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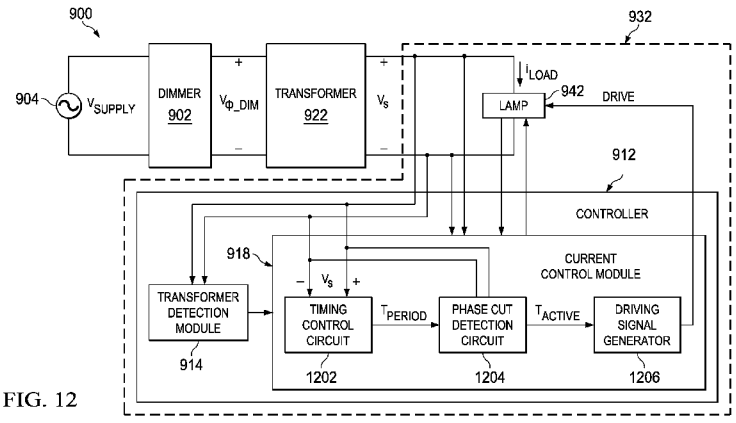

FIG. 12

(57) Abstract: A system and method for providing compatibility between a load and a secondary winding of a magnetic transformer driven at its primary winding by a trailing-edge dimmer may include determining from a magnetic transformer secondary signal a period of a half-line cycle of an output signal of the dimmer, determining from the magnetic transformer secondary signal an estimated occurrence of an end of a phase-cut angle of the dimmer, and generating a driving signal to the load based on the period and the estimated occurrence of the end of the phase-cut angle. A lamp assembly may include a lamp for generating light and a controller for controlling operation of the lamp, the controller comprising a timing control circuit for determining a period of a periodic signal received by the lamp assembly.

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AMENDED CLAIMS
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WHAT IS CLAIMED IS:

1. An apparatus comprising:

a controller to provide compatibility between a load and a secondary winding of a magnetic transformer driven at its primary winding by a leading-edge dimmer, wherein the controller is configured to:

determine from a magnetic transformer secondary signal a period of a half-line cycle of an output signal of the dimmer;

determine from the magnetic transformer secondary signal an estimated occurrence of an end of a phase-cut angle of the dimmer; and

generate a driving signal to the load based on the period and the estimated occurrence of the end of the phase-cut angle.

2. The apparatus of Claim 1, wherein the controller comprises a timing control circuit to determine the period of the half-line cycle of the output signal of the dimmer.

3. The apparatus of Claim 2, wherein the timing control circuit comprises a phase-locked loop.

4. The apparatus of Claim 2, wherein the timing control circuit comprises a delay-locked loop.

5. The apparatus of Claim 1, the controller configured to determine the estimated occurrence of the end of the phase-cut angle based at least on a determination of an estimated time at which the magnetic transformer secondary signal exceeds a predetermined threshold magnitude.

6. The apparatus of Claim 1, the controller configured to determine the estimated occurrence of the end of the phase-cut angle based at least on a determination of an estimated time at which the magnetic transformer secondary signal falls below a predetermined threshold magnitude.

7. The apparatus of Claim 1, the controller configured to determine the estimated occurrence of the end of the phase-cut angle based on at least a determination of an estimated portion of the period in which the magnetic transformer secondary signal is greater than a predetermined threshold magnitude.

8. The apparatus of Claim 1, wherein the load comprises a lamp and the driving signal is indicative of an intensity of light to be generated by the lamp.

9. The apparatus of Claim 8, wherein the lamp comprises a light-emitting diode lamp.

10. The apparatus of Claim 8, wherein the lamp comprises a lamp having a multifaceted reflector form factor.

11. A method for providing compatibility between a load and a secondary winding of a magnetic transformer driven at its primary winding by a leading-edge dimmer comprising:

determining from a magnetic transformer secondary signal a period of a half-line cycle of an output signal of the dimmer;

determining from the magnetic transformer secondary signal an estimated occurrence of an end of a phase-cut angle of the dimmer; and

generating a driving signal to the load based on the period and the estimated occurrence of the end of the phase-cut angle.

12. The method of Claim 11, further comprising determining the period of the half-line cycle of the output signal of the dimmer using a phase-locked loop.

13. The method of Claim 11, further comprising determining the period of the half-line cycle of the output signal of the dimmer using a delay-locked loop.

