

United States Court of Appeals for the Federal Circuit

00-1257

S3 INCORPORATED.
(now known as SONICBLUE, INC.),

Plaintiff-Appellant,

v.

NVIDIA CORPORATION,

Defendant-Appellee.

Kirke M. Hasson , Pillsbury Winthrop LLP, of San Francisco, California, argued for plaintiff-appellant. With him on the brief were David A. Jakopin , Brian J. Beatus , and Mark J. Danielson , of Palo Alto, California.

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Appealed from: U.S. District Court for the Northern District of California

Judge Sandra Brown Armstrong

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(now known as SONICBLUE, INC.),

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DECIDED: August 3, 2001

Before NEWMAN, MICHEL, and GAJARSA, Circuit Judges.

Opinion for the court filed by Circuit Judge NEWMAN. Dissenting opinion filed by Circuit Judge GAJARSA.

NEWMAN, Circuit Judge.

S3 Incorporated, now known as SONICblue, Inc. (herein "S3"), appeals the grant of summary judgment by the United States District Court for the Northern District of California, [\[1\]](#) holding claims 1-4 and 9-11 of S3's United States Patent No. 5,581,279 invalid on the ground of claim indefiniteness. We conclude that the claims are not invalid on this ground. The judgment is reversed and the case is remanded for further proceedings.

BACKGROUND

The patented invention is an integrated circuit for use in computer video color display. The basic technology of video color display was known at the time the '279 patent was filed; the patent is for a novel monolithic circuit in which a programmable clock signal generator circuit, a VGA controller circuit, and a combination random-access memory/digital-to-analog converter are integrated on a single chip.

A computer screen is divided into many horizontal rows, each of which contains a plurality of points called picture elements or "pixels." Each pixel contains fluorescent materials that emit light when charged by an electron beam generated by the monitor. To display colored images, red, green, and blue fluorescent materials are associated with each pixel, structured to be illuminated by electron beams directed by the computer's graphics controller. By varying the intensity of the electron beams, the desired color is produced. The '279 patent explains that the prevailing

standard video display format at the time of filing was the Video Graphics Array (VGA) standard, which specifies an array of 640 horizontal and 480 vertical pixels. In accordance with the VGA standard, pixel data are output by the video controller at a maximum of 8 bits per pixel; this output limits to 256 the number of possible colors available for display.

The patent describes two modes of operation. In the "direct color" mode, the pixel data are transmitted directly from the video controller to a digital-to-analog converter (DAC) for display. In the "indexed" mode, the data output from the video controller is used as an address which is input to a random access memory (RAM) array structured as a look-up table. Each address corresponds to higher bit level color information, thus allowing, for instance, 18 or 24 bit color depth to be presented on the computer screen from only 8 bits of data, albeit limited to 256 combinations at that depth (the total number of addressable positions in the look-up table for 8 bit data).

Independent claims 1 and 9 of the '279 patent follow, with emphases added to the portions of the claims challenged as indefinite:

1. A monolithic integrated circuit comprising:
programmable clock circuit means for producing a video memory clock signal and a video dot clock signal;
a video controller coupled to said programmable clock circuit means for receiving the video memory clock signal and the video dot clock signal and for producing a video information data stream;
random access memory means, coupled to said video controller, for receiving the video information data stream and producing a video display information data stream; and
digital-to-analog converter means, coupled to both said random access memory and to said video controller, for selectively receiving either the video information data stream or the video display information data stream as received data and for converting the received data to analog video signals.

9. A monolithic integrated circuit comprising:
a programmable clock circuit responsive to a reference clock signal and divisor data and generating a video memory clock signal and a video dot clock signal;
a video controller receiving the video memory clock signal and the video dot clock signal and producing a video information data stream from data received from a video RAM;
a random access memory producing a video display information data stream in response to the video information data stream from said video controller;

a digital-to-analog converter converting received digital data to analog video signals; and

a selector supplying one of said video information data stream from the video controller and said video display information data stream from said random access memory to said digital-to-analog converter as said received digital data.

DISCUSSION

The district court granted summary judgment that the claims are invalid for indefiniteness under 35 U.S.C. §112 ¶2:

§112 ¶2. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Summary judgment is appropriate "if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c). On reviewing the grant of summary judgment, the appellate tribunal applies the same criteria as did the district court. See Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 250, 255 (1986); Cortland Line Co. v. Orvis Co., 203 F.3d 1351, 1355, 53 USPQ2d 1734, 1746 (Fed. Cir. 2000).

