DECLARATION OF RICH SEIFERT IN SUPPORT OF PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,942,107

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I, Rich Seifert, declare as follows:

I. Introduction

1. I am an expert in the field of communication systems. I submit this declaration on behalf of Petitioners AMX and Dell, Inc. (collectively, "Petitioner") to analyze, render opinions, and/or provide expert testimony regarding the validity of certain claims of U.S. Patent No. 8,942,107 ("the '107 patent"). I understand that Petitioner submitted the '107 patent as Exhibit 1003.

2. I am being compensated at my usual rate of $400 per hour for the time spent by me in connection with these proceedings. This compensation is not contingent upon my opinions or the outcome of the proceedings. I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would competently testify to them under oath.

II. Background/Qualifications

3. I am currently the President of Networks & Communications Consulting in Los Gatos, California. I received a Bachelor in Engineering (Electrical Engineering) degree from the City College of New York in 1976. I received a Master of Science (Electrical Engineering) degree in 1979 from the Worcester Polytechnic Institute, a Master of Business Administration degree in 1984 from Clark University, and a Juris Doctor degree in 2006 from Santa Clara University. I have over 45 years of experience in computer and communications

technology, and have worked for the past 35 years on the architecture and design of data communications networks and networking products. My curriculum vitae, which I understand has been submitted as Exhibit 1010, includes a list of publications I have authored and legal cases in which I have been involved.

III. Documents and Materials Considered

4. I understand that Petitioner has submitted a list of materials that I have considered in rendering the opinions expressed herein as Exhibit 1011. In forming my opinions, I have also relied on my experience and education.

IV. Legal Principles

5. I am not a patent attorney and offer no opinions on the law. However, I have been informed by counsel of the legal standards that apply with respect to patent validity and invalidity, and I have applied them in arriving at my conclusions.

6. I understand that in an *inter partes* review the petitioner has the burden of proving a proposition of unpatentability by a preponderance of the evidence. I understand this standard is different from the standard that applies in a district court, where I understand a challenger bears the burden of proving invalidity by clear and convincing evidence.

7. I have been informed and understand that a patent claim is invalid based on anticipation if a single prior art reference discloses all of the limitations

of that claim, and does so in a way that enables on of ordinary skill in the art to make and use the invention. Each of the claim limitations may be expressly or inherently present in the prior art reference. I understand that if the prior art necessarily functions in accordance with, or includes a claim's limitation, then that prior art inherently discloses that limitation. I have relied on this understanding in expressing the opinions set forth below.

8. I understand that a prior art reference describes the claimed invention if it either expressly or inherently describes each and every feature (or element or limitation) set forth in the claim; i.e., in determining whether a single item of prior art anticipates a patent claim, one should take into consideration not only what is expressly disclosed in that item, but also what is inherently present as a natural result of the practice of the system or method disclosed in that item.

9. It is my further understanding that to establish such inherency, the evidence must make clear that the missing descriptive matter is necessarily present in the item of prior art and that it would be so recognized by persons of ordinary skill in the art. I also understand that prior art use of the claimed patented invention that was accidental, unrecognized, or unappreciated at the time of filing can still be an invalidating anticipation.

10. I understand that although multiple prior art references may not be combined to show anticipation, additional references may be used to interpret the

allegedly anticipating reference and shed light on what it would have meant to those skilled in the art at the time of the invention. These additional references must make it clear that the missing descriptive matter in the patent claim is necessarily present in the allegedly anticipating reference, and that it would be so recognized by persons of ordinary skill in the art.

11. I also understand that a patent may not be valid even though the invention is not identically disclosed or described in the prior art if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art in the relevant subject matter at the time the invention was made.

12. To determine if a claim is obvious, the following factors should be considered: (1) the level of ordinary skill in the art at the time the invention was made; (2) the scope and content of the prior art; (3) the differences between the claimed invention and the prior art; and (4) so-called secondary considerations, including evidence of commercial success, long-felt but unsolved need, unsuccessful attempts by others, copying of the claimed invention, unexpected and superior results, acceptance and praise by others, independent invention by others, and the like.

13. For example, I understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than

yield predictable results. I also understand that an obviousness analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim because a court can take account of the inferences and/or creative steps that a person of ordinary skill in the art would employ.

14. I also understand that the obviousness determination of an invention turns on whether a hypothetical person with ordinary skill and full knowledge of all the pertinent prior art, when faced with the problem to which the claimed invention is addressed, would be led naturally to the solution adopted in the claimed invention or would naturally view that solution as an available alternative. Facts to be evaluated in this analysis include:

1. (1) the scope and contents of the prior art;
2. (2) differences between the prior art and the claims at issue;
3. (3) the level of ordinary skill in the pertinent art; and
4. (4) evidence of objective factors suggesting or negating obviousness.

15. I understand that the following rationales may be used to determine whether a piece of prior art can be combined with other prior art or with other information within the knowledge of one of ordinary skill in the art:

5. (A) Combining prior art elements according to known methods to yield predictable results;

6. (B) Simple substitution of one known element for another to obtain predictable results;

7. (C) Use of known techniques to improve similar devices (methods, or products) in the same way;

8. (D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

9. (E) "Obvious to try"—choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

10. (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art; or

11. (G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

16. I understand that when a work is available in one field of endeavor, design incentives and/or other market forces, for example, can prompt variations of

it, either in the same field or a different one. Moreover, if a person of ordinary skill can implement a predictable variation, I understand that that likely bars its patentability.

17. I understand that obviousness must be tested as of the time the invention was made. I understand that the test for obviousness is what the combined teachings of the prior art references would have suggested, disclosed, or taught to one of ordinary skill in the art. In particular, it is my understanding that a patent claim is invalid based upon obviousness if it does nothing more than combine familiar elements from one or more prior art references or products according to known methods to yield predictable results. For example, I understand that where a technique has been used to improve one device, and a person of ordinary skill in the art would have recognized that it would improve similar devices in the same way, using that technique is obvious. I understand that obviousness can be proved by showing that a combination of elements was obvious to try, i.e.: that it does no more than yield predictable results; implements a predictable variation; is no more than the predictable use of prior art elements according to their established functions; or when there is design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions. I have been further informed that when a patent claim simply arranges old elements with each element performing the same function it had been known to

perform and yields results no more than one would expect from such an arrangement, the combination is obvious.

18. I understand that another factor to be considered is common sense. For example, I understand that common sense teaches that familiar items may have obvious uses beyond their primary purposes, and, in many cases, a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.

19. I have been informed and understand that the Supreme Court articulated additional guidance for obviousness in its *KSR* decision.[1] My understanding is that the Supreme Court said that technical people of ordinary skill look for guidance in other solutions to problems of a similar nature, and that the obviousness inquiry must track reality, and not legal fictions.[2] I have relied on these understandings in expressing the opinions set forth below.

20. I understand that a new use of an old product or material cannot be

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[1] *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007).

[2] "The obviousness analysis in the patent context cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature, will drive design trends." *KSR*, 550 U.S. at 419.

claimed as a new product; the apparatus or system itself is old and cannot be patented. I further understand that, in general, merely discovering and claiming a new benefit to an old process cannot render the process newly patentable.

V. State of the Art

21. The challenged claims recite well-known structural elements of an Ethernet connector and a path coupled between two pairs of contacts. Indeed, this form of connection existed in Ethernet communication systems dating to the first Ethernet standards in 1980. Further still, twisted-pair wiring configurations, such as 10BASE-T, would use paths coupled between pairs of connector contacts because of its use of separate transmit and receive pairs, each of which allows information to be sent differentially to benefit signal propagation. As Patent Owner has admitted, the challenged claims recite these well-known structural elements.

22. The challenged claims further recite well-known functional features. For instance, the claims provide that the equipment is "to draw different magnitudes of DC current flow," that this is "to result from at least one condition applied" to a contact, and that at least one of the magnitudes is "to convey information about the piece of Ethernet terminal equipment." These are basic functional features that can be used with prior art Ethernet systems.

23. For instance, U.S. Patent No. 4,733,389 shows the following configuration:

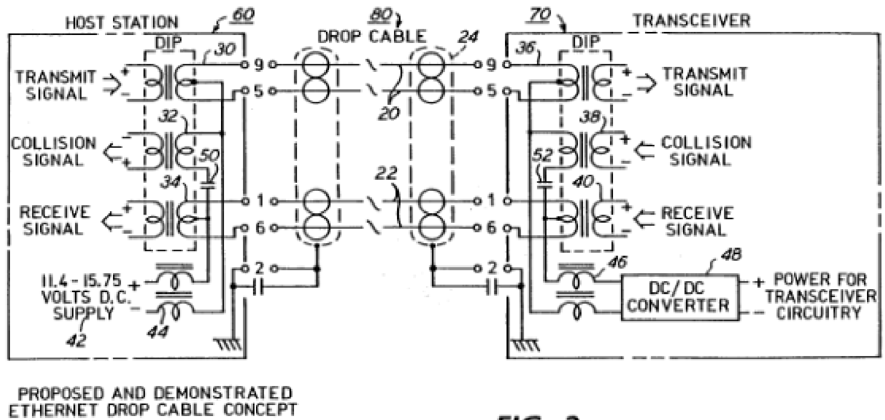


FIG. 2

(Puvogel at FIG. 2.) In this figure, the Ethernet equipment (transceiver 70) has an Ethernet connector comprising first and second pairs of contacts (e.g., pairs 1, 6 and 5, 9). Power supply 42 applies a condition, namely a DC voltage between 11.4 to 15.75 volts to pins 1 and 6. This causes transceiver 70 to draw magnitudes of DC current. The DC current returns to the host station 60 through pins 5 and 9 and conveys to the host station 60, at a minimum, whether transceiver 70 is properly connected or disconnected.

24. The path is completed through the DC/DC converter 48. Fig. 3-13 below depicts a typical DC/DC converter as used in transceiver 70:

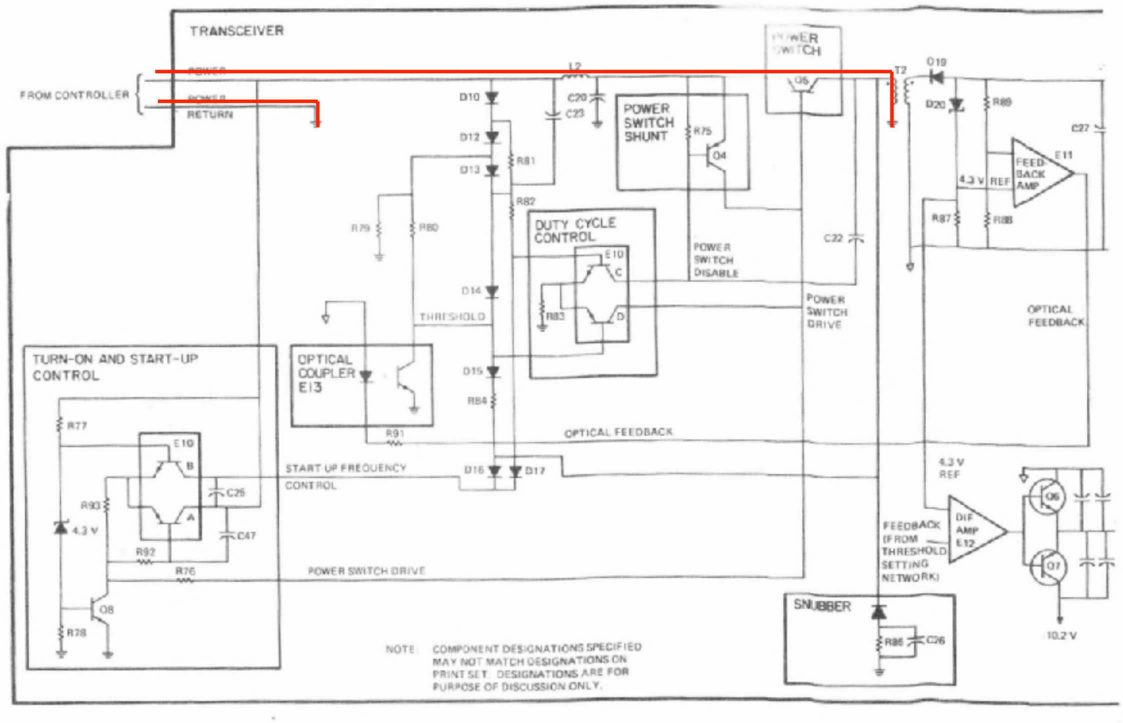


Figure 3–13: DC-to-DC Converter: Functional Schematic Diagram

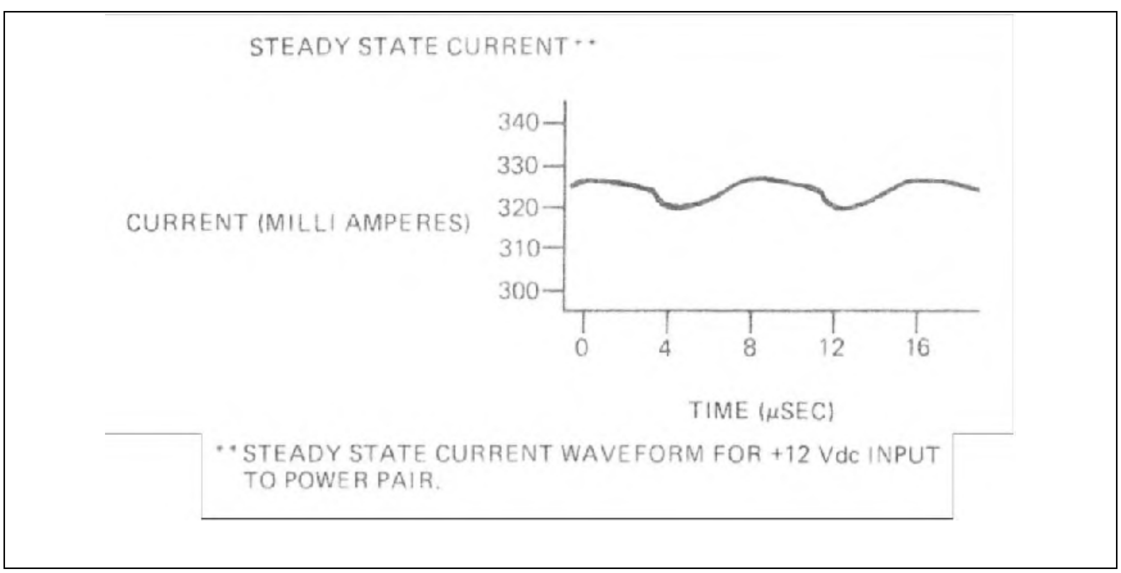
H4000 Ethernet Transceiver Technical Manual at 3-25 (annotations added).

