Universal Multiple-Octet Coded Character Set International Organization for Standardization Organisation internationale de normalisation Международная организация по стандартизации

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Introduction

While there are divergent opinions on the ultimate origins of the Vai script and early influences on its development, there is general agreement that its beginnings as an actively used script are appropriately traced to Mɔmɔlu Duwalu Bukɛlɛ of Jondu, in what is now Grand Cape Mount County, Liberia. He is regarded within the Vai community, as well as by most scholars, as the script's inventor and chief promoter when it was first documented in the 1830s.

One of Bukɛle's cousins, Kaali Bala Ndole Wano, took as his "book-name" the *nom de plume* Rora, and produced a manuscript text of about 50 pages, *The Book of Ndole* (henceforth *Ndole*, also known as *The Book of Rora*), translated and analyzed at different times by Sigismund Koelle, Heymann Steinthal, and Gail Stewart. Other texts were written in the Vai script continuously during each decade of the 19th century, but the archives held at Jondu and Bandakoro were destroyed in warfare with the neighboring Gola tribe. Those texts still extant from this period are of much shorter length than *Ndole*, including sample manuscripts obtained separately by the American missionaries J. L. Wilson and S. R. Wynkoop in 1834, and by F. E. Forbes in 1849.

Koelle's pioneering work on Vai began with a trip into Vai country to meet Bukɛlɛ in 1849. He compiled an inventory of the characters, including several logograms then in use, and translated three Vai books. He continued referring to his work on Vai into his later years, including notes and comments published in 1884 and 1889. Other researchers who took a particular interest in Vai, following Koelle, included Maurice Delafosse, F. W. Migeod, George Washington Ellis, and August Klingenheben; and in its more recent period (post-1962), P. E. H. Hair, David Dalby, Svend Holsoe, Sylvia Scribner, Michael Cole, John Singler, and Konrad Tuchscherer.

At the beginning of the 20th century, Momolu Massaquoi had undertaken efforts to translate gospel and Qur'anic materials into Vai, proposing modifications of characters for use in representing foreign sounds. Becoming Consul to Hamburg and beginning a teaching post at the University of Hamburg, he was able to continue this work in close collaboration with Klingenheben through the 1920s and 1930s. Klingenheben's involvement culminated with a conference held at the University of Liberia in 1962 to standardize the script for modern usage; the team of Vai scholars he worked with included Fatima Massaquoi Fahnbulleh, Zuke Kandakai, S. Jangaba Johnson, and Bai Tamia Moore, among others.

Texts produced over the course of the 20th century included a manuscript of 180 pages in length in diary form, containing a number of clan histories, translations of selections from the gospels and the Qur'an, folktales and short stories, and page-long summaries included in local newsletters. This script remains in use today, particularly among Vai merchants and traders. In addition to its presence in commerce, there is a growing body of literature published in Vai. The

Bible Society in Liberia has recently published a New Testament and the Institute of Liberian Languages has published several compilations of folktales and history.

Sources

The primary sources for the Vai characters in the character set proposed are the 1962 Vai Standard Syllabary (which was a distillation of many sources specifying characters for modern use), modern primers and texts which use the Standard Syllabary (and a few glyph modifications reflecting modern preferences), the 1911 additions of Momolu Massaquoi, and the characters found in *The Book of Ndole*. Secondary sources, such as Johnston 1906 and Dalby 1967, are used as supplementary material and as checks for some of the archaic characters. Both of those sources make some unifications and some distinctions which we have not considered authoritative in terms of the proposed character set. Only those characters in Dalby's "unidentified" column which are circled in Figure 8 do we consider to be safely identified by us. Many of the characters on Dalby's charts are not proposed for encoding.

Structure

In Figure 1 the syllabary as proposed here is given in its standard presentation. Vai is a simple syllabic script written from left to right. (Strictly speaking, the writing system is based on the mora, a unit of duration [or weight] such that a short syllable has one mora and a long syllable has two. A syllable is long if it contains a long vowel or ends with a consonant) The Vai language has seven oral vowels [e i a o u ɔ ɛ] and five nasal vowels [ĩ ã ũ ɔ̃ ɛ̃]. Vai has 31 consonants [ŋ h w p b 6 m6 kp mgb gb f v t d l r ɗ nɗ s ʃ z tʃ dz ndz j k ŋg g m n p] of which [r] and [ʃ] are recent imports into the language. The original Vai script accounted for only the original 29 consonants, but by 1911 Massaquoi's charts give an extended set of characters, including [r ʃ] and also giving series for [m θ ð ʒ]. All six of these extensions were modifications of the base glyphs for [l s w t d z]. Massaquoi's charts also fill in some of the "gaps" for syllables with forms for nasal close vowels [ẽ õ]. His series for [m] was taken over in modern times to represent the nasal [w] series, and his series for [r] has been adopted as part of the Standard syllabary. Massaquoi's other additions for non-Vai sounds have been shown there in red in order to highlight them to the Vai-speaking reviewer of this document who may not be familiar with them. Massaquoi's charts are given in Figure 4.

Diacritical marks

Vai does not make use of a productive system of diacritical marks. Although the glyphs for some characters are certainly related to those of other characters, no systematic application of diacritization is found in Vai, and each character is encoded uniquely.

Vowel length

Modern Vai marks vowel length in three traditional ways. The most common orthographic practice is to write the length by echoing the vowel of the syllable with a syllable in the %, HEE series; so for \$\mathbb{I}\$ FA with a long vowel, \$\mathbb{I}\mathbb{T}\$ FAHA faa is written; for \$\mathbb{Q}\$ NI with a long vowel, \$\mathbb{Q}\mathbb{T}\$ NIHI nii is written. Alternatively, but rarely, the \$=\$\text{syllable lengthener}\$ can be used: \$\mathbb{I}=\text{FA:}\$ faa, \$\mathbb{Q}=\text{NI:}\$ nii. For the third method, namely, the "inherent vowel length" found in some Vai symbols, see see the section "Logograms" below.

Punctuation

Vai makes use of European punctuation, though a small number of script-specific punctuation marks occur commonly. The A COMMA rests on or slightly below the baseline; the * FULL STOP rests on the baseline and can be ** doubled for use as an exclamation mark. The OUESTION

MARK also rests on the baseline; it is rather rarely used. Some modern primers prefer Vai punctuation; some prefer European. Vai punctuation was used in the 1962 Standard.

Digits

In the 1920s ten decimal digits were devised for Vai; these were "Vai-style" glyph variants of European digits (see Figure 11). They were not popular with Vai people and are not proposed for encoding here, even for historical purposes, as we have seen no examples of them in use. All the modern literature uses European digits.

