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AhnMaTae

Phonetic Hangul Keyboard

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The AhnMaTae Phonetic Hangul Keyboard layout is the product of over two decades of research and development in both the United States and China. Through a rigorous series of test, we can show that the AhnMaTae Phonetic Hangul Keyboard layout is twice as fast to memorize the positions of the Jamo (the Korean Alphabet) compared to the Korean Standard keyboard.

This keyboard can be used for both the serial input of Korean alphabet as well as simultaneous input of Korean syllabic characters. The serial input method proved to be 9.8 % faster for beginners and 55.9 % faster by skilled persons in input process in comparison to the Korean standard system. The simultaneous method is like English stenographic shorthand machine by pushing Jamo keys with several fingers at the same time. This method of inputting is nearly as fast as a normal person speaking, and up to three times faster than the Korean standard keyboard input system.

Since Hangul is a systematic phonetic character, and AhnMaTae Phonetic Hangul Keyboard is arranged as a shorthand machine, it can be used as an effective input system to extract most character based languages in the world.

What is Hangul?

Hangul is one of two Korean writing systems (Hangul and Hanja). It was the product of court scholars, who were commissioned by King Sejong. After half a dozen years of hard work by eight scholars, the new writing system was finalized in 1443.

Top world-class linguistic scholars have high praises for Hangul. Gari K. Ledyard described in his book The Korean Language Reform of 1446: The Origin, Background, and Early History of the Korean Alphabet, 1966 that Hangul, **"rather than being developed in a piece-meal way, it is the product of deliberate, linguistically informed planning".** Another distinguished scholar, Florian Coulmas, describes "**it (Hangul) is probably the most remarkable writing system ever invented**" in his recent book, The Writing Systems of the World, 1989 & 1991. Watanabe Kiruyon and Suzuki Takao describe, **"it (Hangul) is the most rational of all writing systems"** in their book, titled, Chosengo no Susume (Recommendation of Korean Language) in 1981.

Even the most prominent word processing expert in the East Asian language, Ken Lunde, in his monumental book, CJKV Information Processing, 1999, praises by saying **"Hangul is considered to be one of the most scientific (or well-designed) writing systems due to its extremely regular and predictable structure".** Taedong Han described in his recent book Phonology of King Sejong's Era, 1998, **Hangul is not only the base for phonology of Koreans, but for the whole human being's.**

What is most remarkable about Hangul is that the consonants were designed to depict the actual articulation of the phonemes they represent; such as the shape and location of one's tongue, palate, teeth, lip and throat as words are pronounced. Coulmas states, "Systematic relationships between elements of the phonological system are thus mapped by graphical relationships between the respective signs." Professor Seuk Yon Kim of New York University, Buffalo reported at T*he International Conference on Information Processing for Korean Language (Yanji, China, 1999)*. "These Korean court scholars knew some consonants were interrelated phonetically and added a bar on non-aspirated consonants to make it an aspirated consonants, and palatalization is indicated by an additional stroke, more than five and half centuries ago." She proved this by taking actual human x-rays of oral organs when certain consonants were pronounced.

Hangul vowel uses only three basic symbols: a dot, symbolizing the sun (heaven); a horizontal line, symbolizing the earth; and a vertical line, symbolizing the upright man. With these three symbols used in

various combinations, 11 basic vowels are formed. By further combining these eleven basic vowels, one can find Hangul vowels are consisted of 66 different vowels with different sounds in ISO 60646 and Unicode 3.0.

Developmental History of Hangul

In 1446, when King Sejong promulgated Hangul in his edict, Hun Min Jung Eum (Instructing People with Correct Sound) stated that Hangul was invented out of the pity for the people who had to use difficult Chinese Characters as the sole writing system in Korea. However, despite his good intention, Hangul was benignly neglected for nearly five centuries. However, only after Korea was annexed and colonized by Japan early in the 20th century did Hangul become popular with the Korean masses. Revitalization of Hangul was seen as a form of participation and support for the independence movement; as Japanese colonial masters viciously suppressed both the Korean language and its' writing system, as a means of control and assimilation to the Japanese culture.

