United States District Court,
D. Delaware.

NCR CORPORATION,
Plaintiff.
v.
PALM, INC. and Handspring, Inc,
Defendants.

No. Civ.A.01-169-RRM

July 12, 2002.

Suit was brought alleging infringement of patents relating to a portable personal terminal for use in a system for handling transactions. Upon cross-motions for summary judgment, the District Court, Thynge, United States Magistrate Judge, held that accused devices did not infringe patents' claims.

Defendants' motion granted.

4,634,845, 4,689,478. Not Infringed.

Robert K. Payson, and Philip A. Rovner, Potter Anderson & Corroon LLP, Wilmington, Delaware, S.Z. Szczepanski, Mary Jo Boldingh, Russell J. Genet, and Justin Swindells, Jenkens & Gilchist, P.C., Chicago, Illinois; Lee A. Freeman, Jerrold E. Salzman, and James T. Malysiak, Freeman, Freeman & Salzman, P.C., Chicago, Illinois; for plaintiff NCR Corporation, of counsel.

Richard K. Herrman, and Mary B. Matterer, Blank Rome Comisky & McCauley LLP, Wilmington, Delaware Bradley J. Hulbert, Paul H. Berghoff, Christopher M. Cavan, George I. Lee, Sean M. Sullivan, and Richard A. Machonkin, McDonnell Boehnen Hulbert & Berghoff, Chicago, Illinois; for defendant Palm, Inc., of counsel.

Frederick L. Cottrell, III, Richards, Layton & Finger, P.A., Wilmington, Delaware; Darryl M. Woo, Henry C. Su, and Richard G. Sanders, Fenwick & West LLP, Palo Alto, California; for defendant Handspring, Inc., of counsel.

MEMORANDUM OPINION

THYNGE**, United States Magistrate Judge**

This is a patent infringement case. Plaintiff NCR Corporation is a Maryland corporation with its principal place of business in Dayton, Ohio. Defendants Handspring Corporation and Palm Corporation are Delaware corporations, and have their principal places of business in Santa Clara, California and Mountain View, California, respectively.

NCR is the owner of U.S. Patent. Nos. 4,634,845 ("the '845 patent") and 4,689,478 ("the '478 patent"). The '845 patent is entitled "Portable Personal Terminal for Use In A System For Handling Transactions." Its

inventors are William J. Hale, William R. Horst, and Ellen P. Riley. The '478 patent is entitled "System for Handling Transactions Including A Portable Personal Terminal." Its inventors are William J. Hale, William R. Horst, and Arthur R. Creech, Jr. Both patents arose from related applications, and issued in 1987. In this opinion the court will refer to the patents collectively as the Hale patents.

In its complaint in this action, which was filed on March 14, 2001, NCR alleges that the handheld personal digital assistant (PDA) devices produced by Palm and Handspring under the PalmPilot, Visor, and Treo trade names infringe the claims of the Hale patents. NCR's complaint includes counts against both defendants for direct infringement, contributory infringement, and inducement to infringe the '845 and '478 patents. NCR seeks both monetary damages and injunctive relief.

On April 30, 2001 defendants filed their respective answers and asserted various counterclaims relating to their defenses to NCR's claims. Palm and NCR raised a number of defenses to NCR's infringement claims, including invalidity, noninfringement, and unenforceability due to inequitable conduct. On August 31, 2001, NCR moved for partial summary judgment on the defendants' inequitable conduct defenses. The court heard the parties' arguments on that motion during a November 7, 2001 telephone conference call, and took the motion under advisement.

Thereafter, the court granted the parties leave to file cross-motions for summary judgment and set out a briefing schedule and a hearing date. In accordance with that schedule, on March 12, 2002, NCR moved for summary judgment on its claims of infringement on and on the affirmative defenses raised by the defendants (D.I.202). On that same date, Palm and Handspring moved for partial summary judgment of noninfringement (D.I.207, 210). Briefing on the parties' cross-motions for summary judgment is now complete. On April 26, 2002, the court heard oral argument on the parties' cross-motions for summary judgment.

Although NCR's briefing addresses all of the defenses raised by the defendants, much of the parties' briefing and the oral argument, in particular, focuses on the proper claim construction of the patent-in-suit. As the operation of the accused devices are not in dispute, each party contends that if the court adopts its proposed construction of the key claim limitations of the Hale patents, it will compel a conclusion in its favor on the issue of infringement.

Having reviewed the parties' briefing, the transcript for the oral argument, and the relevant exhibits submitted to the court at the oral argument, this is the court's decision on the parties' cross-motions for summary judgment. FN1 Since the parties' motions turn on claim construction, the court will first set forth its claim construction of the key disputed claim terms and then analyze whether that construction supports summary judgment of infringement or non-infringement. Afterwards, and only if necessary, will the court address the other issues raised in NCR's briefing-invalidity and unenforceability.

FN1. This case was originally assigned to Judge Roderick R. McKelvie. On June 14, 2002, in connection with Judge McKelvie's resignation, this case was reassigned to the vacant judgship position and was immediately referred to Magistrate Judge Mary P. Thynge. Therefore, although Judge McKelvie heard the oral argument on the parties' motions and had handled the case up until that point, Magistrate Judge Thynge will render the court's opinion resolving those motions.

I. ***BACKGROUND***

The court draws the following facts from the patents themselves, their the prosecution histories, and from relevant product manuals, deposition testimony, and declarations submitted with the parties' briefing.

A. ***The Hale Patents***

The Hale patents were both filed on the December 24, 1984. The '845 patent is entitled "Portable Personal Terminal For Use in a System for Handling Transactions." The '478 patent is entitled "System for Handling Transactions Including a Portable Personal Terminal." The Hale patents have one overlapping inventor (William J. Hale), and both were assigned by their inventors to NCR. The patents share substantively the same specification and expressly reference each other as related in the first paragraph of that specification. '845 patent, col. 1, ll. 5-8; '478 patent, col. 1; ll. 6-11.

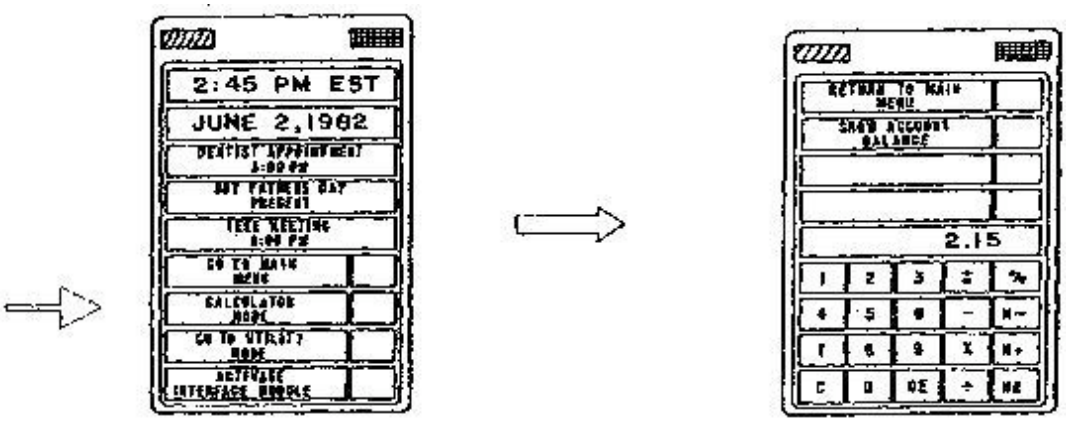
According to the background section of the patents, the invention of the Hale patents was responsive to the trend to automate financial, shopping, and bill-paying transactions. The patent explains that the invention is directed at solving two then-existing problems with such devices. The first problem was that the complexity of existing transaction terminals was overwhelming to unsophisticated users. The second problem was that users were required to operate several different terminals or carry several different credit-cards or ATM cards to carry out their transactions.

To solve these problems, the '845 patent and '478 patent both disclose "a system including a [pocket-sized, user-friendly, and] portable personal terminal which may be used for handling a wide variety of financial, shopping, and other transactions." The purpose of the invention is to provide a single easy to use credit-card sized device that unifies the handling of a number of transactional functions and allows the user to select and use a number of application programs.

The specification of the Hale patents states that the claimed invention relates to:

a data handling device comprising: a panel; a plurality of discrete display elements arranged relative to said panel to present, when selectively energized, user instructions and key information to a user of said device; said discrete display elements being small in size to enable said user instructions and key information to be presented over substantially all of said panel; a plurality of discrete switches for entering data when actuated .... and said device includes means for transferring data between said device and a second data handling device.

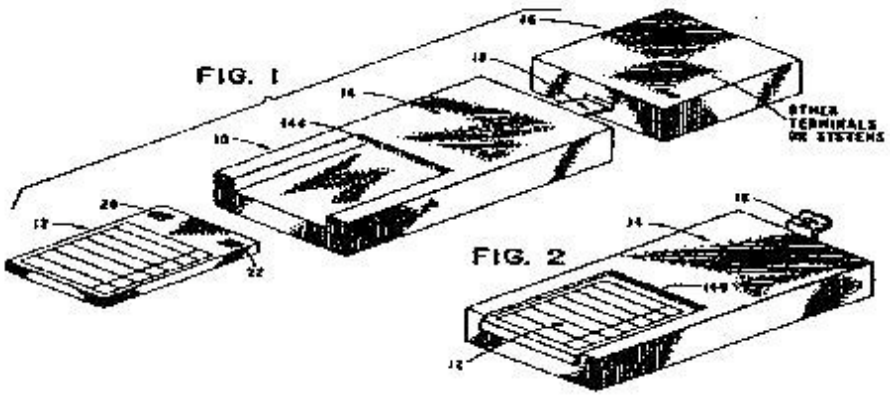
Thus, the hand-held device contemplated by the patents includes an interactive display that reconfigures its menu options in response to user instructions.



The display of the device may initially show a number of application program options, including a calendar, a to-do list, a calculator, and a number of financial programs. According to the Hale patents, such application programs on the terminal are stored in read-only-memory (ROM) on the device. As illustrated above, when the user presses on the display over the calculator button, for example, the face of the device reconfigures to show a calculator device and its buttons, which may then be used by pressing the "buttons" displayed on the screen.

Additionally, to enable the user to perform data transactions with external devices, such as bank terminals or telephones, the invention provides for a data transferring system by which the claimed portable terminal may be used in conjunction with an interface module, which may in turn be coupled to other systems. This is illustrated in relevant figures of the patent, which are reproduced below. Figures 1 and 2 illustrate how the personal terminal device can fit into a receiving area on the interface module, which when coupled together can then be connected to interface with other terminals or systems, such as a point of sale terminal at a store or a home personal computer.

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According to the detailed description of the invention, the claimed invention works as follows. FN2 When a user touches a key delineated on the screen, one switch of a matrix of "transparent" switches that lies underneath the screen is actuated. Actuation of the switch initiates a transmission to a microprocessor that indicates that a particular program associated with that switch, such as the calculator program, has been selected. The machine instructions stored in ROM then change the display on the panel to show the initial screen for the calculator program. This screen has a different format from the previous screen in that it includes on-screen menu options, labels, and instructions that correspond with a calculator's functionality.

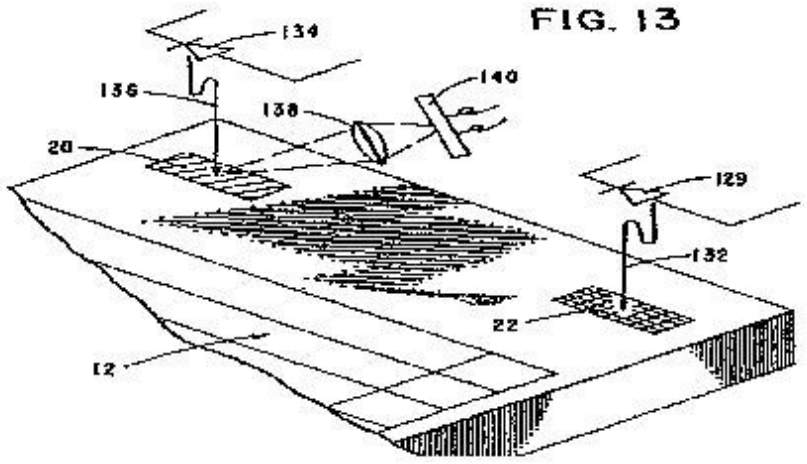
FN2. For the sake of brevity, the court will focus on describing those aspects of the invention that are material to the parties claim construction disputes.