25. From the figure, it can be seen that the path passes from the connector pin through inductor L2, power switch Q5, and the primary winding of transformer T2. T2 is connected to the Power Return signal, which is present on a second connector pin.

26. It was well-known that magnitudes of DC current can convey information about a device. In fact, this is a simple application of Ohm's law (Current (I) = Voltage (V) ÷ Resistance (R)). For example, U.S. Patent No. 2,822,519 ("Murphy) disclosed an apparatus incorporating in paths "known values of resistors and a meter with a source of direct current to identify circuits that have

been connected." (Murphy at 1:20-22.) Murphy uses multiple contacts and twisted pairs. In the context of evaluating how much power to send to a device, the same concept was recognized as well-known prior art in U.S. Patent No. 5,200,686 ("Lee"), in which the resistance in a path (measured using Ohm's law and a known voltage or current) was associated with the power charging requirements for the device.

27. Similarly, in the system shown in Fig. 2 above, a person of ordinary skill would know that a measurement of the current drain from the 11.4 to 15.75 V DC supply 42 would convey whether the transceiver was connected to the cable, and operating within its specified parameters. The IEEE 802.3 standard for 10BASE5 specifies that transceivers (such as shown in Fig. 2 above) can draw a maximum of 0.5A of DC current. IEEE 802.3 at Clause 8.3.2.2. A typical steady-state current drain from such a transceiver is shown in the figure, below:



See H4000 Ethernet Transceiver Technical Manual at 2-8.

28. A person of ordinary skill would know that a current drain on the order of a few hundred milliamps would indicate proper connection of the transceiver; a current drain exceeding 500 mA would indicate a faulty device (according to the Ethernet specification), and a very low or zero current drain would indicate either a defective or disconnected device. In this way, the magnitude of DC current drawn would convey information about the Ethernet device, resulting from the condition (i.e., the voltage applied) to the pins of its connector.

VI. Admitted Prior Art

29. As discussed below, Ethernet and Ethernet data terminal equipment were known in the prior art. An Ethernet connector comprising a plurality of contacts was also known in the prior art, and creating a path across selected contacts of that Ethernet connector was also known in the prior art.

30. In fact, Ethernet connectors comprising a plurality of contacts existed long prior to the 10BASE-T system. For example, the Ethernet Version 1 specification, published on September 30th, 1980 teaches two different Ethernet connectors, each comprising a plurality of connectors. *See generally,* Ethernet V1, Clause 7.

31. A "transceiver cable connector" comprising 15 contacts is disclosed

for connecting an Ethernet station to a physically separate transceiver.[3] Ethernet V1 at 53-56 (§7.2). A second "coaxial cable connector" comprising two contacts is disclosed for connecting sections of the shared coaxial cable communications medium. Ethernet V1 at 60 (§7.3.1.2). *See also,* IEEE 802.3-1985 at 114-115 (§8.5 et seq.)

32. It was well-known to persons of ordinary skill that having a path coupled across selected contacts of an Ethernet connector was prior art and could not be an inventive element of any claim of the '012 patent, even at the earliest possible priority date. For example, the Ethernet Version 1 Specification discloses a schematic diagram with a path coupled between contacts of the Ethernet transceiver cable connector:

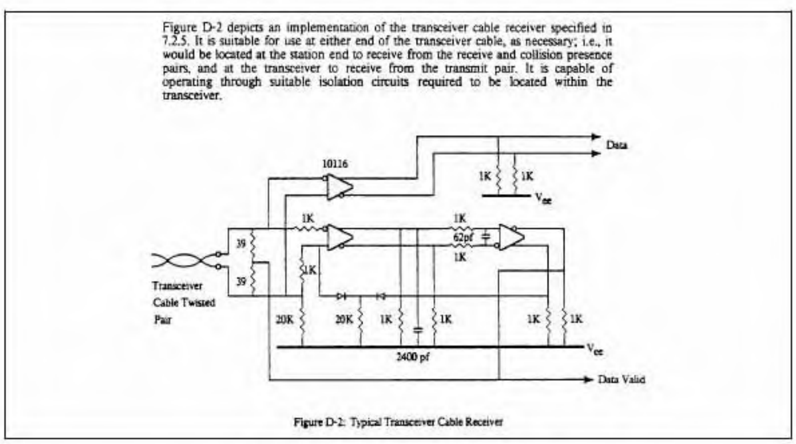


Figure D-2 depicts an implementation of the transceiver cable receiver specified in 7.2.5. It is suitable for use at either end of the transceiver cable, as necessary; i.e., it would be located at the station end to receive from the receive and collision presence pairs, and at the transceiver to receive from the transmit pair. It is capable of operating through suitable isolation circuits required to be located within the transceiver.

Figure D-2: Typical Transceiver Cable Receiver

Ethernet Version 1 at 81 (Fig. D-2)

[3] When the original Ethernet specification was transformed into the IEEE 802.3 specification, first published in 1985, the terms "transceiver cable" and "transceiver cable connector" were changed to "Attachment Unit Interface [AUI} cable" and "Attachment Unit Interface [AUI] connector. *See, generally,* IEEE 802.3-1985 Clause 7.

33. A path between two contacts of the Ethernet transceiver cable including, *inter alia*, a center-tapped 78 Ω impedance (two 39 Ω resistors in series) that will be discussed in greater detail below, is clearly shown in the figure above. Whenever electronic components of any sort (including wires, passive resistors or capacitors, active circuitry, etc.) are attached across pins of an Ethernet connector, a path is created that is coupled across selected contacts.

34. Patent Owner's expert also concedes that an Ethernet connector comprising a plurality of contacts was well-known:

> Q: Okay. So this figure is known, an Ethernet connector comprising a plurality of contacts is known, correct?
>
> A: Yes.

(Baxter Dep. Tr. at 113.)

35. Patent Owner's expert further concedes that having a path coupled across selected contacts of a given Ethernet connector was already known to persons of ordinary skill.

> Q: And you say a person would understand what it means to have a path coupled between contacts of an Ethernet connector, correct?
>
> A: Mm-hmm.
>
> …
>
> Q: But you're not asserting that the inventors invented having a path across the two contacts, right?
>
> A: No.

…

Q: …Would a person of ordinary skill in the art at the date of filing of the earliest patent application or the date of invention have already seen something similar to the schematic in paragraph 77?

A: Whether they would have seen this exact schematic or not, I don't know, but certainly you would be familiar with what the Ethernet connector is, what an impedance is, and what a path is. So I think those are very familiar concepts to anyone of skill in the art at that time and since Ethernet, you know, twisted pairing had been around for some years, certainly they would have seen schematics that had connections across the contacts of a modular jack.

(Baxter Dep. Tr. at 114-116 (objections omitted).)

36. As discussed above, terminal equipment, including terminal equipment having an Ethernet connector was known in the prior art.

37. Similarly, coupling a path across specific contacts of an Ethernet connector comprising 8 contacts (numbered 1 through 8) was also known to persons of ordinary skill. The IEEE 802.3i-1990 specification (10BASE-T) discloses such an Ethernet connector, with eight contacts numbered 1 through 8:

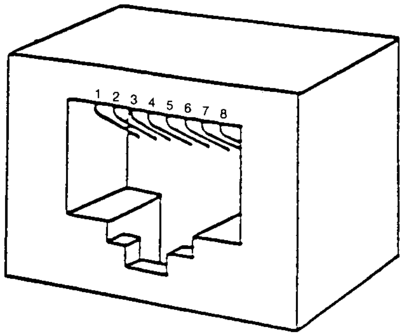


Figure 14–20—MAU MDI connect

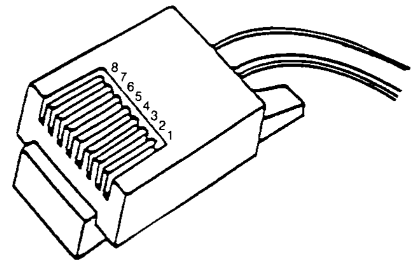


Figure 14–21—Twisted-pair link segment connector

IEEE 802.3i-1990 Figures 14-20 and 14-21: MAU MDI Connect and Twisted-pair Link Segment Connector

IEEE 802.3i-1990 at 52 (§14.5.2); *see also* IEEE 802.3-1993 at 268.

VII. Claim Construction

38. I understand that in an *inter partes* review, a claim in an unexpired patent must be given its broadest reasonable interpretation in light of the specification of the patent in which it appears.

39. Under the broadest reasonable interpretation standard, I understand that Petitioner has proposed that the following claim terms be construed as shown below.

Claim Term	**Claim(s)**	**Construction**
"BaseT"	'760 patent: claims 1, 31, 37, 58, 59, 69, 72, 73, 106, 112, 134, 142, 145 '107 patent: claim 5 '838 patent: claim 1 '019 patent: claims 1, 9-10, 14, 16-17, 19, 23-26, 28, 30-31, 38	10BASE-T

"path coupled across"	'107 patent: claims 1, 104 '019 patent: claim 1	path permitting energy transfer between [at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts]

40. When rendering an opinion, I have used these proposed constructions for these terms. For all other terms, I have applied the plain meaning of the term to a person of ordinary skill in the art.

VIII. Person of Ordinary Skill in the Art

41. I have been informed and understand that the following criteria are useful in determining the level of ordinary skill in the art with respect to a given patent: (a) the educational level of the inventor; (b) the type of problems encountered in the art; (c) prior art solutions to those problems; (d) rapidity with which innovations are made; (e) sophistication of the technology in the art; and (f) the educational level of active workers in the field. A person of ordinary skill in the art with respect to the asserted patent would have had at least a B.S. degree in electrical engineering or computer science, or the equivalent, and at least three years of experience in the design of network communications products.

42. Specifically, such a person would be familiar with, inter alia, data communications protocols, data communications standards (and standards under development at the time), and the behavior and use of common data communications products available on the market.

43. At the time of the filing dates of each of the ’760, ’107, ’838, and ’019 patents, through the time of the earliest claimed priority date of April 10, 1998, I was at least a person of ordinary skill in the art, and regularly worked with and supervised others at that level of skill.

IX. Prior Art

A. De Nicolo References

1. Overview

44. U.S. Patent No. 6,115,468 was filed on March 26, 1998, issued on September 5, 2000, and names as its inventor Maurilio Tazio De Nicolo. I refer to this patent as “De Nicolo ’468” in this declaration. I understand that Petitioner has submitted De Nicolo ’468 as Exhibit 1019.

45. U.S. Patent No. 6,134,666 was filed on March 12, 1998, issued on October 17, 2000, and also names as its inventor Maurilio Tazio De Nicolo. I refer to this patent as “De Nicolo ’666” in this declaration. I understand that Petitioner has submitted De Nicolo ’666 as Exhibit 1020.

46. Collectively, I refer to De Nicolo ’468 and De Nicolo ’666 as “the De Nicolo references” in this declaration.

2. Reasons to Combine the De Nicolo References

47. In my opinion, a person of ordinary skill in the art would have combined De Nicolo ’468 and De Nicolo ’666.

48. Both references disclose techniques for powering a controlled device.

In De Nicolo ’468, for example, a power supply 144 provides power via two twisted pairs 128a, 128b to a power processor 149, which, in turn, provides power to a portion of an Ethernet device 98. (*See, e.g.*, De Nicolo ’468 at FIG. 3.) Similarly, in De Nicolo ’666, a power supervisor 14 provides power via a query conductor 28 to a power circuit soft start 44, which, in turn, provides power to power consuming circuitry. (*See, e.g.*, De Nicolo ’666 at FIG. 1.) De Nicolo ’666 discloses that “multiple query conductors could also be used, if more convenient.” (*Id.* at 5:34-38.)