Syllables unique to The Book of Ndole

In some of the older Vai texts more than one character may be used to represent a pronounced syllable; where these coexist beside another attested character, a disunification is warranted. We mention glyph choices in the discussion below because this is the first time many of these symbols have been given modern typographic form. To design modern typographic forms for such characters, we have looked first at characters in Ndole which resemble them, and then at how those glyphs compare to their modern counterparts; glyphs for the archaic characters were designed on the same principles. The same is true for the design of the logograms discussed below.

- In *Ndole* the character 'I is read as a logogram KAI 'man', but this is the same character as the modern 'I SYLLABLE KA, and in *Ndole* 'I and 'II SYLLABLE NDOLE KA are distinct; compare the related 'III" SYLLABLE GA. Dalby does not give the 'II" shape.
- "
 □ /
 □ In Ndole □ SYLLABLE SOO is distinct from the SYLLABLE NDOLE SOO (Stewart suggested that the former was originally *SOONG). The glyph we give for the latter reflects the same glyph changes as shown in Dalby's 1849 and 1961 glyphs for SYLLABLE PE, namely reversal and sharpening of the centre curve into a zigzag.
- Stewart says that there are four "variant" characters used only in names in *The Book of Ndole*. Of these, the Syllable NDOLE FA is certainly a candidate for encoding, distinct from both Syllable FA and F Symbol FAA 'die, kill'. For the modern glyph we have used the shapes of F Symbol FAA to give it typographic form, based on the relationship of the Ndole FA and FAA glyphs; another choice might be to use a permutation of Syllable MBA, which also has similar shapes. Of the other "variant" characters, two of them are already encoded for other uses: Syllable SHA and Syllable Woon are available to represent the *Ndole* "variants" SA and WO respectively. Further research into the "variant" MA Stewart describes will be required to see if it really should be disunified from M Syllable MA; to us, it seems like a unifiable glyph variant. It could be added at a later date.

Logograms

In the oldest Vai texts, a set of symbols called in the literature "logograms" occurs, representing individual syllables with inherent vowel length or with an inherent final nasal. Two of these logograms are known to enjoy some contemporary use. Of these, the character Υ SYMBOL FAA, has an inherent long vowel. It represents the word meaning 'die, kill' and is used alongside the date of death, as the † DAGGER is in some European practices (the glyph is said to represent a wilting tree). The word meaning 'thing' is represented by § SYMBOL FEENG. A list of the logograms occurring in *Ndole* is given in Figure 6; a number of these are also represented by Dalby in Figure 8. Examination of these repertoires shows that some of the logograms were absorbed as ordinary syllables in the modern syllabary; others we judge to be distinct and have proposed here.

- In Ndole \$\Implies \text{SYMBOL BANG}, \overline{\Pi} \text{SYLLABLE BA, and \$\% \text{SYLLABLE BHA are distinct. Dalby seems to mistakenly identify \$\Implies \text{SYMBOL BANG with \$\% \text{SYLLABLE BHA, listing both under \$ba\$ (BHA). The glyph we give for \$\Implies \text{SYMBOL BANG reflects the same glyph changes as shown in Dalby's 1849 and 1961 glyphs for both \$\Implies \text{SYLLABLE DEE and \$\Implies \text{SYLLABLE SU, namely rotation and sharpening of the hooks into points.}
- Both *Ndole* and Dalby give SYMBOL DANG 'hear, understand'. For the glyph shape we give, compare Dalby's 1849 and 1961 SYLLABLE MI.
- Although the glyph Dalby gives for 1841 11 SYLLABLE DEE has dots or rings, and *Ndole* SYMBOL DEENG 'child, small' has not, we believe these characters should be unified. *Ndole* gives no distinct SYLLABLE DEE, and rotation and sharpening of the hooks gives the modern glyph shape 11; compare Dalby's 1849 and 1961 glyphs for 11 SYLLABLE SU. Johnston 1906 also gives the character, with dots or rings, with the reading *de* (see Figure 17).
- We consider it possible but not necessarily probable that Dalby's 1849 don· (DHOONG) is the same character as the *Ndole* by Symbol doong 'enter'. If a *symbol dhoong exists, we do not know it apart from Dalby's suggestion, and have not encoded it separately here. In any case for the glyph for Symbol doong we have followed that for by Syllable Nya in modernizing it from the *Ndole* manuscript.
- "He is a logogram for symbol do-o 'be small' [do:] (not doo [do]), although Dalby suggests that it is an 1849 glyph variant of modern symbol ndoo; we note that Dalby gives another symbol dhung which looks similar to ndoo, and we note the general similarity of syllable loo, not to mention Massaquoi's syllable tho. We think on balance Dalby's unification is unsafe, and consider it wiser not to try to unify symbol do-o 'be small' with syllable ndoo. *Ndole* does not otherwise give a syllable ndoo, but both its syllable loo and syllable doo have the three branches at the top and a loop below. Johnston 1906 also gives the character with the reading $d\bar{o}$ (do/do). See Figure 17.
- F Both *Ndole* and Dalby give **T** SYMBOL FAA 'die, kill', though Dalby gives it as a glyph variant of **3** SYLLABLE FA. The glyph shape we give conforms to modern practice.
- E Both *Ndole* and Dalby give ε SYMBOL FEENG 'thing'. The glyph shape we give conforms to both older and modern practice.
- Both *Ndole* and Dalby give & SYMBOL JONG 'slave'. The glyph shape follows *Ndole*, with influence from \$\mathbb{U}\$ SYLLABLE JEE.
- Dalby reads \$\mathbb{H}\$ as \$\mathbb{H}\$ SYLLABLE GI but marks his reading as doubtful. We share that doubt and propose to encode *Ndole*'s \$\mathbb{H}\$ SYMBOL KEENG 'foot' as a unique character. Johnston 1906 also gives this character with the reading \$ke\tilde{n}\$ (KEENG). See Figure 18.
- In *Ndole* Symbol NII 'cow' is given, alongside a second reading KPE KOWU 'case of gin'. Johnston 1906 also gives this character with the reading *ni* (see Figure 19). We find Dalby's unification of this character with Syllable Nyu to be doubtful in this context, and prefer to encode the symbol on its own. Neither *Ndole* nor Johnston 1906 give a syllable Nyu, as it happens, but even so, since [n] and [n] are different phonemes and the internal structure fo the script shows no relation between glyphs of those two phonemes, we think it unlikely that the characters are related. Other early box-like glyphs retain a box-shape and do not take on a U-shape; Massaquoi's glyph for Nyu has but a single dot (see Figure 4).
- ∇ Both *Ndole* and Dalby give ∇ symbol kung 'head, be able'. The glyph shape follows Dalby, as this harmonizes better with modern Δ syllable kpa than a tilted triangle would.