The data transfer functionality between the personal terminal (the "P Terminal") and the interface module (the "I Module") is also described in the specification. The patents explain that in the embodiment described, the personal terminal and interface terminal are coupled together by light, and note, that this type of coupling "eliminates the precise tolerances necessary when using mechanical electrical connectors, and minimizes the electrical power consumption in the P Terminal." '845 patent, col. 3:66-4:3; *see also* '478 patent, col. 9, ll. 50-55 ("This type of coupling eliminates critical alignment problems, is free of electrical

noise ... and permits minimum electrical energy to be required by the circuitry of the P Terminal").

In the described embodiment, shown in Figure 13 (reproduced below) the I Module includes two light emitting diodes (LEDs) that direct light onto light detector areas on the P Terminal. When the I Module is transmitting data to the P Terminal it does so via one set of the LED/light detectors. On the other LED/light detector combination, which is used when the P Terminal is transmitting data to the I Module, the LED sends unmodulated light to the light detector. When the P Terminal desires to transmit data, it energizes a light modulator area in conformance with the data. An optical reflector directs the light to a photodetector on the I Module.

FIG. 13



The patent explains that this configuration, in which both LEDs (labeled 129 and 134 in Figure 13) are on the I Module and data is transmitted by the P Terminal using reflection, allows the non-portable I Module to provide the power to the LEDs so that the smaller, battery-powered P Terminal is more energy-efficient.

B. ***The Asserted Claims of the Hale Patents***

NCR is asserting claims 1-7, 9, and 12-16 of the '845 patent and claims 6-9 and 11 of the '478 patent. Of those claims, four are independent claims: claims 6 and 11 of the '478 patent and claims 1 and 16 of the '845 patent. The claims are similar in scope and contain a number of common claim limitations, which the court will construe uniformly.

The court will set forth the claims, truncating them where appropriate to better focus on the principal disputed claim terms. The court will indicate which claim limitations are disputed-which the court will focus on in its claim construction-by bolding the typeface of those particular limitations.

Claim 6 of the '478 patent recites:

A system for handling data comprising:

a portable data handling device; and

an interface module for coupling said device with other systems;

said data handling device comprising:

a panel;

a plurality of discrete display elements arranged relative to said panel to present, when selectively energized, information to a user of said device;

a plurality of discrete switches for entering data when actuated;

said discrete display elements and said discrete switches being positioned in overlapping relationship relative to said panel to enable said switches to be activated from said panel;

....

means for communicating with said interface module;

said interface module comprising:

....

means for communicating with said device;

Claim 11 of the '478 patent recites:

A system for handling data comprising:

a portable data handling device having a size which is substantially the same as a credit card;

at least one other system; and

an interface module **for coupling said device with said other system to transfer data between said device and said other system**;

said device comprising:

a panel;

a plurality of discrete display elements arranged relative to said panel to present, when selectively energized, user instructions and key information to a user of said device; said discrete display elements being small in size to enable said user instructions and key information to be presented over **substantially all of said panel**;

a plurality of discrete switches for entering data when actuated;

said device also including **means for transferring data between said device and a second data handling device**;

Claim 1 of the '845 patent recites:

A data handling device comprising:

a panel;

a plurality of discrete display elements arranged relative to said panel to present, when selectively energized, user instructions and key information to a user of said device; said discrete display elements being small in size to enable said user instructions and key information to be presented over **substantially all of said panel**;

a plurality of discrete switches for entering data when actuated;

said device also including **means for transferring data between said device and a second data handling device**;

Last, claim 16 of the '845 patent recites:

A portable, intelligent, data-handling device comprising:

means for storing data and machine instructions;

means for executing said machine instructions;

a panel;

means for displaying data to a user of said device;

means for entering data on said device;

said displaying means and said entering means being in overlapping relationship relative to said panel and extending over **substantially all of said panel**;

...

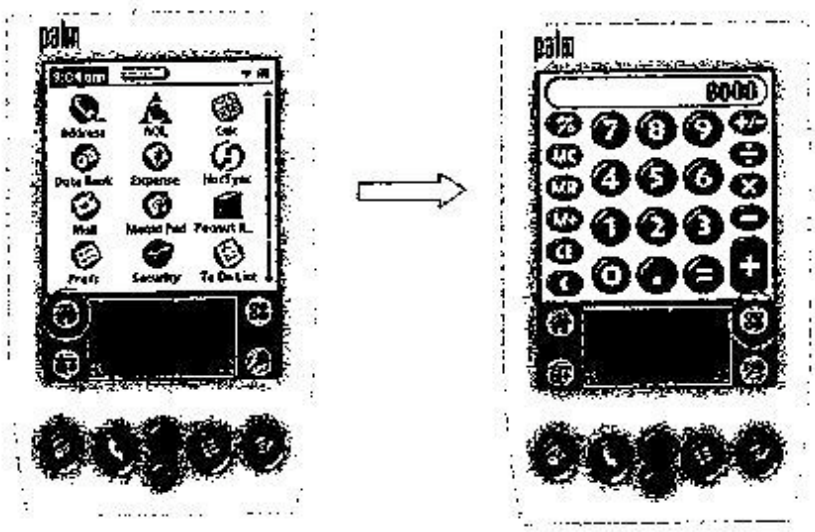
said device also including **a light coupling means for transferring data between said device and a second data handling device**.

C. ***The Accused Products***

Palm's PalmPilot and Handspring's Visor and Treo^{TM} PDA devices are handheld devices that allow a user to select applications and navigate through them by touching a touch screen panel with a stylus or finger. Both defendants' devices contain application programs such as appointments, to-do lists, calendar, calculator, and expense programs.

In the accused devices, the layout of the keys and user instructions displayed on-screen changes depending on which application is selected. For example, when the calculator area is pressed by the user, the display panel changes from a screen that shows a number of application programs to a screen with numeric keys. Although this is illustrated below using a representative Palm device below, the Handspring devices are similar in all relevant respects.

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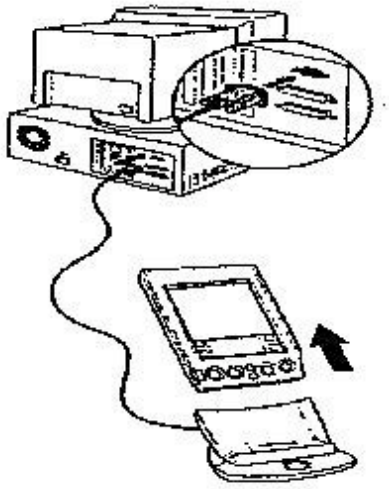


Both the Palm and Handspring devices have a liquid crystal display (LCD) screen which functions as both a display and a keyboard. It is described as the area which "[d]isplays the applications and information stored in the Visor [or Palm] handheld. It is touch sensitive and responds to a stylus." By touching the screen, a user can open applications, choose menu commands, select options in dialog boxes, and open the onscreen keyboard.

This functionality is enabled through the use of a resistive touch screen, which consists of two transparent sheets coated with a resistive material, aligned in parallel, that overlay the display of the PDA device. This resistive touch-screen is often referred to as a "resistive digitizer." When a point on the screen is touched with sufficient force at any point on the touch screen, the top resistive layer contacts the bottom resistive layer. As a result, the current flow is interrupted at this contact point, creating a voltage gradient across the surface of each sheet, which is measured, digitized, and processed by a controller analog-to-digital converter to determine the corresponding coordinates of the contact point. Contact areas are associated with different application programs. Therefore, once the coordinates of the contact point are determined, the device "knows" which program the user has selected and displays that program and its associated keys, instructions, and functions on the screen.

Just below the screen area, the Palm and Handspring devices also contain a separate writing area (the portion delineated by the rectangle in the above illustration), upon which users can input data using Graffiti(R) shorthand writing strokes. The screen and Graffiti(R) writing area are encased in a plastic frame. Along the bottom of the frame are application buttons, linked to built-in application programs such as the calendar and datebook programs, and scroll buttons for scrolling through windows displayed onscreen.

In addition, as shown below, the Palm and Handspring's handheld PDA devices are sold with "cradles" that are designed to hold the PDA and connect it to a personal computer, for the purpose of transferring data between the two devices. The PDA device connects to the cradle through electro-mechanical connectors on the PDA and cradle.



The handheld Palm and Handspring devices are also each equipped with an infra-red (IR) light emitting diode (LED) transceiver, which can be used to transmit data to other computing devices with IR ports and to receive data from such devices. The Palm and Handspring devices use an active light emitting diode to transmit data. Using their active LEDs, two Palm or Handspring devices can "beam" data to each other.

II. *DISCUSSION*

A. *Legal Standard for Summary Judgment*

The disposition of a case under Federal Rule of Civil Procedure 56 is appropriate when after discovery, "the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits" demonstrate that there is no genuine issue as to any material fact and "the moving party is entitled to judgment as a matter of law." Fed.R.Civ.P. 56(c); Celotex Corp. v. Catrett, 477 U.S. 317, 322, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986); Novartis Corp. v. Ben Venue Labs., Inc., 271 F.3d 1043, 1046 (Fed.Cir.2001). When the parties cross-move for summary judgment, the court must evaluate each motion on its own merits, resolving all reasonable inferences against the party whose motion is under consideration. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986); Pickholtz v. Rainbow Technologies, Inc., 284 F.3d 1365, 1371 (Fed.Cir.2002).

The parties' summary judgment motions raise the issue of whether the Palm PalmPilot and Handspring Visor and Treo^{TM} PDA devices infringe or do not infringe the Hale patents as a matter of law. Determining whether a patent claim is infringed involves two steps. Pickholtz, 284 F.3d at 1365 (citing Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1454 (Fed.Cir.1998) (en banc)). First, the court must determine its scope and meaning of the asserted claim terms by rendering its construction of those terms. Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-71 (Fed.Cir.1995) (en banc). Second, the court must compare the properly construed claims to the accused devices to determine whether each limitation is found either literally or equivalently in the accused product. Id. at 976. This comparisonpresent a question of fact. Tanabe Seiyaku Co. v. United States Int'l Trade Comm'n, 109 F.3d 726, 731 (Fed.Cir.1997).

"[W]here as here, the parties do not dispute any relevant facts regarding the accused product[s] but disagree over [claim construction], the question of literal infringement collapses to one of claim construction and is thus amenable to summary judgment." Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1578 (Fed.Cir.1996). Accordingly, the issue of infringement hinges on claim construction. If every one of the limitations of the asserted claims of the patents-in-suit are found in the accused devices, the court will grant

NCR's summary judgment motion on the issue of infringement. If, however, the accused devices do not contain at least one limitation required by the asserted claims, the court must conclude that the devices do not infringe as a matter of law and grant defendants summary judgment motions. *See* Telemac Cellular Corp. v. Topp Telecom, Inc., 247 F.3d 1316, 1323 (Fed.Cir.2001) ("[s]ummary judgment of noninfringement is appropriate where the patent owner's proof is deficient in meeting an essential part of the legal standard for infringement, since such failure will render all other facts immaterial."); Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed.Cir.1995); *see also* Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 39 n. 8, 117 S.Ct. 1040, 137 L.Ed.2d 146 (1997).

B. ***Cannons of Claim Construction***

1. ***General Principles of Claim Construction***

[1] [2] In construing the claims of a patents, a court "should look first to the intrinsic evidence of record, i.e., the patent itself, including the claims, the specification and, if in evidence, the prosecution history." Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Within the intrinsic record, the task of claim construction begins with the language of the claims themselves. Generally, claim terms are to be accorded their "plain, ordinary, and accepted meaning within the community of those of ordinary skill in the relevant art," unless a patentee clearly sets forth a different definition in the specification or prosecution history. Leggett & Platt, Inc. v. Hickory Springs Mfg. Co., 285 F.3d 1353, 1354 (Fed.Cir.2002) (citing Toro Co. v. White Consol. Indus., Inc., 199 F.3d 1295, 1299 (Fed.Cir.1999)); Bell Atl. Network Servs., Inc. v. Covad Comms. Group, Inc., 262 F.3d 1258, 1267 (Fed.Cir.2001).