In the year of 1933, during the Japanese colonial periods, Korean Hangul scholars simplified the Hangul alphabet, from the original 28 to 24, by eliminating 3 consonants and 1 vowel.

How Hangul is written.

Unlike the English language, which writes each alphabet one by one left to right, Hangul is written in syllabic characters (forming characters by stacking various alphabets into one newly formed character). Hangul was written from top to bottom, a clear influence of the Chinese Hanji language. Only recently has Hangul been written from left to right.

Hangul syllabic characters are consisted of consonant(s) and vowel(s) in most cases. However, there are also consonant(s) and vowel(s) combined with trailing consonant(s) used. A consonant written before a vowel is called *Ja-eum*. A vowel is called *Mo-eum*. A trailing consonant is called *Bat-chim*.

However, naming these *Ja-eum, Mo-eum* and *Bat-chim*, as *Choseong* (Initial Sound), *Jungseong* (Middle Sound) and *Jongseong* (Final Sound) is misleading and a incorrect. Most of Hangul syllabic characters consist of *Ja-eum* and *Mo-eum* only, thus, calling *Moeum,* as *Jungseong* is a mistake. In this case, *Mo-eum* is *Jongseong*, not *Jungseong*.

When Hangul was written in the ages of calligraphy by pen or brush, the writer could adjust the size and shapes of each alphabet within the given rectangular space of a syllabic character. However this adjustment in size and placement became a handicap in applying these rules to modern machines such as the typewriter. Whereas these size and placement rules of Hangul served as an advantage to modern printing technology as the spacing between fonts was very regular.

Printing technology in Korea was, in fact, far advanced. Koreans invented and developed the moveable type font more than two hundred years before the *Gutenberg* moveable type font was invented and China before them . The Western World believes that the *Gutenberg* was the first product of the moveable type font, but this is historically inaccurate. The first movable type product is believed to be the 50-volume *Prescribed Texts for Rites of the Past and Present* printed by the printers of the Koryo Dynasty (935-1392) in the mid-1200.

Confinement of Syllabic Hangul characters into a rectangular shape was by the influence of *Hanja* (Korean pronunciation of Chinese ideograph characters, Chinese call it *Hanji*, and Japanese call it *Kanji*). The input method of Hangul on a keyboard in a serial way is the influence of the English writing system. These two influences to Hangul are the two major stumbling blocks for the mechanization of Hangul.

In my view, Hangul is a better phonetic system than International Phonetic Alphabets (IPA) and Chinese Bopomofo. While IPA has only about 110 alphabets and Bopomofo has only 40 alphabets and 5 tone marks, Hangul has total of 238 (90 initial consonants, 66 vowels and 82 trailing consonants) in Unicode3.0 and ISO/IEC 10646. Though true phonetic pronunciation values are not known for archaic vowels and consoneants. Hangul can still be the best phonetic alphabet in the world.

AhnMaTae Phonetic Hangul Keyboard system (hereafter "APHK") was developed to demonstrate that Hangul is one of the better phonetic alphabets in the world. Before we go into the details of the APHK input

system, it is necessary to review how the Hangul keyboard input system was developed. Thus, we can understand how and why the current Hangul keyboard system is ineffective and inefficient in the digital age.

How Hangul was used in the typewriter age.

The first users of the typewriter for Hangul processing were Korean Americans who settled on the Hawaii islands as farm laborers. From 1903 to 1905, there were approximately 7,300 Korean laborers who migrated to Hawaii, mainly to work at sugar and pineapple plantations. Most of the Koreans were illiterate. As soon as they arrived in Hawaii, they were forced to learn a new language, English, as a means of survival. They found that pronouncing English was difficult in itself, written English proved to be a much more difficult task. A solution to this was to write the English pronunciations using Hangul. The reason for Hangul was that it was much simpler to learn, in fact, it could be possible to acquire a basic understanding of Hangul within a day or so. Thus, as you will see American English and American machinery will have a profound impact on the development of both Hangul and Hangul machinery.

