

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HISENSE INTERNATIONAL CO. LTD.; HISENSE INTERNATIONAL (HONG
KONG) AMERICA INVESTMENTS CO. LTD.,

Petitioners,

v.

VISTA PEAK VENTURES, LLC,
Patent Owner.

Case No. IPR2023-00725
U.S. Patent No. 6,594,143

DECLARATION OF EXPERT RICHARD FLASCK

TABLE OF CONTENTS

I. INTRODUCTION	1
II. BACKGROUND AND QUALIFICATIONS	3
III. BRIEF HISTORY OF DISPLAY TECHNOLOGY	5
IV. ACTIVE MATRIX LIQUID CRYSTAL DISPLAYS (AMLCDS)	7
V. Backlight Unit (BLU)	13
VI. SCOPE OF DECLARATION AND LEGAL STANDARDS	18
a. Legal Standard for Prior Art	18
b. Anticipation	21
c. Obviousness	21
VII. Priority date of the '143 patent	26
VIII. OVERVIEW OF THE '143 PATENT	27
a. Prosecution	27
b. Technology	29
IX. Overview of Prior Art: Kopish (U.S. 4,755,035)	30
X. CLAIM ANALYSIS	32
a. Analysis of Claim 1 (Kopish anticipation)	33
i. [1-preamble] An electric apparatus, comprising:	33
ii. [1a] a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof;	33
iii. 1[b] liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location;	35
iv. [1c] at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side	

thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module.....37

b. Claim 2 Analysis.....39

i. [2a] The electric apparatus of claim 1, further comprising: 39

ii. [2b] at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.....40

c. Claim 3 Analysis.....42

i. [3a] The electric apparatus of claim 2. 42

ii. [3b] wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.....43

iii. Claim 3 is obvious from Kopish and to an average POSITA. 45

XI. RESERVATION OF RIGHTS.....45

XII. CONCLUSION 46

I, Richard A. Flasck, declare as follows.

I. INTRODUCTION

1. I have been retained by Hisense International Co. Ltd and Hisense International (Hong Kong) America Investments Co. Ltd. (“Hisense” or “Petitioners”) through its counsel Winston & Strawn LLP as a technical expert witness in connection with the Hisense petition for inter-partes review under PTAB Case No. IPR-00725 of U.S. Patent No. 6,594,143 entitled “LIQUID CRYSTAL MODULE MOUNTING STRUCTURE AND MOBILE TERMINAL MOUNTED WITH THE SAME (“the ’143 Patent”) (Ex. 1001). I have been asked by Petitioners to offer my analyses and opinions regarding whether the issued claims of the ’143 Patent are patentable and valid over prior art. This declaration sets forth my analyses of the ’143 Patent and certain prior art references and the opinions I have reached based on my analyses. I have concluded that Claims 1, 2, and 3 are anticipated and not patentable over the prior art references cited and analyzed below.

2. In preparing this declaration, I have reviewed the ’143 Patent, the prosecution history, and each of the documents I reference here. In reaching my opinions, I have relied upon my experience in the field of Liquid Crystal Display (LCD) and LCD backlight unit (BLU) design and have also considered the viewpoint of a person of ordinary skill in the art at the time of the ’143 patent’s priority date. As explained below, I am familiar with the level of skill of a person of ordinary skill in the art

regarding the technology at issue as of that time frame. In preparing this declaration, I have reviewed the '143 Patent, the prosecution history, and each of the documents I reference here. In reaching my opinions, I have relied upon my experience in the field of Liquid Crystal Display (LCD) and LCD backlight unit (BLU) design and have also considered the viewpoint of a person of ordinary skill in the art at the time of the '143 patent's priority date. As explained below, I am familiar with the level of skill of a person of ordinary skill in the art regarding the technology at issue as of that time frame.

3. My opinions expressed in this declaration are based on documents and materials identified in this declaration, including the '143 Patent, the prior art references and background materials discussed in this declaration, and any other references specifically identified in this declaration. I have considered these materials in their entirety, even if only portions are discussed here.

4. I have considered a number of prior art references, including those in the references listed in the Exhibit list of the Hisense IPR Petition.

5. I have also relied on my own experience and expertise in display technologies, including specifically, LCD displays and their backlighting units (BLUs).

6. All Exhibit numbers used in this declaration refer to Exhibits to Petitioners' IPR Petition.

7. I am being compensated at a rate of \$395/hour by Petitioners for my work in connection with this declaration. The compensation is not contingent upon my performance, the outcome of the IPR or any other proceeding, or any issues involved in or related to the IPR.

II. BACKGROUND AND QUALIFICATIONS

8. My qualifications for forming the opinions set forth in this Declaration are summarized here and explained in more detail in my curriculum vitae, which is submitted as an Exhibit to Petitioners' IPR Petition.

9. I received a Bachelor of Science degree in Physics from the University of Michigan, Ann Arbor, in 1970. I thereafter received a Master of Science degree in Physics from Oakland University in Rochester, Michigan, in 1976. I am the founder and CEO of RAF Electronics Corp., where I developed and patented Liquid Crystal on Silicon (LCOS) microdisplay projection technology and LED-based lighting products.

10. After receiving my Bachelor's degree, I was employed as a scientist and a manager by Energy Conversion Devices, Inc., from 1970 through 1982. My work at Energy Conversion Devices concerned the development of thin film photovoltaics, ablative imaging films, non-volatile memory, multi-chip modules, superconducting materials, electroluminescent materials, and thin film transistors (TFTs).

11. After leaving Energy Conversion Devices, I founded and served as CEO of Alphasil, Inc., where I developed amorphous silicon thin film transistor (TFT) active matrix liquid crystal displays (AMLCDs). My work at Alphasil included TFT process and circuit design, data driver and gate driver design, scalars, video circuits, gamma correction circuits, backlighting unit (BLU), and inverter design. I worked at Alphasil from 1982 through 1989.

12. After leaving Alphasil, I founded RAF Electronics Corporation, described above. I have served as CEO of RAF Electronics since that time. In 1997, I took the position of President and COO at Alien Technology Corporation, where I was responsible for completing a Defense Advanced Research Projects Agency (DARPA) contract, and for implementing MEM fluidic self-assembly (FSA) technology for use in flat panel displays and RFID tags. I left the position in 1999.

13. In 2002, I co-founded and served as COO of Diablo Optics, Inc., where I developed, produced, and commercialized key optical components for HDTV projectors, such as polarization optics, condenser lenses, projection lenses, and ultra-high performance optical interference filters using thin film stacks in conjunction with LED devices and microdisplays. I left Diablo in 2007.

14. Regarding Backlight Units (BLUs) for Liquid Crystal Displays (LCDs), specifically, my experience is as follows: In the mid-1980's, I designed and developed LCD BLUs using cold cathode fluorescent lamps (CCFLs). This activity

included the configuration, design and incorporation of the lamps, the BLU housing, reflector, the diffusers and the lens sheets (also known as Brightness Enhancement Films (BEFs), lenticular lens sheets, or prism sheets). The activity also included the design and implementation of the power supplies and control electronics for the CCFL BLU lamps. This work resulted in U.S. Patent No. 4,824,378. Beginning around 2000, I developed several LED-based products, including LED-based BLUs, for LCDs.

15.I am listed as an inventor on twenty-six patents issued in the United States and foreign countries, including one United States design patent. My inventions concern technologies including LCD, LED devices, semiconductor materials, glass materials, non-volatile memory cells, thin film transistors, flat panel backplanes and displays, and wafer-based active matrices.

16.I have authored or co-authored twenty-five articles or conference presentations, including numerous papers and presentations concerning lighting and display technologies. My curriculum vitae lists these articles and conference presentations.

III. BRIEF HISTORY OF DISPLAY TECHNOLOGY

17.The cathode ray tube (CRT) was the dominant display device from the 1940's through the end of the last century. The CRT relies on raster scanning a focused electron beam inside a large vacuum tube, allowing the beam to impinge on a

phosphor coating on the inner surface of the tube. The phosphor emits light in proportion to the electron beam intensity. Pictures are thus drawn on the inner surface of the CRT with an electron beam of modulated intensity.

18. During the 1970's, interest began to arise to find a "flat panel" technology to supplant the large, heavy CRT displays. Many technologies were pursued, including electroluminescent, electro-chromic, electrophoretic, vacuum fluorescent, plasma, liquid crystal, and others. By 1990, liquid crystal displays (LCD) began emerging as the winning technology to supplant the CRT in most commercial and consumer applications. The first LCDs were low-segment-count, direct-driven displays, such as wristwatch and calculator displays. Each segment had a common upper electrode and a patterned lower electrode. These electrodes were continuously actively driven. Each segment required a separate dedicated conductor running to the segment. While this was feasible for low information content displays, passive and active matrix LCDs were required for higher pixel count display devices. Active matrix generally has brightness, contrast, response time, and viewing angle advantages over passive matrix.

19. Although there are exceptions, most commercial LCD displays comprise two outer polarizer sheets, with a glass plate adjacent to each polarizer. The inner surfaces of the glass plates have transparent indium-tin-oxide (ITO) conductive electrodes. The small gap (usually 1 to 5 micrometers) between the ITO electrodes

is filled with liquid crystal material. An epoxy rim seal keeps the liquid crystal material in place.