[3] [4] Therefore, the court must also look to both the specification and prosecution history of the patents to determine the proper meaning of a claim limitation. *See* Vitronics, 90 F.3d at 1582 (the specification "is the single best guide to the meaning of a disputed term"); Markman, 52 F.3d at 980 ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution."); *see also* Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 979 (Fed.Cir.1999) (noting that a disclaimer occurs where a patentee "reliquished [a] potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference."). Indeed, as this court has stated, "the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim." IPPV v. Echostar, 106 F.Supp.2d 595, 601 (D.Del.2000); *see also* Netword, LLC v. Centraal Corp., 242 F.3d 1347, 1352 (Fed.Cir.2001) ("The claims are directed to the invention that is described in the specification; they do not have meaning removed from the context which they arose"); *see also* Wang Labs., Inc. v. America Online, Inc., 197 F.3d 1377, 1382-82 (Fed.Cir.1999) (construing "frame" as "character-based" data frame and as excluding "bitmapped" data frames, where specification described only "character-based" frames and the prosecution history distinguished the claims from prior art "bit-mapped" frames); SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1344 (Fed.Cir.2001) (holding that "[w]here the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.").

[5] In using the specification to aid in the construction of claim terms, however, the court should take heed not to import claim limitations from the specification into the claims. Additionally, the court should not limit a construction to what is shown in the preferred embodiment when the intrinsic evidence of the patent supports a broader construction. *See* Phonometrics, Inc. v. Northern Telecom, Inc., 133 F.3d 1459, 1466 (Fed.Cir.1998).

2. ***Construction of Means-Plus-Function Limitations***

[6] Several of the limitations in the Hale patents are written in means-plus-function format under 35 U.S.C.

s. 112, para. 6. The use of the term "means for" in a claim limitation creates a rebuttable presumption that the limitation is drafted in s. 112, para. 6 format. Kemco Sales, Inc. v. Control Papers, Co., 208 F.3d 1352, 1361 (Fed.Cir.2000). One can rebut that presumption by showing that the claim itself recites sufficiently definite structure to perform the claimed function. *Id*.

[7] If the court concludes that a particular claim limitation is drafted in means-plus-function form, construction of that limitation requires two steps. Asyst Techs., Inc. v. Empak, Inc., 268 F.3d 1364, 1369 (Fed.Cir.2001). First, the court must identify the function recited in the claim. *Id*. Second, the court must "identify the corresponding structure set forth in the [specification] that performs the particular function set forth in the claim." *Id*.

C. *The Court's Construction of the Principal Disputed Claim Limitations*

NCR, by its motion for summary judgment, contends that the accused Palm and Handspring devices infringe the asserted claims of the Hale patents because they contain every limitation of those claims. In response, Palm and Handspring argue that their devices cannot infringe, because they do not contain a number of the properly construed claim limitations.

Specifically, Palm and Handspring contend that their devices differ from the claimed invention in at least three relevant respects. First, while the claimed invention uses discrete switches for entering data, the Palm and Handspring devices use a single continuous resistive touch screen for entering data. Second, while the claimed invention has particular optical coupling structures for transferring data, the accused devices use a different mechanisms to transfer data, instead employing a mechanical electrical connector and an infrared transceiver. Third, the claimed invention uses a display that covers "substantially all" of the panel, while the accused devices do not use a display that covers "substantially all" of the panel. As each of these differences corresponds to a claimed limitation of the Hale patents, the defendants contend that NCR cannot prove literal infringement.

Palm and Handspring focus on three categories of claim limitations that they contend are not present in their accused devices: (i) those limitations relating to the entry of data-"plurality of discrete switches" and "means for entering data;" (ii) those limitations relating to the transfer of data-"means for transferring data" and "means for communicating;" and (iii) those limitations relating to the display of data-a display covering "substantially all of said panel." The court will construe each of these claim limitations in turn. FN3

FN3. Palm and Handspring share positions on most claim terms and non-infringement arguments. However, there are a few differences. Palm alone addresses the "substantially all of said panel" limitation, while Handspring alone addresses the "means for entering data" limitation. The parties join in addressing the "plurality of discrete switches," the "means for transferring data," and the "means for communicating" limitations and in arguing that those limitations are absent in their devices.

1. "*Plurality of discrete switches" and "means for entering data*"

Three of the four of the asserted independent claims FN4 at issue in this suit require "a plurality of discrete switches for entering data when actuated." In the fourth of the asserted independent claims, claim 16 of the '845 patent, this element is claimed in means-plus-function format as a "means for entering data on said device." As these claim limitations are closely related, the court will discuss and construe them both in this section.

FN4. The court focuses its analysis on the independent claims of the asserted patents. Because dependent claims include all of the limitations of the claims from which they depend, a finding of noninfringement of

an independent claim necessarily precludes the assertion of any claim that depends from it. *See* 35 U.S.C. s. 112, para. 4.

(i) "*plurality of discrete switches*"

[8] The parties do not appear to dispute the term "plurality." The term "plurality" simply means "more than one." The specification confirms that this term is to be given its ordinary and plain meaning, stating that "[i]n the embodiment described, the number of switches included in the P Terminal 12 is 45, with five switches being included in each of the nine line displays .... naturally, this number could be varied to suit particular applications. " '845 patent, col. 5, ll. 42-46; *see also* '845 patent, Fig. 7.

The parties, however, vigorously dispute the proper construction of the term "discrete switches." NCR proposes that the court construe discrete switches to mean "transparent switches on the panel each having an individually distinct identity such that a specific area identified on the panel causes a distinct action when that area is actuated." Handspring and Palm propose that the court construe discrete switches more narrowly to mean an array of distinct and separate physical devices that can be individually actuated, manually or mechanically, to make, break, or change the connections in an electrical circuit.

The differences between the parties' proposed constructions for this claim term are significant. According to NCR, a "switch" exists when there is "a specific area identified on the panel [that] causes a distinct action when that area is actuated." NCR's construction of a switch is broad enough to cover the continuous resistive touch screen digitizer employed to enable data entry in the accused devices, which when combined with software renders the appearance of separate physical areas on the screen without including actual physical switches. In contrast, Palm and Handspring's construction would not cover such technology, because under their definitionthe claim limitation requires a plurality of separate and distinct physical structures.

a. *Palm and Handspring's Position*

In support of their proposed construction, defendants first point out that the definition of the term "switch" is well-accepted. According to the McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition, a "switch" is "a manual or mechanically actuated device for making, breaking, or changing the connections in an electric circuit." Defendants further contend that their definition comports both with the claim language, "switches for entering data when actuated," and the description of the structure and operation of such "switches" in the specification, which states:

when a user wishes to actuate one of the plurality of switches 30, as for example that one associated with key area 28-9 in Fig. 4, the user simply depresses that area 28-9 causing the conductor 52-5 in Fig. 7 to pass through the hole 60-9 and thereby contact the conductor.

'845 patent, col. 6, ll. 58-63.

Defendants also argue that the term "discrete" should be construed as "separate," "individually distinct," and "opposed to continuous," as so defined by the American Heritage Dictionary for the English Language, Fourth Edition and the Oxford English Dictionary. This construction is supported by the specification, which describes using forty-five separate and distinct physical switches, made up of five top conductors and nine bottom conductors, in order to enable users to enter data on the P Terminal device, *See* '845 patent, col. 5, ll. 42-45; Fig. 7. Furthermore, Palm and Handspring point out that the specification makes clear that the claimed plurality of discrete switches are actual physical structures that are always present and that are distinct from the display areas. *See* id., col. 5, ll. 50-54 ("While the actual (physical) switches in the

plurality of switches 30 are always present on the top panel 24, they are outlined or highlighted only when they become necessary for a particular function or instruction being executed by the P Terminal 12."). Defendants thus conclude that "discrete switches" refers to the "actual (physical) switches in the plurality of switches 30," id., col. 5, ll. 50-52, formed by the contact of two conductive elements with each other. *See* Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1303 (Fed.Cir.1997) (finding that "examples disclosed in the preferred embodiment may aid in the proper interpretation of a claim term").

b. *NCR's Position*

In response, NCR contends that Palm and Handspring's construction impermissibly limits the claim to cover only the preferred embodiment in the patent. Phonometrics, 133 F.3d 1459 (noting that "claims are not necessarily restricted in scope to what is shown in the preferred embodiment."). It argues that the disclosure of the patent specification supports its broader construction. *See* Rexnord Corp. v. Laitram Corp., 274 F.3d 1336 (Fed.Cir.2001). To support this position, it points to the following language from the specification:

Although the fabrication of switches 30 has been described in a specific manner, it is not intended to exclude other alternative methodologies to fabricate "transparent" switches such as homogeneous or discrete capacitive-film switches and electrostatic-sensitive switches, for example.

'845 patent, col. 7, ll. 5-10. Based on this portion of the specification, NCR contends that "discrete switches" must be construed to include "other 'transparent' switches [besides the 'micromotion' type switches detailed in the preferred embodiment] such as homogeneous or discrete capacitive-film switches and electrostatic-sensitive switches."

NCR contends that of the two potential dictionary definitions for discrete-(i) composed of separate and distinct parts; and (ii) having an individually distinct identity-the meaning used in the claims must be the latter. The court notes that NCR does not dispute the defendants' proposed construction of the terms "plurality" or "switch." Nonetheless, NCR contends that the term "discrete switches" should be construed to mean that the transparent switches on the panel each have an individually distinct identity in that a specific area identified on the panel causes a distinct action when that area is actuated.

c. *The Court's Construction*

The court begins the task of construing this term by turning the claim language itself. The court also turns to the specification for guidance as to the proper scope of the claims, because it details the claimed invention. Markman, 52 F.3d at 979 ("Claims must be read in view of the specification, of which they are a part"). While NCR is correct that, as a matter of law, it is improper to import limitations from the preferred embodiments into the claim, neither should a court should give a claim term a broader construction than is supported by the specification and claim language. *See* Netword LLC v. Centraal Corp., 242 F.3d 1347, 1352 (Fed.Cir.2001) ("Although ... the claims are not limited to the preferred embodiment of the invention, ... neither do the claims enlarge what is patented beyond what the inventor has described as the invention."); Wang Labs. Inc. v. America Online, Inc., 197 F.3d 1377 (Fed.Cir.1999) (holding that because "[t]he only embodiment described in the '669 patent specification is the character-based protocol, ... the claims were correctly interpreted as limited thereto").

The language of the claim, stating that one element of the claimed data handling device is "a plurality of discrete switches for entering data when actuated," provides some help in choosing between the proposed constructions offered by the parties. First, the court notes that the specific use of the terms "plurality" and "discrete," before the term "switches" in the claim language does give some indication that the claim element is referring to an array of separate switches. The claim language also specifies that these "discrete switches" are "positioned in overlapping relationship" with the display elements relative to the panel of the

claimed device "to enable said switches to be actuated from said panel," and requires in addition that the display elements can be selectively energized "so as to present on said panel the key information ... which are associated with those of said discrete switches...." This demonstrates that the "switches" are distinct elements from the display elements or areas on the display.

The specification explains the claimed relationship between the discrete switches and the key information presented by the display elements in the following passages:

The top panel 24 has a plurality of switches 30 positioned relative to the top panel 24 as shown in Fig. 7. *When a particular switch of the plurality of switches 30* is to be involved in one of the choices which is to be made available to the user, *the associated switch area* on the top panel 24 will be visually outlined by the display 26 to make this choice apparent to the user....

The labels or designations are provided by the display 26 which lies below the plurality of switches 30. While the actual (physical) switches in the plurality of switches 30 are always present in the top panel 24, they are outlined or highlighted only when they become necessary for a particular function or instruction being executed by the P Terminal 12....

The switch areas 28-1 through 28-9, alluded to with regard to the discussion of Fig. 4, area aligned, respectively, with holes 60-1 through 60-9 shown in Fig. 7. When a user wishes to actuate one of the plurality of switches 30, as for example *that one associated with key area* 28-9 causing the conductor 52-5 in Fig. 7 to pass through the hole 60-9 and thereby contact the conductor 56-9....

Col. 4, ll. 46-54; col. 5, ll. 48-54; col. 6, ll. 55-63 (emphasis added).

From the above language, it is clear that the claim term "discrete" means "distinct and separate," as each switch is individually distinct and separate from any other switch in the claimed plurality of switches. Being distinct and separate from one another, each switch is associated with a particular key area or switch area that can be outlined or highlighted by the display screen so that the user can selectively actuate that particular switch from among the plurality of switches. When a particular distinct switch is actuated, it closes the circuit in a specific area, such that the device can determine what corresponding display area on the screen was touched.

