



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

Doc Type: Working Group Document**Title: Proposal to add six characters for Kannada to the BMP of the UCS****Source: Michael Everson****Status: Individual Contribution****Action: For consideration by JTC1/SC2/WG2 and UTC****Date: 2004-10-22**

This document requests six additional characters to be added to the UCS and contains the proposal summary form. Four of these signs (the first and last pair) are rarely used in Kannada and provide support for Sanskrit. The JIHVAMULIYA and UPADHMANIYA are script-specific characters in Kannada in the same way that ANUSVARA and VISARGA are; the four characters belong to a group called *ayogavāha*. The punctuation marks are also chiefly used in the context of Sanskrit texts and Kannada poetry. These have a thin, slender appearance quite unlike the thick-stemmed Devanagari; opinion is strong on the INDIC@UNICODE.ORG list that a disunification of these from Devanagari is required. (It is likely that this is true for all of the Indic scripts, but it makes sense to meet Kannada requirements in this single proposal here.)

0CE2		KANNADA VOWEL SIGN VOCALIC L
0CE3		KANNADA VOWEL SIGN VOCALIC LL
0CE4		KANNADA DANDA
0CE5		KANNADA DOUBLE DANDA
0CF1	∞	KANNADA SIGN JIHVAMULIYA
0CF2	○○	KANNADA SIGN UPADHMANIYA

Unicode Character Properties

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0CE2;KANNADA VOWEL SIGN VOCALIC L;Mn;0;NSM;;;;N;;;;;
0CE3;KANNADA VOWEL SIGN VOCALIC LL;Mn;0;NSM;;;;N;;;;;
0CE4;KANNADA DANDA;Po;0;L;;;;N;;;;;
0CE5;KANNADA DOUBLE DANDA;Po;0;L;;;;N;;;;;
0CF1;KANNADA SIGN JIHVAMULIYA;Lo;0;L;;;;N;;;;;
0CF2;KANNADA SIGN UPADHMANIYA;Lo;0;L;;;;N;;;;;
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Figures

KANARESISCH									
ಅ	a	ಋ	ॠ	ದ	da	<p>Allgemeines. Die kanaresische Sprache gehört zu den Dravidasprachen; sie wird in der vorderindischen Küstenlandschaft Kanāra gesprochen. Die Schrift läuft von links nach rechts und hat viel Ligaturen.</p> <p>Vokale. Außer den im Alphabet aufgeführten Vokalen gibt es noch Vokalzeichen, die über, unter oder neben die Konsonanten geschrieben werden, z. B. beim Konsonant ॠ (g) in folgender Weise:</p> <p>ॠ ga ॠᳵ gr ॠᳶ gē ॠ᳷ gā ॠ᳸ gr̄ ॠ᳹ gai ॠ gi ॠᳺ gl ॠ᳻ gō ॠ᳼ gi ॠ᳽ gl̄ ॠ᳾ gō ॠ᳿ gu ॠ᳾ᳵ gē ॠ᳾ᳶ gau</p> <p>Konsonanten. Konsonantenverdopplungen und -verbindungen werden gebildet, indem unter die Konsonanten verkürzte oder umgebildete Konsonanten gesetzt werden, z. B.:</p> <p>ॠᳵ = gga, ॠᳶ = rka usw.</p> <p>ॠ ॡ ॢ ॣ । ॥ ० १ २ ३ ४ ५ ६ ७ ८ ९ ०</p> <p>1 2 3 4 5 6 7 8 9 0</p> <p>Literatur. A Grammar of the Kannāda Language in English by Dr. Kittel. Mangalore 1903.</p>			
ಆ	ā	ॠ	ॡ	ದ	dha				
ಇ	i	ಕ	ka	ನ	na				
ಈ	ī	ಖ	kha	ಪ	pa				
ಉ	u	ಗ	ga	ಫ	pha				
ಊ	ū	ಘ	gha	ಬ	ba				
ಯ	r	ಙ	ṅa	ಭ	bha				
ಯೂ	r̄	ಚ	ca	ಮ	ma				
ಋ	ᳵ	ಚ	cha	ಯ	ya				
ॠ	ᳶ	ಜ	ja	ರ	ra				
ಋ	᳷	ಝ	jha	ರ	ra				
ಊ	e	ಞ	ṅa	ಲ	la				
ಋ	ē	ಟ	ṭa	ವ	va				
ಋ	ai	ಥ	ṭha	ಶ	śa				
ಊ	o	ಡ	ḍa	ಷ	ṣa				
ಋ	ō	ಢ	ḍha	ಸ	sa				
ಋ	au	ಣ	ṇa	ಹ	ha				
ಊ	m̄	ತ	ṭa	ಳ	ḷa				
ಋ	ḥ	ಠ	ṭha	ಲ	ḷa				

