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## **United States Court of Appeals for the Federal Circuit**

02-1210, -1211

HARRIS CORPORATION,

Plaintiff-Cross Appellant,

v.

SANYO NORTH AMERICA,  
SANYO MANUFACTURING CORPORATION,  
and SANYO VIDEO COMPONENTS (USA) CORPORATION,

Defendants-Appellants.

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DECIDED: October 29, 2003

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Before NEWMAN, LOURIE, and SCHALL, Circuit Judges.

Opinion for the court filed by Circuit Judge NEWMAN. Concurring in part and dissenting in part opinion filed by Circuit Judge SCHALL.

NEWMAN, Circuit Judge.

Sanyo North America, Sanyo Manufacturing Corp., and Sanyo Video Components (USA) Corp. (together "Sanyo") appeal the judgment of the United States District Court for the Northern District of Texas, entering judgment upon a jury verdict that Sanyo infringed United States Patents No. 4,290,063 (the '063 patent) and No. 4,290,064 (the '064 patent) under the doctrine of equivalents, that the patents were not invalid, and awarding \$7,000,000 in damages.<sup>[1]</sup> The patents are owned by Harris Corporation, and relate to video display systems and methods of encoding text for video display, such as are used in closed captioning for television.

We affirm the verdicts of validity, affirm the verdict of infringement of the '064 patent, and reverse the verdict of infringement of the '063 patent. No challenge was raised to the jury's assessment of damages. The final judgment is affirmed.

## BACKGROUND

Closed captioning for television display superimposes upon the video screen a text version of the audible speech and sounds, to make them visibly accessible to viewers who cannot hear the audio broadcast, such as the hearing impaired or restaurant and bar patrons where the audio volume is deliberately reduced.

In closed captioning, the code for the caption is transmitted via the video signal during the interval between scans of the picture tube. The transmissions occur during the brief periods when the electron beam is switched off while it is repositioned for the next scan. The data arrive in packets of zeros and ones, as in all digital communications. The patents in suit relate to systems whereby these data packets are transformed into patterns of letters, numbers, and symbols for the captions, and positioned on the television screen.

There are three principal categories of data in a closed captioning system: characters (the letters, symbols and numbers corresponding to the sounds being broadcast), attributes (such as italics or underlining), and commands (such as a signal to start a new line). At the time of the invention in suit, the data were normally transmitted in eight-bit binary words. When all of the bits of such words are used to represent letters or numbers, an eight-bit word can represent any of  $2^8=256$  values, more than enough to represent the letters, numbers, and symbols needed for closed captioning.

The '063 and '064 patents are directed to systems wherein one of the bits in each eight-bit binary word is used to indicate whether the following bits represent a character or an attribute or a command, for example by assigning to the first bit the number one if what follows is a character, and zero if what follows is either an attribute or a command. However, when one of the bits in the eight-bit binary word is dedicated to identifying what follows as a character, that leaves only a seven-bit word available for representing characters. Since a seven-bit word has only  $2^7=128$  possible values, the word can represent substantially fewer possible letters, numbers, and symbols than an eight-bit word.

The system of the '063 and '064 patents assigns more characters than would normally be possible if one or more bits were dedicated to distinguishing between characters and non-characters, with only the remaining bits used to express characters. In this way the capacity of the eight-bit system is partially restored. The '063 patent is directed to a system for displaying video text, and the '064 patent is directed to a system for modifying the appearance of characters on video displays.

### THE '063 PATENT

The '063 patent is entitled "Video display terminal having means for altering data words." As described therein, at least one of the bits in the data word is dedicated to indicating whether the rest of the word represents a character or a non-character. A "character generator means" converts the data into signals that display the represented character on the screen or perform the non-character tasks assigned. In order to increase the number of possible data words available for representing characters, a "conversion means" is inserted before the character generator means, which converts into additional characters some of the possible data words that would normally represent non-characters. Claim 1 of the '063 patent follows:

**1. A video display system, comprising:**

a data source for providing a data stream comprised of a plurality of multi-bit coded data words, each said data word being comprised of N bits and having at least one dedicated bit position for normally indicating whether the data word is representative of a character to be displayed or a non-character, whereby a maximum of N-1 bits can be used to provide character information;

video display means for displaying images of characters represented by character data words;

character generator means for receiving said data words for controlling said video display means in dependence upon non-character data words for displaying images of said character data words; and

conversion means interposed between said data source and said character generator means for converting the bit patterns of at least some of said data words normally representing said non-character data words into that representing character data words to thereby increase the number of said data words available to represent characters to be displayed.