20. There are several types of liquid crystal material, and generally several modes in which each type of liquid crystal material can be used. The types of liquid crystal materials include twisted nematic (TN), Electrically Controllable Birefringent (ECB), cholesteric, smectic, and ferro-electric, among others. Various modes include 90° twist, super (270°) twist, Polymer Dispersed (PDLC), vertically aligned (VA), In Plane Switching (IPS), Hybrid Aligned (HAN), bi-stable, normally white and normally black.

21. The industry has migrated from direct driven segmented watch and calculator displays to active matrix thin film transistor (TFT) LCD's. Consumer demand has continually grown.

IV. ACTIVE MATRIX LIQUID CRYSTAL DISPLAYS (AMLCDS)

22. Most LCD-based monitors and televisions today use Active Matrix Liquid Crystal Display (AMLCD) technology with Thin Film Transistors (TFTs).¹

¹ In addition to LCD displays, various commercial displays for smart phones, computers, television sets and other devices also use organic light-emitting diodes (OLEDs) that directly emit colored light for displaying images operating in the normally black mode, or In Plane Switching (IPS). Common to each of these modes is the fact that the light transmission at each pixel (picture element) is controlled by the voltage across the pixel electrodes. In the early 2000's, most liquid crystal displays used the TN mode.

AMLCDs use twisted nematic (TN) with a 90-degree twist, or a vertically aligned (VA) ECB with negative dielectric constant anisotropy.

23.“Color TFT LCDs are turning up everywhere these days. The color TFT display, a light, slender display, with a beautiful image that does not tire the eyes even when viewed for hours at a time, is finding its way into many products, even in demanding environments, like the dashboard of a car. Because the color TFT display is an LCD (liquid crystal display) panel incorporating thin film transistors, it can reproduce a wider range of colors than can competing technologies. The color TFT shows extremely uniform brightness, with no color degradation or distortion, even in the corners of the screen.” P. 1, *Color TFT Liquid Crystal Displays*, by Teruhiko Yamazaki, Hideaki Kawakami and Hiroo Hori (Semiconductor Equipment and Materials International, 1996, ASIN B0728FCK38 (“1996 Yamazaki”).

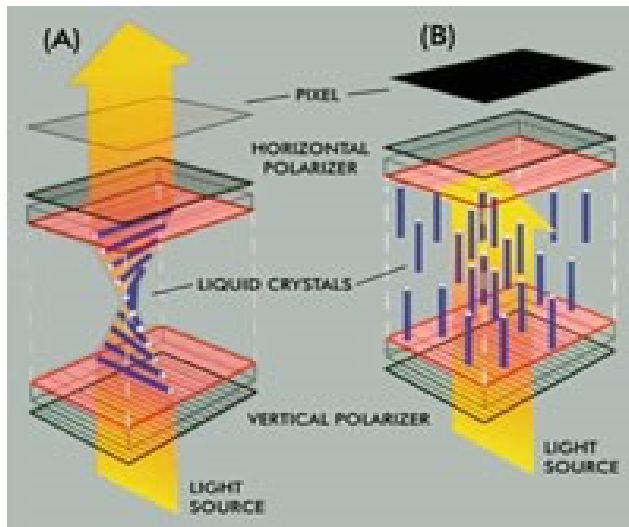
24.The momentum the LCD industry has gained is difficult to supplant by alternative flat panel technologies. Even if, on paper, they may have advantages over LCDs.” P. 7, *Active Matrix Liquid Crystal Displays: Fundamentals and Applications*, Willem den Boer (Newnes-Elsevier, 2005) ISBN-13:978-0-7506-7813-1 (“2005 den Boer”).

25.The quotes above testify to the fact that by the early 2000’s, POSITAs were well aware of the basic structure and operating principles of the ubiquitous Active

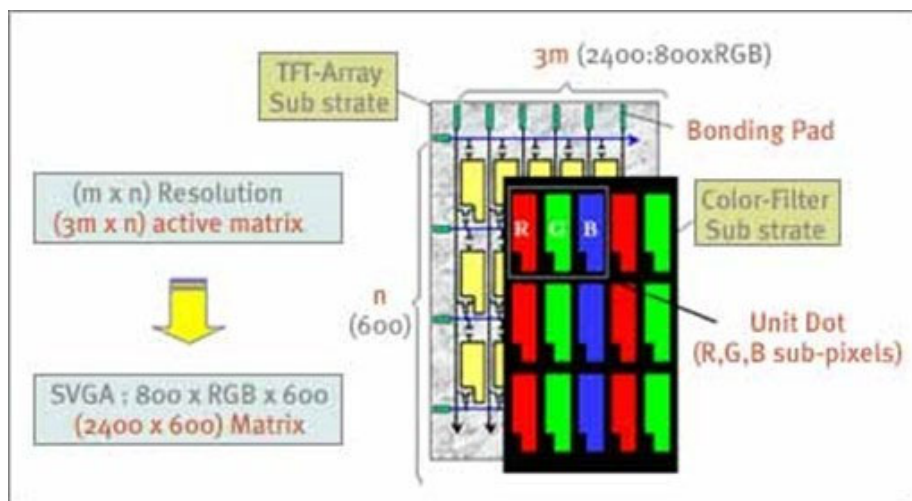
Matrix Liquid Crystal Display (AMLCD). Herein below is a summary of that technology.

26. Liquid Crystal Materials (LCMs) are unusual liquids which exhibit stable states with long range order, wherein the stable state can be determined by the strength of the imposed electric field. These stable states can exhibit differing optical properties. These differing optical properties are exploited to vary the transmission of small segments (pixels or picture elements) of the display by application of an electric field.

27. A typical AMLCD comprises an array of color pixels. Each color pixel can comprise color sub-pixels, usually red, green and blue. At each sub-pixel is a sample and hold circuit, addressed by a thin film transistor, wherein the voltage across the LCM is held by a storage capacitor. Each subpixel acts like a variable shutter, allowing a level of light transmission based on the voltage across the LCM, as shown below. In the figure below, on the left there is no voltage and all light is allowed to pass. On the right, full voltage is applied, and no light is allowed to pass. At intermediate voltages, an intermediate level of light is allowed to pass.

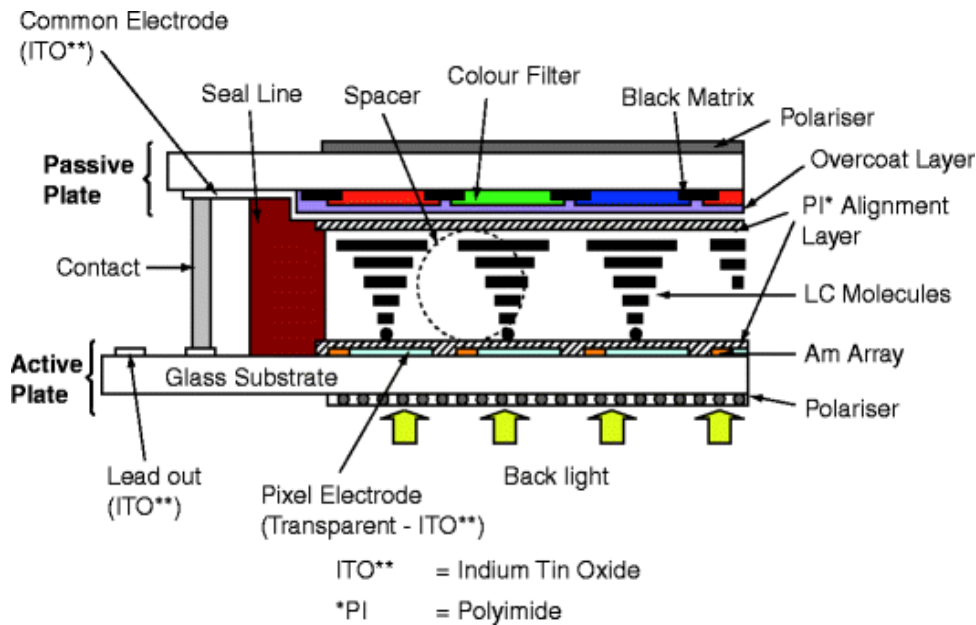


28. Each color pixel is usually organized as three or more subpixels: for example, one red, one green and one blue in various color pixel designs. The color produced by each pixel is determined by the color filter patch over each subpixel, as shown below:

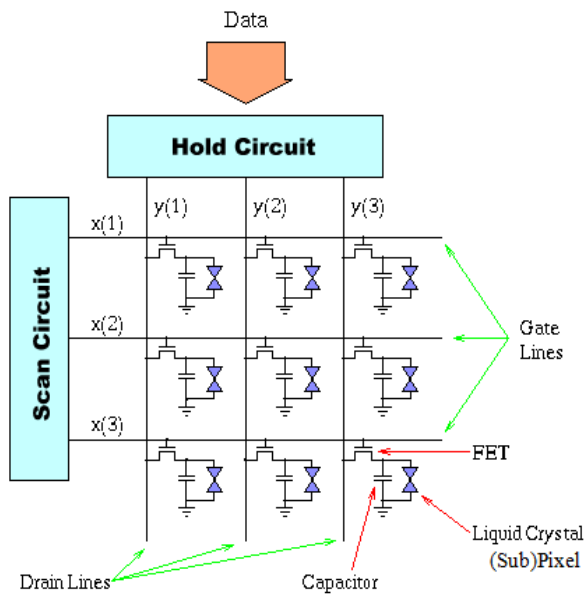


29. The specific color perceived by the human eye (including white) is determined by the proportions of red, green and blue light transmitted by each pixel.

