United States District Court,
W.D. Texas, Austin Division.

The BOARD OF REGENTS OF the UNIVERSITY OF TEXAS SYSTEM,
Plaintiff.
v.
BENQ AMERICA CORP., et al,
Defendants.

Nos. A:05CA181 SS, A:05CA198 SS, A:05CA333 SS

April 25, 2006.

Court-Filed Expert Resumes

JURY DEMANDED

KARL BAYER, Special Master.

REPORT AND RECOMMENDATION OF THE SPECIAL MASTER REGARDING UNITED STATES PATENT NO. 4,674,112

Attached hereto is the Special Master's Report and Recommendation to United States District Judge Sam Sparks regarding the construction of claims in United States Patent No. 4,674,112.

The Special Master notes that during the course of the pre-hearing and post-hearing briefing, the parties reached agreement on certain terms initially identified as being in dispute. Proposed constructions for the remaining terms are attached hereto.

In light of the parties' primary reliance on intrinsic evidence in developing their claims construction positions, which has in turn informed the Special Master's proposed constructions, the parties' respective motions to exclude evidence as well as the Plaintiff's Supplemental Offer of Exhibits are likely moot.

Thus, the Special Master recommends the admission of all the evidence submitted by the Parties with the caveat that an item's admissibility does not necessarily mean it carries any significant weight for claims construction purposes. *See* Domestic Fabrics Corp. v. Sears Roebuck & Co., 212 F.Supp.2d 489, 493 (E.D.N.C.2002) (declining to apply strict rules of evidence in *Markman* proceedings and instead excluding evidence only when the evidence was "objected to [and] its probative value was too marginal to justify the time it would take to receive it").

The parties may file written objections to the recommendations made in this report within ten (10) days from the date of their receipt of it, as discussed at the conclusion of the *Markman* hearing.

SPECIAL MASTER'S RECOMMENDED CONSTRUCTIONS

Claim Term	Special Master's Recommended Construction
syllabic element	A syllabic element is a one-syllable letter group that either comprises a word or can be combined with other one-syllable letter groups to form a word.
one or more pre-programmed codes	No construction.
communicating	No construction.
signalgenerating keyboard	No construction.
inputting a word into said keyboard by depressing a single key for each alphabetic character of said word	This phrase requires all the alphabetic characters of the word to be input, with each character to be input by a single key depression. However, there is no requirement that all of the alphabetic characters be inputted before the other steps in the method may commence.
transmitting signals generated by the key depressions	The "signals" identified in this phrase cannot consist of binary code. Otherwise, no construction is necessary.
receiving said transmitted signals and decoding the signals into binary code	No construction.
matching said binary code with one or more pre-programmed codes	Comparing the binary code with one or more pre-programmed codes until one or more corresponding pre-programmed codes is identified.
each pre-programmed code being representative of a syllabic element	No construction.
forming a representation of the word from the one or more syllabic elements	No construction.
in a form perceptible to user	No construction.
in a visually perceptible form	No construction.

SPECIAL MASTER'S RECOMMNEDED CLAIM CONSTRUCTION

"***syllabic element***" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"syllabic**	*Plaintiff's Intrinsic Support* "stored vocabulary comprising a	It is Defendants' position that the term **"syllabic**	*Defendants' Intrinsic Support* '**112 patent col. col. 2:11-17** ("The	A syllabic element is a one-syllable letter group that either comprises a word or can be combined with other one-syllable letter groups

element" means "a letter-group comprised of any number of alphabetic characters, each such letter-group forming a word or part of a word."

plurality of syllabic elements, each being representative of one or more alphabetic characters ...." Col. 8, ll. 16-19.

"the vocabulary stored in the preferred embodiment, includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generiсly [sic] referred to as 'syllabic elements.' " Col. 5, ll. 9-19.

"[t]he syllabic elements can comprise any number of alphabetic characters (for example, from 1 to 9 alphabetic characters)." Col. 1, ll. 65-68.

"there are a limited number of large

element" is indefinite.

In the alternative only, should the Court determine that this term is not indefinite, the term **"syllabic element"** could be defined as "a one syllable letter group which can be combined with other syllabic elements to form a word."

controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word. Once the particular word is identified, a signal representative of the particular word is passed to an indicating means which displays the word to the receiving person."); **2:21-28:** ("The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the binary code with th e vocabulary. The controller constructs a particular word correspondin g to the received binary code and generates a signal to the mdicating mechanism representaive of

to form a word.

	syllabic elements of 5 to 9 characters which are used to identify words that are difficult to separate into unambiguous short syllabic elements." Col. 6, ll. 33-36. "[t]he binary code [representative of a word] is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element." Col. 2, ll. 40-43. "[f]orming a representation of the word from the one or more syllabic elements represented by the matched one or more pre-programmed codes ...." Col. 9, ll. 6-8.		that particular word."), **2:40-48** ("The binary code is matched wit h a pre-programmed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person. Although the preferred embodiment anticipates using the apparatus hereof as a receiving unit, it will be appreciated that the apparatus can be easily modified within the scope of the present invention to act as a transmission unit."), **4:68-5:19** ("In practice, storing complet e word codes and ASCII representations in memory was found to limit word recognition capability to the stored word vocabulary, and	

	"in a broad sense, the apparatus 10 could incorporate a stored vocabulary word codes and the corresponding ASCII representation for each word in a memory look-up table." Col. 4, ll. 47-49.		even then, large memory size was necessary. In the preferred embodiment, "syllabic elements" are stored in memory and combined to create the words. For example, the "CON" letter group in contest, silicon, conference, contact, etc. is such a stored syllabic element. Thus, the vocabulary stored in the preferred embodiment includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generically referred to as "syllabic elements." In the preferred embodiment, it was found most efficient to include several letter strings which provide and enhance word recognition capability;
	" 'word code' is used to denote the key sequence for a particular word; that is '4357' is the word code for the word 'HELP.' " Col. 4, ll. 62-65. See also, Figures 6 and 7, and Abstract.			
	Plaintiff's Extrinsic Support "syllabic" is defined as **"1.** Of,			

pertaining to, or consisting of a syllable or syllables." The American Heritage College Dictionary, 2nd Ed. 1985.

"syllabic" is defined as "**1.** of, pertaining to, or consisting of a syllable or syllables." Webster' Encyclopedic Unabridged Dictionary of the English Language, 1989.

"syllabic" is defined as "**la.** Of or consisting of a syllable or syllables." The American Heritage College Dictionary, 4th Ed.2004.

"element" is defined as "**1.** A

therefore the vocabulary of syllabic elements in the preferred embodiment includes elements having one alphabetic letter to as many as nine alphabetic letters. Most syllabic elements have a three to six letter group size."), **5:57-58** ("The program (FIGS.5-8) and stored ssyllabic element vocabulary are fetched from ROM 42."), **5:59-6:48**

("The word recognition process is initiated as soon as an entire word code is received (as indicated by the asterisk input). Turning to FIG. 4, the

recognition search is initiated in the segmented look-up table that contains the key codes in the four bit format for the syllabic element

			vocabulary. The look-up table is segmente d according to syllabic element size with the size of the word to be decoded determining the point of entry into the look-up table. In the preferred embodiment, there are nine segments in the look-up table corresponding to syllabic elements ranging from one to nine characters in size. For words having more than nine characters, the search is initiated in the ninth segment and a new word code corresponding to the first nine keystrokes (key codes) of the word is formed (see also FIG. 6). Of course, the size of the syllabic element is known upon entry into a given	
	fundamental, essential, or irreducible constituent a composite entity." The American Heritage College Dictionary, 2nd Ed.1985.			
	"element" is defined as "**1.** a component or constituent of a whole or into which a whole may be resolved by analysis: *Letters are the elements out of which all our words are formed*." Webster's Encyclopedic Unabridged Dictionary of the English Language, 1989.			
	"element" is defined as "**1.** A fundamental, essential, or irreducible			

	constituent a composite entity." The American Heritage College Dictionary, 4th Ed.2004.		segment, therefore the number of bytes required to store the key codes for each of the syllabic elements will also be known. Although the word code typically occupies more than one byte, only the first byte is checked for a match initially. The other bytes are checked only when a match occurs for all the previous bytes for the given syllabic element. If no match is 6detected, the search proceeds to the next syllabic element in the segment of the table. If no match is found in the segment of the table for the syllabic element size equal to the size of the word, the search is continued in the segment of the next lower size. That is, the word code is recomputed to exclude the last	

received key code for later use in the recognition process. This procedure is repeated until a match occurs. At the latest, a match will occur upon entering the single character segment of the look-up table. After the first syllabic element is identified, the search is repeated using a reduced word code. The reduced word code comprises the original word code less the first N characters, where N is the size of the first syllabic element identified. This cycle is repeated until the complete word is identified. Most words are identified by connected syllabic elements 2 to 4 characters in size. However, there are a limited number of large syllabic elements of 5 to 9 characters which