Mr. Lee Wonik, a Hangul teacher, invented a Hangul typewriter by simply changing the English alphabet typefaces with Hangul typefaces. Interestingly, this first Korean typewriter was written sideways when it was typed, thus, the paper had to be turned 90 degrees to read it as Koreans were reading from top to bottom in those days. This first typewriter was well preserved and given to the Korean government in recent years. It is assumed that the invention of this typewriter occurred somewhere around 1914. Another Hangul teacher, Song Kijoo invented an improved Hangul typewriter in the later year at Hawaii islands.

The first computerized Hangul composition machine.

In the computer age, I developed the first computerized Hangul typeset machine. Before I started publishing a monthly educational magazine, New Life, for newly migrating Koreans to the United States in 1977, I was in dire need of an efficient photo composition machine to produce a quality magazine. However, since no American manufacturer had any idea on how to produce Hangul characters, I had to search for a machine, capable of producing Hangul characters, overseas. Importing so many lead based moveable typefaces with many different sizes of several thousand pre-composed Hangul fonts from Korea was out of the question. Therefore, I initially investigated into the possibility of using an English Linotype machine with Hangul characters on it, but the quality of it was not suitable for magazine production. This linotype machine, which was invented by the Rev. David Lee of San Francisco in 1930, was producing Shinhanminbo in Los Angeles.

Finally, I imported a Japanese-made composition machine with two Hangul typeface sets in it. This was a manual machine where the operator had to locate the pre-composed Hangul syllabic characters. Pre-composed syllabic characters were placed on a glass plate to expose each character onto light sensitive paper drum. It took an average of three hours to compose a full page and the manpower cost was prohibitively high. Therefore, I had no choice but to develop a method of shortening the time of production.

The first attempt was to motorize this machine and linking it to a manual Korean typewriter. The linkage was successful, but even so the final product was nearly as slow as manually locating the Hangul typefaces. Later, I replaced the typewriter with a computer, but it was still slow as the machine itself was made for manual operation with square blocks of glass with thousand characters on it.

In 1982, I bought an American made composition machine, which was both motorized and computerized and had a high speed round drum spinning glass fonts. To produce Hangul pages, we replaced English fonts with Hangul fonts, and reprogrammed to create a much more efficient system.

At this time, I decided to work with Dr. Kong Byungwoo, an ophthalmologist, the inventor of the Kong Hangul typewriter, which had already begun to be implemented in the East Coast (U.S.). In 1985, we developed the computerized Hangul composition system. Xynatek Company in Pennsylvania developed the Hangul font. This first efficient computerized typeset system, combined with APHK, produced New Life magazine until 1991, when production was ceased

These computerized machines not only produced New Life magazine inexpensively and efficiently for thirteen years, but also did some work for the various government agencies. One such example was done for the California Department of Motor Vehicles in its production of the driver's manual and test papers for Korean readers.

My experiences in the development of these machines to process Hangul brought me into the thorough study of various Hangul keyboard and input systems. Ironically, my Hangul processing experience occurred much later than my English processing systems did. In 1956, when I was assigned to the American military installation at Osan Air Force Base (South Korea), as a Korean Augmentation to the US Army, I had to use English. I had to make my reports to my superiors, in the 8th US Army, in English. All the term papers for my night classes at the Far Eastern Extension Courses of the University of Maryland had to be submitted in English, using an English typewriter.

My Hangul typewriter use occurred much later in 1966, when I was engaged in my first church ministry in Seoul, South Korea. I used two different typewriters, one was the Kong Byungwoo system and the other was called Kim Donghoon system. Both keyboard systems had completely different keyboard arrangements. The Kong system used three sets (one set of *Ja-eum*, *Mo-eum*, and *Bat-chim*) and Kim system used five sets (two sets of *Ja-eum*, two sets of *Mo-eum*, and one set of *Bat-chim*). The Kong system was more popular even though the final character produced was odd shaped, but it was faster. Kim systems' character looked better, however, only professional typists could master the use of this five set system.

Development of Hangul Keyboard Standardization.

