

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC
Petitioner

v.

ROVI GUIDES, INC.
Patent Owner

Patent No. 8,621,512
Filing Date: October 24, 2011
Issue Date: December 31, 2013

Title: INTERACTIVE TELEVISION PROGRAM GUIDE WITH
SIMULTANEOUS WATCH AND RECORD CAPABILITIES

Inter Partes Review No.: Unassigned

DECLARATION OF VERNON THOMAS RHYNE, PH.D., P.E., R.P.A.

I, Vernon Thomas Rhyne, declare that I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

I. INTRODUCTION

1. I have been retained by Petitioner Comcast Cable Communications, LLC, (“Petitioner”) to assess U.S. Patent No. 8,621,512 (“Ellis” hereafter) titled “Interactive Television Program Guide with Simultaneous Watch and Record Capabilities.”

2. I reside in Austin, Texas.

3. I have also been asked to provide my opinions regarding non-interactive Electronic Program Guide Systems (“EPGs”) and Interactive Program Guide Systems (“IPGs”) and the resolution of programming content conflicts as related to Ellis, including providing an overview of the prosecution history of Ellis, the disclosure of Ellis, the broadest reasonable interpretation of terms in the claims of Ellis, and what constitutes a person of ordinary skill in the art with respect to Ellis. Specifically, this Declaration provides my opinions regarding the obviousness of Ellis over various combinations of the prior art. I am being compensated for my time at a rate of \$695 USD per hour, plus actual expenses. My compensation is not dependent in any way upon the outcome of Petitioner’s IPR petition.

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

A. Education and Certifications

4. I received an undergraduate degree in Electrical Engineering from Mississippi State University in 1962. I received a Master's degree in Electrical Engineering from the University of Virginia in 1964. I received a Doctorate in Electrical Engineering from the Georgia Institute of Technology in 1967.

5. I am a registered professional engineer ("PE") in Texas, No. 28,728, and a registered patent agent, No. 45,041.

B. Career Synopsis

6. I am a retired Professor of Electrical/Computer Engineering at Texas A&M University and a part-time engineering consultant. From 1967 to 1983 I was a Professor of Electrical Engineering at Texas A&M University. From 1983 to 1995 I was employed at the Microelectronics and Computer Technology Corporation (MCC) in Austin TX. There, I was responsible for MCC's R&D programs in neural network applications, data mining, software interface standardization, and other advanced software development projects. From 1995 to 1997, I was employed at Motorola, Inc. in Austin, TX. I was the Manager of Strategic Programs, Strategic Asset Group, Semiconductor Products Sector.

C. Career Milestones

7. The following is a list of some of my awards and honors: IEEE Fellow (1990) for my “contributions to computer engineering and the computer engineering profession;” IEEE Millennium Award (2000); Golden Core Award, IEEE Computer Society (1996); and Fellow of the Accreditation Board for Engineering and Technology (1992). I am also a member of the following honorary societies: Upsilon Pi Epsilon (Computer Science), Eta Kappa Nu (Electrical Engineering), Tau Beta Pi (Engineering), Phi Kappa Phi (Scholarship), and Sigma Xi (Research). I have been a member of the Institute of Electrical and Electronics Engineers since 1963, rising to the level of Life Member as of 2003.

D. Detailed Research Activity

8. During my engineering career, I participated in a number of research programs which were directly related to the subject matter of the patent at issue in this IPR.

9. I have extensive experience with computer technology, including design and teaching experience with a variety of computer systems, microcomputer systems, and microcontrollers. I have participated in the design of several computer systems and microprocessors, and I have designed systems which made use of those devices as controllers. I am familiar with a variety of computer architectures, and I am an experienced programmer in a variety of programming

languages as well as assembly-level language on a number of different computers and microprocessors.

10. I have conducted research on topics such as CAD systems, neural network applications, data mining, software interface standardization, and other advanced software development projects. I have written papers and given lectures related to topics such as electronic design, digital systems design, communications concepts, graphic symbols for logic devices, *etc.*, and have supervised Masters-level and Ph.D.-level engineering students, as well as postdoctoral associates. I have served as a consultant to several companies and law firms regarding intellectual property litigation from 1978 to the present. I have served as a Member of the Panel on Assessment, Electrical and Electronics Engineering Laboratory, U.S. National Institute for Standards and Technology, and as the Chair for nine U.S. engineering program accreditation teams, including accreditation teams for the University of California at Berkeley and the University of Illinois.

11. My detailed employment background, professional experience, and list of technical papers and books are contained in my CV, attached as Appendix A.

12. Prior to reviewing Ellis, I was well familiar with the type of subject matter described and claimed in it. Ellis relates to an interactive television program guide which allows a user to view program listings, to navigate through the

program listings, and to select a program to view or record from that listing. Ex. 1101, Abstract. In that regard, I have over ten years of experience with television transmission systems, including the early use of the blanking interval for transmitting data such as program descriptions, closed captions, parental-control information as part of the broadcast television signal, IPGs and EPGs. I also have had hands-on experience with a variety of set-top boxes including Scientific-Atlanta's Explorer® 2000 and 3000 and the 8600X set-top boxes (including visiting the Scientific-Atlanta R&D facilities to meet with their engineers), the Pioneer BD-V3000 set-top box, and the Cisco 8742HDC. I have also studied other manufacturers' set-top boxes and satellite receivers in the course of my consulting practice. I have owned or rented several other set-top boxes in my home, and have owned a Tivo digital video recorder since its introduction in 1999. I am also familiar with the AT&T U-verse system for delivery of television programming and electronic program guide.

13. I retired from full-time work as of 1997. In addition to the work described above and in my CV (*see* Appendix A), I have worked part-time as a consulting engineer for the past forty years doing computer systems design, application-specific system design, and expert witness work in intellectual property litigation.

14. I believe that my extensive academic and industrial experience well qualify me as an expert in the fields of communications, control, and advanced software applications of relevance to this Declaration, and particularly in IPGs and the manner in which conflicts between viewing and recording programs can be resolved in a set-top box. I am knowledgeable of the relevant skill set that would have been possessed by a hypothetical person of ordinary skill in the art at the time of the invention of Ellis in 1999.

III. MATERIALS REVIEWED

15. The analysis that I provide in this Declaration is based on my education and experience in the fields of electrical and computer engineering, as well as the documents I have considered, including Ellis (Ex. 1101), which claims priority to Provisional Application No. 60/089,487 (“the ’487 Provisional” and “Ex. 1102” herein) which was filed on June 16, 1998. I have also reviewed the file wrapper for Ellis (Ex. 1103).

16. I have also reviewed various relevant publications from the time of the alleged invention of Ellis. These publications are listed below:

Exhibit	Description
1101	U.S. Patent No. 8,621,512 (“Ellis”)
1102	U.S. Prov. App. No. 60/089,487 (“the ’487 Provisional”)
1103	Prosecution History of U.S. Patent No. 8,621,512
1104	U.S. Patent No. 6,240,240 (“Nagano”)
1105	U.S. Patent No. 6,177,931 (“Alexander”)
1106	U.S. Patent No. 5,506,628 (“Chun”)

Exhibit	Description
1107	Not used
1108	<i>Modern Cable Television Technology</i> (i.e., pp. 4, 9, 10, 747, 757-767, 778-779)
1109	U.S. Prov. App. No. 60/055,761 (“the ‘761 Provisional”)

IV. UNDERSTANDING OF APPLICABLE LEGAL STANDARDS

17. The following subsections provide my understanding of the legal principles that I have relied upon in forming my opinions as set forth herein.

A. Person Having Ordinary Skill in the Art

18. It is my understanding that an assessment of the claims of Ellis must be undertaken from the perspective of what would have been known or understood by a person having ordinary skill in the art, upon reading Ellis on its relevant filing date and in light of the specification and file history of that Patent. I refer to such a person as a “PHOSITA” herein.

19. For the relevant priority date for Ellis, I have used June 11, 1999, based on the filing date of the earliest non-provisional application that Ellis claims priority to, Patent Application No, 09/329,850 (“the ’850 Application”), now abandoned. Ex. 1101, 1:8-18.

20. In determining the appropriate level of ordinary skill in the art, I have considered the following factors: (a) the types of problems encountered by those working in the field and prior art solutions thereto; (b) the sophistication of the

technology in question, and the rapidity with which innovations occur in the field; and (c) the educational level of active workers in the field as of 1999.

21. I have been asked to provide my opinion as to the state of the art in the field of IPGs, television video signal processing and recording, graphical user interfaces, and related computer software around 1999, including the knowledge to be expected of a PHOSITA, the manner in which a PHOSITA would have understood the claims of Ellis, the manner in which a PHOSITA would have understood the prior art, or what a PHOSITA would have been led to do based on the prior art. Similarly, when discussing the disclosures of the prior art and/or the claims of Ellis, I address those topics as they would have been viewed by a PHOSITA in the 1999 timeframe.

22. Based on my consideration of the factors listed in ¶¶ 20-21 above, in my opinion a person of ordinary skill in the art related to Ellis in the 1999 timeframe would have had at least a bachelor's degree in computer science, electrical engineering, computer engineering, or a similar discipline, and two to three years' experience or familiarity with EPGs, television video signal processing, graphical user interfaces, and associated computer software, or would have had equivalent experience either in industry or research, such as designing, developing, evaluating, testing, or implementing the aforementioned technologies.

23. I also understand that U.S. law provides categories of information that constitute prior art that may be used to anticipate or render obvious patent claims. To be prior art to a particular patent claim under the relevant law, I understand that in general a reference must have been made, known, used, published, or patented, or be the subject of a patent application by another, before the priority date of the patent, and in this matter, must satisfy one of the standards of pre-AIA 35 U.S.C. § 102. I also understand that a PHOSITA is presumed to have full knowledge of the relevant prior art.

B. Obviousness

24. I also understand that a proper analysis of whether an invention is invalidated for obviousness includes a review of the scope and content of the prior art, the differences between the patent claims and the prior art, and the level of skill in the pertinent art at the time of the invention.

25. I also understand that in determining obviousness I should take into account the knowledge, experience, and creativity of a person of ordinary skill in the art at the time of the alleged invention, and whether such a skilled artisan would have found the challenged claims to be a “predictable use of prior-art elements according to their established functions,” as described by the U.S. Supreme Court in *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 401 (2007), and therefore obvious in view of the prior art.

26. I also understand that a claim may be invalidated for obviousness if there is a teaching or suggestion to combine prior art references in a manner that yields the claimed invention. I understand that a showing of obviousness requires some articulated reasoning with a rational underpinning to support the combination of the references. I understand that in consideration of this issue it is important to identify whether a reason existed at the time of the invention that would have led a person of ordinary skill in the pertinent art to combine elements of the references in a way that yields the claimed invention.

27. I also understand that various objective or “real world” factors may be indicative of non-obviousness. I understand that such factors include:

- (A) The commercial success of the claimed invention;
- (B) The existence of a long-felt, unresolved need for a solution to the problem solved by the claimed invention;
- (C) Failed attempts to solve the problem solved by the claimed invention;
- (D) Copying of the claimed invention;
- (E) Unexpected results of the claimed invention;
- (F) Praise for the claimed invention by others in the relevant field; and
- (G) Willingness of others to accept a license under the patent because of the merits of the claimed invention.

C. Use of the Broadest Reasonable Interpretation

28. I also understand that, in an *inter partes* review proceeding, the patent claims at issue are given their broadest reasonable interpretation in light of the specification of the patent, unless otherwise noted. I also understand that claim terms which are not expressly defined in the patent are to be given their plain and ordinary meaning as would be understood by one of ordinary skill in the art in view of the patent specification, other intrinsic evidence, and extrinsic evidence. As explained below, I have used those understandings in forming the opinions set forth in this Declaration.

V. THE STATE OF THE ART RELATIVE TO ELLIS

A. The Prior Art of Program Guides

29. Ellis discloses and claims a conflict resolution system providing an IPG which a user can use to select a television program to watch while also selecting another program that can be recorded at the same time. Ex. 1101, Abstract; claim 13. The Ellis Abstract also explains that such a system can be implemented by a set-top box with a single tuner or with a set-top box having multiple tuners. The Ellis system allegedly determines that if a conflict exists for a recording, viewing, or other function, the system alerts the user and provides the user with the opportunity to cancel the conflict with the IPG. Ex. 1101, claim 1.

