree that "periodic save code" is explicitly defined in the specification. It did not appear to the Court that Square D accepted this proposition; indeed, counsel for Square D seemed to say exactly the opposite at the *Markman* hearing ("[t]here is no such explicit definition anywhere in the patent as they're representing." Transcript of Proceedings of December 3, 2009, p. 47).

The specification states that "[t]he periodic save task is responsible for saving the device data to the flash memory and ensuring that there is always sufficient amount of erased flash memory blocks ready to accept data during power down event." U.S Patent No. 6,745,138 B2, col. 24, lines 54-57. And that "[d]uring normal operation (i.e., with stable power) . . . the periodic save task is responsible for copying of the relevant data to the data flash memory **1960** and erasing the flash memory blocks." *Id.*, col. 25, lines 24-28. Although EI cites some additional language to suggest that the periodic save code must also assert flags, that language can reasonably be read to be required only under certain circumstances (i.e., when the periodic save task is saving a data unit other than the power down data unit). *See id.*, col. 25, lines 32-40. And this language relates to the preferred embodiment being discussed in this section, not necessarily to every embodiment of the invention. Accordingly, the Court will not read this limitation

into the claim.

At bottom, the language of the claim defines the task of the periodic save code: the code operates "to periodically transfer at least a portion of said working data code from said volatile memory to said non-volatile memory." Thus, the Court adopts Square D's proposed construction.

Conclusion

The disputed claim terms are construed in accordance with the conclusions set forth in this Memorandum Opinion and Order. The case is set for a status hearing on February 24, 2010 at 9:00 a.m.

Dated: February 9, 2010

ENTER:

ARLANDER KEYS
United States Magistrate Judge