The question of whether the claims meet the statutory requirements of §112 ¶2 is a matter of construction of the claims, and receives plenary review on appeal. See Atmel Corp. v. Information Storage Devices, Inc., 198 F. 3d 1374, 53 USPQ2d 1225 (Fed. Cir. 1999); Personalized Media Communications v. Int'l Trade Comm'n, 161 F.3d 696, 705, 48 USPQ2d 1880, 1888 (Fed. Cir. 1998). The claims as granted are accompanied by a presumption of validity based on compliance with, inter alia, §112 ¶2. See Budde v. Harley-Davidson, Inc., 250 F.3d 1369, 1376, 58 USPQ2d 1801, 1806 (Fed. Cir. 2001).

The requirement that the claims "particularly point[] out and distinctly claim[]" the invention is met

when a person experienced in the field of the invention would understand the scope of the subject matter that is patented when the claim is read in conjunction with the rest of the specification. "If the claims when read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, §112 demands no more." Miles Laboratories, Inc. v. Shandon, 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993); see also Union Pacific Resources Co. v. Chesapeake Energy Corp., 236 F.3d 684, 692, 57 USPQ2d 1293, 1297 (Fed. Cir. 2001); North American Vaccine, Inc. v. American Cyanamid Co., F.3d 1571, 1579, 28 USPQ2d 1333, 1339 (Fed. Cir. 1993); Hybritech, Inc. v. Monoclonal Antibodies, 802 F.2d 1367, 1385, 231 USPQ 81, 94-95 (Fed. Cir. 1986).

For claim clauses containing functional limitations in "means for" terms pursuant to §112 ¶6, the claimed function and its supporting structure in the specification must be presented with sufficient particularity to satisfy the requirements of §112 ¶2. As was explained in In re Donaldson Co., 16 F.3d 1189, 1195, 29 USPQ2d 1845, 1850 (Fed. Cir. 1994) (en banc), "if one employs means-plus-function language in a claim, one must set forth in the specification an adequate disclosure showing what is meant by that language. If an applicant fails to set forth an adequate disclosure, the applicant has in effect failed to particularly point out and distinctly claim the invention as required by the second paragraph of section 112." See also Atmel Corp., 198 F. 3d at 1382, 53 USPQ2d at 1230 (Fed. Cir. 1999) ("In order for a claim to meet the particularity requirement of ¶2, the corresponding structure(s) of a means-plus-function limitation must be disclosed in the written description in such a manner that one skilled in the art will know and understand what structure corresponds to the means limitation.")

The Video Controller

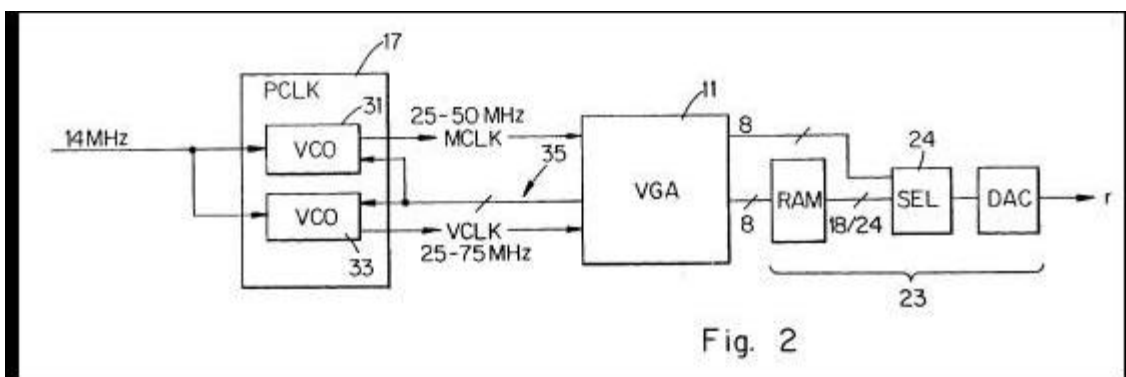
The primary focus of the district court's ruling of claim indefiniteness of the terms "video information data stream" and "video display information data stream" was the video controller and

the description of its emission of video information data. The district court found that the video controller emits two different kinds of information, one of which goes directly to the DAC ("video display information data") and one of which is processed first by the RAM ("video information data"). The district court held that claim 1 is fatally indefinite because:

it is inconsistent for claim 1 to use the term "video information stream" to describe both the information the DAC receives directly from the video controller, and the information the RAM receives from the video controller. . . . it is not apparent whether a particular "video information stream" would contain "video information," "video display information," or both.

