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1. Introduction. This document requests the addition to the UCS of a number of characters used chiefly in Vedic Sanskrit. Some of the characters are script-specific, but many are generic and are intended to be used with any script which conforms to the classic Brahmic script model.

1.1. Tone in Vedic. Indian linguists describe tone either as a feature of vowels, in which case it is shared by consonants in the same syllable, or directly as a feature of syllables. Vowels are marked for tone in Vedic as are certain non-vocalic characters that are syllabified in Vedic recitation (*visarga* and *anusvāra*). Vowels are categorized according to tone as *udātta* (high-toned or ‘acute’), *anudātta* (low-toned or ‘non-acute’), *svarita* (circumflexed or ‘modulated’), or *ekasruti* (monotone). A circumflexed vowel is generally described as dropping from high to low, and a series of syllables is monotone if devoid of relative distinction in tone.

Indian linguists describe a number of different types of *svarita*. A *dependent svarita* is one that results from the contextual raising of an *anudātta* and hence always follows an *udātta*. An *independent svarita*, which results from the lexical or post-lexical combination of an *udātta* vowel with a following *anudātta* vowel, is context-independent. An *aggravated independent svarita* is an independent *svarita* that is followed by an *udātta* or another independent *svarita*; its decline is steeper resulting in a lower tone at the end.

Due to tonal shift in the history of the language, various Vedic traditions differ concerning the surface tone that is recited for the underlying tone. In the common recension of *Ṛgveda*, for example, the last *anudātta* before an *udātta* is recited with low surface tone and the *svarita* has the highest surface tone. Some of the same graphic symbols used for marking tone indicate different tones in different traditions. *Visarga* may be marked for all three tones, and *anusvāra* may be marked for high or low surface tone. While the names given to the marks (both existing in the Unicode standard and hereunder proposed for addition to it) capture the usage in certain traditions, we describe basic parameters for the use of each character below and will detail further specifics in a technical note.

1.2. Tone in the Sāmavedic tradition. The Sāmavedic tradition is divided into three branches (Kauthuma, Rāṇāyanīya, Jaiminīya), each of them having its own way of naming, writing, and singing the texts. The signs vary also according to the manuscript traditions, the habits of the writers, and fonts available to printers. The Sāmaveda may be either recited or sung, with different systems of annotating each.

- a) **Recited.** The collection of the texts (*Sāmaveda-Saṁhitā*) is recited, like most of the Vedic *Samhitā* texts, with three tones (*svara*). The tones are marked with a digit, or letter, or digit with following letter, superscripted above the syllable being marked. *Udātta* (U), *svarita*, (S), and *anudātta* (A) are

marked with <१>, <२> and <३> respectively. The letters <उ>, <र> and <क> are used for specific tonal sequences: <१>-< >-<२र> for the sequence U-U-S, <२उ>-< >-<३> for the sequence U-U-A and <३क>-<२र> for the sequence A-S (in which case S is an independant svarita). As in the other Vedic traditions, the tones that are not marked are inferred.

- b) **Sung.** When a *sāman* is sung in *Sāmagāna*, seven tones (*svara*) are used; they constitute a Sāmavedic scale. Six of them are indicated in the written and printed texts by digits from <१> to <६> in order from high to low; the seventh, and highest tone, is indicated in one of two ways, either by the numeral <१> or by the numeral <१ १>. If the seventh and highest tone is marked with the numeral <१> as is the first tone, the marking is ambiguous. The difference between them is usually inferable from the marking of a skip in descent on the subsequent syllable; in the few remaining cases, it is known by oral tradition.

The original text of the *Sāmaveda-Saṁhitā*, when it is sung, is also modified in different ways: shaking of the voice, prolongation of a vowel, modulation from one *svara* to another (with different cases of omission of one or several *svaras* of the scale), etc. All these modifications are marked with different characters: digits, avagraha, letters, other signs like the arrow, and so on. When a digit is used for different purposes in a particular tradition, one is superscript, the other not. In the annotational tradition of the Rāṇāyanīya school, syllables are added to the original text in line with the text and in the annotational tradition of the Jaiminīya school, syllables are added as superscripts in red above syllables in the original text. These signs are directly linked to the *mūdras* ‘hand-positions’ which, before the oral tradition was committed to writing, were the only means used to visually express musical motives on the text. The signs required to encode the superscript signs used in the Kauthuma tradition of annotation, and the one superscript sign used in the Rāṇāyanīya tradition are detailed below. (To encode the Jaiminīya tradition of annotation, nearly all of the characters of Grantha script, with proper combinatory mechanics for conjuncts, would have to be available in superscript.)

In combination, the combining digits and letters are displayed side by side, for example: ११ or १२. Ordinary digits may also bear diacritical marks, such as ३̣; we mention this because some current implementations may not permit such sequences, and they should.

2. Characters already encoded. Five characters already encoded in the UCS and one character being ballotted for encoding in the UCS are intended to be used generically with any script which conforms to the classic Brahmic script model, despite the fact that they are encoded with script-specific names. These are:

- ◌̣ U+09XX DEVANAGARI STRESS SIGN UDATTA would, if it were being encoded today, been named *VEDIC TONE SVARITA, since that is its primary use. (Figure 2A)
- ◌̤ U+09XX DEVANAGARI STRESS SIGN ANUDATTA would, if it were being encoded today, been named *VEDIC TONE ANUDATTA, since that is its primary use. (Figure 2B)
- ॠ TELUGU SIGN ARDHAIVISARGA is used to mark either *jihvāmūlīya* (which is a velar fricative [x] occurring only before unvoiced velar stops KA or KHA) or *upadhmānīya* (which is a bilabial fricative [ɸ] occurring only before unvoiced labial stops PA or PHA). This character is currently under ballot, and it is proposed to take it out of the ballot and to encode it generically as *VEDIC SIGN ARDHAIVISARGA. (Figure 2C)
- ᳵ U+0CF1 KANNADA SIGN JIHVAMULIYA is used to mark *jihvāmūlīya* (a velar fricative [x] occurring only before unvoiced velar stops KA and KHA). (Figure 2D)
- ᳶ U+0CF2 KANNADA SIGN UPADHMULIYA *upadhmānīya* (which is a bilabial fricative [ɸ] occurring only before unvoiced labial stops PA or PHA). (Figure 2E)

3. Combining diacritic for the Ṛgvedic tradition.

- ◌̣ VEDIC TONE RIGVEDIC KASHMIRI INDEPENDENT SVARITA is used to mark an independent svarita in the *R̥gveda Vāṣkala-Saṁhitā*. (Figure 3)

4. Combining characters for the Sāmavedic tradition. Howard (1986: 228-229) summarizes the significance of the digits <१>, <२> and <३>, and the characters <२>, <३> and <४> in the *Sāmaveda-Saṁhitā* as follows:

Numbers 1 and 3 always represent udātta and anudātta, respectively. Number 2 indicates svarita, but it denotes also an udātta syllable followed by anudātta. When two or more udātta syllables appear in succession, only the first is marked with 1, but the sign 2r is placed above the following svarita. If, however, an anudātta follows, 2u is placed above the first udātta syllable and the rest are left undesignated. In a series of anudātta syllables at the beginning of the line, only the first is marked with 3. An independent svarita has the sign 2r, and the preceding anudātta is marked 3k. Pracaya syllables have no markings.

He (1977: 120) summarizes the principle of the annotation in Sāmagāna as follows:

Each chant consists of a certain number of standard phrases, part of a repertoire of melodic fragments constituting all of the musical material belonging to a certain style of singing. These phrases recur over and over again, in various patterns, to form the several thousand sāmans. This recurrence of melodic formulae is without doubt the *raison d'être* of the division into parvans, each of which corresponds to a specific musical phrase or motive. A melody-type is symbolized in the gānas by a particular syllable (in the case of the Rāṇāyanīyas), a certain sequence of numerals (in the case of the Kauthumas), or a specific sequence of syllables (in the case of the Jaiminīyas). In the latter two cases it is not the individual numeral or syllable which symbolizes always a specific melody-type; rather it is the arrangement of the numerals or syllables within a parvan which determines its musical content.... This technique of patchwork composition (centonization) is characteristic also of the ancient Hebrew chant and some of the oldest Gregorian chants, the Tracts.

The following is based in part on Howard's (1977: 79-81) presentation of the details of the significance of specific marks in his tables 5-6.

4.1. Combining digits and letters for the Sāmavedic tradition.

- ◌̣ COMBINING DEVANAGARI DIGIT ZERO is used to mark a long vowel that is not augmented (*vṛddha*) in the Rāṇāyanīya tradition of Sāmagāna. (Figure 4.1A)
- १ COMBINING DEVANAGARI DIGIT ONE is used to mark an udātta in *Sāmaveda-Saṁhitā*, and, in Sāmagāna, to mark the first tone (*prathama*) or seventh tone (*kruṣṭa*), or, written as a superscript over a numeral in line in the text (which indicates a secondary tone), to indicate that the tone signified by the numeral is held for one mora. (Figure 4.1B)
- २ COMBINING DEVANAGARI DIGIT TWO is used to mark an independent svarita, or, it occurs followed by an <३> over the first of two udātta vowels followed by an anudātta in *Sāmaveda-Saṁhitā*. In Sāmagāna it is used to mark the second tone (*dvitīya*). (Figure 4.1C)
- ३ COMBINING DEVANAGARI DIGIT THREE is used to mark an anudātta in *Sāmaveda-Saṁhitā*, and the third tone (*trītiya*) in Sāmagāna. It may be followed by superscript <४>. (Figure 4.1D)
- ४ COMBINING DEVANAGARI DIGIT FOUR is used to mark the fourth tone (*caturtha*) in Sāmagāna. (Figure 4.1E)

- ५
○ COMBINING DEVANAGARI DIGIT FIVE is used to mark the fifth tone (*mandra* or *pañcama*) in Sāmagāna. (Figure 4.1F)
- ६
○ COMBINING DEVANAGARI DIGIT SIX is used to mark an atisvarya tone in Sāmagāna. (Figure 4.1G)
- ७
○ COMBINING DEVANAGARI DIGIT SEVEN is used to mark brief recitation (*abhigīta*) in Sāmagāna. (Figure 4.1H)
- ८
○ COMBINING DEVANAGARI DIGIT EIGHT has not been found in Sāmagāna, but we propose it here for the sake of completing the logical set.
- ९
○ COMBINING DEVANAGARI DIGIT NINE is used to indicate bending or sinking (*namana*) in Sāmagāna. (Figure 4.1J)
- अ
○ COMBINING DEVANAGARI LETTER A is used to mark brief recitation (*abhigīta*) in Sāmagāna. (Figure 4.1K)
- उ
○ COMBINING DEVANAGARI LETTER U is used to mark an udātta in Böhrtlingk and Roth's St. Petersburg Sanskrit-English lexicon, and, following a superscript <२>, to indicate the first of two successive udāttas followed by an anudātta in *Sāmaveda-Saṁhitā*. (Figure 4.1L)
- क
○ COMBINING DEVANAGARI LETTER KA is used, after a superscript <२>, to mark an anudātta preceding an independent svarita in *Sāmaveda-Saṁhitā*. (Figure 4.1M)
- न
○ COMBINING DEVANAGARI LETTER NA is used in South Indian manuscripts to mark bending or sinking (*namana*) in Sāmagāna. (Figure 4.1N)
- प
○ COMBINING DEVANAGARI LETTER PA is used in Sāmagāna instead of <२> as a superscript over a numeral (a numeral in-line in the text indicates a secondary tone) to mark vibrato (*preṅkha*). (Figure 4.1O)
- र
○ COMBINING DEVANAGARI LETTER RA is used, following a superscript 2, to mark an independent svarita in *Sāmaveda-Saṁhitā*, and in Sāmagāna, alone or following a superscript numeral 1-5, to mark a long (*dīrgha*) vowel that is not augmented (*vṛddha*). (Figure 4.1P)
- वि
○ COMBINING DEVANAGARI LETTER VI is used to mark a musical motive called *vinata* in Sāmagāna. (Figure 4.1Q)
- ५
○ COMBINING DEVANAGARI SIGN AVAGRAHA is used in Sāmagāna to mark the omission or skipping of a tone in a descending scale (*atikrama*), or the musical motive called *vinata*, or bending or sinking (*namana*). (Figure 4.1R)