49. In addition, De Nicolo ’468’s disclosure would have motivated a skilled artisan to incorporate De Nicolo ’666’s teachings with those of De Nicolo ’468. For example, like De Nicolo ’666, De Nicolo ’468 discloses “[a] system for supplying DC power to a remote device.” (De Nicolo ’468 at claim 6.) De Nicolo ’468 shows a system with multiple devices (associated with loads 98, 100, and 102) in Figure 3. De Nicolo ’468 also provides that such a system can have one remote device. (*See, e.g.*, De Nicolo ’468 at claim 6 (“[a] system for supplying DC power to a remote device”), claim 12 (“[a] method for supplying a DC power connection and a bi-directional data connection to a remote device”, claim 16 (“[a] system for supplying DC power to a remote device over a 4-wire Ethernet connection”).) A skilled artisan would have understood that the remote device has a maximum power requirement and that it would have been desirable to provide

that remote device with a power signal that satisfies the device's power requirement. With that understanding, a skilled artisan would have incorporated De Nicolo '666's technique of determining the remote device's maximum power requirement by way of a resistor (or other component) into De Nicolo '468's system.

50. In other words, it would have been obvious to one of skill in the art to use De Nicolo '666's principle of operation together with De Nicolo '468's Ethernet-based system. Moreover, because both references name Maurilio Tazio De Nicolo as their sole inventor, a skilled artisan reviewing one of the De Nicolo references would have reviewed other references naming De Nicolo as an inventor to gain a better understanding of the disclosed teachings.

51. A person of ordinary skill in the art would have understood how to combine De Nicolo 468's teaching with De Nicolo 666's teachings. For example, De Nicolo '468's system in Figure 3 could include a single remote device (*e.g.*, a device that includes load 98) as described, for example, in claim 16 of De Nicolo '468. (De Nicolo '468 at claim 16 ("[a] system for supplying DC power to a remote device over a 4-wire Ethernet connection having a first twisted pair of conductors for transmission of data packets from said remote device and a second twisted pair of conductors for reception of data packets at said remote device").) In this system, the skilled artisan could have included De Nicolo '666's power

supervisor 14 (see Figure 1) into De Nicolo ’468’s power supply module 144 (see Figure 3) and included De Nicolo ’666’s electronic module 26 (see Figure 1) into De Nicolo ’468’s power processor 149. This is a routine, common sense design choice that is well within the skilled artisan’s knowledge and capabilities. This modification would maintain the De Nicolo ’468 circuitry’s existing purpose and functionality—providing power and data over the Ethernet pairs 128 and powering the load 98 via the power processor 149. It would also enable the power processor 149 to power the load 98 in the selective manner that De Nicolo ’666 teaches.

B. Auto-Negotiation References

1. Overview

52. The DP83840 Datasheet is titled “DP83840 10/100 Mb/s Ethernet Physical Layer” and dated November 1995. I refer to this publication as “DP83840 Datasheet” in this declaration. I understand that Petitioner has submitted DP83840 Datasheet as Exhibit 1024.

53. IEEE Std. 802.3u-1995 is titled “Media Access Control (MAC) Parameters, Physical Layer, Medium Attachment Units, and Repeater for 100 Mb/s Operation, Type 100BASE-T (Clauses 21-30)” and was approved by the IEEE Standards Board on June 14, 1995. I refer to this publication as “IEEE 802.3u-1995” in this declaration. I understand that Petitioner has submitted IEEE 802.3u-1995 as Exhibit 1025.

54. IEEE Std. 802.3 is titled "Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications" and is dated July 8, 1993. I refer to this publication as "IEEE 802.3-1993" in this declaration. I understand that Petitioner has submitted IEEE 802.3-1993 as Exhibit 1026.

55. Collectively, I refer to DP83840 Datasheet, IEEE 802.3u-1995, and IEEE 802.3-1993 as "the Auto-Negotiation references" in this declaration.

2. Reasons to Combine the Auto-Negotiation References

56. In my opinion, it would have been obvious for a person of ordinary skill in the art to combine the teachings of the DP83840 Datasheet, IEEE 802.3u-1995, and IEEE 802.3-1993.

57. The technologies disclosed in these printed publications are intended to be used together. The DP83840 Datasheet discloses an implementation of a 10/100 Mb/s Ethernet node that includes the DP83840 chip. (DP83840 Datasheet at 42 (see FIG. 15).) The DP83840 Datasheet discloses that the DP83840 chip implements "IEEE 802.3u Auto-Negotiation for automatic speed selection." (DP83840 Datasheet at 1), which involves exchanging configuration information with another Ethernet device through the use of Fast Link Pulse (FLP) Bursts. (DP83840 Datasheet at 26.)

58. The DP83840 Datasheet directs readers (which would include persons

of ordinary skill in the art) to clause 28 of the IEEE 802.3u specification for further detail regarding Auto-Negotiation. (*Id.*) IEEE 802.3u-1995 similarly explains that Auto-Negotiation provides a "means to exchange information between two devices that share a link segment and to automatically configure both devices to take maximum advantage of their abilities." (IEEE 802.3u-1995 at 235.)

59. In addition, IEEE 802.3u-1995 and IEEE 802.3-1993 constitute a single, cohesive reference, because they collectively define a single standard, specifically reference one another, and are not meant to be considered in isolation.

X. ’107 Patent

A. Summary of the ’107 Patent

60. The claims of the ’107 patent are directed to a piece of Ethernet terminal equipment comprising an Ethernet connector with first and second pairs of contacts, a path coupled across at least one contact from each pair of contacts, with functional limitations for applying a condition to at least one contact to draw different magnitudes of DC current flow, wherein at least one magnitude of the DC current conveys information about the piece of equipment. (’107 patent, at 17:11-25, 22:17-29.) The ’107 patent incorporates by reference U.S. Patent 5,406,260 (also assigned to the Patent Owner), which discloses a current loop including a portion passing through a pair of contacts. (’260 patent at 3:37-52, Fig. 2.) The ’107 patent states that the ’260 patent already disclosed:

> a means of detecting the unauthorized removal of a networked device by injecting a low current power signal into each existing communications link. A sensor monitors the returning current flow and can thereby detect a removal of the equipment. This method provides a means to monitor the connection status of any networked electronic device thus providing an effective theft detection/deterrent system. (Id. at 2:19-25).

61. The ’107 patent then states the desire to “provide a further means in which a networked device may also be identified by a unique identification number using the existing network wiring or cabling as a means of communicating this information back to a central location.” (’107 patent, at 2:26-30.) The ’107 patent discloses a modulation scheme for this purpose:

> [A] communication system is provided for generating and monitoring data over a pre-existing wiring or cables [sic] that connect pieces of networked computer equipment to a network. The system includes a communication device or remote module attached to the electronic equipment that transmits information to a central module by impressing a low frequency signal on the wires of the cable. A receiver in the central module monitors the low frequency data to determine the transmitted information from the electronic equipment. The communication device may also be powered by a low current power signal from the central module. The power signal to the communication device may also be fluctuated to provide useful information, such as status information, to the communication device. (Id. at 3:24-37).

62. The specification emphasizes modulation techniques by which the variation in current transmits identifying information. (*Id.*) In contrast, the challenged claims recite that a single magnitude of DC current is sufficient to convey information about the claimed device. (’107 patent at 17:11-25, 22:17-29.)

B. Challenged Claims

63. I understand that Petitioner is challenging the validity of claims 1, 5, 31, 43, 53, 58, 70, 72, 75, 83, 84, 103 (across 1 and 31), 104, 111, 123, and 125 (across 104, 111, and 123) of the '107 patent.

64. Claim 1 is provided below.

> A piece of Ethernet terminal equipment comprising:
>
> an Ethernet connector comprising first and second pairs of contacts used to carry Ethernet communication signals,
>
> at least one path for the purpose of drawing DC current, the at least one path coupled across at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts, the piece of Ethernet terminal equipment to draw different magnitudes of DC current flow via the at least one path, the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts, wherein at least one of the magnitudes of the DC current flow to convey information about the piece of Ethernet terminal equipment.

65. Claim 5 is provided below.

> The piece of Ethernet terminal equipment of claim 1 wherein the Ethernet communication signals are BaseT Ethernet communication signals.

66. Claim 31 is provided below.

> The piece of Ethernet terminal equipment of claim 1 wherein the DC current comprises a predetermined range of magnitudes.

67. Claim 43 is provided below.

> The piece of Ethernet terminal equipment of claim 1 wherein the information to distinguish the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment.

68. Claim 53 is provided below.

The piece of Ethernet terminal equipment of claim 1 wherein a duration of at least one of the different magnitudes of the DC current to comprise a predetermined range.

69. Claim 58 is provided below.

The piece of Ethernet terminal equipment of claim 1 wherein impedance within the at least one path changes.

70. Claim 70 is provided below.

The piece of Ethernet terminal equipment of claim 1 wherein the DC current to comprise first magnitude of DC current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude.

71. Claim 72 is provided below.

The piece of Ethernet terminal equipment of claim 1 wherein at least one magnitude of the DC current is part of a detection protocol.

72. Claim 75 is provided below.

The piece of Ethernet terminal equipment of claim 74 wherein the electrical component is a resistor.

73. Claim 83 is provided below.

The piece of Ethernet terminal equipment of claim 1 wherein the piece of Ethernet equipment comprises a controller.

74. Claim 84 is provided below.

The piece of Ethernet terminal equipment of claim 83 wherein the controller comprises firmware.

75. Claim 103 is provided below.

The piece of Ethernet terminal equipment of any one of claims 1,17, 18, 19, 21, 22, 31, 32, 46, 47, 67, 68, 85, and 86-89 and wherein the piece of Ethernet of terminal equipment is a piece of powered-off Ethernet terminal equipment.

76. Claim 104 is provided below.

> A powered-off end device comprising:
>
> an Ethernet connector comprising first and second pairs of contacts,
>
> at least one path for the purpose of drawing DC current, the at least one path coupled across at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts, the powered-off end device to draw different magnitudes of DC current flow via the at least one path, the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts, wherein at least one of the magnitudes of the DC current flow to convey information about the powered-off end device.

77. Claim 111 is provided below.

> The powered-off end device of claim 104 wherein the information to distinguish the powered-off end device from at least one other end device.

78. Claim 123 is provided below.

> The powered-off end device of claim 104 wherein at least one of the magnitudes is part of a detection protocol.

79. Claim 125 is provided below.

> The powered-off end device of any one of claims 104 through 124wherein the powered-off end device is a powered-off Ethernet end device.

XI. Invalidity Analysis of '107 Patent

A. The challenged claims are obvious based on the De Nicolo references.

1. Independent Claim 1

a. "A piece of Ethernet terminal equipment"

80. De Nicolo '468 discloses a piece of Ethernet terminal equipment comprising the elements of the claim. For instance, with reference to Figure 3, De

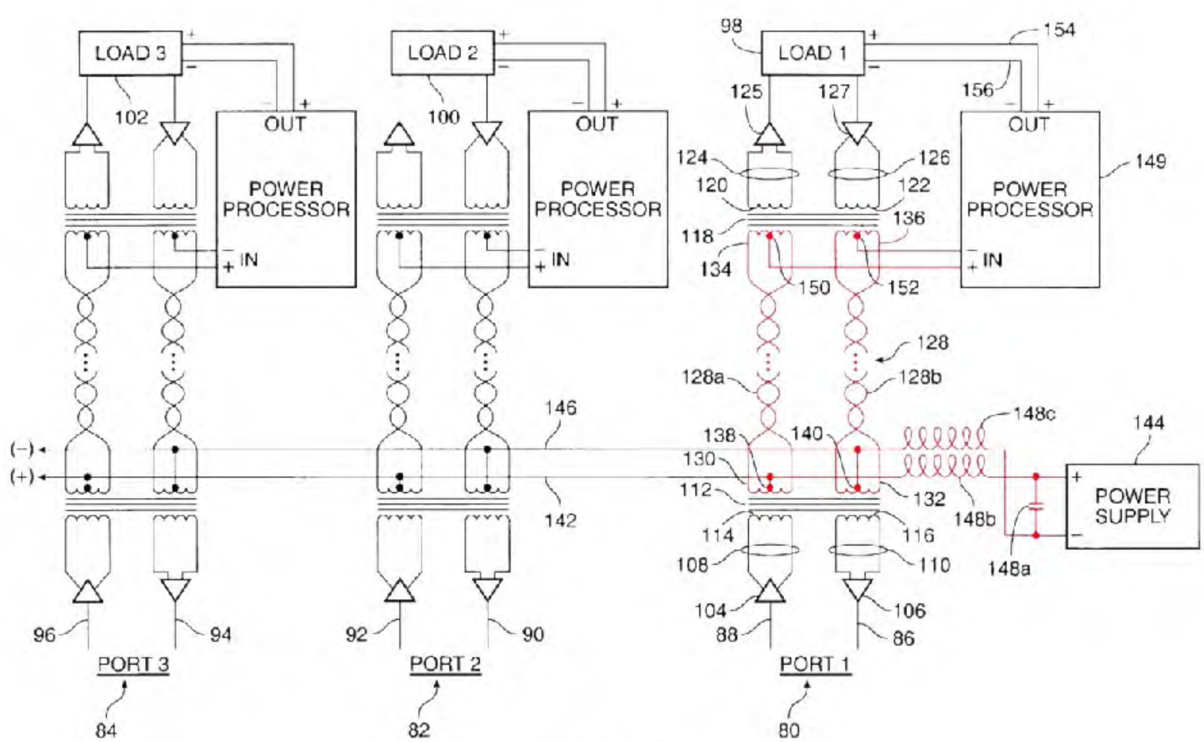
Nicolo '468 discloses a power distribution system that may be used with Ethernet telephones or other Ethernet devices. (De Nicolo '468 at 3:5-12.) In this system, for example, load 98, power processor 149, receiver 125, driver 127, and transformer 118 together constitute Ethernet terminal equipment that is connected to twisted pairs 128a and 128b. (De Nicolo '468 at 3:9-20.)

b. "an Ethernet connector comprising first and second pairs of contacts used to carry Ethernet communication signals"

81. De Nicolo '468 discloses this limitation. For instance, De Nicolo '468 discloses that "[l]oad devices 98, 100, and 102 may be Ethernet telephones and/or other Ethernet devices requiring power to be transmitted to them in addition to data over Ethernet twisted pair lines." (De Nicolo '468 at 3:9-12.) A person of ordinary skill in the art would have understood from De Nicolo '468's disclosure that an Ethernet connector with first and second pairs of contacts would have been necessary to connect the primaries 134, 136 of transformer 118, for example, to twisted pairs 128a and 128b, particularly because De Nicolo '468 discloses that its system applies "without any need for rewiring premises having an existing 4-wire Ethernet system." (De Nicolo '468 at 2:20-34.) A person of ordinary skill in the art would therefore have understood that transformer windings 134 and 136 would connect to the twisted pair wiring 128 using an Ethernet connector, comprising at least two pairs of contacts.

c. "at least one path for the purpose of drawing DC current"

82. De Nicolo '468 discloses this limitation. For example, in Figure 3 of De Nicolo '468, a path is formed from the power supply 144 to the "+" and "-" inputs of power processor 149 as shown by the annotations below. Through the path, the power processor 149 draws DC current.