Park Chungheee, who has succeeded in a military coup in 1961 and became president of South Korea one later year, had ordered his subordinates to unify the Hangul keyboard system in 1969. The purpose said was to unify the different systems; however, the real purpose was to control the people. On July 21, 1969, the Prime Minister proclaimed the first Hangul standard systems, one for the typewriter, and the other for a teletypewriter. On August 26, 1983, a few years after the Park Chunghee assassination, the Prime Minister re-proclaimed that these standard Hangul keyboard systems were no longer the standard.

The short-lived first standard typewriter keyboard had 4 sets (one set of *Ja-eum*, two sets of *Mo-eum*, and one set of *Bat-chim*). This system had to use so many shift keys and produced so many irregular shapes, that the people rarely used them.

The other short-lived standard teletypewriter machine keyboard, was not used by the ordinary people and did not know of its existence. However, an interesting fact about this two set system (one set each of *Ja-eum* and *Mo-eum*) was that it had 26 Hangul Jamo instead of the 24 modern Hangul Jamo. Inventors of this system added two double vowels to match the English machine of 26 alphabets.

This standard teletypewriter machine keyboard became the standard keyboard system for computers on June 17, 1982 as KS C 5715 (This Korean Standard was renamed as KS X-5002 in 1992). Another interesting fact about the conversion of this Hangul keyboard layout, originally designed for tele-type machine to computer system was addition of 5 double consonants and 2 double vowels in addition to the existing 26 Jamo. Therefore, current computer Korean Hangul keyboards have 33 Jamo. This Hangul keyboard standard with 33 Jamo for computers also became a typewriter keyboard standard in 1985.

Problems of the Korean Standard Hangul keyboard (KS X 5002).

There is no documentation available on how that first 26-key Hangul keyboard was laid out in 1969. I can only assume that the person who laid it out had some knowledge of the English typewriter, particularly the Dvorak system, which became another American English keyboard standard in 1982.

Contrary to the traditional QWERTY system, which has vowels all over the places, the Dvorak system has all vowels on the left side of the keyboard. Similarly, all ten vowels on the Korean Standard Hangul keyboard are located on the right hand position except one.

The person(s) who designed the first Hangul keyboard was ignorant of Hangul mechanism, because it should have at least one set each of *Ja-eum*, *Mo-eum*, and *Bat-chim*. Otherwise, it can not be called Hangul. In KS X 5002 (The Korean Hangul standard keyboard), it does not separate *Jaeum* and *Batchim*.

The consequence is that the typewriter using this standard is so slow that no one uses it unless it is an absolute necessity. Who is going to use it when writing by hand is faster than the Hangul typewriter?

The problems with this standard used with a computer keyboard are numerous, but just to name a few:

1. Visual confusion – The English alphabet stays on the screen when a key is pushed, but the Hangul alphabet jumps around until the final character is completed. When a consonant alphabet is typed after a vowel, the consonant goes under the vowel. When another vowel comes after this consonant, the consonant jumps to the top of the vowel. Or this consonant attaches to the left side of the vowel if it is a vertically shaped vowel. The mingling of *Ja-eum* and *Bat-chim* causes this jumping around of consonants.
2. Unnecessary internal re-programming - In English typing, the key for the alphabet represents not only the character on the screen but also the output alphabet. Whereas the Hangul alphabets with the KS X 5002 keyboard, has to re-program it for a syllabic character and then display it on the screen. The assembled syllabic Hangul character must find the code number for the appropriate output Hangul font.
3. Too many code spaces – Like other ideograph characters, such as Chinese and Japanese, it occupies too many code spaces, thousands of them, as it can not assemble syllabic character. It only can use pre-assembled characters.
4. Can not use archaic Hangul – KS X 5002 does not have four old alphabets, and therefore, it can not use any of old Hangul documents produced prior to 1933.
5. It cannot be used as a phonetic alphabet – Since it only can extract pre-assembled syllabic modern Hangul characters, it cannot use phonetic sounds and therefore, it can not produce foreign sounds adequately, nor extract foreign language characters.
6. Too much workload on the left hand – Because it has to use left hand fingers for both *Ja-eum* and *Bat-chim*, left handwork is almost 50 % more than the right hand. Most Koreans are right-handed and this causes major problems of fatigue and mis-typing.