4.2. Combining diacritics for the Sāmavedic tradition.

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○ VEDIC TONE KARSHANA is used in Sāmagāna, as a superscript over a numeral in line in the text (which indicates a secondary tone), to indicate continuous progression or slide (*karṣaṇa*) of the tone signified by the numeral, or over a syllable to indicate bending or sinking (*namana*), or occasionally the musical motive involving descent from a primary second tone to a secondary third tone (*praṇata*). (Figure 4.2A)
- ↑
○ VEDIC TONE SHARA is used in Sāmagāna to mark skipping (*atikrama*), usually (in 52/56 instances appearing above an in-line 2 after a superscript 1) from *kruṣṭa* to *dvitīya*. (Figure 4.2B)
- ○ VEDIC TONE PRENKHA is a horizontal line used in Sāmagāna as a superscript over a character or numeral (a numeral in-line in the text indicates a secondary tone) to mark vibrato (*preṅkha*): २४ (Figure 4.2C)
- 〃
○ VEDIC SIGN NIHSHVASA is a spacing character used to indicate to the performer where a breath can be conveniently taken. (Figure 4.2D)

5. Combining diacritics for the Yajurvedic tradition.

5.1. General

- VEDIC TONE YAJURVEDIC INDEPENDENT SVARITA is used to mark an independent svarita (not aggravated) following an anudatta in the *Śuklayajurveda Mādhyandina-Saṃhitā*, and in the *Atharvaveda Paippalāda-Saṃhitā*. (Figure 5.1A)
- VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA is used to mark an independent svarita (not aggravated) in the *Kṛṣṇayajurveda Kāṭhaka-Saṃhitā*. (Figure 5.1B)
- VEDIC TONE YAJURVEDIC AGGRAVATED INDEPENDENT SVARITA is used to mark an aggravated independent svarita the *Śuklayajurveda Mādhyandina-Saṃhitā* and in the *Kṛṣṇayajurveda Kāṭhaka-Saṃhitā*. (Figure 5.1C)
- VEDIC TONE CANDRA BELOW is used to mark an independent svarita (not aggravated) in the *Kṛṣṇayajurveda Kāṭhaka-Saṃhitā*, and an independent svarita (not aggravated) followed by an anudatta or ekaśruti in the *Kṛṣṇayajurveda Maitrāyaṇī-Saṃhitā*. It is also used instead of DEVANAGARI STRESS SIGN ANUDATTA to indicate low surface tone in *Śatapathabrāhmaṇa*. (Figure 5.1D)
- VEDIC TONE DOUBLE SVARITA is used to mark a long (*dīrgha*) svarita. (Figure 5.1E)
- VEDIC TONE TRIPLE SVARITA is used to mark a dependent svarita followed by an anudatta in *Kṛṣṇayajurveda Maitrāyaṇī-Saṃhitā*. (Figure 5.1F)
- VEDIC TONE DOT BELOW is used to mark a dependent svarita in *Yajurveda Kāṭhaka-Saṃhitā* and *Atharvaveda Paippalāda-Saṃhitā*, and also to mark the first ekaśruti after an independent svarita in the latter. (Figure 5.1G)
- VEDIC TONE KATHAKA ANUDATTA BELOW is used to mark an anudatta in *Yajurveda Kāṭhaka-Saṃhitā* and *Atharvaveda Paippalāda-Saṃhitā*. (Figure 5.1H)
- VEDIC TONE YAJURVEDIC AGGRAVATED INDEPENDENT SVARITA SCHROEDER is used to mark independent svarita (not aggravated) in Schröder's edition of the *Kṛṣṇayajurveda Kāṭhaka-Saṃhitā*. (Figure 5.1I)

5.2 Śatapathabrāhmaṇa.

- VEDIC TONE THREE DOTS BELOW is used to mark a surface low pitch corresponding to an underlying pre-pause udatta, i.e. one that occurs immediately before a pause or mediated by a single syllable before a pause, or followed by an udatta after the pause in Weber's edition of the *Śatapatha-brāhmaṇa*. Doubled stacked, it is followed by a svarita after the pause. (Figure 5.2A)
- VEDIC TONE TWO DOTS BELOW is used to mark a surface low pitch corresponding to an underlying pre-pause udatta, i.e. one that occurs immediately before a pause or mediated by a single syllable before a pause, followed by an udatta or independent svarita after the pause; an (immediately) pre-pause anudatta, followed by an independent svarita after the pause in the *Śatapathabrāhmaṇa*. (Figure 5.2B)

6. Combining diacritic for the Atharvavedic tradition.

- VEDIC TONE ATHARVAVEDIC INDEPENDENT SVARITA is used to mark an independent svarita (not aggravated) in the *Atharvaveda Śaunakīya-Saṃhitā*. (Figure 6)

7. Ardhavisarga and combining diacritics for visarga. These tone markers appear in red in Vedic manuscripts, just as other tone markers do. They combine with the VISARGA, following it in the text stream. VEDIC TONE VISARGA UDATTA and VEDIC TONE ANUDATTA VISARGA sometimes appear together combined on a VISARGA in final position (Figure 8Kb).

- VEDIC TONE VISARGA SVARITA is used to show that a visarga has a svarita tone. (Figure 7A)
- VEDIC TONE VISARGA UDATTA is used to show that a visarga has an udātta tone. (Figure 7B)
- VEDIC TONE VISARGA ANUDATTA is used to show that a visarga has an anudātta or pracaya tone. (Figure 7C)
- VEDIC TONE ARDHAVISARGA is used to mark either *jihvāmūlīya* (which is a velar fricative [x] occurring only before unvoiced velar stops KA or KHA) or *upadhmānīya* (which is a bilabial fricative [ɸ] occurring only before unvoiced labial stops PA or PHA). (Figure 2C)

8. Anusvāras. Indian phonetic treatises describe a number of phonetic distinctions in the articulation of nasals. First they distinguish between nasalized vowels, nasalized semivowels, nasal stops, and anusvāra. Ancient Vedic treatises (Prātiśākhya) describe the nasalization of vowels; nasalized semivowels *y*, *v*, and *l*; and two lengths of anusvāra: short (*hrasva*) and long (*dīrgha*). Long anusvāra occurs after short vowels, and short anusvāra occurs after long vowels. In addition to short and long anusvāra, medieval phonetic texts (Śikṣā) describe a heavy (*guru*) anusvāra, and a two-mora (*dvimātra*) anusvāra, and one treatise describes a prolonged (*pluta*) anusvāra. The heavy anusvāra occurs before a conjunct consonant, and the guru anusvāra occurs before a consonant followed by vocalic *r*. The *Pratijñāsūtra* prescribes that *gm̐* occurs in place of anusvāra before *r* or a spirant and has a three-fold distinction: short (after a long vowel), long (after a short vowel), and heavy (before a conjunct). Most Śikṣās give the name *raṅga* to a two-mora vowel with modulation of tone (*kampa*) in the middle and nasalization at the end. The *Mallaśarmakṛtā Śikṣā* describes several distinctions in the length of nasalized vowels, ranging from one to six mora. Those of four, five and six mora are called *raṅga*, *mahāraṅga*, and *atiraṅga*, respectively, and are followed by a pause in recitation. Different traditions mark varieties of nasals differently using the symbols below and others.

- DEVANAGARI SIGN INVERTED CANDRABINDU is used to mark *anusvāra* before spirants in Schröder's edition of the *Kṛṣṇayajurveda Kāṭhaka-Saṃhitā*. (Figure 8A). Although proposed for the Devanagari block, it may be appropriate to name this VEDIC SIGN INVERTED CANDRABINDU.
- DEVANAGARI SIGN SPACING CANDRABINDU is a spacing mark used to mark *anusvāra*. It is lower than U+0910 DEVANAGARI SIGN CANDRABINDU and occurs in-line at the level of the Devanagari rheadbar. (Figure 8B)
- DEVANAGARI SIGN CANDRABINDU VIRAMA is used to mark *anusvāra*. (Figure 8C)
- DEVANAGARI SIGN DOUBLE CANDRABINDU VIRAMA is used to mark *anusvāra* before a spirant initial in a consonant cluster. (Figure 8D)
- DEVANAGARI SIGN CANDRABINDU TWO is used to mark a vowel prolonged to two mora with nasalization. (Figure 8E)
- DEVANAGARI SIGN CANDRABINDU THREE is used to mark a vowel prolonged to three mora with nasalization. (Figure 8F)
- DEVANAGARI SIGN CANDRABINDU AVAGRAHA is used to mark *anusvāra*. (Figure 8G)
- VEDIC SIGN ANTARGOMUKHA is used, with a bindu added on top, to mark short *anusvāra* after a long vowel. (Figure 8H)
- VEDIC SIGN BAHIRGOMUKHA is used, with a bindu or candrabindu added on top, to mark *anusvāra* or nasalization. (Figure 8I)
- VEDIC SIGN SAJIHVA BAHIRGOMUKHA is used, with a bindu or candrabindu added on top, to mark *anusvāra* or nasalization. (Figure 8J)
- VEDIC SIGN LONG ANUSVARA is used to mark a long *anusvāra* after a short vowel. (Figure 8K)

9. Additions for Devanagari.

- ◌̥ DEVANAGARI VOWEL SIGN PRISHTHAMĀTRA E is used in *pr̥ṣṭhamātrā* orthography to mark vowel matras: क (क + ◌̥) is the same as के *ke*; के (क + ◌̥ + ◌̥) is the same as कै *kai*; का (क + ◌̥ + ◌̥) is the same as को *ko*; को (क + ◌̥ + ◌̥) is the same as कौ *kau*. (Figure 9A)
- ◌̄ DEVANAGARI VOWEL SIGN CANDRA LONG E is used in Devanagari transcriptions of Avestan to mark the long schwa *ē*. (DEVANAGARI VOWEL SIGN CANDRA E is used to mark the regular schwa *a*.) (Figure 9B)
- ॐ DEVANAGARI SIGN PUSHPIKA is used as a placeholder or “filler”, often flanked by double dandas (Figure 9C)
- ❀ DEVANAGARI SIGN PUSHPA is used as a placeholder or “filler”, or otherwise as a bullet or other attention-getting mark (Figure 9D)
- झ DEVANAGARI LETTER ZHA is used in Devanagari transcriptions of Avestan to mark the voiced palatal fricative [ʒ]. (Figure 9E)
- य DEVANAGARI LETTER HEAVY YA is used to mark an affricated glide [dʒ], as in कुर्यात् *kur̥yāt* ‘one would do’, written in other dialects कुर्यात् *kuryāt*. The distinction is similar to that made in Bengali orthography between य BENGALI LETTER YA [dʒ] and য BENGALI LETTER YYA [j]. (Figure 9F)
- ◌̇ DEVANAGARI SIGN DIVIDER ABOVE is used to mark the insertion point of omitted text and to mark word division. (Figure 9G)

10. Additions for Oriya and Malayalam. Three characters are needed to complete the set of vocalic liquids for Oriya and Malayalam. Classical Sanskrit grammar gives four independent vowels ऋ *r̥*, ॠ *r̄*, ॡ *l̥*, ॢ *l̄*, and four dependent vowel matras ॣ -*r̥*, । -*r̄*, ॥ -*l̥*, ० -*l̄*. Oriya currently has only five of these eight encoded: ॣ *r̥*, । *r̄*, ॥ *l̥*, ० *l̄*, and ० -*r̥*. Malayalam has all encoded but one, ० -*l̄*.

