

# United States Court of Appeals for the Federal Circuit

00-1464

XEROX CORPORATION,

Plaintiff-Appellant,

v.

3COM CORPORATION, U.S. ROBOTICS CORPORATION,  
U.S. ROBOTICS ACCESS CORP., and PALM COMPUTING, INC.,

Defendants-Appellees.

Donald R. Dunner , Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., of Washington, DC, argued for plaintiff-appellant. With him on the brief was Thomas H. Jenkins. Of counsel on the brief were R. Bruce Bower, Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., of Atlanta, Georgia. Also of counsel on the brief were Barry J. Kesselman , Xerox Corporation, of Stamford, Connecticut; and James A. Oliff , Edward P. Walker , and Richard E. Rice, Oliff & Berridge, PLC, of Alexandria, Virginia.

Paul H. Berghoff, McDonnell, Boehnen Hulbert & Berghoff, of Chicago, Illinois, argued for defendants-appellees. With him on the brief were Bradley J. Hulbert , James C. Gumina , Christopher M. Cavan, and George I. Lee. Of counsel on the brief were William D. Zahrt, Palm, Inc., of Santa Clara, California; and Steven F. Borsand 3Com Corporation, of Rolling Meadows, Illinois.

Appealed from: United States District Court for the Western District of New York

Senior Judge Michael A. Telesca

# United States Court of Appeals for the Federal Circuit

00-1464

XEROX CORPORATION,

Plaintiff-Appellant,

v.

3COM CORPORATION, U.S. ROBOTICS CORPORATION,  
U.S. ROBOTICS ACCESS CORP., AND PALM COMPUTING, INC.,

Defendants-Appellees.

---

DECIDED: October 5, 2001

---

Before MAYER, Chief Judge , NEWMAN and CLEVINGER, Circuit Judges .

Opinion for the court filed by Chief Judge MAYER. Concurring opinion filed by Circuit Judge CLEVINGER.

MAYER, Chief Judge.

Xerox Corporation (“Xerox”) appeals the judgment of the United States District Court for the Western District of New York granting 3Com Corporation, U.S. Robotics Corporation, U.S. Robotics Access Corporation, and Palm Computing, Inc. (collectively “3Com”) summary judgment of non-infringement of United States Patent No. 5,596,656 (“’656 patent”) directed to “Unistrokes for Computerized Interpretation of Handwriting,” and denying Xerox’s motion for summary judgment of infringement of the ’656 patent. Xerox Corp. v. 3Com Corp., No. 97-CV-6182T(F) (W.D.N.Y. Jun. 6, 2000) (“Xerox ”). We affirm-in-part, reverse-in-part, and remand.

### Background

Xerox is the owner of the ’656 patent, invented by David Goldberg, a Xerox employee. The ’656 patent claims a system of single stroke symbols, called “unistrokes,” for computer recognition of handwritten text that results in fewer errors than the prior art systems because the computer can easily interpret the symbols immediately upon pen lift.

Xerox brought suit against 3Com claiming that its “PalmPilot” line of hand-held computers used the unistrokes technology in its “Graffiti” software. 3Com asserted affirmative defenses of

invalidity, unenforceability, and non-infringement. After the court found the '656 patent not invalid for prior public use on summary judgment, 3Com filed a request for reexamination of the '656 patent with the United States Patent and Trademark Office ("PTO"). The PTO ultimately confirmed all sixteen claims of the '656 patent. The district court granted 3Com summary judgment of non-infringement while dismissing Xerox's motion for summary judgment of infringement because Graffiti does not employ "spatial independence," its symbols are not sufficiently "graphically separated" from each other to be "unistroke symbols," and it does not allow for "definitive recognition" of symbols immediately upon pen lift by the user. This appeal followed.

### Discussion

"We review a district court's grant of summary judgment de novo." Vanmoor v. Wal-Mart Stores, Inc., 201 F.3d 1363, 1365, 53 USPQ2d 1377, 1378 (Fed. Cir. 2000) (citing Petrolite Corp. v. Baker Hughes, Inc., 96 F.3d 1423, 1425, 40 USPQ2d 1201, 1203 (Fed. Cir. 1996)). "Summary judgment is appropriate when there is no genuine issue as to any material fact and the moving party is entitled to judgment as a matter of law." Id. Summary judgment is improper "if the evidence is such that a reasonable jury could return a verdict for the nonmoving party." Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986). When ruling on a motion for summary judgment, all of the nonmovant's evidence is to be credited, and all justifiable inferences are to be drawn in the nonmovant's favor. Id. at 255.