Slip op. at 12-13. The court found claim 9 invalid for the same reason. Id. at 19.

S3 states that the data stream from the video controller can either be sent directly to the DAC through a selector in the direct-color mode, or processed by the RAM in the indexed mode, and that this distinction is represented in the claims and would be so understood in light of the rest of the specification. As support, S3 points to Figure 2 of the '279 patent, which depicts the 8 bit video information data stream from the VGA controller 11 as either processed in the RAM to produce 18/24 bit color information, or bypassing the RAM and going directly to the selector 24. [\[2\]](#)



The specification explains that "in certain modes of operation, it may be desirable for the VGA controller 11 to bypass the RAM portion of the RAMDAC 23 and instead provide video display information directly to the DAC portion of the RAMDAC 23 through a selector 24." Col. 4, lines 1-5.

Comprehension of the terse language of the '279 claims is aided by recourse to the rest of the specification, for the body of the specification explains and illustrates "video information data stream" and "video display information data stream," such that their meaning and scope would be understood by a person experienced in the field of the invention. The claims are directed to the invention that is described in the specification; they do not have meaning removed from the "context from which they arose." Netword, LLC v. Centraal Corp., 242 F.3d 1347, 1352, 58 USPQ2d 1076, 1079 (Fed. Cir. 2001); see also Slimfold Mfg. Co. v. Kinkead Indus., Inc., 810 F.2d 1113, 1116, 1 USPQ2d 1563, 1566 (Fed. Cir. 1987) (claims are construed in light of the specification, of which they are a part).

nVIDIA argues that the claims are ambiguous because two different outputs of the video controller are required, and states that this is inconsistent with the description in the specification. We conclude, however, that a person of skill in this field would understand the claims when viewed in light of the description in the specification. Claim 1 recites a "video controller . . . producing a video information data stream." The next clause of claim 1 states that the RAM receives the "video information data stream" and produces the "video display information data stream"; the specification explains this transformation, and the role of the bit-content of the pixels in generating the display. The final clause of claim 1 states that the DAC is "coupled to both said random-access memory and to said video controller," and serves to "selectively receiv[e] either the video information data stream or the video display information data stream." This clause manifests the specification's teaching that the information from the video controller need not pass through the random-access memory.

The district court objected that the claims are not self-contained in that they do not explain that "video display information is produced by the controller." We agree that the claims are not a self-contained explanation of every step. That is not the role of claims.

The purpose of claims is not to explain the technology or how it works, but to state the legal

boundaries of the patent grant. A claim is not "indefinite" simply because it is hard to understand when viewed without benefit of the specification. Cf. Autogiro Co. of America v. United States, 384 F.2d. 391, 397, 155 USPQ 697, 701 (Ct. Cl. 1967) ("a claim cannot be interpreted without going beyond the claim itself"). As was explained in the specification, the video information data stream emitted by the controller is either processed through the look-up table in the RAM (to produce a video display information stream) or, already consisting of video display information, the stream bypasses the RAM and proceeds directly to the digital-to-analog converter. See col. 4, lines 1-5. This explanation was elaborated by the expert witnesses. See Richard F. Ferraro, Expert Witness Report at 4.4, Joint Appendix at 1541 ("Having the RAMDAC integrated on the display controller chip facilitated a palette bypass in the event that the red, green and blue data was already provided from the . . . circuitry in the display controller."); Declaration of Richard A. Belgard at ¶117 ("video display information that is output from the VGA controller can be directly read, and will therefore bypass the RAM"); '279 patent, col. 4, lines 1-5 (reproduced supra). We conclude that a person skilled in this field would understand the meaning and scope of the data streams as set forth in the claims.^[3]

The ruling of indefiniteness of these terms is reversed.