Problems of other Hangul keyboard system.

Within all Hangul software, there are two keyboard systems to choose from. One is called the two set system (Korean standard KS X 5002 mentioned above) and the other is called the three set system (named so because it has *Ja-eum*, *Mo-eum*, and *Bat-chim*), which was originally invented by Dr. Kong Byungwoo in 1949 solely for typewriter use. Despite the fact that this system became non-standard in 1969, people loved to use the typewriter with this three set system. And most commercial printers use this system, as it is possible to assemble Hangul (they call this method Johap, meaning assemble). However, unless you are a Hangul keyboard fanatic or a professional word-processor, no one uses it now for the following reasons.

1. Too many Jamo to remember – The Kong system had several keyboard arrangements mainly due to different typewriter configurations. However, most computer software now use a 52 Jamo key system but the arrangement is non-logical, and therefore, it takes a long time to remember which Jamo is located where. It is only possible to remember them all by using it for a considerable period of time.
2. Reversal of visual character writing order – Syllabic character writing order in Hangul is always *Ja-eum* on the left or on top of *Mo-eum*. And *Bat-chim* is always under *Ja-eum* and *Mo-eum*. However, with Kong's keyboard arrays *Ja-eum* is on the right, *Mo-eum* is in the middle and *Bat-chim* on the left. This arrangement makes for visual confusion.
3. Jamo on extreme top row – On the English computer keyboard, the top row numerals are no longer used due to the difficulty of extensive finger too far from the home row (the second row from the bottom row). It usually requires looking at the keyboard to strike the right numbers. Instead a ten key arrangement, similar

to the layout of a calculator, on the right side of the keyboard is used. Placing Hangul Jamo on the fourth row (top row) slows the input speed. This is the main reason why the Kong system is not used as the standardized simultaneous syllabic character input system, though it has separate *Ja-eum* and *Bat-chim*.

4. Left hand fingers are over used – All the *Mo-eum* and *Bat-chim* keys are located on the left, and therefore, left hand fingers have to work 60 %, while right hand fingers work only 40 %.
5. Left hand's little finger is over used – In Kong's system, 8 *Bat-chim* Jamos (total usage frequency is 5.8%) are located for the left hand little finger. Also, that little finger is used to depress the shift key.
6. Too many shift keys are used – 13 Hangul Jamo have to use the shift keys.

What is the APHK and input system?

Currently all available Hangul keyboard systems do have some problems as I explained briefly above. Standard keyboards were designed for the teletypewriter in 1969 and the 26 basic key positions had never changed since then. The Kong Byungwoo keyboard was designed for the manual typewriter in 1949 and never changed the basic 3-set system or the layout of right to left sequence.

However, we are living in a new computer age. Luckily Hangul is a perfect match for the computer age though it was invented more than five and a half centuries ago. The APHK and input system was designed to meet the needs of users and exploit computerization. Thanks to our ancestors' far fore sighted wisdom.

APHK layout positions.

Jaeum - home row and one row above left hand side (q w e r t y a s d f g)
Moeum – home row and one row above right hand side (h j k l ; ' I o p [)
Batchim – bottom row (z x c v b n m , . /)

APHK input system.

Both serial input (one by one) and/or simultaneous input (two or more keys at the same time) are possible.

Advantages of APHK system.

Conversion to APHK system will result following advantages.

1. No hardware change required - Unlike other computerized Hangul shorthand-typing machine, which require specially designed keyboards; APHK system does not require any hardware changes at all.

1. Easy to use on typewriter - The same Hangul layout can be applied to a typewriter without any alteration on the mechanical system but by simply changing typeface.

2. Easy to memorize key positions - In tests performed in the U.S. and China, it has been proven that the average memorization time for AHK takes about half an hour, as it is laid out by groups of sounds and repetition of same fingers for similar sounds. Once you memorize the eleven basic key positions on the home row, other keys can be located by similar sounds or by shapes.