14. The method of Claim 11, further comprising determining the estimated occurrence of the end of the phase-cut angle based at least on a determination of an estimated time at which the magnetic transformer secondary signal exceeds a predetermined threshold magnitude.

15. The method of Claim 11, further comprising determining the estimated occurrence of the end of the phase-cut angle based at least on a determination of an estimated time at which the magnetic transformer secondary signal falls below a predetermined threshold magnitude.

16. The method of Claim 11, further comprising determining the estimated occurrence of the end of the phase-cut angle based at least on a determination of an estimated time at which the magnetic transformer secondary signal is greater than a predetermined threshold magnitude.

17. The method of Claim 11, wherein the load comprises a lamp.

18. The method of Claim 17, wherein the lamp comprises a light-emitting diode lamp.

19. The method of Claim 17, wherein the lamp comprises a multifaceted reflector form factor.

20. A lamp assembly comprising:

a lamp for generating light; and

a controller for controlling operation of the lamp, the controller comprising a timing control circuit for determining a period of a periodic signal received by the lamp assembly, wherein the timing control circuit comprises one of a phase-locked loop and a delay-locked loop.

21. The lamp assembly of Claim 20, wherein the lamp comprises a light-emitting diode lamp.

22. The lamp assembly of Claim 20, wherein the lamp assembly comprises a multifaceted reflector form factor.

23. An apparatus comprising:

a controller to provide compatibility between a load and a secondary winding of a transformer driven at its primary winding by a dimmer, wherein the controller is configured to:

determine from a signal indicative of a transformer secondary signal whether the transformer comprises a magnetic transformer or an electronic transformer; and

select a compatibility mode of operation from a plurality of modes of operation based on the determination of whether the transformer comprises a magnetic transformer or an electronic transformer.

24. The apparatus of Claim 23, wherein the controller is further configured to determine whether the transformer is a magnetic transformer or an electronic transformer based on a frequency of oscillation of the signal.

25. The apparatus of Claim 23, wherein the controller is further configured to:

determine that the transformer is an electronic transformer if the frequency of oscillation of the signal is greater than a first predetermined threshold frequency; and

determine that the transformer is a magnetic transformer if the frequency of oscillation of the signal is lesser than a second predetermined threshold frequency.

26. The apparatus of Claim 25, wherein the first predetermined frequency is equal to the second predetermined frequency.

27. The apparatus of Claim 23, wherein the controller is further configured to detect occurrence of alternating phases of the signal responsive to determining from the signal that the transformer is a magnetic transformer.

28. The apparatus of Claim 27, wherein the controller is further configured to:

measure an amount of electrical energy delivered to the load in each of the alternating phases; and

based on the measurement of delivered electrical energy, compensate for any imbalance in delivery of electrical energy to each of the alternating phases.

29. The apparatus of Claim 23, wherein the load comprises a lamp.

30. The apparatus of Claim 29, wherein the lamp comprises a light-emitting diode lamp.

31. The apparatus of Claim 29, wherein the lamp comprises a multifaceted reflector form factor.

32. A method for providing compatibility between a load and a secondary winding of a transformer driven at its primary winding by a dimmer comprising:

determining from a signal indicative of a transformer secondary signal whether the transformer comprises a magnetic transformer or an electronic transformer; and

selecting a compatibility mode of operation from a plurality of modes of operation based on the determination of whether the transformer comprises a magnetic transformer or an electronic transformer.

33. The method of Claim 32, further comprising determining whether the transformer is a magnetic transformer or an electronic transformer based on a frequency of oscillation of the signal.

34. The method of Claim 32, further comprising:

determining that the transformer is an electronic transformer if the frequency of oscillation of the signal is greater than a first predetermined threshold frequency; and

determining that the transformer is a magnetic transformer if the frequency of oscillation of the signal is less than a second predetermined threshold frequency.

35. The method of Claim 34, wherein the first predetermined frequency is equal to the second predetermined frequency.

36. The method of Claim 34, further comprising detecting occurrence of alternating phases of the signal responsive to determining that the transformer is a magnetic transformer.

37. The method of Claim 36, further comprising:

measuring an amount of electrical energy delivered to the load in each of the alternating phases; and

based on the measurement of delivered electrical energy, compensating for any imbalance in delivery of electrical energy to each of the alternating phases.

38. The method of Claim 32, wherein the load comprises a lamp.

39. The method of Claim 38, wherein the lamp comprises a light-emitting diode lamp.

40. The method of Claim 38, wherein the lamp comprises a multifaceted reflector form factor.