			are used to identify words that are difficult to separate into unambiguous short syllabic elements. Some syllabic elements have the same word code and therefore can have multiple interpretations. Such multiple meaning syllabic elements are specially flagged in 1 the look-up table and stored in a way that the most frequently occurring interpretation is decoded first. If the element displayed on the LCD display **50** does not make sense to the reader, he can replace the string with the alternate interpretation by pressing a retry button (such as the operator or "O" key). Of course, in many cases the user can interpret such alternative interpretations from the context of	

			the other syllabic elements forming the word or other words in the message."), **7:24-28:** ("In practice, the apparatus 10 recognizes the entered words as fast as the words can be entered by the sender. Thus, the apparatus 10 is real time, displaying the de-coded word on the LCD display 50 less than 1 second after the asterisk key is depressed."); **2:18-2:28:** ("Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code. The binary code is passed to the controller which is preferably a preprogrammed microcomputer. The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the	

binary code with the vocabulary. The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word."), **2:34-2:43** ("The preferred communication method of the present invention contemplates inputting a word or series of words into a standard "Touch-tone" telephone key-board by depressing a single key for each alphabetic character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof into a binary code. The binary code is matched with a preprogrammed

			vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person.")	
			Prosecution History, Response to Office Action, dated August 11, 1986 pages 9-10: ("In contrast to the Rabiner reference, the present invention contemplates an almost unlimited vocabulary in a standard language i.e. English. Rabiner describes a data base comprises a limited vocabulary of complete words. In contrast, the present invention employs a data base of syllabic elements (i.e. syllable-like letter groups) which are *combined to form* a word of standard English text, giving an almost unlimited vocabulary.... Rabiner adopts the	

			Rabiner adopts the straight forward approach of using a lookup table vocabulary, comprising names or words. In such an approach, every possible choice must be included in the vocabulary .... Thus, in Rabiner, there is *a one-to-one correspondence between stored words and vocabulary size*. It will be appreciated that either the word choice must be very limited, or the vocabulary must be very large to encompass every possible choice. The memory requirements for such a system would be very limiting. In contrast [to Rabiner], claim 1 as amended (original claim 10) provides a structure and methodology for identifying the actual letter groups	

			while removing the potential ambiguity arising from multiple letters on each Touch-Tone key. The letter groups (syllabic elements) are identified one group at a time in a flexible manner. The present invention links the syllabic elements together as each is identified to form the word. Thus, from a limited set of stored syllabic elements, a very large vocabulary of words can be identified.") (Emphasis in original). *Defendants' Extrinsic Support* Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie and designated expert witness Professor Stanley Peters.	
"***one or pre-programmed codes***" in Claim 10				

Plaintiff's Proposed Construction	Plaintiff's Support	Defendants' Proposed Construction	Defendants' Support	Special Master's Construction
Plaintiff proposes that the term **"pre-programmed code"** means "an electronically stored representation of a **syllabic element."**	*Plaintiff's Intrinsic Support* "being representative of a syllabic element ...." Col. 9, ll. 4-5. "stored vocabulary comprising a plurality of syllabic elements, each being representative of one or more alphabetic characters ...." Col. 8, ll. 16-19. "a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element." Col. 2, ll. 41-43. "syllabic element vocabulary [is fetched] from memory." Col. 2, ll. 22-23.	It is Defendants' position that the term **"one or more pre-programmed codes"** means "a database of pre-set codes in which each of the codes represents a syllabic element, wherem the database cannot include more than a few complete words."	*Defendant's Intrinsic Support* '**112 patent col. col. 2:11-17** ("The controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word. Once the particular word is identified, a signal representative of the particular word is passed to an indicating means which displays the word to the receiving person."); **2:18-2:28:** ("Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code. The binary code is passed to the controller which is preferably a preprogrammed	No construction.

	"programmed vocabulary is stored on the ROM." Col. 3,ll.56-57. "controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word." Col. 2, ll. 11-14. Col. 4, ll. 63-65: "a stored vocabulary of word codes and the corresponding ASCII representation for each word in a memory look-up table." Col. 4, ll. 47-49: " 'word code' is used to denote the key sequence for a particular word; that is '4357' is the		microcomputer. The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the binary code with the vocabulary. The controller constructs a particular word corresponding to the received binary code and generates a singal to the indicating mechanism representative of that particular word."), **2:34-2:43** ("The preferred communication method of the present invention contemplates inputting a word or series of words into a standard "Touch-tone" key-board by depressing a single sky for each alphabetic character of the word. The characters are thus transmitted as a series to tones which ar e decoded by the apparatus hereof	

	that is "4357" is the word code for the word 'HELP.' " Col. 5, ll. 5-6: " 'syllabic elements' are stored in memory." Col. 5, ll. 9-12: "[t]hus, the vocabulary stored in the preferred embodiment includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generically [sic] referred to as 'syllabic elements.' " *Plaintiffs Extrinsic Support* "syllabic" is defined as "**1.** Of, pertaining to, or consisting of a syllable or syllables." The American Heritage College Dictionary, 2nd Ed.1985. "syllabic" is defined as "**1.** of,	the apparatus hereof int o a binary code. The binary code is matched with a preprogrammed vocabulary code representative of an alphabtic character string, such as a word or syllabic element. The word is then output to the receiving person."); **2:40-48** ("The binary code is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person. Although the preferred embodiment anticipates using the apparatus hereof as a receiving unit, it will be appreciated that the apparatus can be easily modified within the scope of the present invention to act as a transmission unit."), **4:68-5:19** ("In	

pertaining to, or consisting of a syllable or syllables." Webster's Encyclopedic Unabridged Dictionary of the English Language, 1989.

"syllabic" is defined as "**1a.** Of or consisting of a syllable or syllables." The American Heritage College Dictionary, 4th Ed.2004.

"element" is defined as "**1.** A fundamental, essential, or irreducible constituent a composite entity." The American Heritage College Dictionary, 2nd Ed.1985.

"element" is defined as "**1.** a component or

practice, storing complete word codes and ASCII representation s in memory was found to limit word recognition capability to the stored word vocabulary, and even then, large memory size was necessary. In the preferred embodiment, "syllabic elements" are stored in memory and example, the "CON" letter group in combined to create the words. For example, the "CON" letter group in contest, silicon, conference, contact, etc. is such a stored syllabic element.

Thus, the vocabulary stored in the preferred embodiment includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generically referred to as "syllabic

	constituent of a whole or into which a whole may be resolved by analysis: *Letters are the elements out of which all our words are formed*." Webster's Encyclopedic Unabridged Dictionary of the English Language, 1989.		elements." In the preferred embodiment, it was found most efficient to include several letter strings which provide and enhance word recognition capability; therefore the vocabulary of syllabic elements in the preferred embodiment includes elements having one a alphabetic letter	
	"element" is defined as "**1.** A fundamental, essential, or irreducible constituent a composite entity." The American Heritage College Dictionary, 4th Ed.2004.		to as many as nine alphabetic letters. Most syllabic elements have a three to six letter group size."), **5:57-58** ("The program (FIGS.5-8) and stored syllabic element vocabulary are fetched from ROM 42."), **5:59-6:48** ("The word recognition process is initiated as soon as an entire word code is received (as indicated by the asterisk input). Turning to FIG. 4, the recognition search is initiated in	

			the segmented look-up table that contains the key codes in the four bit format for the syllabic element vocabulary. The look-up table is segmented according to syllabic element size with the size of the word to be decoded determining the point of entry into the look-up table. In the preferred embodiment, there are nine segments in the look-up table corresponding to syllabic elements ranging from one to nine characters in size. For words having more than nine characters, the search is initiated in the ninth segment and a new word code corresponding to the first nine keystrokes (key codes) of the word is formed (see also FIG. 6). Of course, the size of the syllabic element is known upon entry into a given segment, therefore	

segment, therefore the number of bytes required to store the key codes for each of the syllabic elements will also be known. Although the word code typically occupies more than one byte, only the first byte is checked for a match initially. The other bytes are checked only when a match occurs for all the previous bytes for the given syllabic element. If no match is detected, the search proceeds to the next syllabic element in the segment of the table. If no match is found in the segment of the table for the syllabic element size equal to the size of the word, the search is continued in the segment of the next lower size. That is, the word code is recomputed to exclude the last received key code for later use in the recognition process. This procedure is repeated until a match occurs. At the

			latest, a match will occur upon entering the single character segment of the look-up table.	
			After the first syllabic element is identified, the search is repeated using a reduced word code. The reduced word code comprises the original word code less the first N characters, where N is the size of the first syllabic element identified. This cycle is repeated until the complete word is identified. Most words are identified by connected syllabic elements 2 to 4 characters in size. However, there are a limited number of large syllabic elements of 5 to 9 characters which are used to identify words that are difficult to separate into unambiguous short syllabic elements. Some syllabic elements have the same word code and therefore can have multiple interpretations. Such multiple meaning	

			syllabic elements are specially flagged in 1 the look-up table and stored in a way that the most frequently occurring interpretation is decoded first. If the element displayed on the LCD display **50** does not make sense to the reader, he can replace the string with the alternate interpretation by pressing a retry button (such as the operator or "O" key). Of course, in many cases the user can interpret such alternative interpretations from the context of the other syllabic elements forming the word or other words in the message."), **7:24-28:** ("In practice, the apparatus 10 recognizes the entered words as fast as the words can be entered by the sender. Thus, the apparatus 10 is real time, displaying the de-coded word on the LCD display 50 less than 1 second after the asterisk key is depressed.").	