(De Nicolo '468 at FIG. 3 (annotations added).)

83. Specifically, the first and second primary center taps 150, 152 connect to power processor 149 for DC power extraction. (*Id.* at Abstract.)

d. "the at least one path coupled across at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts"

84. De Nicolo '468 discloses this limitation. For example, in the

illustration above, the annotated path is coupled across twisted pairs 128a, 128b. A person of ordinary skill in the art would have understood that the path is therefore coupled across first and second pairs of contacts of the Ethernet connector, to which the twisted pairs are connected, particularly because De Nicolo '468 discloses that its system applies "without any need for rewiring premises having an existing 4-wire Ethernet system." (De Nicolo '468 at 2:20-34.)

e. "the piece of Ethernet terminal equipment to draw different magnitudes of DC current flow via the at least one path"

85. De Nicolo '468 discloses a piece of Ethernet terminal equipment that draws different magnitudes of DC current via the at least one path. For example, with reference to the figure shown above, power processor 149 can draw any suitable magnitudes of DC current from power supply 144. In addition, load 98 can draw any suitable magnitudes of DC current from the power processor 149, especially because De Nicolo '468 provides that power processor 149 can adjust the power it provides to load 98 based on the load's requirements. (De Nicolo '666 at 3:47-50.)

86. In De Nicolo '468, each load (e.g., load 98) necessarily draws different magnitudes of current in operation. For example, the load's current draw changes depending on whether it is on-hook or off-hook. As another example, the load's current draw changes depending on whether it performs basic features or

more advanced features requiring additional processing power and/or memory utilization.

87. De Nicolo ’666 discloses a piece of equipment that draws different magnitudes of DC current via at least one path. For example, as shown by the annotations below, electronic module 26 draws different magnitudes of DC current via query conductor 28, depending on whether the current flows through resistor R1 in series with query line 28. (De Nicolo ’666 at 3:40-4:9.)

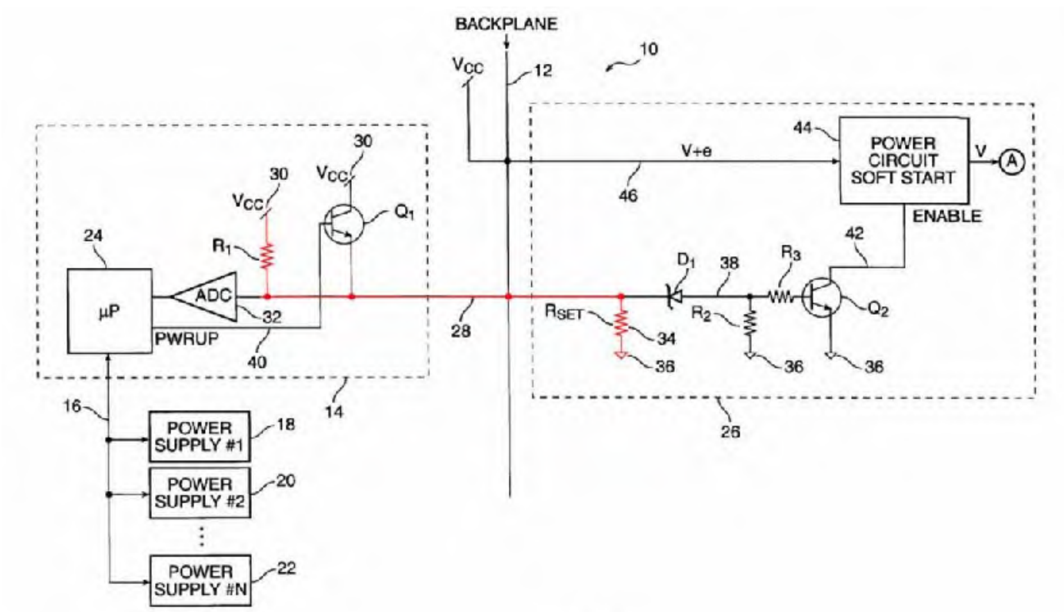


FIG. 1

(De Nicolo ’666 at FIG. 1 (annotations added).)

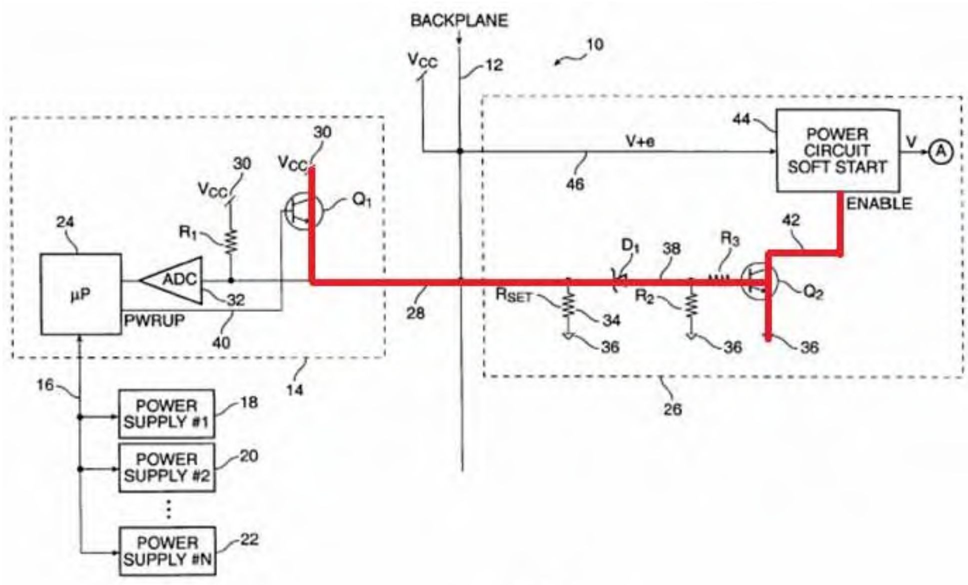


FIG. 1

(De Nicolo ’666 at FIG. 1 (annotations added).)

88. As the top figure shows, if transistor Q1 is not enabled, then the voltage Vcc drops across R1. (De Nicolo ’666 at 3:40-4:9.) In this situation, module 26 only draws current through Rset, since the voltage applied is insufficient to overcome the threshold voltage of Zener diode D1. However, if Q1 is enabled via the PWRUP line, as the bottom figure shows, then voltage Vcc does not drop across R1, resulting in a higher voltage value applied to query line 28 and, in turn, a higher magnitude of DC current through query line 28. (*Id.*) That is, in addition to the current drawn by Rset, module 26 will draw current through Zener diode D1, R2, R3, and the base-emitter junction of Q2.

89. De Nicolo ’666 also explains that the power circuit soft start 44 of the electronic module 26 draws current from VCC via a path, as illustrated below, and “slowly turn[s] on power available on line 46 and appl[ies] it to the power

consuming circuitry of module 26 denoted 'A' while ENABLE signal is asserted on line 42." (De Nicolo '666 at 4:10-15.) In this way, electronic module 26 can draw different magnitudes of DC current from voltage source Vcc via a path and power circuit soft start 44.

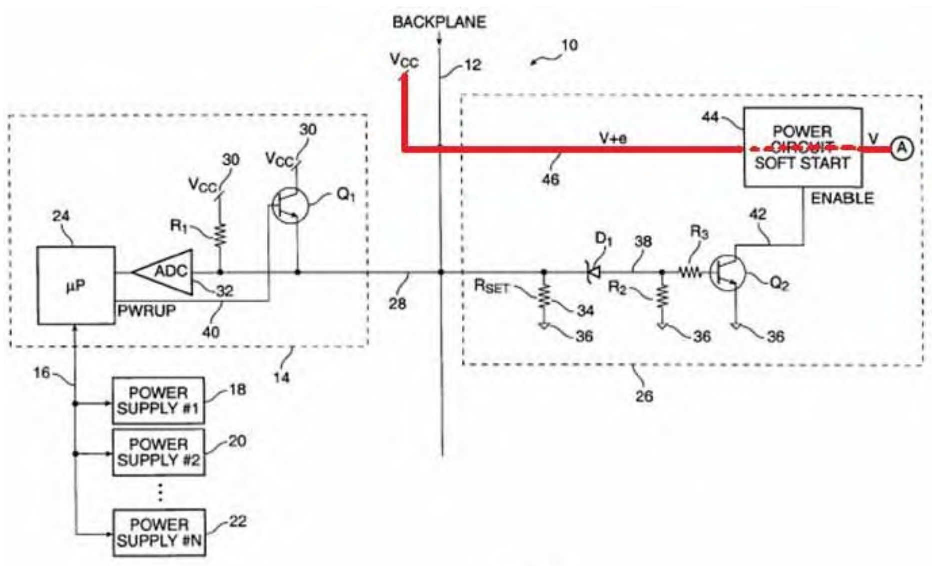


FIG. 1

(De Nicolo '666 at FIG. 1 (annotations added), 4:10-22, 5:25-38.)

90. Moreover, in Figure 4, De Nicolo '666 discloses an example of at least one path via which the electronic module can draw different magnitudes of DC current, for example, as illustrated in the annotated figure below.

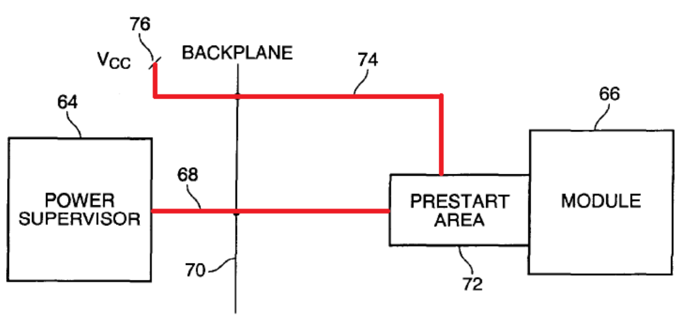


FIG. 4

(*Id.* at FIG. 4 (annotations added), 4:24-5:10).) In this illustration, "[p]restart area

72 is provided with power over line 74 from a backplane connection to Vcc 76. Prestart area 72's circuitry is powered by connection to line 74, but the bulk of the power-consuming circuitry of module 66 remains unpowered until the prestart area 72 receives instructions from power supervisor 64 to turn on module 66." (De Nicolo '666 at 4:63-67.) Based on this disclosure, one of ordinary skill in the art would have understood that module 66 draws different magnitudes of current as controlled by prestart area 72—one magnitude of current before prestart area 72 receives instructions from power supervisor 64 to turn on module 66 and a different magnitude of current after prestart area 72 receives those instructions.

f. "the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts"

91. De Nicolo '468 provides a design by which different magnitudes of DC current result from applying at least one condition to one or more contacts. For example, in Figure 3 (provided above), load 98's power demand changes during its normal operation. For example, its power demand changes depending on whether it is on-hook or off-hook and depending on whether it is performing basic features or more advanced features, requiring additional processing power and or memory utilization. A constant voltage is applied to the path, so when load 98's power demand increases, the power processor's effective impedance decreases and the power processor draws more current

through the path (in accordance with Ohm's Law). Conversely, when load 98's power demand decreases, the power processor's effective impedance increases and the power processor draws less current through the path. Accordingly, different magnitudes of DC current result from an impedance condition in the power processor.

92. De Nicolo '666 provides that different magnitudes of DC current flow result from applying at least one condition to at least one contact. For example, as shown by the annotations below, De Nicolo '666 discloses that different magnitudes of DC current pass through query line 28 depending on the voltage applied to query line 28. (De Nicolo '666 at 3:40-4:9.)