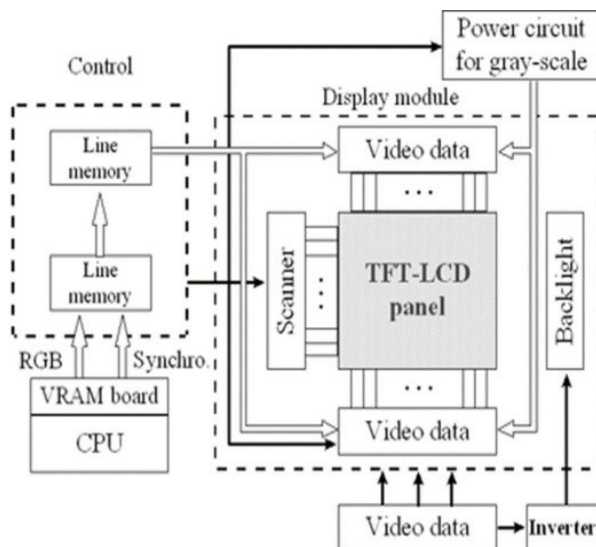
30. As previously mentioned, each subpixel circuit comprises a Thin Film Transistor (TFT), a capacitor, and the LCM between the upper and lower pixel electrode. Below is a typical cross section of a pixel comprising three color subpixels:



31. I include a figure below to illustrate a typical electrical diagram of the TFT active matrix:



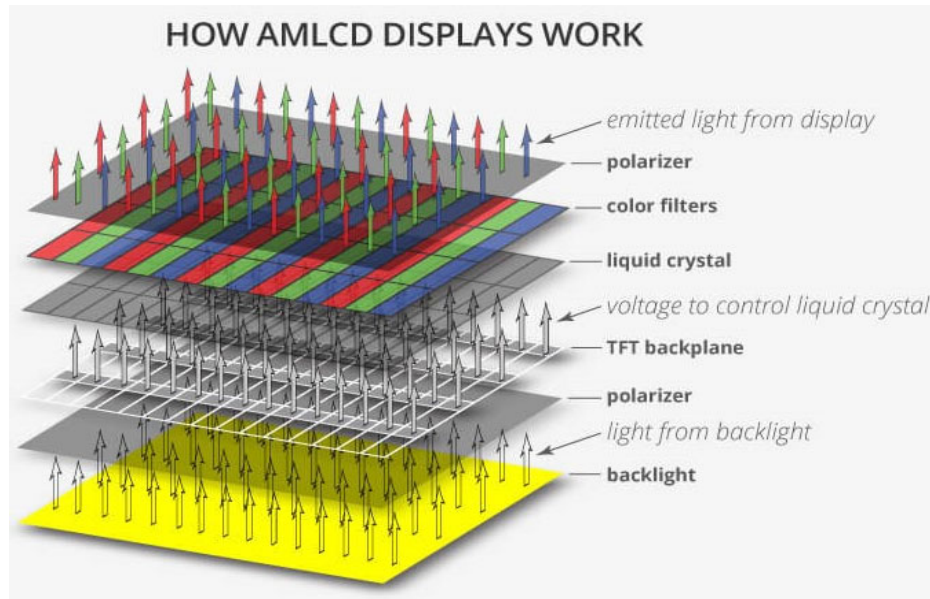
32.I further include below a block diagram of an AMLCD device.



33.Brightness information is loaded into the matrix one line (row) at a time. After the scan drive selects a line, the data driver sends the brightness voltage down all of the data lines simultaneously to program each pixel capacitor on the line with the

correct pixel brightness voltage. Then the selected line is deselected and the next line is selected for writing.

The physical structure of the typical AMLCD is shown below:



34. The AMLCD is a non-emissive technology where the pixels control the light passing through, rather than generating light. Therefore, virtually all AMLCDs comprise a backlight unit (BLU) as indicated in several of the images above.

V. Backlight Unit (BLU)

35. Each AMLCD module has a BLU located below the AMLCD panel. The BLU provides the light that is modulated by each pixel. There are two generic types of BLUs: direct (or full array) BLUs and edge-lit BLUs. The two types of BLUs are shown below from 1996 Yamazaki pp. 272-273. The configuration Yamazaki refers to as “Top-down” is known as direct or full array in today’s terminology.

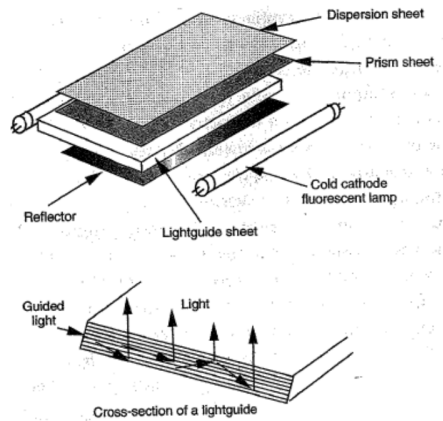


Figure 3.81 Edge illumination unit

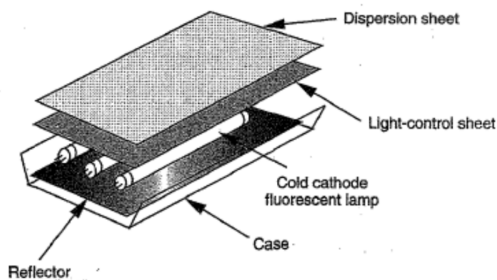


Figure 3.80 Top-down backlight unit

36. Full array BLUs have the light source(s) directly underneath the LCD panel with a dispersion (diffuser) sheet between the light sources and the LCD panel. The edge-lit BLUs have the light sources on one or more sides of a light guide or cavity with the light being directed into the light guide and then exiting toward the LCD panel above the BLU.

37. In both BLU configurations, there is a diffuser plate between the light sources and the LCD panel. “Most AMLCDs operate in the transmissive mode. **They can be considered electronically controlled transparencies on a light box – the backlight.**” P. 105, 2005 den Boer. [Emphasis added.]

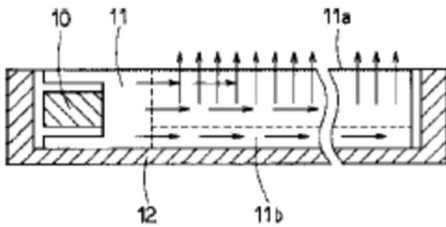
38.Also, in both BLU configurations there is a frame holding the BLU components, and a reflector on the bottom of the frame to reflect light back to the AMLCD pixels.

39.Further, the 1996 Yamazaki states, “Because they have a direct bearing on the performance of the display unit, backlight units are subject to stringent performance requirements as indicated below:.....2) Uniform brightness A minimum uniformity (minimum brightness divided by maximum brightness) of 0.8 is required.” 1996 Yamazaki at pp 274--275. Thus, uniform brightness was a well-known desirable feature.

40.Additionally, the desirability of a thin-profile BLU was a well-known, important parameter of BLUs, and substantial work throughout the years went into addressing this issue. For example, BLU thickness was a known issue identified in Kurihara.

41.Starting as early as 1993, JPH06-230378 entitled “BACK LIGHT DEVICE FOR LIQUID CRYSTAL DISPLAY ELEMENT” by Kisoo disclosed edge-lit BLUs having a light guide, diffuser plate, reflector bottom, a casing and using LEDs as light sources. Figure 5 in Kisoo is reproduced below:

【图5】



42. Figure 4 from Cuipke U.S. 5,485,354 from 1996 below illustrates the basic principles of operation of backlit BLUs.

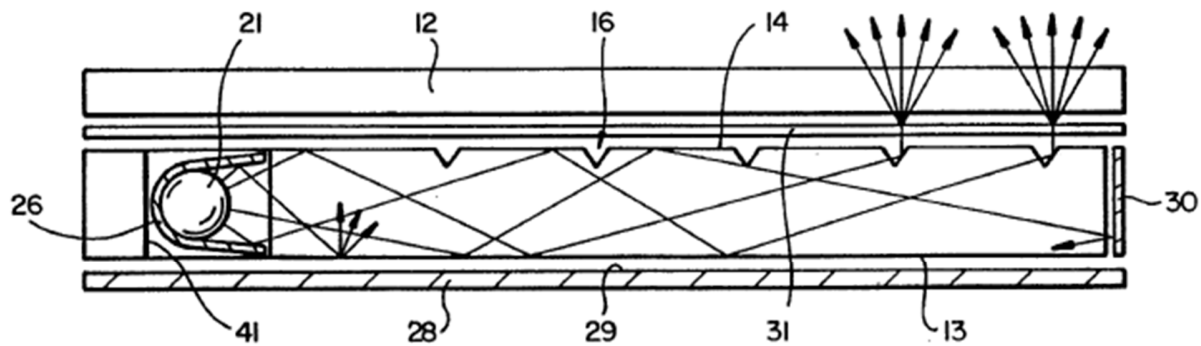


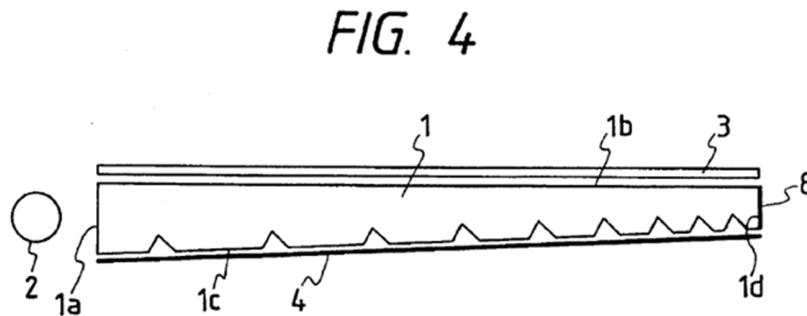
FIG_4

Cuipke US 5,485,354 from 1996

43. Light source 21 injects light into a transparent light guide. Total Internal Reflection (TIR) allows light to propagate down the light guide until a groove, protrusion or other feature negates the critical angle TIR condition and the light escapes the light guide. Any light exiting the light guide through the bottom is reflected back upwards by the reflective surface 29. The spacing of the grooves can spatially vary to ensure uniform brightness. After exiting the top surface of the light

guide, a diffusion film and/or a prismatic lens film 31 tailors the uniformity and viewing angle before the light from the BLU enters the back of the LCD 12.

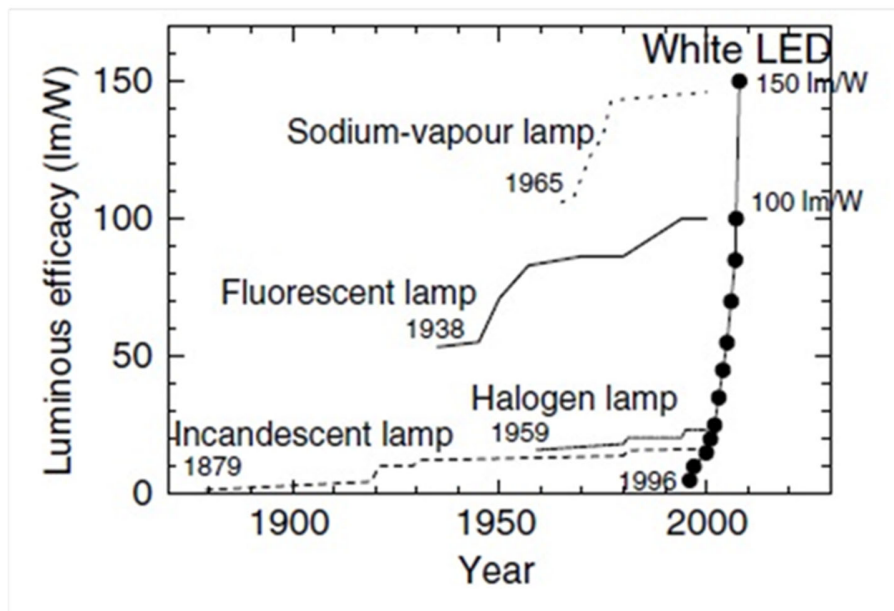
44. Figure 4 from Ishikawa below is another example of a CCFL-based BLU using a wedged light guide 8, a linear (cold cathode fluorescent lamp (CCFL)) light source 2, a diffuser sheet 3, and a reflector sheet 4.



Ishikawa US 5,575,549 from 1996

45. During the 1990's, the edge-lit CCFL backlight was almost universally used. The CCFLs provided more light using less energy than LEDs (at least in the early 1990's), and provided a thinner profile than direct, full-array BLUs.

46. However, in the mid-1990's, LED efficacy and brightness started an exponential rise as phosphor-coated GaN blue LED began reaching the market. See chart below:



47. Throughout the 1990's and 2000's, the edge-lit backlight was common. LEDs eventually replaced CCFLs as the light sources because of their higher efficacy, longer life, and lower operating voltage. Starting in the mid-2000's, consumer demand for High Dynamic Range (HDR) ultra high contrast displays saw full array, direct lit LED BLUs replace the CCFL edge-lit BLUs in TV products.

VI. SCOPE OF DECLARATION AND LEGAL STANDARDS

48. I am not an attorney and will not offer opinions on the law, but I have been instructed in and applied the law as described in this section.

a. Legal Standard for Prior Art

49. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim.

50. I am informed by counsel that the applicable law in this case for prior art is 35 U.S.C. § 102 as written before the America Invents Act.

51. I understand that the “priority date” of a patent is the date on which it is filed, or the date on which an earlier-filed patent application is filed if the patentee claims it is entitled to the benefit of priority to that earlier-filed patent application. To be entitled to that benefit, I further understand that the earlier-filed application must support the claimed subject matter in the manner required by 35 U.S.C. § 112. I understand that this section requires the patent’s specification to contain a sufficient written description of the claimed invention to demonstrate that the applicant actually possessed the invention as of the filing date as broadly as it is claimed. In considering whether this written description requirement is met, I understand that I should consider the written description from the viewpoint of a person of ordinary skill in the art. I also understand that I should consider whether this person of ordinary skill would have recognized that the written description describes the full scope of the claimed invention and that the inventor actually possessed that full scope as of the claimed effective filing date. I understand that a person of ordinary skill would be able to immediately discern the limitations of the claims from the priority specification. I understand that a priority specification may provide inherent support if explicit support is missing. I understand that a person of ordinary skill would have understood an element to be inherent if the priority specification requires

that element, but inherency cannot be established by probabilities or possibilities. I also understand that the law for priority is not the same as the obviousness analysis under 35 U.S.C. § 103.

52.I further understand that the priority date is significant because patents, systems, or documents that are public prior to the priority date may invalidate the claims.

53.I understand that a U.S. patent may qualify as prior art to an asserted patent if the date of publication or issuance is prior to the invention in the asserted patent. I further understand that a printed publication, such as a book or an article published in a magazine or trade publication, may qualify as prior art to an asserted patent if the date of publication is prior to the invention of the asserted patent. A paper or presentation may also qualify as prior art if presented at a publicly available seminar, conference, or trade show prior to the invention in the asserted patent.

54.I understand that a U.S. patent or published patent application may qualify as prior art to the asserted patent if the application for that U.S. patent or published patent application was filed in the United States before the invention of the asserted patent.

55.I understand that to qualify as prior art, a reference must contain an enabling disclosure that allows one of ordinary skill to practice the claims without undue experimentation.

56.I understand that documents and materials that qualify as prior art can be used to invalidate a patent claim as anticipated or as obvious.

b. Anticipation

57.I understand that once the claims of a patent have been properly construed, determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

58.I understand that a prior art reference “anticipates” an asserted claim, and thus renders the claim invalid, if all elements of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present or implied).

59.I understand that a patent is anticipated if, before such person’s invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it.

60.I have written this report with the understanding that in an *inter partes* review, anticipation must be shown by a preponderance of the evidence.

c. Obviousness

61.I have been instructed by counsel on the law regarding obviousness, and understand that even if a patent is not anticipated, it is still invalid under 35 U.S.C. § 103, as written before the America Invents Act, if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole

would have been obvious at the time the invention was made to a person of ordinary skill in the pertinent art.

62.I understand that a person of ordinary skill in the art (POSITA) provides a reference point from which the prior art and claimed invention should be viewed. This reference point prevents a person of ordinary skill from using one's insight or hindsight in deciding whether a claim is obvious.

63.I also understand that an obviousness determination includes the consideration of various factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the challenged claims, (3) the level of ordinary skill in the pertinent art, and (4) the existence of secondary considerations such as commercial success, long-felt but unresolved needs, failure of others, etc.

64.I am informed that secondary considerations of non-obviousness may include (1) a long-felt but unmet need in the prior art that was satisfied by the invention of the patent, (2) commercial success or lack of commercial success of processes covered by the patent, (3) unexpected results achieved by the invention, (4) praise of the invention by others skilled in the art, (5) taking of licenses under the patent by others, and (6) deliberate copying of the invention. I also understand that there must be a relationship or "nexus" between any such secondary indicia and the invention. I further understand that contemporaneous and independent invention by others is a secondary consideration supporting an obviousness determination.

65. I understand that an obviousness evaluation can be based on a combination of multiple prior art references. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but other times the link between two or more prior art references is simple common sense. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, can drive innovation, and that a motivation to combine references may be supplied by the direction of the marketplace.