- ◌̇ MALAYALAM VOWEL SIGN VOCALIC LL is used to mark a long vocalic *l̄*. (Figure 10A)
- ◌̇ ORIYA VOWEL SIGN VOCALIC RR is used to mark a long vowel *r̄*. (Figure 10B)
- ◌̇ ORIYA VOWEL SIGN VOCALIC L is used to mark a vocalic *l̥*. (Figure 10B)
- ◌̇ ORIYA VOWEL SIGN VOCALIC LL is used to mark a long vocalic *l̄*. (Figure 10C)

The current standard contains the independent vowel letters as well as vowel signs for most Brahmic scripts, particularly those which are still concerned with the Sanskrit language. In the table below, the independent vowel signs are given, along with the consonants *ra* and *la* for comparison.

	ṛ	ṝ	ḷ	ḹ	-ṛ	-ṝ	-ḷ	-ḹ	ra	la
Devanagari	ऋ	ॠ	ऌ	ॡ	ॣ	।	॥	०	र	ल
Bengali	ঋ	ঠ	ঌ	ড	৳	৴	৵	৶	র	ল
Gujarati	ઋ	ઠ	ઌ	ડ	૳	૴	૵	૶	ર	લ
Oriya	ଋ	ॠ	ॡ	ॢ	ୣ	୤	୥	୦	ର	ଲ
Telugu	ఋ	ౠ	ఌ	ౡ	ౣ	౤	౥	౦	ర	ల
Kannada	ಋ	ೠ	ಌ	ೡ	ೣ	೤	೥	೦	ರ	ಲ
Malayalam	ഋ	ൠ	ഌ	ൡ	ൣ	൤	൥	൦	ര	ല
Sinhala	ආ	ආ෦	ඌ	ඌ෦	෦	෦෦	෦	෦෦	ර	ල
Myanmar	ဝ	ဝ̄	ဣ	ဣ̄	ၣ်	ၣ်̄	ၣ်	ၣ်̄	ရ	လ
Balinese	ꦫ	ꦫ̄	ꦭ	ꦭ̄	ꦴ	ꦴ̄	ꦸ	ꦸ̄	ꦂ	ꦭ

11. Additions for Bengali and other scripts. All the combining digits 0-9 used in Vedic have the same significance in Bengali as they do in Devanāgarī. All superscript numerals and alphabetic characters should be encoded in a Bengali block since Bengali editions of Vedic texts including Sāmaveda do appear. Similarly every other major Indian script in which editions of Vedic texts appear will require Vedic extensions of this kind.

13. Unicode Character Properties. Character properties are proposed here.

```
094E;DEVANAGARI VOWEL SIGN PRISHTHAMATRA E;Mc;0;L;;;;N;;;;;
0955;DEVANAGARI VOWEL SIGN CANDRA LONG E;Mn;0;NSM;;;;N;;;;;
0973;DEVANAGARI SIGN PUSKPIKA;Po;0;L;;;;N;;;;;
0974;DEVANAGARI SIGN PUSKPA;Po;0;L;;;;N;;;;;
0979;DEVANAGARI LETTER ZHA;Lo;0;L;;;;N;;;;;
097A;DEVANAGARI LETTER HEAVY YA;Lo;0;L;;;;N;;;;;

0B44;ORIYA VOWEL SIGN VOCALIC RR;Mn;0;NSM;;;;N;;;;;
0B62;ORIYA VOWEL SIGN VOCALIC L;Mn;0;NSM;;;;N;;;;;
0B63;ORIYA VOWEL SIGN VOCALIC LL;Mn;0;NSM;;;;N;;;;;

0D63;MALAYALAM VOWEL SIGN VOCALIC LL;Mn;0;NSM;;;;N;;;;;

A4D0;VEDIC TONE NIHSHVASA;Mn;230;NSM;;;;N;;;;;
A4D1;VEDIC TONE KARSHANA;Mn;230;NSM;;;;N;;;;;
A4D2;VEDIC TONE SHARA;Mn;230;NSM;;;;N;;;;;
A4D3;VEDIC TONE PRENKHA;Mn;230;NSM;;;;N;vibrato;;;
A4D4;VEDIC TONE DOUBLE SVARITA;Mn;230;NSM;;;;N;;;;;
A4D5;VEDIC TONE TRIPLE SVARITA;Mn;230;NSM;;;;N;;;;;
A4D6;VEDIC TONE YAJURVEDIC INDEPENDENT SVARITA;Mn;220;NSM;;;;N;;;;;
A4D7;VEDIC TONE YAJURVEDIC AGGRAVATED INDEPENDENT SVARITA;Mn;220;NSM;;;;N;;;;;
A4D8;VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA;Mn;220;NSM;;;;N;;;;;
A4D9;VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA SCHROEDER;Mn;220;NSM;;;;N;;;;;
A4DA;VEDIC TONE CANDRA BELOW;Mn;220;NSM;;;;N;;;;;
A4DB;VEDIC TONE ATHARVAVEDIC INDEPENDENT SVARITA;Mc;0;L;;;;N;;;;;
A4DC;VEDIC TONE RIGVEDIC KASHMIRI INDEPENDENT SVARITA;Mn;230;NSM;;;;N;;;;;
A4DD;VEDIC TONE THREE DOTS BELOW;Mn;220;NSM;;;;N;;;;;
A4DE;VEDIC TONE TWO DOTS BELOW;Mn;220;NSM;;;;N;;;;;
A4DF;VEDIC TONE DOT BELOW;Mn;220;NSM;;;;N;;;;;
A4E0;VEDIC TONE KATHAKA ANUDATTA;Mn;220;NSM;;;;N;;;;;
A4E1;VEDIC TONE SVARITA VISARGA;Mn;1;NSM;;;;N;;;;;
A4E2;VEDIC TONE UDATTA VISARGA;Mn;1;NSM;;;;N;;;;;
A4E3;VEDIC TONE ANUDATTA VISARGA;Mn;1;NSM;;;;N;;;;;
A4E4;VEDIC SIGN ARDHAVISARGA;Lo;0;L;;;;N;;;;;
A4E5;VEDIC SIGN ANTARGOMUKHA;Lo;0;L;;;;N;;;;;
A4E6;VEDIC SIGN BAHIRGOMUKHA;Lo;0;L;;;;N;;;;;
A4E7;VEDIC SIGN SAJIHVA BAHIRGOMUKHA;Lo;0;L;;;;N;;;;;
A4E8;VEDIC SIGN LONG ANUSVARA;Lo;0;L;;;;N;;;;;

A8E0;COMBINING DEVANAGARI DIGIT ZERO;Mn;230;NSM;;;;N;;;;;
A8E1;COMBINING DEVANAGARI DIGIT ONE;Mn;230;NSM;;;;N;;;;;
A8E2;COMBINING DEVANAGARI DIGIT TWO;Mn;230;NSM;;;;N;;;;;
A8E3;COMBINING DEVANAGARI DIGIT THREE;Mn;230;NSM;;;;N;;;;;
A8E4;COMBINING DEVANAGARI DIGIT FOUR;Mn;230;NSM;;;;N;;;;;
A8E5;COMBINING DEVANAGARI DIGIT FIVE;Mn;230;NSM;;;;N;;;;;
A8E6;COMBINING DEVANAGARI DIGIT SIX;Mn;230;NSM;;;;N;;;;;
A8E7;COMBINING DEVANAGARI DIGIT SEVEN;Mn;230;NSM;;;;N;;;;;
A8E8;COMBINING DEVANAGARI DIGIT EIGHT;Mn;230;NSM;;;;N;;;;;
A8E9;COMBINING DEVANAGARI DIGIT NINE;Mn;230;NSM;;;;N;;;;;
A8EA;COMBINING DEVANAGARI LETTER A;Mn;230;NSM;;;;N;;;;;
A8EB;COMBINING DEVANAGARI LETTER U;Mn;230;NSM;;;;N;;;;;
A8EC;COMBINING DEVANAGARI LETTER KA;Mn;230;NSM;;;;N;;;;;
A8ED;COMBINING DEVANAGARI LETTER NA;Mn;230;NSM;;;;N;;;;;
A8EE;COMBINING DEVANAGARI LETTER PA;Mn;230;NSM;;;;N;;;;;
A8EF;COMBINING DEVANAGARI LETTER RA;Mn;230;NSM;;;;N;;;;;
A8F0;COMBINING DEVANAGARI LETTER VI;Mn;230;NSM;;;;N;;;;;
A8F1;COMBINING DEVANAGARI SIGN AVAGRAHA;Mn;230;NSM;;;;N;;;;;
A8F2;DEVANAGARI SIGN DIVIDER;Lo;0;L;;;;N;;;;;
A8F3;DEVANAGARI SIGN INVERTED CANDRABINDU;Mn;0;NSM;;;;N;;;;;
A8F4;DEVANAGARI SIGN SPACING CANDRABINDU;Lo;0;L;;;;N;;;;;
A8F5;DEVANAGARI SIGN CANDRABINDU VIRAMA;Lo;0;L;;;;N;;;;;
A8F6;DEVANAGARI SIGN DOUBLE CANDRABINDU VIRAMA;Lo;0;L;;;;N;;;;;
A8F7;DEVANAGARI SIGN CANDRABINDU TWO;Lo;0;L;;;;N;;;;;
A8F8;DEVANAGARI SIGN CANDRABINDU THREE;Lo;0;L;;;;N;;;;;
A8F9;DEVANAGARI SIGN CANDRABINDU AVAGRAHA;Lo;0;L;;;;N;;;;;
```

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16. Figures.

2. Characters already encoded.

Figure 2A. U+0951 DEVANAGARI STRESS SIGN UDATTA primarily used as svarita but also as udātta in some Vedic schools. In figure 2Aa, the horizontal stroke represents a svarita in Satvalekar's edition of the *R̥gveda* 1.1.1, as it does in figure 2Ab *R̥gveda-Saṁhitā*, Poleman manuscript 4 / Houghton Indic Ms 636, folio 5 verso. In figure 2Ac, on the other hand, the same character represents an udātta in Raghu Vira's edition of the *Atharvaveda Paippalāda-Saṁhitā* 1.30.6.

होतारं

Figure 2Aa

॥ पुनानोवर्धनो गिरः ॥

Figure 2Ab

क इदं

Figure 2Ac

Figure 2B. U+0952 DEVANAGARI STRESS SIGN ANUDATTA. Figure 2Ba shows *R̥gveda* 1.82.1 in Satvalekar's edition. Figure 2Bb is taken from folio 5 verso of Poleman manuscript 4 / Houghton Indic Ms 636 *R̥gveda-Saṁhitā*.

यदा

Figure 2Ba

॥ पुनानोवर्धनो गिरः ॥

Figure 2Bb

Figure 2C. TELUGU SIGN ARDHA VISARGA in Gomatham's Telugu edition of the *Taittirīya-Saṁhitā*, verse TS 1.1.24.

నగ్నిప్రతుంకృణ

Figure 2C

Figure 2D. U+0CF1 KANNADA SIGN JIHVAMULIYA.