In the preferred embodiment, a programmable logic array is the "conversion means" to re-assign to characters some of the words that would normally be identified as commands or attributes. This embodiment provides circuitry that essentially overrides the bit that makes the character/non-character

distinction, whereby words that are normally reserved for non-characters are used to represent additional characters.

The accused Sanyo system does not use eight-bit data words, but sixteen-bit words. The sixteen-bit words contain two parity bits - essentially error correction devices not relevant to the infringement analysis - and fourteen bits for data. They thus can display  $2^{14}=16,284$  characters and other commands. Instead of using one bit or a series of bits to identify whether the data correspond to a character, the accused system assigns some values of the words to specific characters or pairs of characters and other values to attributes and commands. The accused format is required by FCC regulations.

The district court appointed a Special Master, who construed the claims, in accordance with Markman v. Westview Instruments, Inc., 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (*en banc*), aff'd, 517 U.S. 370 (1996). At issue is the claim clause "at least one dedicated bit position for normally indicating whether the data word is representative of a character to be displayed or a non-character." The district court, adopting the Special Master's construction, construed this limitation as follows:

"Dedicated bit position" . . . means one or more bit positions in the multi-bit coded data words in the data stream provided by the data source that indicate whether the data word is representative of a character or a non-character, and that bit position is not used to provide character information.

Neither side challenges this construction. It requires that any bit position that is a candidate for the dedicated bit position limitation must be devoted entirely to identifying the other data bits as either characters or non-characters, and the information specifying which character or non-character is being represented must lie entirely within the remaining bits. Sanyo argued that this limitation is not literally present in its method, and the district court agreed, holding that on this claim construction literal infringement could not be found.

Sanyo further argued that the absence of this step also avoids infringement under the doctrine of equivalents, since this claim limitation is missing in its entirety. See Warner-Jenkinson Co. v. Hilton Davis Chemical Co., 520 U.S. 17, 29, 41 USPQ2d 1865, 1871 (1997) ("It is important to ensure that the application of the doctrine, even as to an individual element, is not allowed such broad play as to

effectively eliminate that element in its entirety.") The district court held that there was insufficient evidence or undisputed facts upon which to decide this question, which was then tried to a jury. The jury was instructed, *inter alia*, as to the all-elements rule, and found that the claims were infringed under the doctrine of equivalents.

Harris argues that the jury verdict is supported by substantial evidence. Harris states that in the Sanyo system the words identifying non-characters are all grouped together, and hence have their first three data bits within the same range. Thus, Harris states, these first three bits identify what follows as either a character or a non-character, depending on their values. Harris concludes that the "dedicated bit position" is met, at least under the doctrine of equivalents.

However, under the court's claim construction, which is unchallenged, Harris' argument that the first three bits meet the dedicated bit position limitation, literally or equivalently, is not supported by substantial evidence. See Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1235, 9 USPQ2d 1913, 1919 (Fed. Cir. 1989) (ascertaining whether there was substantial evidence in support of the jury verdict). When each of these bits is within the non-character range, these first three bits also contain information about what non-character is being expressed. Similarly, when a character is being expressed, these first three bits are also partially used to specify what character is being expressed. Thus there is no bit that flags whether or not what follows is a character. Consequently nothing in the Sanyo method corresponds to or serves the functions of "at least one dedicated bit position for normally indicating whether the data word is representative of a character to be displayed or a non-character."

Since this claim element and equivalents thereof is missing in its entirety, there cannot be infringement under the doctrine of equivalents, as a matter of law. Consequently, the verdict cannot stand, for a material element of the claimed invention is entirely missing, both literally and by an equivalent, from the accused system.