4. Ergonomic design - Both hands are used equally and more frequently used keys are located on the index finger side and only three rows are used. In serial input system, only two rows are used.

5. Same sequence as Hangul is written - Hangul is written *Ja-eum* first, *Mo-eum* second, and *Bat-chim* last. *Ja-eum* is located on the top, or on the left side of *Mo-eum*. *Mo-eum* is just opposite of *Ja-eum*. *Bat-chim* is always on the bottom. AhnMaTae keyboard is *Jaeum* on the left and *Mo-eum* on the right and *Bat-chim* on the bottom.

6. All different Hangul word processor can use it - There are so many Hangul software programs that conversion from one to the other is extremely confusing. However, APHK can be used on any of the existing programs.

7. Save large code space - Since it can assemble syllabic characters with 238 Jamo only, several thousand of code spaces in ISO/IEC 10646 could be returned to ISO for the use of other languages such as Chinese and Japanese which requires more code spaces. (This will not happed due to ISO/IEC 10646 WG2 rules)

8. Old Hangul can be assembled - Neither the Korean standard system, nor the 3-set system has old Hangul Jamo. And therefore, it cannot extract any old Hangul. APHK has all old Jamo and can assemble millions of syllabic characters.

9. All foreign language can be extracted - Since Hangul are based upon phonetic characters, it can be used as an input system of other languages in the world.

10. Fastest input system - As APHK can be used as the stenography shorthand machine, it can input much faster than any other system. Serial input system, as English use, use only keys on the second and third rows, thus fingers move fewer distances than KS keyboard.

11. Easy for character and voice recognition system - Unlike two-set system, which requires internal reprogramming and creates so many problems in character and voice recognition system, APHK system can be directly assessed to the codes, monitors and printers.

12. Possibility of unifying North and South Korean keyboard systems – Since the standard keyboard systems of both North and South Korea needs to be unified; APHK is the perfect solution for it as it has so many advantages.

13. Easy to teach Hangul phonetics – Consonants are arranged by the organs of sounds created. Left to right: lips, teeth, tongue, palate and throat. Vowels are arranged by basic and diacritic sounds.

Research and development.

The first APHK was developed in 1977. And since then hundreds of changes and experiments were conducted. The final version of APHK was patented in the United States in March 2000, and in South Korea in May 2000.

The first APHK was based on the four set system (one set of *Ja-eum*, two sets of *Mo-eum* and one set of *Bat-chim*), which was the Korean standard keyboard for the typewriter in that time. I only eliminated one set of *Mo-em* from this four set system and used it for the Shaken Hangul composition machine. Only the problem with this early APHK was that the operators often complained about their slow finger movements and fatigue. Then the frequency study of Hangul alphabet usage was conducted to improve the key positions. This frequency

study was a time consuming work as the computer was not available for such work in that time. All the works were done manually, counting all *Jamo* one by one. In the early part of 1980, the pre-composed Hangul character frequency study report, published by the Korea Scientific and Technological Information Center, was available and used it for my frequency study in the later years. However, as this report is on the 2007 most frequently used pre-composed characters, it had to be de-composed each syllabic characters and recounted the 24 modern Hangul alphabet by hands.

Between 1982 and 1985, most of APHK research was conducted jointly with Dr. Kong Byung Woo, an inventor of Korean typewriting system. Since we were located thousand miles away from each other, he was in Philadelphia, PA, and I was at Hollywood, CA, most of our studies were conducted over the phone lines or through the US mail system. Occasionally I visited his office in Philadelphia and he visited mine in Hollywood. We were often argumentative. We finally jointly developed a photo composition machine to process Hangul with English machine. In that time, I established a company, International Digital, Inc. to go into a business venture with my APHK and applying it on a computerized digital composition system. This business venture was to raise money to support the Korean Community Services, a non-profit corporation. However, due to embezzlement by a South Korean businessman, this project went out of business, even before it started.

In 1985, the first publication of APHK was appeared on the New Life magazine. This article aroused so much attention that I received letters from as far as Texas, New Jersey, Pennsylvania, Toronto, Osaka, Seoul and Yanji.