ಕೆ. The nineteenth letter of the Alphabet. It is a guttural plosive, made before or (less often) after the nasal plosive (ನ. ಛ. ಞ). It is called Jihvamuliya (ಜಿಹ್ವಮುಲಿಯಾ), the tongue-root plosive, and appears in the sign which has the shape of the character, ಕೆ. It is called Jihvamuliya (ಜಿಹ್ವಮುಲಿಯಾ), the tongue-root plosive, and appears in the sign which has the shape of the character, ಕೆ. It is called Jihvamuliya (ಜಿಹ್ವಮುಲಿಯಾ), the tongue-root plosive, and appears in the sign which has the shape of the character, ಕೆ.

Figure 2D

Figure 2E. U+0CF2 KANNADA SIGN UPADHMANIYA.

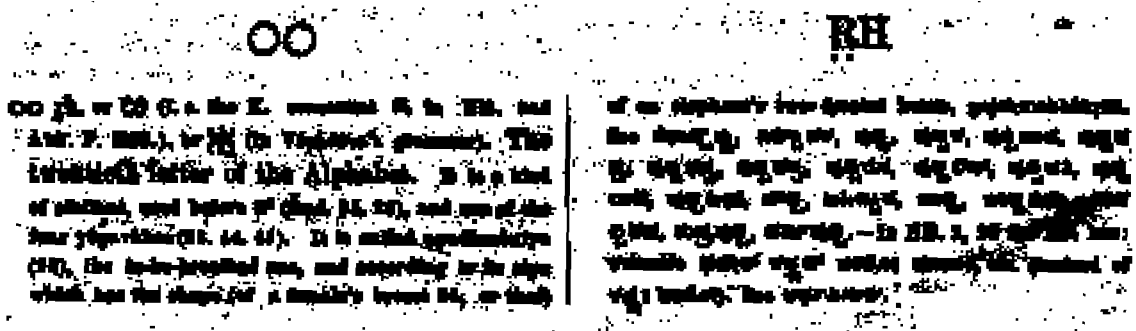


Figure 2E

3. Combining diacritic for the R̥gvedic tradition.

Figure 3. VEDIC TONE RIGVEDIC KASHMIRI INDEPENDENT SVARITA in Sontakke's edition of the *R̥gveda Khilāni*, verse RVKh 1.11.4.

स्वः

Figure 3

4. Combining characters for the Sāmavedic tradition.

4.1. Combining digits and letters for the Sāmavedic tradition.

Figure 4.1A. COMBINING DEVANAGARI DIGIT ZERO in *Sāmaveda*, Kouthama śākhā, *Uha Uhya Gana*, Vol. I. <http://www.vedamu.org/>.

ल-योजरिचुभ्योमधवा ।
 योरा विन् यामा विन् नैतायइ
 १२५ ३ २ ३ २ २ २ २
 लि-येकेचोवरसपिणस्तेभ्योनमा.

Figure 4.1A

Figure 4.1B. COMBINING DEVANAGARI DIGIT ONE in Dandekar's edition of the *Śrautakośa* Sanskrit Section, Vol. II, Part II. Figure 4.1Ba is from p. 206; figure 4.1Bb is from p. 12. Figure 4.1Bc shows the two digits combined as the number 11.

१
 माइमा

Figure 4.1Ba

१ १ १ १
 २ ३ ४ ५

Figure 4.1Bb

अतिक्रमःचतुर्विधः— ११ ३ ५
 १. कुट्टः प्रथममतिक्रामति— ऊऽ२ । न आगाऽ२३४ही ।

Figure 4.1Bc

Figure 4.1C. COMBINING DEVANAGARI DIGIT TWO in samples taken from Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 206.

२
स्यचा

Figure 4.1Ca

२२ १
राधो

Figure 4.1Cb

२९
आ

Figure 4.1Cc

Figure 4.1D. COMBINING DEVANAGARI DIGIT THREE in samples taken from Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 237.

३ २ ३ २
अदा ३४ व्यस्सू

Figure 4.1Da

३२ २
नूना

Figure 4.1Db

Figure 4.1E. COMBINING DEVANAGARI DIGIT FOUR in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 206.

४
गा

Figure 4.1E

Figure 4.1F. COMBINING DEVANAGARI DIGIT FIVE in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 206.

५
दहाउवा

Figure 4.1Fa

रं र ५र
ताओवा

Figure 4.1Fb

Figure 4.1G. COMBINING DEVANAGARI DIGIT SIX in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 237.

६ २
ओ३हा

Figure 4.1G

Figure 4.1H. COMBINING DEVANAGARI DIGIT SEVEN in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 12.

७
अवा

Figure 4.1H

Figure 4.1I. COMBINING DEVANAGARI DIGIT EIGHT ABOVE.

No occurrences of this character have yet been found.

Figure 4.1J. COMBINING DEVANAGARI DIGIT NINE in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 12.

९
यो

Figure 4.1J

Figure 4.1K. COMBINING DEVANAGARI LETTER A in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 239.

अ
कृता

Figure 4.1K

Figure 4.1L. COMBINING DEVANAGARI LETTER U ABOVE. Figure 4.1La shows the character in conjunction with the preceding digit 2 in B. R. Sharma's edition of the *Sāmaveda*, pū 3.6.5. Figure 4.1Lb shows the character unconjoined in Bötlingk and Roth's *Sanskrit Wörterbuch*, p. 831/832.

३२३ ३ २
चनास्मद्वातिः

Figure 4.1La

इष्टका — इष्टि

Figure 4.1Lb

Figure 4.1M. COMBINING DEVANAGARI LETTER KA in B. R. Sharma's edition of the *Sāmaveda*, pū 1.5.8.

इक २र
त न्वा

Figure 4.1M

Figure 4.1N. COMBINING DEVANAGARI LETTER NA in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II. p. 287.

१ न
सियौ

Figure 4.1N

Figure 4.1O. COMBINING DEVANAGARI LETTER PA in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II. p. 250.

१ प
वा २ तौ

Figure 4.1O

Figure 4.1P. Samples showing COMBINING DEVANAGARI LETTER RA in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 206. Figure 4.1Pb shows the character in conjunction with a preceding digit 2, and figure 4.1Pc shows it in conjunction with a preceding digit 5.

२ र ५
धाओवा

Figure 4.1Pa

२र १
रा धो

Figure 4.1Pb

२ र ५र
ताओवा

Figure 4.1Pc

Figure 4.1Q. COMBINING DEVANAGARI LETTER VI in *Sāmaveda*, *Kouthama sakha*, *Uha Uhya Gana*, Vol. I. <http://www.vedamu.org/>.

१,०खि० १,०खि० १खि०
। वाजेऽ२ वाजेऽ२ ह्वाऽ

Figure 4.1Q

Figure 4.1R. Samples showing COMBINING DEVANAGARI SIGN AVAGRAHA ABOVE. Figure 4.1Ra shows avagraha conjoined with the preceding digit 2 in Dandekar's edition of the *Śrautakośa*, Sanskrit Section, Vol. II, Part II, p. 206. Figure 4.1Rb shows it unconjoined in Samasrami's edition of the *Sāmaveda*, p. 620.

Figure 5.1A. Samples showing VEDIC TONE YAJURVEDIC INDEPENDENT SVARITA. Figure 5.1Aa shows the character in *Śuklayajurveda Mādhyandina-Saṁhitā* 18.64, edited by Daulata Rāma Gauḍa and published by Caukhamba. Figure 5.1Ab shows it in Raghu Vira's edition of the *Atharvaveda Paippalāda-Saṁhitā*, verse 14.2.8.

नयस्वर्द्धेवेषु

Figure 5.1Aa

तन्वा शतमया

Figure 5.1Ab

Figure 5.1B. Samples showing VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA Figure 5.1Ba is in Poleman manuscript 93 / Houghton MS Indic 371, *Rudrajāpya*, folio 4 recto. Figure 5.1Bb is from Schröder's edition of the *Kṛṣṇayajurveda Kāṭhaka-Saṁhitā*, verse 24.4.

॥ ब्राह्मणस्य मुखमासीत् ॥

Figure 5.1Ba

वीर्याणि

Figure 5.1Bb

Figure 5.1C. Samples showing VEDIC TONE YAJURVEDIC AGGRAVATED INDEPENDENT SVARITA. Figure 5.1Ca shows the character in Daulata Rāma Gauḍa's edition of the *Śuklayajurveda Mādhyandina-Saṁhitā*, verse 38.17, published by Caukhamba. Figure 5.1Cb shows it in Satvalekar's edition of the *Kṛṣṇayajurveda Kāṭhaka-Saṁhitā*, verse 1.4.

अभीमम्माहिमा

Figure 5.1Ca

उर्वन्तरिक्षं

Figure 5.1Cb

Figure 5.1D. Samples showing VEDIC TONE CANDRA BELOW. Figure 5.1Da shows the character in Satvalekar's edition of the *Kṛṣṇayajurveda Kāṭhaka-Saṁhitā*, verse 24.4; figure 5.1Cb, in Satvalekar's edition of the *Kṛṣṇayajurveda Maitrāyaṇī-Saṁhitā*, verse 1.2.9; and figure 5.1Cc, in the *Mādhyandina Śatapathabrāhmaṇa*, verse 1.1.1.16, published by Gian Publishing.

व्यूद्धा वा

Figure 5.1Da

वीर्याणि प्रवोच ५

Figure 5.1Db

देवान् ह वै यज्ञेन

Figure 5.1Dc

Figure 5.1E. VEDIC TONE DOUBLE SVARITA in *Nakshatra Sutra*, TS 3.5.1.2.
<http://www.sanskritdocuments.org/>.

रोहिणीवेतु पत्नी[॥] विश्वरूपा

Figure 5.1E

Figure 5.1F. VEDIC TONE TRIPLE SVARITA in *Kṛṣṇayajurveda Maitrāyaṇī-Saṁhitā*, Witzel manuscript 1571ce, folio 61 verso.

त्रिष्टुवंतीमाजंमती

Figure 5.1F

Figure 5.1G. VEDIC TONE DOT BELOW in Raghu Vira's edition of the *Atharvaveda Paippalāda-Saṁhitā*, verse 16.104.6.

जिह्वाया आस्याय च

Figure 5.1G

Figure 5.1H. VEDIC TONE KATHAKA ANUDATTA BELOW in Raghu Vira's edition of the *Atharvaveda Paippalāda-Saṁhitā*, verse 2.18.1.

या देवी

Figure 5.1H

Figure 5.1I. VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA SCHROEDER in Raghu Vira's edition of the *Atharvaveda Paippalāda-Saṁhitā*, verse 2.18.1.

उर्वन्तरिष् वीहीन्द्रस्य

Figure 5.1I

5.2 Śatapathabrāhmaṇa.

Figure 5.2A. Samples showing VEDIC TONE THREE DOTS BELOW in Weber's edition of the *Śatapatha - brāhmaṇa*. Figure 5.2Aa is taken from ŚBr 9.2.3.26. Figure 5.2Ab shows the three dots doubled and stacked in ŚBr 4.2.1.13.

सम्पदेव । षट्

Figure 5.2Aa

यदुक्थ्यः । सोऽस्यैष

Figure 5.2Ab

Figure 5.2B. VEDIC TONE TWO DOTS BELOW in the Vedic Yantrālaya edition of the *Śatapathabrāhmaṇa* as shown by Yudhiṣṭhira Mīmāṃsaka 1964.