It is also clear that the specification defines the claimed invention as requiring "actual (physical) switches" in the claimed plurality of switches, that are distinct from the "areas" on the display with which they are associated. The specification makes clear that the switches are actual physical structures that are "always present," regardless of what is being displayed or what function or instruction is being executed. It describes in detail how the switches are to be arrayed in rows and columns. Further, it draws a distinction between the "actual (physical) switches," which are always there, and "switch areas," which are areas on the panel outlined by the display. The "switch" is the actual physical structure that is actuated to enter data, while the corresponding "areas" merely show the user where to press. This distinction between "switches" and images created by the display is also drawn in the claims themselves, in that each is recited as a separate claim element.

Both the common definition of switch and the specifications of the patents-in-suit belie NCR's assertion that a "switch" exists when there is "a specific area identified on the panel [that] causes a distinct action when that area is actuated." First, the ordinary meaning of a "switch" is a "manual or mechanically actuated device for making, breaking, or changing the connections in an electric circuit." This meaning should apply here, as there is no evidence that the inventors intended to impart a novel meaning to that term. York Prods., Inc. v. Cent. Tractor Farm & Family Ctr., 99 F.3d 1568, 1572 (Fed.Cir.1996) ("Without an express intent to impart a novel meaning to claim terms, an inventors' claim terms take on their ordinary meaning"). Second,

the patent clearly distinguishes between the actual (physical) switches and their associated display areas. Thus, a switch cannot be defined simply as a "specific area identified on the panel." The claims and specification make clear that in the invention of the patents-in-suit, an array of switches lies under the specific areas on the panel; the switches are separate claim elements.

NCR argues, however, that in construing the claims, the court must look at other embodiments mentioned in the specification. The phrase in the specification that NCR relies upon to demonstrate that a broader construction is proper, states that "although the fabrication of switches 30 has been described in a specific manner, it is not intended to exclude other alternative methodologies to fabricate 'transparent' switches such as homogeneous or discrete capacitive film switches and electrostatic-sensitive switches, for example." '845 patent, col. 7, ll. 5-10. NCR argues that this portion of the specification requires that definition of "discrete switches" to be broad enough to encompass homogeneous capacitive film switches.

The court does not agree with NCR's reading of this phrase. First, if indeed homogeneous modifies "switches" and not "capacitive film," FN5 the reference to "homogenous" switches in the specification cannot act to expand the definition of the claim term "discrete switches" to include "homogeneous switches" or "continuous switches." The claims do not claim "switches" generally, and certainly do not claim "homogeneous switches." Rather, only "discrete switches" are claimed. As a result, the claim term "a plurality of discrete switches" does not cover "homogeneous capacitive-film switches." *See* Novo Nordisk of No. Am., Inc. v. Genentech, Inc., 77 F.3d 1364, 1369 (Fed.Cir.1996) ("The claims, ... not the specification, measure the protected patent right to exclude others."); *see also* Johnson & Johnston Associates Inc. v. R.E. Service Co., Inc., 285 F.3d 1046, 1052 (Fed.Cir.2002) (noting that "the claims, not the specification, provide the measure of the patentee's right to exclude" and that "when a patent drafter discloses but declines to claim subject matter ... this action dedicates that unclaimed subject matter to the public"). If the court construed discrete switches to include homogeneous or continuous switches, it would impart no meaning to the claim term "discrete." Thus, because of the claim language requiring "discrete switches," "homogeneous switches," which the patent specification makes clear are distinct from "discrete switches," are outside the scope of the claims. Second, and similarly, a fair reading of the phrase relied upon by NCR, indicates only that the specification teaches that "homogeneous or discrete capacitive-film switches and electrostatic-sensitive switches," whatever their actual structures may be, are contemplated by the inventors to be examples of other methods of *fabricating* "the plurality of discrete switches." Such potential embodiments do not affect of the plain meaning of "plurality of discrete switches." Any of the referenced methodologies must still result in the fabrication of two of more manually or mechanically actuated devices that make, break, or change connections in an electric circuit, which are individually distinct and separate from one another.

FN5. Palm's expert, Louis E. Tannas, Jr., points out in his declaration that "a more natural reading of the reference in the patent is that the term 'homogeneous' modifies the term 'capacitive-film' (the dielectric) rather than 'capacitive-film switches.' In other words, it is the capacitive film (the dielectric) that is homogeneous rather than the conductors. Moreover, [the use of the term] 'switches' would indicate that the conductors were partitioned to make multiple switches." Tannas Decl. para. 14. Tannas also notes that the Hale patents do not disclose the A/D converter and software needed to implement a capacitive touch screen. *Id*. at para. 15.

Finally, the court notes that, contrary to NCR's assertion, this is not a case of limiting a construction to a preferred embodiment.FN6 Rather, it is a case of construing the claims in line with the disclosed invention. The specification of the '845 and '478 patents describes only one embodiment of the claimed "plurality of switches." A construction that construes the invention as broader than what was disclosed and claimed is not supportable.

FN6. Neither is it, as NCR argues, a case where the court's construction of the term "discrete" as "individually distinct or separate from each other" would read out the preferred embodiment. NCR asserts that the switches disclosed in its patents are not "discrete" in that sense. The patents confirm that NCR is incorrect. They show forty-five different and distinct switches in the array of switches that are formed by forty-five holes at the intersections of the top and bottom conductors. *See, e.g.,* Fig. 7. These switches are actuated by pressing a particular top conductor through a particular one of the forty-five holes to contact a particular bottom conductor. That each switch itself is not made of separate or distinct parts is of no moment. Each switch is distinct from each other in that each may make, break, or change its connection in an electric circuit. Accordingly, the defendants definition of a "plurality of discrete switches" does, in fact, read directly on the preferred embodiment.

Here, NCR argues that the keys and buttons display generated by the software application fall within the claimed "plurality of discrete switches" of the invention. But nothing in the specification or claims teaches that the claimed "plurality of switches" may be generated by software. This contention that the display and software create a "plurality of discrete switches" runs counter to the claims' and specifications' distinction between switches and images. It also runs counter to the ordinary and undisputed meaning of a switch as a device, i.e., a physical structure. If anything, the specification teaches only that the switches are "fabricated" in some manner, implying that they are constructed out of various hardware components, rather than rendered functional by a software component. Moreover, the specification teaches that "the actual (physical) switches in the plurality of switches 30 are always present on the top panel 24." By contrast, software generated "switches" would disappear from the panel once the rendering application quits running.

For the above stated reasons, the court construes the claim term "plurality of discrete switches" as two or more distinct and separate manual or mechanically actuated devices for making, breaking, or changing the connections in an electric circuit. This definition, proposed by the defendants, best comports with the ordinary meaning of the claim terms as read in light of the claim language and the specification. *See* Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998) ("The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention, will be, in the end, the correct construction").

(ii) "*means for entering data*"

a. *The Parties' Positions*

[9] Palm does not address the claim term "means for entering data" in its briefing. Handspring and NCR, however, dispute the corresponding structure that is associated with this limitation. Both parties agree that one corresponding structure for the "means for entering data" is the array of micromotion switches described in detail in the specification and discussed at length in the preceding section. The parties, however, as with their dispute regarding "the plurality of discrete switches" limitation, dispute whether other structures are disclosed as corresponding structure.

Specifically, NCR contends that the patent discloses a generic class of transparent switches and alternative switches in the now-familiar passage of the specification:

Although the fabrication of switches 30 has been described in a specific manner, it is not intended to exclude other alternative methodologies to fabricate "transparent" switches such as homogeneous or discrete capacitive film switches and electrostatic film switches, for example.

'845 patent, col. 7, ll. 5-10. *See* Serrano v. Telular Corp., 111 F.3d 1578, 1583 (Fed.Cir.1997) ("Disclosed structure includes that which is described in a patent specification, including any alternative structures

identified."); *Micro Chem. Inc.,* 194 F.3d at 1258 ("When multiple embodiments in the specification correspond to the claimed function, proper application of s. 112. para. 6 generally reads the claim element to embrace each of those embodiments")

In response, Handspring contends that the above-quoted reference to alternative methodologies does not reserve other structures as corresponding to the recited function, because it does not specifically identify what homogeneous or discrete capacitive film switches or electrostatic-sensitive switches are, how they operate, or how they could be used to fabricate transparent switches in the claimed invention. *See* In re Donaldson Co., 16 F.3d 1189, 1195 (Fed.Cir.1994) (en banc) (emphasizing that where patentee employs means-plus-function language, he must set forth adequate disclosure showing what is meant by claim language in accordance with section 112, paragraph 2); Fonar Corp. v. General Electric Co., 107 F.3d 1543, 1551 (Fed.Cir.1997) (limiting the scope of a means-plus-function limitation to a generic gradient waveform and its equivalents, because "[a]lthough [the specification] states that other waveforms may be used, it fails to specifically identify those waveforms").

Alternatively, Handspring contends that even if the court construes the passing reference to alternative methodologies to include capacitive-film switches and electrostatic-sensitive switches as corresponding structures, the means for entering data is still limited to a plurality of physical switches. The specification only states that these manufacturing techniques can be used to fabricate the "plurality of switches 30." The fact that alternative methodologies may be used to fabricate the switches, does not mean that the corresponding structure is still not limited to an array of discrete switches.

b. *The Court's Construction*

The court will construe the function and corresponding structure of the "means for entering data" means-plus-function limitation as follows. The function is "entering data on the claimed device." Searching the specification, one corresponding structure that is clearly linked to this function is the above construed "plurality of discrete switches for entering data when actuated."

As noted above, the more difficult question is what, if any, corresponding structure is identified by the specification's cryptic reference to "homogeneous or discrete capacitive film switches and electrostatic film switches," as "alternative methodologies to fabricate 'transparent switches....' " The parties submitted contrasting declarations on whether the above phrase imparts any specific structure at all to one of skill in the art in 1984.FN7 The phrase is indeed confusing. But, the specification makes this much clear-while alternate methodologies could be used in place of the specific structures disclosed to fabricate the "plurality of switches 30" (e.g., the forty-five conductive strips, the plurality of holes), no other structures are disclosed that could replace the "plurality of switches 30" itself. In other words, while the specification states that the switches in the plurality of switches could be made using capacitive or electrostatic-sensitive materials, the structure disclosed is still any array of physical switches. Thus, if the "alternate methodologies" language imparts any corresponding structure at all to one of skill in the art, it is capacitive-film and electrostatic-sensitive switches fabricated as an array of discrete transparent switches.

FN7. NCR submitted the declaration of David Blass, in which Blass stated that he understood the term "transparent touch switches" to encompass homogeneous or discrete capacitive films, homogeneous or resistive films, or infrared light emitters and detectors. *See* Blass Decl. para.para. 3, 11. Palm submitted the declaration of Louis Tannas, its expert, who stated that no class of capacitive touch screens were generally referred to as "homogeneous capacitive-film switches" and also that it is unclear as to what "electrostatic-sensitive film switches" refer to. Decl. para.para. 13, 16.

Palm has moved to strike the Blass declaration as Blass was not disclosed as an expert and has not filed an expert report. NCR contends that Blass' declaration should not be stricken because his declaration is based

upon his personal knowledge. While the court is sympathetic to Palm's argument, the court sees no need to take the step of striking the Blass declaration from the record at this time. Rather, it simply will accord the Blass declaration the minimal weight deserving of extrinsic evidence that is submitted by a person who does not hold a technical degree and who is not an expert in this case.
Accordingly, the corresponding structure for the "means for entering data" is the plurality of discrete switches (as described in the specification and construed in the preceding section), including capacitive-film and electrostatic-sensitive switches fabricated as an array of discrete transparent switches.

2. "*Means for transferring data" and "means for communicating*"

[10] All of the asserted independent claims require either a "means for transferring data" or a "means for communicating." Claims 1 and 16 of the "845 patent and claim 11 of the" 478 patent require that the claimed device include a "means for transferring data between said device and a second data handling device." FN8 Claim 6 of the '478 patent requires that the claimed device include a "means for communicating with said interface module." These claim limitations are drafted in means-plus-function format according to 35 U.S.C. s. 112. Each limitation invokes the classic formulation of a means-plus-function element by use of the word "means" followed by a function, without reciting any structure for performing the function. Greenberg v. Ethicon Endo-Surgery, 91 F.3d 1580, 1583 (Fed.Cir.1996).

FN8. The limitation in claim 16 adds the words "light coupling" in front of "means." The court will construe this claim term together with the other two means-plus-function limitations as they refer to the same function and the same corresponding structures.

