

Title: Cham encoding discussion
 Source: Michael Everson, Everson Gunn Teoranta (IE)
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Cham has some features unique to Brahmic scripts, particularly as regards the vowel signs and initial vowels. Following are the initial vowels as they appear in the dictionary *Từ Điển Chăm-Việt*.

ᵇᵇ a, ᵇᵇ ā, ᵇᵇ i, ᵇᵇ u, ᵇᵇ ɔ, ᵇᵇ o, ᵇᵇ ai, ᵇᵇ au,
 ᵇᵇ ɸ, ᵇᵇ ya, ᵇᵇ yā, ᵇᵇ yɔ, ᵇᵇ ye, ᵇᵇ yau, ᵇᵇ
 wa, ᵇᵇ wi, ᵇᵇ wɔ; ᵇᵇ i, ᵇᵇ ī; ᵇᵇ u; ᵇᵇ e/ē; ᵇᵇ ai,
 ᵇᵇ ai, ᵇᵇ e; ᵇᵇ o, ᵇᵇ ō.

Firstly it is interesting that ᵇᵇ and ᵇᵇ both mean *i*, that ᵇᵇ and ᵇᵇ both mean *o*, and that ᵇᵇ and ᵇᵇ both mean *u*. In this case it is certain that the independent vowel must be coded independently -- the words are sorted separately in the dictionary, and the independent sign has a unique form. A number of the vowels given as independent vowels in the French source that Hugh Ross provided gave forms which do *not* occur initially in the dictionary (such as ᵇᵇ *ū*). The problem which this causes is in terms of inputting. It will be much simpler to encode only the vowel signs which do not have unique independent forms (that is, those that are not attested as ᵇᵇ plus a vowel sign), as this may well be the native perception (which would not be the case could *i*, *o* and *u* only be coded in way). Independent vowels can occur word-internally, as in ᵇᵇᵇᵇ *paan* and ᵇᵇᵇᵇ *pael*. It is possible that there is a glottal onset *pa'an* and *pa'el* in these words. In that case ᵇᵇ is really a consonant, which makes the treatment different than in other Brahmic scripts. The Cham dictionary gives a phonetic inventory in which does include a glottal stop (p. XXXIII).

The vowels ᵇᵇ ya, ᵇᵇ yā, ᵇᵇ yɔ, ᵇᵇ ye, ᵇᵇ yau, ᵇᵇ wa, ᵇᵇ wi, ᵇᵇ wɔ are not really vowels; they have a conjoined *y* and *w*, just as other consonants do: ᵇᵇ yā, ᵇᵇ byā, ᵇᵇ wa, ᵇᵇ bwa. Again, ᵇᵇ is functioning as a consonant. Note the near-minimal pairs ᵇᵇᵇᵇᵇᵇ *tayak* (*ta'yak?*) and ᵇᵇᵇᵇᵇᵇ *tayah*.

Both ᵇᵇ *roh* and ᵇᵇ *loh* can be coded by sequences, and I could not find any evidence of Sanskrit loanwords containing *r*, *l*, *r̄*, or *l̄* in the dictionary. No vowel signs for these are provided even in the French source; I do not believe that these should be coded either as independent vowels or as vowel signs.

A number of consonants have special final forms which should not be coded separately. Three finals, however, operate in the same way as in other Brahmic scripts and accordingly are given in positions 1901,

1902, and 1903 here.

I can find no evidence in the Cham dictionary for the NASAL RHYMER character (*takai dak*) of N1126. Combinations of the vowel signs with the three characters at 1901-1903 should be realized as combinations. Note the near-homoglyphs 𑜀𑜃𑜂𑜫 *kung* and 𑜀𑜃𑜂𑜫 *kou* (coded 1915 + 1941 + 1901 and 1915 + 1970 + 1941 respectively).

Virama or halant is used to create conjuncts, which occur internally and finally: 𑜀𑜃𑜂𑜫𑜀𑜃𑜂𑜫 *dakssanuk* (1926 + 1915 + 194D + 1936 + 1928 + 1915 + 194D); 𑜀𑜃𑜂𑜫𑜀𑜃𑜂𑜫 *kuhlaum* (1919 + 1941 + 1939 + 194D + 1932 + 194C + 1902) where 1932 𑜀𑜃𑜂𑜫 *la* has its conjoined form "𑜀𑜃𑜂𑜫" and not its final form since it is *preceded* by virama. Note that rendering can be complex in such instances: 𑜀𑜃𑜂𑜫𑜀𑜃𑜂𑜫 *kraik* is 1915 + 194D + 1930 + 1948 + 1915 + 194D, but only the second 𑜀𑜃𑜂𑜫 has its final form 𑜀𑜃𑜂𑜫.

Attached is a revised code table and names list for Cham. In the code table some of the consonant conjunct glyphs appear in the grey boxes; these can be ignored but their presence provides information as to how Cham could be encoded in an 8-bit system with the positions used for font representation.