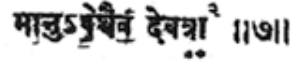


Figure 5.2B

6. Combining diacritics for the Atharvavedic tradition.

Figure 6. Samples showing VEDIC TONE ATHARVAVEDIC INDEPENDENT SVARITA. Figure 6Aa is taken from Whitney’s edition of the *Atharvaveda Śaunakīya-Samhitā*, verse 1.1.1; figures 6Ab and 6Ac, from other editions.

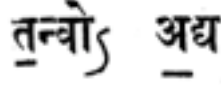


Figure 6a

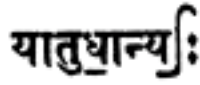


Figure 6b

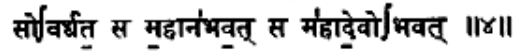


Figure 6c

7. Combining diacritics for visarga.

Figure 7A. Samples showing VEDIC TONE SVARITA VISARGA. Figures 7Aa and 7Ab show the character in verses 4.25 and 1.31 in Daulata Rāma Gauḍa’s edition of *Śuklayajurveda Mādhyandina-Samhitā*, as published by Gupta. Figure 7Ac shows the character in red, in accordance with the custom of marking all accents in red, in Poleman manuscript 93 / Houghton MS Indic 371, *Rudrajāpya*, folio 3 verso.

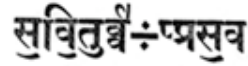


Figure 7Aa

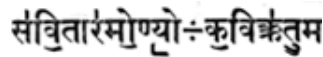


Figure 7Ab

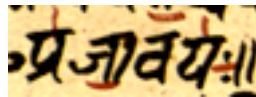


Figure 7Ac

Figure 7B. Samples showing VEDIC TONE UDATTA VISARGA. Figure 7Ba shows the character in verse 1.21 in Daulata Rāma Gauḍa’s edition of *Śuklayajurveda Mādhyandina-Samhitā*, as published by Gupta. Figure 7Bb shows the character in red, in accordance with the custom of marking all accents in red, in Poleman manuscript 93 / Houghton MS Indic 371, *Rudrajāpya*, folio 4 verso.

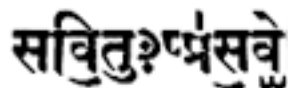


Figure 7Ba

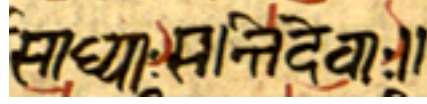


Figure 7Bb

Figure 7C. Samples showing VEDIC TONE ANUDATTA VISARGA. Figure 7Ca shows the character in verse 1.21 in Daulata Rāma Gauḍa's edition of *Śuklayajurveda Mādhyandina-Saṁhitā*, as published by Gupta. Figure 7Cb shows the character in red, in accordance with the custom of marking all accents in red, in Poleman manuscript 93 / Houghton MS Indic 371, *Rudrajāpya*, folio 4 verso.

ओषधीभिः समोषधयो

Figure 7Ca

विष्णुर्कर्मणः समवर्ततः

Figure 7Cb

8. Anusvaras.

Figure 8A. DEVANAGARI SIGN INVERTED CANDRABINDU in *Kṛṣṇayajurveda Kāṭhaka-Saṁhitā* 9.7 in Schröder's edition.

भेषजं सुभेषजं

Figure 8A

Figure 8B. DEVANAGARI SIGN SPACING CANDRABINDU in Rāmamūrtiśrauti's edition of *Sāmaveda, Kouthama śākhā*, Uha Uhya Gana, Vol. I. <http://www.vedamu.org/>.

५ ३ ४६ ५६
फ-प्रम-ह-५३-इ-ष-ड-य-मा-य-ता ॥

Figure 8B

Figure 8C. DEVANAGARI SIGN CANDRABINDU VIRAMA in *Taittirīya-Saṁhitā* 5.6.1.2 in Shastri's edition.

सर्वाः अग्नीः

Figure 8C

Figure 8D. Samples showing DEVANAGARI SIGN DOUBLE CANDRABINDU VIRAMA. Figure 8Da and 8Db show it in *Taittirīya-Saṁhitā* 5.6.6.26 and 5.7.11.42 in Shastri's edition. 8Dc shows it in *Taittirīya Brāhmaṇa* 1.1.3.20 in Shastri's edition.

सु-ऋ-कृत्या-त्मना

Figure 8Da

भूयोस्यान्नं॑ स्यादित्य

Figure 8Db

कथमिदं॑ स्यादिति

Figure 8Dc

Figure 8E. DEVANAGARI SIGN CANDRABINDU TWO in Houghton Ms. Indic 62, folio 4 recto.

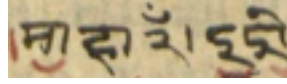


Figure 8E

Figure 8F. Samples showing DEVANAGARI SIGN CANDRABINDU THREE. Figure 8Fa shows the character in *R̥gveda-Samhitā* 10.146.1 in Satvalekar's edition. Figure 8Fb shows it in Poleman manuscript 163 / UP 2021, *Aitareya Āraṇyaka*, *Pañcāranya*.

विन्दती॑

Figure 8Fa

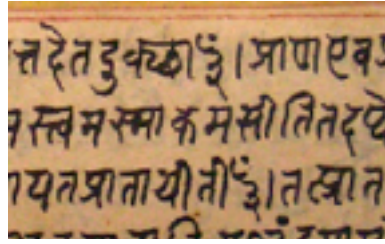


Figure 8Fb

Figure 8G. DEVANAGARI SIGN CANDRABINDU AVAGRAHA in Poleman manuscript 100 / Houghton MS Indic 133, *Śatarudriya*, folio 9 verso.

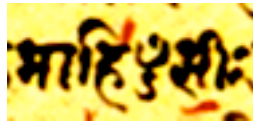


Figure 8G

Figure 8H. Samples showing VEDIC SIGN ANTARGOMUKHA. Figure 8Ha shows it in *Śuklayajurveda Mādhyandina-Samhitā* 1.21 in Daulata Rāma Gauḍa's edition published by Gupta. Figure 8Hb shows it in the same passage of the same text published by Caukhamba.

जगतीभिः॑ पृच्छन्तां॑ सम्मधु॑मती॒र्म्म

Figure 8Ha

जगतीभिः॑ पृच्छन्तां॑ सम्मधु॑मती॒र्म्म

Figure 8Hb

Figure 8I. Figures 8Ia and 8Ib show VEDIC SIGN BAHIRGOMUKHA in Poleman manuscript 3474 / UP 2032, *Rudraprārambha*, folio 2 verso.

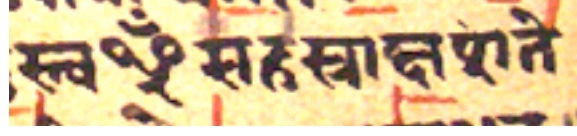


Figure 8Ia

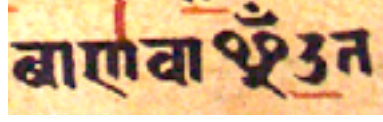


Figure 8Ib

Figure 8J. Samples showing VEDIC SIGN SAJIHVA BAHIRGOMUKHA. Figure 8Ja shows the character without bindu in the Acyutagranthamālā edition of the *Śuklayajurveda Mādhyandina Śatapatha - brāhmaṇa* 1.1.1.3. Figure 8Jb shows it with bindu in *Śatapathabrāhmaṇa* 1.1.2.4 in the same edition. Figure 8Jc shows it with candrabindu in Gian Publishing edition of the *Śuklayajurveda Mādhyandina Śatapathabrāhmaṇa*, page 83.

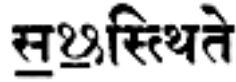


Figure 8Ja

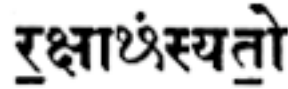


Figure 8Jb

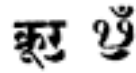


Figure 8Jc

Figure 8K. Sample showing VEDIC SIGN LONG ANUSVARA. Figure 8Ka shows the character in *Śuklayajurveda Mādhyandina-Saṁhitā* 5.43 in Daulata Rāma Gauḍa's edition as published by Gupta, and figure 8Kb shows it in *Śuklayajurveda Mādhyandina-Saṁhitā* 4.1 in Daulata Rāma Gauḍa's edition as published by Caukhamba. The latter also shows VEDIC TONE VISARGA UDATTA and VEDIC TONE VISARGA ANUDATTA combined on a visarga in final position. Figure 8Kc shows a typeface imitation of the character using the Devanāgarī digit <६> with a bindu in *Śuklayajurveda Mādhyandina Śatapatha - brāhmaṇa* 1.1.3.11 in Gian Publishing's edition. Figures 8Kd and 8Ke show the same in *Śuklayajurveda Mādhyandina Śatapathabrāhmaṇa* 1.2.1.18 and 1.4.1.39, in the Acyutagranthamālā edition.

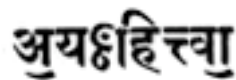


Figure 8Ka

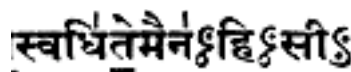


Figure 8Kb

सथोपूर्व ङिहृ ङिषि

Figure 8Kc

धान्न्यङ् हि

Figure 8Kd

वृणीङ्

Figure 8Ke

9. Additions for Devanagari.

Figure 9A. Samples showing DEVANAGARI VOWEL SIGN PRISHTHAMATRA E in Witzel manuscript 1250 CE of the *Vājasaneyī-Saṁhitā*. Figure 9Aa illustrates vowels o and e. Figure 9Ab illustrates vowel au.



Figure 9Aa



Figure 9Ab

Figure 9B. DEVANAGARI VOWEL SIGN CANDRA LONG E in Kanga's edition of the *Avesta*, yazna 41.4

तू नै

Figure 9B

Figure 9C. DEVANAGARI SIGN PUSHPIKA in Poleman manuscript 4554 / Houghton MSIndic 133, *Devīrahasya*, folio 7 recto.

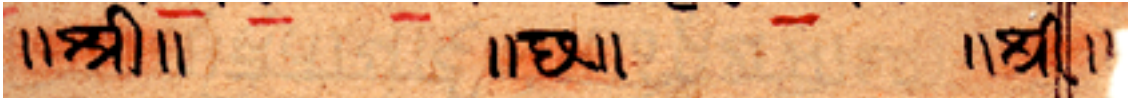


Figure 9C

Figure 9D. Samples showing DEVANAGARI SIGN PUSHPA. Figure 9Da shows a puṣpa in verse 1.1 in Daulata Rāma Gauḍa's edition of *Śuklayajurveda Mādhyandina-Saṁhitā*, as published by Gupta. Figure 9Db shows the description of the use of puṣpa in the Introduction to the Poona Critical Edition of the *Mahābhārata*.

❀ अथ प्रथमोऽध्यायः ❀

Figure 9Da

❀❀ (in the critical footnotes) enclose
citations from commentators.

Figure 9Db

Figure 9E. DEVANAGARI LETTER ZHA in Kanga's edition of the *Avesta*, yazna 41.3

इज़ीम्

Figure 9E

Figure 9F. DEVANAGARI LETTER HEAVY YA in the Acyutagranthamālā edition of the *Śuklayajurveda Mādhyandina Śatapathabrāhmaṇa*, verse 1.1.3.4.

स षुदिदः

Figure 9F

Figure 9G. Samples showing DEVANAGARI SIGN DIVIDER. in Poleman manuscript 4 / Houghton MSIndic 636, *R̥gveda-Samhitā*, folio 5 verso indicates that the characters in the top margin are to be inserted at the insertion point.