66. I understand that if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

67. I also understand that practical and common-sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that a person of ordinary skill in the art looking to overcome a problem will often be able to fit the teachings of multiple publications together like pieces of a puzzle, although the prior art need not be like two puzzle pieces that must fit perfectly together. I understand that obviousness analysis therefore considers the inferences and creative steps that a person of ordinary skill in the art would employ under the circumstances.

68.I understand that a particular combination may be proven obvious by showing that it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp because the result is likely the product not of innovation but of ordinary skill and common sense.

69.I understand that the combination of familiar elements according to known methods may be proven obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, obviousness likely bars its patentability.

70.It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed. Additionally, a reference outside of the field of endeavor may still be prior art if the reference is reasonably pertinent to the particular problem being solved by the patentee.

71.I understand that a claim can be obvious in light of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense and knowledge of one of skill in the art.

72.I understand that a person of ordinary skill could have combined two pieces of prior art or substituted one prior art element for another if the substitution can be made with predictable results, even if the swapped-in element is different from the swapped-out element. In other words, the prior art need not be like two puzzle pieces that must fit together perfectly. The relevant question is whether prior art techniques are interoperable with respect to one another, such that a person of skill would view them as a design choice, or whether a person of skill could apply prior art techniques into a new combined system. The person of ordinary skill would use ordinary creativity and is not limited like an automaton.

73.In sum, my understanding is that prior art teachings are properly combined where a POSITA, having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

74.I have been informed and understand that the obviousness analysis requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

75.I have written this report with the understanding that in an *inter partes* review, obviousness must be shown by a preponderance of the evidence.

VII. Priority date of the '143 patent

76.I understand that the priority date of the '143 Patent is assumed for the purposes of this Petition as December 11, 1998.

77.I understand that a POSITA is presumed to know and be familiar with all of the relevant art in the field at the time of the relevant invention before December 11, 1998, the priority date of the '143 Patent.

78.The technology at issue in the challenged claims of the '143 Patent relates mounting structures for Liquid Crystal Display (LCD) modules.

79.I was also asked to provide an opinion regarding the skill level of a POSITA at the time of the alleged invention of the '143 Patent. I considered several factors, including the types of problems encountered in the art, the solutions to those problems, the pace of innovation in the field, the sophistication of the technology, and the education level of active workers in the field. In my opinion, the POSITA would have: (i) a bachelor's degree in mechanical engineering, optical engineering, or physics, or undergraduate training in an equivalent field, and (ii) at least two years

of experience in the mechanical design of LCD modules. Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education.

80.I am qualified as a person of at least ordinary skill in the art and my qualifications enable me to provide opinions regarding the '143 Patent from the perspective of a POSITA.

81.I understand that the prior art to the '143 Patent includes patents and printed publications in the relevant art that predate the '143 Patent's alleged priority date of December 11, 1998.

VIII. OVERVIEW OF THE '143 PATENT

a. Prosecution

82.The '143 Patent has an alleged priority date of December 11, 1998, a filing date of December 13, 1999, and an issue date of July 15, 2003.

83.The USPTO initially noted that there were four distinct species of the claimed invention, and required the applicant to elect to pursue one of the species. In response, the applicant selected the invention of Species 1 of Figures 5-12 and at least claims 1-3, 11, and 30-31.

84.In the next office action, the examiner rejected claims 1-3 and 11 as being anticipated by Ichikawa (5,486,942). Claims 30-31 were deemed to be unpatentable due to obviousness over Ichikawa (5,486,942).

85. Applicant responded that the 102 and 103 rejections were not justified largely based on the Ichikawa use of shock mounts.

86. In the next office action, the examiner rejected the applicant's arguments and all pending claims. In response, the applicant cancelled all pending claims except claim 2 and added six new claims and argued that all of the claims were then patentable.

87. In the next office action, new claims 30-35 were rejected and claim 2 was objected to. New claims 30-40 were rejected as anticipated by Kim (6,151,207). In response, the applicant cancelled all claims except claims 35-37 and amended claims 35-37 and added new claims 41 and 42 and argued that the pending claims were patentable largely because the remaining claims required threaded screw holes on the back of the LCD module.

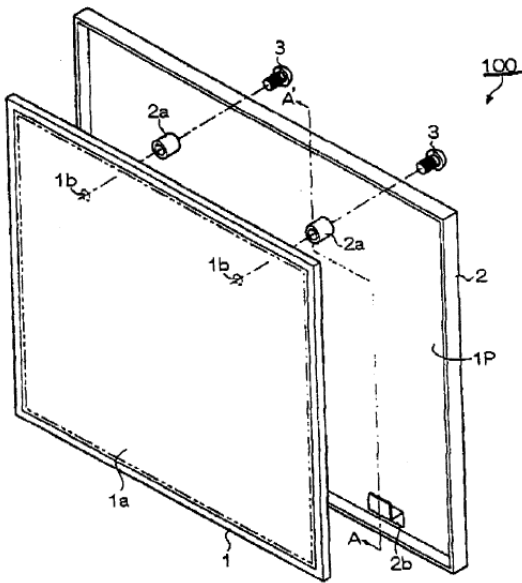
88. In the next office action, all pending claims were rejected as being anticipated by Kim. In response, claims 41 and 42 were cancelled by the applicant and claim 35 was amended to clarify a particular screw and screw hole and threaded hole arrangement. In particular, amended claim 35 was amended to require the screw to pass through a hole from the back side of the frame member to a threaded hole on the back of the LCD module.

89. On 12/13/2002, the examiner allowed claims 35-37. These claims became independent claim 1 and dependent claims 2 and 3 of the '143 patent.

b. Technology

90. The '143 Patent's purported invention is an improved structure for mounting LCD modules. The core of the purported invention is the arrangement of an LCD module being attached to a frame by means of a screw that enters from the back side of the frame, passes through a clearance hole in the frame, and secures the LCD module to the frame by having the screw engage a threaded screw hole on the back of the LCD module. This is Figure 5 of the '143 Patent:

FIG. 5



91. The components in Figure 5 are identified as follows:

- 1 is the LCD module.
- 2 is the bottom frame

- 3 are the screws
- 1b are the threaded screw holes in the back of the LCD module
- 2a are spacers or bosses

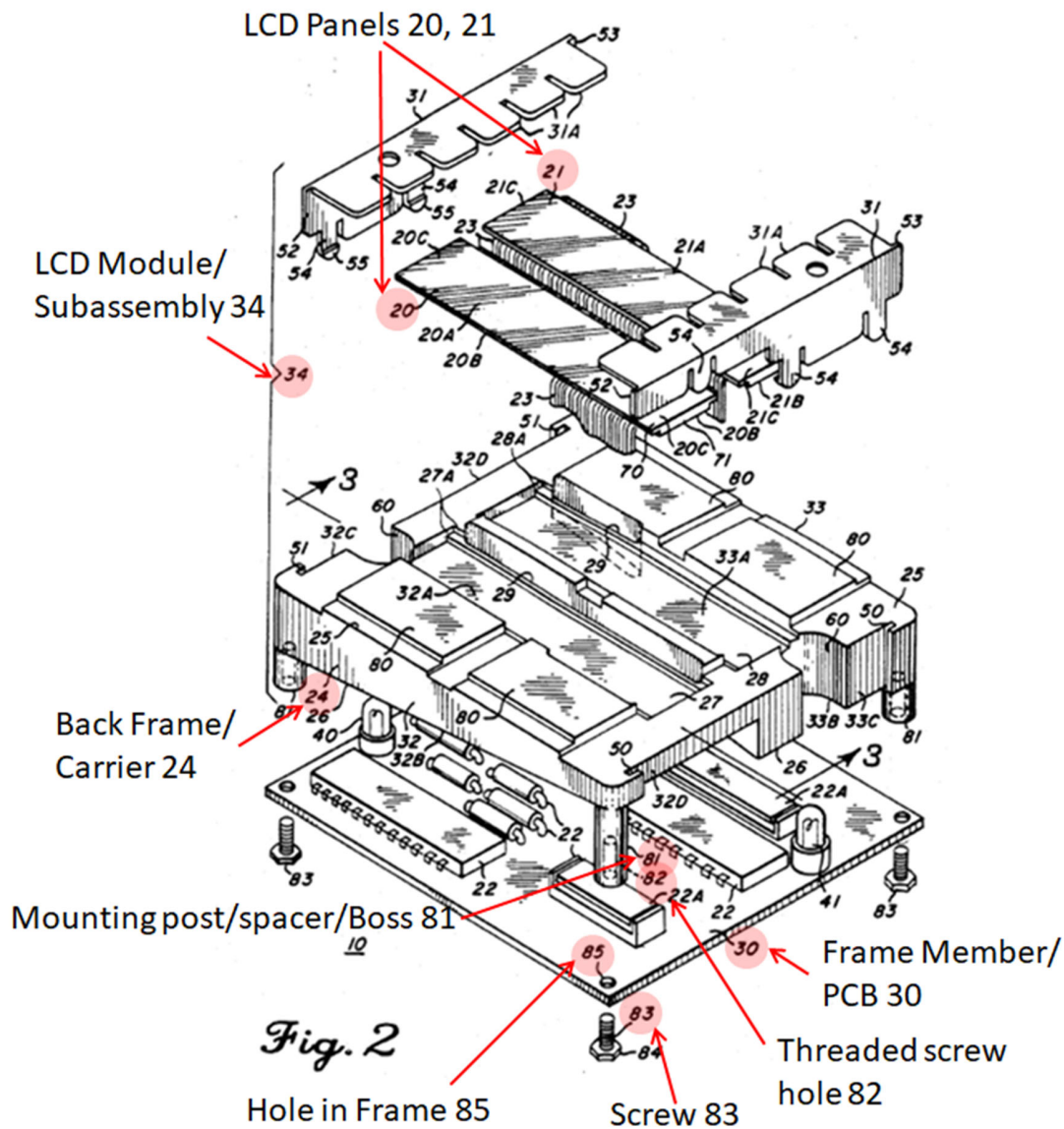
IX. Overview of Prior Art: Kopish (U.S. 4,755,035)

92.Kopish (U.S. 4,755,035) is a U.S. patent filed on October 6, 1987 and issued on July 5, 1988. It is prior art to the '143 Patent.