			Prosecution History, Response to Office Action, dated August 11, 1986 pages 9-10: ("In contrast to the Rabiner reference, the present invention contemplates an almost unlimited vocabulary in a standard language i.e. English. Rabiner describes a data base comprises a limited vocabulary of complete words. In contrast, the present invention employs a data base of syllabic elements (i.e. syllable-like letter groups) which are *combined to form* a word of standard English text, giving an almost unlimited vocabulary.... Rabiner adopts the straight forward approach of using a lookup table vocabulary, comprising names or words. In such an approach, every possible choice must be included in the	

vocabulary .... Thus, in Rabiner, there is a *one-to-one correspondence between stored words and vocabulary size*. It will be appreciated that either the word choice must be very limited, or the vocabulary must be very large to encompass every possible choice. The memory requirements for such a system would be very limiting. In contrast [to Rabiner], claim 1 as amended (original claim 10) provides a structure and methodology for identifying the actual letter groups while removing the potential ambiguity arising from multiple letters on each Touch-Tone key. The letter groups (syllabic elements) are identified one group at a time in a flexible manner. The present invention links the syllabic

			elements together as each is identified to form the word. Thus, from a limited set of stored syllabic elements, a very large vocabulary of words can be identified.") (Emphasis in original). *Defendants' Extrinsic Support* **From Oxford English Dictionary, 2nd Edition, 1989: ("preprogram:** to program (a computer or calculator) beforehand."). Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie.	

TERMS FOR WHICH DEFENDANTS PROPOSE A CONSTRUCTION AND PLAINTIFF DOES NOT BELIEVE REQUIRE CONSTRUCTION

A. Plaintiffs Statement: Plaintiff asserts that, at most, only two terms in the asserted claims require construction. The remainder of the language is clear and capable of being understood by a person of ordinary skill in the art without additional construction. The Court will note that Defendants are requesting the Court to construe the majority of the terms in these two claims. The Court should reject Defendants' invitation to over-construe the claim terms. Claim construction is necessary only when the meaning or scope of technical terms and words of art is unclear and in dispute. U.S. Surgical Corp. v. Ethicon, Inc., 103 F.3d 1554, 1568 (Fed.Cir.1997); Biotec Biologische Naturverpackungen GmbH & Co. KG v. Biocorp, Inc., 249 F.3d 1341, 1349 (Fed.Cir.2001). As the Federal Circuit has repeatedly emphasized, claim construction "is not an obligatory exercise in redundancy" and the trial court need not "repeat or restate every claim term in order to comply with the [*Markman*] ruling." *Id*. Accordingly, district courts routinely ignore artificial

claim constructs and refuse to construe claims when the plain and ordinary meaning of the claim terms is clear to a person of ordinary skill in the art. *See e.g.,* Zip Dee, Inc. v. Dometic Corp., 63 F.Supp.2d 868, 872 (N.D.Ill.1998); Starpay.com LLC v. Visa Int'l Serv. Ass'n, No. 3-03-CV-976-L, 2005 WL 17776, at (N.D.Tex., Jan.4, 2005); Advanced Med. Optics, Inc. v. Alcon Inc., 361 F.Supp.2d 370, 378-79 (D.Del.2005). Claim terms such as "each," "word," "keyboard," "signal," "communicating," "transmitting," "receiving," and "visually perceptible" are amply clear to anyone, especially a person of ordinary skill in the art, and require no special construction by this Court. With the exception of the two claim terms noted above ("syllabic element" and "pre-programmed code"), the following constructions set forth by the Plaintiff are provided in the alternative only, and subject to and without waiver of the Plaintiff's position that these terms do not require construction.

B. Defendants' Preliminary Response to Plaintiff's "Statement": Defendants request that the Court disregard the argument set forth as "Plaintiff's Statement" above. It is inappropriate to include argument in this jointly filed statement which is meant to set forth the parties positions on the construction of terms without argument. Although the parties have been negotiating the contents of this Joint Statement for weeks, Plaintiff provided the above argument as part of their portion of the joint statement for the first time at approximately 8:00 p.m. CT tonight. While such a late submission, in addition to being inappropriate, does not afford Defendants a reasonable opportunity to respond, the Court should be aware that Defendants disagree with Plaintiff's contention that the following claim terms need not be construed. The best and most obvious proof of this is that the parties disagree as to what the "ordinary" meaning of these terms should be. If no construction is provided, the Court would nevertheless have to pick one of the parties competing "ordinary" constructions. Accordingly, construction of the below listed terms is appropriate in this matter. Defendants will provide the Court with a further response to Plaintiff's argument in their *Markman* submission.

"A method of ***communicating,*** utilizing a ***signal-generating keyboard*** where at least some of the keys represent two or more alphabetic characters, comprising the steps of" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"communicating"** means "conveying information."	*Plaintiff's Intrinsic Support* "The present invention relates to an apparatus and method for communicating by manual entry on a keypad using a minimum of key stroke entries." Col. 1, ll. 7-9.	Defendants propose that the term **"communicating"** means "conveying information from one user to another."	*Defendants' Intrinsic Support* '**112 patent col. 1:7-1:19:** ("The present invention relates to an apparatus and method for communicating by manual entry on a key-pad using a minimum of key stroke entries. More particularly,	No construction.

			the
Plaintiff proposes	"The preferred communication method		invention relates to an apparatus and
that the term	of the present invention contemplates	Defendants	method for use by the hearing or
"signal	inputting a word or series of words into	propose that the	speech impaired to communicate over
generating	a standard "Touch-tone" telephone	term **"signal**	the telephone network using a standard
keyboard" means	keyboard by depressing a single key	**generating**	twelve key, dual tone, multi-frequency
"a keyboard that is	for each alphabetic character of the	**keyboard"** means	telephone. 2. Description of the Prior
capable of	word." Col. 2, ll. 34-38.	"a device that	Art For the hearing or speech impaired
generating a		includes a set of	to effectively communicate over a long
signal."	"Another important alternative is to	keys that produces	distance, several methods have been
	utilize the apparatus and method for	a non-binary	devised which enable nonverbal
Plaintiff proposes	other modes of communication. For	waveform in	communication over a communications
that the term	example, the apparatus and method	response to the	network, such as a telephone grid."),
"keyboard"	hereof can be incorporated into a	depression of its	**1:28-30:** ("It has been recognized that
means "a set of	paging system network, radio	keys."	it is desirable to use a standard 12 key,
keys."	telephone network, or practically any communications network where		dual tone multiple frequency (DTMF or Touch-tone) telephone to

Plaintiff proposes that the term "**signal**" means "an indicator"	ambiguity resolution is necessary because of limited keystroke inputs." Col. 2, ll. 53-59. "Of course, the apparatus 10 hereof is equally adaptable for use in many other situations. For example, with a paging system where space is limited, a small number of keys could be incorporated to efficiently send a message using the single character entry recognition of the present invention." Col. 7,ll. 32-38. "The apparatus 10 could also be used for consumers to enter orders to a vendor's computer. Many variations exist; the apparatus		communicate between the hearing or speech impaired."), **4:20-24:** ("The initial problem addressed by the present invention was to provide a simple method for the hectoring or speech impaired to communicate using standard "Touch-tone" telephones without the need for complicated equipment, such as teletypes, etc."), **2:28-2:33:** ("Preferably, the indicating means comprises a liquid crystal diode display which visually represents the word or message to the user. In another embodiment, a speech synthesizer audibly communicates the wors or message to the user"), **3:16-3:49:** ("Turning now to the drawings, a communications	

	10 enabling the entry of messages easily into a computer or practically any message receiver." Col. 7, ll. 63-67. "Still another alternative would be to use the apparatus 10 of the present invention for remote computer control by non-handicapped individuals." Col. 7,ll.49-51.		apparatus **10** is illustrated in **FIG. 1** in conjunction with a telephone network having a sending telephone **12** and receiving telephone." **52:6-30:** ("In use, the receiving individual must attach the conductive pick-up 26 to the ear portion of the band piece 16 (see FIG. 1). The sending individual simply enters the dcsired alphabetic letters of the desired message on the touch-tone telephone 12 sequentially."), **5:40-41:** ("As can be seen from **FIG** 3, the series of tones constituting each word are decoded into a binary code."), **7:30-32:** ("This represent a significant advance as a communication aid for the handicapped.").	
	"A communication apparatus and method designed to interface with a standard, twelve key, dual tone, multiple frequency telephone, which allows easy, non-verbal entry of a message. Although particularly designed for use by the hearing and/or speech impaired with a dual tone			

telephone, the apparatus is equally adapted for use with practically any communication network where a keyboard with a limited number of keys is utilized and ambiguity resolution necessary." Abstract

"outputs a signal indicative of ..." Col. 2,ll. 9-10.

