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

TELE-CONS, INC., et al.,	§	
	§	**NO. 6:10cv451 LED-JDL**
Plaintiffs,	§	
	§	
vs.	§	
	§	
GENERAL ELECTRIC CO., et al.	§	**PATENT CASE**
	§	
Defendants.	§	

MEMORANDUM OPINION AND ORDER

This claim construction opinion construes the disputed claim terms in U.S. Patent Nos. 5,686,799 ("the '799 patent") and 5,955,841 ("the '841 patent"). Plaintiffs Tele-Cons, Inc. and Michael Moisin (collectively, "Tele-Cons") allege Defendants Brookshire Grocery Co., Elliott Electric Supply, Inc., General Electric Company, Wal-Mart Stores, Inc., Wal-Mart Store Texas L.L.C. (collectively, "GE"), Technical Consumer Products, Inc. and Services Lighting and Electrical Supplies, Inc., d/b/a 1000Bulbs.com (collectively, "TCP") infringe the '799 and '841 patents. The parties have presented their claim construction positions (Doc. Nos. 248, 250, 252, 255 & 256).[1] On March 1, 2012, the Court held a claim construction hearing. For the reasons stated herein, the Court adopts the constructions set forth below.

OVERVIEW OF THE PATENTS

The patents-in-suit are directed to dimmable ballast circuits for fluorescent lamps. Although the '799 and '841 patents are not related, the illustrations and descriptions of the ballast circuits are similar. TCP RESPONSE AT 1 n.3 (Doc. No. 252).

[1] There are two Defendant groups in this case: GE and TCP. Each Defendant group filed their own response to Tele-Cons' Opening Claim Construction Brief. Tele-Cons, in turn, filed two separate replies.

Figure 10 of the '841 patent,[2] depicted below, illustrates an embodiment of the dimmable ballast circuit 49 in relation to fluorescent lamp 60:

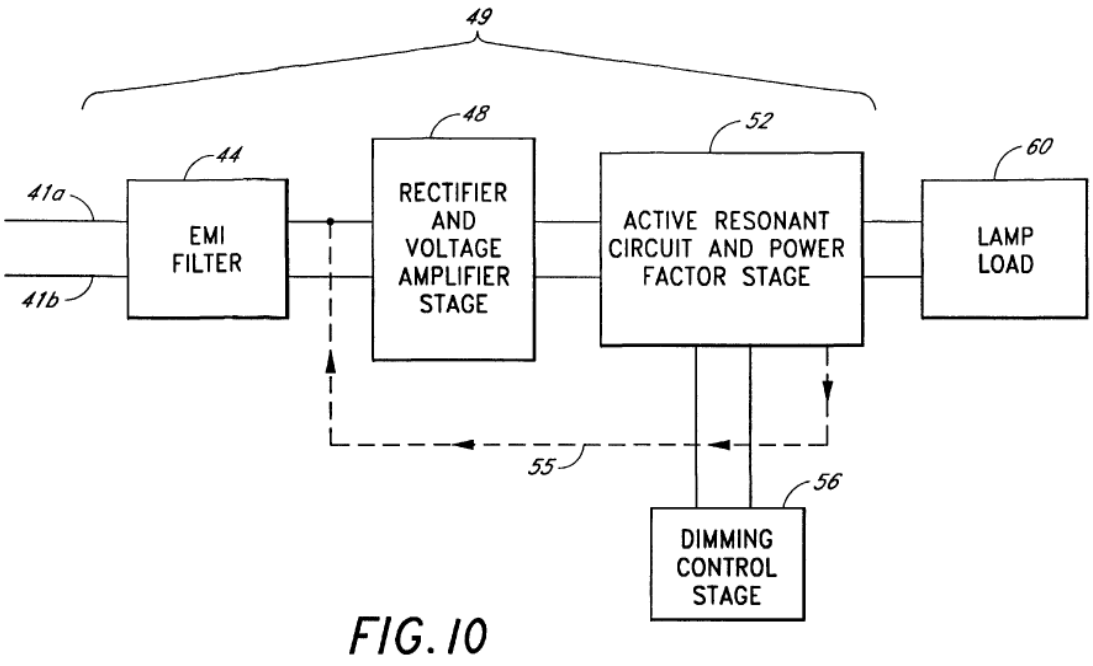

FIG. 10

'841 patent, FIG. 10; 12:64-13:1. An AC input source enters through lines 41a and 41b, which are connected in series to the EMI filter stage. *Id.* at 5:9-11. The EMI filter stage reduces any interference. *Id.* at 5:42-46. The outputs of the EMI filter stage are connected to the rectifier and voltage amplifier stage 48. *Id.* at 5:12-13. At stage 48, the AC voltage input is converted to a DC voltage and amplified "to the level necessary to start or ignite the fluorescent lamp level." *Id.* at 5:61-63. The active resonant circuit and power factor stage 52 includes a pair of switching transistors and a voltage feedback capacitor. *Id.* at 6:26-36. The stage (52) both powers the lamp load 60 and provides a high frequency feedback to the input of the rectifier and voltage amplifier stage 48. *Id.* at 7:5-9; 8:61-63; 9:17-19. The dimmer control stage 56, electronically connected in parallel to the active resonant circuit and power factor stage, "produces an output

[2] Figure 3 of the '799 patent is similar.

dimming signal for varying the current supplied to the lamp load 60 by the resonance circuit 52." *Id.* at 13:6-13.

Tele-Cons asserts that Defendants infringe Claims 4, 9, 13, 25-26 and 35 of the '841 patent,[3] as well as Claims 1, 2, 5, 17-18, and 27-29 of the '799 patent. PLTFFS' SLIDES. Claim 1 of the '799 patent and Claim 4 of the '841 patent are set forth below as representative claims with disputed claim terms set forth in bold:

> 1. In compact dimmable fluorescent lamp apparatus for connection with at least one fluorescent lamp and with an input power source supplying an AC input voltage, the improvement comprising
>
> **rectification means** for rectifying said AC input voltage,
>
> **dimming means** for generating a dimming signal indicative of lamp brightness, and
>
> ballast circuit means in circuit with said rectification means and said dimming means, and arranged for connection with the lamp for applying power variably to the lamp, said ballast circuit means including resonant circuit means including
>
> resonant circuit means for electrical connection with the lamp, said resonant circuit generating a high frequency voltage in response to said input voltage, and further varying the level of power supplied to the lamp in response to said dimming signal, thereby attaining a selected level of lamp brightness, and
>
> **voltage feedback means** electrically in series with the lamp and in electrical communication with said resonant circuit means and with said rectification means, for generating a selected high frequency voltage signal and for applying said voltage signal to said rectification means, whereby said high frequency voltage signal is **superimposed** over said AC input voltage.

'799 patent at 12:38-63 (Claim 1).

> 4. A ballast for providing a continuous dimming control over a fluorescent lamp including:
>
> a rectification stage having an input coupled to line voltage;
>
> a **feedback capacitor connected in parallel** with said line voltage;
>
> a **dimmer control**; and

[3] Only Claims 4 and 35 are asserted against TCP. TCP SLIDES AT 3.

> an active high frequency resonant circuit **operating linearly**, said resonant circuit comprising a first active element and a second active element, said high frequency resonant circuit connected to said dimmer control and to the output of said rectification stage, said active circuit producing an output having a first cycle portion and a second cycle portion, said dimmer control **directly altering only said second active element to vary a duration of said second cycle portion**.

'841 patent at 19:11-27 (Claim 4).

CLAIM CONSTRUCTION PRINCIPLES

"It 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., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The Court examines a patent's intrinsic evidence to define the patented invention's scope. *Id.* at 1313-1314; *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). Intrinsic evidence includes the claims, the rest of the specification and the prosecution history. *Phillips*, 415 F.3d at 1312-13; *Bell Atl. Network Servs.*, 262 F.3d at 1267. The Court gives claim terms their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention. *Phillips*, 415 F.3d at 1312-13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

Claim language guides the Court's construction of claim terms. *Phillips*, 415 F.3d at 1314. "[T]he context in which a term is used in the asserted claim can be highly instructive." *Id.* Other claims, asserted and unasserted, can provide additional instruction because "terms are normally used consistently throughout the patent." *Id.* Differences among claims, such as additional limitations in dependent claims, can provide further guidance. *Id.*

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)). "[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.* (quoting *Vitronics Corp.v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex. Inc. v.Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). In the specification, a patentee may define his own terms, give a claim term a different meaning that it would otherwise possess, or disclaim or disavow some claim scope. *Phillips*, 415 F.3d at 1316. Although the Court generally presumes terms possess their ordinary meaning, this presumption can be overcome by statements of clear disclaimer. *See SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343-44 (Fed. Cir. 2001). This presumption does not arise when the patentee acts as his own lexicographer. *See Irdeto Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1301 (Fed. Cir. 2004).

The specification may also resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex, Inc.*, 299 F.3d at 1325. For example, "[a] claim interpretation that excludes a preferred embodiment from the scope of the claim 'is rarely, if ever, correct." *Globetrotter Software, Inc. v. Elam Computer Group Inc.*, 362 F.3d 1367, 1381 (Fed. Cir. 2004) (quoting *Vitronics Corp.*, 90 F.3d at 1583). But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988); *see also Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patentee may define a term during prosecution of the patent. *Home Diagnostics Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent"). The well established doctrine of prosecution disclaimer "preclud[es] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution." *Omega Eng'g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). The prosecution history must show that the patentee clearly and unambiguously disclaimed or disavowed the proposed interpretation during prosecution to obtain claim allowance. *Middleton Inc. v. 3M Co.*, 311 F.3d 1384, 1388 (Fed. Cir. 2002); *see also Springs Window*, 323 F.3d at 994 ("The disclaimer . . . must be effected with 'reasonable clarity and deliberateness.'") (citations omitted)). "Indeed, by distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover." *Spectrum Int'l v. Sterilite Corp.*, 164 F.3d 1372, 1378-79 (Fed. Cir. 1988) (quotation omitted). "As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution." *Omega Eng'g, Inc.*, 334 F.3d at 1324.

Although, "less significant than the intrinsic record in determining the legally operative meaning of claim language," the Court may rely on extrinsic evidence to "shed useful light on the relevant art." *Phillips*, 415 F.3d at 1317 (quotation omitted). Technical dictionaries and treatises may help the Court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but such sources may also provide overly broad definitions or may not be indicative of how terms are used in the patent. *Id.* at 1318. Similarly, expert testimony may aid the Court in determining the particular meaning of a term in the

pertinent field, but "conclusory, unsupported assertions by experts as to the definition of a claim term are not useful." *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

The patent in suit may contain means-plus-function limitations that require construction. Where a claim limitation is expressed in means-plus-function language and does not recite definite structure in support of its function, the limitation is subject to 35 U.S.C. § 112 ¶ 6. *Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997). In relevant part, § 112 mandates that "such a claim limitation be construed to cover the corresponding structure . . . described in the specification and equivalents thereof." *Id.* (citing 35 U.S.C. § 112 ¶ 6.). Accordingly, when faced with means-plus-function limitations, courts "must turn to the written description of the patent to find the structure that corresponds to the means recited in the [limitations]." *Id.*

Construing a means-plus-function limitation involves two inquiries. The first step requires "a determination of the function of the means-plus-function limitation." *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001). Once a court has determined the limitation's function, "the next step is to determine the corresponding structure disclosed in the specification and equivalents thereof." *Medtronic*, 248 F.3d at 1311. A structure is corresponding "only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id.* Moreover, the focus of the corresponding structure inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is "clearly linked or associated with the [recited] function." *Id.*

DISCUSSION

I. "feedback"[4]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "feedback" needs to be construed, Tele-Cons proposes the following construction: "feedback" means "an electrical connection between two points or collections of circuit elements in a circuit that allows current and/or a voltage signal to pass between them"	"Feedback" means the return of a current and/or a voltage signal from the output of a circuit to the input of the circuit.	Claims 9 and 25 of the '841 patent are not asserted against TCP. With regard to claims 1, 14, 24, 27 and 32, the term "feedback" does not require separate construction by the Court and should be given its ordinary and customary meaning to a person of ordinary skill in the art.