93.The title of Kopish is “Display assembly for LCD’s.” The Abstract states: “...the LCD is mounted in a recessed portion of the top surface of a carrier made of light transmitting material with preferably the back surface of the LCD contacting the carrier top surface . . . The preceding configuration allows the carrier to provide for backlighting of the LCD since the carrier serves as a light pipe in addition to providing mounting structure for the LCD.”

94.The LCD panel and backlight form the LCD module.

95.Kopish further states: “A pair of retainer clips 31 are illustrated in FIGS. 2 and 3 and are coupled to and join together the LCD devices 20 and 21 and the carrier 24 to form a snap together subassembly 34.” Kopish at 5:8-11. This carrier subassembly is the LCD module. An annotated version of Figure 2 of Kopish is shown below:



96. Further, Kopish states: “. . . the carrier 24, preferably on a printed circuit board 30 positioned effectively below the carrier 24 as shown in FIG. 2.” Kopish at 5:3-5.

97.Kopish: “As illustrated in the drawings, the carrier 24 has vertically downwardly extending mounting posts 81 each having a threaded center hole 82 therein. The posts 81 extend below the wedge portion bottom surface. A plurality of mounting screws 83 having head portions 84 and have body portions which pass through holes 85 in the printed circuit board 30 and effectively join the carrier 24 to the printed circuit board 30.” Kopish at 7:53-60. Kopish thus explains that the carrier 24 (which holds the LCD panels 20 and 21) is attached to the PCB 30 by screws that pass through holes 85 in the PCB 30 and screw into threaded holes 82 in mounting posts (bosses) 81 of the carrier 24.

X. CLAIM ANALYSIS

98.I have been asked by Hisense to analyze Claims 1 through 3 of the '143 Patent. Claim 1 is an independent claim. Claims 2 and 3 are dependent claims of Claim 1.

99.The claim limitations are:

Claim 1

Independent claim 1 reads:

[1-preamble] *An electric apparatus, comprising:*

[1a] *a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof;*

[1b] *liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location; and*

[1c] *at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module.*

Claim 2

[2a] *The electric apparatus of claim 1, further comprising:*

[2b] *at least one spacer through which at least one of side at least one screw passes through to join said liquid crystal module to said frame member.*

Claim 3

[3a] *The electric apparatus of claim 2,*

[3b] *wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.*

a. Analysis of Claim 1 (Kopish anticipation)

i. [1-preamble] An electric apparatus, comprising:

100. The preamble is not limiting. If found to be limiting, then Kopish in its Abstract says: “A display assembly for an LCD device,” and also discloses at Kopish that there are “drive electronics 22 positioned on the circuit board 30.” If found limiting, then this limitation is disclosed by Kopish. Kopish at 5:7.

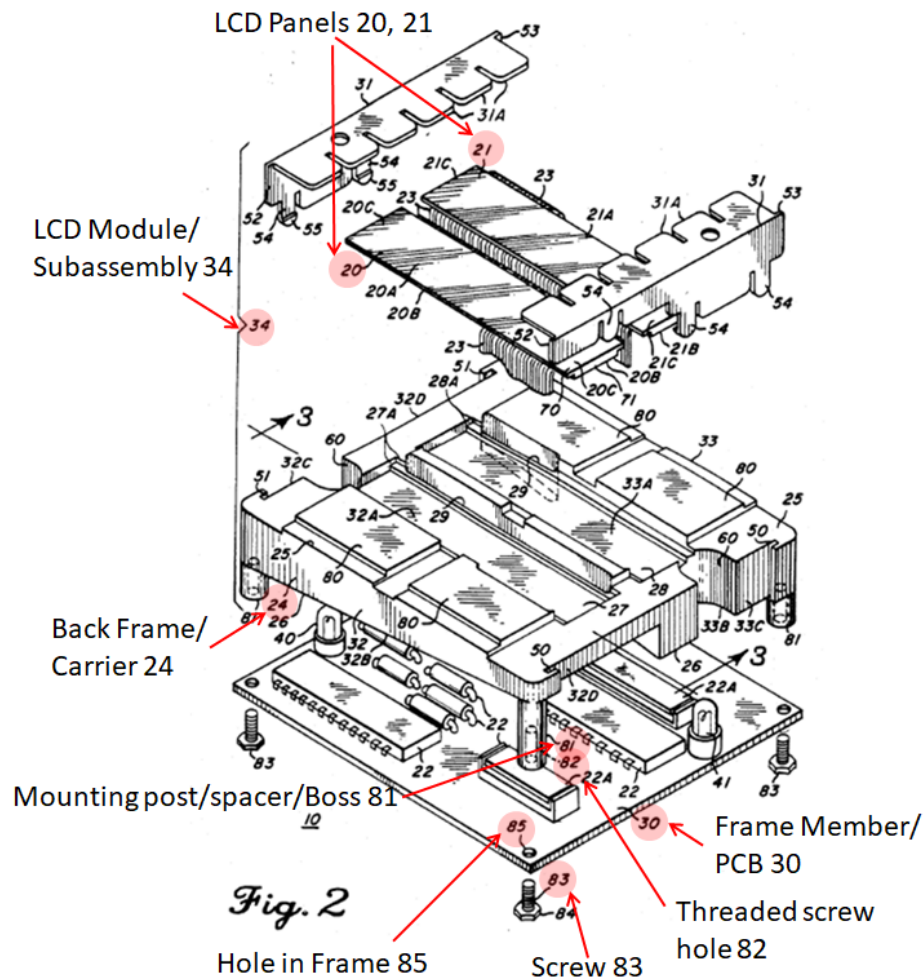
ii. [1a] a frame member having at least one hole in a first predetermined location through which a screw can pass from a back side thereof;

101. Referring to Kopish Figure 2:

of a screw that passes through the back side of a frame member. As can be seen in Kopish Figure 2 above, there is a hole in the frame 85 through which a screw 83 passes from the backside. With reference to Kopish Figure 2 (copied above), PCB 30 (“frame member”) has hole 85 through which screw 83 (“a screw”) passes from the back side of PCB 30 (“frame member”).

103. Further, Kopish teaches: “As illustrated in the drawings, the carrier 24 has vertically downwardly extending mounting posts 81 each having a threaded center hole 82 therein. The posts 81 extend below the wedge portion bottom surface. A plurality of mounting screws 83 having head portions 84 and have body portions which pass through holes 85 in the printed circuit board 30 and effectively join the carrier 24 to the printed circuit board 30.” Kopish at 7:53-60. This limitation is disclosed by Kopish.

iii. 1[b] liquid crystal module having a liquid crystal display panel as a front display area and having a back frame allowing said liquid crystal display module to be mounted to said frame member, said back frame including at least one threaded screw hole in a second predetermined location corresponding to said first predetermined location;