My research on APHK continued until about 1990. My research on it was mainly concentrated on experimentation with different arrangement of APHK. This research was virtually discontinued from 1990 to 1996 due to my other involvement. I was working in the Washington DC as the Campaign Director of the Peaceful Reunification of Korea, a project of the National Council of Churches in the United States of America in the earlier part of it. In the later part of it, I was the Executive Director of Korean Reunification Council in California.

North & South Korean Unified Hangul Keyboard System.

In the summer of 1996, I read an article in the Internet about the International Conference on Computer Processing for Korean Language, which was scheduled in Yanji, China. This conference re-ignited my interest in the Hangul keyboard research as the delegates from North and South Korea was discussing about the unified new model of Hangul keyboard with current non-scientific standard systems of both Koreas.

As I was determined to prove it was wrong to make a new unified Hangul keyboard, I have contracted with Professor Jin ShuZi of Yanbian University to conduct the comparative study of APHK and the standard system. She has immediately hired four Korean-Chinese graduates from the Medical College. This study continued until 1997 and the end result was just astonishing. The speed of memorizing of keyboard of both systems was just beyond expectation. The APHK was twice faster than the Korean Standard. Input speed after a year later was 55.9 % faster with APHK than Korean Standard. In the later part of 1997, ten young people of different educational attainment were hired to test on the initial stages of input speed of two systems. It was proved that the APHK was 9.8 % faster than the Korean Standard. This study was reported at the International Conference on Computer Processing for Korean Language in September 1999 at Yanji, China.

Since early part of 1980', I was interested in the simultaneous input method of Hangul on computer, but I did not have time to do it. As I am retired from my church ministry as well as my community work, I can devote full-time now for Hangul development. In recent month, I have completed the first prototype of simultaneous input system on Hangul DOS's word processor, and I am in process of testing the input speed of it with this prototype input system. My preliminary test shows that the simultaneous input method with APHK is 200 % - 300 % faster than serial typing method with Korean Standard keyboard.

It is possible because:

1. Hangul syllabic character is consisted of 2.4 Hangul Jamo (alphabet).
2. A space after a word can be simultaneously input with the last syllabic character.
3. Commas, periods, question marks, and spaces after them can be simultaneously input with the last syllable.

If this simultaneous method with APHK is that faster than the serial input with Korean Standard keyboard (KS X 5002), which cannot use the simultaneous input system, it is evident that APHK will become the standard keyboard system in both North and South Korea some day. Only the time can tell when.

How APHK could be used.

Since the prototype of APHK was developed on DOS Hangul, and shared it with friends, there were some questions on how it could be used. They asked whether there are any rules on how one can type simultaneously? In fact, I do not know the answer as I never saw any one typing simultaneously on computer. It may be the first invention that one can type by pushing several fingers at the same time on computer. But I do know that the stenographic short hand typist push their fingers simultaneously on their machines. The principle is the same. Only the difference is that the vowels are located on the bottom raw on the short hand machine and you use the thumbs to push it. However, APHK has vowels on the second and third raw of right hand side and you use it with four fingers of your right hand.

I use my thumbs for typing space bar and *Bat-chim* on the bottom row. When I make double *Ja-eum,* I use any numbers on fourth raw from 1 to 6 simultaneously, instead of typing *Ja-eum* twice. Same principle is applied when I make double *Bat-chim*, but I simultaneously push any keys from 7 to 0 on fourth row. In this way I could make any syllabic characters in one stroke.

I make a habit of typing last syllabic character simultaneously with space bar, comma, period and question mark to save strokes. I use eight fingers when I type serial way; as there is no need for pushing *Bat-chim* keys on the bottom row. APHK is designed to use only two rows for serial typing.

It took me only a short while to remember the basic keys on the keyboard and to type simultaneously. When I became accustomed to type simultaneously, I found it difficult to type serial way.

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(Added on original writing)

You can download the MS Window driver for APHK simultaneous input system and Hangul keyboard sticker, free of charge, by visiting following home page.

http://ai.kaist.ac.kr/ahnmatae

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