The parties generally agree that "feedback" is a signal connecting two points of a circuit. However, there is a dispute regarding whether a feedback signal may connect *any* two points of a circuit or whether the points must specifically be at the beginning and end of the circuit. GE RESPONSE AT 2. Although Tele-Cons maintains that "feedback" may be understood by its plain and ordinary meaning, it offers an alternative construction, arguing that feedback occurs between two points or collections of circuit elements. PLTFFS' BRIEF AT 9. Tele-Cons asserts that such a construction is supported by the specification. *Id.* GE, however, contends that the feedback signal is returned from a circuit's output to that circuit's input, as illustrated by Figure 3 of the '799 patent and Figures 3 and 10 of the '841 patent. GE RESPONSE AT 2.

[4] This term is contained in Claim 1 of the '799 patent and Claims 9 and 25 of the '841 patent.

Tele-Cons' alternative construction is too broad because such a construction would cover an electrical connection between any two points, thus effectively defining "feedback" as merely a connection. As shown by the parties' extrinsic evidence, the term "feedback" was well known at the time the patent was filed and its definition supports Defendant GE's proposal that feedback is a signal returned to a circuit input from the circuit's output. Inventor Moisin confirmed this understanding in a discussion of the patents at issue:

> Q. [W]hat is feedback in terms of this electric circuit?
>
> A. Well. It's a very generic term. It's basically taking – ***taking some entity, in this circuit here voltage, and bringing it back from the output*** – let's imagine a black box. You apply something at its input, you generate something at output***. If you take an amount of whatever gets out, you take that back to the input, it's like feeding that signal back from the output to the input***".
> * * * * *
> Q. So ***feedback is something that comes from the output of a circuit and goes back to the input***?
>
> A. ***Right,*** right. . .

MOISIN DEP. AT 42:8-18; 42:24-43, EX. 1 AT MA0194, ATTACHED TO GE RESPONSE.

Mr. Moisin's testimony is echoed in relevant technical dictionaries, such as the 1997 version of the *McGraw-Hill Electronics Dictionary*, which defines "feedback" as "[t]he return of a portion of the output of a circuit or device to its input." MCGRAW-HILL ELECTRONICS DICTIONARY 168 (Neil Sclater et al. eds., 6th ed. 1997). Another dictionary states that "feedback" is "5. The return of a portion of the output of a circuit or device to its input." RUDOLF F. GRAF DICTIONARY OF ELECTRONICS 276 (7th ed. 1999).

Importantly, the '841 and '799 specifications are in accord with the extrinsic evidence. In particular, while feedback is always used to refer to a connection "between two points," as Tele-Cons suggests, the connections always begin at a circuit output and end at the same circuit's

input. In viewing the specifications, this uniformity is most easily seen by examining both patents' discussion of feedback line/signal 55, which appears in multiple circuit diagrams and discussion from each patent. For example, Figure 3 of the '841 patent shows feedback line 55 originating at an output of active resonant circuit 52 and terminating at an input to rectifier 48.

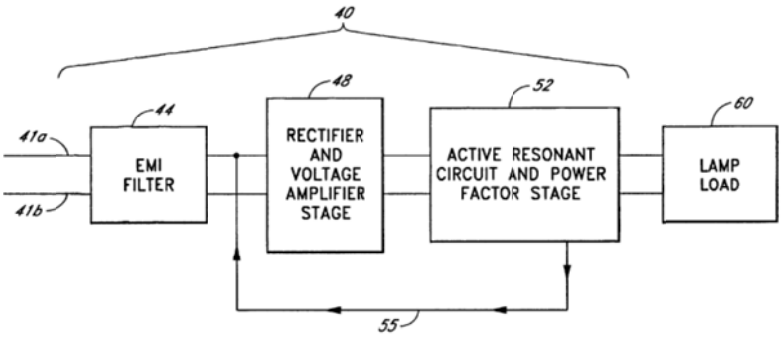

FIG. 3

Thus, Figure 3 of the '841 patent confirms that the feedback originates at a circuit output and returns to the circuit input; in this case, the "circuit" is the combination of rectifier 48 and active resonant circuit 52. The '841 specification further confirms the Court's conclusion: "the resonant circuit 52 generates a high frequency voltage feedback signal on line 55 that is electrically connected to the respective inputs of the voltage amplification stage 48." '841 patent at 5:17-20.

The '799 patent specification similarly supports the extrinsic suggestion of "feedback" with reference to its own Figure 3 and the path of feedback line 55:

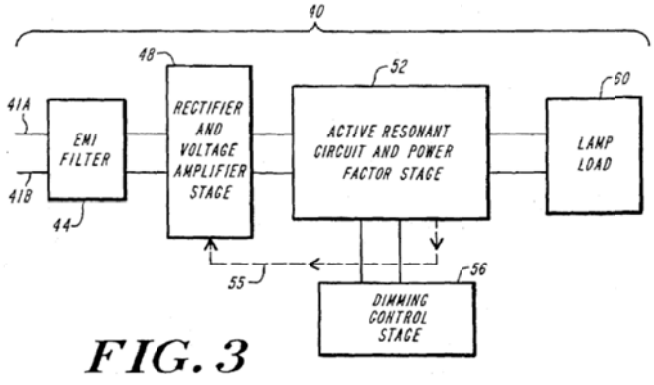

FIG. 3

As with the '841 patent, Figure 3 of the '799 patent affirms that the feedback originates at a circuit output and returns to the circuit input (in this instance, the "circuit" is the combination of rectifier 48 and active resonant circuit 52). Moreover, the '799 patent specification discloses that "the resonant circuit 52 generates a voltage feedback signal 55 that electrically communicates with the voltage amplification stage 48." '799 patent at 7:19-21.

The Court notes that the parties agree, per their respective proposed constructions, that feedback may consist of a current or voltage signal.[5] Thus, the Court construes "feedback" as "the return of a current and/or voltage signal from the output of a circuit to the input of a circuit." However, in applying the Court's construction, the parties should be mindful that the "circuit" referred to in the Court's construction can be any circuit, or more particularly, a part of any circuit.

[5] Tele-Cons maintains that "feedback" should be treated as a means-plus-function given that the claims recite "feedback means" rather than just "feedback." *See* PLTFFS' BRIEF AT 11; MARKMAN TRANSCRIPT AT 24:10-13. Tele-Cons therefore proposes corresponding structure for the "feedback means," citing capacitor C9 and Line 55, s*ee* MARKMAN TRANSCRIPT AT 27:7-15, where Line 55 passes the feedback current and capacitor C9 passes voltage and/or current. *Id.* at 27:16-20. Because Line 55 transmits only feedback current, Tele-Cons asserts that that a feedback path need not transmit voltage and/or current. *Id.* at 27:20-22. This issue, however, will be addressed in SECTION VIII *infra*.

II. "feedback capacitor"[6]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "feedback capacitor" needs to be construed, Tele-Cons proposes the following construction: "feedback capacitor" means "a capacitor that provides an electrical connection between two points in a circuit that allows current and/or a voltage signal to pass between them"	A "feedback capacitor" is a capacitor that provides an electrical connection between the output of a circuit back to the input of the circuit that allows a current and/or voltage signal to be returned from the output to the input.	A capacitor that divides and feeds back high frequency current from the lamp between the line and the input of the rectification circuit.

Many of the issues related to the construction of "feedback capacitor" mirror those stated above in Section I. In addition, TCP contends that the feedback capacitor carries current from the lamp to the input of the rectification circuit. TCP RESPONSE AT 7. TCP maintains that certain statements within the specification dictate imposing the limitations outlined in its proposed construction. *Id.* at 9.

The term at issue is "feedback capacitor" and the parties have no apparent dispute regarding the word "capacitor." Thus, TCP's proposal must either gain support from the word "feedback" or from a definition that applies to the whole phrase "feedback capacitor." As discussed in Section I, the word "feedback" has an ordinary meaning supported by the specification, and that meaning does not include TCP's suggested limitations. Further, nothing

[6] This term is contained in Claim 4 of the '841 patent.

in TCP's citation of the specification or otherwise[7] in the '841 patent seeks to expressly define or disclaim the phrase "feedback capacitor."

Accordingly, the Court finds that "feedback capacitor" is "a capacitor that provides an electrical connection between the output of a circuit back to the input of the circuit that allows a current and/or voltage signal to be returned from the output to the input."

III. "connected in parallel with said line voltage"[8] / "connected in parallel with said AC input voltage"[9]

Plaintiffs' Proposed Construction	GE & TCP's Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "parallel" needs to be construed, Tele-Cons proposes the following construction: "parallel" means "connected in such a way that the input signal and feedback signal are combined in such a way that the input signal does not pass through the (i) feedback capacitor; or (ii) feedback means." *See* Disputed Term #1 for construction of FEEDBACK CAPACITOR	A capacitor is connected in PARALLEL with the LINE VOLTAGE when one end of the capacitor is electrically connected to one voltage line of the LINE VOLTAGE and the other end of the capacitor is electrically connected to the other voltage line of the LINE VOLTAGE. *See* Disputed Term #1 for construction of FEEDBACK CAPACITOR

For these terms, the parties dispute the relative nature of circuits that are considered "parallel" to each other. The dispute does not relate to the meaning of "line voltage" or "input

[7] To a large extent, TCP attempts to extrapolate limitations recited by the surrounding claim language into the construction of "feedback capacitor," specifically arguing that because the claim recites "A rectification stage having an input coupled to line voltage," that the rectification stage must also be connected to the feedback capacitor via the same line voltage. *See* '841 patent at 19:13-14. The Court finds no reason to restate other claim limitations within the construction of the term "feedback capacitor."

[8] This term is contained in Claim 4 of the '841 patent.

[9] This term is contained in Claim 35 of the '841 patent.

voltage." Thus, instead of construing both "connected in parallel with said line voltage" and "connected in parallel with said AC input voltage," the Court finds that only "connected in parallel with" requires construction.

While the specification provides examples of parallel circuits, the meaning of "parallel" is simply assumed. The Court is persuaded that persons of ordinary skill would agree that elements connected in parallel have a common voltage across them, as indicated by the plethora of dictionary definitions the parties provide:

- Parallel circuit A circuit in which the same voltage is applied to all components and the current divides among the components according to their resistances or impedances. MCGRAW-HILL ELECTRONICS DICTIONARY 328 (Neil Sclater et al. eds., 6th ed. 1997).

- Parallel [Elec] Connected to the same pair of terminals. MCGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS 1528 (6th ed. 2003).

- Parallel circuit [Elec] An electric circuit in which the elements, branches (having elements in series) or components are connected between two points, with one of the two ends of each component connected to each point. *Id.*

- Parallel (parallel elements) . . . (A) Two-terminal elements are connected in parallel when they are connected between the same pair of nodes. THE NEW IEEE STANDARD DICTIONARY OF ELECTRICAL AND ELECTRONICS TERMS 914 (Christopher J. Booth ed. 5th ed. 1993).

These extrinsic definitions are bolstered by the embodiments described in the specification. *See e.g.*, '841 patent at 2:36-40; 5:36-41; 13:6-10. Therefore, the Court's construction of "connected in parallel with" should reflect how one of ordinary skill in the art would commonly understand the term "parallel." As the various definitions from technical dictionaries indicate, "parallel" connotes an understanding that components share the same voltage and/or are connected between the same pair of nodes.

The parties' proposals stray from the simplicity afforded by the understanding of "parallel" as one of ordinary skill in the art would perceive the term. Tele-Cons' proposal

suggests defining the term "parallel" essentially in the negative; in other words, Tele-Cons refers to the details of Figures 4 and 11 and attempts to define "parallel," in effect, as "not connected in series." PLTFFS' BRIEF AT 19. Setting aside the complexity of Tele-Cons' proposal, the Court declines to construe the term in the negative, e.g., "does not pass through," without compelling reason, such as a "clear disavowal, disclaimer or estoppel." *See Paltalk Holdings, Inc. v. Microsoft Corp.*, No. 2:06cv367, 2008 WL 4830571, at *18 (E.D. Tex. July 29, 2008) (citing *Omega Eng'g v. Raytek*, 334 F.3d 1314, 1323 (Fed. Cir. 2003)) (declining to add a negative limitation without express intent). Thus, Tele-Con's proposal fails.