"1. A communications apparatus comprising: receiving means operably connectable to a telephone or the like for receiving a series of transmitted tones corresponding to an input word and for decoding

'**112 patent col. 2:1-2:20:** ("Generally speaking, the apparatus hereof includes a receiving mechanism coupled to a telephone which receives as eries of transmitted tones corresponding to an inputted word. With a standard 'Touch-tone' telephone, each tone received by the receiving mechanism represents three alphabetic characters. The receiving mechanism translates each tone into a code-a series of codes corresponding to a word. A controller receives the series of codes and outputs a signal indicative of a particular word which corresponds to the series of

	the tones into a series of codes " Col. 8,ll. 1-5		codes. The controller advantageously has a recognition means which matches the series of	
	"12. The method of claim 10, wherein, the signal generated by the keyboard is a dual tone multiple frequency and the keyboard comprises a touch-tone telephone." Col. 9, ll. 15-17.		codes received with a programmed code sequence indicative of the particular word. Once th e particular word is identified, a signal representative of the particular word is passed to an indicating means which displays the word to the receiving person. Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code."), 2:18-2:28: ("Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code. The binary code is	
	"The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word." Col. 2,ll. 25-27.			
	"A controller receives the series			

	of codes and outputs a signal ... Once the particular word is identified, a signal representative of the particular word is passed to an indicating means...." Col. 2, ll. 8-16.		passed to the controller which is preferably a preprogrammed microcomputer. The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the binary code with the vocabulary. The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word."), **2:34-48** ("The preferred communication method of the present invention contemplates imputting a word or series of words into a standard 'Touch-tone' telephone keyboard by depressing a single	
	"It has been recognized that it is desirable to use a standard 12 key, dual tone multiple frequency (DTMF or Touch-tone) telephone to communicate between the hearing or speech impaired. Utilizing such a standard "Touch-tone" telephone would be inexpensive and provide a partial solution to the problem of transporting bulky communication equipment. A primary difficulty			

primary difficulty with using such "Touch-tone" telephones is that the industry standard telephone keypad utilizes 12 keys. Ten of the keys represent a single numeric character, while 8 of the keys each represent 3 alphabetic characters." Col. 1, ll. 27-39.

"As can be seen from FIG. 2, the standard industry key pad 18 presents twelve keys containing alphabetic and numeric characters, as well as the asterisk (*) and number ("# ") characters. FIG. 2 differs slightly from the industry standard in that in a standard touch tone telephone, the alphabetic characters "Q" and "Z" are

depressing a single key for each alphabetic character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof into a binary code. The binary code is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person.

Although the preferred embodiment anticipates using the apparatus hereof as a receiving unit, it will be appreciated that the apparatus can be easily modified within the scope of the present invention to act as a transmission unit."), **9:1-2** (Receiving

	omitted. In FIG. 2, the letters "Q" and "Z" are carried by the key representative of numeral "1"." Col. 3, 11.24-31.		said transmitted signals and decoding the signals into binary code.").	

Plaintiffs Extrinsic Support

"communicate" is defined as "**1. a.** To make known; impart; *communicate information*." The American Heritage College Dictionary, 2nd Ed.1985.

"communicate" is defined as "**la.** To convey information about; make known; impart." The American Heritage College Dictionary, 4th Ed. 2004.

"keyboard" is

Defendants' Extrinsic Support

From IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Edition, 1984:

("**signal:** (1) (data transmission): (A) A visual, audible or other indication used t o convey information. (B) The intelligence, message or effect to be conveyed over a communication system. (C) A signal wave; the physical embodiment of a message. (7) (circuits and systems). A phenomenon (visual, audible or otherwise) used to convey information. The signal is often coded, such as a modulated code, so

defined as "A set of keys, as on a piano, an organ, or a typewriter." The American Heritage College Dictionary, 2nd Ed.1985. "keyboard" is defined as "**1.** A set of keys, as on a computer terminal, typewriter, or piano." The American Heritage College Dictionary, 4th Ed. 2004.	that it requires decoding to be intelligible."). ("**signaling** (1) (data transmission); The production of an audible o r visible signal at a station or switchboard by means of an alternating or pulsing current. In a telephone system, any of several methods used to alert subscribers or operators or to establish and control connections.").
"signal" is defined as (1) (data transmission). (A) A visual, audible or other indication used to convey information." IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Edition, 1984. "signal" is defined as "**1. a.** An indicator, as a gesture or	Defendants will also rely upo n the testimony and/or affidavit of designated expert witness Professor I. Scott Mackenzie.

mechanical device, serving as a means of communication. **b.** A message communicated by such means. **2.** Something that incites action: *The execution was the signal for mass protests*. **3.** *Electronics*. An impulse or fluctuating electric quantity, such as voltage, current, or electric field strength, whose variations represent coded information. **4.** The sound, image, or message transmitted or received in telegraphy, telephony, radio, television, or radar." The American Heritage College Dictionary, 2nd Ed.1985.

	"signal" is defined as "**1a.** An indicator, such as a gesture or colored light, that serves as a means of communication. **b.** A message communicated by such means. **2.** Something that			

	incited action. **3.** Electronics An impulse or a fluctuating electric quantity, such as voltage, whose variations represent coded information. **4.** The sound, image, or message transmitted or received in telegraphy, telephony, radio, television, or radar." The American Heritage College Dictionary, 4th Ed.2004.			

"***inputting a word into said keyboard by depressing a single key for each alphabetic character of said word***" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"inputting a word into said keyboard"** means "entering letters of a word by manual entry with a	*Plaintiff's Intrinsic Support* "A prime advantage of the method and apparatus 10 is that single character entry is sufficient for communication." Col. 7, 11. 28-30. "The present	Defendants propose that the term **"inputting a word into said keyboard"** means "the act of a user entering all of the alphabetic	*Defendants' Intrinsic Support* '**112 patent Abstrace:** ("The message sender depresses a single key which corresponds to the alphabetic letter in the word being sent-because most keys on a telephone represen t three letters, such a word	This phrase requires all the alphabetic characters of the word to be input, with ea ch character to be input by a single key depression. However, there is no requirement that all of the alphabetic characters be inputted before the other steps in the method may commence.

invention relates to an
keyboard." apparatus and method for
communication by manual entry on a
Plaintiff proposes keypad using a minimum of key stroke
that the term **"by** entries." Col. 1, 11. 7-9.
depressing a
single key for "The preferred communication method
each of the present
alphabetic invention contemplates
character of said inputting a word or series of words into
word" means a standard "Touch-
"where for each tone" telephone
keyboard by depressing a single key
alphabetic for each alphabetic
character that is character of the word." Col. 2, 11. 34-38.
input via the
keyboard, a "In a broad sense,
single the present invention
key is recognizes the
depressed." possibility of using a
microprocessor-based device to enable
a single keystroke

characters for a word and an end of
word incicator into
the signal-
generating
keyboard."
Defendants propose that the term **"word"** means "a complete word."
Defendants propose that the term **"each"** means "every."

is ambiguous when sent. The apparatus receives the ambiguous word and resolves the ambiguity in favor of a preprogrammed word which is displayed to the person receiving the message. Although the apparatus can be programmed to recognize words, the apparatus is programmed with a vocabulary of syllabic elements which are used to reconstruct the word."). **Col. 1:59-68:** ("Because each keystroke can represent three possibilities, each keystroke transmitted-and therefore the composite word-is inherently ambiguous. The apparatus hereof receives the ambiguous word and reconstructs and

	per alphabetic letter." Col. 4, 11. 36-38. "[T]he method and apparatus hereof provides for a single keystroke to identify which alphabetic character is desired." Col. 1, 11.57-59. "The message sender depresses a single key which corresponds to the alphabetic letter in the word being sent ..." Abstract. "[W]ith a paging system where space is limited, a small number of keys could be incorporated to efficiently send a message using the		displays the word based upon a preprogrammed ambiguity resolution. To simplify operation and memory size, the apparatus recognizes a particular word in terms of syllabic elements. The syllabic elements can comprise any number of alphabetic characters (for example, from 1 to 9 alphabetic characters)."); **Figure 6; co l. 2:1-17:** ("Generally speaking, the apparatus hereof includes a receiving mechanism coupled to a telephone which receives a series of transmitted tones corresponding to an inputted word. With a standard 'Touch-tone' telephone, each tone received by the receiving	

	single character entry recognition of the present invention." Col. 7, 11. 34-38. "It has been recognized that it is desirable to use a standard 12 key, dual tone multiple frequency (DTMF or Touch-tone) telephone to communicate between the hearing or speech impaired.... A primary difficulty with using such "Touch-tone" telephones is that the industry standard telephone keypad utilizes 12 keys. Ten of the keys represent a single numeric character, while 8 of the keys each represent 3 alphabetic characters. To utilize such a standard "Touch-		mechanism represents three possible alphabetic characters. The receiving mechanism translates each tone into a code-a series of codes and outputs a signal indicative of a particular word which corresponds to the series of codes. The controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word. Once the particular word is passed to an indicating means which displays the word to the receiving person."), **2:34-48** ("The preferred communication metho d of the present invention contemplates inputting a word or series of words	

tone" telephone for nonverbal communication, past solutions have used multiple keystroke entries to identify a particular alphabetic letter. For example, a first depression identifies which key the desired letter appears on and a second depression identifies which letter of the three possibilities is desired for input.