- The glyph Dalby gives for 1849 T Syllable DO is the modern glyph turned on its side; we believe that *Ndole* symbol lo 'in' is the same character and the two should be unified. *Ndole* seems to have some confusion using δ syllable lo for lo as well as DO and NDO; it also uses \parallel for LA, DA, NDA; \parallel for LA, DA; \vdash for LU, DU; \mid for LE, DE; and \forall for LOO, DOO. Johnston 1906 likewise shows early confusion in the representation of these phonemes: \parallel for RA, DA, NDA; \bullet for RI, DI; δ for ROO, DOO; Υ and \forall for RO, DO (Johnston does not use L- in transcription).
- Both *Ndole* and Dalby give \triangleright SYMBOL TAA 'go, carry, journey'. The glyph shape we give conforms to both older and modern practice.
- Both *Ndole* and Dalby give 엑 SYMBOL TING 'island'. The glyph shape we give conforms to both older and modern practice.
- Both *Ndole* and Dalby give F SYMBOL TONG 'be named'. The glyph shape we give conforms to both older and modern practice.

Character names

Transliteration into ASCII-based character names follows the usual UCS conventions. The vowels are EE I A OO U O E, doubling the close vowels [e o] and leaving single the open vowels [\mathfrak{d} \mathfrak{e}]. Nasality is marked with -N. Because the implosive consonants are far more frequent than the non-implosive ones, Vai are [b d] conventionally transliterated
b d> and [b d] are conventionally written
bh dh>; accordingly [ð], a modification of <dh> is written <dhh> here. Figure 1 gives both phonetic values and UCS character name values.

Ordering

There is no evidence of traditional conventions on ordering *per se* apart from conventions found in syllabary charts. The ordering proposed here is that agreed upon by an experts working group, based on current practices in chart presentation. Our analysis of Vai recognizes that structurally, the "inherent" order is based first on the rhyme, and then on the consonant-groupings within each rhyme, themselves in a standard order which shows a high degree of linguistic sophistication on the part of the script's creator, Məməlu Duwalu Bukele.

Vowels. The relative order of the vowel series in Vai seems to be based on the names of the corresponding transliteration vowel in English; compare [e i a o u $) \epsilon$] with [eɪ i: aɪ oʊ ju] + [$) \epsilon$]. This order is sung in alphabet chants in Liberia, which is why we have chosen it in the absence of a "standard" Vai ordering. Other ordering systems exist. A "row-based" order based on the

Latin transliteration of Vai characters is found; others are "column-based" as though with the vowel orders sorted as in Latin [a ε e i o o u] or [a e ε i o o u]; a "linguists' order" [i a u ε e o o] is sometimes found, as in Dalby 1967.

Logograms. The NDOLE SYLLABLES \mathcal{L} FA, \mathcal{L} KA, and \mathcal{L} SOO are sorted as equivalent to the SYLLABLES \mathcal{L} FA, \mathcal{L} KA, and \mathcal{L} SOO. The SYMBOLS \mathcal{L} FEENG, \mathcal{L} KEENG, TING, \mathcal{L} BANG, \mathcal{L} DOONG, \mathcal{L} KUNG, \mathcal{L} TONG, and \mathcal{L} JONG are sorted as equivalent to the SYLLABLES \mathcal{L} FEE+NG, \mathcal{L} W KEE+NG, \mathcal{L} TI-NG, \mathcal{L} BA-NG, \mathcal{L} DOO-NG, \mathcal{L} W DOO-NG, \mathcal{L} KU-NG, \mathcal{L} TO-NG, and \mathcal{L} JO-NG respectively. The SYMBOLS \mathcal{L} NII, \mathcal{L} FAA, \mathcal{L} TAA, and \mathcal{L} DO-O are sorted as equivalent to the SYLLABLES \mathcal{L} NI+LENGTHENER, \mathcal{L} FA+LENGTHENER, \mathcal{L} TA+LENGTHENER, and \mathcal{L} DO+LENGTHENER. We do not recommend that these be treated as equivalent to the SYLLABLES \mathcal{L} NI+HI, \mathcal{L} FA+HA, \mathcal{L} TA+HA, and \mathcal{L} DO+HO, even though the readings are the same.

Line breaking

An opportunity for line breaking within a word can occur *after* any character, but not *before* U+A606 $\stackrel{\smile}{\sim}$ SYLLABLE NG or U+A606 $\stackrel{\smile}{\sim}$ SYLLABLE LENGTHENER which should not begin a line in hyphenation since they are syllable finals. ($\stackrel{\smile}{\sim}$ SYLLABLE NG can begin a line when it is the first-person singular pronoun, but then it does not follow another character.) The "logogram" symbols should be treated as any other character. In words where length is indicated by a $\stackrel{\smile}{\sim}$ HEE series character echoing the vowel of the preceding syllable, the long syllable should not be broken. While VA + I = $\stackrel{\smile}{\bowtie}$ $\stackrel{\smile}{\sim}$ \stackrel

Unicode Character Properties

All Vai syllables and symbols have the same properties except for the three punctuation characters:

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A500; VAI SYLLABLE EE; Lo; 0; L;;;; N;;;;

...
A605; VAI SYLLABLE NYE; Lo; 0; L;;;; N;;;;
A606; VAI SYLLABLE NG; Lo; 0; L;;;; N;;;;
A607; VAI SYLLABLE LENGTHENER; Lo; 0; L;;;; N;;;;
A608; VAI COMMA; Po; 0; CS;;;; N;;;;
A609; VAI FULL STOP; Po; 0; CS;;;; N;;;;
A600; VAI QUESTION MARK; Po; 0; ON;;; N;;;;
A60E; VAI SYMBOL FENG; Lo; 0; L;;;; N;;;;
A60F; VAI SYMBOL FAA; Lo; 0; L;;;; N;;;;
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Acknowledgements

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Figures

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Figure 1. Vai character repertoire as conventionally presented in tabular form. The characters in red are Massaquoi's additions (apart from his wh- and r- series) as well as the syllable 2_0 KAN from *The Book of Ndole*. On the left are phonetic values; in blue are the UCS name transcriptions.

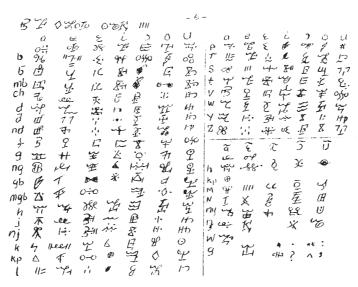


Figure 2. Handwritten syllabary from a teach-yourself book.