Moreover, Defendants' proposal is directed only to a capacitor. Although Claim 4 describes "a feedback capacitor connected in parallel with said line voltage," the term "connected in parallel" is not exclusive to capacitors or Claim 4. *See, e.g.*, '841 patent at 21:37-41 (Claim 14); 24:13 (Claim 35). Thus, "connected in parallel" should not be limited to a capacitor. In addition, the disclosure of the '841 patent discusses various elements connected in parallel—elements other than capacitors: "The dimmable ballast circuit 49 also includes a dimmable control stage 56 which is connected in parallel to the active resonant circuit and power factor stage 52." '841 patent at 13:6-9; *see also id.* at 2:39-40; 13:46-47; 16:1-2.

Because one of ordinary skill would understand that elements in parallel share the same voltage, the Court construes "connected in parallel with" to mean "having the same voltage across terminals as."

IV. "said dimmer control directly altering only said second active element to vary a duration of said second cycle portion"[10]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
No construction necessary. A	The language requiring the dimmer	Providing a signal to the second

[10] This term is contained in Claim 4 of the '841 patent.

person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "directly altering only said second active element to vary a duration of said second cycle portion" needs to be construed, Tele-Cons proposes the following construction: "directly altering" in the context of these claims means "driving or altering the second active element through a circuit connection that is not applied directly to the first active element"	control to DIRECTLY ALTER the second active element means that the operation of the second active element changes as a result of an electrical signal provided by the dimmer control to the second active element through a circuit connection. The language requiring the dimmer control to directly alter ONLY the second active element means that the dimmer control DIRECTLY ALTERS the second active element but does not DIRECTLY ALTER the first active element such that the operation of the switching elements is asymmetric.	active element to vary the duration of the second cycle portion without providing a signal to the first active element to vary the duration of the first cycle portion.

Tele-Cons takes issue with GE's use of the word "asymmetric" to describe altering the first and second active elements because such a construction limits the term to a preferred embodiment. PLTFFS' BRIEF AT 17-18. Instead, Tele-Cons maintains that the dimmer control directly alters the second active element, but may also indirectly alter the first active element. *Id.* at 18. GE partially agrees, stating that the real issue is not whether the switching transistors Q1 and Q2 operate asymmetrically, but whether the dimmer control directly alters only the second active element (Q2), as opposed to both the first and second active elements. GE RESPONSE AT 4-5. Likewise, TCP contends that only the second active element is directly altered to vary the duration of the second cycle portion, to the exclusion of any direct control of the first active element. TCP RESPONSE AT 12.

As an initial matter, the words of the claim do not support the imposition of an "asymmetric" requirement. Claim 4 recites, in relevant part:

> 4. A ballast for providing a continuous dimming control over a fluorescent lamp including:
> . . .
> an active high frequency resonant circuit operating linearly,

> said resonant circuit comprising a first active element and a second active element, said high frequency resonant circuit connected to said dimmer control and to the output of said rectification stage, said active circuit producing an output of said rectification stage, said active circuit producing an output having a first cycle portion and a second cycle portion, said dimmer control directly altering only said second active element to vary a duration of said second cycle portion.

'841 patent at 19:19-26. As this portion of the claim indicates, asymmetrical operation of the first and second active elements is not required. Moreover, the intrinsic evidence does not support a disclaimer, disavowal or special definition.

The Court now turns to whether the dimmer control directly alters only the second active element, to the exclusion of the first active element. As will be explained below, the intrinsic record of the '841 patent shows that the dimmer control directly drives only the second active element to vary the duration of the second cycle portion; the dimmer control does not directly alter the first active element. At the same time, the intrinsic record does not foreclose the possibility that the direct operation of the second element indirectly affects the operation of the first active element.

While prosecuting the '841 patent, the applicants stated:

> Claims 1, 3, and 4 as amended require an active high frequency resonant circuit comprising "a first active element and a second active element." A dimmer control acts upon the resonant circuit, the "dimmer control directly altering only said second active element to vary a duration of said second cycle portion." This is not shown in any of the cited art . . . . Sullivan discloses a pulse duration modulation circuit, but does not vary only one of the active elements . . . . Quazi shows an active state having two active elements. However, the first cycle portion and the second cycle portion in Quazi is determined by a complex control circuit. One embodiment of such a circuit is seen in Figure 9. This circuit directly alters both active elements, sending an on/off signal to each MOSFET. By only controlling a single active element, Applicants achieve dimming of a fluorescent lamp in a much more efficient manner.

PRELIMINARY AMENDMENT AT 18, U.S. PATENT APPL. SER. NO. 08/316,395 (AUG. 1, 1997), EX.

A, ATTACHED TO GE RESPONSE (emphasis original). This particular portion of the prosecution history spotlights the applicants' intent to directly control only a single active element with the dimmer control, particularly the second active element. In distinguishing both the *Sullivan* and *Quazi* references, the applicants emphasize that only the second active element is directly altered to achieve a dimming effect.

In a subsequent amendment, the applicants reiterated that only one of the two switches is directly driven by the dimmer control:

> *Quazi accomplishes this by a special control circuit that directly drives both of the switching devices* . . . Applicants teach how to create an asymmetric waveform *without using a control circuit that drives both switches. The direct control of one switch causes an indirect effect on the other switch.*

PRELIMINARY AMENDMENT AT 12-13, U.S. PATENT APPL. SER. NO. 08/723,289 (OCT. 22, 1996), EX. A, ATTACHED TO GE RESPONSE (emphasis added). This particular portion of the prosecution history highlights that the applicants specifically considered that the direct control of the second active element indirectly affected the first active element.

Having resolved the parties' disputes, the Court concludes that the term "said dimmer control directly altering only said second active element to vary a duration of said second cycle portion" requires no construction. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). As the file history indicates, the patentee used words like "direct" and "only" in a very ordinary way. The applicants clarified the meaning of the term in dispute in accordance with its plain and ordinary meaning. However, to avoid any potential future dispute on this term, the Court will provide the following guidance, and the parties are instructed to limit their trial arguments accordingly. The dimmer control must directly alter (i.e., "drive" with a signal from the dimmer control) the second active element to vary the duration of the second cycle portion, but it may not directly alter (i.e., drive with a signal from the dimmer control) the

first active element for any purpose or effect. Furthermore, the direct operation of the second element may indirectly (i.e., through a causal chain starting with a signal from the dimmer control) affect the operation of the first element for any purpose or effect.

V. "operating linearly"[11] / "linearly operating"[12]

Plaintiffs' Proposed Construction	GE & TCP's Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "operating linearly" or "linearly operating" needs to be construed, Tele-Cons proposes the following construction: "operating linearly" and "linearly operating" in the claims mean "functioning such that the intended behavior is invariant with respect to voltage level and/or current level and/or operation of the active switch elements, if present." As this term "power factor" is not contained in any of the asserted claims, no construction is necessary. Plaintiffs do not believe the term "power factor" should be part of the definition of "operating linearly/linearly operating," but even so, Plaintiffs believe it should be given its plain and ordinary meaning. Alternately, if this Court determines that the term "power factor" needs to be construed, Plaintiffs contend that it means "the cosine of the angle difference between voltage and current waveforms."	A stage or circuit "operates linearly" or is "linearly operating" when its POWER FACTOR is 95% or greater such that it appears as a linear (i.e., resistive) load. The "power factor" of a circuit (or stage) refers to the ratio of: (i) the amount of power actually used by the circuit to (ii) the total amount of power provided to the circuit by the AC utility line. Defendant Group 1 believes that the term "power factor" requires construction because the only objective definition of linear operation in the '841 Patent defines linear operation with reference to a power factor of 95% or greater and there is a dispute as to the concept of power factor. *See* '841 Patent at col. 9:10-16 (". . .the ballast circuit appears as an almost linear load. . .i.e., a power factor of 95% or greater.") Thus, for the parties and the Jury to have an definite – non-subjective and non-vague. and non-indefinite construction of "operating linearly the concept of power factor must be defined by the Court.

[11] This term is contained in Claim 4 of the '841 patent.
[12] This term is contained in Claim 35 of the '841 patent.

The parties' primary disagreement regarding "operating linearly" and "linearly operating" is whether the use of the word "linear" with respect to a circuit requires that circuit to have a near 100% power factor. PLTFFS' BRIEF AT 5; GE RESPONSE AT 6. Tele-Cons contends that Claims 4 and 35 only require that the resonant circuit, not the whole ballast, operate linearly. PLTFFS' BRIEF AT 6. To the contrary, Defendants maintain that the specification expresses that a linear operation is one that provides "a power factor of 95% or greater." GE RESPONSE AT 6 (citing'841 patent at 9:10-16).

As Defendants suggest, the '841 patent is crowded with references to a "linear" load as a load having a power factor of 95% or more. For example:

- "By eliminating the non-linearities of the diodes, the ballast circuit appears as an almost linear load *at the voltage interface*, i.e., a power factor of 95% or greater." '841 patent at 9: 10-16 (emphasis added);

- "The ballast circuit unlike an incandescent bulb, presents a non-linear load to the AC line. Typically the power factor which measures the phase relationship of the current and voltage of a conventional ballast circuit is about 0.4 which is an undesirable level." '841 at 1 :55-60;

- "Thus, as indicated above the power factor typically associated with compact fluorescent lamps of the prior art is in the range of about 0.4-0.6 which is an undesirable level. In the present invention, the power factor correction is much higher, e.g., on the order of 95% or greater." '841 at 2:51-56;

- "The feedback capacitor of the improved ballast circuit reduces the nonlinear characteristics of the diode, thus providing an almost linear load on the input power supply and therefore achieving an improved power factor, on the order of 0.95 of greater." '841 patent, ABSTRACT.

Notwithstanding the many intrinsic references associating "linearity" with power factor, the Court finds that the disputed claim terms do not employ an analogous usage of the word "linear." This conclusion is virtually compelled when the claim language is considered in context. In particular, the disputed terms use the word "linear" referring only to *a portion* of the ballast

circuit; Claim 35 states, "a linearly operating series resonant circuit in circuit with said rectification means and said first and second switching means . . . ." '841 patent at 24:4-6. Whether considered in the context of the intrinsic record or beyond, the concept of power factor derives little meaning when applied to only a portion of the circuit.[13]

Further examination of the specification reveals use of the term "linear" without mention of a power factor, but rather in the context of a resonant circuit. For example, the specification states:

> Another advantage of the resonant circuit 52 of the present invention is that it only requires a single linear inductor to control the switching of the resonant circuit and to limit the current that is applied to the lamp load. Resonant circuits of the prior art utilized either a combination of a *saturation* transformer to control the switching of the resonant circuit and a *linear* transformer to limit the current to the lamp load or two linear transformers, one to control the switching of the resonant circuit and one to limit the current to the lamp load.

'841 patent at 9:66-10:8 (emphasis added). Like the relevant portion of the claim language, the quoted disclosure refers to the linear operation of the resonant circuit without any discussion of a power factor. Furthermore, the Court finds that the use of "linear" in this instance is consistent with the ordinary meaning of the word to one of ordinary skill, which generally refers to the applicability of superposition principles.[14] As the quoted portion of the specification explains, prior art resonant circuits sometimes used saturation transformers, which introduce non-linearity in the resonant circuit. By claiming the resonant circuit as linearly operating, the claim merely indicates that the portion of the ballast circuit, i.e., the resonant circuit, would operationally

[13] GE requests a construction for "power factor." However, because the term "power factor" is absent from the asserted claims and the Court has determined that "operating linearly" and "linearly operating" do not require a specific power factor, the Court declines to construe "power factor."

[14] "The most distinguishing characteristic of a linear system is the principle of superposition, which states that, whenever a linear system is excited, or driven, by more than one independent source of energy, the total response is the sum of the individual responses." JAMES W. NILSSON, ELECTRICAL CIRCUITS 135 (4th ed. 1993). "One of the most important concepts in system theory is linearity. What precisely is a linear system? Linear systems possess the property of superposition." ROBERT A. GABEL AND RICHARD A. ROBERTS, SIGNALS AND LINEAR SYSTEMS 4 (2d ed. 1980).

conform to the superposition principle, something the prior art circuit would not do if saturation transformers were employed.

Thus, the Court construes the terms "operating linearly" and "linearly operating" to mean "operating in a manner that complies with the principle of superposition."