The necessity for depressing two keys to identify one letter, is of course a major impedimate [sic] to effective telecommunication using a standard "Touch-tone" telephone." Col. 1, 11. 27-50.

"Therefore, in the

into a standard 'Touch-tone' telephone keyboard by depressing a single key for each alphabetic character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof into a binary code. The binary code is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person. Although the preferred embodiment anticipates using the apparatus hereof as a receiving unit, it will be appreciated that the apparatus can be easily modified within the scope of the present invention

Therefore, in the past, a single letter has been input using two keystrokes. For example, to input the alphabetic letter "H" in the word "HELP", the Operator would first push the number "4" key (row 2 column 1) followed by the "0" key (row 4, column 2) to designate the second character on the number "4" key." Col. 4, ll. 29-35. *Plaintiff's Extrinsic Support* "keyboard" is defined as "A set of keys, as on a piano, an organ, or a typewriter." The American Heritage College Dictionary, 2nd Ed.1985. "keyboard" is defined as "1. A set of keys, as on a computer terminal,	present invention to act as a transmission unit."), **4:20-43:** ("The initial problem addressed by the present invention was to provide a simple method for the hearing or speech impaired to communicate using standard "Touch-tone" telephones without the need for complicated equipment, such as teletypes, etc. Several devices and methods have been devised which allow for effective communication, but are slow and difficult to use; a large number of keystrokes are involved in inputting a message. As can be seen from FIG. 2, most keys represent three alphabetic letters. Therefore, in the past, a single letter has been input using two keystrokes. For example, to input		

			the alphabetic letter "H" in the word "HELP", the Operator would first push the number "4" key (row 2 column 1) followed by the "0" key (row 4, column 2) to designate the second character on the number "4" key. In a broad sense, the present invention recognizes the possibility of using a microprocessor-based device to enable a single keystroke per alphabetic letter. That is, it has been found that most English words are identified by the keystroke sequence required to enter the letters of the word-a character pattern recognition. Of course, the invention is equally applicable to the identification of words in other languages as well."), **4:44-49**	

typewriter, or piano." The American Heritage College Dictionary, 4th Ed. 2004.

("For example, to enter the word "HELP" the numbered keys '4,2,5, and 7' are depressed followed by a ' * '. The ' * ' key is used to delineate the end of a word. The term 'word code' is used to denote the key sequence for a particular word; that is '4357' is the word code for the word "HELP."), **4:65-5:12** ("When a sequence of word codes is entered followed by an " * ", a search could be initiated in memory which points to the correct ASCII characters to be displayed. In practice, storing complete word codes and ASCII representations in memory was found to limit word recognition capability to the stored word vocabulary, and even then, large memory size was

			necessary. In the preferred embodiment, "syllabic elements" are stored in memory and combined to create the words. For example, the "CON" letter group in contest, silicon, conference, contact, etc, is such a stored syllabic element. Thus, the vocabulary stored in the preferred embodiment includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generically referred to as "syllabic elements."), **5:30-5:36** ("The asterisk key ' * ' is used as a space to separate words. The number key '# ' is used before or after any information that should be interpreted as numeric information. Of course, the sender cannot use	

			sender cannot use abbreviations. The apparatus responds in real time, beginning the recognition process as soon as the space key is received."), **5:47-50** ("The word code comprises a series of key codes entered between the asterisk ' * ', and in the preferred embodiment can occupy up to 7 bytes, accommodating word sizes up to fourteen characters."), **5:59-61** ("The word recognition process is initiated as soon as an entire word code is received (as indicated by the asterisk input)."), **7:24-7:28** ("In practice, the apparatus **10** recognizes the entered words as fast as the words can be entered by the sender. Thus, the apparatus **10** is real time, displaying the decoded word on the LCD display	

the LCD display less than 1 second after the asterisk key is depressed."). **Figure 6, Decision Tree** ("WAS IT END OF WORD (*) KEY?" [IF] "YES"-"FORM WORD CODE TO FACILITATE DECODING").

Prosecution History, Response to Office Action, dated August 11, 1986, page 9: ("In contrast to the Rabiner reference, the present invention contemplates an almost unlimited vocabulary in a standard language i.e. English. Rabiner describes a data base comprises a limited vocabulary of complete words. In contrast, the present invention employs a data base of syllabic elements (i.e. syllable-like letter groups) which are *combined to*

			form a word of standard English text, giving an almost unlimited vocabulary.") (Emphasis in original), **page 10** ("In contrast [to Rabmer], claim i as amended (original claim 10) provides a structure and methodology for identifying the actual letter groups while removing the potential ambiguity arising from multiple letters on each Touch-Tone key. The letter groups (syllabic elements) are identified one group at a time in a flexible manner. The present invention links the syllabic elements together as each is identified to form the word. Thus, from a limited set of stored syllabic elements, a very large vocabulary of words can be identified.").	

			Defendants' Extrinsic Support **From Chambers 20th Century Dictionary, New Edition, 1983:** ("**each**:" every one separately considered." Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie	

"***transmitting signals generated by the key depressions***" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"transmitting"** means "sending."	*Plaintiff's Intrinsic Support* "That is, the method and apparatus hereof provides for a single keystroke to identify which alphabetic character is desired. Because each keystroke can represent three possibilities, each	Defendants propose that the term **"transmitting siguals generated by the key depressions"**	*Defendants' Intrinsic Support* **'112 patent Figure 1; col. col. 2:1-2:20:** ("Generally speaking, the apparatus hereof includes a receiving mechanism coupled to a telephone which receives a series of transmitted	The "signals" identified in this phrase cannot consist of binary code. Otherwis e, no construction is necessary.

keystroke transmitted-and therefore the composite word-is inherently ambiguous." Col. 1. 11. 57-61.

"Generally speaking, the apparatus hereof includes a receiving mechanism coupled to a telephone which receives a series of transmitted tones corresponding to an inputted word." Col. 2, 11. 1-4.

"The preferred communication method of the present invention contemplates inputting a word or series of words into a standard "Touch-tone" telephone keyboard by depressing a single key means "sending tones corresponding to an inputted word. With a standard 'Touch-tone' telephone, each tone received by the receiving mechanism represents three alphabetic characters. The receiving mechanism translates each tone into a code-a series o f codes corresponding to a word. A controller receives the series of codes and outputs a signal indicative of a particular word which corresponds to the series of codes. The controller advantageously has a recognition means which matches the series of codes receive d with a programmed code sequence indicative of the particular word. Once the

the no-binary waveforms corresponding to the inputted word from the signal-generating keyboard to a separate receiving device."