The court does not agree with NCR's contention that the "light coupling means" limitation is not a means-plus-function limitation. It is drafted using "means" language and functionally described. The term "light coupling" is used as a modifier; it does not alone recite any structure sufficient to remove it from the realm of s. 112, para. 6.
To construe a means-plus-function claim limitation, the court must first identify the claimed function from the claim language. Kemco Sales, Inc., 208 F.3d at 1360-61. Then, the court resorts to the specification to determine the corresponding structures disclosed for performing that function. *Id*. The scope of the means-plus-function claim is statutorily limited to these disclosed structures and their equivalents. Atmel Corp. v. Information Storage Devices, Inc., 198 F.3d 1374, 1381 (Fed.Cir.1999).

The parties do not dispute the recited function of the "means for transferring data" or the "means for communicating." The patents-in-suit make clear that the recited function for transferring data is the same as the recited function for communicating.That function is transmitting data to and receiving data from another device.

The parties' dispute centers on the construction of the corresponding structure for these claim elements. NCR contends that the corresponding structure for these limitations include both optical couplers and electrical mechanical connectors. Palm and Handspring, however, maintain that the corresponding structure is not this broad. Rather, they contend, the corresponding structure is limited to the disclosed optical reflector of the patents-in-suit, a passive reflecting optical coupling mechanism, and therefore, does not cover optical couplers such as their devices' active infrared light emitting diodes. The defendants further contend that electrical mechanical connectors, of the type used by the accused devices to interface with their cradles, are also not disclosed as a corresponding structure.

a. *NCR's Position*

NCR seeks support for its position that the corresponding structure of the "means for communicating" and "means for transferring data" include all optical couplers and electrical mechanical connectors in the

following passage from the patents-in-suit. First, in describing the interface between the P Terminal and the I Module, the specification states:

The communications between the P Terminal 12 and the I Module 14 are carried on by an *optical coupling*. This connection reduces noise, eliminates the precise tolerances necessary *when using mechanical electrical connectors,* and minimizes the electrical power consumption in the P Terminal.

'845 patent, col. 3, l. 66-col. 4, l. 3 (emphasis added). NCR notes that a latter portion of the specification states that:

In the embodiment described, the interfaces 108 and 118 are *coupled together by light*. This type of coupling eliminates critical alignment problems, is free of electrical noise which is usually associated with capacitive and low-level-signal reception, and permits minimum electrical energy to be required by the circuitry of P Terminal 12 ... the output XMTR 130 of the interface 108 on the P Terminal 12, is aligned with the input receiver 126 of the I Module 14.

Id., col. 9, ll. 48-61. NCR submits that the block diagram of Figure 12, illustrates the basic optical coupling principle of aligning the output optical transmitter of the P Terminal with the input optical receiver of the I Module, and vice versa. *See* Figure 12.

Based on these disclosures, NCR argues that both optical couplers and mechanical electrical connectors are disclosed as corresponding structures. Seizing on the specification language calling for "optical coupling" and the "coupling" of the interfaces of the P Terminal and the I Module "by light," in combination with the block diagram of Figure 12 and the corresponding language in the specification, NCR contends that "optical coupling" is disclosed in a general sense, and that the corresponding structure should cover optical couplers, generally. In further support for the proposition that a broad optical coupler is sufficiently disclosed, NCR presents the following definition of an "optical coupler:"

a coupling device consisting essentially of a light source (actuated by an input signal) mounted in a light-tight housing with a light-sensitive device (which delivers the output signal). In its simpler form the arrangement consists of a lamp and photocell.

The Illustrated Dictionary of Electronics 553 (1980). NCR also points to prior art references for the purpose of showing that "optical coupling" is a term of art and that "light" in optical coupling includes infrared. *See, e.g.,* U.S. Patent No. 4,454,414 to Benton (June 12, 1984), Col. 1, ll. 13-17, Col. 5, ll. 14-19, Col. 6, ll. 60-65 (discussing "optical coupling" in which the aligned couplers for transmitting and receiving light pulses "in the infrared band").

As for whether the specification supports mechanical electrical connectors as corresponding structure, NCR contends that the above disclosure of electrical mechanical connectors as an inferior alternative to optical coupling is sufficient. It notes the specification discloses that electrical mechanical connectors, though less desirable than optical connectors, are structures that carry out the function of transferring data between the devices. NCR contends that such alternative inferior embodiments are to be included as corresponding structures under s. 112, para. 6 unless they are incapable of performing the function or the patent was distinguished as being patentable over prior art. *See* Clearstream Wastewater Sys., Inc. v. Hydro-Action, Inc., 206 F.3d 1440, 1445-46 (Fed.Cir.2000) (construing as corresponding structure a rigid-conduit system that the specification billed as inferior to the newer flexible hose system, because "the specification does not require that only the new, flexible hose system, but not the old, rigid-conduit system, could be used in the claimed wastewater treatment plant.").

In addition, NCR contends that including mechanical electrical connectors as well as optical couplers as

corresponding structure is supported by the doctrine of "claim differentiation." Claim differentiation is a guideline that suggests that it is presumptively unreasonable to adopt a construction that would result in two claims of the same patent having the same scope, because such a construction would render one claim superfluous. *See* Beachcombers, Int'l v. WildeWood Creative Prod., Inc., 31 F.3d 1154, 1162 (Fed.Cir.1994); *but see* Wenger Mfg. v. Coating Machinery Sys., 239 F.3d 1225, 1233 (Fed.Cir.2001) (noting that the doctrine of claim differentiation is a guideline and not a hard and fast rule and that claim differentiation cannot be relied upon to broaden claims beyond their correct scope or to overcome the statutory requirements of s. 112, para. 6). NCR notes that claim 7, which ultimately depends from claim 1, specifically defines the "means for transferring" as being optical ("said sensor and transmitting areas being light operated."). It argues that because claim 7 specifically narrows the "transferring means" to optical couplers, under the doctrine of claim differentiation, the scope of the claim 1 "transferring means" is necessarily broader than only optical couplers.

b. ***Palm and Handspring's Position***

Conversely, both Palm and Handspring contend that the proper construction of the "means for transferring" and the "means for communicating" excludes two-way optical couplers and electrical mechanical connectors. They contend that the proper corresponding structure identified in the specification that performs the function of transferring data between the claimed portable device and a second data handling device is not a generic "optical coupler" or mechanical electrical connector, but is specifically identified as "light modulator 20, consisting of liquid crystal material and a reflective metal layer, that is included in the output transmitter 130 of the claimed device; light detector 22 that is included in the input receiver 128 of the claimed device; and equivalents thereof." In this arrangement, the optical reflector of the P Terminal is a passive element that does not have a light source for transmitting data. Moreover, defendants assert that the range of equivalents cannot include mechanical electrical connectors or two-way active optical couplers, as these structures were expressly disclaimed in the specification or given up during prosecution of the claims at issue.

To support their argument, Palm and Handspring reference the specification of the '845 patent and '478 patent and the prosecution history of the '478 patent. Based on their reading of the specification, the defendants contend that the only corresponding structure in the specification that performs the function of transferring data between the claimed portable device and a second data handling device is the specific optical coupling arrangement described in the specification with reference to Figure 13:(1) "Light from LED 129 is modulated in accordance with the stream of data to be transferred from the I Module 14 to the P Terminal 12[;]" and (2) "The area 20 contains a liquid crystal element which is modulated in accordance with the stream of data to be transmitted from the P Terminal 12 to the I Module 14." Col. 10, ll. 2-4, 29-32. Further, the structures for performing the function of communicating with the interface module are identical. *See* '478 patent, col. 3, ll. 53-55 ("The communications between the P Terminal 12 and the I Module are carried on by an optical coupling"); '478 patent, col. 9, ll. 46-49 ("Figure 13 is a schematic diagram showing the optical coupling between the P Terminal 12 and the I Module 14 when the two are positioned in the assembled relationship shown in Figure 2"); *see also* '478 patent, col. 9, ll. 49-68 and col. 10, ll. 1-28.

The specification details the operation of these structural components to perform the communicating and transferring data between the two devices functions as follows. The structure for performing the function of transferring data *from the claimed portable device* to a second data handling device is the light modulator area 20 that is included in the output transmitter 130 of the P Terminal 12, and equivalents thereof. Id., col. 10, ll. 5-7. The light modulator 20 contains a liquid crystal element and further includes a reflective metal layer. Id., col. 10, ll. 22-29. To perform the function of transferring data to a second data handling device, the light modulator area 20 modulates its liquid crystal element in accordance with the stream of data to be transmitted from the claimed device to the second data handling device. The structure for performing the function of transferring data from a second data handling device *to the claimed portable device* is the light

detector area 22 that is included in the input receiver 128 of the claimed device, and equivalents thereof. Id., col. 10, ll. 1, 4-5. The light detector area 22 contains an array of thin-film transistors that serve as photosensors. Id., col. 10, ll. 43-44. To perform the function of transferring from a second data handling device, the light detector area 22 receives modulated light from a source on the second data handling device and converts it into an electrical signal, referred to as the detector signal. Id., col. 10, ll. 47-51. The detector signal is then outputted to input receiver 128. Id., col. 10, ll. 44-47.

According to the specifications of the Hale patents, these reflective light coupling structures avoided the alignment problems inherent in the use of mechanical electrical connectors while, at the same time solving power consumption problems associated with having to equip the claimed device with a light generating structure. As explained above, the structures involved were all placed on the more powerful I Module and use a light reflective structure that enables the claimed device to send data without having its own light-generating structures. Thus, defendants contend the corresponding structures are not simply a generic optical coupler, but the particular reflective coupling structures of Figure 13, where no light emitting structures are found on the P Terminal, and all of them are instead on the I Module.

The defendants also contend that the prosecution history lends additional support their position that the corresponding structure for the "means for transferring" and "means for communicating" is limited in this manner and does not include any generic optical coupler. *See* Cultor Corp. v. A.E. Staley Mfg. Co., 224 F.3d 1328, 1331 (Fed.Cir.2000) ("Whether a claim must, in any particular case, be limited to the specific embodiment presented in the specification, depends in each case on the specificity of the description of the invention and on the prosecution history. These sources are evaluated as they would be understood by persons in the field of invention."). Specifically, Palm and Handspring point out that to obtain the '478 patent, NCR made clear to the Patent Examiner that its "means for transferring" and "means for communicating" were limited to the disclosed energy-saving optical reflector. The defendants further contend that because the '478 patent and '845 patents are related-having overlapping inventors, identical filing dates, and essentially identical disclosures-it is proper to consider the prosecution history of the '478 patent in construing the claims of the '845 patent, especially in this instance where the construction of the "means for transferring" and "means for communicating" means-plus-function limitations are derived from the same structure in the patent specification. *See* Wang Labs., Inc., 197 F.3d at 1394; Ballard Med. Prods. v. Allegiance Healthcare Corp., 268 F.3d 1352, 1360-61 (Fed.Cir.2001) ("In light of the identical disclosures of the two patents, it was therefore appropriate for the district court to construe the means-plus-function claims of the two patents *in pari materia*"); *see also* Elkay, 192 F.3d at 980 ("When multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applied with equal force to subsequently issued patents that contain the same claim limitation").

The specific portions of the prosecution history of the '478 patent upon which the defendants rely, is reproduced in detail below. During the prosecution of the '478 patent, the Examiner rejected the submitted claims, under s. 102 and s. 103, based on certain prior art references, including U.S. Patent No. 4,454,414 to Benton (the "Benton patent") and U.S. Patent No. 4,575,621 to Dreifus (the "Dreifus patent"). In traversing the rejection, the applicants made certain arguments regarding the novelty and non-obviousness of their light-coupling arrangement as compared to the prior art. The inventors pointed out to the Examiner that the specific, power-saving structures shown in Figure 13 were what distinguished their optical coupling arrangement from the prior art:

Applicants' claim 7 [later renumbered as issued claim 1] contains the structure shown in Applicants' Fig. 13, and Applicants submit that this structure is not shown in the references cited in the previous paragraph. As stated in page 18 of Applicant's specification, a feature of the light coupling arrangement shown in Fig. 13 is that most of the energy for the coupling is supplied by the I Module 14. This light coupling arrangement is not shown in the applied references and accordingly, Applicants submit that claim 7 is patentable thereover.