VI. "whereby said high frequency voltage signal is superimposed over said AC input voltage"[15]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that "superimposed over" needs to be construed, Tele-Cons proposes the following construction: "superimposed over" means "applied such that the resulting signal has properties of both component signals"	The language requiring the SELECTED high frequency voltage signal to be SUPERIMPOSED over the AC input means that the SELECTED high frequency voltage signal is combined with the AC input voltage such that the input to the "rectification means" is the combination of the AC input signal and the SELECTED high frequency signal.	**No construction necessary**. The term should be given its ordinary and customary meaning to one of ordinary skill in the art.

The parties' dispute does not appear to relate to the meaning of "superposition," but rather which signals are superimposed and where. *See* MARKMAN TRANSCRIPT AT 96:21-98:24. Since the dispute does not clearly relate to any terms in the actual claims, the Court finds that no construction is necessary.

VII. "a dimmer control"[16]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
a circuit that enables variable adjustment of the level of brightness of a fluorescent lamp	These claim limitations are indefinite. The do not recite any specific structure. These	This element is a means-plus-function element to be construed under 35 U.S.C. § 112, ¶ 6.

[15] This term is contained in Claims 1 and 17 of the '799 patent and Claim 25 of the '841 patent.
[16] This term is contained in Claim 4 of the '841 patent.

	limitations reflect an attempt to claim any element that provides a "dimming control" function. Such functional claiming is not allowed under United States Patent Law and the claims including these limitations, therefore, are invalid. The indefiniteness of these limitations render claims 1,3 and 4 of the '841 Patent invalid. The claim limitations are not written in means-plus-function form such that the provisions of 35 U.S.C. § 112 ¶ 6 can be used to render them definite.	**Function**: controlling dimming. **Structure**: dimming control stage 56, including resistors R5, R7, R8 and R10, variable resistor R6, capacitor C10, zener diode Z1, transistor Q3, and optionally resistor R4 and inductor L5 as shown and arranged in Figure 11.

The central issues in dispute are (1) whether the term "dimmer control" is sufficiently definite without resorting to § 112 ¶ 6 and (2) in the alternative, whether the term requires construction pursuant to § 112 ¶ 6. *See* GE RESPONSE AT 11; TCP RESPONSE AT 15-18. Tele-Cons argues that a dimmer control is a type of circuit that varies the brightness of the lamp. PLTFFS' BRIEF AT 2. In contrast, GE contends that the term is directed exclusively to the function of dimming, and provides no specific structure. GE RESPONSE AT 11. Contrary to both Tele-Cons and GE, TCP maintains that the term should be governed by § 112 ¶ 6. TCP RESPONSE AT 15. However, TCP's arguments rest on the supposition that the term does not connote sufficiently definite structure. *Id.*

The Court finds that the word "dimmer" strongly connotes structure and thus the term "dimmer control" is inherently structural. The extrinsic evidence provided by the parties is clear in this regard because it defines "dimmer" in both general and specific structural terms, e.g., as a "device" or as a "choke, coil, rheostat, or transformer":

- dimmer . . . 1: a device for causing an electric light to burn less brightly . . . *esp:* a choke, coil, rheostat, or transformer connected to the light. WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 634 (2002).

- Dimmer—1. A device for controlling the amount of light emitted by a luminaire. Common types employ resistance, autotransformer, magnetic amplifier, silicon-

> controlled rectifier or semiconductor, thyratron, or iris control elements. 2. An electric or electronic device that regulates the voltage going to a light source as a means of varying the intensity of the light emitted by the source. RUDOLF F. GRAF, MODERN DICTIONARY OF ELECTRONICS 201 (7th ed. 1999).

The quoted extrinsic evidence provides examples of different types of structure that control the brightness of the lamp. Therefore, the Court concludes that one of ordinary skill in the art would understand the inherent structure associated with the term "dimmer control." *See Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1320 (Fed. Cir. 2004) (looking to technical dictionaries to determine whether "circuit" connotes structure); *Massachusetts Institute of Technology v. Abacus Software, Inc.*, No. 5:01cv344, 2003 WL 25832597, at *2 (E.D. Tex. Sept. 15, 2003) (noting that one of ordinary skill would understand the structure involved with the term "scanner"). As a result, the term does not require construction under § 112 ¶ 6. *See Phillips*, 415 F.3d at 1311 ("Means-plus-function claiming applies only to purely functional limitations that do not provide the structure that performs the recited function."); *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524, 531 (Fed. Cir. 1996) ("To invoke this statute [§112 ¶ 6], the alleged means-plus-function claim element must not recite a definite structure which performs the described function.").

In addition to finding that "a dimmer control" inherently connotes structure, the Court finds that the term is used in a very ordinary fashion that jurors will easily understand. Reference to the specification confirms the plain and ordinary meaning:

- "This is achieved by including an improved dimmer control circuit to enable variable adjustment of the level of brightness of the fluorescent lamp." '841 patent at 3:1-3;

- "The dimmer control 34 electrically connects to the dimmable ballast circuit 49 within the ballast circuit housing 28, and manual circumferential movement of the dimmer control 34 varies the light output of the lamp to the desired brightness." '841 patent at 10:44-48;

- "Manual adjustment of the dimmer control 34 varies the light output as previously

describes [sic]." '841 patent at 10:65-68.

The discussion concerning "dimmer control" within the '841 patent specification indicates that "dimmer control" is used in its plain and ordinary fashion, reflecting the dictionary definitions cited above.

Having resolved the parties' claim scope disputes, the Court finds that the term "dimmer control" needs no construction. *O2 Micro*, 521 F.3d at 1362.

VIII. "second feedback means connecting the signal components produced by said resonant circuit means back to said second AC voltage rail"[17]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
Defendant Group 1 takes the position that the claim in question is indefinite for failure to clarify whether "the signal components" in the highlighted phrase refers to all signal components produced by the resonant circuit or a selected subset of such signal components. Tele-Cons disagrees that the claims in question are indefinite.	This limitation is indefinite. *See* Disputed Term #4 for construction of FEEDBACK It recites "said second feedback means connecting the signal components produced by said resonant circuit means back to said second AC voltage rail." There is no antecedent basis in claim 9 for the phrase "the signal components" and the phrase is indefinite. Among other things, it is unclear whether this phrase is intended to refer to ***all*** signal components produced by the resonant circuit means or some undefined, selected subset of such signal components. The indefiniteness of this limitation renders claim 9 of the '841 Patent invalid.	**CLAIM NOT ASSERTED AGAINST TCP**

GE contends the term is indefinite because the phrase "the signal components" lacks an antecedent basis, and further, the phrase does not connote whether the feedback means carries all signal components back to the voltage rail, or only some. GE RESPONSE AT 12. Tele-Cons maintains that because the '841 patent specification discusses voltage, electrical, and current

[17] This term is contained in Claim 9 of the '841 patent.

signals, Claim 9 refers to an electrical signal component that can be a voltage or a current when it discloses "the signal components." PLTFFS' BRIEF AT 17. At the hearing, the parties submitted their arguments on the briefing.

Although Tele-Cons does not dispute that Claim 9 lacks an antecedent basis for "the signal components," it does argue that one of ordinary skill in the art would understand the term in light of the specification. *Id.* Section 2173.05(e) of The Manual of Patent Examining Procedure states, in part, that "the failure to provide explicit antecedent basis for terms does not always render a claim indefinite." Further, the Federal Circuit has explained that if a term is amenable to construction, the claim may escape a finding of indefiniteness: "If the meaning of the claim is discernible, even though the task may be formidable and the conclusion may be one over which reasonable persons will disagree, we have held the claim sufficiently clear to avoid invalidity on indefiniteness grounds." *Exxon Research and Eng'g Co. v. U.S.*, 265 F.3d 1371, 1375 (Fed. Cir. 2001).

Whether "the signal components" may be construed depends on the context of the claim and the specification. *See Energizer Holdings, Inc. v. International Trade Com'n*, 435 F.3d 1366, 1370 (Fed. Cir. 2006) (quoting *Union Pac. Res. Co. v. Chesapeake Energy Corp.*, 236 F.3d 684, 692 (Fed. Cir. 2001)). "If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite." *Id.* at 1370-71 (quoting *Bose Corp. v. JBL, Inc.*, 274 F.3d 1354, 1359 (Fed. Cir. 2001)).

Claim 9 recites, in relevant part:

> first and second feedback means, said first feedback means connecting a portion of the high frequency signal produced by said resonant circuit means back to said first AC voltage rail, and said second feedback means connecting the signal components produced by said resonant circuit means back to said second AC voltage rail.

‘841 patent at 21:12-18. Having no express antecedent basis for “the signal components,” one of ordinary skill would look to the specification to determine what kind of signal components are produced by the resonant circuit means. As is explained further in Section XII, the resonant circuit means is resonant circuit stage 52, which “generates a high frequency voltage feedback signal on line 55 that is electrically connected to the respective inputs of the voltage amplification stage 48.” ‘841 patent at 5:18-20. In addition, Figure 11, below, shows resonant circuit 52 contains capacitor C9, which is “connected to the neutral rail 41b and the opposite end of the capacitor C9 is connected to the lamp connection 61c and to an input of the rectifier and voltage amplifier stage 48 via feedback path 55.” *Id.* at 7:5-9; FIGURE 11.

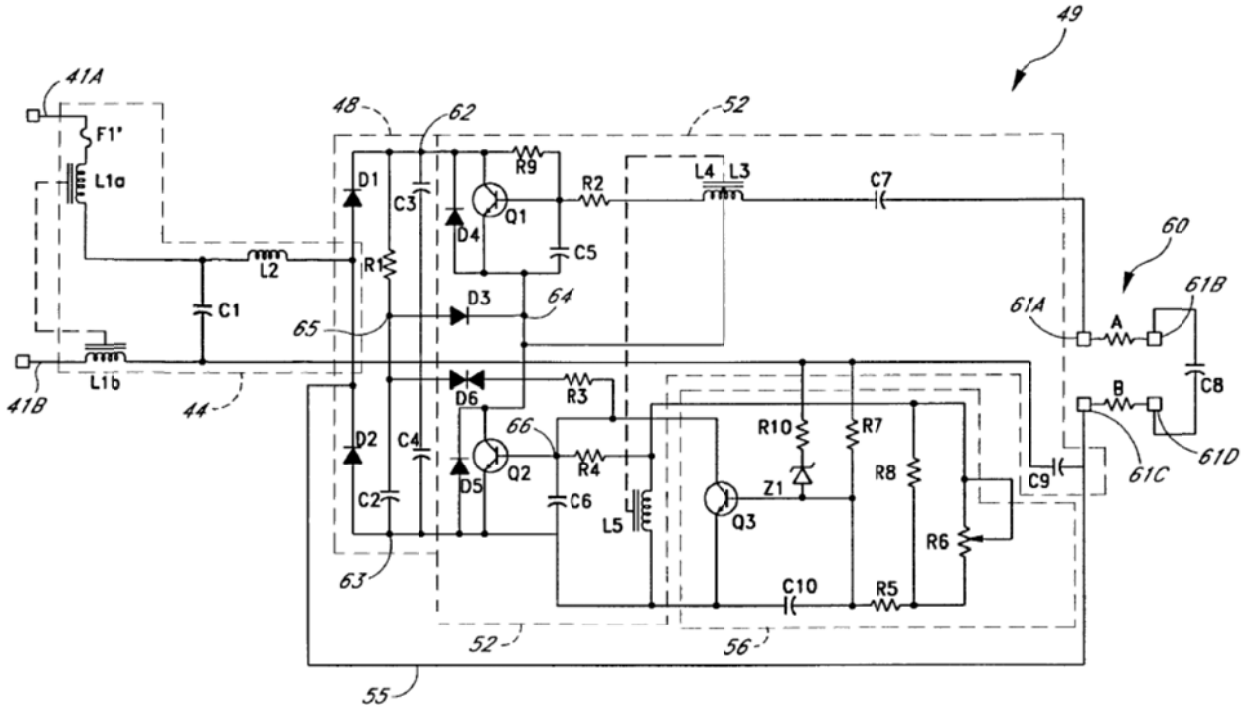

FIG. 11

“[T]he feedback capacitor C9 feeds back a selected high frequency voltage level to the input of the voltage amplification stage 48. The capacitor C9 divides a high frequency feedback current from the lamp load between the neutral rail and the input of the rectification circuit.” *Id.* at 8:61-

66. Thus, the specification indicates that both voltage and current signals—in sum, electrical signals—are produced by the resonant circuit means and fed back, as Claim 9 requires.