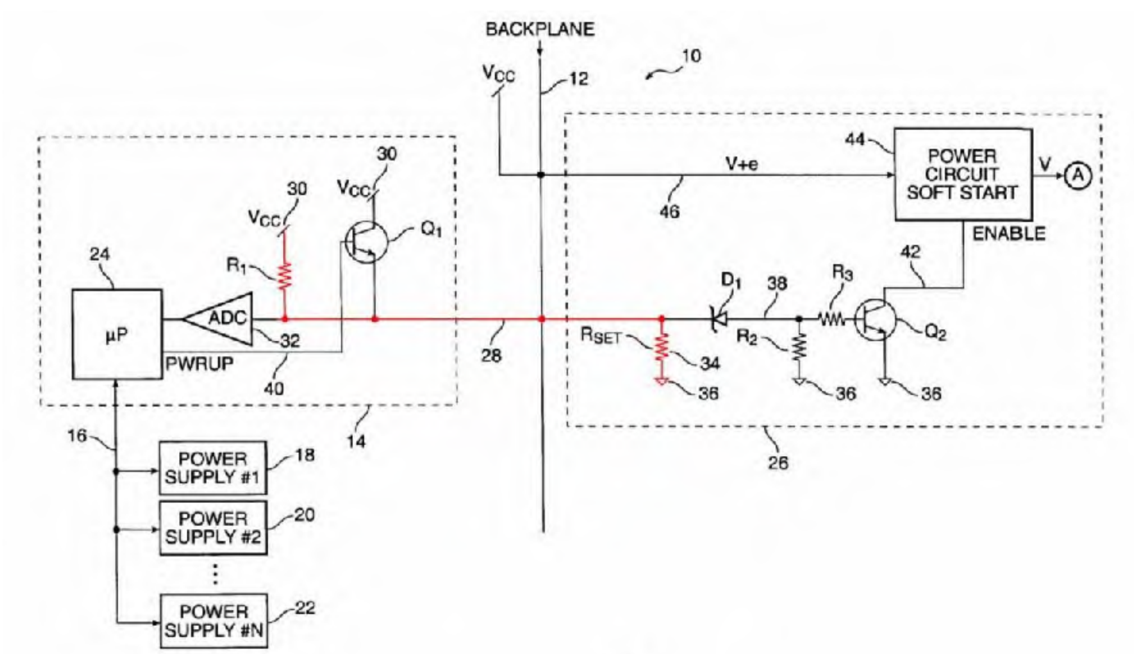


FIG. 1

(De Nicolo '666 at FIG. 1 (annotations added).)

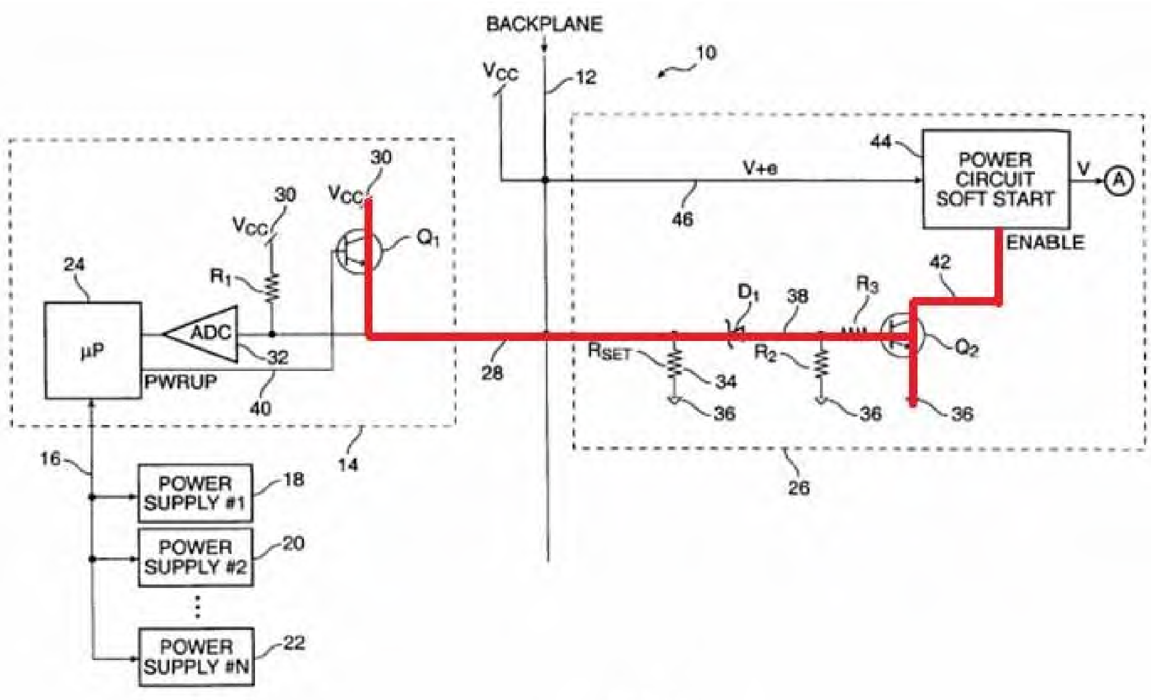


FIG. 1

(De Nicolo '666 at FIG. 1 (annotations added).)

93. As the top figure shows, if transistor Q1 is not enabled, then the voltage Vcc drops across R1. (De Nicolo '666 at 3:40-4:9.) However, if Q1 is enabled, as the bottom figure shows, then voltage Vcc does not drop across R1, resulting in a higher voltage value applied to query line 28 and, in turn, a higher magnitude of DC current through query line 28. (*Id.*) Because the higher voltage value exceeds the threshold of Zener diode D1, current will flow through resistors R2 and R3, providing a signal on a the emitter of transistor Q2, which will in turn provide an ENABLE signal on line 42 to power circuit soft start 44. (De Nicolo '666 at 4:2-10.)

94. De Nicolo '666 also discloses that different magnitudes of DC current

flow through the power consuming circuitry of electronic module 26 as a result of voltage applied from Vcc to power circuit soft start 44 and as a result of voltage applied from Vcc across transistor Q1 to the ENABLE line of power circuit soft start. The point of contact at line 28 and the backplane 12 is an example of a contact to which power supervisor 14 applies a condition (*e.g.*, voltage).

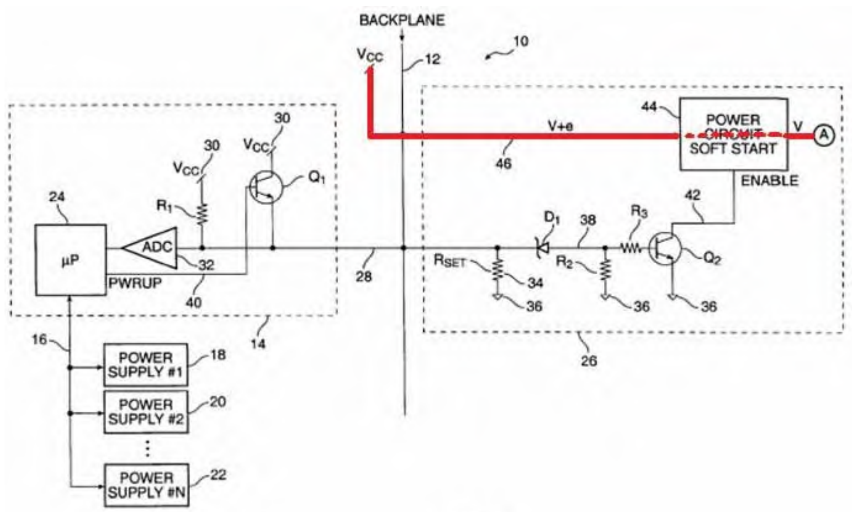


FIG. 1

(De Nicolo ’666 at FIG. 1 (annotations added), 4:10-22, 5:25-38.)

95. Finally, like De Nicolo ’468’s equipment, De Nicolo ’666’s electronic module 26 permits different magnitudes of DC current to flow by applying at least one condition to at least one contact. For example, different magnitudes of DC current flow through the query path as a function of the resistance of Rset 34 (*e.g.*, an impedance condition), which “could be 25 ohms if power demand of the module is 5 amperes, 50 ohms if 10 amperes, 75 ohms if 15 amperes, and 100 ohms if 20 amperes.” (De Nicolo ’666 at 3:55-57.)

g. "wherein at least one of the magnitudes of the DC current flow to convey information about the piece of Ethernet terminal equipment"

96. De Nicolo '666 discloses that at least one magnitude of DC current conveys information about the piece of Ethernet terminal equipment. For example, De Nicolo '666 discloses that a magnitude of a DC current through the query conductor 28 conveys information about the maximum power requirement of the electronic module 26.

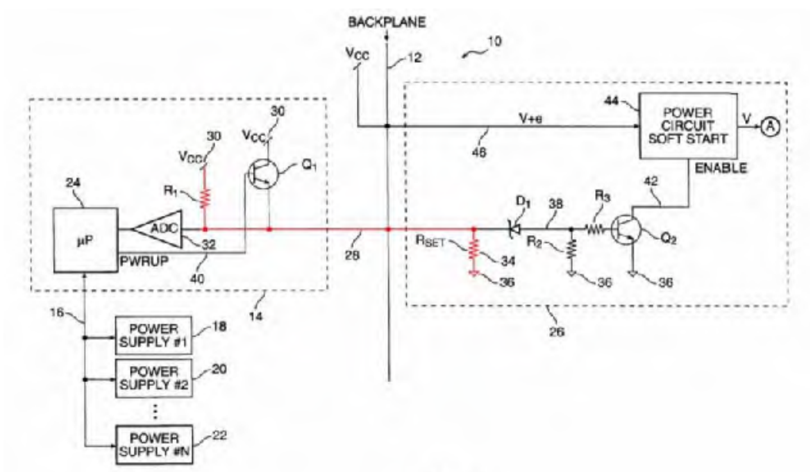


FIG. 1

(De Nicolo '666 at FIG. 1 (annotations added).)

97. De Nicolo '666 explains that each electronic module 26 has particular power requirement which fluctuates, but also has a known maximum power requirement or demand. (De Nicolo '666 at 1:55-58, 3:32-40.) This maximum power requirement is determined by resistor Rset 34 and communicated by an analog voltage signal on the query conductor 28 passing from the electronic module 26 through the backplane 12 to the power supervisor. (De Nicolo '666 at

3:50-56, 4:40-56.) An impedance element is used to encode the voltage signal on the conductor 28, where the voltage is a function of the resistance element. (*Id.*)

2. Claim 5: "wherein the Ethernet communication signals are BaseT Ethernet communication signals"

98. De Nicolo '468 discloses a "system for supplying DC power to a remote device over a 4-wire Ethernet connection having a first twisted pair of conductors for transmission of data packets from said remote device and a second twisted pair of conductors for reception of data packets at said remote device." (De Nicolo '468 at 16:23-27; *see id.* at 2:30-34 (describing 4-wire Ethernet system), 2:20-28 (same).)

99. A person of ordinary skill in the art would have understood that the 4-wire Ethernet connection could be used to transmit 10BASE-T Ethernet communication signals, particularly because the 802.3 standard discloses 10BASE–T using a two-pair wiring system to convey Ethernet signals.

3. Claim 31: "wherein the DC current comprises a predetermined range of magnitudes"

100. De Nicolo '666 discloses that the DC current has a predetermined range of magnitudes. For example, electronic module 26 has a maximum power requirement. (De Nicolo '666 at 3:36-39.) Therefore, current will range between a low value (i.e., Vcc ÷ (R1 + Rset)) and the module's maximum requirement.

101. The range of magnitudes of the DC current through query conductor

28 is determined at least by the resistance of resistor R1, the resistance of resistor Rset, the voltage values of Vcc 30 and its reference 36, the resistance of the query conductor 28, and the presence or absence of the PWRUP signal at the base of transistor Q1. (De Nicolo ’666 at FIG. 1, 3:40-4:10.) The range of magnitudes of the DC current applied to the power consuming circuitry of electronic module 26 is controlled by the Power Circuit Soft Start 44, and will vary from zero to the maximum required by the device. (De Nicolo ’666 at FIG. 1, 4:11-23.)