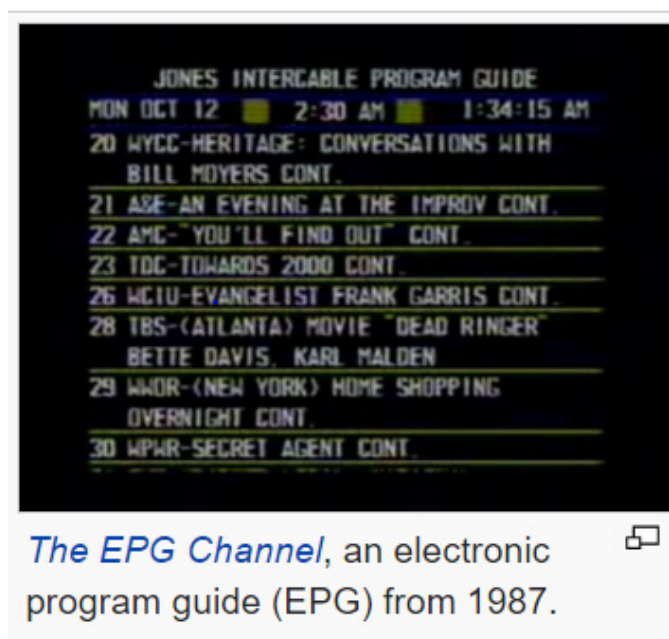
30. Of note here, however, is the fact that of the 1999 filing date of Ellis, there were a number of IPG-based systems which supported the simultaneous watching and recording of television programs, with a number of companies and individuals developing and publicizing approaches to creating such systems as a way for a television viewer to identify programs of interest for either (or both) viewing and recording. A significant contributor to these developments was the transition by many television viewers from broadcast television received with the then-familiar TV antennas, to the delivery of television programming and other services through coaxial cables, which were brought to the users' homes. Whereas over-the-air delivery of television programming was limited to a small number of channels in most markets, the transition to cable delivery provided an opportunity to deliver many more channels of general and special-interest programming.

31. As of the early-to-middle 1990s, cable television systems and their larger number of available channels were proliferating across the U.S. For example, a seminal book in the field—*Modern Cable Television Technology* by Walt Ciciora, James Farmer, and David Large¹—on page 4 (Ex. 1108 at 3) notes that around that time cable television service was supplied to nearly 65 million

¹ Morgan Kaufmann Publishers, Inc., San Francisco, CA, 1999. (Ex. 1108).

U.S. households, corresponding to a market penetration of nearly 67%. As a result, cable television service was available to 96.7 % of U.S. television households.

32. To inform users about the various television programs that were available from their cable service, early cable systems provided a dedicated channel showing a scrolling display of the names of those programs, a brief description of the program and what time the programs were going to be aired. The data slowly displayed on a rolling basis, and the user could not increase the speed of the display. Those displays were the original EPGs; they were not interactive. An example of such a non-interactive EPG is shown below²:



² Excerpt from Wikipedia, *Electronic program guide*,

https://en.wikipedia.org/wiki/Electronic_program_guide (as of Dec. 15, 2016).

33. A more modern form of the EPG is the *interactive* [electronic] program guide (the “IPG,” though often loosely referred to as an EPG). An IPG allows television viewers to navigate scheduling menus interactively, selecting and discovering programming by time, title, channel or genre by using an input device such as a television remote control. The interactive menus are generated entirely within local receiving or display equipment using raw scheduling data sent by individual broadcast stations or centralized scheduling information providers. Today, a typical IPG provides user selectable information covering a span of one or two weeks.

34. On pages 9 and 10 (Ex. 1108 at 4-5), *Modern Cable Television Technology* also explains that with cable television, one of the major parts of that system is “the terminal equipment (set top terminals and consumer electronics hardware).” Given those terminals (also called “set-top boxes” or “STBs”), *Modern Cable Television Technology* goes on to explain that most set-top boxes available in the mid to late 1990s provided an on-screen display which allowed the user to select channels to watch and/or record through the use of an EPG. Ex. 1108 at 7.

35. That book also noted that EPGs were being built into television systems and STBs, and that some of the STBs also provided IR LEDs which could be used to control a separate video recorded. Ex. 1108 at 7.

36. Further, Chapter 19 of *Modern Cable Television Technology* describes a number of different ways of connecting the coaxial cable supplying television programming to a home with TVs, VCRs, and STBs based on a 1987 report from the National Cable & Television Association's³ Engineering Committee. One approach described in § 19.3.1 of *Modern Cable Television Technology* allows the user to “watch one unscrambled channel while recording a different unscrambled channel.” Ex. 1108 at 10. An alternate approach described in § 19.3.3 of *Modern Cable Television Technology* uses two STBs, each with its own tuner, to supply programming to a VCR and a television set which allows a user to “watch any authorized scrambled or unscrambled program” and to “record any (other or the same) authorized scrambled or unscrambled program.” Ex. 1108 at 12.

37. The original function of STBs, also referred to as “converter boxes” in the early 1990s,⁴ was simply to select one of the many incoming channels so that it could be watched on a TV set. The incoming channel was tuned to and then converted to a specific channel (often channel 3 or 4) for output to the associated television set or recorder, those end devices being tuned to receive programming

³ Currently known as the Internet & Television Association.

⁴ See the Cable Television Consumer Protection and Competition Act of 1992, Public Law 102-383-OCT. 5, 1992.

on that fixed channel. This basic capability was soon enhanced, however, to allow the STB to be controlled using a hand-held infrared controller. Later, more sophisticated set-top boxes were introduced by companies like Scientific-Atlanta and Cisco. Those STBs contained enough memory and graphics resources to allow them to accept downloaded features providing enhanced capabilities including an on-screen display, volume control, virtual text channels, a sleep timer, parental locks, reminder messages, and multi-lingual displays.⁵

38. As STB capabilities expanded, EPGs such as those described in *Modern Cable Television Technology* became a common feature of those in-home devices. As an example, as early as 1997, Alexander (Ex. 1105, discussed in detail below) describes a multi-tuner system that uses an IPG that provides a listing of available programs and allows a user to select a program for viewing or recording from the IPG. Ex. 1105, 6:1-55. I note that although Alexander specifically describes its program guide as an “EPG,” in my opinion a PHOSITA would have understood that the “EPG” of Alexander is, in fact, an IPG since it provides an on-screen display that presents PIP and other information to the user and is also interactively responsive to user inputs. Ex. 1105, 6:1-55; 14:34-41. I thus refer to

⁵ See http://blogs.cisco.com/sp/a_brief_history_of_set-top_box_innovation (last accessed on October 26, 2016).

the EPG of Alexander as an IPG throughout this Declaration. Ex. 1105, 14:34-41. Similarly, Chun (Ex. 1106, also discussed below) describes a menu-driven program selection system for use in a two-tuner television receiver. Ex. 1106, Abstract.

39. By 1998, therefore, in my opinion a PHOSITA would have known many of the features of the purported invention claimed by Ellis to be well known.

B. Overview Of Ellis

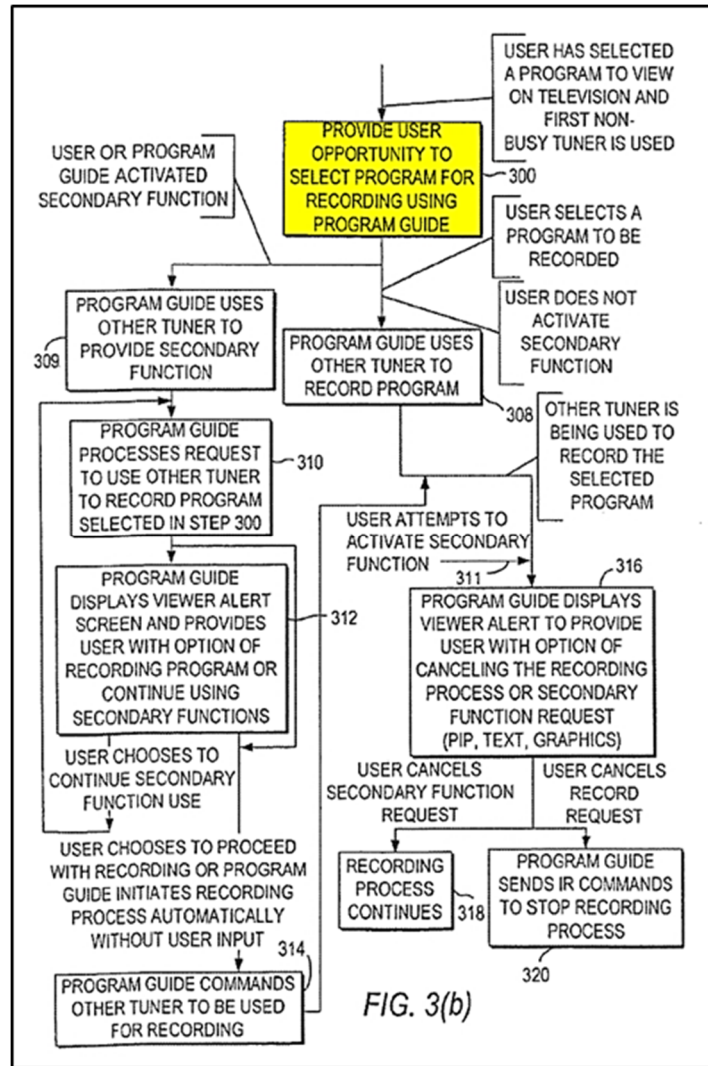
40. As I noted above, Ellis relates to a conflict resolution system using an interactive program guide that allow a user to view program listings, to navigate through the program listings, to select a program to view or record, and to resolve any conflicts which may arise when they make a selection. Ex. 1101, Abstract; claim 13. Ellis also discloses that the IPG can be implemented on a receiver with multiple tuners or on a VCR and television by using an RF bypass switch. Ex. 1101, 1:42-47; 1:57-2:9; Fig. 12. Ellis also explains that when providing “a full-featured interactive program guide, it is typically necessary to use several different screens, each screen being associated with one or more features of the system.” Ex. 1101, 3:19-22; 5:49-51; FIGS. 3-10 (depicting “sample screen displays which illustrate the operation of the interactive program guide of the present invention”).

41. Ellis also discloses that IPGs are typically implemented on STBs (Ex. 1101, 1:26-27), and that having a set-top box which provides an IPG allows users to view a listing of viewable television programs, to select a program for viewing, and in some cases, to select a program to be recorded. Ex. 1101, 1:27-30. Given those capabilities, Ellis identifies as a “significant disadvantage” the alleged fact that the available IPGs are provided by STBs that contain only one tuner, though admitting that STBs containing two tuners had been proposed. Ex. 1101, 1:35-38. Given a one-tuner STB, therefore, Ellis opines that if the user has assigned that tuner to a program being recorded, the user will be unable to watch a second program while that recording is taking place. Ex. 1101, 1:38-41. Accordingly, Ellis proposes to provide a “more sophisticated program guide” that operates with a multi-tuner STB. Ex. 1101, 1:42-43.

42. To implement such a conflict-free IPG system, Ellis discloses an STB having more than one tuner and states that the “arrangement of FIG. 2(b) allows the interactive television program guide to allocate whichever tuner is not currently busy for recording a selected program when that program is about to begin.” Ex. 1101, 7:55-58; Fig. 2(b).

43. Having such a system, Ellis also discloses that even when a program is being recorded by using one tuner within a two-tuner STB, a user can still use the IPG to select a different program for viewing. In so doing, the IPG system uses

the second tuner to provide that second program to a television set for viewing. Ex. 1101, 8:19-23. Ellis also discloses a system that includes multiple tuners that are capable of allowing a user to view or record a program, and various “secondary tuner functions” such as allowing the user to utilize a picture-in-picture (“PIP”) function. Ex. 1101, 1:55-2:5. Further, with regard to possible conflicts, Ellis discloses with respect to the highlighted flowchart of Figure 3(b) (below) that a user can choose to cancel a tuner function currently in progress to switch the tuner to a different requested function, or, alternatively, the user may cancel the requested function, thereby continuing the current tuner function. Ex. 1101, Fig. 3(b). I also note that in the alternate embodiment shown in Fig. 12 of Ex. 1101, the end user may perform these functions by using a set-top box connected to a VCR, a television, and an RF bypass switch. As I explain below, however, the use of IPG systems which could resolve such tuner conflicts was well known in the prior art as of 1999.



C. The Priority Date and the Prosecution History

44. I have reviewed the prosecution file history of Ellis. U.S. Application No. 13/280,215 was filed on October 24, 2011 (Ex. 1103). That application was the fifth of a series of applications claiming priority to the '487 Provisional (Ex. 1102). However, based on my study of it, it is my opinion that Ellis is not entitled to the filing date of the '487 Provisional. I base that opinion on my understanding that in order to properly support a later-filed application, a

provisional application must contain a written description of the claimed invention such that a PHOSITA would believe that, as of the priority date sought, the applicant was in possession of the invention that is later claimed, and that such a written description must actually or inherently disclose each and every element of the later-allowed claims. Clearly, that requirement is also not satisfied by the '487 Provisional.