Figure 1. From the Reichsdruckerei 1951. Illustration of both LETTERS and VOWEL SIGNS VOCALIC L and VOCALIC LL as well as JIHVAMULIYA and UPADHMANIYA.

ಕ	klri	ಕ	klri	ಕೆ	kē	ಕೇ	kē	ಕೈ	kai	ಕೊ	kō	ಕೋ	kō	ಕೌ	kau
ಖ	khri	ಖ	khri	ಖೆ	khē	ಖೇ	khē	ಖೈ	khai	ಖೊ	khō	ಖೋ	khō	ಖೌ	khau
ಗ	gri	ಗ	gri	ಗೆ	gē	ಗೇ	gē	ಗೈ	gai	ಗೊ	gō	ಗೋ	gō	ಗೌ	gau
ಘ	ghri	ಘ	ghri	ಘೆ	ghē	ಘೇ	ghē	ಘೈ	ghai	ಘೊ	ghō	ಘೋ	ghō	ಘೌ	ghau
ಙ	ṅri	ಙ	ṅri	ಙೆ	ṅē	ಙೇ	ṅē	ಙೈ	ṅai	ಙೊ	ṅō	ಙೋ	ṅō	ಙೌ	ṅau
ಚ	ṅri	ಚ	ṅri	ಚೆ	ṅē	ಚೇ	ṅē	ಚೈ	ṅai	ಚೊ	ṅō	ಚೋ	ṅō	ಚೌ	ṅau
ಝ	ṅri	ಝ	ṅri	ಝೆ	ṅē	ಝೇ	ṅē	ಝೈ	ṅai	ಝೊ	ṅō	ಝೋ	ṅō	ಝೌ	ṅau
ಞ	ṅri	ಞ	ṅri	ಞೆ	ṅē	ಞೇ	ṅē	ಞೈ	ṅai	ಞೊ	ṅō	ಞೋ	ṅō	ಞೌ	ṅau
ಟ	ṭri	ಟ	ṭri	ಟೆ	ṭē	ಟೇ	ṭē	ಟೈ	ṭai	ಟೊ	ṭō	ಟೋ	ṭō	ಟೌ	ṭau
ಥ	ṭri	ಥ	ṭri	ಥೆ	ṭē	ಥೇ	ṭē	ಥೈ	ṭai	ಥೊ	ṭō	ಥೋ	ṭō	ಥೌ	ṭau
ಡ	ḍri	ಡ	ḍri	ಡೆ	ḍē	ಡೇ	ḍē	ಡೈ	ḍai	ಡೊ	ḍō	ಡೋ	ḍō	ಡೌ	ḍau
ಢ	ḍri	ಢ	ḍri	ಢೆ	ḍē	ಢೇ	ḍē	ಢೈ	ḍai	ಢೊ	ḍō	ಢೋ	ḍō	ಢೌ	ḍau
ಣ	ṇri	ಣ	ṇri	ಣೆ	ṇē	ಣೇ	ṇē	ಣೈ	ṇai	ಣೊ	ṇō	ಣೋ	ṇō	ಣೌ	ṇau

Figure 2. From Kittell 1993 (1903). Illustration of VOWEL SIGNS VOCALIC L and VOCALIC LL.