The "Means . . . for Selectively Receiving"

Claim 1 includes a "digital-to-analog converter means . . . for selectively receiving either the video information data stream or the video display information data stream [and] converting the received data to analog video signals." The district court held that the "means . . . for selectively receiving" was indefinite because the "structure claimed by the 'selectivity' limitation is not disclosed in the specification as required by 35 U.S.C. §112 ¶6."^[4]

The parties agree that the "means . . . for selectively receiving" limitation corresponds to the

"selector" referred to in the specification and shown in Figure 2 as element 24 of the integrated circuit. However, the electronic structure of the selector and the details of its electronic operation are not described in the specification. S3 presented evidence that a selector is a standard electronic component whose structure is well known in this art, and that such standard components are usually represented in the manner shown in the '279 patent. The inventor of the '279 patent and the expert witnesses testified that persons of skill in this field would readily recognize that the selector as shown in the specification is an electronic device such as a simple multiplexer, whose structure is well known. The district court held that such evidence can not "compensate for the failure of the '279 patent to expressly disclose the structure of such devices." The district court found that this testimony provided a factual foundation "on which [S3 may] base its assertion that multiplexers are 'well known in the art,'" but found the evidence inadequate to overcome the indefiniteness charge, stating that the disclosure must be judged on the basis of the "common experience" of "those outside the relevant art." The court found that "common experience" does not suggest that the function described by the 'selectivity' limitation refers to a 'simple multiplexer.'" Thus, the court declined to give any weight to the evidence of the understanding of persons of skill in the field.

The law is clear that patent documents need not include subject matter that is known in the field of the invention and is in the prior art, for patents are written for persons experienced in the field of the invention. See Vivid Technologies, Inc. v. American Science and Engineering, Inc., 200 F.3d 795, 804, 53 USPQ2d 1289, 1295 (Fed. Cir. 1999) ("patents are written by and for skilled artisans"). To hold otherwise would require every patent document to include a technical treatise for the unskilled reader. Although an accommodation to the "common experience" of lay persons may be feasible, it is an unnecessary burden for inventors and has long been rejected as a requirement of patent disclosures. See Atmel Corp., 198 F.3d at 1382, 53 USPQ2d at 1230 (Fed. Cir. 1999) ("The specification would be of enormous and unnecessary length if one had to literally reinvent and describe the wheel."); W.L. Gore & Assoc., Inc. v. Garlock, Inc., 721 F.2d 1540, 1556,

220 USPQ 303, 315 (Fed. Cir. 1983) ("Patents are written to enable those skilled in the art to practice the invention, not the public.").

The uncontradicted evidence was that a selector is of well known electronic structure and performs a common electronic function, and is readily implemented from the description in the specification. There was no contrary evidence. It is not the criterion for compliance with §112, whether a lay person having no skill whatsoever in this field would know how a selector is constructed. Thus the ruling in invalidity for failure to comply with §112 is incorrect, and must be reversed.

CONCLUSION

The judgment of invalidity of claims 1 and 9 and the claims depending therefrom, on the ground of indefiniteness, is reversed. The case is remanded for further proceedings.

REVERSED AND REMANDED

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GAJARSA, Circuit Judge, dissenting.

I respectfully dissent from the majority opinion. It concludes that the district court erroneously held that claims 1-4 and 9-11 of the '279 patent are indefinite. Contrary to the majority, I would affirm the district court's determination.

The majority finds that the claims are definite. However, an astute reading of the claims clearly establishes that the term "video information data stream" renders their scope and meaning ambiguous. Reference to the intrinsic evidence fails to rectify this ambiguity, and the majority's speculative and illusive analysis of the written description to the contrary is insufficient to salvage the claims.

Where the bounds of the claims are indeterminable, the claims are invalid under 35 U.S.C. § 112, ¶ 2, as indefinite. Personalized Media Communications, LLC v. International Trade Comm'n, 161 F.3d 696, 705, 48 USPQ2d 1880, 1888 (Fed. Cir. 1998). Thus, whether a claim is invalid for indefiniteness requires a determination of whether one skilled in the art would be able to discern the scope of the claim "when read in light of the specification." Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). In Solomon v. Kimberly-Clark Corp., 216 F.3d 1372, 55 USPQ2d 1279 (Fed. Cir. 2000), we explain the purpose of this statutory requirement, stating: "As has been noted in the context of definiteness, the inquiry under section 112, paragraph 2, now focuses on whether the claims, as interpreted in view of the written description, adequately perform their function of notifying the public of the [scope of the] patentee's right to exclude." Id. at 1379, 55 USPQ2d at 1283. When the claims become so ambiguous that one of ordinary skill in the art cannot determine their scope absent speculation, such claims are invalid for indefiniteness. See In re Steele, 305 F.2d 859, 862-63, 134 USPQ 292, 295 (CCPA 1962).