45. To the contrary, the '487 Provisional consisted of only a two-page write-up that lacked any drawings or flowcharts. Further, the '487 Provisional did not provide any implementation details, did not provide a complete written description of the various features set forth in the later-filed application for Ellis, and did not provide an enabling disclosure that would allow a PHOSITA to practice any of the alleged inventions set forth in those later claims. Ex. 1102 at 5 and 6. More specifically, the brief discussion found in the two-page '487 Provisional fails to disclose those skilled in the art how to make and use the full scope of the later-allowed Ellis claims without undue experimentation, and lacking that disclosure, those claims fail to bear a reasonable correlation to the limited disclosure found in that Provisional.

46. Due to the shortcomings discussed above, it is my opinion that Ellis is not entitled to the priority date of the '487 Provisional, but rather only the June 11,

1999 date of the later-filed '850 Application, now abandoned. Ellis is a continuation of the '850 Application. Ex. 1101, 1:8-18.

VI. SUMMARY OF THE PRIOR ART

A. The Combinations of Prior Art

47. I address herein the unpatentability of claims 1-24 of Ellis on the grounds set forth in the table below.

Ground	Claims of Ellis	Basis for Unpatentability
1	1-24	Obviousness under 35 U.S.C. 103(a) over Nagano in view of Alexander
2	1-24	Obviousness under 35 U.S.C. 103(a) over Nagano in view of Chun

B. Nagano


48. Nagano is directed toward an apparatus and a method of “controlling the recording of television programs” and “[i]f any of the reserved programs overlap, the apparatus allows the starting time and/or ending time of any of the overlapped programs to be changed.” Ex. 1104, Abstract. Nagano discloses an IPG system that includes channel and program data with program categories and an on-screen display of an IPG that allows the users to select a program for viewing or recording. Ex. 1104 at 1:25-38 and Fig. 9A. I note that while Nagano specifically describes its program guide as an “EPG,” in my opinion a PHOSITA would have understood that the “EPG” of Nagano is, in fact, an IPG since it provides an on-screen display that presents programming information to the user and is also

interactively responsive to user inputs. Ex. 1104 at 1:25-38 and Fig. 9A. I thus refer to the EPG of Nagano as an IPG throughout this Declaration. For reference, Nagano's Fig. 9A is copied below, showing an IPG that includes channel identifiers, programs, and program times:

FIG. 9A

Program Guide		
SEP 7	8:00pm	9:00pm
CSP2	NEWS 1	NEWS 2
26	Famous American	
CNN	Primenews	
SHOW	City Slickers	
HBO	Bingo	

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49. Nagano also discloses that the apparatus includes a single tuner and a remote control and that a “user selects a preferred program on the channel and watches the program on a TV set or records the program on a picture recorder.” Ex. 1104, Fig. 1; 1:15-17.

50. Nagano discloses that the system can collect IPG data. Ex. 1104, 6:34-37. At Ex. 1104, 8:23-33, Nagano also discloses that the IPG shows programming for all available channels by allowing scrolling of the EPG when the number of channels exceeds the display capacity of that guide. Nagano also discloses that the user can move a cursor across the IPG to select a program for recording, with the

image of that program being changed to show where the cursor is positioned. Ex. 1104, 8:27-30.

51. Further, Nagano discloses that the apparatus can perform conflict resolution, stating that “[i]f any of the reserved programs overlap, the apparatus allows the starting time and/or ending time of any of the overlapped programs to be changed.” Ex. 1104, Abstract. In other words, Nagano discloses that if a user reserves a program for recording with the IPG and that program overlaps with another scheduled recording, the Nagano system determines that the programming overlaps and there is a conflict. Ex. 1104, 2:10-17.

52. Ex. As shown below in Figs. 17B and 17E (copied below), Nagano also discloses that the “electronic appliance is provided with a display means for displaying the picture recording reservation information of the overlapped program reserved for picture recording.” Ex. 1104 at 4:36-38. The “?” displayed in Fig. 17B indicates to the user that the movie they have selected for recording overlaps with the recording of the previously scheduled news program as shown in Fig. 17E.

FIG. 17B

Program Guide		
SEP 7	8:00pm	9:00pm
A	News	
B		?Movie

FIG. 17E

Over Lapped event			
A	MON	8:00p	News 2:00
B	MON	9:00p	Movie 1:00

53. A PHOSITA would thus realize that Nagano discloses a method of correcting tuner conflicts between user selections. For example, at Ex. 1104, 5:6-13 Nagano discloses that when programs which have been selected for recording by using his IPG happen to overlap in time, the overlapped reserved programs are displayed to the user, allowing them to change the starting time or ending time for the selected program or, alternatively, to cancel one of the overlapping operations.

54. Nagano also discloses that the user can resolve the identified conflicts “by operating the cursor moving keys to cancel the picture recording reservation, expedite[ing] the ending time of the picture recording reservation, or delay[ing] the picture recording starting time.” Ex. 1104, 11:44-51.

C. Alexander

55. Alexander discloses a system and method for improved IPGs and improved user control of program video recording. Ex. 1105 Abstract. Alexander also discloses several EPG improvements, including a PIP capability, programming content conflict resolution, and viewer access to the Internet. Ex. 1105, 6:1-32.

56. Alexander also discloses that its system includes both a first and second tuner. Ex. 1105, 14:37-41. Alexander also discloses that the “viewer instructs the EPG what programs to add to the Record List, which is the list of

programs and related programming schedule information, for programs that the viewer want to have recorded.” Ex. 1105, 7:59-62.

57. Alexander also discloses that the “EPG’s Record Function recognizes conflicts in viewer record instructions” and “prompts the viewer to resolve the conflict.” Ex. 1105, 12:53-55. Alexander also discloses that if a user schedules a new recording, “[t]he EPG compares the newly received record instructions to as-yet incompletely executed, or as yet unexecuted, record instructions” to determine if a conflict exists. Ex. 1105, 12:57-60.

58. Alexander also discloses that if a conflict is detected, “the EPG formats a message to the viewer describing the conflict.” Ex. 1105, 12:60-64. As a result, Alexander explains that the viewer must “revise the record instructions to eliminate the conflict.” Ex. 1105, 13:2-3. Alexander also discloses that when a “one occurrence program” conflicts with a “regularly recorded program,”⁶ the user can use the EPG to select the “one occurrence program to be recorded” to eliminate the conflict. Ex. 1105, 13:3-8; Figs. 5 and 6. In my opinion, therefore, a PHOSITA would realize that if the user chooses to record the “one occurrence”

⁶ Scheduling the regular recording of a multi-episode television program is commonly referred to as “recording a series.”

program when the IPG identifies such a conflict, the recordings of the other program(s) scheduled at the same time are cancelled.

59. Alexander also discloses IPG-selectable tuner functions such as viewing and recording television programming, as well as advanced secondary tuner functions such as PIP, Internet access, and collecting EPG data. Ex. 1105, 6:1; 6:32-33; 6:64-66; 7:15-17; 7:57-62; 8:18-31.

D. Chun

60. Chun discloses a self-contained, multi-tuner system with a picture-in-picture (PIP) function that can be implemented on either tuner. Ex. 1106, Abstract; 2:37-38. Further, at 5:36-41, Chun explicitly discloses that a PIP function improves “the convenience and reliability of channel selection so that a user may easily select channels through a menu-based selection.” Ex. 1106, 5:36-41.

VII. CLAIM CONSTRUCTION

61. In making this Declaration, I have been asked to review the terms found in the Ellis claims to determine what a person of ordinary skill in the art would understand those terms to have meant at the time of the alleged invention. As discussed above, Ellis describes and claims “[a]n interactive television program guide system is provided in which a user may use the program guide to watch one program while simultaneously recording another program without interrupting the recording or viewing process.” Ex. 1101, Abstract.

62. I understand that the patentability of each claim of Ellis must be evaluated individually on its merits, and I have done so below in Sections VIII and IX.

63. Independent claim 1 of Ellis is a method claim with claims 2-12 depending from it. Independent claim 13 of Ellis is a system claim and claims 14-24 depend from it. Aside from the fact that claim 1 is directed to a method and claim 13 is directed to a system, to my reading those two sets of claims (*i.e.*, claims 2-12 and claims 14-24) essentially correspond to one another as is illustrated in the following table which compares the wording of those two parallel sets of claims. I note, however, that in contrast to independent claim 13, the receiving and determining steps of independent claim 1 are not required to be implemented by an IPG since the receiving and determining steps do not require an IPG. Accordingly, in my opinion the validity of claims 13-24 can be addressed together with the validity of claims 1-12.

The Ellis Method Claims	The Corresponding System Claims
1. A method for resolving a conflict when multiple operations are performed using multiple tuners controlled by an interactive television program guide, the method comprising:	13. A system for resolving a conflict when multiple operations are performed using multiple tuners controlled by an interactive television program guide, the system comprising: a first tuner; a second tuner; and an interactive television program

The Ellis Method Claims	The Corresponding System Claims
<p>receiving a request to perform a tuning operation;</p> <p>determining that neither a first tuner nor a second tuner are available to perform the requested tuning operation, wherein the first tuner and the second tuner are both capable of performing the tuning operation; and</p> <p>in response to the determination, displaying an alert that provides a user with an opportunity to direct the interactive television program guide to cancel a function of the second tuner to permit the second tuner to perform the requested tuning operation.</p>	<p>guide implemented on the system, wherein the interactive television program guide is operative to:</p> <p>receive a request to perform a tuning operation;</p> <p>determine that neither the first tuner nor the second tuner is available to perform the requested tuning operation, wherein the first tuner and the second tuner are both capable of performing the tuning operation; and</p> <p>in response to the determination, display an alert that provides a user with an opportunity to direct the interactive television program guide to cancel a function of the second tuner to permit the second tuner to perform the requested tuning operation.</p>
<p>2. The method of claim 1 further comprising:</p> <p>receiving a user selection to not cancel the function of the second tuner; and</p> <p>in response to the user selection to not cancel the function of the second tuner, continuing to perform the function of the second tuner.</p>	<p>14. The system of claim 13 wherein the interactive television program guide is further operative to:</p> <p>receive a user selection to not cancel the function of the second tuner; and</p> <p>in response to the user selection to not cancel the function of the second tuner, continue to perform the function of the second tuner.</p>

The Ellis Method Claims	The Corresponding System Claims
<p>3. The method of claim 1 further comprising:</p> <p style="padding-left: 40px;">receiving a user selection to cancel the function of the second tuner; and</p> <p style="padding-left: 40px;">in response to the user selection to cancel the function of the second tuner, canceling the function of the second tuner and performing the requested tuning operation.</p>	<p>15. The system of claim 13 wherein the interactive television program guide is further operative to:</p> <p style="padding-left: 40px;">receive a user selection to cancel the function of the second tuner; and</p> <p style="padding-left: 40px;">in response to the user selection to cancel the function of the second tuner, cancel the function of the second tuner and perform the requested tuning operation.</p>
<p>4. The method of claim 1 wherein the requested tuning operation, the function of the second tuner, and a function of the first tuner each comprises a tuning function selected from the group consisting of viewing television programming, recording television programming, and performing a secondary tuner function.</p>	<p>16. The system of claim 13 wherein the requested tuning operation, the function of the second tuner, and a function of the first tuner each comprises a tuning function selected from the group consisting of viewing television programming, recording television programming, and performing a secondary tuner function.</p>
<p>5. The method of claim 4 wherein the secondary tuner function comprises a tuning function selected from the group consisting of providing a picture-in-picture signal, collecting program guide data, browsing the Internet, and playing a music channel.</p>	<p>17. The system of claim 16 wherein the secondary tuner function comprises a tuning function selected from the group consisting of providing a picture-in-picture signal, collecting program guide data, browsing the Internet, and playing a music channel.</p>

The Ellis Method Claims	The Corresponding System Claims
<p>6. The method of claim 1 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is performing a secondary tuner function, and the requested tuning operation is recording a second television program.</p>	<p>18. The system of claim 13 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is performing a secondary tuner function, and the requested tuning operation is recording a second television program.</p>
<p>7. The method of claim 1 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is performing a secondary tuner function.</p>	<p>19. The system of claim 13 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is performing a secondary tuner function.</p>
<p>8. The method of claim 1 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is viewing a third television program.</p>	<p>20. The system of claim 13 wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is viewing a third television program.</p>
<p>9. The method of claim 1 wherein the alert provides the user with the opportunity to direct the interactive television program guide to cancel the function of the second tuner when the function of the second tuner is viewing a television program, and provides the user with the opportunity to direct the interactive television program guide to cancel a function of the first tuner when the function of the first tuner is viewing the television program.</p>	<p>21. The system of claim 13 wherein the alert provides the user with the opportunity to direct the interactive television program guide to cancel the function of the second tuner when the function of the second tuner is viewing a television program, and provides the user with the opportunity to direct the interactive television program guide to cancel a function of the first tuner when the function of the first tuner is viewing the television program.</p>

The Ellis Method Claims	The Corresponding System Claims
10. The method of claim 1 wherein the displaying the alert comprises displaying a display screen using the interactive television program guide that provides the user with a first option to continue to perform the function of the second tuner, and with a second option to cancel the function of the second tuner to perform the requested tuning operation.	22. The system of claim 13 wherein the displaying the alert comprises displaying a display screen using the interactive television program guide that provides the user with a first option to continue to perform the function of the second tuner, and with a second option to cancel the function of the second tuner to perform the requested tuning operation.
11. The method of claim 1 wherein the user selects to cancel the function of the second tuner to permit the second tuner to perform the requested tuning operation using a remote control.	23. The system of claim 13 wherein the user selects to cancel the function of the second tuner to permit the second tuner to perform the requested tuning operation using a remote control.
12. The method of claim 1 wherein the first tuner and the second tuner are included in a single device.	24. The system of claim 13 wherein the first tuner and the second tuner are included in a single device.