ಸತ್ಯದ ಧರ್ಮವ ನಿತ್ಯವು ಬೋಧನೆ ತೊತ್ತಿನ ಮನಸಿಗೆ ನೋಗಪೀತೇ
 ತತ್ಸದ ಅರ್ಥ ವಿಚಿತ್ರದಿ ನೇಲಲು ಕತ್ತಿಯ ಮನಸಿಗೆ ತಿಳಿದೀತೇ |
 ವುತ್ತಳಿಬೋಪ್ಪಿಯ ಚಿತ್ರದಿ ಬರೆದರೆ ಮುತ್ತು ಕೊಟ್ಟರೆ ಮಾತಾಡೀತೇ
 ರಿತ್ತುರಿತಲರವನ್ ಒತ್ತಿ ಫಣಿಯಾಳೆ ಇಡೆ ಅರ್ತಿಯ ತೋಪದೆ ಇದ್ದೀತೇ ||

corps 17 Kittel, *A grammar of the Kannada language*

Figure 3. From the Imprimerie Nationale 1990. Illustration of DANDA and DOUBLE DANDA in a poetic context. The stroke is thin and narrow (and slightly tapering in the original document) and quite different from the Devanagari dandas, which typically are based on the thick vertical common to many Devanagari letters.

ಕೊಳ್ಳೊಳ್ಳೆನ್ನೊಡನೊಡನೆಯೆ
 ತುಳ್ಳುವ ಯುವತಿಯರ ಕರಸರಿಚ್ಚುತನಲಿಲಂ |
 ಗಳ್ಳೊಳ್ಳೆ ಬಿಡಿಕೆದಲುುವ ಕಿಂ
 ಜಳ್ಳದಿನ್ ಅದುದು ಸರೋವರಂ ಕಮಿಶಜಳಂ || When the pond
 took the waters that fell from the hands of the young women who said
 “take! take!” and all at once sprinkled, it became reddish-brown water
 on account of the filaments (of lotus flowers) that became loose and
 were scattered about. ತಮ್ಮಾ, ಇಲ್ಲಿಗೆ ಬಾ, brother, come here! ತಂಗೀ,
 ಊಟಕ್ಕೆ ನಡೆ, sister, go to dine! ಮಗಳೇ, ಸುಖದಿನ್ನ ಇರು, daughter, be
 joyful! ದೇವಾ, ನನ್ನನ್ನ ಉದ್ಧರಿಸು, God, save me!

Figure 4. From Kittell 1993 (1903). Another illustration of DANDA and DOUBLE DANDA in a poetic context.

◌ (hと転写する)は気音を表わし、ヴィサルガ (vi-sarga) と呼ばれる。この記号は、サンスクリット語からの借用語の転写のみに用いられる (**दुःख** duḥka [苦])。◌はka, khaの前の気音, ◌はpa, phaの前の気音を示すが、今日では一般には用いない。この2つの記号は、~~タシヤ~~ ~~ナ朝以降~~のグプタ (Gupta) 文字のそれ (**⊗ hka, ○○ hpa**) に近似した形を保っている。 ~~カンナダ数字は、インド数字の系統をひいている~~ (表4)。

Figure 5. From Kôno 2001. Illustration of JHVAMULIYA and UPADHMANIYA along with ANUSVARA and VISARGA

Of the 57 letters forty-eight (in various forms) are notorious on the “**sea-girdled**” earth, *i. e.* throughout India, and the order in which they are read (pāṭhakrama) is as follows: — ಅ ಆ ಇ ಈ ಉ ಊ ಋ ೠ ಳ್ಲ ಳ್ಲ ಎ ಏ ಓ ಔ ಕ್ ಖ್ ಗ್ ಘ್ ಙ್ ಚ್ ಛ್ ಜ್ ಝ್ ಞ್ ಟ್ ಠ್ ಡ್ ಢ್ ಣ್ ತ್ ಥ್ ದ್ ಧ್ ನ್ ಪ್ ಫ್ ಬ್ ಭ್ ಮ್ ಯ್ ರ್ ಲ್ ವ್ ಶ್ ಷ್ ಸ್ ಹ್ ಳ್. The letter ಳ್ in this list is called kshala in order to distinguish it from the true Kannada kuḷa. In Samskr̥ita the kshala is a substitute for the letter ಢ್ (*cf.* § 230); in Kannada it is a substitute for the Samskr̥ita letter ಳ್ (see § 31).