Further, one may deduce from the language of the claim—particularly, the word "the"—that all signal components are fed back to the AC input, not just a portion. Claim 9 expressly recites that the "first feedback means connect[s] *a portion* of the high frequency signal." *Id.* at 21:13-14 (emphasis added). The claim later states, "the second feedback means connecting the signal components. . . ." *Id.* at 21:51-16. The dichotomy between "a portion of" and "the" indicates that "*the* signal components" refers to all signal components. *See Chicago Bd. Options Exchange v. International Securities Exchange, LLC*, --- F.3d ----, 2012 WL 1570989, at *5 (Fed. Cir. May 7, 2012) (stating claim construction principles create a presumption that different claim terms have different meanings) (internal citations omitted). Therefore, one of ordinary skill could determine from both the words and context of the claim that "the signal components" refers to all signal components.

Consequently, the Court construes "the signal components" as "all signal components."[18]

IX. "rectification means . . ."[19]

Plaintiffs' Proposed Construction	GE's Proposed Construction	TCP's Proposed Construction
Governed by 35 U.S.C. § 112 ¶ 6 **Function:** The Parties agree that the required function is "rectifying the AC input voltage." **Corresponding Structure:** D1, D2. **VOLTAGE AMPLIFICATION MEANS/VOLTAGE DOUBLER MEANS:** Plaintiffs contend that the definitions of "voltage amplification means" and "voltage doubler	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** The Parties agree that the required function is "rectifying the AC input voltage." **Corresponding Structure:** The circuitry within stage 48, including the combination of diodes D1 and D2 and capacitors C3 and C4 shown in Fig. 4 of the '799 Patent and Figs. 4 and 11 of the '841 Patent. **VOLTAGE AMPLIFICATION MEANS/VOLTAGE DOUBLER MEANS:** The defendants agree that the function of the "voltage amplification means" in claim 2 of the '799 patent is "selectively amplifying said input	

[18] In addition, the Court finds the term definite.
[19] This term is contained in Claims 1, 17 and 27 of the '799 patent and Claims 9, 25 and 35 of the '841 patent.

means" do not depend on the Court's definition of "rectification means." Regardless of which construction for "rectification means" the Court chooses, Plaintiffs contend that "voltage amplification means" and "voltage doubler means" should be construed as follows: **Function:** **(voltage amplification means):** increasing the voltage level **(voltage doubler means):** increasing the peak voltage level by approximately double (all claims): C3, C4	voltage," and in claims 17 and 28 of the '799 patent is "amplifying said rectified voltage." Defendants believe that the function of the "voltage doubler means" in '841-25 is "amplifying the rectified AC voltage". Defendants agree that if the Court adopts Plaintiffs' corresponding structure for "rectification means" (*i.e.*, D1, D2, only), then the corresponding structure for the "voltage amplification means" of 799-2, 17 and 28 and the corresponding structure for the "voltage doubler means" of '841-25 shall be construed to be "C3, C4." NOTE: Claims 9 and 25 of the '841 patent are not asserted against TCP.

The parties agree that the function for "rectification means" is "rectifying the AC input voltage." PLTFFS' BRIEF AT 14; GE RESPONSE AT 14; TCP RESPONSE AT 18. However, the parties dispute whether the corresponding structure for both the '799 and '841 patents includes capacitors C3 and C4, as well as diodes D1 and D2. TCP RESPONSE AT 18. Tele-Cons maintains that only diodes D1 and D2 are necessary. PLTFFS' BRIEF AT 14. Further, Defendants propose to lump the voltage amplification stage together with the rectification stage, arguing that the structure performing the functions of both the "rectification means" and the "voltage amplification means"/"voltage doubler means" are one and the same. *See* TCP RESPONSE AT 20-21.

A. "rectification means . . ."

Tele-Cons asserts that capacitors C3 and C4 amplify voltage and therefore cannot be structure corresponding to the function of "rectifying the AC input voltage." *See* PLTFFS' BRIEF AT 14. Tele-Cons further argues that the patentees intended for the rectification stage to be distinct from the voltage amplification stage, particularly due to the recitation of voltage amplification means in dependent claims. *Id.* at 15 (citing Claim 2 of the '799 patent and Claims

10 and 36 of the '841 patent). Defendants contend that based on the disclosure and claim language, capacitors C3 and C4, in addition to diodes D1 and D2, are necessary to complete rectification of the input voltage. TCP RESPONSE AT 18-19.

"While corresponding structure need not include all things necessary to enable the claimed invention to work, it must include all structure that actually performs the recited function." *Default Proof Credit Card System, Inc. v. Home Depot U.S.A., Inc.* 412 F.3d 1291, 1298 (Fed. Cir. 2005) (citing *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 296 F.3d 1106, 1119 (Fed. Cir. 2002)). Under these circumstances, the specifications of the '799 and '841 patents link diodes D1 and D2 to the function of "rectifying the AC input voltage."[20] For example, the specifications not only refer to "rectification diodes," but also mention that diodes rectify the AC voltage, exclusive of storage capacitors:

- "According to further aspects of the invention, the rectification stage includes first and second diodes having an associated conduction angle. . . ." '799 patent at 4:22-28;

- "This feedback path has to be found to substantially compensate for this non-linearities characteristic of the rectifier diodes." '841 patent at 2:56-61;

- "[A] typical series resonant circuit provides for a poor power factor because the input appears very distorted and non-linear due to the effects of the storage capacitors and the rectification diodes. In a typical series resonant circuit, the rectification diodes are only turned ON during periods of the peak voltages of the positive and negative cycles of the input A/C." '841 patent at 8:43-49;

- "Stage 48 converts the input A/C voltage to a D/C voltage an amplifies the magnitude of this DC voltage to the level necessary to start or ignite the fluorescent lamp level and includes a pair of rectifying diodes D1 and D2, current limiting resistor R1, and storage capacitors C3 and C4." '841 patent at 5:59-65.

The portions of the specifications cited above clearly link diodes D1 and D2 to the function of rectifying the AC input. The technical definition of "diode" further supports the conclusion:

[20] Rectification is "[t]he process of converting an alternating current (AC) to a unidirectional current (DC)." NEIL SCLATER AND JOHN MARKUS MCGRAW-HILL ELECTRONICS DICTIONARY 383 (6th ed. 1997).

"diode 1. A two-terminal semiconductor (rectifying) device that exhibits a nonlinear current-voltage characteristic. It allows current to flow in one direction (*forward bias*), but blocks it in the opposite direction (*reverse bias*)." NEIL SCLATER AND JOHN MARKUS MCGRAW-HILL ELECTRONICS DICTIONARY 127 (6th ed. 1997).[21]

Indeed, some portions of the specification note that the rectification stage includes diodes and capacitors. However, these portions either combine discussion of the rectification and voltage amplification stages or describe another aspect of the invention that is not material to this inquiry. For example, the '799 patent disclosure states, "The rectification *and* voltage amplification stage 48 includes a pair of rectifying diodes D1 and D2, current limiting resistor R1, and storage capacitors C3 and C4." '799 patent at 7:40-43 (emphasis added); *see also* '841 patent at 5:59-65. In this particular case, the specification notes that diodes D1 and D2, along with resistor R1 and capacitors C3 and C4, in sum, comprise both the rectification stage and the voltage amplification stage; it does not state that the capacitors participate in rectifying the AC signal.

Defendants, however, argue that the specification links capacitors C3 and C4, in addition to diodes D1 and D2, to the function of rectifying the AC signal. As support, Defendants note that the '799 specification states, "According to another aspect, the rectification stage includes at least first and second diodes and at least first and second storage capacitors in circuit with the diodes." '799 patent at 3:3-5. However, the Court finds that, in context, the quoted portion of the specification is referring to the rectification *stage*, meaning the entire item 48 of Figure 3 ("rectifier and voltage amplifier *stage*"). The quoted portion does not refer to a "rectifying means" or circuit as claimed.

[21] Defendants provided portions of a technical textbook that discusses rectifier circuits: "In these circuits [full-wave rectifiers] the *diodes* connect the dc load to the ac source during both the positive and negative half cycles of the source." JOHN KASSAKIAN, ET AL. PRINCIPLES OF POWER ELECTRONICS 55 (1991) (emphasis added).

The Court finds nothing in the specification to indicate that capacitors (1) are necessary to rectification or (2) perform rectification, and Defendants have not sufficiently illuminated the point. Further, extrinsic technical resources indicate that diodes perform rectification without reference to capacitors:

> An ideal diode can be placed in series with an a-c voltage source to provide *rectification* of the signal. Since current can flow only in the forward direction through the diode, only the positive half-cycles of the input sine wave are passed. The output voltage is a *half-rectified sine wave*. Whereas the input sinusoid has a zero average value, the rectified signal has a positive average value and therefore contains a d-c component. By appropriate filtering, this d-c level can be extracted from the rectified signal.

BEN G. STREETMAN AND SANJAY KUMAR BANERJEE SOLID STATE ELECTRONIC DEVICES 201 (6th ed. 2006). In addition, a "rectifier" is defined as a "[d]evice that converts alternating current into unidirectional current by permitting appreciable current in one direction only." RUDOLF F. GRAF MODERN DICTIONARY OF ELECTRONICS 631 (7th ed. 1999). According to the technical definitions of "diode" cited above, diodes allow current to travel in only one direction. A capacitor, on the other hand, "stores electric energy, *blocks the flow of direct current, and permits the flow of alternating current* to a degree dependent on its capacitance value and the frequency." NEIL SCLATER AND JOHN MARKUS MCGRAW-HILL ELECTRONICS DICTIONARY 58 (6th ed. 1997) (emphasis added). Thus, diodes, as opposed to capacitors, perform the rectification of the AC signal.

Accordingly, the Court finds that the function of the "rectification means" is "rectifying the AC input voltage," and the corresponding structure is diodes D1 and D2, and equivalents.

B. "voltage amplification means"[22] / "voltage doubler means"[23]

Because the parties dispute whether the same circuitry performing the function of the "rectifying means" also carries out the functions of the "voltage amplification means" and "voltage doubler means," the functions of the "voltage amplification means" and "voltage doubler means" are in debate. The Court finds such functions are dictated by the claim language. *Micro Chemical, Inc. v. Great Plains Chemical Co., Inc.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("The statute [35 U.S.C. § 112 ¶ 6] does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim."). Therefore, the function of the "voltage amplification means for selectively amplifying said input voltage"—recited in Claim 2 of the '799 patent —is "selectively amplifying said input voltage." Claims 17 and 28 of the '799 patent both recite "voltage amplification means for amplifying said rectified voltage." Accordingly, the function is "amplifying said rectified voltage." Finally, Claim 25 of the '841 patent states "voltage doubler means for amplifying said rectified voltage." Thus, the function is "amplifying said rectified voltage."

By agreement of the parties, the Court's finding regarding "rectification means" renders that capacitors C3 and C4, and equivalents, provide structure to amplify/double voltage (voltage amplification means/voltage doubler means).

X. "dimming means . . . "[24] / "dimming control means"[25]

Plaintiffs' Proposed Construction	GE & TCP's Proposed Construction
Governed by 35 U.S.C. § 112 ¶ 6 **Function:** The Parties agree that the required functions are as follows: **Dimming Means: "**generating a dimming signal indicative of lamp brightness."	

[22] This term is contained in Claims 2, 17 and 28 of the '799 patent.
[23] This term is contained in Claim 25 of the '841 patent.
[24] This term is contained in Claims 1 and 18 of the '799 patent and Claims 9 and 26 of the '841 patent.
[25] This term is contained in Claim 27 of the '799 patent and Claim 35 of the '841 patent.