Applicant's January 15, 1987 Response to Examiner's Action dated September 15, 1986, at 4. The applicants reiterated that their claims were limited to the structure of Fig. 13 when distinguishing the Benton patent and the Dreifus patent. The applicants argued that:

Benton discloses an optically coupled, portable, funds transfer system, however, Benton does not disclose the combination of elements recited in Applicants' claim 7, including the optical coupling shown in Applicants' Fig. 13 as previously discussed. This optical coupling is not shown in any of the applied references.... Dreifus uses a light emitting diode 8 as a transmitter. Applicants submit that the combination of elements included in claim 7 in conjunction with the structure shown in Fig. 13 and included in claim 7 is patentable over Benton, Dreifus, and the remaining reference cited by the Examiner.

Id. The applicants also made clear that the above statements about the novelty and non-obviousness of their optical coupling arrangement applied equally to distinguish the other claims, including independent claims 6 and 11 of the '478 patent over the same prior art references:

Independent claim 12 [later renumbered as issued claim 6] and dependent claims 13-16, Applicants submit, are patentable over the applied references for the reasons already given.... Claim 17 [later renumbered as issued claim 11] is a very specific independent claim which is directed to Applicants' system for handling data. The same arguments given for advancing the patentability of claims 7-16 are here repeated.

Id. at 7. The defendants contend that these statements should operate to exclude from the range of equivalent structures the optical coupling structures disclosed in the Benton patent and the Dreifus patent, i.e., bi-directional optical coupling systems involving the placement of an optical transmitter and optical receiver on *each* device. Moreover, the defendants argue that the surrender of such coverage is consistent with the fact that the specification discloses no optical data transfer or communications structures other than the particular reflective optical coupling structures of Fig. 13.

Last, the defendants take issue with NCR's assertion that mechanical electrical connectors are sufficiently disclosed in the specification as alternative structures to perform the claimed function. Palm and Handspring contend that the optical "means for transferring" and "means for communicating" cannot cover mechanical electrical connectors, because the patent specification makes clear that the claimed structure of the invention is optical and does not describe mechanical electrical connectors as being any part of the claimed invention; rather, it specifically distinguishes and disclaims prior art mechanical electrical connectors:

The communications between the P Terminal 12 and the I Module 14 are carried out by an optical coupling. This connection reduces noise, eliminates the precise tolerances necessary when using mechanical electrical connectors, and minimizes the electrical power consumption in the P Terminal 12.

Col. 3, l. 66-Col. 4, l. 3. Thus, in the patents-in-suit, the only structure clearly linked to the recited function of communicating with the I Module is an optical coupling. Mechanical electrical connectors are mentioned in the above passage only in passing as an example of a prior art shortcoming that was overcome by the claimed optical coupling. No person of skill in the art reading this statement in patent specification would think that the patented invention covered mechanical electrical connectors. Nowhere in the specification or claims are mechanical electrical connectors ever mentioned again. Palm and Handspring contend that this mention of mechanical electrical connectors, for the express purpose of demonstrating superior attributes of the claimed invention over the prior art is wholly insufficient to bring such structures into the ambit of the claims. *See* Signtech USA, Ltd. v. Vutek, Inc., 174 F.3d 1352, 1357 (Fed.Cir.1999) ("explicit disavowal of prior art structure" limits the means-plus-function claim limitations); J & M Corp. v. Harley-Davidson, Inc., 269 F.3d 1360, 1368 (Fed.Cir.2001) ("Structure expressly disclaimed in the specification ... cannot be considered an equivalent under the doctrine of equivalents" and may not be included within the literal scope

of a means-plus-function element. Because specification described a single clamp as a "flaw" of prior art accessories, "J & M cannot now extend the scope of its claims to include this disclaimed structure.").

c. *The Court's Construction*

The specification portions cited by Palm and Handspring make clear that one structure that corresponds to the data transferring function of the "means for transferring" and "means for communicating" claim elements is the disclosed optical reflector illustrated in Fig. 13 and described in detail in the specification. NCR argues, however, that the specification also discloses optical couplers, generally, and mechanical electrical connectors as corresponding structure.

In arguing whether it is proper to construe the corresponding structure of the "means for transferring" and "means for communicating" to include all optical couplers and mechanical electrical connectors, as NCR contends, or whether the corresponding structure should be construed as limited to the particular reflective optical coupler of Fig. 13 and excluding mechanical electrical connectors, as Palm and Handspring contends, the parties frame two issues for the court's consideration. First, does the specification disclose "mechanical electrical connectors" as a corresponding structure for the means-plus-function limitations at issue? Second, what is the significance of the prosecution history of the '478 patent on the court's construction of the corresponding structure?

The court first will take up the issue of whether mechanical electrical connectors are corresponding structure. The parties rely on the same passage from the specification to support their contrasting positions. The court reproduces that passage here:

The communications between the P Terminal 12 and the I Module 14 are carried out by an optical coupling. This connection reduces noise, eliminates the precise tolerances necessary when using mechanical electrical connectors, and minimizes the electrical power consumption in the P Terminal 12.

Col. 3, l. 66-Col. 4, l. 3. In view of the disclosures of the specification as a whole, the court concludes that this passage does not support a finding that mechanical electrical connectors are corresponding structures for the means-plus-function limitations at issue. While the above passage indicates that mechanical electrical connectors are well known in the art, nothing in the patent indicates that such connectors are within the scope of the claimed invention. To the contrary. The court agrees with Palm and Handspring that the above passage makes clear that mechanical electrical connectors are not a part of the invention. *See* Ballard Med., 268 F.3d at 1359 ("An inventor may use the specification and prosecution history to define what is his invention and what is not...."). Mere mention of mechanical electrical connectors as an example of illustrating the superiority of the particular optical coupling mechanism described in the specification cannot sweep such structures into the claimed invention, where the specification makes clear that the inventors did not intend to envelop such structures within the claim. *See* Renishaw PLC, 158 F.3d at 1250.

NCR seeks support for its position from the Federal Circuit's decision in Clearstream Wastewater Sys., Inc. v. Hydro-Action, Inc., 206 F.3d 1440 (Fed.Cir.2000). There, the court reversed the district court's grant on summary judgment, which turned on the district court's construction of the corresponding structure for the means-plus-function limitations, "means for injecting air" and the "means for aerating." In Clearstream, 206 F.3d at 1445, the specification of the patent at issue disclosed two structures that correspond to the functions of the limitations at issue. The first was the prior art, rigid-conduit, aeration system detailed at column 1, lines 54-62, of the patent:

In waste water treatment plants of this type, air is pumped into the aeration chamber through conduits that extend downwardly to a point adjacent the bottom of the chamber so that the air, as it rises, will pass through most of the liquid in the chamber. Air is usually supplied through plastic pipe, such as PVC pipe,

having fine bubble diffusers attached at the lower end. The upper end of each pipe is connected to a source of air under pressure.

The other corresponding structure to the functions of "injecting air into the waste water" and "aerating the liquid" was the new, flexible-hose system described in detail at column 2, line 60-62:

Positioned in [the rigid] conduits 32 are flexible-hoses 38 through which air is supplied to diffusers 40 connected to the end of the flexible-hoses.

Id. The construction of the district court excluded the prior art structure as a corresponding structure and found that only the new, flexible-hose system was a corresponding structure. The Federal Circuit reversed, stating that although "the written description does point out the disadvantages of the rigid-conduit system and the advantages of the flexible-hose system ... the written description does not require that only the new, flexible-hose system, but not the old, rigid-conduit system, could be used in the claimed wastewater treatment plant ... Thus it was error for the district court to conclude that the means limitations for the aerating system could only cover new elements or the preferred embodiment." *Id*.

Fairly read, Clearstream Wastewater Sys., Inc., 206 F.3d at 1445, stands for the proposition that prior art structures, where described as part of the claimed invention, are not to be construed as not being corresponding structure merely because they are not in and of themselves novel. That is, prior art structures should be construed as being corresponding structures where they are capable of performing the claimed function and described as a corresponding structure in the specification.

Clearstream does not support NCR's argument here, because, unlike the rigid conduit structures described as being part of the invention in that case, mechanical electrical connectors are in no way described as part of any embodiment of the claimed invention. In *Clearstream,* the patent at issue described two embodiments for performing the function of the means-plus-function limitation. The Federal Circuit ruled that the means-plus-function limitations would be construed to cover both disclosed embodiments. Here, by contrast, NCR's patents do not disclose a P Terminal embodiment that uses a mechanical electrical connector. The only mention of "mechanical electrical conductors" is to distinguish them and contrast them to NCR's invention, which uses a specific type of passive optical coupling. Thus, unlike the patent in *Clearstream,* which suggested that the prior art structures could well be used to perform the function, despite some disadvantages, the patents in this case do not at all suggest the use of mechanical electrical connectors to perform the data transfer or communication function. For these reasons, the court declines to include mechanical electrical connectors as a corresponding structure.FN9

FN9. Neither does the court find NCR's claim differentiation argument in favor of including mechanical electrical connectors as corresponding structure to be convincing. In this case, the specification and prosecution history clearly delineate the scope of the limitation as covering the particular structures shown on the P Terminal in Fig. 13, and equivalents thereof. The guideline of claim differentiation cannot alter this. *See* O.I. Corp. v. Tekmar Co., 115 F.3d 1576, 1582 (Fed.Cir.1997) ("Although the doctrine of claim differentiation may at times be controlling, construction of claims is not based solely upon the language of other claims; the doctrine cannot alter a definition that is otherwise clear from the claim language, description, and prosecution history.")

The court next turns to the issue of whether generic optical couplers are disclosed as corresponding structure, or whether the corresponding structure is limited to the particular reflective optical coupler described above. The parties dispute the significance of disclosures within the specification and of statements made in the prosecution history of the '478 patent.

NCR contends that since the patent states that "an optical coupler" is used, and any optical coupler can be used to perform the function of transferring data between the two devices, any generic optical coupler should constitute corresponding structure. *See* Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250 (Fed.Cir.1999) ("the statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim. Nor does the statute permit incorporation of structure from the written description beyond that necessary to perform the claimed function"). It asserts that although the structure of the specific optical coupling arrangement described in Fig. 13 is a preferred structure, because it is designed to save power, the structure of Fig. 13 is not necessary to perform the recited function of transferring data. Therefore, the structure for transferring data should not be limited to that specific structure. Id. at 1258 (holding that "district court erred by incorporating structure beyond that necessary to perform that claimed functions and by incorporating unrecited functional limitations into the claims.").

In response, Palm and Handspring contend that to abstract the detailed and specific structural disclosure of a passive optical coupling system down to a disclosure of a generic optical coupler would be improper, because the invention is not directed to a generic optical coupler, but to the specific coupling arrangement described in Fig. 13. *See* Network, LLC, 242 F.3d at 1352 ("Network's argument that the district court improperly limited the scope of claim 1 by importing the caching and pulling functions from the specification misperceives the role of claim construction in an infringement analysis. The role is neither to limit nor to broaden the claims, but to define, as a matter of law, the invention that has been patented....").

The court agrees that to construe the corresponding structure to include a generic optical coupler that is not described or linked to the claimed function in the patent specification would not be true to the disclosed invention of the patents-in-suit, which differs from a generic optical coupler in significant respects.FN10 Although the specifications state that the function is performed by use of "an optical coupling," that optical coupling is described throughout the specification as the specific passive optical coupling arrangement of Fig. 13. Moreover, the very section of the specification that refers to "an optical coupling," goes on to say that the optical coupling used "minimized the electrical power consumption in the P Terminal 12." This is a clear reference to the passive optical coupling arrangement of Fig. 13. No other type of optical coupler is disclosed that can "transfer data between said device [the P Terminal] and said second data handling device."

FN10. The disclosed reflective optical coupler differs from a generic coupler in that both the light source and light-sensitive device are placed adjacent to each other rather than opposite each other. In addition, the flow of data occurs from the P Terminal to the I Module through a reflected beam of light as opposed to from a light source, since the P Terminal has no light source of its own.

The court also finds compelling the prosecution history statements made by the applicants, regarding the distinction between the '478 patent and the Benton and Dreifus references. The statements, cited in full above, confirm and reinforce the court's conclusion that the corresponding structure should be limited to the passive optical coupler of Fig. 13 and not be expanded to cover all types of optical couplers because confirming that the "data transferring means" it limited to that specific structure enabled the applicants to distinguish the invention from prior art references that claimed other types of optical couplers. It is also clear, from the language of those statements (using the plural "for the reasons already give" and "the same arguments" in reference to applications claims 12 and 17 respectively) that it argued that the same distinctions apply to all of the relevant independent claims.