	for each alphabetic character of the word. The characters are thus transmitted as a series of tones which		particular word is identified, a signal representative of the particular word is passed to an indicating means which	
	are decoded by the apparatus hereof into a binary code." Col 2, 11. 34-40. "The message sender depresses a single key which corresponds to the alphabetic letter in the word being sent -because most of the keys on a telephone represent three letters, such a word is ambiguous when sent." Abstract. *Plaintiff's Extrinsic Support* "transmit" is		displays the word to the receiving person__ Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code."), **2:33-2:39:** ("The preferred communication method of the present invention contemplates inputting a word or series of word s into a standard "Touch-tone" telephone keyboard by depressing a single key for each alphabetic character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof into a	

	defined as "5a. *Electronics* To send (a signal), as by wire or radio." The American Heritage College Dictionary, 2nd Ed.1985. "transmit" is defined as "5a. *Electronics* To send (a signal), as by wire or radio." The American Heritage College Dictionary, 4th Ed.2004.		binary code"), **3:15-3:23** ("Turning now to the drawings, a communication s apparatus **10** is illustrated in FIG. 1 in conjunction with a telephone netword having a sending telephone **12** and receiving telephone **14.** Each telephone **12, 14** has a hand piece **16** and a twelve key "Touch-tone" key pad **1 8 .** Each telephone **12, 14** represents a common, industry standard touch tone system in which a key closure generates two tones according to teh dual tone multiple frequency standard."), **4:44-4:46** ("For example to enter the word "HELP" the numbered keys **'4,2,5, and** 7' are depressed followed by a ' * '. The ' * ' key is used to delineate the end of a word"), **5:30-5:36** ("The asterisk key ' * ' is used as a space to separate	

			words. The number key '# ' is used before or after any information that should be interpreted as numeric information. Of course, the sender cannot use abbreviations. The apparatus responds in real time, beginning the recognition process as soon as the space key is received."), **5:59-6:61** ("The word recognition process is initiated as soon as an entire word code is received (as indicated by the asterisk input)."), **7:24-7:28** ("In practice, the apparatus **10** recognizes the entered words as fast as the words can be entered by the sender. Thus, the apparatus **10** is real time, displaying the decoded word on the LCD display less than 1 second after the asterisk key is depressed."), **Figure 6, Decision Tree** ("WAS IT END OF WORD (*) KEY?" [IF] "YES" -> "FORM WORD CODE TO FACILITATE DECODING").	

Defendants' Extrinsic Support

From American National Dictionary for Information Processing Systems, 1984: ("**transmit:** To send data from one place for reception elsewhere.").

From Dictionary of Computers, Data Processing, and Telecommunication, 1984: ("**transmit:** (1) To send data from one place for reception elsewhere.").

From IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Edition, 1984: ("**transmit (computing machines):** To move data from one location to another location."), ("**transmission:** (data transmission): The electrical transfer of a signal, message, or other form of intelligence from one location to another.").

Defendants will also rely upon the testimony and/or affidavit

			of designated expert witness Professor I. Scott MacKenzie.	

"***receiving said transmitted signals and decoding the signals into binary code***" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"decoding the signals into binary code"** means "converting the signals into **binary code."**	*Plaintiff's Intrinsic Support* "With a standard "Touch-tone" telephone, each tone received by the receiving mechanism represents three possible alphabetic characters. The receiving mechanism translates each tone into a code-a series of codes corresponding to a word. A controller receives the series of codes and outputs a signal indicative of a particular word which corresponds to the codes." Col. 2, ll. 4-11. "The characters are thus transmitted as a series of tones which are decoded	Defendants propose that the term **"receiving said transmitted signals and decoding the signals into binary code"** means "receiving the transmitted signals at the receiving device and translating them into a binary code representing the inputted word."	*Defendants' Intrinsic Support* '**112 patent col. 2:1-2:18:** ("Generally speaking, the apparatus hereof includes a receiving mechanism coupled to a telephone which receives a series of transmitted tones corresponding to an inputted word. With a standard 'Touch-tone' telephone, each tone received by the receiving mechanism represent s three alphabetic characters. The receiving mechanism translates series of each tone into a code-a series of codes corresponding to a word. A controller receives the series of codes and outputs a signal indicative of a	No construction.

	by the apparatus hereof into a binary code. The binary code is matched with a preprogrammed vocabulary code representive [sic] of an alphabetic character string, such as a word or syllabic element." Col. 2, ll. 38-43. "The output of the automatic gain control (1.5 volts p-p) is fed to a filter section 32 (AMI S3525A integrated circuit) to separate the high and low dual tone multiple frequency bands. As shown in FIG. 6, the high and low group filter outputs are fed to a tone decoder 34 (e.g., Mostek MK-5102). The tone decoder 34 provides a four-bit binary code to the controller means 22 for each signal received at its input." Col. 2, ll. 43-50. "As can be seen		particular word which corresponds to the series of codes. The controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word. Once the particular word is identified, a signal representative of the particular word is passed to an indicating means which displays the word to the receiving person."), **2:34-2:40:** ("The preferred communication method of the present invention contemplates inputting a word or series of words into a standard "Touch-tone" telephone key-board by depressing a single key for each alphabetic character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof	

	from FIG. 3, the series of tones constituting each word decoded into a binary code. In the preferred embodiment each key depression represents a "key code" indicative of the key depressed. Two key codes are entered per byte, thus, the first byte contains the four bit binary code representation of the first two key codes of a word. The word code comprises a series of key codes entered between the asterisk " *," and in the preferred embodiment can occupy up to 7 bytes, accommodating word sizes up to fourteen characters." Col. 5, 11. 41-50.		into a binary code.'), **3:35-50:** ("In more detail, the are receiving means **20** includes an inductive pick-up **26** attachabl e to the ear portion of the hand piece 16 by a suction cup. In the preferred embodiment, a preamp **28** provides a fixed gain of 60 dB to the automatic gain control amplifier **30.** The automatic gain control amplifier **30** has a gain range of 0.1-20 dB resulting in a total gain for the amplifier section (**28,** 30) in the range of 30-100 dB. The output of the automatic gain control (1.5 volts p-p) is fed to a filter section **32** (AMI S3525A intergraded circuit) to separate the high and low dual tone multiple frequency bands. As shown in **FIG. 6,** the high	
	"Preferably, the receiving mechanism amplifies the			

ambiguous tone and decodes the tone into binary code." Col. 2, ll. 18-19.

The binary code is passed to the controller..." Col. 2, 1. 20.

Plaintiff's Extrinsic Support

"decode" is defined as "To convert from code into plan text." The American Heritage College Dictionary, 2nd Ed.1985

"decode" is defined as "**1.** To convert

from code into plain text." The American Heritage College Dictionary, 4th Ed.2004.

"binary code" is defined as "(1) a code in which each code element may be either of two distinct kinds or values."

and low group filter outputs are fed to a tone decoder **34** (e.g., Mostek MK-5102). The tone decoder **34** provides a four-bit binary code to the controller means 22 for each singal received at its input."), **5:04-41:** ("As can be seen from **FIG 3,** the series of tones constituting each word are decoded into a binary code.").

Prosecution History, Response to Office Action, dated August 11, 1986 page 10: ("In claim 1, a random message of English text can be entered into the communication apparatus and reconstructed into a message for the user.").

Defendants' Extrinsic Support

From Chambers *20th Century* Dictionary, New Edition, 1983:

IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Ed., 1984.

("**receiving**: to take, get, or catch, usu.

More or less passively: to have given or delivered to one: to experience: to take in or on: to admit: to accept ....").

From Dictionary of Information Technology, 2nd Edition, 1986:

("**receiver:** In communications and broadcasting, a device used for detecting and decoding information transmitted down a line, or optical fiber, or as a radiated electromagnetic wave.").

From Chambers *20th Century* Dictionary, New Edition, 1983:

("**decode:** v.t. to translate from a code -n. a decoded message.").

IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Edition, 1984:

("**binary code:** (1) a code in which

			each code element may be either of two distinct kinds or values, for example, the presence or absence of a pulse. (2) a code that makes use of an alphabet containing exactly two characters, usually 0 and 1. The binary number system is one of many binary codes."). Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie.	

"*matching said binary code with one or more pre-programmed codes, each pre-programmed code being representative of a syllabic element*" in Claim 10

Plaintiff's Proposed Construction	***Plaintiff's Support***	***Defendants' Proposed Construction***	***Defendants' Support***	***Special Master's Construction***
Plaintiff proposes that the term **"matching said binary code with one or more pre-programmed**	*Plaintiff's Intrinsic Support* "The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the binary code with the vocabulary. The	Defendants propose that the term **"matching said binary code with one or more pre-programmed**	*Defendants' Intrinsic Support* '**112 patent col. col. 2:11-17** ("The controller advantageously has a recognition means which matches the series o f codes received with a	"matching said binary code with one or more preprogrammed codes" means comparing the bina ry code with one or more pre-programmed codes until one or more corresponding pre-programmed codes is identified.

codes" means "comparing the **binary code** with one or more **preprogrammed codes** until one or more corresponding **preprogrammed codes** is identified."

controller constructs a particular word corresponding to the received binary code ...." Col. 2, 11.21-24.

"The controller advantageously has a recognition means which matches the series of codes received with a programmed code sequence indicative of the particular word." Col. 2., 11. 11-14.

"the microcomputer 40 begins the search process until a match is formed." Col. 7, 11. 14-15.