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s z ch j nj	४ % ह * ** **	# .:: 	#- 3- 3+ 34 34 T	8# ≪ 6 6	ክ 8 ;! -!- !! !: ይ	£ £ ₽ ₽ ₽	7.7 7.7 Mr Mr Mr Mr	ىيە
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s z ch j nj y k	8 8 3 *** *** *** 'ሃ	# 	+ * 3- 3- 3- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-	8# €¥ € 	ክ 8 ;! -!- !! !: ይ	F F P P F	7.7 7.7 Mr Mr Mr Mr	ىيە
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s z ch j nj y k ng g h h~	% る 不 光 に り の の の の の の の の の の の の の	we see see see see see see see see see s	# 3 3 3 T T T # #	8# 6 6 9# 9# 9# 9# 9# 9#	ክ 8 # + + ! ! ! ይ ይ ይ ተ 2 1 7	£ ₽ ₽ ₽ 8 E # .:.333 O	77 77 #h #h 0 2 2	¥ II U
s z ch j nj y k ng g h h~ w m n	% る 水 光 光 光 光 ガ が が で れ れ れ れ に れ に れ に れ に れ に れ に れ に れ に れ に れ に れ に れ に れ に れ れ に れ れ に れ に れ に れ に れ れ に れ れ に れ に れ に れ れ れ に に れ に れ に に れ に に れ に に に れ に に に れ に に に に に に に に に に に に に	we see see see see see see see see see s	+ * 3 3 3 T T T # # # # T	8# & 6 	ክ 8 # + + ! ! ! ይ ይ ይ ተ 2 1 7	5 4 8 8 6 2 3 3 3 3 3 5 3 3 3 3 3 3 3 3 3 3	77 27 # # # 0 2 2 4 4	¥ X Y
s z ch j nj y k ng g h h~ w m	8 3 水 米 ミ ン 8 光 サ で れ ア り り れ り れ り れ り れ り れ り れ り れ り れ り	we see see see see see see see see see s	# 3 3 3 T T T # #	8# 6 6 9# 9# 9# 9# 9# 9#	ክ 8 # + + ! ! ! ይ ይ ይ ተ 2 1 7	£ ₽ ₽ ₽ 8 E # .:.333 O	77 27 # # # 0 2 2 4 4	¥ II U

Figure 3. Vai syllabary chart from Tucker 1999.

	zha zhé zhé zhí zhó zhó zhó	Hiscellaneous. The fast of his his house of his his house of his	Punctuation and other Signs. bridge comma	ercia- mation accent detrac- d
	11年後冬年日終	が かのよ 強	Bum Pum	> = () pur
	nya nyé nyi nyi nyō nyō	sha shé shë shí shō shö	tha thé thé thí thô thơ	whe whe whi who who who who
SS.	□ 計 🕆 🗕 元 正 祝 リ	11 第二四次,四次,四次,11 次,11 次,11 次,11 次,11 次,11 次,1	ᆉ뉴푶ᇂᄼᆏᅂ	in they, see in not, see in old, dess in sub, while is a combination of y and u.—Ed.
LE	nda ndé ndi ndō ndō	ngs ngse ngs ngo ngo	nja nja njo njo	nkpa nkpé nkpí nkpó nkpó nkpó nkpú
CHARACTERS.	日から十分の日	क ≩ दिख सदस	※ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	177 has Eg mbs Fg nks hkps 29 mbs Fg nkps 29 mbs Fg nkps 30 hni 84 mbi Hp nkpi Nkpi 20 hni 85 mbi Fg nkpi 30 hni 85 mbi Fg nkpi
AR	kpa kpé kpí kpí kpó kpö	lba lba lba	1ds 1ds 1ds 1ds 1ds	mbe mbe mbe mbe mbe mbo
СН	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	및 작 주 જ <i>ল 주</i> જ	于二二十五年	E 24 77 18 28 38 38 38 38 38 38 38 38 38 38 38 38 38
11	cha ché chí chí cho cho	dha dhe dhr dho dho dho	gba gbé gbí gbí gbó gbó	hna hnč hní hnů hnů in pin,
VAI	~ 3 K P ÷ \$1 E	李县村曾村中	日下医非日戊华	连 6 00 Am 30 是真
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ΡH	g g g g g g g g g g g g g g g g g g g	ha bé hi bo	ji jo ji	ku kū kū
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	g 40 m μ ιο κο μ	ba ba ba ba	de de do da	fe f
	c: 응 수 \ 다 됐 됐	张士《77四条》	소구축나 부 > 로	~ 0.0 € 1 + 1 × 0.00

Figure 4. Syllabary chart from Massaquoi 1911. The logogram FAA occurs in his "Miscellaneous" section; of his "Punctuation and other signs", only COMMA, QUESTION MARK, and FULL STOP have been proposed for encoding. As noted, the exclamation mark is simply two FULL STOPS.

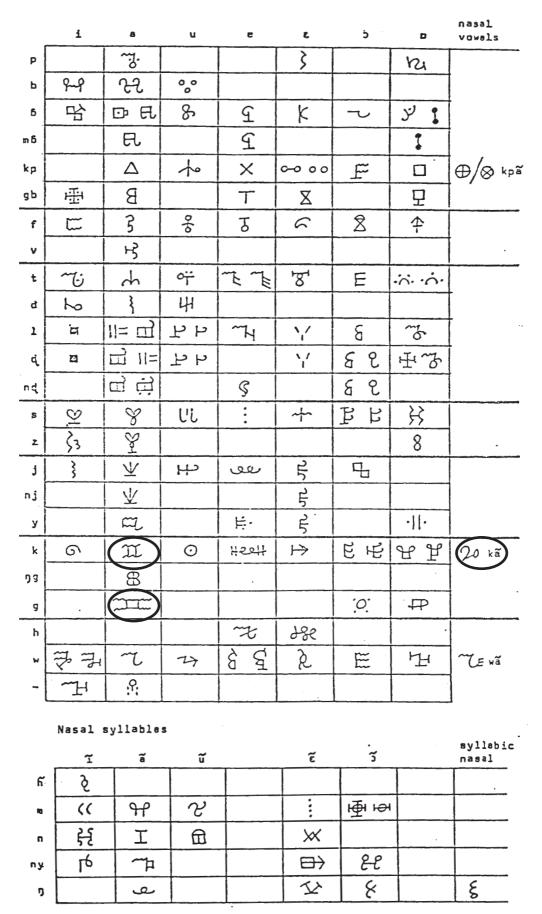


Figure 5. The "Ndole Syllabary", that is, the repertoire of character in *The Book of Ndole*. Circled is W NDOLE SYLLABLE KA, not found in later syllable charts; note its similarity to W SYLLABLE GA. Also circled is 20 SYLLABLE KAN.

NOTES

- 1. An additional character, so(n), occupies an ambiguous position in the syllabary.

 So(n), occupies an ambiguous position in the syllabary.

 So(n), occupies an ambiguous position in the syllabary.

 In that a final n seems always to be either included or actually added, and yet the character has no fixed meaning which would indicate it as a logogram.