NCR contends that it is wholly improper to look at such statements where they were made during the prosecution of one patent (the '478 patent), but were made after the issuance of the '845 patent. The court disagrees. Statements made during the prosecution of a concurrently prosecuted but subsequently-issued

patent can be used as a claim construction tool in construing the claim terms of an earlier-issued related patent. *See* CVI/Beta Ventures, Inc. v. Tura L.P., 112 F.3d 1146, 1158-59 (Fed.Cir.1997) (statements made in a later prosecution "may commit [a patentee] to a particular meaning for a patent term, which meaning is then binding in litigation"); Ballard Med. Prods., 268 F.3d at 1360-61 (concluding that "[b]ecause means-plus-function claims derived their scope from the structure disclosed in the written description, and because the two patents share the same written description, all of the means-plus-function claims at issue in this case derive their scope from the same disclosed structure ....;" therefore, it was "appropriate for the district court to construe the means-plus-function claims of the two patents *in pari materia*"); *see generally,* Advanced Cardiovascular Sys., Inc. v. Medtronic, Inc., 265 F.3d 1294, 1305 (Fed.Cir.2001) ("The prosecution history of a related patent can be relevant if, for example, it addresses a limitation in common with the patent in suit"). Here, the express relationship between the '478 patent and the '845 patent is beyond dispute; aside from being filed on the same date, and sharing essentially identical disclosures, the same "means for transferring data" limitation addressed in the prosecution history of the '478 patent appears in the claims of the '845 patent.

Accordingly, for the reasons stated above, the court construes the corresponding structure of the "means for transferring" and "means for communicating" limitations as the disclosed passive optical reflector arrangement shown in Fig. 13: "light modulator area 20, consisting of a liquid crystal material and a reflective metal layer, that is included in the output transmitter 130 of the claimed device; light detector 22 that is included in the input receiver 128 of the claimed device; and equivalents thereof." Further, the range of equivalent structures does not include mechanical electrical connectors or direct optical coupling arrangements.

3. ***A display covering "substantially all of said panel."***

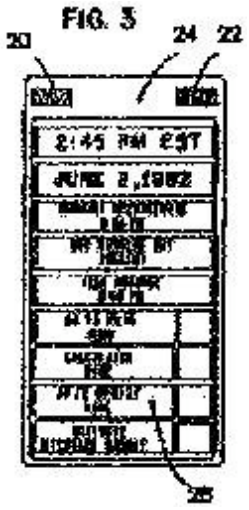
[11] The claim limitations "panel" and "substantially all of said panel" appear in claims 1 and 16 of the '845 patent and claim 11 of the '478 patent. All the claims require that the claimed device have a "panel." The "substantially all" language describes the relationship between different claim elements and the panel. Claim 1 of the '845 patent and claim 11 of the '478 patent both require that the display elements are small enough to enable the user instructions and key information to be presented over "substantially all of said panel." Claim 16 of the '845 patent requires the displaying means and data entering means to be in an overlapping relationship with the panel and to extend over "substantially all of said panel."

Palm argues that it also does not infringe claims 1 and 16 of the '845 patent and claim 11 of the '478 patent, because Palm's handheld computers do not include a display covering "substantially all of said panel." This position is based on Palm's proposed definition for the "panel" as meaning "the entire face or upper surface of the device, i.e., the face or surface where the controls are located." In opposition, NCR contends that the term panel should be defined as a smaller area, "that portion of the surface of the claimed device which functions as both a display and a keyboard," and should not be defined as encompassing the entire surface of the claimed device.FN11

FN11. The court focuses its analysis on the dispute as to the construction of "panel" and not on the dispute regarding "substantially all." Palm urges the court to place a percentage value (more than x percent) on "substantially all." The court declines this invitation. "Substantially all of the said panel" simply means "largely or essentially all" of the panel. Resolving the dispute about what constitutes the "panel" will be determinative in resolving the parties' dispute about this claim limitation.

As both parties reference Fig. 3 of the Hale patents (identifying "panel 24" and "display 26") to support their claim construction argument, the court will reproduce that figure below:

FIG. 3



a. ***Palm's Position***

Palm draws support for its proposed construction from the ordinary meaning of the term "panel" and from the specification of the patents.

First, it notes that the ordinary meaning of "panel" is the face or surface where the controls are located, as evidenced by both technical and general purpose dictionary definitions. The McGraw-Hill Dictionary of Science and Engineering (1984) defines the term "panel" as "the face of the console, which is normally equipped with lights, switches, and buttons to control the machine ...." or as "a metallic or nonmetallic sheet on which operating controls and dials of an electronic unit or other equipment are mounted." McGraw-Hill Dictionary of Science and Engineering 690, 691 (1984). Webster's New Universal Unabridged Dictionary (2d. ed.1983) defines "panel" as "an insulated board, or flat surface, for instruments or controls...." Webster's New Universal Unabridged Dictionary 1293 (2d. ed.1983).

Palm goes on to argue that, consistent with this ordinary meaning, the patent specification uses the term "panel" to refer to the entire face or upper surface of the device, "top panel 24," which is where the controls-the plurality of switches 30-are located. Col. 5, ll. 50-57; col. 5, ll. 36-43. Moreover, it notes that Figs. 3-6 of the patents identify the "top panel 24" as the entire face or upper surface of P Terminal 12. The arrow for the "panel 24" is drawn to indicate the entire face of the device, including the display 26 and the area where the transmitting area 20 and sensor 22 are located.

Last, Palm argues that under NCR's definition, "panel" is synonymous with "display." Palm asserts that this "would lead to the self-fulfilling and nonsensical construction that the display covers substantially all of the display." Palm asserts this definition is improper because the reference arrow on Figs. 3-6 makes clear that the "panel 24" covers the entire face of the P Terminal, including the display 26 and the optical coupling area.

For these reasons, Palm contends that the term panel refers to the entire face or upper surface of the device.

b. ***NCR's Position***

NCR asserts that a thorough review of the specification indicates that Palm's definition of "panel" as "the entire face or upper surface of the device" is not consistent with the manner in which the term "panel" is used in the specification or the claims of the Hale patents. *See* Vitronics, 90 F.3d at 1584 n. 6 ("Judges ... may rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents."). NCR contends that the specification clearly shows that the "panel" occupies less space than the entire surface of the claimed device.

First, NCR points out that the specification makes clear that the hard frame of the device is not included in the definition of panel. Instead, the specification refers to the "panel" as "a semi-flexible top panel 24 which functions as both a display and a keyboard." '845 patent, col. 4, ll. 19-21. The specification goes on to state that:

when viewing the top panel 24 as a display, there are display elements or pixels which are distributed over the panel 24 in a pattern that is appropriate to display information to the user. The panel can be viewed as having nine line displays 26-1 through 26-9 which will be collectively referred to as display 26.

Id., col. 4, ll. 21-26. Under Palm's definition of "panel," which includes the hard frame itself, that portion of the panel cannot function as a display or a keyboard.

Second, the specification also makes clear that the panel, which functions as a display and key-board, is distinct from and does not include the frame on the front surface of the handheld device, e.g., the Bezel frame 48 shown in Figs. 3 and 7. *See* Id., Fig. 3, Fig. 7, col. 6, ll. 17-18. The specification explains that the frame retains the display elements and the plurality of switches (the data entry mechanism) in the upper compartment. Id., col. 6, ll. 8-24. This language clearly limits the panel to that portion of the surface of the device that functions as both a display and a keyboard and excludes the portion of the surface of the device covered by the Bezel frame in the preferred embodiment.

NCR argues that this is further confirmed by reference to the claim language. In both claims 12 and 16, the language used in connection with the "substantially all" limitation does not concern the frame of the device, but is directed expressly at the display and keyboard section of the device. Claim 12 states that "the plurality of discrete switches ... [must be] arranged in a matrix of switches which ... extends over substantially all of said panel." Similarly, claim 16 requires the "said displaying means and said entering means" ... to be in "overlapping relationship relative to said panel and extending over substantially all of said panel."

As for Palm's argument that the arrows on Fig. 3-6 delineate the entire surface as the "panel," NCR contends that Palm reads too much into the arrows on the Figure. NCR contends that, when viewed in accordance with patent drafting rules for the use of arrows and lead lines in figures, it becomes clear that the arrow labeled "panel 24" is not pointing to the entire surface of the device, but is only pointing to that portion of the device that functions as a display and keyboard. The patent drafting rules indicate that arrows are to be used-as opposed to lead lines-when the location of the structure is indicated, but not touched. *See* MPEP s. 608.02 ("Lead lines ... extend to the feature indicated." "Arrows ... indicate the entire section towards which it points"). NCR argues that if "panel 24" were pointing to the surface of the device (including the frame), a lead line would have been used.

Last, NCR argues that it is not, as Palm asserts, equating the "panel" with the "display." Under NCR's definition, the panel simply overlays the display. As the specification describes the various elements as overlaying each other, such a definition is wholly consistent with the Hale patents. FN12 This is demonstrated by Fig. 7 of the Hale patents, which is "an exploded view, in perspective, of the components of the terminal shown in Fig. 1. " '845 patent, col. 2, ll. 31-32. The Bezel frame 48 is not shown in that drawing, but NCR contends that reference to Fig. 3 confirms that its would be placed over the top layer

shown on the Fig. 7. Under that, lies the plurality of switches and the display elements, which are covered with a "top, transparent, flexible, plastic-film layer 50 such as Mylar...." The specification adds that "the top transparent layer 50 (Fig.7) protects the areas 20 and 22. " '845 patent, col. 10, ll. 57-62. This, NCR argues, and not Bezel frame 48, comprises the claimed "panel" that the display elements are to extend to cover "substantially all of."

FN12. The "overlapping relationship" between the display and the panel is also confirmed by the language of claim 16 of the '845 patent and claim 6 of the '478 patent.

To illustrate NCR's argument, the court reproduces Fig. 7 and an altered version of Fig. 7 with the Bezel frame 48 overlaying the device below.

Figure 7

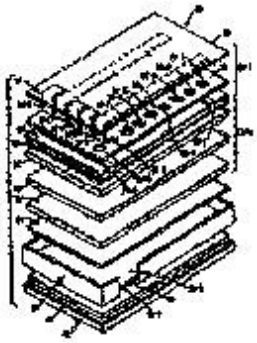
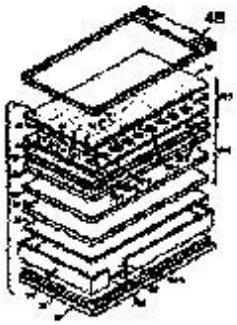


Figure 7 with Bezel Frame 48 Shown



c. *The Court's Construction*

The court finds NCR's position to be more persuasive and will adopt its proposed construction of the term "panel." The claim language and specification, including the cited Figures, indicate that the panel occupies a portion of the surface of the claimed device and that it is the semi-flexible part of the transparent terminal which overlaps the display elements and the switches so that the terminal functions as a display and a keyboard. Palm's construction would encompass even the plastic frame, which cannot function as a keyboard and display.

Further, the court does not agree that the arrow pointing to "display 24" on Fig. 3-6 includes the frame of the device. Rather, the panel is simply indicated as the viewable area of the device. As the specification makes clear that the display, data entry, and panel elements are arranged in a layered fashion, it is more instructive to look to Fig. 7. In light of Fig. 7, the court does not believe that NCR's definition simply equates the "panel" with the "display area;" instead the panel overlaysthe display area. Figs. 3-6 show a flat view of the device, where the Bezel frame 48 has been placed over the rest of the components identified in Fig. 7. This frame is not a part of the panel; it is laid over the panel.

NCR's proposed construction best comports with the specification, claims, and figures of the Hale patents.

Accordingly, the court accepts NCR's proposed construction and construes "panel" to mean "that portion of the surface of the claimed device which functions as both a display and a keyboard."

D. ***Applying The Court's Claim Construction to Accused Devices***

Having construed the disputed terms of the asserted claims of the Hale patents, the next step in the court's infringement analysis is to compare the properly construed claims to the accused devices to determine whether each limitation is found either literally or equivalently in the accused product. Markman, 52 F.3d at 976.