VIII. GROUND 1 - NAGANO IN VIEW OF ALEXANDER RENDER OBVIOUS CLAIMS 1-24 OF ELLIS

64. I have compared claims 1-24 Ellis to the disclosures of Nagano and Alexander. Based on that comparison, it is my opinion that Nagano in combination with Alexander discloses each and every limitation of claims 1-24. I explain that opinion on a limitation-by-limitation basis below.

A. Claims 1 and 13

65. The preambles of claims 1 and 13 read as:

A method/system for resolving a conflict when multiple operations are performed using multiple tuners controlled by an interactive television program guide, the method/system comprising:

66. It is my opinion that under the broadest reasonable interpretation, these preambles are not construed to be limitations on claims 1 or 13 because the preambles do not provide an antecedent basis for any claim elements and the preambles are merely statements of intended use. It is also my opinion that the preambles of claims 1 and 13 are not limiting because the bodies of claims 1 and 13 each describe a structurally complete invention and deletion of the preambles would not affect the structure or steps of the claimed inventions. Although Nagano only discloses a television system having a single tuner, at Ex. 1104, 6:28-29, Alexander discloses a first television tuner and the various IPG Windows and IPG features on the face of the television monitor, while the television monitor continues to receive a second video signal of a second television channel tuned by a second television tuner. Ex. 1105, 14:35-41. In addition, I note that Alexander states that the “invention allows the television viewer to manipulate the PIP ... with a first tuner while [receiving] a second television channel tuned by a second television tuner.” Ex. 1105, 14:35-41. In my opinion, therefore, it would have been obvious to a PHOSITA to modify the single-tuner method and system of

Nagano with the IPG and two-tuner system taught by Alexander to improve and simplify a user's control over the increased programming content.

67. Claim 13 further requires:

a first tuner;

68. Nagano's Figure 1, as noted above, discloses a single tuner system.

69. Claim 13 further requires:

a second tuner; and

70. As I explained above, Alexander discloses a system with two tuners and in my opinion it would have been obvious to a PHOSITA to modify the single-tuner system of Nagano with the two-tuner system taught by Alexander to increase the control capabilities and content available to a viewer.

71. Claim 13 further requires:

an interactive television program guide implemented on the system, wherein the interactive television program guide is operative to:

72. Nagano at Ex. 1104, 1:34-38 and Figure 9A discloses an IPG that "can be displayed on a screen for individual categories of program ... and on the display of the electronic program guide on a screen, a user can select a program for receiving and can reserve for recording of a program." Based on this, it is my opinion that an IPG is implemented by the Nagano system.

73. Claims 1 and 13 of Ellis further require:

receiving/receive a request to perform a tuning operation;

74. It is my opinion, under the broadest reasonable interpretation, that the preamble is not limiting and this element of claim 1 does not require an IPG. I note, however, that Nagano discloses that “the electronic program guide can be displayed on a screen for individual categories of program such as sports, news, and movies, and on the display of the electronic program guide on a screen, a user can select a program for receiving and can reserve for recording of a program.” Ex. 1104, 1:33-38 (emphasis added). Based on this, it is my opinion that Nagano’s system can receive a user request to perform a tuning operation, such as recording or viewing, with the IPG.

75. Claims 1 and 13 further require:

determining/determine that neither a first tuner nor a second tuner are/is available to perform the requested tuning operation, wherein the first tuner and the second tuner are both capable of performing the tuning operation;

76. Nagano discloses an apparatus and a method for “controlling the recording of television programs” such that this system determines “[i]f any of the reserved programs overlap, the apparatus allows the starting time and/or ending time of any of the overlapped programs to be changed.” Ex. 1104, Abstract.

77. As I noted above, the preamble in claim 1 is not limiting and this claim limitation does not require an IPG. It is my opinion, however, that a PHOSITA would understand that Nagano teaches that the IPG can determine if a

tuner is available to perform a function. For example, at Ex. 1104, 2:10-17, Nagano explains that the IPG is used to schedule the recording of a program (a “reservation”), if that program overlaps the recording of a previously scheduled program, the Nagano system rejects scheduling the new recording. Ex. 1104, 2:10-17. As an alternate approach, at Ex. 1105, 12:53-55, Alexander discloses that the “EPG’s Record Function recognizes conflicts in viewer recording instructions” and “prompts the viewer to resolve the conflict.” Based on this, it is my opinion that it would have been obvious to a PHOSITA to modify Nagano with Alexander’s user-selected conflict-resolution approach and two-tuner system to simplify a user’s ability to control programming content conflicts with multiple tuners.

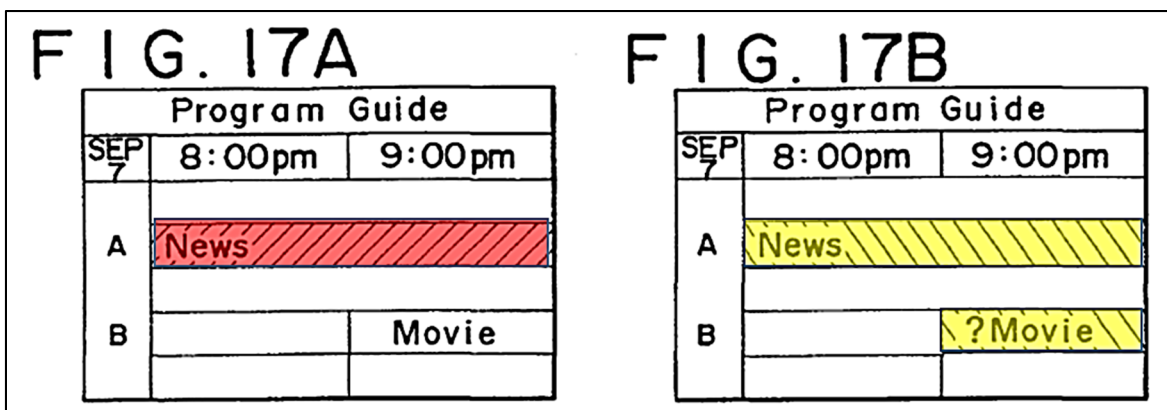
78. I note that during prosecution, Ellis asserted that the prior art only disclosed “conflicts associated with timers for different programs.” Ex. 1103 at 89. In so doing, Ellis argued that “checking for such timer related conflicts does not include determining that neither the first nor the second tuner are available to perform the requested tuning operation.” Ex. 1103 at 90. While I do not agree with that assertion, the argument certainly does not apply to Nagano. Nagano expressly states that an alert is provided when the tuner is not capable of recording overlapping requests and the user may change any scheduled recording. Ex. 1104, Abstract; 5:6-12. In addition, Nagano describes overlapping recordings (*i.e.*, a

tuner conflict) which reasonably applies to the present or future, as Nagano makes no distinction as to when a user can “set” a recording request.

79. Claims 1 and 13 further require:

and in response to the determination, displaying an alert that provides a user with an opportunity to direct the interactive television program guide to cancel a function of the second tuner to permit the second tuner to perform the requested tuning operation.

80. Nagano discloses that when programs reserved for recoding overlap, a display is provided for the user and the user may correct the scheduled recording start or end time, or the user may cancel the scheduled recording. Ex. 1104, 5:6-12. Also see Nagano’s disclosure of the use of the IPG to select a program for recording as shown in ¶ 48 above. In accordance with that disclosure, annotated versions of Nagano’s Figs. 17A and 17B are shown below, demonstrating how the background of an entry within Nagano’s IPG changes from red to yellow on overlapping programs to alert the user.



81. Nagano also discloses that the user may cancel or delay any of the scheduled recordings. For example, at Ex. 1104, 11:44-51 and Figure 17E, Nagano explains that with his system, when a scheduling overlap arises, that overlap is displayed as shown in his FIG. 17(e), thereby allowing the user to confirm the list of the overlapped programs. The user can then eliminate the overlap by operating the cursor moving keys to cancel one of his or her scheduled recordings, to modify the ending time of one of the scheduled recordings, or to delay the starting time of one of those recordings. *See* Ex. 1104, Abstract. In other words, the user may cancel a previously scheduled recording or a new scheduled recording.

82. Further, Alexander discloses that “the EPG formats a message to the viewer describing the conflict” and the “EPG will require that the viewer revise the record instructions to eliminate the conflict.” Ex. 1105, 12:63-13:3.

83. Thus, in my opinion it would have been obvious to a PHOSITA to modify the IPG enabled conflict-resolution method and system of Nagano with the multiple-tuner method and system of Alexander to provide a user a simplified capability to correct programming conflicts, such as canceling a requested tuner function. Given the nature of those conflict-resolution systems, in my opinion a PHOSITA would have thus found claims 1 and 13 to be only a predictable use of prior art elements according to their established functions. Further, in my opinion a PHOSITA would have found performing functions such as determining a

conflict, providing an alert, and canceling a tuner function for a second tuner to be obvious in view of Nagano's teachings for performing such functions with a single (*i.e.* first) tuner. Applying such techniques to a second tuner would yield predictable results.

84. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 1 and 13 of Ellis through obviousness.

B. Claims 2 and 14

85. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 2 and 14 of Ellis.

86. Claims 2 and 14 depend from claims 1 and 13 and further require:

receiving a user selection to not cancel the function of the second tuner; and in response to the user selection to not cancel the function of the second tuner, continuing to perform the function of the second tuner.

87. Nagano's single-tuner system which, in combination with Alexander's two-tuner system, discloses that a user, after receiving a conflict alert, can choose to cancel the requested action or to proceed with a previously scheduled tuner operation such as a recording, as taught by Nagano, across two tuners, as taught by Alexander. For example, Nagano discloses that when "an overlapped information

picture is displayed on the monitor as shown in FIG. 17(e), the user can confirm the list of the overlapped programs,” meaning that if the user wants to go ahead with the previously scheduled recording operation, the user can choose not to cancel that recording and instead cancel the newly scheduled, overlapping recording. Ex. 1104, 11:44-51.

88. Alexander also discloses that the “EPG’s Record Function recognizes conflicts in viewer record instructions” and the IPG “prompts the viewer to resolve the conflict.” Ex. 1105, 12:53-55.

89. Thus, in my opinion it would have been obvious to a PHOSITA to combine the conflict recognition and resolution method system of Nagano with the multi-tuner system and conflict-resolution system of Alexander to provide the user a simplified means to not cancel his or her prior request thus proceeding with the tuner function currently in progress. In this case, the user chooses not to cancel the requested function of the second tuner, and the tuner continues to record or execute some other tuner function. A PHOSITA would thus have found claims 2 and 14 to be only a predictable use of prior art elements according to their established functions.

90. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 2 and 14 of Ellis through obviousness.

C. Claims 3 and 15

91. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 3 and 15 of Ellis.

92. Claims 3 and 15 depend from claims 1 and 13 and further require:

receiving a user selection to cancel the function of the second tuner; and in response to the user selection to cancel the function of the second tuner, canceling the function of the second tuner and performing the requested tuning operation

93. Nagano discloses that “an overlapped information picture is displayed on the monitor as shown in FIG. 17(e), the user can confirm the list of the overlapped programs.” Ex. 1104, 11:44-46. Nagano allows “any . . . overlapped programs to be changed.” Ex. 1104, Abstract. For example, Nagano discloses that “the picture recorder may be structured so that the picture recording reservation is corrected on this picture display by operating the cursor moving keys to cancel the picture recording reservation . . . or delay the picture recording starting time.” Ex. 1104, 11:46-51.