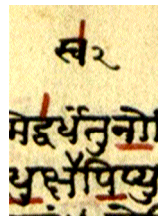


Figure 9G

10. Additions for Oriya and Malayalam

Figure 10A. Sample from *Keralapanineeyam* by A. R. Rajaraja Varma, published 1896 (reprinted 1997 by DC books), showing the VOCALIC LL in a discussion of the phonetic properties of chillus.

82

കേരളപാണിനീയം

സംസ്കൃതത്തിൽ രേഫലകാരങ്ങളെ സ്വരീകരിക്കുന്നതാണല്ലോ പ്രകാരണകാരങ്ങൾ. അതുപോലെ ഭാഷയിൽ വേറെ വ്യഞ്ജനങ്ങളെയും സ്വരീകരിക്കുന്നു എന്നു ഉള്ളൂ. രീ, തീ, ശീ എന്ന മധ്യമങ്ങളുടെ ചില്ലുകൾക്കു ഭാഷയിലും ഏകദേശം പ്രകാരണകാരങ്ങളുടെ ധ്വനിതന്നെ വരും. പ്രകാരം ചില വാക്കുകളിൽ എഴുതുകകൂടി ചെയ്യാറുണ്ട്.

രീ	രീ	എതിർവശം	എതുവശം	തിർ=തു
	രീ	പുണർതം	പുണ്ണതം	ണർ=ണ്ണ
	രീ	നേർവഴി	നൂവഴി	നേർ=നൂ
	രീ	കാർമേഘം	ക്ലമേഘം	കാർ=ക്ല

തീ	ലീ	മുകിൽമാല	മക്ലമാല	കിൽ=ക്ല
	ലീ	അതിൽനിന്ന്	അത്ത്നിന്ന്	തിൽ=ത്ത്
	ലീ	പാൽമുതക്ക്	പ്ലമുതക്ക്	പാൽ=പ്ല

ശീ	ഴീ	പുകൾപൊങ്ങിന	പുക്ലപൊങ്ങിന	കൾ=ക്ല
	ജീ	തേൾവിഷം	തേവ്വിഷം	തേൾ=തേ

ഈ ഉദാഹരണങ്ങളിൽ ചില്ലിനും അതിന്റെ പൂർവ്വസ്വരത്തിനുംകൂടി

Figure 10a

Figure 10B. ORIYA VOWEL SIGN VOCALIC RR and ORIYA VOWEL SIGN VOCALIC L in Sir Hugh McPherson's "The Oriya Alphabet," *Journal of Bihar and Orissa Research Society*, Mar-Jun 1924. Table I shows vowels with entries of: Roman, Nāgarī, Oriya and Remarks.

Vowels, Etc.			
Roman	Nāgarī	Oriya	Remarks.
ā	ā	ā	This is the opening description
ai	ai	ai	
au	au	au	
ra	ra	ra	
sha	sha	sha	
o	o	o	
ō	ō	ō	
-ā	ā	ā	The sign ā is placed to the right of the consonant.
-i	ī	ī	This sign ī is placed on the head of the consonant.
-u	ū	ū	Placed to the right.
-e	ē	ē	
-ai	āi	āi	Placed below.
-au	āu	āu	
-ī	ī	ī	Placed below.
-ī	ī	ī	(1) This letter sounds as ra in origin.
-ī	ī	ī	Placed below.
-ī	ī	ī	
-ī	ī	ī	Placed below.
-ī	ī	ī	(2) This letter sounds as la in origin.
-ī	ī	ī	Placed below.

Figure 10B

Figure 10C. ORIYA VOWEL SIGN VOCALIC LL

Image not available.

TABLE XX - Row 09: DEVANAGARI

	090	091	092	093	094	095	096	097
0		ऐ	ठ	र	ी	ॐ	ऋ	०
1	ँ	ऑ	ड	ॠ	ु	ं	ॡ	ॠ
2	ं	ओ	ढ	ल	ॡ	ॢ	ॣ	अँ
3	ः	ओ	ण	ळ	ॣ	े	॥	ध
4	ऐ	औ	त	ळ	॥	े	।	॥
5	अ	क	थ	व	ँ	ँ	॥	
6	आ	ख	द	श	े		०	
7	इ	ग	ध	ष	े		१	
8	ई	घ	न	स	ै	क्र	२	
9	उ	ङ	न	ह	ॉ	ख	३	ज़
A	ऊ	च	प		ो	ग	४	ष
B	ऋ	छ	फ		ो	ज	५	ग
C	ॠ	ज	ब	ॠ	ौ	ङ	६	ज़
D	ँ	झ	भ	ऽ	ॠ	ढ	७	१
E	ऐ	ज	म	ा	ि	फ़	८	ड
F	ए	ट	य	ि		य	९	ब

G = 00
P = 00

TABLE XX - Row 09: DEVANAGARI

hex	Name	hex	Name
00	(This position shall not be used)	59	DEVANAGARI LETTER KHHA
01	DEVANAGARI SIGN CANDRABINDU	5A	DEVANAGARI LETTER GHHA
02	DEVANAGARI SIGN ANUSVARA	5B	DEVANAGARI LETTER ZA
03	DEVANAGARI SIGN VISARGA	5C	DEVANAGARI LETTER DDDHA
04	DEVANAGARI LETTER SHORT A	5D	DEVANAGARI LETTER RHA
05	DEVANAGARI LETTER A	5E	DEVANAGARI LETTER FA
06	DEVANAGARI LETTER AA	5F	DEVANAGARI LETTER YYA
07	DEVANAGARI LETTER I	60	DEVANAGARI LETTER VOCALIC RR
08	DEVANAGARI LETTER II	61	DEVANAGARI LETTER VOCALIC LL
09	DEVANAGARI LETTER U	62	DEVANAGARI VOWEL SIGN VOCALIC L
0A	DEVANAGARI LETTER UU	63	DEVANAGARI VOWEL SIGN VOCALIC LL
0B	DEVANAGARI LETTER VOCALIC R	64	DEVANAGARI DANDA
0C	DEVANAGARI LETTER VOCALIC L	65	DEVANAGARI DOUBLE DANDA
0D	DEVANAGARI LETTER CANDRA E	66	DEVANAGARI DIGIT ZERO
0E	DEVANAGARI LETTER SHORT E	67	DEVANAGARI DIGIT ONE
0F	DEVANAGARI LETTER E	68	DEVANAGARI DIGIT TWO
10	DEVANAGARI LETTER AI	69	DEVANAGARI DIGIT THREE
11	DEVANAGARI LETTER CANDRA O	6A	DEVANAGARI DIGIT FOUR
12	DEVANAGARI LETTER SHORT O	6B	DEVANAGARI DIGIT FIVE
13	DEVANAGARI LETTER O	6C	DEVANAGARI DIGIT SIX
14	DEVANAGARI LETTER AU	6D	DEVANAGARI DIGIT SEVEN
15	DEVANAGARI LETTER KA	6E	DEVANAGARI DIGIT EIGHT
16	DEVANAGARI LETTER KHA	6F	DEVANAGARI DIGIT NINE
17	DEVANAGARI LETTER GA	70	DEVANAGARI ABBREVIATION SIGN
18	DEVANAGARI LETTER GHA	71	<i>DEVANAGARI SIGN HIGH SPACING DOT</i>
19	DEVANAGARI LETTER NGA	72	<i>DEVANAGARI LETTER CANDRA A</i>
1A	DEVANAGARI LETTER CA	73	<i>DEVANAGARI SIGN PUSHPIKA</i>
1B	DEVANAGARI LETTER CHA	74	<i>DEVANAGARI SIGN PUSHPIKA</i>
1C	DEVANAGARI LETTER JA	75	(This position shall not be used)
1D	DEVANAGARI LETTER JHA	76	(This position shall not be used)
1E	DEVANAGARI LETTER NYA	77	(This position shall not be used)
1F	DEVANAGARI LETTER TTA	78	(This position shall not be used)
20	DEVANAGARI LETTER TTHA	79	<i>DEVANAGARI LETTER ZHA</i>
21	DEVANAGARI LETTER DDA	7A	<i>DEVANAGARI LETTER HEAVY YA</i>
22	DEVANAGARI LETTER DDHA	7B	DEVANAGARI LETTER GGA
23	DEVANAGARI LETTER NNA	7C	DEVANAGARI LETTER JJA
24	DEVANAGARI LETTER TA	7D	DEVANAGARI LETTER GLOTTAL STOP
25	DEVANAGARI LETTER THA	7E	DEVANAGARI LETTER DDDA
26	DEVANAGARI LETTER DA	7F	DEVANAGARI LETTER BBA
27	DEVANAGARI LETTER DHA		
28	DEVANAGARI LETTER NA		
29	DEVANAGARI LETTER NNA		
2A	DEVANAGARI LETTER PA		
2B	DEVANAGARI LETTER PHA		
2C	DEVANAGARI LETTER BA		
2D	DEVANAGARI LETTER BHA		
2E	DEVANAGARI LETTER MA		
2F	DEVANAGARI LETTER YA		
30	DEVANAGARI LETTER RA		
31	DEVANAGARI LETTER RRA		
32	DEVANAGARI LETTER LA		
33	DEVANAGARI LETTER LLA		
34	DEVANAGARI LETTER LLLA		
35	DEVANAGARI LETTER VA		
36	DEVANAGARI LETTER SHA		
37	DEVANAGARI LETTER SSA		
38	DEVANAGARI LETTER SA		
39	DEVANAGARI LETTER HA		
3A	(This position shall not be used)		
3B	(This position shall not be used)		
3C	DEVANAGARI SIGN NUKTA		
3D	DEVANAGARI SIGN AVAGRAHA		
3E	DEVANAGARI VOWEL SIGN AA		
3F	DEVANAGARI VOWEL SIGN I		
40	DEVANAGARI VOWEL SIGN II		
41	DEVANAGARI VOWEL SIGN U		
42	DEVANAGARI VOWEL SIGN UU		
43	DEVANAGARI VOWEL SIGN VOCALIC R		
44	DEVANAGARI VOWEL SIGN VOCALIC RR		
45	DEVANAGARI VOWEL SIGN CANDRA E		
46	DEVANAGARI VOWEL SIGN SHORT E		
47	DEVANAGARI VOWEL SIGN E		
48	DEVANAGARI VOWEL SIGN AI		
49	DEVANAGARI VOWEL SIGN CANDRA O		
4A	DEVANAGARI VOWEL SIGN SHORT O		
4B	DEVANAGARI VOWEL SIGN O		
4C	DEVANAGARI VOWEL SIGN AU		
4D	DEVANAGARI SIGN VIRAMA		
4E	<i>DEVANAGARI VOWEL SIGN PRISHTHAMATRA E</i>		
4F	(This position shall not be used)		
50	DEVANAGARI OM		
51	DEVANAGARI STRESS SIGN UDATTA		
52	DEVANAGARI STRESS SIGN ANUDATTA		
53	DEVANAGARI GRAVE ACCENT		
54	DEVANAGARI ACUTE ACCENT		
55	<i>DEVANAGARI VOWEL SIGN CANDRA LONG E</i>		
56	(This position shall not be used)		
57	(This position shall not be used)		
58	DEVANAGARI LETTER QA		