An infringement analysis entails two steps. The first step is determining the meaning and scope of the patent claims asserted to be infringed. The second step is comparing the properly construed claims to the device accused of infringing. Markman v. Westview Instruments, Inc., 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (en banc). Claim construction is a question of law that we review de novo. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46

USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc). Infringement, both literal and under the doctrine of equivalents, is a question of fact which we review for clear error. Insituform Techs., Inc. v. Cat Contracting, Inc. , 161 F.3d 688, 692, 48 USPQ2d 1610, 1614 (Fed. Cir. 1998).

The claim limitations at issue read as follows:

16. A system for interpreting handwritten text comprising
  - i. a user interface including a manually manipulatable pointer for writing mutually independent unistroke symbols in sequential time order and a user controlled signaling mechanism for performing a predetermined, symbol independent, delimiting operation between successive unistroke symbols in said sequential order, some of said unistroke symbols being linear and others being arcuate, each of said unistroke symbols representing a predefined textual component said delimiting operation distinguishing said unistroke symbols from each other totally independent of without reference to their spatial relationship with respect to each other . . . .

'656 patent, col. 7, ll. 9-36 (subdivision and emphasis added).

10. A machine implemented method for interpreting handwritten text comprising

- i. writing said text in sequential time order using an alphabet of mutually independent unistroke symbols to spell out said text at an

atomic level, each of said unistroke symbols conforming to a respective graphical specification that includes a stroke direction parameter, some of said unistroke symbols having graphical specifications that differ from each other essentially only on the basis of their respective stroke direction parameters, some of said unistroke symbols being linear and others being arcuate;

ii. entering a predetermined, symbol independent delimiter between successive ones of said unistroke symbols in said time order, said delimiter distinguishing successive unistroke symbols from each other without reference to and totally independently of their spatial relationship with respect to each other . . . .

Id., col. 8, ll. 31-53 (subdivisions and emphasis added).

12. A handwriting recognition process for pen computers, said process comprising the steps of

a) correlating unistroke symbols with natural language alphanumeric symbols, each of said unistroke symbols being fully defined by a single continuous stroke that conforms geometrically and directionally to a predetermined graphical specification, some of said unistroke symbols being linear and others being arcuate;

b) entering user written unistroke symbols into buffer memory in sequential time order, successive ones of said unistroke symbols being delimited from each other by a predetermined, symbol independent delimiting operation , said delimiting operation distinguishing successive unistroke symbols from each other without reference to and totally independently of their spatial relationship with respect to each other . . . .

Id., col. 8, l. 57 - col. 9, l. 14 (subdivisions and emphasis added).

16. A machine implemented handwriting recognition process comprising the steps of

a) correlating natural language symbols with unistroke symbols, where each of said unistroke symbols is fully defined by a single continuous stroke that conforms geometrically and directionally to a predetermined graphical specification, at least certain of said unistroke symbols being arcuate;

b) writing user selected unistroke symbols in sequential time order while performing a predetermined, symbol independent delimiting operation for delimiting successive ones of said unistroke symbols

from each other, said delimiting operation distinguishing successive unistroke symbols from each other without reference to and totally independently of the spatial relationship of said unistroke symbols with respect to each other . . . .

Id., col. 10, ll. 3-24 (subdivisions and emphasis added).

3Com argues that the four independent claims, 1, 10, 12, and 16 each include the same four limitations despite slightly different wording in each claim. These are (1) entirely single stroke symbols, (2) graphical separation of symbols, (3) definitive recognition of symbols, and (4) spatial independence. Xerox counters that 3Com's proposed construction is overly narrow and that only (1) unistroke symbols, and (2) symbol independent delimiting, i.e., pen lift, are required for infringement.

In considering the definition of "unistrokes," the trial court properly looked to the plain meaning of the claims, the specification, and the prosecution history of the '656 patent. Vitronics Corp. v. Conceptoronic, Inc., 90 F.3d 1576, 1582, 39 USPQ2d 1573, 1576 (Fed. Cir. 1996). The specification defines the term "unistroke" as "a single, unbroken stroke." '656 patent, col. 2, l. 46. In addition, only claims 10 and 11 require an entire alphabet. We therefore agree with the district court that the definition of "unistrokes" itself does not require an entire alphabet.