Dimming Control Means: "adjusting variably said brightness level of the lamp."	
Corresponding Structure for BOTH terms: **'841 Patent:** Structure: elements: 56, R6; specification: 13:6–12, 17:28–36 **'799 Patent:** Structure: elements: 56; specification: 5:35–39 Note, Plaintiffs take the position that remote, wall-mounted dimmers are disclosed and/or are an alternate equivalent structure to the disclosures as cited in the '799 and '841 Patents.	**Corresponding Structure for BOTH terms:** **'841 Patent:** The circuitry within stage 56 of Fig. 11, including bipolar junction transistor Q3, capacitor C10, resistor R5, variable resistor R6, resistors R7 and R8 and the combination of resistor R10 and zener diode Z1. **'799 Patent**: The circuitry within stage 56 of Fig. 4., including bipolar junction transistor Q3, capacitor C10, resistor R5, variable resistor R6, zener diode Z1 (or zener diode Z1' in combination with diode D7). NOTE: Claims 9 and 26 of the '841 patent are not asserted against TCP.

The parties agree § 112 ¶ 6 applies, and further, that the function of "dimming means" is "generating a dimming signal indicative of lamp brightness." As for the "dimming control means," the parties also agree that the function is "adjusting variably said brightness level of the lamp."

Despite these agreements, the parties differ over the respective corresponding structures and further, whether the '841 and '799 patent specifications link the recited functions to remote, wall-mounted dimmers. Tele-Cons contends that stage 56 of the '799 patent and stage 56, including element R6, of the '841 patent serve as corresponding structure for both "dimming means" and "dimming control means." PLTFFS' BRIEF AT 3. In addition, Tele-Cons maintains that remote, wall-mounted dimmers are disclosed within both patent specifications and serve as alternate corresponding structure. *Id.* Although Defendants seem to generally agree that dimming stage 56 performs the functions recited in both patents, Defendants contend that element R6 should be included as corresponding structure for the '799 patent. GE RESPONSE AT

16. In addition, Defendants argue that remote, wall-mounted dimmers are not linked to "dimming means" or "dimming control means." *Id.* at 15, 17-18.

A. R6

The Court finds that stage 56, including variable resistor R6, is structure that "generat[es] a dimming signal indicative of lamp brightness" (dimming means) and "adjust[s] variably said brightness level of the lamp" (dimming control means) in both the '799 and '841 patents. The '799 patent discloses that variable resistor R6 affects the transistors that determine the illumination level of the lamp:

> The dimming stage 56, FIG. 4, includes a transistor Q3, storage capacitor C10, resistor R5, variable resistor R6, and zener diode Z1. . . . The illustrated dimming [*sic*] stage 56 adjusts the level of lamp illumination by turning off transistor Q2 for selected portions of the voltage half cycle in which it conducts. . . . The variable resistor R6 controls the conduction state of transistor Q3 by varying the voltage drop across capacitor C10. According to one practice, when the dimming stage total dimming resistance, defined as the cumulative resistance of resistor R5 and variable resistor R6, is relatively high, defined as a minimum dim condition, the voltage drop across capacitor C10 is insufficient to turn on transistor Q3. In this state, transistor Q2 continues to conduct uninterrupted during its selected portion of the input voltage cycle, and maximum current is supplied to the lamp load 60 to produce maximum lamp illumination. *When the cumulative dimming resistance is relatively low by manually adjusting the variable resistor to define a lower resistance, the voltage drop across capacitor C10 increases and turns on transistor Q3, which then turns off transistor Q2 during some selected portion of its half cycle. Specifically, the total dimming resistance as defined by the variable resistor R6 determines the specific portion of the half cycle in which Q2 conducts. This, in turn, determines the amount of lamp-driving current that is supplied to the load, and thus determines the lamp illumination level.*

'799 patent at 10:5-49 (emphasis added). The '799 patent specifically calls out variable resistor R6 as affecting transistor Q2, which controls the amount of current supplied to the lamp. As the quantity of current delivered to the lamp varies, so does the brightness of the lamp. In addition, the disclosure contemplates the variable resistor (R6) as part of dimming stage 56. Thus,

variable resistor R6 is an element that is clearly linked to the dimming functions described above.[26]

B. Remote, Wall-Mounted Dimmers

Defendants cite to portions of the specifications of the patents-in-suit to argue that remote, wall-mounted dimmers are not appropriate structure for the terms "dimming means" and "dimming control means." In particular, Defendants point to a particular part of the '841 patent, arguing that any disclosure of a remote dimmer has no relevance to varying the brightness of the lamp, nor does the specification link such a dimmer to said function. GE RESPONSE AT 15-16. However, the Court finds that this particular portion of the specification provides adequate structure linked to the function of dimming:

Remote Dimmer Control

> Although the specific embodiments described above have been described with reference to the dimmable control ballast being located as an integral unit with the fluorescent lamp, the present invention can also be advantageously used as a remote dimmer control, e.g., used in a wall-mounted control unit. A particular advantage of the circuit of FIGS. 10 and 11 is that as shown, only two wires are needed to connect the remotely mounted ballast stage 40 and the fluorescent lamp 60.

'841 patent at 17:26-36. As discussed in Section VII, a dimmer control regulates "the amount of light emitted by a luminaire." *See* Section VII *supra* at p. 24 (citing RUDOLF F. GRAF, MODERN DICTIONARY OF ELECTRONICS 201 (7th ed. 1999)). Further, other portions of the '841 patent specification describe the dimmer control as varying "the light output of the lamp to the desired brightness." *See*, *e.g.*, '841 patent at 10:44-48; 3:1-3; 10:65-68. Thus, despite being remote, i.e., the ballast circuit is separated from the lamp, the '841 patent particularly links a remote dimmer

[26] The same reasoning applies to the structure of the '841 patent. *See* '841 patent at 13:31-14:27 ("Specifically, the total dimming resistance as defined by the variable resistor R6 and R5 determines the specific portion of the resonant circuit cycle in which transistor Q2 conducts. This, in turn, determines the amount of the lamp driving current that is applied to the load, and thus determines the lamp illumination level.").

control—particularly dimmable ballast circuit 49 electrically connected by two wires to lamp load 60—to the functions of "generating a dimming signal indicative of lamp brightness" and "adjusting variably said brightness level of the lamp." *See id.* at 13:16-19 ("FIG. 11 illustrates a dimmable ballast circuit in accordance with one aspect of the present invention. The dimmable ballast circuit 49 operates in a similar manner as the ballast circuit 40."); FIGURE 11.

Likewise, the '799 patent discloses a remote dimmer:

> This invention provides a compact fluorescent lamp having a lamp-supporting housing that mounts a ballast circuit that is adaptable for local and remote dimming. . . . Alternatively, according to another practice, the housing mounts a remotely dimmable ballast circuit that is in electrical communication with a conventional two-wire remote dimmer.

'799 patent at 5:30-39. The Court has determined that a dimmer has inherent structure and that one of ordinary skill would understand that such structure controls the level of brightness emitted from the bulb. *See* Section VII *supra* pp. 23-25 However, the '799 patent discloses only dimmable ballast circuit 40. *See* '799 patent, FIGURES 3 & 4. Thus, the '799 patent articulates that dimmable ballast circuit 40, when in electrical communication with a conventional two-wire remote dimmer, varies the brightness level of the lamp.

Although the '799 and '841 patents may teach that the ballast circuit may be separate from the lamp, i.e., a remote dimmer, the Court finds no support for any type of structure where the dimmer circuitry (e.g., item 56 of the diagrams of both patents) is separated to operate remotely from the overall ballast. *See* '841 patent, FIGURE 10; '799 patent, FIGURE 3. Nor have the parties proffered any argument to the contrary.

Accordingly, the Court finds that the function of "dimming means" is "generating a dimming signal indicative of lamp brightness." Further, the function of "dimming control means," is "adjusting variably said brightness level of the lamp." The corresponding structure in

the ‘841 patent is all the structure in subsystem 56 (including for clarity, R6), and equivalents; or alternatively, dimmable ballast circuit 49 remotely mounted and connected by two wires to lamp load 60, and equivalents. ‘841 patent at 17:28-36. Similarly, the corresponding structure in the ‘799 patent includes all structure in subsystem 56 (including for clarity, R6), and equivalents; or alternatively, a remotely dimmable ballast circuit (item 40) that is in electrical communication with a conventional two-wire remote dimmer, and equivalents. *See* ‘799 patent at 5:35-39. However, the Court sees no structure supporting a system that separates a dimmer circuit from the ballast.

XI. “for generating a high frequency voltage in response to said input voltage”[27]

Plaintiffs’ Proposed Construction	GE’s Proposed Construction	TCP’s Proposed Construction
No construction necessary. A person of ordinary skill in the art would understand the meaning of the terms or phrases in question as used in the context of the claimed invention. Alternately, to the extent the Court determines that “generating a high frequency voltage in response to said input voltage” needs to be construed, Tele-Cons proposes the following construction: “generating a high frequency voltage in response to said input voltage” means “with the presence of an input voltage, the resonant circuit generates a high-frequency voltage”	The language requiring a series resonant circuit “for generating a high frequency voltage” requires that the operation of the series resonant circuit itself generate the high frequency voltage signal. In other words this requires that the resonant circuit be self-resonating (self-oscillating) to cause the establishment of the high frequency voltage. The language requiring the series resonant circuit to generate the high frequency voltage “in response to said input voltage” means that the resonant circuit generates the high frequency voltage as a result of the application of the input voltage to the resonant circuit.	**No construction necessary**. The term should be given its ordinary and customary meaning to one of ordinary skill in the art.

The central issue concerning the term “for generating a high frequency voltage in response to said input voltage” is whether the resonant circuit must self-resonate, i.e., the resonant circuit itself generates the high frequency voltage signal. GE RESPONSE AT 19-20; *see*

[27] This term is contained in Claim 27 of the ‘799 patent and Claim 35 of the ‘841 patent.

also PLTFFS' BRIEF AT 12. Tele-Cons and TCP contend that the term needs no construction, but in the alternative, Tele-Cons proposes that the resonant circuit may produce a high frequency voltage in reaction to the input voltage, but not to the exclusion of any other external element; in other words, Tele-Cons argues that the resonant circuit may generate the high frequency voltage signal in conjunction with another circuit element. PLTFFS' BRIEF AT 12. Tele-Cons maintains that because Claim 27 ('799 patent) and Claim 35 ('841 patent) are "comprising" claims, the claim language does not exclude unrecited inputs or elements; therefore the series resonant circuit may generate a high frequency voltage in response to any input. *Id.* at 13. In contrast, GE contends the series resonant circuit produces a high frequency voltage signal without any help from another circuit element. GE RESPONSE AT 20.

The plain language of the claims dictates that the resonant circuit creates the high frequency voltage signal. The claims recite, in relevant part, a "series resonant circuit . . . for generating a high frequency voltage in response to said input voltage." '799 patent at 15:20-23; '841 patent at 24:4-7. According to GE, the word "generate" connotes "an active act of creation." GE RESPONSE AT 20. While the Court agrees with GE's proposal regarding the word "generate," it does not agree with GE's understanding that "generate" requires self-resonance in the claimed series resonant circuit.

Webster's Third New International Dictionary defines "generate" as "1: to cause to be: bring into existence . . . 2: to originate." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 945 (Philip Babcock Gove, Ph.D., ed. 1981). Thus, "generate," as used in the claims, means that the series resonant circuit must "originate" or "bring into existence" the high frequency voltage in response to an input. The claims' use of the word "generate" precludes a pass through situation where the claimed "input" is the same as the claimed "high frequency voltage." Thus,

in order to "originate" the claimed "high frequency voltage," the series resonant circuit must make some non-trivial manipulation or contribution to the input signal. A plain reading of the claim language requires such a condition.

The Court's conclusion is consistent with the specification, which states that the high frequency signal is *produced* by the series resonant circuit:

> The inductor L3 stores energy along with the capacitors C7, C8 and C9, forming a series resonant circuit. These components produce a current having a selected elevated frequency . . . during normal operation of the ballast circuit. This high-frequency operation reduces hum and other electrical noises delivered to the lamp load. Additionally, high-frequency operation of the lamp load reduces the occurrence of annoying flickering of the lamp.

'841 patent at 8:20-28; *see also* '799 patent at 8:57-65. Like the excerpt above, the descriptions contained within the '799 and '841 patent disclosures indicate that the resonant circuit creates the high voltage frequency signal rather than passively receiving the signal from another source.