Group 00

Plane 00

Row 09

TABLE XX - Row 0B: ORIYA

	0B0	0B1	0B2	0B3	0B4	0B5	0B6	0B7
0		ୱ	ୠ	ୡ	ୢ		ୣ	୵
1	୦̣		୦̣		ୠ̣		ୡ̣	ୢ̣
2	ୢ̣		ୣ̣	୤̣	୥̣		୦̣̣	
3	୦̣̣	୦̣̣	ୠ̣̣	ୡ̣̣	ୢ̣̣		ୣ̣̣	
4		ୠ̣̣̣	ୡ̣̣̣		ୢ̣̣̣			
5	ୡ̣̣̣̣	ୢ̣̣̣̣	୤̣̣̣̣	୥̣̣̣̣				
6	ୡ̣̣̣̣̣	ୢ̣̣̣̣̣	୤̣̣̣̣̣	୥̣̣̣̣̣		୦̣̣̣̣̣	ୠ̣̣̣̣̣	
7	ୡ̣̣̣̣̣̣	ୢ̣̣̣̣̣̣	୤̣̣̣̣̣̣	୥̣̣̣̣̣̣	୦̣̣̣̣̣̣	ୠ̣̣̣̣̣̣	ୡ̣̣̣̣̣̣	
8	ୡ̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣	୥̣̣̣̣̣̣̣	୦̣̣̣̣̣̣̣		ୠ̣̣̣̣̣̣̣	
9	ୡ̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣		୤̣̣̣̣̣̣̣̣			ୡ̣̣̣̣̣̣̣̣	
A	ୡ̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣				ୡ̣̣̣̣̣̣̣̣̣	
B	ୡ̣̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣̣		୦̣̣̣̣̣̣̣̣̣̣		ୠ̣̣̣̣̣̣̣̣̣̣	
C	ୡ̣̣̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣̣̣	୥̣̣̣̣̣̣̣̣̣̣̣	୦̣̣̣̣̣̣̣̣̣̣̣	ୠ̣̣̣̣̣̣̣̣̣̣̣	ୡ̣̣̣̣̣̣̣̣̣̣̣	
D		ୡ̣̣̣̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣̣̣̣	୥̣̣̣̣̣̣̣̣̣̣̣̣	୦̣̣̣̣̣̣̣̣̣̣̣̣	ୠ̣̣̣̣̣̣̣̣̣̣̣̣	
E		ୡ̣̣̣̣̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣̣̣̣̣			ୡ̣̣̣̣̣̣̣̣̣̣̣̣̣	
F	ୡ̣̣̣̣̣̣̣̣̣̣̣̣̣̣	ୢ̣̣̣̣̣̣̣̣̣̣̣̣̣̣	୤̣̣̣̣̣̣̣̣̣̣̣̣̣̣	୥̣̣̣̣̣̣̣̣̣̣̣̣̣̣		୦̣̣̣̣̣̣̣̣̣̣̣̣̣̣	ୠ̣̣̣̣̣̣̣̣̣̣̣̣̣̣	

G = 00
P = 00

TABLE XX - Row 0B: ORIYA

hex	Name	hex	Name
00	(This position shall not be used)	59	(This position shall not be used)
01	ORIYA SIGN CANDRABINDU	5A	(This position shall not be used)
02	ORIYA SIGN ANUSVARA	5B	(This position shall not be used)
03	ORIYA SIGN VISARGA	5C	ORIYA LETTER RRA
04	(This position shall not be used)	5D	ORIYA LETTER RHA
05	ORIYA LETTER A	5E	(This position shall not be used)
06	ORIYA LETTER AA	5F	ORIYA LETTER YYA
07	ORIYA LETTER I	60	ORIYA LETTER VOCALIC RR
08	ORIYA LETTER II	61	ORIYA LETTER VOCALIC LL
09	ORIYA LETTER U	62	<u>ORIYA VOWEL SIGN VOCALIC L</u>
0A	ORIYA LETTER UU	63	<u>ORIYA VOWEL SIGN VOCALIC LL</u>
0B	ORIYA LETTER VOCALIC R	64	(This position shall not be used)
0C	ORIYA LETTER VOCALIC L	65	(This position shall not be used)
0D	(This position shall not be used)	66	ORIYA DIGIT ZERO
0E	(This position shall not be used)	67	ORIYA DIGIT ONE
0F	ORIYA LETTER E	68	ORIYA DIGIT TWO
10	ORIYA LETTER AI	69	ORIYA DIGIT THREE
11	(This position shall not be used)	6A	ORIYA DIGIT FOUR
12	(This position shall not be used)	6B	ORIYA DIGIT FIVE
13	ORIYA LETTER O	6C	ORIYA DIGIT SIX
14	ORIYA LETTER AU	6D	ORIYA DIGIT SEVEN
15	ORIYA LETTER KA	6E	ORIYA DIGIT EIGHT
16	ORIYA LETTER KHA	6F	ORIYA DIGIT NINE
17	ORIYA LETTER GA	70	ORIYA ISSHAR
18	ORIYA LETTER GHA	71	ORIYA LETTER WA
19	ORIYA LETTER NGA	72	(This position shall not be used)
1A	ORIYA LETTER CA	73	(This position shall not be used)
1B	ORIYA LETTER CHA	74	(This position shall not be used)
1C	ORIYA LETTER JA	75	(This position shall not be used)
1D	ORIYA LETTER JHA	76	(This position shall not be used)
1E	ORIYA LETTER NYA	77	(This position shall not be used)
1F	ORIYA LETTER TTA	78	(This position shall not be used)
20	ORIYA LETTER TTHA	79	(This position shall not be used)
21	ORIYA LETTER DDA	7A	(This position shall not be used)
22	ORIYA LETTER DDHA	7B	(This position shall not be used)
23	ORIYA LETTER NNA	7C	(This position shall not be used)
24	ORIYA LETTER TA	7D	(This position shall not be used)
25	ORIYA LETTER THA	7E	(This position shall not be used)
26	ORIYA LETTER DA	7F	(This position shall not be used)
27	ORIYA LETTER DHA		
28	ORIYA LETTER NA		
29	(This position shall not be used)		
2A	ORIYA LETTER PA		
2B	ORIYA LETTER PHA		
2C	ORIYA LETTER BA		
2D	ORIYA LETTER BHA		
2E	ORIYA LETTER MA		
2F	ORIYA LETTER YA		
30	ORIYA LETTER RA		
31	(This position shall not be used)		
32	ORIYA LETTER LA		
33	ORIYA LETTER LLA		
34	(This position shall not be used)		
35	ORIYA LETTER VA		
36	ORIYA LETTER SHA		
37	ORIYA LETTER SSA		
38	ORIYA LETTER SA		
39	ORIYA LETTER HA		
3A	(This position shall not be used)		
3B	(This position shall not be used)		
3C	ORIYA SIGN NUKTA		
3D	ORIYA SIGN AVAGRAHA		
3E	ORIYA VOWEL SIGN AA		
3F	ORIYA VOWEL SIGN I		
40	ORIYA VOWEL SIGN II		
41	ORIYA VOWEL SIGN U		
42	ORIYA VOWEL SIGN UU		
43	ORIYA VOWEL SIGN VOCALIC R		
44	<u>ORIYA VOWEL SIGN VOCALIC RR</u>		
45	(This position shall not be used)		
46	(This position shall not be used)		
47	ORIYA VOWEL SIGN E		
48	ORIYA VOWEL SIGN AI		
49	(This position shall not be used)		
4A	(This position shall not be used)		
4B	ORIYA VOWEL SIGN O		
4C	ORIYA VOWEL SIGN AU		
4D	ORIYA SIGN VIRAMA		
4E	(This position shall not be used)		
4F	(This position shall not be used)		
50	(This position shall not be used)		
51	(This position shall not be used)		
52	(This position shall not be used)		
53	(This position shall not be used)		
54	(This position shall not be used)		
55	(This position shall not be used)		
56	ORIYA AI LENGTH MARK		
57	ORIYA AU LENGTH MARK		
58	(This position shall not be used)		

Group 00

Plane 00

Row 0B

TABLE XX - Row 0D: MALAYALAM

	E70	E71	E72	E73	E74	135	136	137
0		ഐ	ഓ	ര	ീ		ജ	ധ
1			ഡ	റ	ൂ		ഞ	ന
2	ം	ക	ഡ	ല	ൂ		്	നം
3	ഃ	കാ	ണ	ള	്യ		്	റ
4		ഔ	ത	ഴ	്			ൽ
5	അ	ക	ഥ	വ				ൻ
6	ആ	ച	ഭ	ശ	െ		ഓ	
7	ഇ	ഗ	ധ	ഷ	േ	ൗ	ഫ	
8	ഈ	ഘ	ന	സ	ൈ		റ	
9	ഉ	ബ		ഹ			ന	ന
A	ഊ	ച	വ		ൊ		ർ	ൻ
B	ഈ	ഘ	ഘ		ോ		ർ	ൻ
C	ൺ	ജ	ബ		ൌ		ന	ർ
D		ഡ	ഭ	ഈ	്		ൗ	ൽ
E	എ	ഞ	മ	ാ			വ	ശ
F	എ	ട	യ	ി			ൻ	ക