The district court determined that the term “video information data stream” is used inconsistently within each of the independent claims, thereby rendering them indefinite. I agree. Claims 1 and 9 use the term “video display information data stream” to represent data output by the RAM after processing. The meaning of that term is clear. By contrast, the term “video information data stream” is used to describe three different signals: 1) the sole output of the video controller; 2) the data the RAM receives from the video controller which it transforms into a “video display information data stream” and sends to the DAC; and 3) the information the DAC receives directly from the video controller. Thus, the language of the claim suggests that the term has three different meanings. Therein lies the confusion preventing one of ordinary skill in the art from determining the scope of the claimed invention.

It is beyond dispute that the claims use the term “video information data stream” to describe both data requiring transformation and to describe data ready for display. As noted, the clause reciting the function of the RAM describes the input of a “video information data stream” to the RAM for processing. Once processed, the resultant data is referred to as a “video display information data stream.” (emphasis added). In the clause reciting the function of the DAC, on the other hand, the term “video information data stream” is used to describe data received directly from the controller. Because that data bypasses the transformation step of the RAM, the data receives no color processing prior to its use in the display. Nevertheless, the claim refers to such unprocessed data as a “video information data stream.” The DAC, however, functions only to convert the digital color data to analog form and does not perform color processing. Thus, any data received by the DAC must already be in color format and be ready for display. Because the clause reciting the function of the DAC is written to recite receipt of both unprocessed “video information” and processed “video display information,” which are necessarily different, reference in that clause to the output of the controller as simply “video information” is not only confusing but also inaccurate.

The majority's flawed analysis fails to address use in the claims of the term "video information" to describe data sent directly to the DAC, wherein data is sent to the display without color processing. Such use of the term is inconsistent with the required conversion of "video information" by the RAM prior to transmission to the display. Accordingly, the ambiguity raised by use of the term "video information data stream," as the sole output of the video controller, and the input to both the RAM and the DAC, cannot be rectified based simply on a reading of the plain language of the claims.

The majority is satisfied that the description in the specification resolves the ambiguity in the claims. Nothing in the written description supports use of the term "video information" to refer to data transmitted directly to the display, however, the term "video display information" is consistently used to describe data ready for display. Indeed, the specification consistently uses the term "video information" to describe the data sent to the RAM for transformation prior to display. Column 1, line 65, through column 2, line 6; column 2, lines 32-41; column 3, lines 12-14; column 4, lines 23-26; column 6, lines 1-8. There is no suggestion in the description that a "video information data stream" can include "video display information." Instead, the description states that the "video information stream" input to the RAM is converted into a "video display information stream." Column 2, lines 1-6, 37-41; column 4, lines 1-5, 20-23; column 6, lines 9-10. Thus, the written description suggests that a "video information stream" is composed of unprocessed "video information," while a "video display information stream" is composed of data ready for display, namely "video display information."

The majority notes that Figure 2 depicts the transmission of 8-bit information from the controller to both the RAM and directly to the selector (and then the display). It further acknowledges that the RAM produces 18/24-bit color information, or that in the "bypass" mode "video display information" is sent directly to the display. The majority's conclusion that in the "bypass" mode 8-bit data is transmitted directly to the selector/display, while consistent with Figure 2, is in direct conflict with

the written description's requirement that the selector/display receive 18/24-bit "video display information."

The majority fails to explain this inconsistency. To reiterate, the majority's conclusion that in the bypass mode 8-bit unprocessed video information is transmitted directly to the display is inconsistent with the written description's requirement that the display receive 18/24-bit color "display" information in that mode. No explanation of how the 8-bit video information is converted into 18/24-bit color information for display is articulated in the majority opinion. Indeed, devoid of analysis, the majority opinion washes its hands of this issue on the basis "that a person of skill in this field would understand the claims when viewed in light of the description in the specification."

Clearly, the specification does nothing to rectify the confusion generated by the ambiguous claim language. The text of the written description is in conflict with the claims and even with the illustration of the invention shown in Figure 2. In the only portion of the specification discussing a "bypass" mode, in which data is sent directly from the video controller to the DAC, the patent states: "In certain modes of operation it may be desirable for the VGA controller 11 to bypass the RAM portion of the RAMDAC 23 and instead provide video display information directly to the DAC portion of the RAMDAC 23." Column 4, lines 1-5 (emphasis added). Thus, in the bypass mode, the data output by the controller and sent directly to the DAC is comprised of "video display information." The patent's written description also explains that "video information" is used to produce "a video information stream" that is sent to the RAM. Using information stored in the RAM, the "video information" is translated into "video display information." Column 4, lines 1-5. Thus, even in the description of the invention pertaining to the operation of the system illustrated in Figure 2, the inventors used the term "video information stream" to describe the data that must be processed for display and the term "video display information" as the data already processed by the RAM and ready for display. Such statements are inconsistent with the claims' reference to the data bypassing the RAM as "video information," and reference to that same data as data that

is also processed by the RAM for display.