"Some syllabic elements have the same

codes, each pre-programmed code being representative of a syllabic element" means "each time a binary code is matched against a pre-programmed code, each such matched pre-programmed code represents a syllabic element."

programmed code sequence indicative of the particular word. Once the particular word is identified, a signal representative of the particula r word is passed to an indicating means which displays the word to the receiving person."); **2:21-28:** ("The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the bi-nary code with the vocabulary. The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word."), **2:40-48** ("The

The rest of the terms and phrases require no construction.

	word code and therefore can have multiple interpretations. Such multiple meaning syllabic elements are specially flagged in the look-up table and stored in a way that the most frequently occurring interpretation is decoded first." Col. 6, ll. 37-41. "the recognition search is initiated in the segmented look-up table that contains the key codes in the four bit format for the syllabic element vocabulary." Col. 5, ll. 62-65 "entering the mapping table with reference to the key depressed on the	Defendants propose that the term **"matching"** means "a comparison to determine identity of items."	binary code is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person. Although the preferred embodiment anticipates using the apparatus hereof as a receiving unit, it will be appreciated that the apparatus can be easily modified within th e scope of the present invention to act as a transmission unit."), **4:68-5:19** ("In practice, storing complete word codes and ASCII representations in memory was found to limit word recognition	

	keyboard for each character of the matched one or more syllabic elements ...." Col. 9, 11. 28-30. *Plaintiff's Extrinsic Support* "binary code" is defined as "(1) a code in which each code element may be either of two distinct kinds or values." IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Ed., 1984.		capability to the stored word vocabulary, and even then, large memory size was necessary. In the preferred embodiment, "syllabic elements" are stored in memory and combined to create the words. For example, the "CON" letter group in contest, silicon, conference, contact, etc. is such a stored syllabic element. Thus, the vocabulary stored in the preferred embodiment includes common letter-groups, suffixes, prefixes, single letters, and a few complete words, generically referred to as "syllabic elements." In the preferred embodiment, it was found most efficient to	

include several letter strings which provide and enhance word recognition capability; therefore the vocabulary of syllabic elements in the preferred embodiment includes elements having one alphabetic letter to as many as nine alphabetic letters. Most syllabic elements have a three to six letter group size."), **5:57-58** ("The program (FIGS.5-8) and stored syllabic element vocabulary are fetched from ROM 42."), **5:59-6:48** ("The word recognition process is initiated as soon as an entire word code is received (as indicated by the asterisk input). Turning to FIG. 4, the recognition search is initiated in the segmented look-up table that contains the key

			codes in the four bit format for the syllabic element vocabulary. The look-up table is segmented according to syllabic element size with the size of the word to be decoded determining the point of entry into the look-up table. In the preferred embodiment, there are nine segments in the look-up table corresponding to syllabic elements ranging from one to nine characters in size. For words having more than nine characters, the search is initiated in the ninth segment and a new word code corresponding to the first nine keystrokes (key codes) of the word is formed (see also FIG. 6). Of course, the size of the syllabic element is known upon entry into a given	

			segment, therefore the number of bytes required to store the key codes for each of the syllabic elements will also be known. Although the word code typically occupies more than one byte, only the first byte is checked for a match initially. The other bytes are checked only when a match occurs for all the previous bytes for the given syllabic element. If no match is detected, the search proceeds to the next syllabic element in the segment of the table. If no match is found in the segment of the table for the syllabic element size equal to the size of the word, the search is continued in the segment of the next lower size. That is, the word code	

is recomputed to exclude the last received key code for later use in the recognition process. This procedure is repeated until a match occurs. At the latest, a match will occur upon entering the single character segment of the look-up table. After the first syllabic element is identified, the search is repeated using a reduced word code. The reduced word code comprises the original word code less the first N characters, where N is the size of the first syllabic element identified. This cycle is repeated until the complete word is identified. Most words are identified by connected syllabic elements 2 to 4 characters in size. However, there are a limited number

			of large syllabic elements of 5 to 9 characters which are used to identify words thata re difficult to separate into unambiguous short syllabic elements. Some syllabic elements have the same word code and therefore can have multiple interpretations. Such multiple meaning syllabic elements are specially flagged in 1 the look-up table and stored in a way that the most frequently occurring interpretation is decoded first. If the element displayed on the LCD display **50** does not make sense to the reader, he can replace the string with the alternate interpretation by pressing a retry button (such as the operator or "O" key). Of	

course, in many cases the user can interpret such alternative interpretations from the context of the other syllabic elements forming the word or other words in the message."), **7:24-28:** ("In practice, the apparatus 10 recognizes the entered words as fast as the words can be entered by the sender. Thus, the apparatus 10 is real time, displaying the de-coded word on the LCD display 50 less than 1 second after the asterisk key is depressed."); **2:18-2:28:** ("Preferably, the receiving mechanism amplifies the ambiguous tone and decodes the tone into binary code. The binary code is passed to the controller which

			is preferably a preprogrammed microcomputer. The microcomputer fetches the word or syllabic element vocabulary from memory and begins comparing the binary code with the vocabulary. The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word."), **2:34-2:43** ("The preferred communication method of the present invention contemplates inputting a word or series of words into a standard "Touch-tone" telephone key-board by depressing a single key for each alphabetic	

			character of the word. The characters are thus transmitted as a series of tones which are decoded by the apparatus hereof into a binary code. The binary code is matched with a preprogrammed vocabulary code representative of an alphabetic character string, such as a word or syllabic element. The word is then output to the receiving person.") **Prosecution History, Response to Office Action, dated August 11, 1986 pages 9-10:** ("In contrast to the Rabiner reference, the present invention contemplates an almost unlimited vocabulary in a standard language i.e. English. Rabiner describes a data base comprises a limited vocabulary of	

complete words. In contrast, the present invention employs a data base of syllabic elements (i.e. syllable-like letter groups) which are *combined to form* a word of standard English text, giving an almost unlimited vocabulary.... Rabiner adopts the straight forward approach of using a lookup table vocabulary, comprising names or words. In such an approach, every possible choice must be included in the vocabulary .... Thus, in Rabiner, there is a *one-to-one correspondence between stored words and vocabulary size*. It will be appreciated that either the word choice must be very limited, or the vocabulary must be very large to

			encompass every possible choice. The memory requirements for such a system would be very limiting. In contrast [to Rabiner], claim 1 as amended (original claim 10) provides a structure and methodology for identifying the actual letter groups while removing the potential ambiguity arising from multiple letters on each Touch-Tone key. The letter groups (syllabic elements) are identified one group at a time in a flexible manner. The present invention links the syllabic elements together as each is identified to form the word. Thus, from a limited set of stored syllabic elements, a very large vocabulary	

of words can be identified.") (Emphasis in original).

Defendants' Extrinsic Support

From Chambers *20th Century* Dictionary, New Edition, 1983: ("**match:** n. that which tallies or exactly agrees with another thing: an equal: one able to cope with another: a condition of exact agreement, compatibility or close resemblance ...").

From American National Dictionary for Information Processing Systems, 1984: ("**match:** (1) A comparison to determine identity of items.").

From American Heritage Dictionary of the English Language, 4th Edition, 2000: ("**matching:** la. To be exactly

			like; correspond exactly."). **From The McGraw-Hill Illustrated Dictionary of Personal Computers, 4th Edition, 1990:** ("**matching:** A technique used to verify coding. Individual codes can be compared by machine against master codes to detect any that are invalid ...."). **From Oxford English Dictionary, 2nd Edition, 1989:** ("**preprogram:** to program (a computer or calculator) beforehand."). Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie.	

"***forming a representation of the word from the one or more syllabic elements***" in Claim 10

Plaintiff's Proposed Construction	Plaintiff' Support	Defendants' Proposed	Defendant's Support	Special Master's

		Construction		Construction
Plaintiff proposes that the term **"forming a representation of the word"** means "forming a representation of a word corresponding to the received binary code."	*Plaintiff's Instrinsic Support* "The controller constructs a particular word corresponding to the received binary code and generates a signal to the indicating mechanism representative of that particular word." Col. 2, ll. 24-27. "The apparatus hereof receives the ambiguous word and reconstructs and displays the word based upon a pre-programmed programmed ambiguity resolution." Col 1, ll. 61-64. *Plaintiff's Extrinsic Support* "bindary code" is defined as "(1) a code in which each code	Defendants propose that the term **"forming a representation of the word from the one or more syllabic elements"** means "forming the inputted word from the one or more syllabic elements."	*Defendants' Instrict Support* '**112 patent Figures 4-7; col. 7:11-23** ("FIG. 4 illustrates the recognition process for the word "HELP". The word code, "4357" is passed to the four character segment of the look-up table. As previously discussed, the microcomputer 40 begins the search process until a match is formed. The matched word code points to a letter positio n mapping code (LPMC) byte. As illustrated iN FIG. 4, the first letter position code (LPC) in the letter positioning mapping code (LPMC) byte has the binary code (10 for "2" which is the letter position of "H" on the number "4" key. The LPC is used as the column	No construction.

	element may be either of two distinct kinds or values." IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Ed., 1984.		pointer in the ASCII mapping table with the key code used as the row pointer to identify the letter "H".). **Prosecution History, Response to office Action, dated August 11, 1986,**	
			page 9: ("In contract to the Rabiner reference, the present invention contemplates an almost unlimited vocabulary in a standard language i.e. English. Rabiner describes a data base comprises a limited vocabulary of complete words. In contrast, the present invention employs a data base of syllabic elements (i.e. syllable-like letter groups) which are *combined to form* a word of standard English text, giving an almost	

unlimited vocabulary.") (Emphasis in original), **page 10** ("In contrast [to Rabiner], claim 1 as amended (original claim 10) provides a structure and methodology for identifying the actual letter groups while removing the potential ambiguity arising from multiple letters on each Touch-Tone key. The present invention links the syllabic elements together as each is identified to form the word. Thus, from a limited set of stored syllabic elements, a very large vocabulary of words can be identified.").