 (An exception to this phonetic identification appears to be the use of in sowolu, 'five', but there seems to be an implied n in sowolu which makes its appearance in the word for 'six', a combination of the root word 'five' with 'one': sondanda.)
- 2. Seldom-used variant characters, or variants used only in names, include the following: To fa, 92 ma, % sa, 12 wo.

Figure 6. Logograms from *The Book of Ndole*. All but *SYMBOL DEENG, *SYMBOL KAI, *SYMBOL LO, and *SYLLABLE NDOLE MA are proposed for encoding, as they are considered to be unified with 11SYLLABLE DEE, 11SYLLABLE KA, 11SYLLABLE DO, and 11SYLLABLE MA.

Figure 7. An example from Stewart and Hair 1969. showing the = SYLLABLE LENGTHENER in use in a book title.

		,	Table I	The Vai	Syllabar	У			
	i	a	u	е	ε	0	0	NASAL VOWELS	UNIDENTIFIE (1849)
	1962	٧٠١.	#	्री ०	{	نس (منده)	S		
p	1849	~~~~ <u>;</u> (~~~ <u>1</u>)	[P] <i>5</i> ^-7 ₂	Ţ	了(3)	[9]	S(N)		
1.	1962	H (H)	0,0	1.Jr1 (°5°)	.{.	(02:10) 0220	S		
b	1849 gre (grine)	સ (૫)	°°	[7] =	2	[9]	J:		'bai' (who)
6	1962		8-	4	IC	•	E(K)		
D	1849 廿(�� 8·)	(69 G [4]) (9	8 (8)	9 (P)	IC (0)	L (L)	(C (C 4)		
ան	1962	叮	8:-	4.	l:C	*	••		
ши	1849 [= 6i ?]	स (त)	6u ?]	٦	K	[9 cd =]	, (••)		
l-m	1962	Δ	4	Ŧ	00	ঋ	♦(□)	kpã (⊕)	
kp	[2]	\triangle (\triangleright)	[7] 1	[7] +	0-0	<u>k</u> (km)		⊕ (⊗)	
m œb	1962	.\(\triangle \).	(¥)	丰	o÷0	뚹	.♦.		
mgb	1849	[=kpa ?]	[P] Am	[=gbe?]	[7] 💥	[P] F==	[7] [7]		
m'h	1962	В	T	Τ	M	$\bar{\Delta}$, $\langle \Delta \rangle$	디		
gb	1849	В	[9] 👆	T	∑(X)	(95) 2	卢(모)		gbon'(Yn)
	1		L						
f	1962 [(\ta)	B	0-50	9	口(5)	-8-	7		
	1849	3(5332)	8	1(1)	E(56)	첫(첫 월)	(ተየተ)		(11) It (11)
v	1962 片(岩)	મંડ્રે	040	9	压(吗)	\$	¥	. (fen' E
	1849 juhn	ક્મ (ર્ધ)	[:: fu ?]	[:: fe ?]	[= fe ?]	8	[= fo ?]		
t	1962	4	P. (2.)	٣ <u>ـ</u>	181	E	(:C)	,	'tin' •
	1849	ゆ(4)	7(0:4)	<u></u>	8(8.8)	E(m)	$\dot{\sim}$ ($\dot{\omega}$)		'tā' Ђ
d	1962	ij	別(中)	Ym (Ym)	器(班)	E	TT		(to, Lo
	1849 H-0 (P)	}	41(%)	[b]_F(LF)	[7]	(~~m~~m) LLL~~	~~[77*(71°)		
1 (r)	1962	(=)	1>	4	1,1 (,1,1)	δ(δ)	y		'dan·' <u>ČČ</u> Č
-(-)	1849	11=(=)	بسا	~~H(~~N)	Υ	а	~~}		'dan'⊦∳
đ	1962	(m)	⊬→	11	11; (11,)	T	Ŧ		'dun'~~;
~~	1849 [P] 🔓	四(四)	[= lu ?]	ll (ii)	¥	[1-0]	난(아)		'dòn'(~~[]
nd	1962 L	(cc;)	FP	&(과)	111	\$	y,		'dòn' &
	¹⁸⁴⁹ [P]	.चंतः (क्य)	[= lu ?]	$\mathcal{L}(\delta)$	Υ	[?] •⊰	~~!· (~ ? ;)		'don'' (?)
s	1962	&(%)	1,1	111	4	F	Щ		'sen.' · - }
	1849 P	8	l'L (LL)	:	~f~ (}	P(F)	产(4严)		'sō' <u>₹</u> -₹
z	1962	88 (%)	11(11)	111	平(※)	F(F)	8		
Z	1849 [E([]5]]	&(&&)	[= su ?]	[= se ?]	[- se ?]	무	8		

Figure 8a. Syllabary chart (here and on the next page) from Dalby 1967 showing old (1849) and contemporary (1961) syllable shapes. Circled here are \$\int\symbol\$ SYMBOL BANG, \$\int\symbol\$ SYMBOL FAA, \$\int\simbol\simb