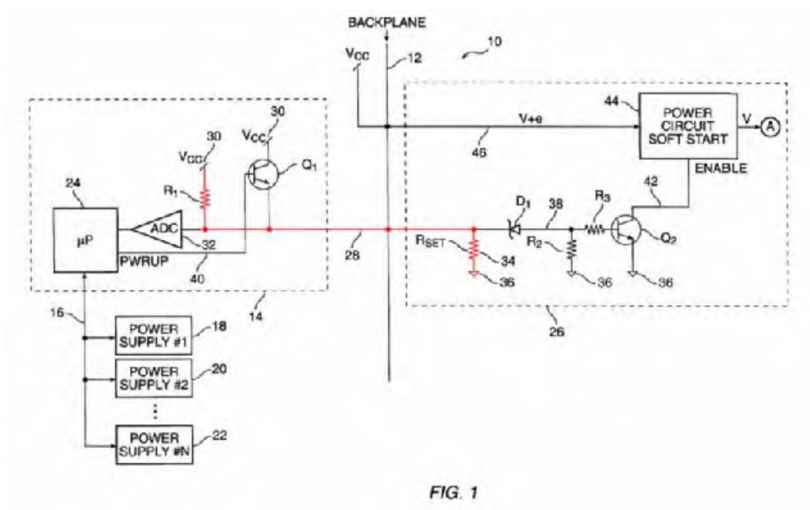
4. Claim 43: “wherein the information to distinguish the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment”

102. De Nicolo ’666 discloses that information distinguishes one piece of equipment from another. De Nicolo ’666 discloses that the particular electronic module 26 shown in Figure 1 has a resistor Rset 34 that the module 26 uses to convey information about the module’s maximum current or power requirement via the query conductor 28. (De Nicolo ’666 at 3:40-57.) Based on De Nicolo ’666’s disclosure, a person of ordinary skill in the art would have understood that the information about the module’s maximum current or power requirement distinguishes that particular module 26 from other modules connected to the backplane 12, for example, because De Nicolo ’666 discloses that backplane 12 “provides electrical interconnections among a plurality of electronic modules or cards which are electrically attached to it (*e.g.*, plugged into it)“ (De Nicolo ’666 at

2:30-35) and that "[e]ach modular processor card of a modular electronic system carries a component defining its maximum current or power requirements" (De Nicolo '666 at 1:55-57.)

5. Claim 53: "wherein a duration of at least one of the different magnitudes of the DC current to comprise a predetermined range"

103. De Nicolo '666 discloses this limitation. For example, De Nicolo '666 discloses that the magnitude of the current flowing through query conductor 28 changes after the PWRUP signal is provided to the base of transistor Q1. Before the PWRUP signal is provided to the base of Q1, as shown in the illustration below, the path includes resistor R1, resulting in a relatively lower magnitude of current flowing through query line 28.



(De Nicolo '666 at FIG. 1 (annotations added).)

104. After the PWRUP signal is provided to the base of Q1, as shown in the illustration below, the path does not include R1, resulting in a relatively higher

magnitude of current flowing through query line 28.

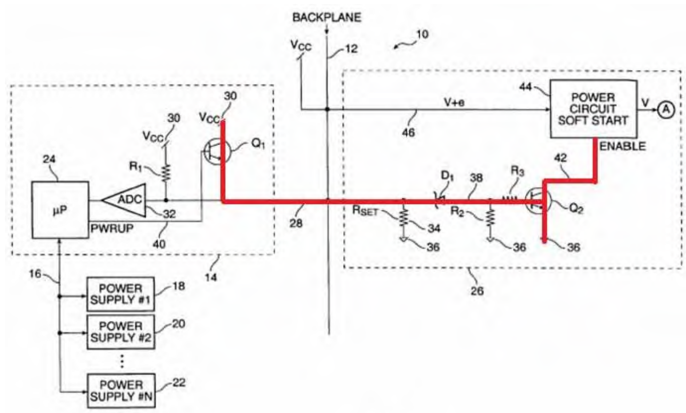


FIG. 1

(De Nicolo ’666 at FIG. 1 (annotations added); 3:40-4:10.)

105. De Nicolo ’666 discloses that the duration of a magnitude of the DC current may have a predetermined range. That duration is determined at least by the algorithm operating in the microprocessor 24. De Nicolo ’666 describes microprocessor 24 as a “programmed microprocessor 24.” (De Nicolo ’666 at 3:47-49.) One of ordinary skill in the art would have understood that the microprocessor 24 is programmed to assert the PWRUP signal on line 40 after a predetermined duration (during which it is determining the current drawn through Rset).

6. Claim 58: “wherein impedance within the at least one path changes”

106. De Nicolo ’468 discloses this limitation. For example, with reference to Figure 3, the current drain in the path changes over time as a function of the variation in current drawn by load 98 and the DC-DC power converter function in

the power processor 149. (De Nicolo '468 at 3:47-50.) Given a constant voltage provided by Power Supply 144, a change in current necessarily implies a change in effective impedance, through the operation of Ohm's Law (R = V ÷ I).

107. De Nicolo '666 also discloses this limitation. For example, De Nicolo '666 provides that the module 26 will draw more current when a the higher voltage is applied to the query conductor 28 through the operation of Q1, implying a change in effective impedance through the operation of Ohm's Law (R = V ÷ I). (*See* De Nicolo '666 at 3:40-4:10.) The impedance within the path changes because Rset is now paralleled by the combination of Zener diode D1, R2, R3, and Q2.

7. Claim 70: "wherein the DC current to comprise first magnitude of DC current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude"

108. De Nicolo '666 discloses this limitation. For example, De Nicolo '666 discloses that the magnitude of the current flowing through query conductor 28 changes after the PWRUP signal is provided to the control gate of transistor Q1. Before the PWRUP signal is provided to the control gate of Q1, the path includes resistor R1, resulting in a relatively lower magnitude of current flowing through query line 28. After the PWRUP signal is provided to the control gate of Q1, the path does not include R1, resulting in a relatively higher magnitude of current flowing through query line 28.

8. Claim 72: "wherein at least one magnitude of the DC current is part of a detection protocol"

109. De Nicolo '666 discloses this limitation. For example, De Nicolo '666 discloses a detection protocol by which a power supervisor can detect a device and query it to determine if turning it on would exceed power resources available to the system. As part of that protocol, different magnitudes of current can flow through the query conductor 28 and line 46. (De Nicolo '666 at 3:40 - 4:15, 5:16-25.)

9. Claim 75: "wherein the electrical component is a resistor"

110. De Nicolo '666 discloses a resistor in the path. For example, De Nicolo '666 discloses that resistor Rset 34 is provided in the current flow path. (De Nicolo '666 at 3:40-57.)

10. Claim 83: "wherein the piece of Ethernet equipment comprises a controller"

111. De Nicolo '666 discloses that the claimed terminal equipment includes a controller. For example, De Nicolo '666 discloses that the electronic module 26 includes power circuit soft start 44, which operates "to slowly turn on power available on line 46 and apply it to the power consuming circuitry of module 26 denoted 'A' while the ENABLE signal is asserted on line 42." (De Nicolo '666 at 4:11-15, FIG. 1.)

112. De Nicolo '666 also discloses a prestart area 72, for example, which "may carry on extensive communications with power supervisor 64 and power

supervisor 64 may require information in addition to maximum power requirement—for example, a password could be required, or a particular range of serial numbers could be required." (De Nicolo '666 at 4:67-5:5, FIG. 4.) The power start soft circuit and prestart area independently satisfy the claimed controller.

11. Claim 84: "wherein the controller comprises firmware"

113. De Nicolo '666 discloses that the controller has firmware. For example, a person of ordinary skill in the art would have understood that prestart area 76, shown in FIG. 4 of De Nicolo '666, requires software and/or firmware to perform functions such as "carry[ing] on extensive communications with power supervisor 64" and communicating with power supervisor 64 when "power supervisor 64 may require information in addition to maximum power requirement—for example, a password could be required, or a particular range of serial numbers could be required." (De Nicolo '666 at 4:67-5:5.)

12. Claim 103: "wherein the piece of Ethernet of [sic] terminal equipment is a piece of powered-off Ethernet terminal equipment"

114. I understand that in the district court, Patent Owner has argued that "powered-off Ethernet terminal equipment" is equipment without its operating power. This is not the plain and ordinary meaning of "powered-off Ethernet terminal equipment" for the reasons I provided in my district court declaration,

dated January 21, 2006, which I understand has been submitted as Exhibit 1029. But to the extent that Patent Owner's interpretation applies here, De Nicolo '666 discloses this limitation.

115. For example, De Nicolo '666 discloses that "[t]he supervisor will determine the current/power requirements of a processor card while the card is substantially powered off." (De Nicolo '666 at 1:60-62.) To the extent Patent Owner's interpretation of "powered-off Ethernet terminal equipment" applies here, one of ordinary skill in the art would have understood from this disclosure that at least some circuitry in the processor card lacks operational power while the supervisor determines the current/power requirements of the card.

116. As another example, De Nicolo '666 discloses that "[p]ower circuit soft start 44 operates in a conventional manner, such as that shown in FIG. 2, to slowly turn on power available on line 46 and apply it to the power consuming circuitry of module 26 denoted 'A' while the ENABLE signal is asserted on line 42." (De Nicolo '666 at 4:11- 15.) To the extent Patent Owner's interpretation of "powered-off Ethernet terminal equipment" applies here, one of ordinary skill in the art would have understood from this disclosure that at least some circuitry in the power consuming circuitry of module 26 lacks operational power before the power circuit soft start 44 applies power to it.

117. As yet another example, De Nicolo '666 discloses that "[p]restart area

72's circuitry is powered by connection to line 74, but the bulk of the power-consuming circuitry of module 66 remains unpowered until the prestart area 72 receives instructions from power supervisor 64 to turn on module 66." (*Id.* at 4:63-67.) To the extent Patent Owner's interpretation of "powered-off Ethernet terminal equipment" applies here, one of ordinary skill in the art would have understood from this disclosure that the bulk of the power-consuming circuitry of module 66 remains unpowered and, therefore, lacks operational power until the prestart area 72 receives instructions from power supervisor 64 to turn on module 66.

13. Independent Claim 104

118. Claim 104 recites essentially the same limitations of claim 1 with the exception that claim 104 recites "a powered-off end device." The De Nicolo references disclose the limitations of claim 104 for the same reasons I provide above in connection with claims 1 and 103.

14. Claim 107: "wherein the at least one condition comprises an impedance condition"

119. De Nicolo '666 discloses an impedance condition. For example, De Nicolo '666 discloses that impedance through the query conductor 28 changes depending on whether the PWRUP signal is provided to the base of transistor Q1. If the PWRUP signal is not provided to the base of Q1, then the path includes resistor R1, resulting in relatively higher impedance for the current flowing through query line 28. However, if the PWRUP signal is provided to the control

gate of Q1, then the path does not include R1, resulting in relatively lower impedance for the current flowing through query line 28. (See De Nicolo '666 3:40-4:10.)

15. Claim 111: "wherein the information to distinguish the powered-off end device from at least one other end device"

120. The De Nicolo references disclose this limitation. (See analysis of claim 43 above.)

16. Claim 123: "wherein at least one of the magnitudes is part of a detection protocol"

121. The De Nicolo references disclose this limitation. (See analysis of claim 72 above.)

17. Claim 125 (across 104, 111, and 123): "wherein the powered-off end device is a powered-off Ethernet end device"

122. The De Nicolo references disclose this limitation. (See analysis of claim 103 above.)

B. The challenged claims are obvious based on the Auto-Negotiation references.

1. Independent Claim 1

a. "A piece of Ethernet terminal equipment"

123. The DP83840 Datasheet discloses a piece of Ethernet equipment. The Datasheet refers to the DP83840 as a "Physical Layer device for Ethernet 10BASE-T and 100BASE-X." (DP83840 Datasheet at 1, 4.) The Datasheet further

provides a diagram of an Ethernet node that incorporates the DP83840 chip. (DP83840 Datasheet at 42 (see FIG. 15).)

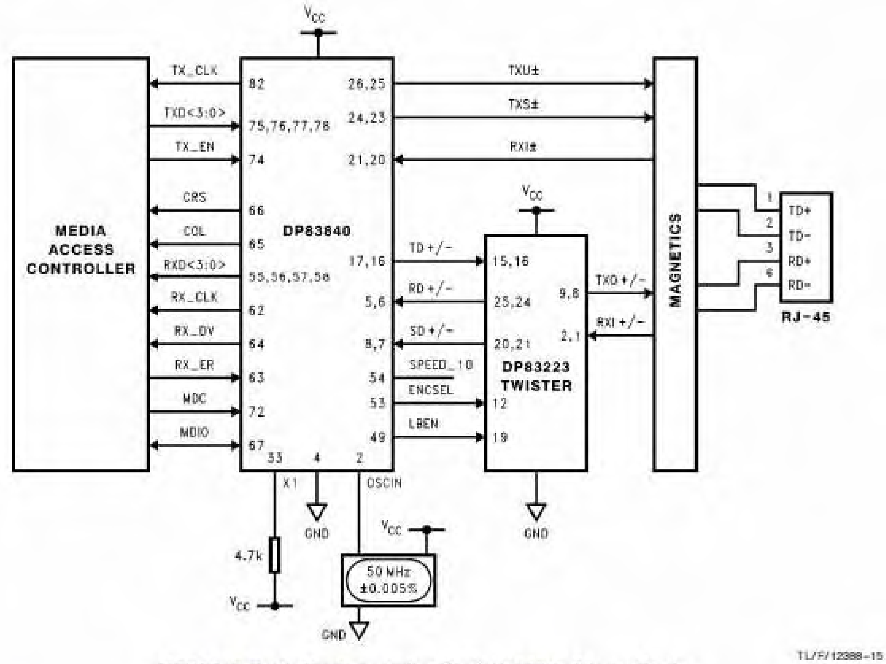
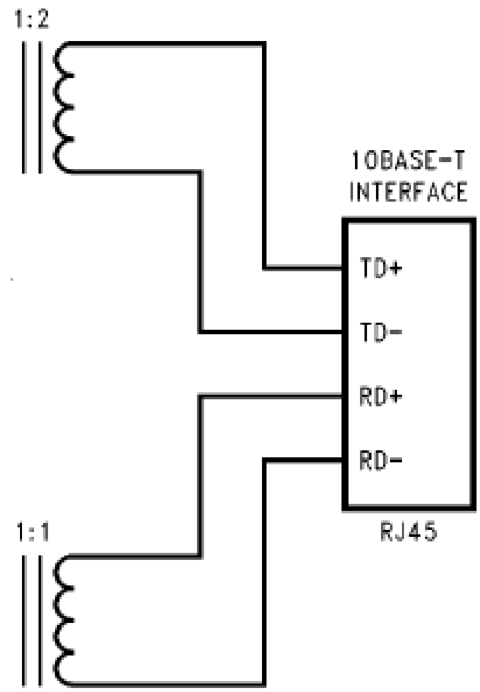