94. As I noted above, while Nagano fails to disclose a second tuner, Alexander is a two-tuner system and further discloses that the IPG recognizes recording conflicts and allows the user to reconcile the conflict. Ex. 1105, 12:53-

55. Further, Alexander describes a “one occurrence” program selection that essentially cancels the preexisting, overlapped tuner function in favor of the new “one occurrence” request when such an overlap is identified. *See* ¶ 58 above.

95. Thus, in my opinion it would have been obvious to a PHOSITA to combine the conflict recognition and resolution method and system of Nagano with the multi-tuner system of Alexander to provide the user with improved access and control of programming content across multiple tuners. In this case, the user chooses to cancel the current function of the second tuner, and the tuner is allowed to execute some other tuner function. Again, I note that in the Abstract, Nagano discloses that the user can modify (*i.e.*, cancel) any overlapped program and this functionality would not be distinct from a first or a second tuner. In my opinion, a PHOSITA thus would have found claims 3 and 15 to be only a predictable use of prior art elements according to their established functions.

96. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 3 and 15 of Ellis through obviousness.

D. Claims 4 and 16

97. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 4 and 16 of Ellis.

98. Claims 4 and 16 depend from claims 1 and 13 and further require:

wherein the requested tuning operation, the function of the second tuner, and a function of the first tuner each comprises a tuning function selected from the group consisting of viewing television programming, recording television programming, and performing a secondary tuner function.

99. As I noted above, both Nagano and Alexander teach tuner functions consisting of viewing and recording television programs. Claims 4 and 16 are written in a form such that the requirements for a “tuning function” are met by having the first and second tuners being used to perform either a viewing operation, a recording operation, or to perform a secondary tuner function. A secondary tuner function can include a process other than television program viewing or recording that requires allocation of the first or second tuner, for example, to collect interactive program guide data, enable Internet browsing, to play a music channel, or to provide a picture-in-picture signal. Ex. 1101, Fig 3(c).

100. Nagano discloses that a user can select a program for viewing or recording. Ex. 1104, 1:15-17. Further, while Nagano fails to teach a second tuner, Alexander does so. Alexander also discloses a PIP secondary tuner function. Ex. 1105, 3:58-62; Figs. 1 and 5.

101. In my opinion, therefore, it would have been obvious to a PHOSITA to combine the single-tuner method and system taught by Nagano with the two-

tuner and PIP system of Alexander to provide the user with the capability to view and record increased programming content across multiple tuners. A PHOSITA thus would have found claims 4 and 16 to be only a predictable use of prior art elements according to their established functions.

102. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 4 and 16 of Ellis through obviousness.

E. Claims 5 and 17

103. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 5 and 17 of Ellis.

104. Claims 5 and 17 depend from claims 4 and 16 and further require:

wherein the secondary tuner function comprises a tuning function selected from the group consisting of providing a picture-in-picture signal, collecting program guide data, browsing the Internet, and playing a music channel.

105. As discussed above, secondary tuner functions include a process other than television program viewing or recording that requires allocation of the first or second tuner, for example, to collect interactive program guide data, enable Internet browsing, to play a music channel, or to provide a picture-in-picture signal. *See* Ex. 1101, Fig. 3(c). Nagano discloses that “tuner circuit 2 selects

channels to which the electronic program guide is inserted in the vertical blanking time period and outputs the electronic program guide information” thereby teaching a secondary tuning function. Ex. 1104, 6:34-37. As discussed above, although Nagano fails to teach a second tuner, Alexander does so. Alexander also discloses a PIP secondary tuner function. Ex. 1105, 3:58-62; Figs. 1 and 5.

106. It is my opinion that, therefore, it would have been obvious to a PHOSITA to modify Nagano’s single-tuner system with Alexander’s multi-tuner and PIP system for the purpose of maximizing a user’s access to additional programming content. A PHOSITA thus would have found claims 5 and 17 to be only a predictable use of prior art elements according to their established functions.

107. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 5 and 17 of Ellis through obviousness.

F. Claims 6 and 18

108. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 6 and 18 of Ellis.

109. Claims 6 and 18 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is performing a secondary tuner

function, and the requested tuning operation is recording a second television program.

110. As discussed above, Nagano discloses tuner functions that include viewing and recording programs, but fails to disclose a two-tuner system. *See* ¶105. Alexander, however, discloses a multi-tuner system with a PIP capability. *See* ¶105.

111. Thus, in my opinion, it would have been obvious to a PHOSITA at the time to combine the method and system of Nagano with Alexander's multi-tuner system where the function of the second tuner can be a secondary operation such as the PIP function disclosed by Alexander, and the new user-requested operation is recording a program. Such a capability would allow a user to easily cancel or proceed with a tuner function different from the function currently in progress, thereby maximizing his or her enjoyment of increased programming content. A PHOSITA thus would have found claims 6 and 18 to be only a predictable use of prior art elements according to their established functions.

112. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 6 and 18 of Ellis through obviousness.

G. Claims 7 and 19

113. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I

explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 7 and 19 of Ellis.

114. Claims 7 and 19 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is performing a secondary tuner function.

115. As I explained above, “secondary tuner functions” include a process other than television program viewing or recording that requires allocation of the first or second tuner to perform, such as collecting interactive program guide data, enabling Internet browsing, playing a music channel, or providing a picture-in-picture signal. *See* Ex. 1101, Fig. 3(c). As I also explained above, Nagano describes a single-tuner system with a conflict identification capability, wherein the tuner functions include receiving and viewing a program, recording a program, and retrieval of EPG data, while Alexander discloses a multi-tuner system, also with a conflict resolution capability, and a PIP capability.

116. In my opinion, therefore, due to the limited number of possible tuner functions such as viewing, recording, and PIP, a PHOSITA would have found it obvious to provide the capability for a user to view a first program with one tuner while using a second tuner to record a different program, and as that was taking

place, the user attempted to perform a secondary tuner function on the tuner recording the second television program. Having that capability would allow a user to maximize enjoyment of increased programming content since the user would be free to activate a PIP feature, as disclosed by Alexander, while viewing the first program, as an example. Such a capability would also allow a user to maximize his enjoyment of increased programming content across multiple tuners, as taught by Alexander. A PHOSITA thus would have found claims 7 and 19 to be only a predictable use of prior art elements according to their established functions.

117. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 7 and 19 of Ellis through obviousness.

H. Claims 8 and 20

118. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 8 and 20 of Ellis.

119. Claims 8 and 20 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is viewing a third television program.

120. As I explained above, Nagano describes a single-tuner system with a conflict identification capability, wherein the tuner functions include receiving and viewing a program, recording a program, and retrieval of EPG data. Alexander discloses a multi-tuner system, with a conflict resolution capability, wherein the tuning functions include receiving and viewing programs, retrieval of EPG data, and a picture-in-picture (PIP) capability that will require viewing two television programs at the same time, one on the main screen and a second within the PIP window.

121. In my opinion, therefore, due to the limited number of design options (*i.e.*, tuner functions such as viewing or recording), a PHOSITA at the time would have found it obvious to combine the method and system of Nagano with the multiple tuner system described by Alexander to provide the user a simplified means to cancel or proceed with a different tuner function currently in progress. In this case, the function of the second tuner is recording a program, and the requested function is to view a different program. Such a capability would allow a user to maximize his or her enjoyment of increased programming content. A PHOSITA thus would have found claims 8 and 20 to be only a predictable use of prior art elements according to their established functions. Further, IMO a PHOSITA would choose among a limited number of known and obvious approaches, such as viewing and recording as disclosed by Nagano and Alexander.

122. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 8 and 20 of Ellis through obviousness.

I. Claims 9 and 21

123. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 9 and 21 of Ellis.

124. Claims 9 and 21 depend from claims 1 and 13 and further require:

wherein the alert provides the user with the opportunity to direct the interactive television program guide to cancel the function of the second tuner when the function of the second tuner is viewing a television program, and provides the user with the opportunity to direct the interactive television program guide to cancel a function of the first tuner when the function of the first tuner is viewing the television program.

125. Claims 9 and 21 require an IPG that can be used to cancel the use of the first and second tuners to end the viewing of a television program on one or the other of those tuners. After a careful review of the specification, claims, and file history of the '512 patent, I have found no support for the cancellation of a tuner that is being used to view a television program. Rather, the specification and drawings of that patent disclose only cancelling the use of a tuner that is being used

to provide a recording or a secondary function. The idea of cancelling a tuner (either the first or second) is only disclosed in claims 9 and 21 themselves.

126. However, in my opinion, given the alert that is disclosed in the '512 specification, a PHOSITA would readily be able to extend the teachings found there for an alert for cancelling the use of a tuner to stop a recording or a secondary function (*see*, for example, Ex. 1101, Fig. 3(b), Fig. 4(b), and 8:55-10:67), to using that same alert to offer the user the opportunity to cancel the use of a tuner (either the first tuner or the second tuner) for viewing a television program as required by claims 9 and 11. Adding that feature to the alerting method and system of the '512 patent would not, in my further opinion, be difficult to implement, and would give the user the option called for in claims 9 and 12. That same addition would also be easily implemented as an extension of the prior art addressed herein which discusses cancelling the use of a tuner for recording a program. In fact, both Nagano and Alexander teach that an IPG can be used to select a program for viewing, as well as to cancel the viewing of one program by changing to a channel carrying a different program.

127. In a two-tuner system such as that of Alexander, each tuner is capable of viewing a program, recording a program, or performing a secondary tuner function. Thus, due to the limited number of design options, a PHOSITA would find it an obvious design choice to provide a user the capability to cancel the

function of a first or a second tuner when viewing a program. This capability would simplify a user's control over viewing content and improve the user's viewing experience. Therefore, in my opinion, it would have been obvious to a PHOSITA at the time to combine the conflict resolution system of Nagano with the multiple tuner system described by Alexander to provide the user a means to cancel the viewing function of either the first or second tuner with the IPG. Such a capability would allow a user to improve control over viewing content and improve his viewing experience. A PHOSITA thus would have found claims 9 and 21 to be only a predictable use of prior art elements according to their established functions.

128. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 9 and 21 of Ellis through obviousness.

J. Claims 10 and 22

129. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 10 and 22 of Ellis.

130. Claims 10 and 22 depend from claims 1 and 13 and further require:

wherein the displaying the alert comprises displaying a display screen using the interactive television program guide that provides the user with a first option to continue to perform the function of the second tuner,

and with a second option to cancel the function of the second tuner to perform the requested tuning operation.

131. These claims describe a situation in which an alert notifies the user that a conflict exists, and allows the user the option to continue the function of the tuner, or to cancel the function of the tuner to perform the requested operation.

132. Nagano allows “any of the overlapped programs to be changed.” Ex. 1104, Abstract. Alexander also discloses that “[t]he EPG will require that the viewer revise the record instructions to eliminate the conflict.” Ex. 1105, 13:1-3. At Ex. 1104, 11:44-51, Nagano discloses that the IPG is used to cancel a tuner function or continue a tuner function by delaying the recording start time.

133. In my opinion, therefore, a PHOSITA would have found it obvious to modify Nagano’s alert and cancellation system with the two-tuner method and system of Alexander, to allow a user to: 1) continue a tuner function as taught by Nagano and Alexander or 2) cancel a requested tuner function such as a recording as taught by Nagano and Alexander. Such a capability would have simplified the user’s viewing experience and control over programming content. A PHOSITA thus would have found claims 10 and 22 to be only a predictable use of prior art elements according to their established functions.

134. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 10 and 22 of Ellis through obviousness.

K. Claims 11 and 23

135. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 11 and 23 of Ellis.

136. Claims 11 and 23 depend from claims 1 and 13 and further require:

wherein the user selects to cancel the function of the second tuner to permit the second tuner to perform the requested tuning operation using a remote control.

137. Nagano discloses that “a picture recording is reserved by the remote controller.” Ex. 1104, 6:66-67. In my opinion, therefore, it would have been obvious to a PHOSITA at the time to combine the conflict resolution method and system of Nagano that includes a remote control to cancel conflicting recordings, with the two-tuner system described by Alexander, to provide the user a simplified means to cancel the tuner function currently in progress to proceed with the requested tuner function. Such a capability would allow a user to maximize his or her enjoyment of increased programming content. A PHOSITA thus would have found claims 11 and 23 to be only a predictable use of prior art elements according to their established functions.

138. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 11 and 23 of Ellis through obviousness.