Defendants' Extrinsic Support

Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie.

"***in a form perceptible to the user***" in Claim 10

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"in a form perceptible to the user"** means "in a manner that can be discerned by the user."	*Plaintiff's Intrinsic Support* "[T]he invention relates to an apparatus and method for use by the hearing or speech impaired to communicate over the telephone network using a standard twelve key, dual tone, multi-frequency telephone." Col 1, ll. 10-13. "Although the present invention contemplates that the sender will simply use a standard touch-tone telephone and the receiver will utilize the apparatus 10, roles could be reversed. The apparatus 10 can be used as a sending device which incorporates a speech synthesizer. That is, the sender would couple the	Defendants propose that the term **"in a form perceptible to the user"** means "in a manner that can be discerned by a user at the receiving device who receives the communication from the inputting user."	*Defendants' Intrinsic Support* '**112 patent col. 1:7-1:14:** ("The present invention relates to an apparatus and method for communicating by annual entry on a key-pad using a minimum of key stroke entries. More particularly, the invention relates to an apparatus and method for use by the hearing or speech impaired t o communicate over the telephone network using a standard twelve key, dual tone, multi-frequency telephone."), **2:28-2:33** ("Preferably, the indicating means comprises a liquid crystal diode display which visually represents the word or messag e to the user. In another embodiment, a	No construction.

	device 10 to the mouth section of hand piece 16 of the sending telephone 12 and generate the message on the key pad 18. Apparatus 10 would generate synthetic speech audibly conveyed to the receiving telephone 14." Col. 7, ll. 39-48.		speech synthesizer audibly communicates the word or message to the user."), **3:16-3:19** ("Turning now to the drawings, a communications apparatus **10** is illustrated in FIG. 1 in conjunction with a telephone network having a sending telephone **12** and receiving telephone."), **3:60-68:** ("Preferably, the indicating means 24 includes a liquid crystal diode (LCD) display 50 capable of displaying two rows of alpha numeric characters of twenty characters per row. A character generator 52 is couple d to the R AM 44 and the LCD display 50 to generate standard 65 dot matrix characters on the display 50. The LCD display 50 also addresses the RAM 44 to periodically scan ASCII character data	
	"The apparatus could also be used for consumers to enter order to a vendor's computer. Many variations exist; the apparatus 10 enabling the entry of messages easily into a computer or practically any message receiver." Col. 7, 11. 63-67.			
	"Preferably, the indicating means comprises a liquid diode display which visually represents the word or			

	message to the user. In another embodiment, a speech synthesizer audibly communicates the word or message to the user." Col. 2, 11. 28-32. Col. 2, ll. 48-52: "the apparatus can be modified to utilize a speech synthesizer, with the message sender inputting a word or series of words into the telephone with the apparatus converting the input into an audible message." "Preferably, the indicating means 24 includes a liquid crystal diode (LCD) display 50 capable of displaying two rows of alphanumeric characters of twenty characters per row. A character generator 52 is coupled to the RAM 44 and the LCD		in the RAM 44."). *Defendants' Extrinsic Support* **From Merriam Webster's Collegiate Dictionary, 10th Edition, 1997:** ("**perceptible:** capable of being perceived by the senses."). Defendants will also rely upon the testimony and/or affidavit of designated expert witness Professor I. Scott MacKenzie.	

display 50 to generate standard dot matrix characters on the display." Col. 3, ll. 61-66.

Col. 8, ll. 24-26: "indicating means for receiving said signal and communicating the signal in a form perceptible to the user."

"The apparatus according to claim 1, wherein said indicating means includes a visual display for communicating said particular word." Col. 8, ll. 36-38.

"The apparatus according to claim 5, wherein said indicating means comprises a liquid crystal display module." Col. 8, ll. 39-41.

"A communication apparatus and method designed to interface with a standard, twelve

	key, dual tone, multiple frequency telephone, which allows easy, non-verbal entry of a message. Although particularly designed for use by the hearing and/or speech impaired with a dual tone telephone ...." Abstract. *See also* Figures 1, 3, 7, and 8. *Plaintiffs Extrinsic Support* "perceptible" is defined as "Capable of being perceived; discernible by the senses or mind." The American Heritage College Dictionary, 2nd Ed. 1985. "perceptible" is defined as "Capable of being perceived by the senses or the mind ... SYNONYMS ... appreciable, noticeable, discernible ...." The American Heritage College Dictionary, 4th			

	Ed.2004. "perceive" is defined as "1. To become aware of directly through any of the senses, esp. sight or hearing." The American Heritage College Dictionary, 4th Ed.2004.			

"***in a visually' perceptible form***" in Claim 11

Plaintiff's Proposed Construction	**Plaintiff's Support**	**Defendants' Proposed Construction**	**Defendants' Support**	**Special Master's Construction**
Plaintiff proposes that the term **"in a visually perceptible form"** means "in a manner that can be seen"	*Plaintiff's Intrinsic Support* "Preferably, the indicating means comprises a liquid diode display which visually represents the word or message to the user." Col. 2, ll. 28-30. "Preferably, the indicating means 24 includes a liquid crystal diode (LCD) display 50 capable of displaying two rows of alphanumeric characters of	Defendants propose that the term **"virtually perceptible form"** means "in a manner that can be seen by a user at the receiving device."	*Defendants' Intrinsic Support* '**112 patent col. 3:61-3:68:** ("Preferably, the indicating means **24** includes a liquid crystal diode (LCD) display **50** capable of displaying two rows of alpha numeric characters of twenty characters per row. A character generator **52** is coupled to the RAM **44** and the LCD display **50** to generate standard dot matrix character s on the	No construction.

	twenty characters per row. A character generator 52 is coupled to the RAM 44 and the LCD display 50 to generate standard dot matrix characters on the display." Col. 3, ll. 61-66. "The apparatus according to claim 1, wherein said indicating means includes a visual display for communicating said particular word." Col. 8, ll. 36-38. "The apparatus according to claim 5, wherein said indicating means comprises a liquid crystal display module." Col. 8,11.39-41. "A communication apparatus and method designed to interface with a		display **50.** The LCD display **50** also addresses the RAM **44** t o periodically scan ASCII character data in the RAM **44."**), **FIG. 1, Item 24.** *Defendants' Extrinsic Support* **From IEEE Standard Dictionary of Electrical and Electronics Terms, 3rd Edition, 1984:** ("visual perception (2) (light emitting diodes) The interpretation of impressions transmitted from the retina to the brain in terms of information about a physical world displayed before the eye."). Defendants will also rely upon the testimony and/or affidavit of	

	standard, twelve key, dual tone, multiple frequency telephone, which allows easy, non-verbal entry of a message. Although particularly designed for use by the hearing and/or speech impaired with a dual tone telephone...." Abstract. "The apparatus could also be used for consumers to enter order to a vendor's computer. Many variations exist; the apparatus 10 enabling the entry of messages easily into a computer or practically any message receiver." Col. 7, ll. 63-67. *See also* Figures 1, 3, 7, and 8. *Plaintiff's Extrinsic Support* "perceptible" is defined as "Capable of being perceived; discernible by the senses or mind." The American Heritage College	designated expert witness Professor I. Scott MacKenzie.		

Heritage College Dictionary, 2nd Ed. 1985.

"perceptible" is defined as "Capable of being perceived by the senses or the mind ... SYNONYMS ... appreciable, noticeable, discernible...." The American Heritage College Dictionary, 4th Ed.2004.

"perceive" is defined as "1. To become aware of directly through any of the senses, esp. sight or hearing." The American Heritage College Dictionary, 4th Ed.2004.

"visual" is defined as "1. Serving, resulting from, or pertaining to the sense of sight. 2. Capable of being seen by the eye; visible." The American Heritage College Dictionary, 2nd Ed. 1985.

"visual" is defined as "1. Of or relating to the sense of sight

	to the sense of sight. 2. Seen or able to be seen by the eye; visible." The American Heritage College Dictionary, 4th Ed.2004.			

Produced by Sans Paper, LLC.