**New Cham fonts Design**

The Cham script font is a set of drawings in art style of all the characters in the alphabet. In order to implement drawing Cham script on computers, we used software Fontographer. To type the letters Cham script on computer, usually typing directly on the keyboard with lowercase letters as (q, w, e, r, ...) and uppercase letters as (Q, W, E, R, ...) using the Shift key or turn on Caps lock. Especially, these new font using for both Windows and Macintosh operating systems.

In addition, font Cham new design also have a particular characteristic, which four characters (Takai Kuk Kak Takai, Takai KLAK, Takai Kuak) can be used simultaneously, but do not overlap and very stable position. After a period of work we have done with 3 font named *EFEOParik, EFEOPanrang* and *EFEO Udong*.

• *EFEO Parik* typeface is based on drawings presented in Cham-French dictionary of E. Aymonier & A. Cabaton published in 1906

• *EFEO Panrang* typeface is based on drawings presented in Cham-Vietnamese-French dictionary of G Moussay, published in 1971

• *EFEO Udong*, refer to Cham Cambodia script, a typeface of Akhar Thrah fonts presented in the Cham language documents comes from Cambodia and currently stored in the France library

Cham script has a total of 82 characters and adds two more punctuation characters, such as: character sign for beginning of a sentence (>), comma (,). For the convenience of typing Cham script, we design and add more 5 punctuation characters for using in Latin system, which is (‘), (“) (:) (•) (?)

In traditional Cham script systems, there are two character (/) and (z) very similar in a style of drawing. In 1963, a group of Cham intellectuals who edited the character kha (K) to be distinguishable with the character (z). Therefore, in order for users or researchers who using Cham script to easily compare of these two different characters, we design and additional traditional characters (/) in location "002F", that is characters (/) (under the question mark).

For easily to use Cham font, we divided Cham characters into different 3 positions on the keyboard:

**1). Akhar Matai Location** (final consonant group)

For using convenience, we assign all *Akhar Matai* characters (final consonant group) as `, !, @, #, $, … on the row key numbers, from the first key (~), 1, 2, 3.... to key number 9.

**2). Ina Akhar Location** (vowels and consonants group)

All of the *Ina Akhar* of Cham script such as k, K, g, G, q... located on the regional location of vowels and consonants in English keyboard, including Q, W, E, R, ... B , N, M. Also in this area, we assign an extra 6 characters of Takai Akhar, that is:

Takai kuak ( W) = Shift + w

Dar tha dar dua (E) = Shift + e

Takai krak ( R ) = Shift + r

Takai kiak ( Y ) = Shift + y

Takai kâk ( I) = Shift + i

Takai klak ( L) = Shift + l

**• Takai Akhar Location (diphthong and Semi-vowels Group)**

Except 6 characters of *takai akhar* has presented in the previous section, all of *takai akhar* (diphthong and semi-vowels) mostly remaining on the right side of the keyboard.

For example:

Paoh ngâk ( ) ) = Shift + )

Paoh thek ( - ) = lowercase keys: -

Craoh aw ( \_ ) = Shift + –

Craoh aw paoh ngâk ( = ) = lowercase keys: =

Craoh aw tut takai mâk ( + ) = Shift + +

**• Traditional *Kha* consonant Location (/)**

Particularly the traditional *Kha* consonant (/) is designed in the last position with value "002F", that key (/) under the question mark.

**Akhar Thrah Cham using in Vietnam and Cambodia**

*Cham* *Akhar Thrah* using in Vietnam and Cambodia are not much difference, except for a few characters have own drawing style. Here is the alphabet of *Cham* *Akhar Thrah* in Vietnam (red) and *Cham* *Akhar Thrah* in Cambodia (black):

**a i u e A o**

a I u e A o

**k K g G q Q**

k K g G q Q

**c C j J z Z x**

c C j J z Z x

**t T d D n N V**

t T d D n N V

**p P b B m M v**

p P b B m M v

**y r l w S s h**

y r l w S S h

**1 2 3 4 5 6 7 8 9 0**

1 2 3 4 5 6 7 8 9 0

One other point to note is *Cham* *Akhar Thrah* in Vietnam has total 82 characters while *Cham* *Akhar Thrah* in Cambodia has only 81 characters, because Cham people in Cambodia do not use *Takai Kak* ( I). In addition, there are differences on character sign for beginning of a sentence and comma. For example:

( > ) Cham in Viet Nam = (> ) Cham in Campuchia

( ,) Cham in Viet Nam = ( , ) Cham in Campuchia

And finally, all the characters of *Cham* *Akhar Thrah* alphabet in Vietnam and Cambodia are designed with the same value (position) on the keyboard.