#### THE '064 PATENT

The '064 patent is entitled "Video display of images with improved video enhancements thereto," and is directed to a system for modifying the appearance of characters on video displays. Typical modifications include underlining the character, changing it to italics, changing its color, and changing

its intensity.

Television displays are composed of a series of dots or pixels, which are selectively illuminated to form the video display. The characters in a closed caption display can be viewed as a pattern of dots which, when seen from a normal viewing distance, look like a printed word. Some of the character modifications at issue change the pattern of the dots displayed on the screen, for example by underlining, and some change the character in other ways, such as by changing the intensity of the dots. Sanyo does not dispute that its system contains all of the elements of claim 1, except for the following clause:

means for providing a data stream including . . . at least one coded modifier word each representing one or more of a plurality of N dot pattern modifiers.

Sanyo states that its system performs only one modification that qualifies as a modification of the dot pattern, and that there is not a "plurality of N dot pattern modifiers" as required by this clause. Sanyo states that this claim limitation is "missing in its entirety," and thus that it is not subject to infringement under the doctrine of equivalents.

One of the dot pattern modifications available in the accused Sanyo system is underlining. The parties agree that underlining is a dot pattern modification, since underlining is accomplished by adding a row of dots to the bottom of the pattern of dots that forms the letter on the screen. They disputed at trial whether there is a second, and hence a plurality, of dot pattern modifications. Harris argued, and its expert witness testified, that the second dot pattern modification is a change in the color of the character. Sanyo argued, and its expert witness testified, that changing the color is not a modification of the dot pattern, or an equivalent thereof.

The specification does not define "dot pattern modification," but gives examples of what is excluded from the category, listing "dot position" and "dot intensity" as modifications that are not to the dot pattern, but not mentioning change of color. Harris' position is that a change of color is more akin to underlining (an admitted dot pattern modification) than to a change in intensity, which does not modify the dot pattern. Experts testified as to each position, each presenting logical and credible explanations. The necessary jury finding that change of color is a dot pattern modification was supported by

substantial evidence, and is not incorrect as a matter of law. As to this issue, the jury verdict of infringement of the '064 patent under the doctrine of equivalents must be sustained.<sup>[2]</sup>

#### VALIDITY

Sanyo argued that a closed captioning system "essentially the same" as the one it uses was jointly developed and tested by the Public Broadcasting System and Texas Instruments (the PBS/TI system) and was the subject of a contract for sale between PBS and TI, more than a year before the applications were filed for the patents in suit. This issue was tried to the jury.

The Harris position was that the PBS/TI system is not the same as that of the '063 and '064 patents, and in any event is not prior art because the system was developed privately and was neither used nor disclosed. Harris also argued that the contract between PBS and TI was not a sales contract but a joint development contract. Sanyo disputed that the PBS/TI system could be deemed abandoned, suppressed, or concealed, for it was later sold to Sears.

Before the jury there was extensive evidence concerning the nature of the PBS/TI activity, the relationship between TBS and TI, and whether the system offered to Sears was the same as the invention in the patents in suit. Sanyo has not met its burden of showing that no reasonable jury could have found that invalidity on on-sale grounds was not proven. The verdict of validity is affirmed.

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and SANYO VIDEO COMPONENTS (USA) CORPORATION,

Defendants-Appellants.

SCHALL, Circuit Judge, concurring in part, dissenting in part.

I join the majority's well reasoned analysis with respect to the issues of infringement of the '063 patent and the validity of both the '063 and the '064 patents. However, I respectfully dissent from the part of the majority's opinion that affirms the district court's denial of Sanyo's motion for JMOL of non-infringement of the '064 patent under the doctrine of equivalents. In my view, because Sanyo's receivers do not generate a "plurality" of "dot pattern modifiers," as required by the claim at issue, the district court erred by not granting Sanyo's motion for JMOL.