Accordingly, the specification contains an internal conflict. Indeed, rather than resolving the claim ambiguity, the written description uses the disputed language in a manner contradicting the majority's conclusion that "video information" bypasses the RAM and is transmitted to the display. Because the written description is ambiguous, if not inconsistent with the language of the claims, it can hardly be relied upon to resolve the confusing description of the invention found in the claims. Thus, the majority's conclusion that the claims are definite because the specification discloses that 8-bit "information data" is output to the display in the bypass mode is in fact inconsistent with the written description.

As noted, the written description demonstrates that the two types of information are different. "Video information" and the contents of a "video information stream" refer to data and the contents of data streams which must be processed by the RAM prior to display, 8-bit data. On the other hand, "video display information" and the contents of a "video display information stream" correspond to data ready for display once converted to analog form, 18/24-bit color data. Thus, the majority incorrectly cites to the written description to suggest that the claims are definite. Even when read in light of the written description, the claims are indefinite because they fail to apprise one of ordinary skill in the art of their scope. Personalized Media, 161 F.3d at 705, 48 USPQ2d at 1888.

Finally, the selection performed by the DAC in no way clarifies the confusion created by the ambiguous references to a "video information data stream." Indeed, the district court considered, but rejected, S3's extrinsic evidence offered in support of its argument that one of ordinary skill in the art would find the claims definite. The district court found the testimony of S3's expert lacking evidentiary support. Somehow, the majority sees through this magnificent confusion to conclude that the evidence is sufficient to reasonably apprise those of ordinary skill in the art of the scope of the invention.

Expert testimony, while useful to clarify the patented technology and to explain its meaning, may not correct errors or erase limitations or otherwise be used to diverge from the description of the invention. Aqua-Aerobic Systems, Inc. v. Aerators, Inc., 211 F.3d 1241, 1245, 54 USPQ2d 1566, 1568 (Fed. Cir. 2000) (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 981, 34 USPQ2d 1321, 1331 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370, 38 USPQ2d 1461 (1996)). An expert's opinion on the ultimate legal issue, including those under 35 U.S.C. § 112, must be supported by something more than a conclusory statement. In re Buchner, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991). There must be evidence in the record to support the testimony; here the mere conclusory statements made by the experts were correctly dismissed by the district court.

The majority believes that “a person skilled in this field would understand the meaning and scope of the data streams as set forth in the claims.” However, it fails to reconcile the fact that its own conclusion—that unprocessed 8-bit data bypasses the RAM and is sent directly to the display—is inconsistent with the evidence offered by S3. Specifically, S3's expert acknowledges that the DAC “cannot properly read video information that has not been translated into video display information.” Although the majority attempts to confuse this issue by suggesting, without support in the intrinsic record, that the 8-bit video information data, input into the RAM in the index mode to generate 18/24-bit color video display data, is itself display data, S3's expert's own testimony contradicts the majority's unsupported factual finding arrived at independently by the majority in the course of this appeal. [5] Ignoring this fact, the majority has proceeded to reach its own conclusion regarding the operation of the claimed invention based upon its flawed understanding of the technology beyond even that of the testimony of S3's expert as evidence of the understanding of one of ordinary skill in the art. This is dialectic alchemy.

Because the remaining testimony offered by S3 to explain the operation of the claimed system is merely conclusory, that testimony as to the clarity of the claims should not dictate the outcome in

this case. The expert's opinion testimony, offered without factual support, was properly rejected by the district court. [6] Acknowledging that the DAC "cannot properly read video information," S3's expert fails to explain the discrepancy between the claim's description of the display of data that bypasses the RAM, and the use of the same data by the RAM for processing prior to display. Therefore, S3's expert testimony fails to clarify how one stream of data can be sent both directly to the DAC and is also sent simultaneously to the RAM for translation.

We may construe ambiguous claims to preserve their validity, if possible. ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 932 (Fed. Cir. 1984). We may not, however, rewrite claims that fail to apprise one of ordinary skill in the art of the scope of the invention. See Rhine v. Casio, Inc., 183 F.3d 1342, 1345, 51 USPQ2d 1377, 1379 (Fed. Cir. 1999). We must resist the temptation to supplement the disclosure of the patent and thereby adopt our own theory of how the claimed system might function. The majority is unable to rewrite the claims in this case because the invention cannot function as claimed and because nothing in the written description fills in the gaps sufficiently to resolve the confusion. An appellate court should not weigh evidence and undertake to make its own inconsistent factual findings from the intrinsic record to reach a desired result.