		1	Table I	The Vai	Syllabar	y (contin	aued)		
	i	a	u	е	3	၁	0	NASAL VOWELS	UNIDENTIFIED (1849)
	1962	76	#>	w	莱(♂)	В́н	: :		
C	1849	[= ja ?]	[= ju ?]	[= je ?]	[= je ?]	[= jo ?]	[= jo ?]		-1
•	1962	不	1+->	عف	닭(닭)	$\mathbb{P}(\mathbb{P})$	+ (11.)		(dṣon., b
j	1849	不(不)	₩->	ලුව	કુ ₍ કુકુકુ)	₽(₽)	- -	y	
•	1962 نن(بنب)	**	. #1-5	⊨:	हुः॥ (हुः।)	₽(8)	H· (+)		
nj	1849 [= ji ?]		HH->	H;	[= j ɛ ʔ]	[: c t ::]·	[= jo]		1
	1962 بني	— સુ	11:	 		8	:		
У	1849 [= ji ?]	122 (122)	[= ju ?]	[≓nje]	[= jɛ]	[= jo ?]	[= jo ?]		-
	1962	И	0	HeeH	T	E	H		'ka' 2 ₀
k	1849 (6)	4 (Y)	0	4001	→ (→ 구)	長(民)	업(원)		'kā' (○○)
	(6)	8	0	y (8)	I(I)	الجفا (١٠٠٠١)	24		, ko,
ŋg	1849 [= ki ?]	8	[-ku/gu?]	\$	[=ke/ge ?]	[?] HE(H)	上(元)		(kun' ∀
	1962	II	9	++	<u> </u>	· ()·(.ö.)	71		
g ((849 [P] ~~~~	III(III)	9 (9)	**(#±)	<u>-</u> \- \-	;O;	4(pf)		, & é , }}
				<u> </u>			.,,		1 , ,
h	当(江)	44	4	~(~x)	88	벌 (뜀)	予 (严)		'hā' ~~
11	[P] ~}e	(TT)	[= wu?]	~~~~(~%)	88	[% cw =]	H (H)		'hā'~~;
w	1962 💥	٣	4	Ą	Š	€ (≅)	τ _{Γ'}	wã (%)	
	(dans)	~~~~	(< <u><</u> < <u>></u> (< <u>></u> < < >)	g (P)	À	£	가 (남)	~~@	'we' 🥞
-	1962	<u>:</u> P	:4:	• <u>I</u> •	88	₩[ef.wo]	꾸		
	1849 WY4 (~y4)	: :	[= wu]	۰Į۰	[=he?]	[% cw =]	'T'		
NASAL SYLLABLES	~	~	~		~	~		SYLLABIC	
	ũ ¹⁹⁶² දි	ã.	ũ		€	õ		SYLLABIC	-
$ ilde{\mathbf{h}}$	1849 2 (2)	(HY)	©		-	(56)			'hn' ∾Ն
	1849 & (§)	د ب	[P] S		H-0~~~	[= ŋɔ̃ ʔ]			nn - L
m	1849 CC	ار (۶۷)	<u>ئ</u>		1111	<u>页(回)</u> 顷(问)			
	1962 Pg (Pd)					項(刊)			
n	1849 2 E (35)	T			X (X)	知(年) (本 ※)			
	1962	<u></u>	(年 四)		4	22(24)			
$\mathbf{n}\mathbf{y}$	1849 F6 (Le)	~~p(~P.%)			⊕(D)	원 용			-
	1962	ه (عب)	2(3/		IŞ	∞(x)		8(4)	
Ŋ	1849	ක(<i>w</i>)			\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	8		&(E, F)	1
	1962	(e)			(04)			- 5 57	1
		. ,		1	1	ı	1		.1

Figure 8b. Circled here are $\$ Symbol Jong, $\$ Syllable Ndole ka, and $\$ Symbol kung. Also circled is $\$ Syllable Ma, showing its glyph variant. Compare Stewart's mention of this in Figure 6 below.

引予令予11%* VAI-SCHRIFT.

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                        \Diamond
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17 kp+v ⊕ 0...0
                               36 z
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18 1
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              4.
                    D ··· S
          \mathbf{III}
                \mathbb{C}
19 m
             Satzzeichen,
                             Vokallosigkeit
                                            Vokaldehnung
                 - Vokal,
                          V = nasalierter Vokal.
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Figure 9. Syllabary chart entitled 당보 ◊약 11% Vai kpolo deŋ 'Vai script' from Jensen 1960. The "punctuation" symbols he gives for "vowellessness" (Vokallosigkeit) and "vowel length" (Vokaldehnung) seem to answer to what Massaquoi gives as "detraction" and "continuation of sound" in his chart in Figure 4.

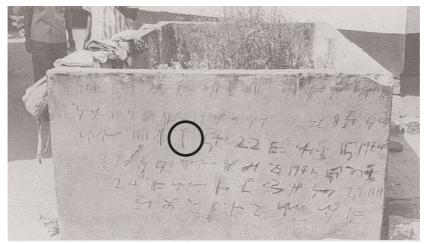


Figure 10. A tombstone in a Vai community in Monrovia, from Scribner and Cole 1981. The symbol **F** FAA 'died' can be seen in the second line of the inscription.

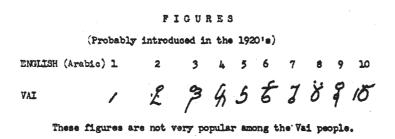


Figure 11. Vai digits, from S. Jangaba M. Johnson [s.d]. To date, this chart is the only representation of the Vai digits we have seen. They are not proposed for encoding because they are poorly attested; should they be needed in future, they can be encoded at that time.



Figure 12. From Nyei and Getawek's 1976 schoolbook.

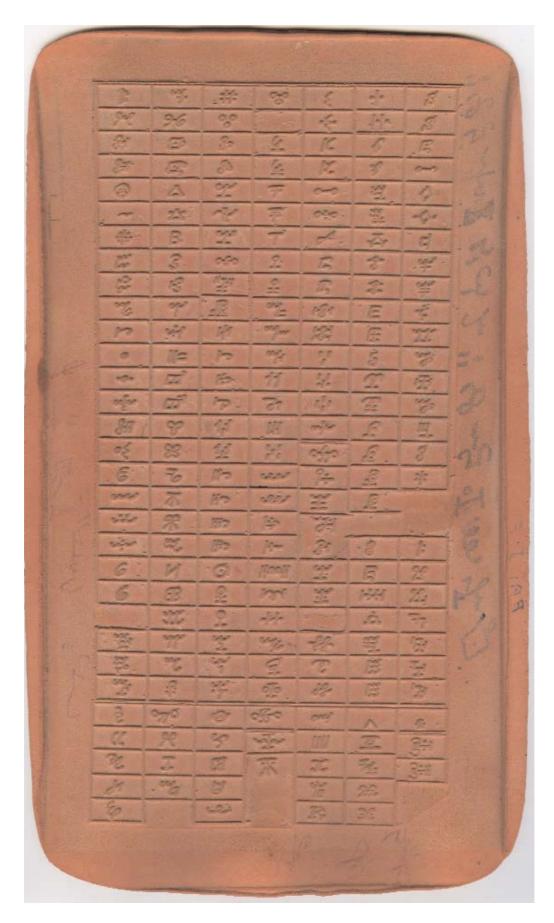


Figure 13. A rubber plate used to print the syllabary. The image has been digitally reversed to show the characters as they would be printed. The plate was produced by Scribner and Cole's 1981 project

ר−« בשוקגהו היי »−1

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gw go ższtia nagorus ga	्रे वर्ग्य सुद्धित्तर प्रश्नाद्

Figure 14. Description of the Vai syllabary in N'Ko. by Solomana Kante.