L. Claims 12 and 24

139. I explained above my opinion that Nagano in view of Alexander discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion, Nagano in view of Alexander also discloses a method and system having all of the limitations of claims 12 and 24 of Ellis.

140. Claims 12 and 24 depend from claims 1 and 13 and further require:
wherein the first tuner and the second tuner are included in a single device.

141. Nagano fails to disclose a system with two tuners. Alexander discloses a system that includes “a first television tuner and a second television channel tuned by a second television tuner.” Ex. 1105, 14:37-41.

142. In my opinion, therefore, a PHOSITA would have found it obvious to combine the method and system of Nagano with the two-tuner system of Alexander so that the tuners could be located in a single device, as taught by Nagano, resulting in increased user convenience of one device rather than multiple components that also provides the user with increased programming content. A PHOSITA thus would have found claims 12 and 24 to be only a predictable use of prior art elements according to their established functions.

143. Given the disclosures identified above, it is my opinion that Nagano in view of Alexander invalidates claims 12 and 24 of Ellis through obviousness.

IX. GROUND 2 – NAGANO IN VIEW OF CHUN RENDER OBVIOUS CLAIMS 1-24 OF ELLIS

144. I have also compared claims 1-24 to the Nagano Patent and Chun (Ex. 1106). It is my opinion that the Nagano Patent in combination with Chun discloses each and every limitation of claims 1-24. I address that combination for each claim on a limitation-by-limitation below.

A. Claims 1 and 13

145. Claim 1 of Ellis is a method claim. Claim 13 of Ellis is a system claim. As I explain below, in my opinion Nagano in view of Chun disclose a method and system having all of the limitations of claims 1 and 13 of Ellis.

146. The preamble of claims 1 and 13 read as follows:

A method/system for resolving a conflict when multiple operations are performed using multiple tuners controlled by an interactive television program guide, the method/system comprising:

147. As I noted above, it is my opinion that under the broadest reasonable interpretation, these preambles are not construed to be limitations on claims 1 or 13 because the preambles do not provide an antecedent basis for any claim elements and the preambles are merely statements of intended use. It is also my opinion that the preambles of claims 1 and 13 are not limiting because the bodies of claims 1

and 13 each describe a structurally complete invention and deletion of the preambles would not affect the structure or steps of the claimed inventions. However, Nagano discloses a single-tuner system with an IPG capability that displays programs on the screen in which a user can select programs for viewing or recording. Ex. 1104, 1:33-38, Fig. 9A. Chun discloses a system with a first and a second tuner. Ex. 1106, Abstract; Fig. 6.

148. In my opinion, therefore, it would have been obvious to a PHOSITA to modify the single-tuner system of Nagano with the two-tuner system taught by Chun to “display plural images on a single television screen” and “to provide a convenient and easy-to-use menu system.” Ex. 1106, 1:27-31.

149. Claim 13 further requires:

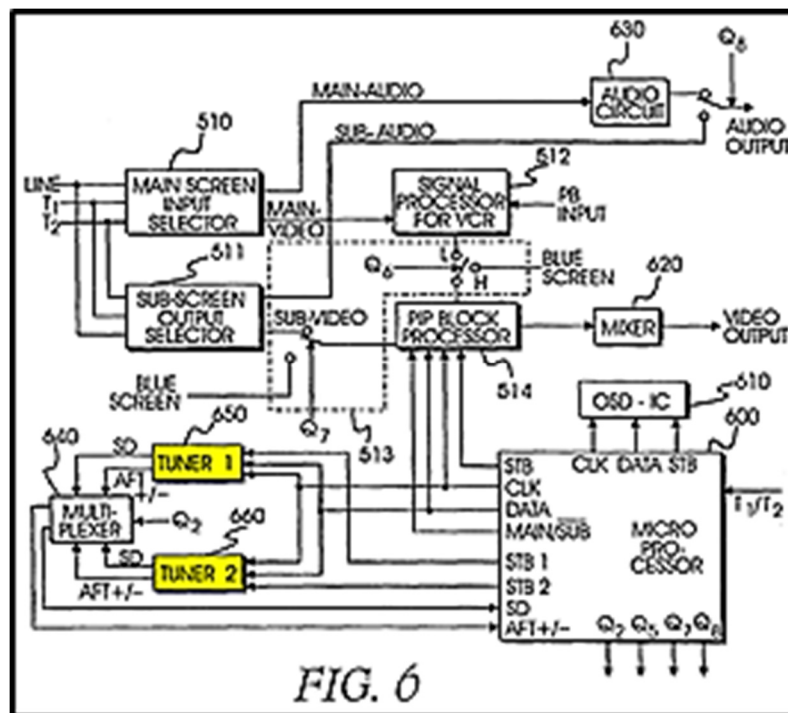
a first tuner;

150. As I noted above, Nagano discloses a single tuner system.

151. Claim 13 further requires:

a second tuner; and

152. Chun discloses that the “present invention first comprises a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106 at Abstract and Fig. 6. Chun’s two tuners are highlighted in yellow below:



153. In my opinion, therefore, it would have been obvious to a PHOSITA to modify the single-tuner method and system of Nagano with the two-tuner system taught by Chun to improve a user's access and control over increased programming content and to "display plural images on a single television screen." Ex. 1106, 1:27-28.

154. Claim 13 further requires:

an interactive television program guide implemented on the system, wherein the interactive television program guide is operative to:

155. Nagano at Ex. 1104, 1:33-38 and Figure 9A (copied below) discloses an "interactive television program guide" and states that the "program table data is referred to as electronic program guide" and that the IPG "can be displayed on a

screen for individual categories of program and on the display of the electronic program guide on a screen, a user can select a program for receiving and can reserve for recording of a program.”

FIG. 9A

Program Guide		
SEP 7	8:00pm	9:00pm
CSP2	NEWS 1	NEWS 2
26	Famous American	
CNN	Primenews	
SHOW	City Slickers	
HBO	Bingo	

156. Claims 1 and 13 further require:

receiving a request to perform a tuning operation;

157. It is my opinion, under the broadest reasonable interpretation, that the preamble is not limiting and this element of claim 1 does not require an IPG. I note, however, that Nagano discloses that the user can use the IPG to select programs for viewing and recording. Ex. 1104, 1:33-38; Fig. 9A.

158. Claims 1 and 13 further require:

determining that neither a first tuner nor a second tuner are available to perform the requested tuning operation, wherein the first tuner and the second tuner are both capable of performing the tuning operation;

159. As I noted above, the preamble in claim 1 is not limiting and this claim limitation does not require an IPG. It is my opinion, however, that a PHOSITA would understand that Nagano teaches that the IPG can determine if a tuner is available to perform a function. For example, Nagano discloses an apparatus and a method for “controlling the recording of television program,” where “[i]f any of the reserved programs overlap, the apparatus allows the starting time and/or ending time of any of the overlapped programs to be changed.” Ex. 1104, Abstract. Nagano also explains that the IPG is used to schedule the recording of a program (a “reservation”), if that program overlaps the recording of a previously scheduled program, the Nagano system rejects scheduling the new recording. Ex. 1104, 2:10-17. Nagano fails to disclose a second tuner.

160. Chun, however, discloses a two-tuner system. Chun states that “[t]he present invention first comprises a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106, Abstract.

161. In my opinion, therefore, it would have been obvious to a PHOSITA to modify the single-tuner method and system of Nagano with the two-tuner system taught by Chun to provide the user the ability to determine that a tuner is

not available to perform a tuning operation as a result of increased programming content, as well as providing the capability to resolve such a conflict.

162. As I discussed above, Ellis asserted that the prior art only disclosed “conflicts associated with timers for different programs.” Ex. 1103 at 89. In so doing, Ellis argued that “checking for such timer related conflicts does not include determining that neither the first nor the second tuner are available to perform the requested tuning operation.” Ex. 1103 at 90. While I do not agree with that assertion, the argument certainly does not apply to Nagano. Nagano expressly states that an alert is provided when the tuner is not capable of recording overlapping requests and the user may change any scheduled recording. Ex. 1104, Abstract; 5:6-12. In addition, Nagano describes overlapping recordings (*i.e.*, a tuner conflict) which reasonably applies to the present or future, as Nagano makes no distinction as to when a user can “set” a recording request.

163. Claims 1 and 13 further require:

and in response to the determination, displaying an alert that provides a user with an opportunity to direct the interactive television program guide to cancel a function of the second tuner to permit the second tuner to perform the requested tuning operation.

164. Nagano discloses that when programs reserved for recording overlap, a display is provided for the user and the user may correct any scheduled recording

start or end time, or the user may cancel the scheduled recording. Ex. 1104, Abstract; 11:44-51.

165. Nagano also discloses that the user may cancel or delay the scheduled recording. Ex. 1104, 11:44-51.

166. Chun discloses that the “present invention first comprises a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106, Abstract; Fig. 6.

167. Thus, in my opinion it would have been obvious to a PHOSITA to modify the IPG enabled conflict-resolution method and system of Nagano to include the two-tuner method and system of Chun to provide a user improved access and control of desired programming content over multiple tuners. Given the nature of Nagano’s conflict-resolution system, in my opinion a PHOSITA would have thus found claims 1 and 13 to be only a predictable use of prior art elements according to their established functions. Further, it is my opinion that a PHOSITA would have found performing functions such as determining a conflict, providing an alert, or canceling a tuner function for a second tuner, to be obvious in view of Nagano’s teachings for a single (*i.e.*, first) tuner. Applying such techniques to a second tuner would yield predictable results.

168. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 1 and 13 of Ellis through obviousness.

B. Claims 2 and 14

169. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 2 and 14 of Ellis.

170. Claims 2 and 14 depend from claims 1 and 13 and further require:

receiving a user selection to not cancel the function of the second tuner; and in response to the user selection to not cancel the function of the second tuner, continuing to perform the function of the second tuner.

171. Nagano discloses that “an overlapped information picture is displayed on the monitor as shown in FIG. 17(e), the user can confirm the list of the overlapped programs.” Ex. 1104, 11:44-46. Nagano also discloses that “the picture recorder may be structured so that the picture recording reservation is corrected on this picture display by operating the cursor moving keys to cancel the picture recording reservation or delay the picture recording starting time.” Ex. 1104, 11:46-51. A PHOSITA would understand that by choosing to delay the recording, the user chooses to continue the current tuner function. Nagano, however, fails to disclose a second tuner.

172. Chun discloses a system that includes a first and a second tuner. Ex. 1106, Abstract.

173. In my opinion, therefore, it would have been obvious to a PHOSITA to combine the conflict recognition and resolution method and system of Nagano with the multi-tuner system of Chun to provide the user with improved access and control over programming content with a simplified means to cancel or proceed with a different tuner function currently in progress. In this case, if the user chooses not to cancel the requested function of the second tuner, the tuner is allowed to record or execute some other tuner function. A PHOSITA thus would have found claims 2 and 14 to be only a predictable use of prior art elements according to their established functions.

174. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 2 and 12 of Ellis through obviousness

C. Claims 3 and 15

175. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 3 and 15 of Ellis.

176. Claims 3 and 15 depend from claims 1 and 13 and further require:

receiving a user selection to cancel the function of the second tuner; and in response to the user selection to cancel the function of the second tuner, canceling the function of the second tuner and performing the requested tuning operation.

177. Nagano discloses that “an overlapped information picture is displayed on the monitor as shown in FIG. 17(e), the user can confirm the list of the overlapped programs.” Ex. 1104, 11:44-46. Nagano allows “any overlapped programs to be changed.” Ex. 1104, Abstract. For example, Nagano discloses that “the picture recorder may be structured so that the picture recording reservation is corrected on this picture display by operating the cursor moving keys to cancel the picture recording reservation or delay the picture recording starting time.” Ex. 1104, 11:46-51. Again, Nagano is a single-tuner system.

178. Chun discloses a system that includes a first and a second tuner. Ex. 1106, Abstract.

179. In my opinion, therefore it would have been obvious to a PHOSITA to combine the conflict recognition and resolution method and system of Nagano with the multi-tuner system of Chun to provide the user a simplified means to cancel or proceed with a different tuner function currently in progress. In this case, the user chooses to cancel the current function of the second tuner, and the tuner is allowed to execute some other tuner function. A PHOSITA thus would have found claims 3 and 15 to be only a predictable use of prior art elements according to their established functions.

180. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 3 and 15 of Ellis through obviousness.

D. Claims 4 and 16

181. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 4 and 16 of Ellis.

182. Claims 4 and 16 depend from claims 1 and 13 and further require:

wherein the requested tuning operation, the function of the second tuner, and a function of the first tuner each comprises a tuning function selected from the group consisting of viewing television programming, recording television programming, and performing a secondary tuner function.