FIGURE 15. Typical Implementation of a 10/100 Mb/s Ethernet Node

Figure 15 shows a typical implementation of a 10/100 Mb/s Ethernet node application. This is given only to indicate the major circuit elements of such a design. It is not intended to be a full circuit diagram.

b. "an Ethernet connector comprising first and second pairs of contacts used to carry Ethernet communication signals"

124. The Ethernet connector disclosed in the DP83840 Data Sheet comprises first and second pairs of contacts used to carry Ethernet communication signals. For instance, the DP83840 Datasheet shows a box labeled "RJ-45" in the System Diagram figure on page 1 which represents an RJ-45 connector. (DP83840 Datasheet at 1.) An RJ-45 connector is a type of an Ethernet connector. As shown in Figure 12, the RJ-45 connector has pins labeled TD+, TD-, RD+, and RD-, which comprise first and second pairs of contacts:



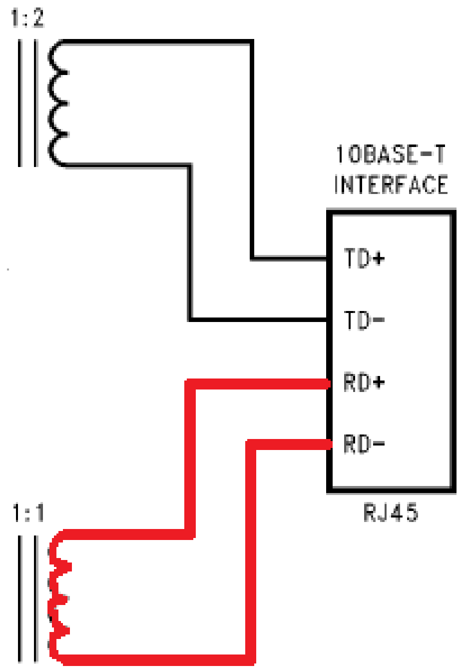
125.

(DP83840 Datasheet at 24.)

126. For instance, TD+ and RD+ constitute a first pair of contacts, and TD- and RD- constitute a second pair of contacts. These pins are used to carry Ethernet communication signals. For example, TD+ and TD- can carry 10BASE-T transmit data. (DP83840 Datasheet at 6-7.) Similarly, for example, RD+ and RD- can carry 10BASE-T receive data inputs. (*Id.* at 6-7, 22.)

c. "at least one path for the purpose of drawing DC current"

127. The DP83840 Datasheet discloses a path for the purpose of drawing DC current. For instance, Figure 12 illustrates a path coupled across pins RD+ and RD- of the RJ-45 connector.



(DP83840 Data Sheet at 24 (annotations added).)

d. "the at least one path coupled across at least one of the contacts of the first pair of contacts and at least one of the contacts of the second pair of contacts"

128. DP83840 Data Sheet discloses a path that is coupled across a contact of the first pair and a contact of the second pair. For instance, as mentioned above, TD+ and RD+ constitute a first pair of contacts, and TD- and RD- constitute a second pair of contacts. In that instance, in Figure 12, the connection between RD+ and RD- (annotated above in Figure 12) constitutes a path coupled across a contact of the first pair (*e.g.*, TD+/RD+) and a contact of the second pair (*e.g.*, TD-/RD-).

e. "the piece of Ethernet terminal equipment to draw different magnitudes of DC current flow via the at least one path"

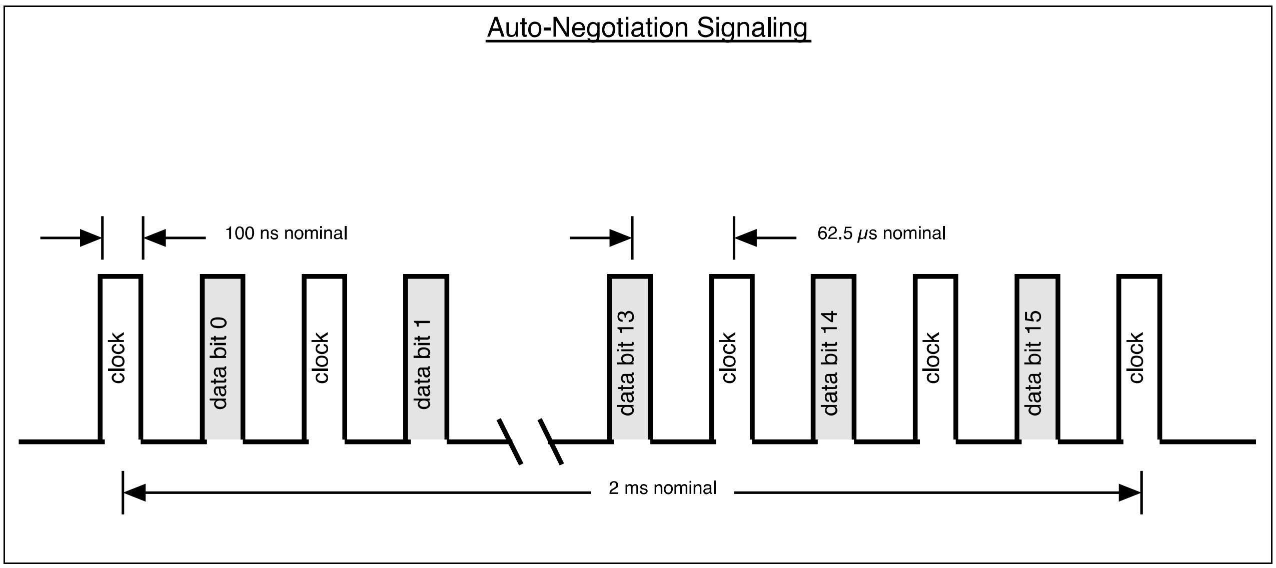
129. The DP83840 Datasheet discloses a piece of Ethernet terminal

equipment that draws different magnitudes of DC current via a path. For instance, the DP83840 Datasheet discloses that the DP83840 chip implements "IEEE 802.3u Auto-Negotiation for automatic speed selection." (DP83840 Datasheet at 1.) Auto-Negotiation involves exchanging configuration information with another Ethernet device by exchanging Fast Link Pulse (FLP) Bursts. (*Id.* at 26.) Auto-Negotiation is controlled either by internal register access or by use of AN1 and AN0 pins (pins 46 and 95). (*Id.*) "The DP83840 supports four different Ethernet Protocols [100Base-TX Full Duplex, 100Base-TX Half Duplex, 10Base-T Full Duplex, and 10Base-T Half Duplex], so the inclusion of Auto-Negotiation ensures that the highest performance protocol will be selected based on the ability of the Link Partner." (*Id.*)

130. The DP83840 Datasheet refers to clause 28 of the IEEE 802.3u specification for further detail regarding Auto-Negotiation. (DP83840 Datasheet at 26.) IEEE 802.3u-1995 similarly explains that Auto-Negotiation provides a "means to exchange information between two devices that share a link segment and to automatically configure both devices to take maximum advantage of their abilities." (IEEE 802.3u-1995 at 235.) To achieve Auto-Negotiation, each capable device "issues FLP Bursts at power up, on command from management, or due to user interaction." (*Id.*)

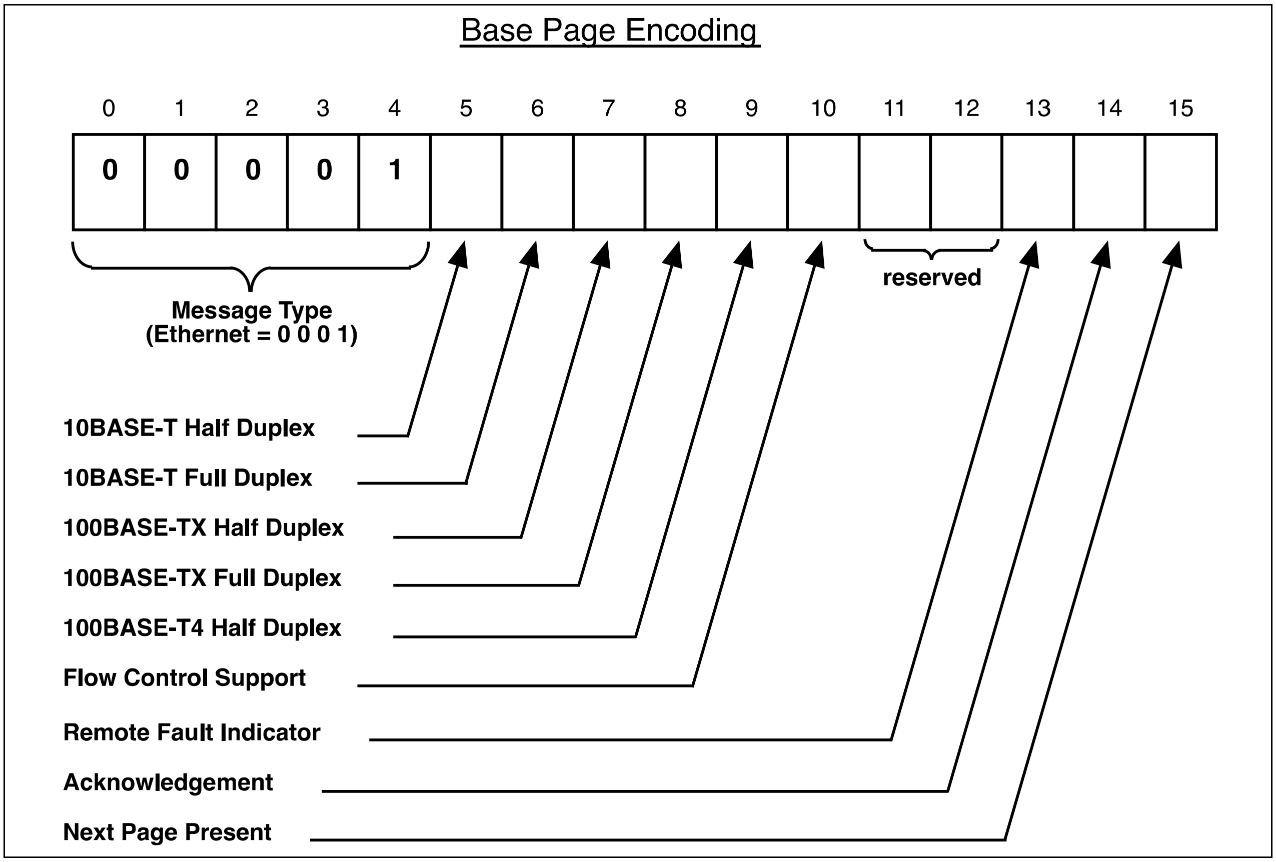
131. The FLP Bursts have different magnitudes of DC current flow. An

FLP Burst has 33 pulse positions. (*Id.* at 239.) The odd-numbered pulse positions are clock positions that carry clock information, while the even-numbered positions are data positions that carry data. (*Id.*) Every clock position contains a link pulse. (*Id.*) A given data position either contains a link pulse (representing logic "1") or lacks a link pulse (representing logic "0"). (IEEE 802.3u-1995 at 239.) This scheme is depicted in the figure below:



Gigabit Ethernet at 137 (Fig. 8-3)

132. FLP Bursts have link pulses in some positions and no link pulses in other positions. For example, an FLP Burst can have some logic "1" data positions and other logic "0" data positions, depending on the information in the FLP Burst's Technology Ability field, depicted below. (IEEE 802.3u-1995 at 241, 344.) As another example, if a first FLP Burst's Toggle field has a value of "1," the next FLP Burst's Toggle field will have a value of "0." (*Id.* at 247.)



Gigabit Ethernet at 136 (Fig. 8-2).

133. A link pulse is a positive pulse, which has different magnitudes of current, due both to its controlled rise and fall times, and the action of a coupling transformer. (IEEE 802.3-1993 at 259.) Therefore, in an FLP Burst, any given position containing a link pulse has different magnitudes of current. As a result, when an Ethernet device receives FLP Bursts from its link partner, the Ethernet device draws different magnitudes of DC current via the said path.

f. "the different magnitudes of DC current flow to result from at least one condition applied to at least one of the contacts of the first and second pairs of contacts"

134. The DP83840 Datasheet discloses that the different magnitudes of DC

current flow result from at least one condition applied to at least one of the claimed contacts. For instance, the DP83840 Datasheet discloses that Ethernet devices exchange FLP Bursts. When an Ethernet device receives an FLP Burst from its link partner, an electrical (voltage) condition is applied to at least one contact of the Ethernet device by virtue of the FLP Burst. As a result, the specific electrical condition applied by the Ethernet device containing the DP83840 is based on the FLP Burst that the Ethernet device receives from its link partner. The content of the transmitted FLP Burst (which has different magnitudes of DC current flow) is dependent upon the content of the received FLP Burst (which applies the at least one condition).