The other nine letters are: — ಎ ಒ ಲ್ ಳ್ ಳ್ (**○ ◌ ⊗ ○○**). Of these ಎ ಒ ಲ್ ಳ್ ಳ್ are peculiar to the Kannada country (dēṣya), and this letter ಳ್ is the kuḷa.

The four letters (**○ ◌ ⊗ ○○**), together with the above-mentioned forty-eight, form the Samskr̥ita alphabet of 52 letters.

Figure 6. From Kittell 1993 (1903). JHVAMULIYA and UPADHMANIYA along with ANUSVARA and VISARGA.

○ **ṁ. 1.** The seventeenth letter of the Alphabet.
 It is an *avargya* letter, and has been called the neutral or unmodified nasal. In the Śmd. its names are: bindu, anuvāra, sūnē or śnya (19. 20). It belongs to the yōgavāhas (25. 26. 43. 44). The unmodified nasal always precedes the *avargya* letters ಯ್, ರ್, ಲ್, ವ್, ಶ್, ಷ್, ಸ್, ಹ್ in the body of a word or in composition, e. g. ಅಂಶ, ಅಂಸ, ಅಂಶಕ, ಸಂಯತ, ಸಂಯೋಗ, ಸಂಯಮ, ಸಂಯಮಿ, ಸಂಯಮಿ, ಸಂಯಮಿ, ಸಂಯಮಿ. Remark: The five *vargya* letters ಷ್, ರ್ಷ್, ಷ್, ಸ್ and ಮ್, that express the nasal sound as modified by guttural, palatal, lingual, dental,

and labial pronunciation (Śmd. 24), are often, for the sake of more expeditious writing, replaced by the sign of the unmodified sūnē. With regard to ಷ್ and ರ್ಷ್ this convenient mode of writing has been adopted also for this Dictionary; but the alphabetical places of the two letters have been retained, so that, e. g., ಅಂಶ follows ಅಂಶ್ಯ; and ಅಂಶ follows ಅಂಶ್ಯ. When in Kannada final ○ is followed by a vowel, it changes into ಸ್, ಮ್, or ವ್ (Śmd. 127. 128; cf. 192. 193).
 ○ ṁ. 2. = ಅಂ (am) 8 q. v., of which it is the *grammatical* form (Śmd. 114. 115).

○ **ḥ.** The eighteenth letter of the Alphabet, (called visarga, Śmd. 19. 20. 44. 45). It is an unmodified

(*avargya*) sibilant, and one of the four yōgavāhas (26. 44).

× **ḫ.** The nineteenth letter of the Alphabet.
 It is a guttural sibilant, used before ಶ್ (Śmd. 25. 26), and one of the four yōgavāhas (26. 44. 45). It is called

jihvāmūlyā (26), the tongue-root sibilant, and according to its sign which has the shape of the thunderbolt, vajrakṛtī. See ಅರ್ಧವಿಸರ್ಗ.

○○ **ṛh.** or ಠ (i. e. the K. consonant ಠ, in Hīā. and Abb. P. MSS.) or ṛ (in Vopādēva's grammar). The twentieth letter of the Alphabet. It is a kind of sibilant, used before ಶ್ (Śmd. 25. 26), and one of the four yōgavāhas (26. 44. 45). It is called upadhmanīya (26), the to-be-breathed one, and according to its sign which has the shape (of a female's breast 26, or that

of an elephant's two frontal bones, gajakumbhākṛtī. See ತಲಬಲ್ಲೆ, ನಿರ್ದಾನ, ಪದ್ಮ, ಪದ್ಮಕ, ಪದ್ಮಲಾಸ, ಪದ್ಮನ, ಪದ್ಮಧನ್ಯ, ಪದ್ಮಪತ್ರ, ಪದ್ಮರಸ, ಪದ್ಮಲಿಪ್, ಪದ್ಮನಕ, ಪದ್ಮನಾಟ, ಪದ್ಮಹೀನ, ಪಾದ್ಮ, ಹಸಿದ್ಧುರ, ಪಾದ್ಮ, ಪಾದ್ಮವಿನ್ಯಾಸಕ ಲಿಖಕ, ರುದ್ರಪದ್ಮ, ವರ್ಣಪದ್ಮ.—In Hīā. 2, 28 this ṛh. has: ಕರವಾಟಂ ಭವೇತ್ ಕನ್ಯಕಾ ವಾದೇತ್ ಮೂಲಂ, etc. (instead of ಕನ್ಯಕಾ ವಾದೇತ್). See ಅರ್ಧವಿಸರ್ಗ.