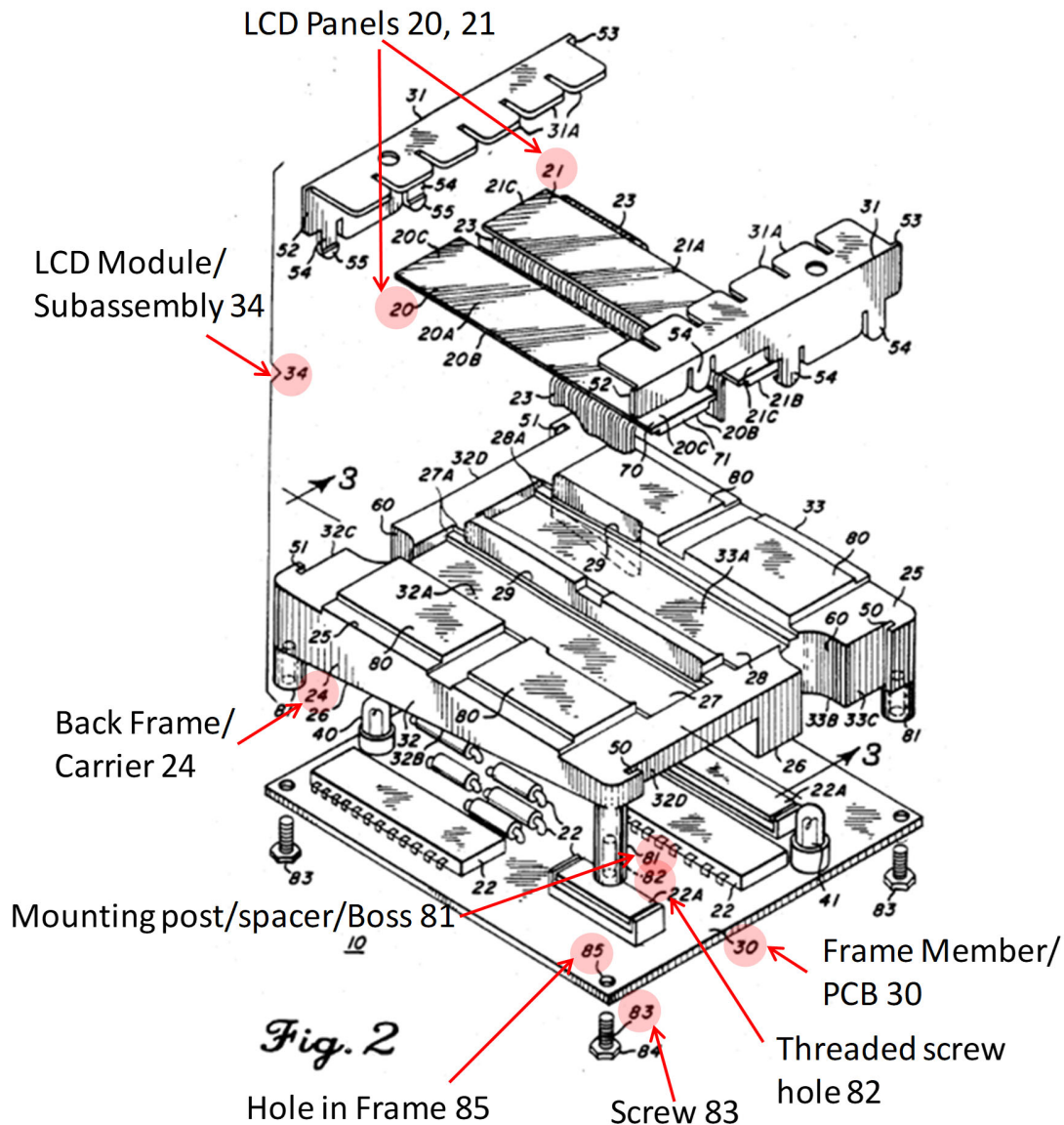


104. With reference to Kopish Figure 2, subassembly 34 including LCD devices 20 and 21 comprise “a liquid crystal module having a liquid crystal display panel as a front display area” that are mounted to the back frame (collectively components 24, 25, 26) to form a “a liquid crystal module having a liquid crystal display panel as a front display area and having a back frame” as claimed in the ’143 Patent’s claim 1. Kopish shows the LCD panels as a top (front) display area. The back frame 24 allows the LCD module 34 to be mounted to the frame member/PCB

30. Kopish teaches: “The LCD devices 20 and 21 will be mounted to a unitary LCD carrier 24.” Kopish at 4:56-57. The carrier / backframe 24 includes a threaded screw hole 82 aligned with the first frame screw hole 85. This would allow LCD devices (“said liquid crystal display module”) to be mounted to the PCB 30 (“said frame member”).

105. Kopish at teaches: “As illustrated in the drawings, the carrier 24 has vertically downwardly extending mounting posts 81 each having a threaded center hole 82 therein. The posts 81 extend below the wedge portion bottom surface. A plurality of mounting screws 83 having head portions 84 and have body portions which pass through holes 85 in the printed circuit board 30 and effectively join the carrier 24 to the printed circuit board 30.” Kopish at 7:53-60. Kopish teaches this limitation.

iv. **[1c] at least one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module.**



106. With reference to Kopish Figure 2 (copied below), subcomponents of screw 83, screw hole 85, frame member/PCB 30, and screw hole 82 interact to comprise “one screw to fix said liquid crystal module to said frame member by passing through said at least one hole in said frame member from the back side thereof and screwing into said threaded screw hole on said back frame of said liquid crystal module,” as claimed in the ’143 Patent’s claim 1. Kopish Figure 2 above

shows a screw fixing the liquid crystal module to the frame member by passing through a hole on the back side of the frame member, screwing into the back frame of said liquid crystal module. Kopish Figure 2 above shows the LCD module 34 fixed to the frame member 30 by passing screw 83 through frame member hole 85, and screwing into threaded screw hole 82 which is in the mounting post 81 of the back frame 24. This is further verified by Kopish; “[a]s illustrated in the drawings, the carrier 24 has vertically downwardly extending mounting posts 81 each having a threaded center hole 82 therein. The posts 81 extend below the wedge portion bottom surface. A plurality of mounting screws 83 having head portions 84 and have body portions which pass through holes 85 in the printed circuit board 30 and effectively join the carrier 24 to the printed circuit board 30.” Kopish at 7:53-60. Kopish thus explains that the carrier 24 (which holds the LCD panels 20 and 21) is attached to the PCB 30 by screws that pass through holes 85 in the PCB 30 and screw into threaded holes 82 in mounting posts (bosses) 81 of the carrier 24.

107. Kopish teaches this limitation.

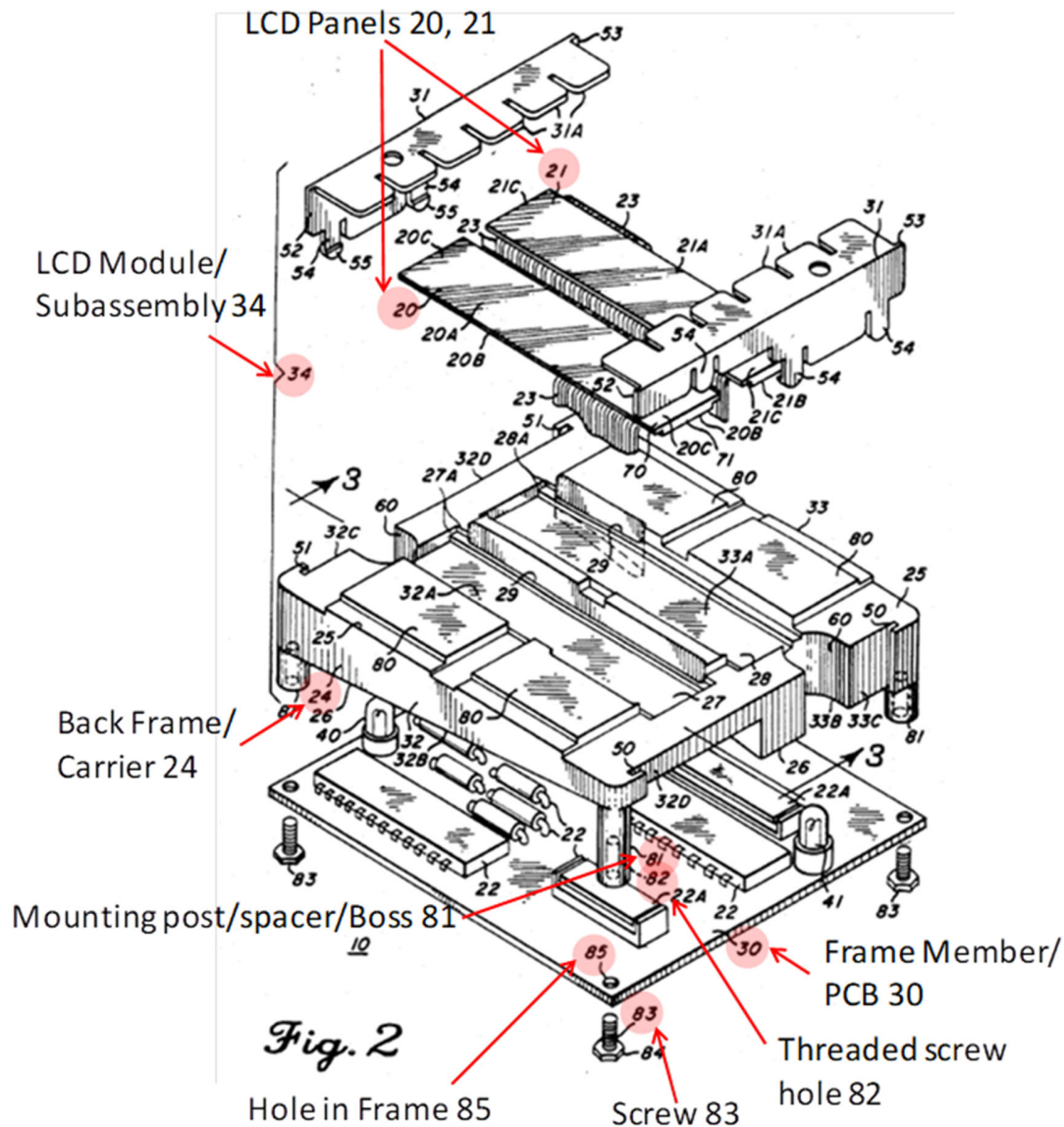
108. Kopish teaches each and every limitation of claim 1. Claim 1 is anticipated by Kopish. Claim 1 is invalid.

b. Claim 2 Analysis

i. [2a] The electric apparatus of claim 1, further comprising:

109. The preamble is not limiting. If found to be limiting, then Kopish in its Abstract says: “A display assembly for an LCD device,” and also discloses that there are “drive electronics 22 positioned on the circuit board 30.” Kopish at 5:7. If found limiting, then this limitation is disclosed by Kopish.