Having settled the claim scope dispute between the parties, the Court finds that no construction is necessary for the term "for generating a high frequency voltage in response to said input voltage." *O2 Micro*, 521 F.3d at 1362. However, to clarify, a self-resonating circuit is not required, but the term "generate" cannot mean a pure pass through where the input signal is the same as the high frequency voltage.

XII. "resonant circuit means . . . "[28]

Plaintiffs' Proposed Construction	GE & TCP's Proposed Construction
Governed by 35 U.S.C. § 112 ¶ 6 The parties agree that the resonant circuit means functions are as follows: **Functions ('841–9, '799-1)**: The recited "resonant circuit means" has two functions: (1) "generating a high frequency voltage in response to the rectified AC input voltage" and (2) varying the level of power supplied to the lamp in response to the dimming signal provided by the dimming means." **Functions ('841–25, '799–17)**: The recited "resonant circuit means" has one function: "generating a high frequency voltage in response to the rectified AC input voltage."	

[28] This term is contained in Claim 1 and 17 of the '799 patent and Claims 9 and 25 of the '841 patent.

Structure: stage 52, Fig. 4 of the '799 patent & Figs. 4 and 11 of the '841 patent; specifically, Q1, Q2, L3 and C7	**Structure:** stage 52, Fig. 4 of the '799 patent and series resonant circuit, which includes L3, C7, C8 and C9

Three issues permeate the dispute regarding "resonant circuit means." First, the parties disagree over whether "resonant circuit means" is part of a nested means-plus-function claim. GE RESPONSE AT 21. Second, the parties differ over whether the resonant circuit means must self-resonate.[29] *Id.* Finally, the parties propose adverse corresponding structures. *See id.*

As an initial matter, the parties agree that the term is governed by § 112 ¶ 6, and have further agreed to various functions of "resonant circuit means." As to Claim 9 of the '841 patent[30] and Claim 1 of the '799 patent, the parties agree that the "resonant circuit means" has two functions: (1) "generating a high frequency voltage in response to the rectified AC input voltage" and (2) "varying the level of power supplied to the lamp in response to the dimming signal provided by the dimming means." With respect to Claim 25 of the '841 patent and Claim 17 of the '799 patent, the function is "generating a high frequency voltage in response to the rectified AC input voltage."

A. Nested Means-Plus-Function Element

GE contends that the "resonant circuit means" is a component of the "ballast circuit means" or ballast circuit, as reflected by the claim language. GE RESPONSE AT 21-22. Plaintiffs disagree, but provide no support. *See* PLTFFS' BRIEF AT 13. The Court finds that the "resonant circuit means" is a part of the ballast circuit, as described in Claim 9 of the '841 patent, and the "ballast circuit means," as recited in Claim 25 of the '841 patent and Claims 1 and 17 of the '799 patent.

[29] *See* SECTION XI *supra*.
[30] Claims 9 and 25 of the '841 patent are not asserted against TCP.

A portion of Claim 25 of the '841 patent is set forth below and is exemplary of the other claims in dispute. The claim language plainly states that the "ballast circuit means" includes the "resonant circuit means":

> 25. A fluorescent lamp apparatus for connection to an AC input voltage and to at least one fluorescent lamp, said lamp apparatus comprising:
> . . .
> ballast circuit means in circuit with said rectification means and said voltage doubler means and arranged for connection with the lamp for applying power variably thereto, said ballast circuit means including:
> resonant circuit means for generating a high frequency voltage in response to said rectified voltage.

'841 patent at 22:31-45; *see also id.* at 21:1-11; '799 patent at 12:45-55; 14:16-22. Because the claim language explicitly states that the ballast circuit means includes the resonant circuit means, the Court finds that the resonant circuit means is a component of the ballast circuit means.[31]

B. Corresponding Structure

Turning to a discussion of the corresponding structure, the Court finds that resonant circuit stage 52 performs the functions of (1) "generating a high frequency voltage in response to the rectified AC input voltage" and (2) "varying the level of power supplied to the lamp in response to the dimming signal provided by the dimming means."

Tele-Cons asserts that only some of the components that comprise resonant circuit stage 52—specifically Q1, Q2, L3 and C7—actually perform the functions recited above. PLTFFS' BRIEF AT 13-14. Defendants, however, contend that the entirety of stage 52, rather than mere

[31] Note that Claim 9 of the '841 patent recites "said ballast circuit comprising[] resonant circuit means . . . ." '841 patent at 21:1-11.

components of stage 52, comprise the corresponding structure for "resonant circuit means." GE RESPONSE AT 22-23.[32]

As shown in the excerpts below, the resonant circuit stage generates a high frequency voltage in response to the input signal:

- "Further, the resonant circuit 52 generates a high frequency voltage feedback signal on line 55 . . . ." '841 patent at 5:17-18;

- "The inductor L3 stores energy along with the capacitors C7, C8 and C9, forming a series resonant circuit. These components produce a current having a selected elevated frequency . . . during normal operation of the ballast circuit. This high-frequency operation reduces hum and other electrical noises delivered to the lamp load. Additionally, high-frequency operation of the lamp load reduces the occurrence of annoying flickering of the lamp." '841 patent at 8:20-28; *see also* '799 patent at 8:57-65;

- "[T]he ballast circuit includes a resonant circuit stage that electrically connects with the lamp and that generates a high frequency voltage in response to the input voltage." '799 patent at 2:56-59;

- "The ballast circuit includes a resonant circuit stage for generating a high frequency voltage in response to the rectified voltage, and a voltage feedback stage." '799 patent at 3:55-58.

Further, the respective disclosures describe that resonant circuit 52 also varies the level of power supplied to the lamp in response to a dimming signal:

- "The dimming stage 56 is electrically connected to the resonant circuit and power factor stage 52 and produces an output dimming signal for varying the current supplied to the lamp load 60 by the resonant circuit 52." '841 patent at 13:9-13;

- "The improved ballast circuit may also include a dimming stage which works with the active resonant circuit to vary the amount of power that is supplied to the lamp load." '841 patent, ABSTRACT;

- "The resonant circuit varies the level of power supplied to the lamp in response to the dimming signal, thereby attaining a selected level of lamp brightness." '799 patent, Abstract; *see also id.* at 2:59-62; 3:64-4:3;

[32] Because Claims 9 and 25 of the '841 patent are not asserted against TCP, TCP provides argument for corresponding structure only with regard to the '799 patent. TCP RESPONSE AT 21-22. In particular, TCP notes that stage 52 includes the following components: resistors R2 and R4, transistors Q1 and Q2, diodes D4 and D5, capacitors C5, C6, C7 and C9, and inductors L3, L4 and L5. *Id.* at 22.

- "The output of the resonant circuit 52 is connected, powerwise, in series with the lamp load 60. The resonant circuit is also electrically connected to the dimming control stage 56, and is responsive to an output dimming signal produced by the dimming stage 56 for varying the current supplied to the lamp load." '799 patent at 7:13-18.

Thus, the '799 and '847 patent disclosures are replete with descriptions clearly linking the resonant circuit stage 52 with the function of "varying the level of power supplied to the lamp in response to the dimming signal provided by the dimming means" and "generating a high frequency voltage in response to the rectified AC input voltage."

As stated above, Tele-Cons maintains that the entirety of resonant circuit stage 52 does not actually perform the functions recited above. For example, Tele-Cons asserts that although capacitor C9 is a component of stage 52, C9 is not necessary to create a resonant circuit. PLTFFS' BRIEF AT 13-14. Because the patent specifications describe stage 52 as "a resonant circuit and power factor stage," Tele-Cons argues that not all components within stage 52 are needed to perform the recited functions. *Id.* Indeed, the specifications describe stage 52 as a resonant circuit and power factor stage. '799 patent at 7:6-7; '841 patent at 5:6. However, the respective patent disclosures explicitly state that capacitor C9 is part of the resonant circuit: "The inductor L3 stores energy along with the capacitors C7, C8 and C9, forming a series resonant circuit." '841 patent at 8:20-21; *see also id.* 6:32-36 ("The resonant stage 52 further comprises . . . voltage feedback capacitor C9."); '799 patent at 8:57-58 (same). As noted above, the respective patent disclosures note that resonant stage 52 varies the level of power to the lamp in response to the dimming means, as well as generates a high frequency voltage in response to the input voltage, without distinguishing between individual components within stage 52. Further, Tele-Cons fails to persuade the Court that only certain portions of stage 52 perform the recited functions, much less which components do so. Therefore, the Court declines to parse resonant circuit stage 52 into distinctive components to discern the corresponding structure for "resonant circuit means."

Accordingly, the corresponding structure for all the above functions is resonant circuit stage 52, as shown in Figure 4 of the '799 patent and Figures 4 or 11 in the '841 patent, and equivalents. Further, the resonant circuit means is a part of the ballast circuit (Claim 9 of the '841 patent) or the ballast circuit means (Claim 25 of the '841 patent and Claims 1 & 17 of the '799 patent). Finally, as iterated above, there is no requirement that the "resonant circuit means" self-resonate. *See* SECTION XI.

XIII. "voltage feedback means . . ."[33]

Plaintiffs' Proposed Construction	GE & TCP's Proposed Construction
Governed by 35 U.S.C. § 112 ¶ 6 **Function for "feedback means"** – conducting a current and/or voltage signal from one part of the circuit to another part of the circuit. Plaintiffs contend that "feedback means" should be construed as a single term that is then applied to the relevant claims, as this will (a) reduce the number of separate issues for the Court to resolve; and (b) provide consistency in the construction of this term across all relevant claims. Plaintiffs contend that "feedback means" generally has the function "conducting a current and/or voltage signal from one part of the circuit to another part of the circuit."	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** **('799–1):** (a) generating a selected high frequency voltage signal and (b) applying said voltage signal to said rectification means whereby the high frequency voltage signal is superimposed over the AC input voltage. **('799–27):** feeding back to the rectification means the selected high frequency voltage provided by the series resonant circuit as a voltage level at least substantially equal to the input voltage. **('799-17):** generating a selected high frequency voltage signal that is superimposed over the AC input voltage. **Function:** **('841–7, 25):** (a) generating a selected high frequency voltage signal that is superimposed over the AC input voltage; and (b) providing a high frequency feedback voltage in parallel with the AC input voltage. **('841-9 – "first feedback means")**: connecting a portion of the high frequency signal produced by the resonant circuit means back to the first AC voltage rail. **('841-9 – "second feedback means" - if not found indefinite)**: connecting all the signal components produced by the series resonant means back to the second AC voltage rail.
Structure for "feedback means": (all claims) line 55, the connection created by capacitor C9, or both (see below). '799 Patent at 4:40–45, 7:19–21, 8:6–7, 9:26–30; '841 Patent at 5:17–20, 6:36, 7:5–9, 8:61–66.	**Corresponding Structure ('799 Patent):** The corresponding structure is capacitor C9 in Fig. 4 of the '799 Patent and the combination of: (i) the electrical connection provided by between the end of capacitor C9 and the junction between capacitors C3, and C4 as described in the text of the '799 Patent but not shown in Fig. 4 of the '799 patent as a result of uncorrected errors in the patent figures and (ii) the electrical connection

[33] This term is contained in Claims 1, 17 and 27 of the'799 patent and Claims 9 and 25 of the '841 patent.

There are two structures for "feedback" disclosed in the patents: (1) line 55 as depicted in Fig. 4 of the '799 Patent and Figs. 4 and 11 in the '841 Patent; and (2) the connection created by capacitor C9 as depicted in Fig. 4 of the '799 Patent and Figs. 4 and 11 in the '841 Patent. Thus, a "feedback means" could be line 55, C9, or the combination of both. NOTE: There is a "dot" or connection missing between C3 and C4 in Fig. 4 of the '799 Patent and Fig. 11 of the '841 Patent. The connection is shown correctly in Fig. 4 of the '841 Patent.	between the other end of the capacitor C9 and the junction of diodes D1 and D2 as shown by line 55 in Fig. 4 of the '799 Patent as described in the '799 Patent's specification at 4:40-45, 7:19-21 and 9:26-62. **Corresponding Structure ('841 Patent)**: To the extent that the Court does not find claim 9 of the '841 Patent indefinite for reciting "the signal components" for the reasons set forth in DISPUTED TERM #9, the corresponding structure for the "first feedback means" is the capacitor C9 connected as shown in FIG. 11 of the '841 Patent and the corresponding structure for the "second feedback means" is the line 55 as shown in FIG. 11 of the '841 Patent and as described in the '841 Patent at 5:17–20, 6:36, 7:5–9, 8:61–66. NOTE: Claims 7, 9, 25 and 26 of the '841 patent are not asserted against TCP.