135. That is, under normal operation, the Ethernet device responds to a received FLP burst by transmitting another FLP Burst, which has different magnitudes of DC current, with the Acknowledgement Field of the FLP set to "1." (DP83840 Datasheet at 26 (describing FLP Bursts), 34 (describing bit 14 being set to "1" when reception of the Link Partner ability data is acknowledged).)

136. IEEE 802.3u-1995 similarly explains that the different magnitudes of DC current flow result from at least one condition applied to at least one of the claimed contacts. For instance, the first FLP Burst that a device transmits to its link partner contains a base Link Code Word. (IEEE 802.3u-1995 at 239, 241 (Link Code Word uses encoding shown in figure 28-7, further explained in the Base Page

Encoding figure, above.).) As noted above, different magnitudes of current are transmitted by the link partner and received by the Ethernet device based on the abilities of the link partner. In response to receiving the FLP Burst with the base Link Code Word, the Ethernet device responds with an FLP Burst in which the Acknowledgement Bit is either set or cleared, depending on proper decoding of the received Link Code Word. (*Id*. at 238.)

g. "wherein at least one of the magnitudes of the DC current flow to convey information about the piece of Ethernet terminal equipment"

137. The DP83840 Datasheet discloses a magnitude of DC current that conveys information about the piece of Ethernet terminal equipment. For example, DP83840 Datasheet discloses that an FLP Burst from a link partner to an Ethernet device contains a series of bits whose values indicate which Ethernet technologies the link partner supports. (DP83840 Datasheet at 34 (describing bit 8 identifies whether 100BASE-TX Full Duplex is supported, bit 7 identifies whether 100BASE–TX Half Duplex is supported, bit 6 identifies whether 10BASE-T Full Duplex is supported, and bit 5 identifies whether 10BASE-T Half-Duplex is supported).) As noted above, different magnitudes of current are supplied by the link partner and received by the Ethernet device in an FLP, whose link pulses are positive pulses with different magnitudes of current. For instance, when the pulse exceeds a threshold value indicating logic "1," information is conveyed based on

the assignment of a technology capability to that bit position.

138. IEEE 802.3u-1995 similarly discloses a magnitude of DC current that conveys information about the piece of Ethernet terminal equipment. For example, IEEE 802.3u-1995 discloses that an FLP Burst contains a Technology Ability field, whose magnitudes convey information about which technologies a device supports. (IEEE 802.3u-1995 at 241) The Technology Ability field is an eight-bit field in the Auto-Negotiation base page that is used to indicate the ability of the station, such as support for 10BASE-T, 100BASE-TX, 100BASE-T4, as well as full duplex capabilities. (*Id.* at 17, 241, 344 (showing bit assignments). In addition, an FLP Burst that a device sends to its link partner can identify the sending device as being capable of Auto-Negotiation. (*Id.* at 243.)

2. Claim 5: "wherein the Ethernet communication signals are BaseT Ethernet communication signals"

139. DP83840 Data Sheet discloses BaseT Ethernet communication signals, for example, because it discloses that the DP83840 is as a "Physical Layer device for Ethernet 10BASE-T" (*see* DP83840 Datasheet at 1).

3. Claim 31: "wherein the DC current comprises a predetermined range of magnitudes"

140. DP83840 Data Sheet discloses that the DC current comprises a predetermined range of magnitudes. For example, DP83840 Data Sheet discloses voltage and impedance ranges for the TXU and RXI pins, which the DP83840 chip

uses to transmit and receive FLP Bursts. (DP83840 Datasheet at 24 (Figure 12), 47 (R_{OL}, R_{OH}, V_{TH1}).) DP83840 Data Sheet also discloses that FLP Bursts are to be transmitted with a high voltage level and a low voltage level. (*See id.* at 54.) Based on at least this disclosure, a skilled artisan would have understood that FLP Bursts transmitted to and from the DP83840 chip have predetermined magnitudes within the thresholds specified in the DP83840 Data Sheet.

141. Similarly, IEEE 802.3 discloses that an FLP Burst has different magnitudes of DC current. IEEE 802.3-1993 defines a link pulse as a single positive pulse and provides an upper limit on the magnitude of the link pulse in Figure 14-12. (*See* IEEE 802.3-1993 at Fig. 14-12.)

4. Claim 43: "wherein the information to distinguish the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment"

142. DP83840 Datasheet discloses that information distinguishes the piece of Ethernet terminal equipment from at least one other piece of Ethernet terminal equipment (*e.g.*, its link partner). For example, DP83840 Datasheet discloses that Ethernet devices exchange FLP Bursts. When a device sends an FLP Burst to its link partner, the FLP Burst contains a series of bits whose values indicate which Ethernet technologies the device supports. That information permits the link partner to distinguish its capabilities from the link partner's capabilities. (DP83840 Datasheet at 26, 34.)

143. Similarly, IEEE 802.3u-1995 discloses that an FLP Burst contains a Technology Ability field, which distinguishes a first piece of Ethernet terminal equipment from another piece of Ethernet terminal equipment by conveying information about which technologies the first piece of Ethernet terminal equipment supports.

5. Claim 53: "wherein a duration of at least one of the different magnitudes of the DC current to comprise a predetermined range"

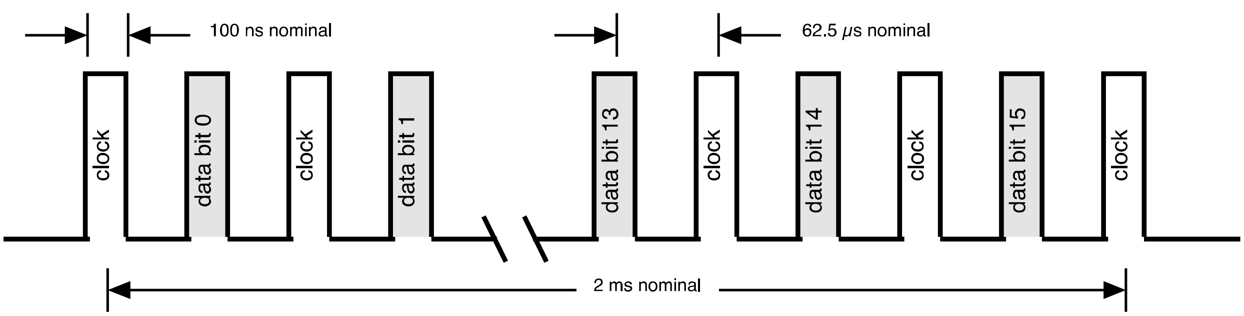
144. DP83840 Datasheet and IEEE 802.3u-1995 disclose that a duration of at least one of the different magnitudes of the DC current comprises a predetermined range. The FLP Bursts have a predetermined timing relationship. For instance, Section 6.3.12 of the DP83840 Datasheet identifies the timing relationships between the FLP Bursts. (DP83840 Datasheet at 54.) Similarly, as explained above, IEEE 802.3u-1995 identifies the timing relationship between the FLP Bursts so that it can be readily determined whether a logic "1" or a logic "0" is being sent and received. (IEEE 802.3u-1995 at 239 ("Clock pulses within an FLP Burst shall be spaced at 125 ± 14 us. If the data bit representation of logic one is to be transmitted, a pulse shall occur 62.5 ± 7 us after the preceding clock pulse. If a data bit representing logic zero is to be transmitted, there shall be no link integrity test pulses within 111 us of the preceding clock pulse.").)

Table 28-1—FLP Burst timing summary

#	Parameter	Min.	Typ.	Max.	Units
T1	Clock/Data Pulse Width (figure 14-12)		100		ns
T2	Clock Pulse to Clock Pulse	111	125	139	µs
T3	Clock Pulse to Data Pulse (Data = 1)	55.5	62.5	69.5	µs
T4	Pulses in a Burst	17		33	#
T5	Burst Width		2		ms
T6	FLP Burst to FLP Burst	8	16	24	ms

(*Id.* at 240.)

Auto-Negotiation Signaling



Gigabit Ethernet at 137 (Fig. 8-3).

6. Claim 58: "wherein impedance within the at least one path changes"

145. DP83840 Datasheet provides that the path between RD+ and RD- has a transformer winding, which is an electrical component with impedance. (DP83840 Data Sheet at 24.) The impedance will change during normal operation as a function of temperature.

7. Claim 70: "wherein the DC current to comprise first magnitude of DC current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude"

146. DP83840 Datasheet and IEEE 802.3u disclose that a DC current comprises a first magnitude of DC current for a first interval followed by a second magnitude of DC current for a second interval, wherein the second magnitude is greater than the first magnitude. As explained above, the DP83840 chip implements "IEEE 802.3u Auto-Negotiation for automatic speed selection" (DP83840 Datasheet at 1), which exchanges configuration information with a link partner by transmitting FLP Bursts. An FLP Burst contains link pulses. Each link pulse is a positive pulse, which has different magnitudes of current. (IEEE 802.3-1993 at 259.) This current has a first magnitude for a first time interval followed by a greater second magnitude for a second time interval.

8. Claim 72: "wherein at least one magnitude of the DC current is part of a detection protocol"

147. DP83840 Datasheet and IEEE 802.3u-1995 disclose that at least one magnitude of the DC current is part of a detection protocol. For instance, DP83840 Datasheet discloses that FLPs are transmitted as part of the Auto-Negotiation detection protocol to identify the capabilities of the Ethernet device and its link partner (DP83840 Datasheet at 26). Similarly, IEEE 802.3u-1995 discloses that FLPs are transmitted as part of the same Auto-Negotiation detection protocol.

(IEEE 802.3u-1995 at 235 (disclosing that data bits from FLP Bursts yields Link Code Word identifying operational mode supported by device).)

9. Claim 75: "wherein the electrical component is a resistor"

148. DP83840 Datasheet provides that the path between RD+ and RD- comprises a transformer winding, which is an electrical component with resistance. (DP83840 Data Sheet at 24.)

10. Claim 83: "wherein the piece of Ethernet equipment comprises a controller"

149. DP83840 Datasheet discloses the claimed Ethernet terminal equipment that includes a controller. (DP83840 Datasheet at 23 (defining parameters of IEEE 1149.1 controller in DP83840), 25 (illustrating controller architecture).) In addition, DP83840 Datasheet provides that "[s]oftware can determine which mode has been configured by Auto-Negotiation." (*Id*. at 26.) This implies that the Ethernet node contains a microprocessor, i.e., a controller that runs this software.

11. Claim 84: "wherein the controller comprises firmware"

150. DP83840 Datasheet discloses firmware that is used to configure Auto-Negotiation. DP83840 Datasheet provides that "[s]oftware can determine which mode has been configured by Auto-Negotiation." (DP83840 Datasheet at 26.) A person of ordinary skill in the art would have understood that this

software would be loaded onto a non-volatile memory such as Read Only Memory, Erasable Programmable Read-Only Memory, or flash memory as firmware in the Ethernet node.

12. Claim 103: "wherein the piece of Ethernet of [sic] terminal equipment is a piece of powered-off Ethernet terminal equipment"

151. I understand that in the district court, Patent Owner has argued that "powered-off Ethernet terminal equipment" is equipment without its operating power. This is not the plain and ordinary meaning of "powered-off Ethernet terminal equipment" for the reasons I provided in my district court declaration, dated January 21, 2006, which I understand has been submitted as Exhibit 1029. But to the extent that Patent Owner's interpretation applies here, the DP83840 Datasheet discloses this limitation.

152. The DP83840 Datasheet discloses an Ethernet node that performs Auto-Negotiation. (DP83840 Datasheet at 42 (see FIG. 15).) Auto-Negotiation is an initial procedure by which two connected devices choose transmission parameters, such as data rate. This procedure takes place before the devices begin transmitting Ethernet data to each other. A skilled artisan would have understood that circuitry responsible for Auto-Negotiation could be powered on while other circuitry not necessary for Auto-Negotiation could be powered off or in a low-power state. This would have been a routine design choice for the skilled artisan.

One reason to implement the circuitry in this manner is to save power.

13. Independent Claim 104

153. Claim 104 recites essentially the same limitations of claim 1, except that claim 104 recites "a powered-off end device." DP83840 Datasheet and IEEE 802.3u-1995 disclose the limitations of claim 104 for the reasons I provide above in connection with claims 1 and 103.

14. Claim 107: "wherein the at least one condition comprises an impedance condition"

154. The Auto-Negotiation references disclose this limitation. (*See* analysis of claim 75 above.)

15. Claim 111: "wherein the information to distinguish the powered-off end device from at least one other end device"

155. The Auto-Negotiation references disclose this limitation. (*See* analysis of claim 43 above.)

16. Claim 123: "wherein at least one of the magnitudes is part of a detection protocol"

156. The Auto-Negotiation references disclose this limitation. (*See* analysis of claim 72 above.)

17. Claim 125 (across 104, 111, and 123): "wherein the powered-off end device is a powered-off Ethernet end device"

157. The Auto-Negotiation references disclose this limitation. (*See* analysis of claim 103 above.)

I, Rich Seifert, do hereby declare and state that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, under Section 1001 of Title 18 of the United States Code.

Dated: February 8, 2016

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Rich Seifert