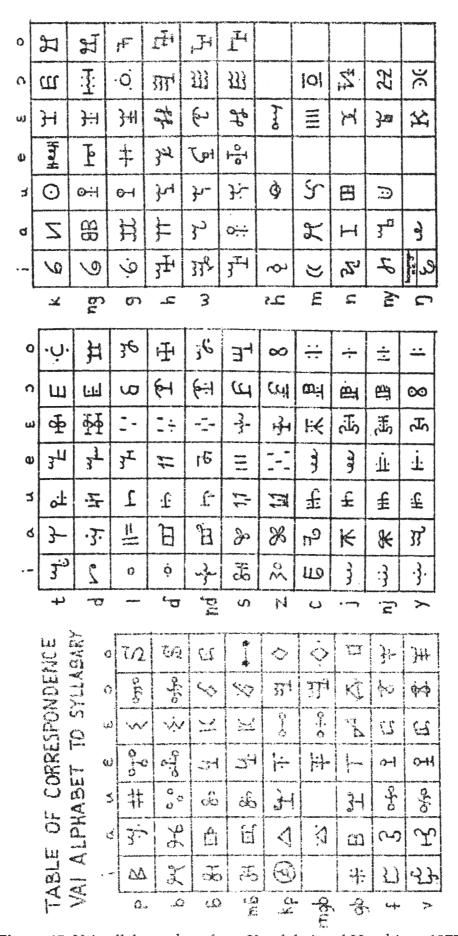


Figure 15. Vai syllabary chart from Kandakai and Hutchison 1975.

OB IF NIFOR TH III

2.* # T "THT. O'I'B HEEN'S FIN H:

3.** # T THOXEHHI KO IN HO'I'WH:

4.~ # F T "H & 8T O'I'WH:

5.= # T |= O'I' & 8T " WH! *

6.. # T |= "THO TO OTH HE *

6.. # T |= "THO TO OTH HEEN" TO A 14 8 6 TO THE

HEEN" TO AND SOIT "TT * 8 6 TO

LE K.

8. ~ \$ T IF & T & 0 7 11 6 # 8 9 T \$ ES 6 IF, DX 26 T & F 3 H, \$ T 3 T T L & V F 6 0 7 11 8 T. O' 18 8 4 6 T 5 8 K 28 K*

Figure 16. Discussion of Vai punctuation in Kandakai, et al., 1962. Items 1, 2, 3, 4, and 5 can be represented with the encoding proposed here. The second part of Item 2 is superceded by Massaquoi's series for $[\theta \ \delta]$. Items 6 and 8 do not seem to have ever been implemented at all (though item 6 first could have some utility, in keyboarding specifications); item 7 is not productive, and the *re*-series is fully encoded. This translation is by Mohamed Nyei:

This is information about reading the book

When you are writing and you want your ideas to be clear and precise, you should place these marks between your expressions.

- 1. \land This is what separates expressions. When one sees it written like this \uparrow the associated character should be pronounced with the tongue between the teeth, as in English.
- 2. * This is what ends an expression or sentence.
- 3. ** This is used in commands to do something and denotes a statement of surprise.
- 4. (No This denotes a question.
- 5. = This signifies a long sound.
- 6. .. When this is placed below a character, one should utter a nasal sound.
- 7. When this is placed under a character, one should say it with a trilling tongue; like "\models" ra.
- 8. // When this is placed beside a character to the right, it puts stress on the character; like in " \otimes " sa and " \otimes " za.

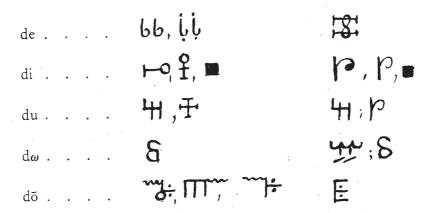


Figure 17. "Original" symbols on the left and "modern" symbols on the right in Johnston 1906. In the first line, Johnston shows *de* which corresponds to modern 1 SYLLABLE DEE, though it has a ring shape or dot element. On the right the modern \$\mathbb{E}\$ SYLLABLE DHE is shown; Johnston did not distinguish [d] from [d] or [e] from [ε]. In the fourth line, Johnston shows *dō* with three glyphs, coresponding to what Dalby identifies as 1849 **ndo** (NDOO), **dɔ** (DO), and **ndo** (NDOO) respectively. We identify these instead as logogram ***dɔx (SYMBOL DO-O), \$\overline{E}\$ dɔ (DO), and **Modo (NDOO). On the right he shows the modern \$\overline{E}\$ SYLLABLE DHO.

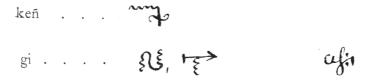


Figure 18. The syllable KEENG compared with the syllable GI from Johnston 1906. Dalby reads Johnston's glyph for keñ as ?gi, and gives the first two of Johnston's gi glyphs as "unidentified" ge and gε respectively. The modern glyph on the right is modern "Syllable GI. We have not found Johnston's first GI attested other than there and in Dalby; we have not proposed its encoding.

Figure 19. The syllable *ni* from Johnston 1906, showing both its ❷ SYLLABLE NI form and a ⑤ SYMBOL NII form.

TABLE xx - Row A5: VAI

	A50	A51	A52	A53	A54	A55	A56	A57
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F	Ψμ	#	W	ii	%	Щ.	ጕ	¥

G = 00 P = 00

TABLE XX - Row A5: VAI

hex	Name	hex	Name
A500 A501 A502 A503 A504 A505 A506 A505 A506 A507 A508 A509 A500 A500 A500 A500 A501 A512 A513 A514 A515 A516 A517 A518 A519 A518 A510 A511 A511 A511 A511 A511 A511 A512 A513 A514 A515 A516 A517 A518 A519 A510 A511 A512 A513 A514 A515 A516 A517 A518 A510 A510 A511 A512 A513 A514 A515 A516 A517 A518 A519 A510 A511 A510 A510 A511 A511 A511 A512 A522 A523 A524 A525 A526 A527 A528 A529 A528 A529 A520 A521 A521 A521 A521 A521 A521 A521 A522 A523 A524 A525 A526 A527 A528 A529 A528 A529 A521 A521 A521 A521 A521 A522 A523 A524 A525 A526 A527 A528 A529 A528 A529 A528 A529 A529 A521 A521 A521 A521 A521 A522 A523 A524 A525 A526 A527 A528 A529 A528 A529 A528 A529 A528 A529 A529 A533 A533 A533 A533 A533 A533 A534 A535 A536 A537 A538 A539 A538 A538 A539 A538 A538 A539 A538 A538 A539 A538 A538 A538 A538 A538 A538 A538 A538	VAI SYLLABLE HEE VAI SYLLABLE WEEN VAI SYLLABLE WEEN VAI SYLLABLE WEEN VAI SYLLABLE BHEE VAI SYLLABLE BHEE VAI SYLLABLE BHEE VAI SYLLABLE MBEE VAI SYLLABLE MBEE VAI SYLLABLE MBEE VAI SYLLABLE GBEE VAI SYLLABLE FEE VAI SYLLABLE DHEE VAI SYLLABLE DEE VAI SYLLABLE DEE VAI SYLLABLE DEE VAI SYLLABLE SEE VAI SYLLABLE GEE VAI SYLLABLE SEE VAI SYLLABLE SEE VAI SYLLABLE MEE VAI SYLLABLE MEE VAI SYLLABLE NOGE VAI SYLLABLE MEE VAI SYLLABLE MIN VAI SYLLABLE HIN VAI SYLLABLE HIN VAI SYLLABLE HIN VAI SYLLABLE MIN VAI SYLLABLE MIN VAI SYLLABLE MIN VAI SYLLABLE BII	A559 A55A A55B A55C A55B A55C A561 A562 A563 A563 A564 A565 A566 A566 A567 A568 A568 A568 A568 A568 A56B A56C A56B A56C A56B A570 A571 A572 A573 A574 A575 A576 A577 A578 A578	VAI SYLLABLE DHA VAI SYLLABLE LA VAI SYLLABLE LA VAI SYLLABLE DA VAI SYLLABLE DA VAI SYLLABLE SA VAI SYLLABLE SA VAI SYLLABLE ZA VAI SYLLABLE CA VAI SYLLABLE CA VAI SYLLABLE CA VAI SYLLABLE CA VAI SYLLABLE NJA VAI SYLLABLE KA VAI SYLLABLE KA VAI SYLLABLE RA VAI SYLLABLE NA VAI SYLLABLE NA VAI SYLLABLE NA VAI SYLLABLE NA VAI SYLLABLE NO VAI SYLLABLE NO VAI SYLLABLE NO VAI SYLLABLE WOO VAI SYLLABLE WOON VAI SYLLABLE WOON VAI SYLLABLE BOO VAI SYLLABLE BOO VAI SYLLABLE BOO VAI SYLLABLE BOO VAI SYLLABLE RABOO VAI SYLLABLE POO VAI SYLLABLE POO VAI SYLLABLE POO VAI SYLLABLE POO VAI SYLLABLE PHOO VAI SYLABLE