Tele-Cons maintains that "feedback means," rather than "voltage feedback means" should be construed for simplicity, particularly because "first feedback means" and "second feedback means" also require construction. PLTFFS' BRIEF AT 10-11. Thus, construing "feedback means" would provide consistency in construction of the term across all claims. *Id.* at 11. Defendants disagree, maintaining that "voltage feedback means" should be the term to be construed, and further, the functions related to the voltage feedback means differ depending on the language recited in the claim. *See* GE RESPONSE AT 23.

The Court agrees that "voltage feedback means" should be construed, and similarly, "first feedback means" and "second feedback means" should be construed separately. Although "feedback means" consistently appears in the disputed claims, the majority of the claims at issue—Claims 1, 17 and 27 of the '799 patent and Claim 9 and 25 of the '841 patent—recite a specific feedback means, particularly a "voltage feedback means." Further, the function for each of these means-plus-function elements are the functions recited by the claim language. *Micro Chemical*, 194 F.3d at 1258. Each claim containing "voltage feedback means" recites a different function; therefore, a generic construction for the term "feedback means" would be erroneous as

a matter of law. Consequently, the Court must construe each phrase containing "voltage feedback means" separately.

Turning to the parties' arguments regarding corresponding structure, Tele-Cons asserts that two structures are disclosed in the patents: line 55 and the connection created by capacitor C9.[34] PLTFFS' BRIEF AT 11. Tele-Cons maintains that the "feedback means" may be line 55, the connection created by capacitor C9, or both. *Id.* As for "first and second feedback means," Tele-Cons asserts that the corresponding structure is both line 55 and the connection created by capacitor C9. *Id.* at 12.

Defendants seem to agree that the patents disclose line 55 and the electrical connection between capacitor C9 and the junction between capacitors C3 and C4[35] as the structure linked to the recited functions. GE RESPONSE AT 24-25. However, unlike Tele-Cons, Defendants contend that the corresponding structure for the voltage feedback means is *both* line 55 *and* the connection created by capacitor C9. *Id.* at 25.

A. The '799 Patent

Claim 1 of the '799 patent recites "voltage feedback means electrically in series with the lamp and in electrical communication with said resonant circuit means and with said rectification means, for generating a selected high frequency voltage signal and for applying said voltage signal to said rectification means, whereby said high frequency voltage signal is superimposed over said AC input voltage." The function for this phrase is "generating a selected high frequency voltage signal and applying the voltage signal to the rectification means."

[34] Note that a connection that is shown in Fig. 4 of the '841 patent was mistakenly omitted from the rest of the figures. The connection shows that one terminal of capacitor C9 connects to a point between capacitors C3 and C4. '841 PATENT, FIG. 4.

[35] In its response GE states that the corresponding structure, in part, "is the electrical connection between the other end of the capacitor C9 and the junction between the capacitors C1 and C2." GE RESPONSE AT 24. However, the Court notes that the connection GE discusses is between capacitors C3 and C4. *See supra* note 35; MARKMAN TRANSCRIPT AT 7:25-8:10.

The ‘799 patent links capacitor C9 and the two connections arising from respective terminals of capacitor C9 as the structure that generates a high frequency voltage signal and applies the signal to the rectification means. The specification notes that the voltage drop across C9 generates a high frequency voltage signal and the signal is then carried to the rectification means, diodes D1 and D2 (*see* SECTION XI *supra* pp. 38-40):

> The capacitor C9 operates both as a dc blocking capacitor for preventing the passage of unwanted dc voltage along the neutral rail 41B, and *as a feedback capacitor for feeding back a selected high frequency voltage level to the input of the voltage amplification stage 48*. As previously stated, the voltage drop across the capacitor C9 is preferably in the range of the input voltage, and most preferably is greater than the input voltage value. This elevated feedback voltage expands the conduction angle of the diodes D1 and D2, essentially forcing them to conduct during nearly the entire portion of each voltage cycle, thereby compensating for the non-linearities of the diodes. *The high frequency voltage, supplied by the feedback capacitor* modulates the amplitude of the low frequency input voltage, which in turn functions as a carrier to transport the high frequency current over substantially the entire low frequency cycle.

‘799 patent at 9:26-30 (emphasis added); *see also id.* at 3:39-45 (“[T]he voltage feedback element comprises a capacitive element for storing a selected elevated voltage level . . . .”); 8:7 (“voltage feedback capacitor C9”). This particular portion of the specification discloses that the voltage drop across capacitor C9 generates a high frequency voltage signal. The signal then travels to the input of the rectification and voltage amplification stage 48, more specifically, to the rectification means, diodes D1 and D2. Looking to Figure 4, the signal travels from the terminals of C9 via line 55 and the connection between capacitors C3 and C4. *See id.* at 8:29-30 (“The feedback storage capacitor C9 is connected in series between the neutral rail 41B and the lamp connection 61C.”); 7:19-21 (“The resonant circuit 52 generates a voltage feedback signal 55 that electrically communicates with the voltage amplification stage 48.”).

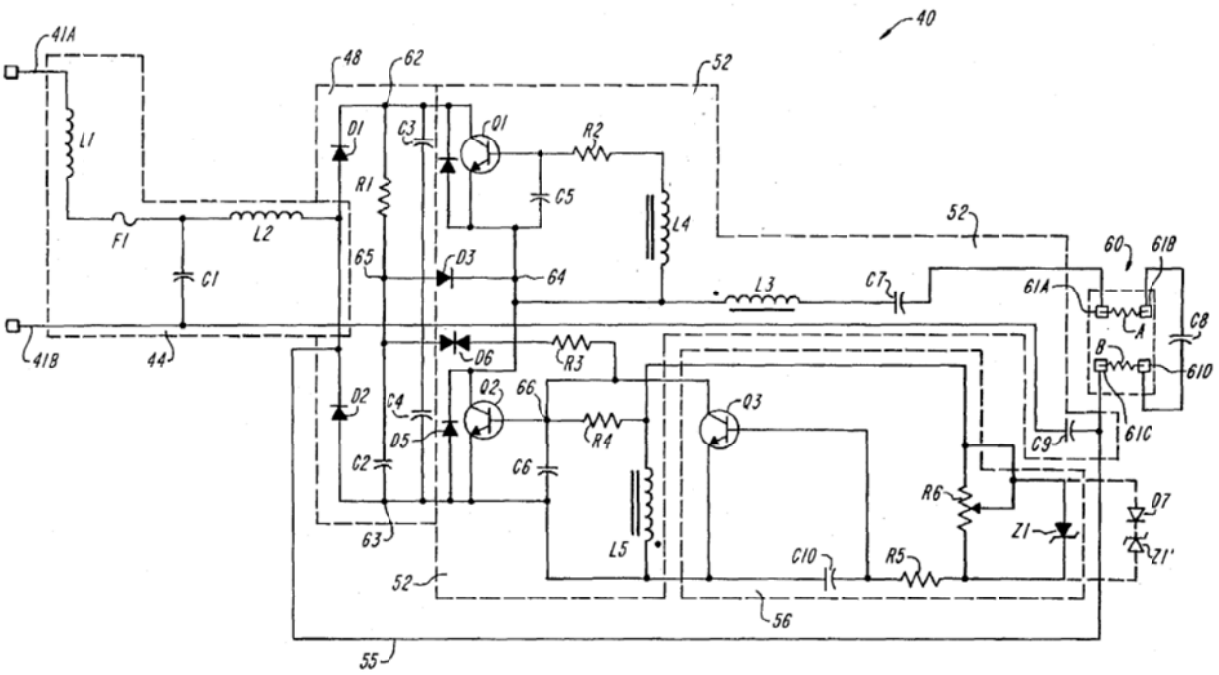

FIG. 4

Thus, the structure that "generat[es] a selected high frequency voltage signal and appl[ies] the voltage signal to the rectification means" is capacitor C9 and the two connections arising from respective terminals of capacitor C9 and equivalents.

The "voltage feedback means" phrase in Claim 17 of the '799 patent is as follows: "voltage feedback means, in electrical communication with said resonant circuit means and said rectification means, for generating a selected high frequency voltage signal, whereby said high frequency voltage signal is superimposed over said AC input voltage." The recited function is "generating a selected high frequency voltage signal." For the reasons stated above, the structure is capacitor C9 and equivalents.

Claim 27 of the '799 patent recites "voltage feedback means in circuit with said resonant circuit for feeding back to said rectification means said selected high frequency voltage at a selected elevated voltage level at least substantially equal to said input voltage." The Court finds the function is "feeding back to said rectification means said selected high frequency voltage at a

selected elevated voltage level at least substantially equal to said input voltage." For the reasons stated with regard to Claim 1, the structure corresponding to the recited function is capacitor C9, along with the two connections arising from respective terminals of C9, and equivalents.

B. The '841 Patent

As for the '841 patent, a variation of "voltage feedback means" appears in Claims 9 and 25. Claim 9 recites a "first feedback means" and a "second feedback means." With regard to "first feedback means," the Court finds that the function of "first feedback means connecting a portion of the high frequency signal produced by said resonant circuit means back to said first AC voltage rail" is "connecting a portion of the high frequency signal produced by said resonant circuit means back to said first AC voltage rail." In addition, Claim 9 recites "second feedback means connecting the signal components produced by said resonant circuit means back to said second AC voltage rail." The function for this phrase is "connecting the signal components produced by said resonant circuit means back to said second AC voltage rail."

Figures 3 and 10 illustrate that a portion of the output of the resonant circuit stage 52, is connected to the voltage input rail via line 55. Further, the output of resonant circuit stage 52 culminates in feedback capacitor C9: "The feedback capacitor C9 feeds back a selected high frequency voltage level to the input of the voltage amplification stage 48. The capacitor C9 divides a high frequency feedback current from the lamp load between the neutral rail and the input of the rectification circuit." *See* '841 patent at 8:61-66; *see also id.* at 9:49-50 ("The high frequency voltage, supplied by the feedback capacitor C9 . . . ."). "The charging end of the feedback storage capacitor C9 is connected to the neutral rail 41b and the opposite end of the capacitor C9 is connected to the lamp connection 61c and to an input of the rectifier and voltage amplifier stage 48 via feedback path 55." '841 patent at 7:5-9; *see also id.* at 5:17-20 ("Further,

the resonant circuit 52 generates a high frequency voltage feedback signal on line 55 that is electrically connected to the respective inputs of the voltage amplification stage 48."). Thus, the signals resulting from the resonant circuit means may travel via line 55 or the path connected to neutral rail 41b, terminating between capacitors C3 and C4. *See id.*, Figure 11.

The claim language necessitates that the "second feedback means" be different from the "first feedback means." As noted above, the first feedback means connects a portion of the high frequency signal. Therefore, the corresponding structure for the "first feedback means" is the connection starting at capacitor C9 and terminating between C3 and C4, and equivalents ("[t]he ballast circuit includes a feedback capacitor which provides a feedback path for a *portion* of the high frequency current to the rectifier and voltage amplification stage." '841 patent, ABSTRACT (emphasis added)); and corresponding structure for the "second feedback means" is Line 55 and equivalents.

Finally, Claim 25 of the '841 patent states "voltage feedback means, in electrical communication with said resonant circuit means and said rectification means, for generating a selected high frequency voltage signal, whereby said high frequency voltage signal is superimposed over said AC input voltage, said voltage feedback means further providing a high frequency feedback voltage in parallel with said AC input voltage." The Court finds that the function is "generating a selected high frequency voltage signal." As stated above, capacitor C9 generates a high frequency voltage signal. *See id.* at 8:61-63 ("The feedback capacitor C9 feeds back a selected high frequency voltage level to the input of the voltage amplification stage 48."). Therefore, the corresponding structure is capacitor C9 and equivalents.

CONCLUSION

For the foregoing reasons, the Court adopts the constructions set forth above.

So ORDERED and SIGNED this 31st day of July, 2012.

JOHN D. LOVE
UNITED STATES MAGISTRATE JUDGE