The majority further finds that the specification adequately discloses the structure of the "selector" in accordance with the requirements of 35 U.S.C. § 112, ¶ 6. The majority's analysis of our precedent suggests that the structure need not be specifically identified in the written description to satisfy the definiteness requirements of claims written in accordance with 35 U.S.C. § 112, ¶ 6. Again, the majority washes its hands of the issue, and reverses the district court's factual determination that the specification inadequately describes the required structure of the "selector" to the extent required by the precedent of this court. The majority instead finds that "a 'selector' is [a] well known electronic structure and performs a common electronic function and is readily implemented from the description in the specification."

Even though patents are written for and by skilled artisans, the court should avoid the temptation to find structure in a patent where none has been identified by the patentee. Claims written in means-plus-function format for which no structure has been identified gives rise to claims which are not technically sufficient to provide appropriate notice to a person of ordinary skill in the art of the identity of the exact structure required, and therefore, the scope of the claim, in the context of a § 112, ¶ 6 claim. The test for definiteness in such instances is whether “structure supporting a means-plus-function claim under § 112, ¶ 6 [appears] in the specification.” Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374, 1381, 53 USPQ2d 1225, 1229 (Fed. Cir. 1999) (emphasis added), not simply in the knowledge of one of ordinary skill in the art. This requirement is the tradeoff of means-plus-function claiming, enabling patentees to claim a list of structures identified in the patent’s written description using general, functional terminology, without the burden of listing those structures within the text of the claim itself. 198 F.3d at 1381-82, 53 USPQ2d at 1230. Where the structure for performing the claimed function is neither stated or properly incorporated by reference within the description, “[f]ulfillment of the § 112, ¶ 6 tradeoff cannot be satisfied.” 198 F.3d at 1382, 53 USPQ2d at 1230.

In this case, the means-plus-function limitation of claim 9 does not meet this requirement. Accordingly, I dissent from the majority’s finding on this issue as well.

[1] SONICblue, Inc. v. NVIDIA Corp., No. C 98-01938 SBA (N.D. Cal. Aug. 16, 1999).

[2] The district court refused to limit the output of the VGA controller to a maximum of 8 bits per pixel, agreeing with S3 that “the ‘279 patent contemplates the use of a VGA controller with a

24-bit output." Slip op. at 28-29. Indeed, there is nothing in the specification or the evidence presented to the district court to suggest that the selector/display is required to receive only 18/24-bit information. *nVIDIA* so acknowledged in arguing that the video controller should be limited to the "8-bit VGA standard at that time . . . consistent with the output described in Figure 2 (only 8-bit outputs from VGA controller)." *nVIDIA* Opposition to S3 Claim Construction, Joint Appendix at A1750.

[3] The dissent misperceives the teachings of the specification and our opinion in stating that the data bypassing the RAM and sent directly to the DAC is "unprocessed" video information. See, e.g., dissent at 3 ("video information" . . . is sent to the display without color processing"); id. at 5 ("the majority's conclusion [is] that in bypass mode 8-bit unprocessed video information is transmitted directly to the display"); id. at 7 ("unprocessed 8-bit data bypasses the RAM and is sent directly to the display"). Despite the dissent's characterization, neither the specification nor our opinion state that video information bypassing the RAM is unprocessed. Supra at 8-9. Nor does our opinion "suggest[] that the 8-bit video information data, input into the RAM in the index mode to generate 18/24-bit color video display data, is itself display data." As our opinion states, "the data output from the video controller is used as an address which is input to a random access memory (RAM) array." Supra at 2.

Both parties agree that the video controller can produce information streams which are either routed directly to the DAC, or first to the RAM; that is, both parties agree that a video controller can produce information which is read directly by the DAC and information which is sent to the RAM as an address. For example, *nVIDIA* explained: "One way to process digital data is to send it directly from the video controller to a [DAC]. . . . This is sometimes referred to as 'direct color mode.' It is possible to expand the number of possible colors available with a given number of bits per pixel by using a [RAM] . . . which functions as a 'look-up table.' The RAM looks up the location (sometimes referred to as an . . . address) corresponding to the pixel data from the video controller. . . . This arrangement is sometimes referred to as 'indexed color mode.'" Brief at 3.