- ii. **[2b] at least one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member.**



110. With reference to Kopish Figure 2 (copied below), subcomponents of the mounting posts 81, frame member 85, back frame 24, LCD module 34, carrier 24, and others interact to comprise “one spacer through which at least one of said at least one screw passes through to join said liquid crystal module to said frame member,” as claimed in the ’143 Patent’s claim 2. Kopish discloses at least one spacer through which a screw passes through to join the liquid crystal module to the

frame member. In Kopish Figure 2, we see mounting posts 81, which are spacers between the frame member 85 and the back frame 24 of the LCD module 34.

111. This is further verified by Kopish: “As illustrated in the drawings, the carrier 24 has vertically downwardly extending mounting posts 81 each having a threaded center hole 82 therein. The posts 81 extend below the wedge portion bottom surface. A plurality of mounting screws 83 having head portions 84 and have body portions which pass through holes 85 in the printed circuit board 30 and effectively join the carrier 24 to the printed circuit board 30.” Kopish at 7:53-60. Kopish explains that the mounting posts 81 act as spacers compensating for the wedge shape of the back frame.

112. Kopish teaches this limitation.

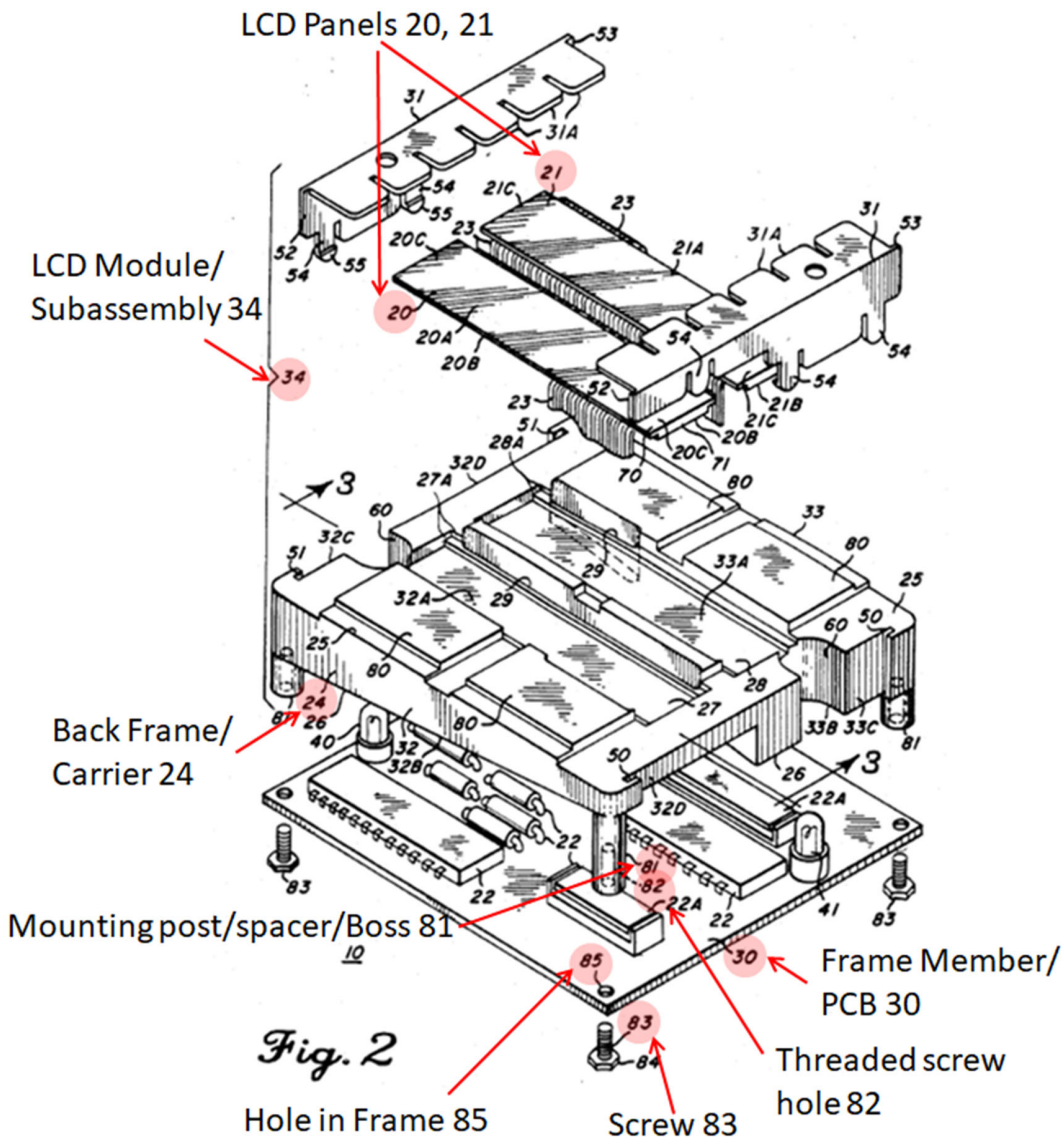
113. Each and every limitation of claim 2 is disclosed by Kopish. Kopish anticipates claim 2. Claim 2 is invalid.

c. Claim 3 Analysis

i. [3a] The electric apparatus of claim 2.

114. The preamble is not limiting. If found to be limiting, then Kopish in its Abstract says: “A display assembly for an LCD device.” Further, Kopish discloses that there are “drive electronics 22 positioned on the circuit board 30.” Kopish at 5:7. If found limiting, then this limitation is disclosed by Kopish.

ii. [3b] wherein said at least one spacer comprises a boss provided on a confronting face of said frame member.



115. With reference to Kopish Figure 2 (copied below), subcomponents of the mounting posts 81, frame member 85, back frame 24, LCD module 34, carrier 24, and others interact to comprise “one spacer comprises a boss provided on a confronting face of said frame member,” as claimed in the ’143 Patent’s claim 3.

Kopish discloses a spacer comprising a boss from a confronting face of the frame member. As can be seen in Figure 2, the mounting posts 81 act as spacers and are bosses extending down vertically from the back frame 24. Kopish explains that by using such bosses, separate spacers are eliminated. “In this manner, the molded carrier 24 provides mounting posts which assist in mounting the carrier to its associated printed circuit board 30. This eliminates the need for additional mounting structure for the display assembly of the present invention. In addition, by providing the carrier 24 as a unitary molded part, separate spacers to position the carrier with respect to the display cover plate 13 can be eliminated.” Kopish at 7:60-68.

116. As previously explained and as seen in Figure 2 above, the mounting post/bosses 81 align with the framemember screw holes (85), so the back frame (24) can be securely attached to the frame member (30) with screws (83). When these screws (83) are tightened to secure the back frame (24) and LCD module (34) to the frame member (30) via the boss (81) which is in intimate tight contact with the frame member (30). That is, the boss is “provided on a confronting face of said frame member.”

117. Kopish discloses this limitation.

118. Each and every limitation of claim 3 is taught by Kopish. Kopish anticipates claim 3 of the '143 Patent. Claim 3 is invalid.

iii. Claim 3 is obvious from Kopish and to an average POSITA.

119. A POSITA would have found it obvious to modify Kopish's teachings of mounting bosses 81 extending from back frame (24) to extending them from the frame member (30).

120. A POSITA would have recognized that in the present case, there are only two options of where the mounting bosses (81) can be located. The first option is for the mounting bosses (81) to extend from the frame member (30). The only other option is for mounting bosses (81) to extend from the back frame (24), as shown in Kopish Figure 2. In my experience, a POSITA could implement either option as a simple matter of design choice. The design is often implemented through use of plastic molding and can be shaped into a configuration on either frame without undue experimentation and easily form a molded shape with very predictable results.

121. One benefit of extending bosses from the frame member (30), over extension from back frame (24) is that the LCD module / subassembly (34) would be more lightweight in design, as that it would not contain the bosses. Such relief from extra weight and complexity would protect sensitive electronic components, such as LCD devices (20 and 21).

XI. RESERVATION OF RIGHTS

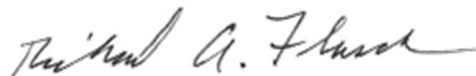
122. My opinions are based upon the information that I have considered to date. I am unaware of any evidence of secondary considerations with respect to the '143 Patent that would render any of the asserted claims non-obvious. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the owner of the '143 Patent and to consider new information that becomes available to me.

XII. CONCLUSION

123. For the reasons discussed above, it is my opinion that claims 1-3 of the '143 Patent are invalid for at least the reasons stated herein.

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

DATE: March 17, 2023



Richard A. Flasck