TABLE xx - Row A5: VAI

	A58	A59	A5A	A5B	A5C	A5D	A5E	A5F
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TABLE XX - Row A5: VAI

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TABLE XX - Row A6: VAI

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F		80

G = 00 P = 00

TABLE XX - Row A6: VAI

hex	Name	hex	Name
A600 A601 A602 A603 A604 A605 A606 A607 A608 A609 A60A A60B A60D A611 A612 A613 A614 A615 A616 A617 A618 A616 A617 A618 A61A A61B A61B A61C	VAI SYLLABLE NGGEN VAI SYLLABLE NGGEN VAI SYLLABLE GEN VAI SYLLABLE GEN VAI SYLLABLE ME VAI SYLLABLE NE VAI SYLLABLE NE VAI SYLLABLE NG VAI SYLLABLE NG VAI SYLLABLE NG VAI SYLLABLE LENGTHENER VAI COMMA VAI FULL STOP VAI QUESTION MARK (This position shall not be used) VAI SYLLABLE NDOLE FA VAI SYLLABLE NDOLE FA VAI SYLLABLE NDOLE KA VAI SYLLABLE NDOLE SOO VAI SYMBOL KEENG (foot) VAI SYMBOL KEENG (foot) VAI SYMBOL NII (cow) VAI SYMBOL NII (cow) VAI SYMBOL NII (cow) VAI SYMBOL DANG (finished) VAI SYMBOL DANG (finished) VAI SYMBOL DANG (near, understand) VAI SYMBOL DONG (enter) VAI SYMBOL TONG (be named) VAI SYMBOL TONG (be named) VAI SYMBOL DONG (slave)		

A. Administrative

1. Title

Proposal to add the Vai script to the BMP of the UCS.

2. Requester's name

Michael Everson, Charles Riley, José Rivera

3. Requester type (Member body/Liaison/Individual contribution)

Individual contribution.

4. Submission date

2005-08-01

- 5. Requester's reference (if applicable)
- 6. Choose one of the following:

6a. This is a complete proposal

Yes

6b. More information will be provided later

No.

B. Technical -- General

1. Choose one of the following:

1a. This proposal is for a new script (set of characters)

Yes.

Proposed name of script

Vai.

1b. The proposal is for addition of character(s) to an existing block

No.

1b. Name of the existing block

2. Number of characters in proposal

284.

3. Proposed category (see section II, Character Categories)

Category A.

4a. Proposed Level of Implementation (1, 2 or 3) (see clause 14, ISO/IEC 10646-1: 2000)

Level 1.

4b. Is a rationale provided for the choice?

Yes.

4c. If YES, reference

No combining characters.

5a. Is a repertoire including character names provided?

Yes

5b. If YES, are the names in accordance with the character naming guidelines in Annex L of ISO/IEC 10646-1: 2000?

Yes.

5c. Are the character shapes attached in a legible form suitable for review?

Yes

6a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Jason Glavy via Michael Everson. TrueType.

6b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:

Michael Everson (Everson Typography). Fontographer.

7a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?

Yes (see above).

7b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

Yes.

8. Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?

Yes. See above.

9. Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script.

See above for character properties.

C. Technical -- Justification

1. Has this proposal for addition of character(s) been submitted before? If YES, explain.

Yes. A preliminary discussion proposal was made in L2/05-053.

2a. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?

Yes.

2b. If YES, with whom?

S. Jabaru Carlon (formerly University of Liberia), Mohamed B. Nyei (New York University), John V. Singler (New York University), Tombekai Sherman (Liberia), Jim Laesch (Lutheran Bible Translators), Miata Jessica Metzger (Cape Mount), Jumah Jennifer Gray Brumskine (Cape Mount), Lorna Priest (SIL), Peter Martin (SIL)

2c. If YES, available relevant documents

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?

See above.

4a. The context of use for the proposed characters (type of use; common or rare)

Used to write a the Mande language Vai used in Liberia.

4b. Reference

See above.

5a. Are the proposed characters in current use by the user community?

Yes.

5b. If YES, where?

Used in Liberia.

6a. After giving due considerations to the principles in Principles and Procedures document (a WG 2 standing document) must the proposed characters be entirely in the BMP?

Yes.

6b. If YES, is a rationale provided?

Yes.

6c. If YES, reference

Vai is a living script; BMP encoding is in accordance with the Roadmap.

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?

Yes.

8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?

8b. If YES, is a rationale for its inclusion provided?

8c. If YES, reference

9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?

No.

9b. If YES, is a rationale for its inclusion provided?

9c. If YES, reference

10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?

Nο

10b. If YES, is a rationale for its inclusion provided?

10c. If YES, reference

11a. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)?

No.

11b. If YES, is a rationale for such use provided?

11c. If YES, reference

12a. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

No.

12b. If YES, reference

13a. Does the proposal contain characters with any special properties such as control function or similar semantics?

No

13b. If YES, describe in detail (include attachment if necessary)

14a. Does the proposal contain any Ideographic compatibility character(s)?

No.

14b. If YES, is the equivalent corresponding unified ideographic character(s) identified?

14c. If YES, reference