G = 00
P = 00

TABLE XX - Row 0D: MALAYALAM

hex	Name	hex	Name
00	(This position shall not be used)	59	(This position shall not be used)
01	(This position shall not be used)	5A	(This position shall not be used)
02	MALAYALAM SIGN ANUSVARA	5B	(This position shall not be used)
03	MALAYALAM SIGN VISARGA	5C	(This position shall not be used)
04	(This position shall not be used)	5D	(This position shall not be used)
05	MALAYALAM LETTER A	5E	(This position shall not be used)
06	MALAYALAM LETTER AA	5F	(This position shall not be used)
07	MALAYALAM LETTER I	60	MALAYALAM LETTER VOCALIC RR
08	MALAYALAM LETTER II	61	MALAYALAM LETTER VOCALIC LL
09	MALAYALAM LETTER U	62	<u>MALAYALAM VOWEL SIGN VOCALIC L</u>
0A	MALAYALAM LETTER UU	63	<u>MALAYALAM VOWEL SIGN VOCALIC LL</u>
0B	MALAYALAM LETTER VOCALIC R	64	(This position shall not be used)
0C	MALAYALAM LETTER VOCALIC L	65	(This position shall not be used)
0D	(This position shall not be used)	66	MALAYALAM DIGIT ZERO
0E	MALAYALAM LETTER E	67	MALAYALAM DIGIT ONE
0F	MALAYALAM LETTER EE	68	MALAYALAM DIGIT TWO
10	MALAYALAM LETTER AI	69	MALAYALAM DIGIT THREE
11	(This position shall not be used)	6A	MALAYALAM DIGIT FOUR
12	MALAYALAM LETTER O	6B	MALAYALAM DIGIT FIVE
13	MALAYALAM LETTER OO	6C	MALAYALAM DIGIT SIX
14	MALAYALAM LETTER AU	6D	MALAYALAM DIGIT SEVEN
15	MALAYALAM LETTER KA	6E	MALAYALAM DIGIT EIGHT
16	MALAYALAM LETTER KHA	6F	MALAYALAM DIGIT NINE
17	MALAYALAM LETTER GA	70	MALAYALAM NUMBER TEN
18	MALAYALAM LETTER GHA	71	MALAYALAM NUMBER ONE HUNDRED
19	MALAYALAM LETTER NGA	72	MALAYALAM NUMBER ONE THOUSAND
1A	MALAYALAM LETTER CA	73	MALAYALAM FRACTION ONE QUARTER
1B	MALAYALAM LETTER CHA	74	MALAYALAM FRACTION ONE HALF
1C	MALAYALAM LETTER JA	75	MALAYALAM FRACTION THREE QUARTERS
1D	MALAYALAM LETTER JHA	76	(This position shall not be used)
1E	MALAYALAM LETTER NYA	77	(This position shall not be used)
1F	MALAYALAM LETTER TTA	78	(This position shall not be used)
20	MALAYALAM LETTER TTHA	79	MALAYALAM DATE MARK
21	MALAYALAM LETTER DDA	7A	MALAYALAM LETTER CHILLU NN
22	MALAYALAM LETTER DDHA	7B	MALAYALAM LETTER CHILLU N
23	MALAYALAM LETTER NNA	7C	MALAYALAM LETTER CHILLU RR
24	MALAYALAM LETTER TA	7D	MALAYALAM LETTER CHILLU L
25	MALAYALAM LETTER THA	7E	MALAYALAM LETTER CHILLU LL
26	MALAYALAM LETTER DA	7F	MALAYALAM LETTER CHILLU K
27	MALAYALAM LETTER DHA		
28	MALAYALAM LETTER NA		
29	(This position shall not be used)		
2A	MALAYALAM LETTER PA		
2B	MALAYALAM LETTER PHA		
2C	MALAYALAM LETTER BA		
2D	MALAYALAM LETTER BHA		
2E	MALAYALAM LETTER MA		
2F	MALAYALAM LETTER YA		
30	MALAYALAM LETTER RA		
31	MALAYALAM LETTER RRA		
32	MALAYALAM LETTER LA		
33	MALAYALAM LETTER LLA		
34	MALAYALAM LETTER LLLA		
35	MALAYALAM LETTER VA		
36	MALAYALAM LETTER SHA		
37	MALAYALAM LETTER SSA		
38	MALAYALAM LETTER SA		
39	MALAYALAM LETTER HA		
3A	(This position shall not be used)		
3B	(This position shall not be used)		
3C	(This position shall not be used)		
3D	MALAYALAM SIGN AVAGRAHA		
3E	MALAYALAM VOWEL SIGN AA		
3F	MALAYALAM VOWEL SIGN I		
40	MALAYALAM VOWEL SIGN II		
41	MALAYALAM VOWEL SIGN U		
42	MALAYALAM VOWEL SIGN UU		
43	MALAYALAM VOWEL SIGN VOCALIC R		
44	<u>MALAYALAM VOWEL SIGN VOCALIC RR</u>		
45	(This position shall not be used)		
46	MALAYALAM VOWEL SIGN E		
47	MALAYALAM VOWEL SIGN EE		
48	MALAYALAM VOWEL SIGN AI		
49	(This position shall not be used)		
4A	MALAYALAM VOWEL SIGN O		
4B	MALAYALAM VOWEL SIGN OO		
4C	MALAYALAM VOWEL SIGN AU		
4D	MALAYALAM SIGN VIRAMA		
4E	(This position shall not be used)		
4F	(This position shall not be used)		
50	(This position shall not be used)		
51	(This position shall not be used)		
52	(This position shall not be used)		
53	(This position shall not be used)		
54	(This position shall not be used)		
55	(This position shall not be used)		
56	(This position shall not be used)		
57	MALAYALAM AU LENGTH MARK		
58	(This position shall not be used)		

Group 00

Plane 00

Row 0D

TABLE XX - Row A4: VEDIC EXTENSIONS

	A4D	A4E	A4F
0	॥	◌̣	
1	◌̣^	◌̣̣	
2	◌̣↑	◌̣̣̣	
3	◌̣	◌̣̣̣̣	
4	◌̣=	ॐ	
5	◌̣≡	ॐ̣	
6	◌̣᳚	ॐ̣̣	
7	◌̣̣̣	ॐ̣̣̣	
8	◌̣̣̣̣	ॐ̣̣̣̣̣	
9	◌̣̣̣̣̣		
A	◌̣̣̣̣̣̣		
B	◌̣̣̣̣̣̣̣		
C	◌̣̣̣̣̣̣̣̣		
D	◌̣̣̣̣̣̣̣̣̣		
E	◌̣̣̣̣̣̣̣̣̣̣		
F	◌̣̣̣̣̣̣̣̣̣̣̣		

G = 00
P = 00

TABLE XX - Row A4: VEDIC EXTENSIONS

hex	Name	hex	Name
D0	VEDIC SIGN NIHSHVASA		
D1	VEDIC TONE KARSHANA		
D2	VEDIC TONE SHARA		
D3	VEDIC TONE PRENKHA (vibrato)		
D4	VEDIC TONE DOUBLE SVARITA		
D5	VEDIC TONE TRIPLE SVARITA		
D6	VEDIC TONE YAJURVEDIC INDEPENDENT SVARITA		
D7	VEDIC TONE YAJURVEDIC AGGRAVATED INDEPENDENT SVARITA		
D8	VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA		
D9	VEDIC TONE YAJURVEDIC KATHAKA INDEPENDENT SVARITA SCHROEDER		
DA	VEDIC TONE CANDRA BELOW		
DB	VEDIC TONE ATHARVAVEDIC INDEPENDENT SVARITA		
DC	VEDIC TONE RIGVEDIC KASHMIRI INDEPENDENT SVARITA		
DD	VEDIC TONE THREE DOTS BELOW		
DE	VEDIC TONE TWO DOTS BELOW		
DF	VEDIC TONE DOT BELOW		
E0	VEDIC TONE KATHAKA ANUDATTA		
E1	VEDIC SIGN VISARGA SVARITA		
E2	VEDIC SIGN VISARGA UDATTA		
E3	VEDIC SIGN VISARGA ANUDATTA		
E4	VEDIC SIGN ARDHAVISARGA		
E5	VEDIC SIGN ANTARGOMUKHA		
E6	VEDIC SIGN BAHIRGOMUKHA		
E7	VEDIC SIGN SAJIHVA BAHIRGOMUKHA		
E8	VEDIC SIGN LONG ANUSVARA		
E9	(This position shall not be used)		
EA	(This position shall not be used)		
EB	(This position shall not be used)		
EC	(This position shall not be used)		
ED	(This position shall not be used)		
EE	(This position shall not be used)		
EF	(This position shall not be used)		
F0	(This position shall not be used)		
F1	(This position shall not be used)		
F2	(This position shall not be used)		
F3	(This position shall not be used)		
F4	(This position shall not be used)		
F5	(This position shall not be used)		
F6	(This position shall not be used)		
F7	(This position shall not be used)		
F8	(This position shall not be used)		
F9	(This position shall not be used)		
FA	(This position shall not be used)		
FB	(This position shall not be used)		
FC	(This position shall not be used)		
FD	(This position shall not be used)		
FE	(This position shall not be used)		
FF	(This position shall not be used)		

TABLE XX - Row A8: DEVANAGARI EXTENDED

	A8E	A8F
0	० ◌	वि ◌
1	१ ◌	ॡ ◌
2	२ ◌	ॢ ◌
3	३ ◌	ॣ ◌
4	४ ◌	। ◌
5	५ ◌	॥ ◌
6	६ ◌	०॥ ◌
7	७ ◌	१॥ ◌
8	८ ◌	२॥ ◌
9	९ ◌	३॥ ◌
A	अ ◌	
B	उ ◌	
C	क ◌	
D	न ◌	
E	प ◌	
F	र ◌	

G = 00
P = 00

TABLE XX - Row A8: DEVANAGARI EXTENDED

hex	Name	hex	Name
E0	COMBINING DEVANAGARI DIGIT ZERO		
E1	COMBINING DEVANAGARI DIGIT ONE		
E2	COMBINING DEVANAGARI DIGIT TWO		
E3	COMBINING DEVANAGARI DIGIT THREE		
E4	COMBINING DEVANAGARI DIGIT FOUR		
E5	COMBINING DEVANAGARI DIGIT FIVE		
E6	COMBINING DEVANAGARI DIGIT SIX		
E7	COMBINING DEVANAGARI DIGIT SEVEN		
E8	COMBINING DEVANAGARI DIGIT EIGHT		
E9	COMBINING DEVANAGARI DIGIT NINE		
EA	COMBINING DEVANAGARI LETTER A		
EB	COMBINING DEVANAGARI LETTER U		
EC	COMBINING DEVANAGARI LETTER KA		
ED	COMBINING DEVANAGARI LETTER NA		
EE	COMBINING DEVANAGARI LETTER PA		
EF	COMBINING DEVANAGARI LETTER RA		
F0	COMBINING DEVANAGARI LETTER VI		
F1	COMBINING DEVANAGARI SIGN AVAGRAHA		
F2	DEVANAGARI SIGN DIVIDER		
F3	DEVANAGARI SIGN INVERTED CANDRABINDU		
F4	DEVANAGARI SIGN SPACING CANDRABINDU		
F5	DEVANAGARI SIGN CANDRABINDU VIRAMA		
F6	DEVANAGARI SIGN DOUBLE CANDRABINDU VIRAMA		
F7	DEVANAGARI SIGN CANDRABINDU TWO		
F8	DEVANAGARI SIGN CANDRABINDU THREE		
F9	DEVANAGARI SIGN CANDRABINDU AVAGRAHA		
FA	(This position shall not be used)		
FB	(This position shall not be used)		
FC	(This position shall not be used)		
FD	(This position shall not be used)		
FE	(This position shall not be used)		
FF	(This position shall not be used)		

A. Administrative

1. Title

Proposal to encode characters for Vedic Sanskrit in the BMP of the UCS

2. Requester's name

Michael Everson and Peter Scharf (editors), Michel Angot, R. Chandrashekar, Malcolm Hyman, Susan Rosenfield, B. V. Venkatakrishna Sastry, Michael Witzel

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

Individual contribution.

4. Submission date

2007-04-26

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.

1b. Proposed name of script

Vedic Extensions, Devanagari Extended.

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

Yes

1d. Name of the existing block

Devanagari, Oriya, Malayalam, Tibetan.

2. Number of characters in proposal

61 (6, 3, 1, 25, 26).

3. Proposed category (A-Contemporary; B.1-Specialized (small collection); B.2-Specialized (large collection); C-Major extinct; D-Attested extinct; E-Minor extinct; F-Archaic Hieroglyphic or Ideographic; G-Obscure or questionable usage symbols)

Category B.1.

4a. Is a repertoire including character names provided?

Yes.

4b. If YES, are the names in accordance with the “character naming guidelines” in Annex L of P&P document?

Yes.

4c. Are the character shapes attached in a legible form suitable for review?

Yes.

5a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Michael Everson.

5b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:

Michael Everson, Fontographer.

6a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?

Yes.

6b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

Yes.

7. 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.

8. 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.

See above.

C. Technical – Justification

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

Yes, some of the characters have been proposed to the UTC by the Indian National Body.

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?

Peter Scharf (editors), Michel Angot, R. Chandrashekar, Malcolm Hyman, Susan Rosenfield, B. V. Venkatakrishna Sastry, Michael Witzel

2c. If YES, available relevant documents

Co-authors

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

Indologists, Indo-Europeanists, teachers, students, and practitioners of Vedic recitation, Hindus.

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

Used historically and liturgically.

4b. Reference

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

Yes.

5b. If YES, where?

Scholarly and religious publications.

6a. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?

Yes.

6b. If YES, is a rationale provided?

Yes.

6c. If YES, reference

Accordance with the Roadmap. Keep with other Indic characters.

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?

No.

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?

Yes.

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

Yes.

10c. If YES, reference

DEVANAGARI SIGN CANDRABINDU is a combining character and VEDIC SIGN CANDRABINDU is a non-combining character which is located below the Devanagari headbar.

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

11d. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

No.

11e. If YES, reference

12a. Does the proposal contain characters with any special properties such as control function or similar semantics?

No.

12b. If YES, describe in detail (include attachment if necessary)

13a. Does the proposal contain any Ideographic compatibility character(s)?

No.

13b. If YES, is the equivalent corresponding unified ideographic character(s) identified?