183. As I noted above, claims 4 and 16 are written in a form such that the requirements for a “tuning function” are met by having the first and second tuners being used to perform either a viewing operation, a recording operation, or to perform a secondary tuner function. A secondary tuner function can include a process other than television program viewing or recording that requires allocation of the first or second tuner, for example, to collect interactive program guide data, enable Internet browsing, to play a music channel, or to provide a picture-in-picture signal. *See* Ex. 1101, Fig 3(c). Nagano discloses that a “user selects a

preferred program on the channel and watches the program on a TV set or records the program on a picture recorder.” Ex. 1104, 1:15-17. Further, while Nagano fails to teach a second tuner, Chun does so. Chun discloses that the “[m]ulti-channel mode can work on the PIP system with either tuner 1 or tuner 2.” Ex. 1106, 2:37-38.

184. In my opinion, therefore, it would have been obvious to a PHOSITA to combine the conflict recognition and resolution method and system of Nagano with the multi-tuner and PIP system of Chun to provide the user increased access to additional programming content. A PHOSITA thus would have found claims 4 and 16 to be only a predictable use of prior art elements according to their established functions.

185. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 4 and 16 of Ellis through obviousness.

E. Claims 5 and 17

186. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 5 and 17 of Ellis.

187. Claims 5 and 17 depend from claims 4 and 16 and further require:

wherein the secondary tuner function comprises a tuning function selected from the group consisting of providing a picture-in-picture signal, collecting program guide data, browsing the Internet, and playing a music channel.

188. As described above, Nagano fails to disclose a two-tuner system. Chun, however, describes a two-tuner system with a secondary tuner function of PIP. Chun states that the “[m]ulti-channel mode can work on the PIP system with either tuner 1 or tuner 2.” Ex. 1106, 2:37-38.

189. In my opinion, therefore, it would have been obvious to a PHOSITA to modify Nagano’s single-tuner system with Chun’s two-tuner and PIP system for the purpose of maximizing a user’s control over additional programming content. A PHOSITA thus would have found claims 5 and 17 to be only a predictable use of prior art elements according to their established functions.

190. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 5 and 17 of Ellis through obviousness.

F. Claims 6 and 18

191. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 6 and 18 of Ellis.

192. Claims 6 and 18 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is performing a secondary tuner function, and the requested tuning operation is recording a second television program.

193. As I explained above, Nagano fails to describe a two-tuner system.

194. Chun, however, describes a two-tuner system with a PIP capability (a “secondary tuner function”) with either tuner. Ex. 1106, 2:37-38.

195. In my opinion, therefore, it would have been obvious to a PHOSITA at the time to combine the method and system of Nagano with Chun’s multi-tuner system where the function of the second tuner can be a secondary operation such as the PIP function disclosed by Chun, and the new user-requested operation is recording a program. Such a capability would allow a user to easily cancel or proceed with a tuner function different from the function currently in progress, thereby maximizing his or her enjoyment of increased programming content. A PHOSITA thus would have found claims 6 and 18 to be only a predictable use of prior art elements according to their established functions.

196. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 6 and 18 of Ellis through obviousness.

G. Claims 7 and 19

197. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain

below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 7 and 19 of Ellis.

198. Claims 7 and 19 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is performing a secondary tuner function.

199. As discussed above, Nagano describes a single-tuner system with a conflict identification capability, wherein the tuner functions include receiving and viewing a program, recording a program, and retrieval of EPG data.

200. Chun discloses a system that includes a first and second tuner. Ex. 1106, Abstract. Chun also discloses a secondary tuner function (PIP) capability that can work with either the first or second tuner. Ex. 1106, 2:37-38.

201. In my opinion, therefore, due to the limited number of possible tuner functions, a PHOSITA would have found it obvious to provide the capability for a user to view a first program with one tuner while using a second tuner to record a different program, and as that was taking place, the user attempted to perform a secondary tuner function on the tuner recording the second television program. Having that capability would allow a user to maximize enjoyment of increased programming content since they would be free to activate a PIP feature, as

disclosed by Chun, while viewing the first program, as an example. Such a capability would also allow a user to maximize their enjoyment of increased programming content across multiple tuners, as taught by Chun. A PHOSITA thus would have found claims 7 and 19 to be only a predictable use of prior art elements according to their established functions.

202. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 7 and 19 of Ellis through obviousness.

H. Claims 8 and 20

203. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 8 and 20 of Ellis.

204. Claims 8 and 20 depend from claims 1 and 13 and further require:

wherein a function of the first tuner is viewing a first television program, the function of the second tuner is recording a second television program, and the requested tuning operation is viewing a third television program.

205. As discussed above, Nagano discloses a single-tuner system, with a conflict identification capability, wherein the tuner functions include receiving and viewing a program, recording a program, and retrieval of EPG data.

206. Chun discloses a multi-tuner system that includes a picture-in-picture (PIP) capability that will require viewing two television programs at the same time. Ex. 1106, Abstract; 2:37-38.

207. In my opinion, therefore, since there are only a limited number of tuner functions, such as viewing or recording, a PHOSITA at the time would have found it obvious to combine the method and system of Nagano with the multiple tuner system described by Chun to provide the user a simplified means to cancel or proceed with a different tuner function currently in progress. In this case, the function of the second tuner is recording a program, and the requested function is to view a different program. Such a capability would provide a user with increased access to programming content. A PHOSITA thus would have found claims 8 and 20 to be only a predictable use of prior art elements according to their established functions. Further, such a PHOSITA would choose among a limited number of known and obvious approaches such as viewing and recording, as disclosed by Nagano and Chun.

208. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 8 and 20 of Ellis through obviousness.

I. Claims 9 and 21

209. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain

below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 9 and 21 of Ellis.

210. Claims 9 and 21 depend from claims 1 and 13 and further require:

wherein the alert provides the user with the opportunity to direct the interactive television program guide to cancel the function of the second tuner when the function of the second tuner is viewing a television program, and provides the user with the opportunity to direct the interactive television program guide to cancel a function of the first tuner when the function of the first tuner is viewing the television program.

211. As I noted above claims 9 and 21 require an IPG that can be used to cancel the use of the first and second tuners to end the viewing of a television program on one or the other of those tuners. After a careful review of the specification, claims, and file history of the '512 patent, I have found no support for the cancellation of a tuner that is being used to view a television program. Rather, the specification and drawings of that patent disclose only cancelling the use of a tuner that is being used to provide a recording or a secondary function. The idea of cancelling a tuner (either the first or second) is only disclosed in claims 9 and 21 themselves.

212. However, in my opinion, given the alert that *is* disclosed in the '512 specification, I believe that a PHOSITA would readily be able to extend the teachings found there for an alert for cancelling the use of a tuner to stop a

recording or a secondary function (*see*, for example, Ex. 1101, Fig. 3(b), Fig. 4(b), and 8:55-10:67), to using that same alert to offer the user the opportunity to cancel the use of a tuner (either the first tuner or the second tuner) for viewing a television program as required by claims 9 and 11. Adding that feature to the alerting system of the '512 patent would not, in my further opinion, be difficult to implement, and would give the systems user the option called for in claims 9 and 21. That same addition would also be easily implemented as an extension of the prior art addressed herein.

213. Nagano discloses an IPG which can be used to select a program for viewing, as well as to cancel the viewing of one program by changing the channel that is selected or by programming the recording of a program.

214. Although Nagano is only a single-tuner system, Chun discloses a system that includes a first and a second tuner. Ex. 1106, Abstract.

215. As I explained above, Nagano describes a single-tuner system, with a conflict identification capability, wherein the tuner functions include receiving and viewing a program, recording a program, and retrieval of EPG data. Chun discloses a multi-tuner system with a conflict resolution capability with a tuning function that includes a picture-in-picture (PIP) capability.

216. In a two-tuner system such as that of Chun, each tuner is capable of viewing a program, recording a program, or performing a secondary tuner

function. Thus, due to the limited number of design options, a PHOSITA would find it an obvious design choice to provide a user the capability to cancel the function of a first or a second tuner when viewing a program. This capability would simplify a user's control over viewing content and improve the user's viewing experience. Therefore, in my opinion, it would have been obvious to a PHOSITA at the time to combine the conflict resolution system of Nagano with the two-tuner system described by Chun to provide the user a means to cancel the viewing function of either the first or second tuner with the IPG. Such a capability would allow a user to improve control over viewing content and improve his or her viewing experience. A PHOSITA thus would have found claims 9 and 21 to be only a predictable use of prior art elements according to their established functions.

217. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 9 and 21 of Ellis through obviousness.

J. Claims 10 and 22

218. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 10 and 22 of Ellis.

219. Claims 10 and 22 depend from claims 1 and 13 and further require:

wherein the displaying the alert comprises displaying a display screen using the interactive television program guide that provides the user with a first option to continue to perform the function of the second tuner, and with a second option to cancel the function of the second tuner to perform the requested tuning operation.

220. These claims describe a situation in which an alert notifies the user that a conflict exists, allowing the user the option to continue the function of the tuner, or allows the user to cancel the function of the tuner to perform the requested operation. Nagano allows “any of the overlapped programs to be changed.” Ex. 1104, Abstract. Nagano also discloses that the IPG is used to cancel a tuner function or continue a tuner function by delaying the recording start time. Ex. 1104, 11:44-51. Nagano fails to disclose a second tuner.

221. Chun, however, discloses a system that includes “a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106, Abstract.

222. In my opinion, therefore, a PHOSITA would have found it obvious to modify Nagano’s alert and cancellation system with the two-tuner system of Chun, to allow a user to: 1) continue a tuner function as taught by Nagano or 2) cancel a requested tuner function such as a recording as taught by Nagano. Such a capability would have simplified the user’s viewing experience and control over

programming content. A PHOSITA thus would have found claims 10 and 22 to be only a predictable use of prior art elements according to their established functions.

223. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 10 and 22 of Ellis through obviousness.

K. Claims 11 and 23

224. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 11 and 23 of Ellis.

225. Claims 11 and 23 depend from claims 1 and 13 and further require:

wherein the user selects to cancel the function of the second tuner to permit the second tuner to perform the requested tuning operation using a remote control.

226. Nagano discloses that “a picture recording is reserved by the remote controller.” Ex. 1104, 6:66-67. Nagano also discloses that the user can adjust the time of a scheduled recording to eliminate a conflict, but fails to disclose a second tuner. Ex. 1104, 11:19-29.

227. Chun discloses a system that includes “a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106, Abstract. Chun also discloses “[a] menu-type multi-channel

system, comprising: means for receiving a command signal representative of one of a multi-screen signal and a page up/down signal from one of a keypad and a remote controller.” Ex. 1106, Claim 8.

228. In my opinion, therefore, it would have been obvious to a PHOSITA at the time to combine the conflict resolution method and system of Nagano that includes a remote capability to cancel a tuner function, with the two-tuner system described by Chun to provide the user an enhanced means to control programming content and increase a user’s convenience. A PHOSITA thus would have found claims 11 and 23 to be only a predictable use of prior art elements according to their established functions.

229. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 11 and 23 of Ellis through obviousness.

L. Claims 12 and 24

230. I explained above my opinion that Nagano in view of Chun discloses all of the limitations of independent claims 1 and 13 of Ellis. Further, as I explain below, in my opinion Nagano in view of Chun also discloses a method and system having all of the limitations of claims 12 and 24 of Ellis.

231. Claims 12 and 24 depend from claims 1 and 13 and further require:

wherein the first tuner and the second tuner are included in a single device.

232. Nagano fails to disclose a system with two tuners. However, Chun discloses a single device with a first and a second tuner. Chun discloses that “a first and second tuner to receive broadcasting signals and to output each of the broadcasting signals on a channel.” Ex. 1106, Abstract; Fig. 6.

233. In my opinion, therefore, a PHOSITA would find it obvious to combine the single tuner method and system of Nagano with the multi-tuner system described by Chun for the purpose of providing a user increased convenience and access to greater programming content via a single device. A PHOSITA thus would have found claims 12 and 24 to be only a predictable use of prior art elements according to their established functions.

234. Given the disclosures identified above, it is my opinion that Nagano in view of Chun invalidates claims 12 and 24 of Ellis through obviousness.

X. CONCLUSION


235. After reviewing the prior art discussed herein and the claims of Ellis, it is my opinion that PHOSITA would understand that the combinations of prior art discussed above render claims 1-24 of Ellis invalid as being obviousness over that art.

XI. SIGNATURE

236. I hereby declare under penalty of perjury that all statements made in this Declaration of my own personal knowledge are true and that all statements

made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the U.S. Code.