Figure 7. From Kittel 1993 (1894). Illustration of JIHVAMULIYA and UPADHMANIYA as the 19th and 20th Kannada letters in their alphabetical order following ANUSVARA and VISARGA.

ಠ **ṛ.** The forty-eighth letter of the Alphabet (Śmd. 26-28). It is the final of many words (58. 59. 78. 79. 275. 284. 286), and the initial of some; it changes into ಶ್ (215. 232. 285), into ಷ್ (206), into ಲ್ (218), and into ಯ್ (223); replaces the Sanskrita ರ e. g. in ರೂಢಿ (in Padmarāja's Śānandacaritra there is also ಧ್ಯಾನರೂಢಿ), ಕಾಠ, ರಾಠ; and since about one or two hundred years is represented by ರ್ in the common Kannada language. (See also ಠಾ 2, ಠಮ್). It is occasionally elided (Śmd. 222. 246. 247). About its representation of the upadhmanīya see ○ ○. 2, it forms an auxiliary in ಠ 2.
 ಠ ṛa. 1. The letter ಠ pronounced with a short a

Ṛ.
 ಠವೈ rappē. = ರಪ್ಪೆ. (My.).
 ಠವೈ rambhē. = ರಮ್ಮ. (Śmd. 160 Mdb. Cm.).
 ಠವಕೆ ṛavakē. = ಠವಕೆ. A bodice (worn by females, V. 5, after 14; My.; Tu.; Tē. ಠಯಕೆ, ಠವಕೆ); a quilted jacket, armour, mail (ವಾರವಾಣ, ಕರವಾಣ Nn. 97). See ಠಾ, ಮಿಸುನಿ.
 ಠವಿಕೆ ṛavikē. = ಠವಿಕೆ. (Bp. 14, 15; My.).
 ಠಲಿ ṛa-la. A compound letter used to represent the letter ಠ or a term with the letter ಠ (Śmd. 26. 27. 28. 29. 81. 82. 51. 78).
 ಠಲಾನ್ತ ṛa-anta. A term with final ಠ. (Śmd. 52. 54).
 ಠಲಾನ್ತ-ಶಾಲಾ = ಶಾಲಾನ್ತ. 8 q. v.

Figure 8. From Kittel 1993 (1894). Showing LETTER RRA, the 40th of the Kannada letters, related but distinct from the UPADHMANIYA.

A. Administrative

1. Title

Proposal to add six characters for Kannada to the BMP of the UCS.

2. Requester's name

Michael Everson

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

Individual contribution.

4. Submission date

2004-10-22

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)

No.

Proposed name of script

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

Yes.

1b. Name of the existing block

Kannada

2. Number of characters in proposal

6

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 2.

4b. Is a rationale provided for the choice?

Yes.

4c. If YES, reference

Brahmic 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?

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. Fontographer.

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

Yes, see bibliography below.

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 below.

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. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional

behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at <http://www.unicode.org> for such information on other scripts. Also see Unicode Character Database <http://www.unicode.org/Public/UNIDATA/UnicodeCharacterDatabase.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

Yes, see Unicode properties below.

C. Technical – Justification

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

No.

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?

Discussion on the indic@unicode.org list has shown support for the encoding of the characters.

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?

Yes. Scholars and poets writing Sanskrit in Kannada script.

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

Rarely used Kannada characters.

4b. Reference

See examples above.

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

Yes.

5b. If YES, where?

In Sanskrit and older Kannada texts.

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

All Kannada points are in the BMP.

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

No.

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

Yes. All Indic scripts share a similar structure, but they are disunified on grounds of glyph identity. Devanagari has a LETTER KA, VOWEL SIGN VOCALIC L, AVAGRAHA, DANDA, and in Vedic texts uses a JHVAMULIYA. Likewise, Kannada has all of these. They should not be unified with their Devanagari counterparts.

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?

No.

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)?

Yes.

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

No.

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