The only reference to graphical separation in the independent claims is found in claim 10, which states "some of said unistroke symbols hav[e] graphical specifications that differ from each other essentially only on the basis of their respective stroke direction parameters." '656 patent, col. 8, ll. 37-40. During reexamination, Xerox clarified that "unistroke symbols are single stroke symbols (representing alphanumeric characters or specified functions) that are sufficiently well separated from each other graphically so that definitive recognition can occur after each such symbol is written, e.g., immediately upon pen-up, without requiring the system to wait for possible additional strokes." Xerox additionally distinguished United States Patent No. 4,972,496 ("Sklarew patent")

on the basis that it was designed to accommodate multi-stroke symbols as well as single stroke symbols, and, therefore, did not implement the '656 patent's claimed combination of unistroke symbols and symbol independent delimiting. The term "unistroke symbols" therefore requires sufficient graphical separation for the computer to definitively recognize a symbol immediately upon delimitation or pen lift.

The district court noted that the '656 patent discloses that "the performance of interpreted text entry systems could be improved if all text was entered using characters that are well separated from each other in 'sloppiness space.' . . . If there is little, if any, overlap between the variants of different symbols, the symbols are 'well separated from each other in sloppiness space.'" '656 patent, col. 1, l. 61 – col. 2, l. 9. However, the term "sloppiness space" appears only in claims 9 and 11, which require that "said unistroke symbols are well separated from each other in sloppiness space." *Id.*, col. 8, ll. 28-30, 54-56. The dependent limitation for the symbols to be well separated from each other in sloppiness space is clearly separate and additional to the requirements to be considered a "unistroke symbol." If we were to read the "even when perfectly formed" requirement into the graphical separation limitation for all claims, we would effectively be rendering claims 9 and 11 superfluous. This we will not do. Comark Comms., Inc. v. Harris Corp., 156 F.3d 1182, 1187, 48 USPQ2d 1001, 1005 (Fed. Cir. 1998) ("There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims. To the extent that the absence of such difference in meaning and scope would make a claim superfluous, the doctrine of claim differentiation states the presumption that the difference between claims is significant." (quoting Tandon Corp. v. United States Int'l Trade Comm'n, 831 F.2d 1017, 1023, 4 USPQ2d 1283, 1288 (Fed. Cir. 1987))).

Xerox argues that the spatial independence feature of Unistrokes is part of the claimed delimiting operation, which requires only that the delimiting operation must distinguish unistroke symbols from each other "totally independent of and without reference to their spatial relationship with



respect to each other.” The specification of the ’656 patent states that “unistroke symbols may be written one on top of another because they are interpreted in the order in which they are written and they are unambiguously differentiated from each other by being defined by different strokes.” ’656 patent, col. 6, ll. 17-20. During original prosecution, Xerox argued that unistrokes were different from the prior art Whitaker system because some of the Whitaker symbols differ from each other only in their positioning within the so-called “character space.” Xerox specifically asserted “symbols appear to be delimited by Whitaker based on their spatial relationship to each other, rather than by a user controlled predetermined, symbol independent, delimiting operation.” Xerox, slip op. at 21-22 (emphasis omitted). During reexamination, Xerox clarified in its summary of the May 24, 1999, PTO interview that the “[u]nistrokes invention include[s the feature that] delimiting of unistroke symbols is spatially independent, i.e., a unistroke symbol can be written without reference to where a previous unistroke symbol was written (in a preferred embodiment, symbols can be written on top of one another), and still be properly distinguished and recognized.” Id. at 20.

The key to the spatial independence requirement, as shown in the plain language of the claims, the specification, and Xerox’s arguments over the prior art, is the recognition of symbols without reference to where the last symbol was drawn. The district court properly found “spatial independence” requires the invention to be capable of properly distinguishing and recognizing symbols without reference to where a previous symbol was written on the writing surface. We therefore affirm the court’s claim construction that (1) the definition of “unistrokes” itself does not require an entire alphabet, (2) the term “unistroke symbols” requires sufficient graphical separation that the computer can definitively recognize a symbol immediately upon delimitation or pen lift, and (3) “spatial independence” requires the accused device to be capable of properly distinguishing and recognizing symbols without reference to where a previous symbol was written on the writing surface.

The district court applied the properly-construed claims of the '656 patent to 3Com's Graffiti software and concluded on summary judgment that the accused device does not infringe the disputed claims because Graffiti's symbols are not sufficiently "graphically separated" from each other to be "unistroke symbols," it does not allow for "definitive recognition" of symbols immediately upon pen lift by the user, and it does not employ "spatial independence." Id. at 22-23. Because the court was in error on each of these determinations, we reverse the summary judgment of non-infringement in favor of 3Com.