Executed on January 30, 2017


V. Thomas Rhyne, Ph.D., P.E., R.P.A.

Appendix A

Curriculum Vitae and Publications

VERNON THOMAS (TOM) RHYNE, III

8407 Horse Mountain Cove

Austin, TX 78759-6828

Phone and FAX: (512) 219-0849

E-Mail: trhyne@texas.net or t.rhyne@ieee.org

BIOGRAPHICAL DATA

Birthdate: February 18, 1942

Citizenship: USA

Married: Glenda Pevey Rhyne

Children: Amber Rhyne Compton and Vernon Thomas Rhyne, IV

Grandchildren: Truett Rhyne Compton and Tate James Compton

Security Clearance: Department of Defense Secret (Inactive)

PROFESSIONAL INTERESTS

- Microprocessor/Microcomputer Design and Application
- Computer-Aided Design
- Computer Architecture
- Digital Systems Design and Synthesis
- Digital Communications
- Electronic Circuit Design
- Semiconductor Manufacture
- Technology Maturation and Commercialization
- Intellectual Property Litigation

EDUCATION

- Ph.D. (Electrical Engineering) — Georgia Institute of Technology, 1967.
- M.E.E. — University of Virginia, 1964.
- B.S.E.E. (Special Honors) — Mississippi State University, 1962.
- Japanese Language Instruction, 1988-89, 1996, 1997.

- Modern Semiconductor Manufacturing, Motorola University, 1996.

WORK EXPERIENCE

Industrial and Research:

- 1997-Present: Retired from Texas A&M University; part-time engineering consultant.
- 1995-1997: Manager of Strategic Programs, Strategic Asset Group, Semiconductor Products Sector, Motorola, Inc., Austin, TX. Responsible for technology transfer negotiations and management of joint ventures with strategic partners.
- 1994-1995: Vice President, Research and Development, Information Systems Division, Microelectronics and Computer Technology Corporation (MCC). Responsible for MCC R&D in neural network applications, data mining, software interface standardization, and other advanced software development projects.
- 1991-1994: Director, MCC ATLAS Standards Laboratories. Responsible for definition and testing of CAD framework and interfaces in support of the CAD Framework Initiative, Inc.
- 1989-1991: Manager, CAD Framework Laboratory, MCC CAD Program. Responsible for definition and testing of CAD framework and interfaces.
- 1988-1989: Manager, Systems Engineering Group, MCC CAD Program, 1988. Responsible for alpha testing of MCC CAD System.
- 1986-1989: Deputy Director, MCC CAD Program. Responsible for general program administration.
- 1983-1986: Director, Systems Technology Laboratory, MCC CAD Program, Austin, TX. Responsible for development of supporting technologies for MCC CAD System including distributed databases, natural-language interface, and rule-based design management.
- 1962-1965: Aerospace Technologist, Analysis and Computer Technology Division, NASA Langley Research Center, VA
- 1965-1967: System Engineer (Part-Time), Lockheed-Georgia Research Center, Marietta, GA.
- 1961: Summer Intern, Union Carbide Corporation, Texas City, TX.

Academic:

- Senior Lecturer in Electrical/Computer Engineering, University of Texas at Austin, 1984-1994.
- Adjunct Faculty Member, Department of Electrical and Computer Engineering, Carnegie-Mellon University, 1986-1992.
- University/SRC Coordinator, MCC CAD Program, 1988-1990; SRC Design Sciences Advisory Committee, 1989-1990.
- Professor, Electrical Engineering, Texas A&M University 1974-1986 (on leave to MCC during 1983-86).
- Coordinator of Computing, Texas AM University, 1982-1983.
- Director, Digital Systems Laboratory, Department of Electrical Engineering, Texas A&M University, 1978-1983.
- Associate Professor, Electrical Engineering, Texas A&M University, 1969-1974.
- Assistant Professor, Electrical Engineering, Texas A&M University, 1967-1969.
- Instructor, Electrical Engineering, Georgia Institute of Technology, 1965-1967.
- Lecturer, Computer Systems, George Washington University Extension, 1964.

Consulting:

- Consultant to a number of companies and law firms re intellectual property litigation, 1978-present (part-time).
- Consultant to the Electric Power Research Institute, including serving as technical project manager on the EPRI/DOE Distribution Automation Project, 1979-1983.
- Consulting engineer to a variety of national and international industries dealing with microelectronics and computer design. Clients have included Texas Instruments, Control Data Corporation, AMD, ETA, and Signetics.
- Consulting engineer to a variety of clients dealing with computer systems for satellite navigation. Clients have included Texas Instruments, Gould, Matsushita, ITE-Europe, and the Federal Republic of Germany.
- Invited member of NASA Shuttle-GPS Advisory Panel and EPRI/DOE Distribution Automation Research Review Panel, 1979-1981.

- Consultant to U.S. Coast Guard, developing on-line data acquisition system for shipboard navigation data and off-line data processing/analysis systems, 1979-1982.
- Principal investigator on research projects dealing with automated Boolean minimization, high-speed computer arithmetic, bit-serial processing, special-purpose VLSI architectures, marine navigation systems, and computer-aided design of digital systems, 1967-83.

OTHER PROFESSIONAL ACTIVITIES

- Member, Panel on Assessment, Electrical and Electronics Engineering Laboratory, U.S. National Institute for Standards and Technology, 1993 to 1999; Panel Chair, 1996-99. (Appointed by National Research Council)
- Planning Committee, 1997 Workshop for National Technology Roadmap for Semiconductors, SIA.
- Member, Technical Working Group (TWIG) on Semiconductor Manufacture, SIA, 1995-97.
- Secretary, Board of Directors of White Oak Semiconductor, Inc., Richmond, VA, 1996-97.
- Executive Secretary, Board of Directors of the Tohoku Semiconductor Corporation, Sendai, Japan, 1996-97.
- Board of Directors Alternate, Semiconductor Research Corporation, representing Motorola, 1995-96.
- Roadmap Coordinating Committee, Semiconductor Industries Association, 1995.
- Book reviewer, *American Scientist*, 1993.
- Reviewer for State-funded research proposals in microelectronics, computer science, and computer engineering, Texas Higher Education Coordinating Board, 1993.
- Visitor for Accreditation Board for Engineering and Technology, accrediting undergraduate programs in Computer Science, Computer Engineering and Electrical Engineering, 1981-1983, 1991-92, 1997-present.
- Chair for nine U.S. engineering program accreditation teams, 1984-90, including the accreditation teams for the University of California at Berkeley (1988) and the University of Illinois (1989).

- Advisor, Texas State Board of Education (1985), Texas State Coordinating Board for Higher Education (1987).
- Consultant on international engineering accreditation, Kuwait University College of Engineering and Petroleum (1990 and 1992), Korean Institute for Advanced Science and Technology (1993), Bilkent University, Ankara, Turkey (1995), University of the United Arab Emirates (1998), ITESM, Querétaro, Mexico (1999), Kyoto University, Japan (2000), Ritsumeikan University, Japan (2000), Mapua Institute of Technology, Manila (2004).
- Consultant on engineering accreditation to the Japan Accreditation Board for Engineering Accreditation, 2000-2004.
- Advisor to the Washington Accord on International Engineering Accreditation, 2003-04.
- Consultant on engineering education and long-range planning, George Washington School of Engineering and Applied Science, 1990 and 1993-94.

PROFESSIONAL LICENSES

- Registered Professional Engineer, Texas, No. 28,728.
- Registered Patent Agent, No. 45,041.
- Pilot (Single-Engine Land).

PROFESSIONAL AND HONORARY SOCIETY MEMBERSHIPS

Professional Societies:

- Member, Institute of Electrical and Electronics Engineers, 1963-present.
- IEEE Treasurer, 1994 and 1995.
- IEEE Board of Directors, 1991-1995.
- IEEE Executive Committee, 1993-1995.
- IEEE Board of Directors, Division VIII Director, 1993, Division VI Director, 1991-1992.
- IEEE Technical Activities Board, 1991-93.
- IEEE Employee Benefits Committee, Member, 1991 to 1999, Chair, 1997, 1998.
- IEEE Computer Society, 1964 to present.
- IEEE Computer Society Board of Governors, 1985.

- IEEE Computer Society Executive Committee, 1993.
- Accreditation Board for Engineering and Technology, 1994 to 1999, representing IEEE.

Honorary Societies:

- Upsilon Pi Epsilon (Computer Science).
- Eta Kappa Nu (Electrical Engineering).
- Tau Beta Pi (Engineering).
- Phi Kappa Phi (Scholarship).
- Sigma Xi (Research).

Other Honors:

- The Contemporary Who's Who, 2003.
- Strathmore's Who's Who, 2000-present.
- IEEE Millennium Award, 2000.
- Golden Core Award, IEEE Computer Society, 1996.
- Fellow of the Accreditation Board for Engineering and Technology, 1992.
- Outstanding Engineering Graduate, Mississippi State University, 1992.
- IEEE Educational Activities Board Award for Meritorious Achievement in Accreditation Activities, 1991.
- Who's Who in America, 1991-present.
- Who's Who in Engineering, 1991-present.
- Elected as an IEEE Fellow for "contributions to computer engineering and the computer engineering profession," 1990.
- F. E. Terman Award (Outstanding Young Electrical Engineering Educator in U.S.), American Society for Engineering Education, 1980.
- Outstanding Young Engineer (Honorable Mention), National Society of Professional Engineers, 1974.
- Young Engineer of the Year, State of Texas, Texas Society of Professional Engineers, 1973.
- Outstanding Faculty Member, Texas A&M University Student Engineers Council Award, 1973.

- General Dynamics Award for Excellence in Engineering Teaching, 1972.
- American Men and Women of Science.

COMMITTEE MEMBERSHIPS

Professional:

- Technical Program Chair for 1992 IFIPS Workshop on Electronic CAD Design Environments, March 23-25, 1992, Paderborn, Germany.
- Chair, ISO TC184/SC4-IEC TC3 Joint Working Group (JWG9) for Electrical/Electronic Product Data Exchange, 1991-1993.
- DARPA Principal Investigators Advisory Panel, Information Systems Technology, 1990-1994
- Review team member for academic and research programs in microelectronics at the Microelectronics Research Center, Iowa State University, 1989.
- CAD Framework Initiative: Interim Steering Committee, 1988-1989; Board of Directors, 1989-1992; Treasurer, 1989-1992; Chair, Technical Coordinating Committee, 1989-1990.
- Member, IEC TC3, WG11, 1990-1991.
- Member, Working Group 2, IEC Technical Committee TC3, and IEEE SCC 11.9, developing IEEE Standard 91-1984, "Explanation of Logic Symbols," 1982-1985.

Civic:

- Elected to Eanes Independent School District Board of Trustees, 1986-1997; President, 1987-1990, 1996-97.
- Texas Association of School Boards Finance Committee, 1989-1994; Tax Restructuring Committee, 1990.
- Citizens Advisory Committee, *Westlake Picayune*, 1988-90.
- Advisory Committee for Electric Power Distribution, City of West Lake Hills, 1987-1990.
- Capital Area Easter Seal Rehabilitation Center Advisory Board, 1985-1986, Telethon Committee, 1986.

Publications

Books, Contributions to Books, Published Notes, and Standards:

- *Electronic Design Automation Frameworks—When Will the Promise Be Realized?*, North-Holland, Amsterdam, 1992 (editor and contributor).
- ISO 10303 Standard for Product Data Exchange, Parts 103 (Electrical Interconnectivity), 212 (Electrotechnical Plants), 210 (Printed Circuit Assembly Design and Manufacture), and 211 (PCA Test and Logistics); editor and technical contributor, 1991-1993.
- “An Introduction to CAD Framework Technology,” Published notes for DAC Tutorial, 1991 Design Automation Conference, June 21, 1991.
- “NAVSTAR Global Position System, A User’s Approach to Understanding,” published notes for IEEE Continuing Education Course No. 1125 (1982), with P. S. Noe and J. H. Painter.
- *Traffic Control Systems Handbook*, Chapter 8, “Communications Concepts,” Federal Highway Administration, 1976.
- *Fundamentals of Digital Systems Design*, Prentice-Hall, 1973.
- “Supplementary Information for Computer Engineering Program Evaluators,” IEEE Manual for Program Evaluators on EAC Accreditation Teams, IEEE Educational Activities Board, May 1987.
- “ABET/EAC Program Criteria for Computer Engineering and Similarly Named Engineering Programs,” contributor, 1985-87.
- “Graphic Symbols for Logic Devices,” ANSI/IEEE Standard 91-1982, (co-author), IEEE Standards Office, New York, March 1982.
- “The NAVSTAR Global Positioning System, A User’s Approach to Understanding.” Produced by ALTAIR Corp., College Station, Texas. With P.S. Noe and John H. Painter. 1979 to 1985.