It is undisputed that Sanyo's receivers generate one dot pattern modifier: underlining. The parties disagree, though, on whether a change in the color of a dot qualifies as an additional "dot pattern modifier." In my view, it does not. The district court interpreted the phrase "dot pattern modification" and its variations (i.e., "dot pattern modifier") as "any variation from the dot pattern that would otherwise appear on the video screen if only the character as generated by the character generator ROM were displayed, but does not include dot position or dot intensity modifications." (emphasis added). I believe this claim construction bars a finding that changes in color are "dot pattern modifications."

As we have noted, the words used in a claim are examined from the perspective of a person skilled in the art. Tegal Corp. v. Tokyo Electron Am., Inc., 257 F.3d 1331, 1342 (Fed. Cir. 2001). In the absence of an express intent to impart a novel meaning to claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by those of ordinary skill in the art. See, e.g., Teleflex, Inc. v. Ficoso N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002). The ordinary and customary meaning of a claim term may be determined by reviewing a variety of sources. Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294 (Fed. Cir. 2003). Some of these sources include the claim itself, see Process Control Corp. v. HydReclaim Corp., 190 F.3d 1350, 1357 (Fed. Cir. 1999); dictionaries and treatises, Tex. Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed. Cir. 2002); and the written description, the drawings, and the prosecution history, see, e.g., DeMarini Sports,



Inc. v. Worth, Inc., 239 F.3d 1314, 1324 (Fed. Cir. 2001).

The dictionary defines "pattern" as "[a]n arrangement or order discernible in objects, actions, ideas, situations, etc." 2 New Shorter Oxford English Dictionary at 2126. "Dot pattern modifiers" therefore vary the "arrangement" or "order" of the dots, a definition that quite reasonably includes functions that add or subtract dots from the dot pattern. Thus, underlining is a dot pattern modifier because it varies the arrangement of the dots --the pattern-- by adding dots beneath the characters produced by the character generator. A change in color, however, does not alter the arrangement of the dots that comprise a character.

The '064 patent's written description also supports the conclusion that a dot pattern modifier requires that the pattern (i.e., the arrangement) of the dots be modified. The written description should be examined in every case to determine if the presumption of ordinary and customary meaning is rebutted. Brookhill-Wilk, slip op. at 6 (citing Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed. Cir. 1998)). The presumption will be rebutted where the patentee, acting as his or her own lexicographer, has clearly set forth a definition of a claim term that is different from the term's ordinary and customary meaning. Id. at 6-7 (citing In re Paulsen, 30 F.3d 1475, 1480 (Fed. Cir. 1994); Intellicall, Inc. v. Phonometrics, Inc., 952 F.2d 1384, 1387-88 (Fed. Cir. 1992)). It also will be rebutted if the inventor has disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope. Id. at 7 (citing Teleflex, 299 F.3d at 1324). The specification of the '064 patent does not define "dot pattern modifier" in a way that is at variance with its ordinary meaning. Nowhere in the specification does the patentee, acting as his or her own lexicographer, clearly set forth a definition of "dot pattern modifier" different from its ordinary and customary meaning.

In sum, because the ordinary meaning of "dot pattern modifier" requires that there be a variation in the arrangement of the dots, a change in the color of a dot would not qualify as a dot pattern modification. As a result, because Sanyo's receivers can only generate a single "dot pattern modifier," i.e., underlining, they lack a "plurality" of "dot pattern modifiers," and thus cannot infringe under the doctrine of equivalents. See Kustom Signals, Inc. v. Applied Concepts, Inc., 264 F.3d 1326, 1333 (Fed. Cir. 2001) (stating that under the "all elements" rule, there can be no infringement under the doctrine of equivalents

if even one limitation of a claim or its equivalent is not present in the accused device or method).

For the foregoing reasons, I most respectfully dissent.

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[1] Harris Corp. v. Sanyo North America Corp., No. 98-CV-2712 (N.D. Tex. Dec. 26, 2001)

[2] Although Sanyo refers to this court's now-vacated decision in Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558, 56 USPQ2d 1865 (Fed. Cir. 2000), application of the Supreme Court's ensuing decision, 535 U.S. 722, 62 USPQ2d 1705 (2002), shows that this claim element was not amended during prosecution and no prosecution history estoppel arose as to equivalent subject matter.