The court has construed the following claim terms above, as follows:

Claim Language	The Court's Construction	Corresponding Asserted Claims of '845 and '478 Patents
"Plurality of discrete switches"	"Two or more distinct and separate manual or mechanically actuated devices for making, breaking, or changing the connections in an electric circuit."	All asserted claims, except claim 16 of the '845 patent.
"Means for entering data"	The corresponding structure is the plurality of discrete switches (as described in the specification, illustrated in Fig. 7, and construed above), including capacitive-film and electrostatic-sensitive switches fabricated as an array of discrete transparent switches.	Claim 16 of the '845 patent.
"Means for communicating" and "Means for transferring data"	The corresponding structure is the disclosed passive optical reflector shown in Fig. 13: "light modulator area 20, consisting of a liquid crystal material and a reflective metal layer, that is included in the output transmitter 130 of the claimed device; light detector 22 that is included in the input receiver 128 of the claimed device; and equivalents thereof." The range of equivalent structures does not include mechanical electrical connectors or direct optical coupling arrangements.	All asserted claims.
"Substantially all of said panel"	"Panel" means "that portion of the surface of the claimed device which functions as both a display and a keyboard." "Substantially all" means "largely or essentially all."	All asserted claims, except claims 6-9 of the '478 patent.

[12] In order for NCR to successfully prove that the Palm and Handspring accused devices infringe an asserted claim of the Hale patents, the devices must contain each limitation of that claim. *See* Forest Labs., Inc. v. Abbott Labs., 239 F.3d 1305, 1310 (Fed.Cir.2001) ("A patentee claiming infringement must present proof that the accused product meets each and every claim limitation."). In NCR's motion for summary judgment, it contends that it has met this burden.

Conversely, in the defendants' cross-motions for summary judgment, both Palm and Handspring contend that NCR cannot meet its burden to prove infringement, as a matter of law, because the accused devices do not have the claimed "plurality of discrete switches" and do not have the claimed "means for transferring data" or "means for communicating." In addition, Handspring separately contends that its accused devices

do not meet the "means for entering data limitation," while Palm separately contends that its accused devices do not meet the "substantially all of said panel" limitation.

Based on the court's construction of the disputed terms, the court finds that while the accused devices satisfy the "substantially all of said panel" limitation, they do not satisfy the "means for transferring data," "means for communicating," "means for entering data," or "plurality of discrete switches" limitations. Accordingly, the Palm and Handspring devices do not infringe the Hale patents as a matter of law. As such, the court will grant the defendants' motions and will deny NCR's motion.

The court will recount its analysis below for each of the claim limitations in issue.

1. ***Do the accused devices contain a "means for transferring data" or "means for communicating"?***

All of the asserted claims require either a "means for transferring data" or a "means for communicating." A means-plus-function limitation covers only the corresponding structure disclosed in the specification and equivalents thereto. The court construed the corresponding structure for both means-plus-function limitations as: the disclosed passive optical reflector arrangement shown in Fig. 13.

The Palm and Handspring accused devices use two methods of transferring data or communicating: (1) mechanical electrical connectors (via a cradle or cable that interfaces with a PC), and (2) active LED light sources for transmitting data. Neither of these structures are literally covered by the "means for transferring data" or "means for communicating" limitations. The mechanical electrical connectors are not optical. The active LED transceivers do not employ a passive reflector arrangement.

Nor are these structures equivalent to the disclosed passive optical reflector arrangement. The Hale patents specify that the "means for transferring" and "means for communicating" structures are optical and specifically disclaim prior art mechanical electrical connectors. In addition, as the patentees themselves pointed out during prosecution of the '478 patent, the use of active LEDs to transfer data is very different from the passive energy-saving transmission mechanism in the Hale patents.

Accordingly, the court finds that the "means for transferring" and "means for communicating" limitations are not present, either literally or equivalently, in the accused devices. For this reason, NCR cannot meet its burden to prove infringement. The court will deny its motion for summary judgment on infringement, but grant the defendants' motions for summary judgment of non-infringement.

For purposes of completeness, the court will analyze the remaining claim limitations covered in its claim construction.

2. ***Do the accused devices have "a plurality of discrete switches"?***

All of the asserted claims of the Hale patents, except for claim 16 of the '845 patent (in which this term is claimed in means-plus-function format as "means for entering data"), call for "a plurality of discrete switches" overlaying the display. The Palm and Handspring accused devices have a structure for entering data that overlays the display-a resistive touch screen. NCR contends that the resistive touch screen of the accused devices, satisfies this claim limitation.

As discussed in greater detail above, NCR argued that the claim term "plurality of discrete switches" should be construed to mean transparent switches on the panel, each having an individually distinct identity such that a specific area identified on the panel causes a distinct action when that area is actuated. Based on upon this construction, NCR argues that the defendants' hand held devices meet this limitation, because "discrete switches" are created on the resistive-film touch screen of those devices. NCR explained its position as

follows. During operation of the accused devices, the liquid crystal display that is overlaid by the resistive-film touch screen delineates discrete areas on the panel, such as command buttons, which are actuated by the user by pressing the corresponding areas on the touch screen. When a user presses an area on the panel, which corresponds to a command button, a microprocessor causes the function associated with the command button to be performed.

The court defined the term "plurality of discrete switches" as "two or more distinct and separate manual or mechanically actuated devices for making, breaking, or changing the connections in an electric circuit." As so construed, the single continuous resistive touch screen of the accused devices does not literally meet the "plurality of discrete switches" limitation.

In the Hale patents, depressing a specific key area results in the closure of a specific physical switch, which completes an electrical circuit, thereby causing current to flow from one conductive element to the other. The keyboard interface scans the rows of switches in the keyboard array for any switch closures and informs the microprocessor of such closures.

In contrast to the Hale patents' use of rows of discrete switches, the touch screen digitizer employed by the accused devices is a single, continuous structure. Touching the touch screen digitizer of the accused devices with a stylus or finger does not complete or energize an electrical circuit as a "switch" or array of switches would. Rather, it merely puts two sheets of resistive material into contact with each other. A controller then applies a small voltage across each sheet of resistive material and measures the voltages at the location of the touch. These voltages are then converted from analog into digital codes to identify the coordinates of the contact point. In this manner, the resistive touch screen provides a continuous surface for registering tactile input. Nothing like this is taught in the specifications of the Hale patents.

Even, assuming arguendo, the touch screen can somehow be considered a "switch," as used in the claims, it is neither a set of "discrete" switches nor a "plurality" of switches. There would be at most only one "switch."

In its briefing, NCR argues that software on the defendants' accused devices, by rendering graphical user interface objects on the display, creates the individually distinct switches. However, software rendered graphical objects are not identical to a plurality of discrete "switches," as above defined. Such objects can neither make, break, nor change the connections in an electric circuit, because they are not physical structures. Thus, the software and analog to digital converter do not create or "fabricate" separate switches. While there is surely a plurality of areas on the display underlying the touch screen, and software may simulate the *appearance* of separate switches, these areas do not constitute a "plurality of discrete switches." FN13

FN13. As noted in the claim construction section of this opinion, the Hale patents make very clear that the claimed "switches" are distinct from the images created by the display. The claims, themselves, make clear that switches, and not merely areas on the panel, are actuated to enter data by using separate claim elements to refer to the switches and the display elements.

Nor can this limitation be met under the doctrine of equivalents. First, as described above, the touch screen digitizer and the plurality of discrete switches function to enter data in a substantially different way. In the claimed invention, data is entered by closing a particular switch and energizing a particular electrical circuit; the microprocessor is informed of which switches are closed and reacts accordingly. By contrast, in the accused devices, data is entered by means of a digitizer that measures voltages produced at the location of the touch and converts those voltages into digital coordinates. Moreover, the resistive sheets of the accused devices are "continuous" and comprise a single device for measuring tactile input. This is the precise

opposite of the "plurality" of "discrete switches" used to enter data in the patented invention. To find the single continuous touch screen to be equivalent to the plurality of discrete switches, would render the terms "plurality" and "discrete" meaningless. For these reasons, no reasonable jury could find that this limitation is met under the doctrine of equivalents.

Accordingly, the touch screen digitizer of the accused products does not comprise "a plurality of discrete switches," either literally or under the doctrine of equivalents. Therefore, this element is absent from the accused devices. This finding provides an independent basis upon which to grant the defendants' motions with respect to claim 1 of the '845 patent and claims 6 and 11 of the '478 patent, and all claims which depend from those three independent claims.

3. ***Do the accused devices have a "means for entering data"?***

Claim 16 of the '845 patent does not claim "a plurality of discrete switches." Instead it claims the data entry limitation in means-plus-function format as a "means for entering data." "Literal infringement of a s. 112, para. 6 limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be identical or equivalent to the corresponding structure in the specification." Odetics, Inc. v. Storage Tech. Corp., 185 F.3d 1259, 1267 (Fed.Cir.1999) (explaining that "[f]unctional identity and either structural identity or equivalence are both necessary"). While there is functional identity between the function of the touch screen digitizer and the claim limitation-both function to enter data into the device-there is no structural identity between the claimed means and the touch screen digitizer.

The court has construed the corresponding structure of this means-plus-function element to be coterminous with the "plurality of discrete switches," with the one caveat; that the corresponding structure can be built using capacitive-film switches or electrostatic switches, in addition to using conductive-films as described in detail in the specification and associated figures. As such, the court's conclusion that the accused devices do not contain the "plurality of discrete switches" element either literally or equivalently applies with equal force here. Particularly, the court again emphasizes, there is no structural equivalence between the plurality of discrete switches and the touch screen digitizer of the accused devices, because they do not enter data in substantially the same way. Id. at 1267 ("Structural equivalence under s. 112, para. 6 is met only if ... the assertedly equivalent structure performs the claimed function in substantially the same way to achieve substantially the same result as the corresponding structure described in the specification.").

This finding provides an independent basis upon which to grant the defendants' motions with respect to claim 16 of the '845 patent.

4. ***Do the accused devices have a display small enough in size to enable user instructions and key information to be presented over "substantially all of" the "panel"?***

The term "substantially all of said panel" is used in all of the asserted independent claims of the Hale patents except for claim 6 of the '478 patent. Claims 1 of the '845 patent and claim 11 of the '478 patent require that the discrete display elements are "small in size to enable said user instructions and key information to be presented over *substantially all of said panel*." Claim 16 of the '845 patent requires the "displaying means" and "entering means" to be in an "overlapping relationship" relative to the panel and "to extend[ ] over substantially all of said panel." Dependent claim 12 of the '845 patent also uses this language in another claim limitation, requiring "the plurality of discrete switches arranged in a matrix ... extends over *substantially all of said panel*."

The court has construed the term "panel" to mean that "that portion of the surface of the claimed device which functions as both a display and a keyboard." "Substantially all" means "largely or essentially all."

NCR asserts that the touch-sensitive plastic screens on the accused devices that display applications and information stored in the devices satisfy the "panel" claim limitation. NCR also argues that the accused devices satisfy the "substantially all of said panel" limitations as follows: (i) the LCD used with the accused devices contains 25,600 pixels in an area less than 3 inches square, and therefore, these pixels are small enough to enable user information to be displayed over the entire portion of the active area which is also overlaid by the touch screen; (ii) the touch screen overlaps all of the LCD in the region covered by the screen, and therefore, this overlapping region covers "substantially all" of the panel.

Under the court's construction, NCR is correct that the accused devices satisfy each of the "substantially all of said panel" limitations. However, to prove infringement, NCR must demonstrate that each limitation of the asserted claims is found in the accused devices. As set forth in the preceding sections, this, NCR cannot do.

III. *CONCLUSION*

Based on the application of the court's construction of certain disputed claim terms to the accused devices, the court concludes that the defendants' devices do not infringe the asserted claims of the Hale patents. The Palm and Handspring devices cannot infringe because they do not contain a "means for transferring data" or "means for communicating" with identical or equivalent structure to that disclosed and claimed in the Hale patents. The accused devices use an active LED transceiver and a mechanical electrical connector to transfer data, while the asserted claims of the Hale patents cover only passive optical reflectors as corresponding structure to accomplish the data transfer function. In addition, the Palm and Handspring devices do not contain a "plurality of discrete switches" or a "means for entering data" with identical or equivalent corresponding structure to that of the Hale patents. The accused devices enter data by using a single continuous touch screen digitizer that measures voltage gradients on the screen, while the asserted claims of the Hale patents only cover the use of a plurality of discrete physical switches whose closures are recorded by a microprocessor.

For these reasons, the court will deny NCR's motion for summary judgment, grant the defendants' motions for summary judgment of noninfringement.

The court will issue an appropriate order accompanying this memorandum opinion.

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