First, the district court erred in declaring that the "Graffiti symbols are not sufficiently 'graphically separated' from each other to be 'unistroke symbols.'" Id. at 22. The court looked only to the geometric overlap between symbols to determine the degree of graphic separation. By looking only to the geometry of the symbol and ignoring the direction the pen must travel to create the symbol, the court ignored an integral aspect embedded in multiple claims of the '656 patent—namely, that each unistroke symbol has "geometric shape and direction." '656 patent, col. 7, ll. 49-50, 56-57, col. 8, ll. 4-7, 13-18, 37-53, 63, col. 10, ll. 8-10 (emphasis added). Independent claim 10 goes so far as to require that "some of said unistroke symbols hav[e] graphical specifications that differ from each other essentially only on the basis of their respective stroke direction parameters." '656 patent, col. 8, ll. 37-40.

Considering direction shows the error in the court's conclusion that some pairs of Graffiti symbols, namely the symbols for the "O" and the "Q" and the symbols for the "B" and the "R," "are extremely similar graphically." Xerox, slip op. at 22. To draw this conclusion, the court compared these respective pairs with the Whitaker symbols for "7" and "15" which Xerox distinguished during patent prosecution to overcome the prior art. This misapprehends Xerox's arguments to distinguish Whitaker that "symbols appear to be delimited by Whitaker based on their spatial relationship to each other, rather than by a user controlled predetermined, symbol independent, delimiting operation." Id. at 21-22 (emphasis omitted). Nowhere did Xerox argue that its

unistrokes were visually more distinguishable than Whitaker's "7" and "15." Instead, it argued that Whitaker distinguished its symbols in part by where they are drawn relative to each other, whereas unistrokes are discernable by their "geometric shape and direction." Whitaker discloses a system in which symbols are written in columns on a sheet of paper and then scanned all at once into a computer; such a system is unable to discern the direction in which a symbol was drawn. Significantly, the district court failed to consider that the unistroke symbols of the '656 patent have several pairs of symbols that are geometrically identical; but for direction, the computer could not discern between them. The court should have considered direction in its determination of what constitutes graphic similarity. Had it properly applied its own claim construction, it could not have said that Graffiti symbols are not graphically separated from each other sufficiently to be unistroke symbols.

Second, the trial court erred in declaring that "Graffiti does not allow for 'definitive recognition' of symbols immediately upon pen lift by the user." The court points out that Graffiti allows for certain letters (the vowels and the letter "n") to be accented. But it did not consider the difference between definitive recognition of a character and definitive recognition of a symbol. All Graffiti symbols are created with one stroke (i.e., immediately upon pen lift). With respect to accented vowels, the first stroke creates the vowel and the second creates the accent. This constitutes a multi-stroke, multi-symbol character. None of the Graffiti symbols are altered by subsequent strokes; only the generated character is altered. Moreover, the accented characters are not even part of the English alphabet. And, even if they had not met the definitive recognition limitation, which they do, their presence in the Graffiti software does nothing to preclude infringement of even claims 10 and 11, which require an alphabet of unistroke symbols. Consequently, the court was incorrect that Graffiti does not allow for definitive recognition of all symbols immediately upon pen lift.

The third error was the court's declaration that "Graffiti does not employ 'spatial independence.'"

According to its own definition, the court outlines spatial independence as requiring “the invention to be capable of properly distinguishing and recognizing symbols without reference to where a previous symbol was written on the writing surface.” Xerox, slip op. at 22 (emphasis added). The court then says there is no infringement because Graffiti requires the computer to consider the placement of the stroke on the writing surface when performing recognition of a symbol. The location of the character on the writing surface is not the issue; the spatial independence limitation is met if the computer recognizes the symbol without reference to where a previous symbol was written. It is not where the current symbol is written on the writing surface that determines whether the spatial independence limitation is met; it is whether the current symbol has to be written in a particular location relative to the previous symbol in order to be recognized.

The court’s “Y2K” example illustrates its misapprehension of the spatial independence term. It believes that, because the “Y” must be written on the left side, the “2” on the right side, and the “K” on the left side of the accused writing surface to be recognized, Graffiti does not meet the spatial independence limitation. In fact, the “2” would be recognized as a two regardless of whether it was preceded by a “Y,” written on the left side, or a “1,” written on the right side. The recognition of the “2” is thus independent of the placement of the previous symbol, which is all that is required by the spatial independence limitation of the ’656 patent. Had the court properly applied its own claim construction, it would have seen that Graffiti symbols meet the spatial independence limitation of the claims of the ’656 patent.