[4] ' 112 &6. An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

[5] The majority incorrectly states that this dissent mischaracterizes the specification and the majority's opinion, arguing that neither the specification nor the opinion "state that video information bypassing the RAM is unprocessed." The majority further states that "our opinion [does not] 'suggest [] that the 8-bit video information data, input into the RAM in the index mode to generate 18/24-bit color video display data, is itself display data.'" Indeed, the specification does not suggest that the 8-bit data sent from the VGA controller is displayable. As noted, the written description provides that the 8-bit video data must be converted into 18/24 bit video display information prior to display. As the majority correctly recognizes, the data converted by the RAM is in fact not displayable until processed. The majority opinion fails to explain how the 8-bit video information data, input into the RAM for color processing in the index mode to generate 18/24-bit color video display data, can also be displayed by the DAC in the bypass mode, given that both streams of data originate from the same stream of data output by the VGA, and are thus identical. The majority's analysis of the claimed invention, as illustrated in Figure 2 of the patent incorporated into the majority opinion, requires that the "video data stream" is 8-bit data input to the RAM for conversion into 18/24-bit display data, and that same stream of 8-bit data is also directly output to the DAC, bypassing the RAM for display without further processing. While the majority attempts to distance its analysis from the fact that the DAC cannot accept unprocessed data and the RAM cannot receive processed data, because the same data must be transmitted to both the RAM and the DAC simultaneously, the majority's analysis requires that both the RAM

and the DAC receive unprocessed 8-bit data, or both receive 8-bit display data.

The majority argues that the dissent “confuse[s] indefiniteness with nonenablement.” That suggests a misunderstanding of the dissent. Whether a claim is invalid for indefiniteness requires a determination of whether one skilled in the art would be able to discern the scope of the claim “when read in light of the specification.” Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). Furthermore, where the language of a claim renders it so unclear “that there is no means by which the scope of the claim may be ascertained from the language used,” resort to the specification is required. Johnson Worldwide Assocs., Inc. v. Zebco Corp., 175 F.3d 985, 990, 50 USPQ2d 1607, 1610 (Fed. Cir. 1999). With regard to definiteness of claims written in means-plus-function format, “the question in the case before us is not whether there has been compliance with some aspect of § 112 ¶ 1, but whether, in utilizing the authority of § 112 ¶ 6 to claim in means-plus-function form, the drafter has adequately described structure, material, or acts which satisfy the claiming requirement of § 112 ¶ 2. In re Dossel, 115 F.3d 942, 946, 42 USPQ2d 1881, 1885 (Fed. Cir. 1997). The dissent maintains that because the claims are technically incorrect, and the written description adds nothing to clarify the ambiguity found in the claims, the claims are indefinite. Indeed, the majority appears to have confused definiteness with indefiniteness. The majority makes the outlandish suggestion that even if the claims recite the patented invention in a manner that is technically incorrect, as in this case, the claims are definite. As noted, only if the written description clarifies and ambiguity in the claim is that suggestion correct. To compensate for the fact that the claims are technically incorrect, and the fact that the written description contains conflicting evidence regarding the operation of the claimed invention, based on evidence not before this court the majority substitutes its own theory regarding the operation of the claimed invention for the district court’s factual findings, to reach the unsupported conclusion that “a person skilled in this field would understand the meaning and scope of the data streams as set forth in the claims,” even where the patentee’s expert’s testimony is in conflict with the findings of the majority. There is absolutely no support in the record that the unprocessed data received by the RAM and converted into display data is simultaneously transmitted directly to the DAC for output to the display. Nor is there support in the intrinsic evidence for the majority’s finding that the VGA controller transmits 8-bit data directly to the selector/display in the by-pass mode. Instead, the majority must rely upon attorney argument that appears to have been taken out of context to support that finding.

[6] The majority concludes that the district court “declined to give any weight to the evidence of the understanding of persons of skill in the art,” in part on the basis that the district court reviewed the disclosure from the perspective “of those outside of the relevant art.” To the contrary, the district court considered the testimony of S3’s expert, as well as that of the inventor, finding it conclusory. Furthermore, rejecting S3’s reliance on In re Dossel, 115 F.3d 942, 42 USPQ2d 1881 (Fed. Cir. 1997), the court explained that in that case the evidence was such that even an unskilled person, “those outside the relevant art,” would have concluded that the structure corresponding to the claimed function was sufficiently recited in the written description. The majority’s conclusion that the district court applied a “lay person” standard for determining compliance with §112 is a misreading of the district court’s analysis.