Because the court relied on these defective factual predicates in granting summary judgment of non-infringement, both literally and under the doctrine of equivalents, that summary judgment must be reversed.

### Conclusion

Accordingly, the judgment of the United States District Court for the Western District of New York is affirmed-in-part, reversed-in-part, and the case is remanded for further proceedings consistent with this opinion.

Costs

No costs.

AFFIRMED-IN-PART, REVERSED-IN-PART, AND REMANDED

United States Court of Appeals for the Federal Circuit

00-1464

XEROX CORPORATION,

Plaintiff-Appellant,

v.

3COM CORPORATION, U.S. ROBOTICS CORPORATION,  
U.S. ROBOTICS ACCESS CORP., and PALM COMPUTING, INC.,

Defendants-Appellees.

CLEVENGER, Circuit Judge, concurring.

As the court correctly holds, whether Xerox can succeed at trial in this patent infringement suit depends upon whether the stroke symbols employed by the defendants are “unistroke symbols.”

I agree with the court that the definition of unistroke symbols requires that the symbols achieve “definitive recognition” and employ “spatial independence.” I further agree that the district court

erred in its explanation of why the accused symbols fail to meet those parts of the definition of unistroke symbols. I also agree with the court that "unistroke symbols" require graphic separation. The question to be resolved on remand is whether the accused symbols have sufficient graphic separation to meet the limitations of the claims in suit.

I agree with the court that unistroke symbols, as claimed in the '656 patent, must have sufficient graphic separation to permit a computer to definitively and correctly recognize a symbol immediately upon delimitation or pen lift. And I agree that a group of accused symbols need not form any particular alphabet, whether it be a 26-letter alphabet or another of greater or fewer characters. Presumably, any accused system will have enough characters to permit cogent information in some language to be recorded by the use of the unistrokes employed in the particular system. Thus no particular alphabet is required, even by claims 10 and 11, which only specify "an alphabet of mutually independent unistroke symbols."

I am writing separately to emphasize a point that seems to be implicit in the court's holding. This point has to do with whether, in order to infringe, all of the accused symbols, as opposed to only some of them, must be proven to be unistroke symbols. The file history of the '656 patent makes it perfectly clear that every symbol made by a single stroke that is used by the defendants must be a "unistroke symbol," as defined by the court.

During the course of prosecution of the '656 patent, the applicant was required to distinguish his invention over the Whitaker '645 patent. In doing so, the applicant asserted that Whitaker "is not wholly composed of 'Unistroke' symbols . . . ." This assertion can only be taken to mean that the '656 patent only reads on a system of symbols all of which are unistroke.

In a file memorandum, the examiner noted comments made by the applicant's representatives, who "clarified that the claimed invention does require all handwritten unistroke symbols to be a single stroke." The applicant's written understanding of the same comments made to the

examiner, contained in “Patent Owner’s (Xerox’) Summary of May 24, 1999 Personal Interview with Examiners,” is the same: although the patent does not require any particular alphabet of letter symbols, the patent requires that “all claim requirements are met for the unistroke symbols that are used.” This means, clearly, that every unistroke symbol (meaning a symbol that is composed with a single unbroken stroke) must meet the complete definition of “unistroke symbol.” This, in turn, means that for Xerox to prevail, it must prove that each unistroke symbol in the accused symbols (i.e., all symbols except for “x” which is composed with two strokes) has (a) graphic separation, (b) definitive recognition, and (c) spatial independence.

That every accused symbol made by a single stroke must itself be a “unistroke symbol” as claimed and defined in the prosecution history is confirmed in the reexamination proceedings. There, the examiner distinguished the claimed unistroke symbols over the Sklarew reference because it “does not disclose an alphabet consisting entirely of unistroke symbols” (emphasis supplied by the examiner).

Consequently, on remand, unless the infringement issue is susceptible to resolution by summary judgment, the jury will have to decide if every one of the accused symbols that is composed by a single stroke meets all of the tests of a “unistroke symbol.” This is so, because in order to escape the reach of potentially invalidating prior art, the patentee insisted that his invention requires that every symbol composed by a single stroke must be a complete “unistroke symbol.”