Musical Symbols and Sasak Characters in the Balinese Script
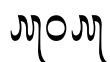
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Aditya Bayu Perdana
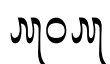
Version 1.0
August 29, 2023

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1. INTRODUCTION

The use of some characters already encoded in the Balinese Unicode block is not well documented, and the original Balinese proposal by Michael Everson and I Made Suatjana (2005) does not always provide samples beyond isolating tables. The Indonesian national standard for fonts for traditional scripts, Standar Nasional Indonesia 9047:2021 (Badan Standardisasi Nasional, 2021) also includes these characters without specifying their use. This technical note provides attestations of character use from existing materials to help Balinese implementers and users better understand their properties.

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2. MUSICAL SYMBOLS

As of Unicode 15.0.0 (The Unicode Consortium, 2022), the Balinese block provides 28 symbols described as "musical symbol," marked blue below:

Table 1. Musical symbols encoded in the Balinese block.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
U+1B6x	3	⏝	ᭁ	ᭂ	ᭃ	᭄	ᭅ	ᭆ	ᭇ	ᭉ	ᭊ	ᭋ	ᭌ	᭍	᭎	᭏
U+1B7x	᭐	᭑	᭒	᭓	᭔	᭕	᭖	᭗	᭘	᭙	᭚	᭛	᭜	᭝	᭞	

Code point	Name
U+1B61	BALINESE MUSICAL SYMBOL DONG
U+1B62	BALINESE MUSICAL SYMBOL DENG
U+1B63	BALINESE MUSICAL SYMBOL DUNG
U+1B64	BALINESE MUSICAL SYMBOL DANG
U+1B65	BALINESE MUSICAL SYMBOL DANG SURANG
U+1B66	BALINESE MUSICAL SYMBOL DING
U+1B67	BALINESE MUSICAL SYMBOL DAENG
U+1B68	BALINESE MUSICAL SYMBOL DEUNG
U+1B69	BALINESE MUSICAL SYMBOL DAING
U+1B6A	BALINESE MUSICAL SYMBOL DANG GEDE
U+1B6B	BALINESE MUSICAL SYMBOL COMBINING TEGEH
U+1B6C	BALINESE MUSICAL SYMBOL COMBINING ENDEP
U+1B6D	BALINESE MUSICAL SYMBOL COMBINING KEMPUL
U+1B6E	BALINESE MUSICAL SYMBOL COMBINING KEMPLI
U+1B6F	BALINESE MUSICAL SYMBOL COMBINING JEGOGAN

Code point	Name
U+1B70	BALINESE MUSICAL SYMBOL COMBINING KEMPUL WITH JEGOGAN
U+1B71	BALINESE MUSICAL SYMBOL COMBINING KEMPLI WITH JEGOGAN
U+1B72	BALINESE MUSICAL SYMBOL COMBINING BENDE
U+1B73	BALINESE MUSICAL SYMBOL COMBINING GONG
U+1B74	BALINESE MUSICAL SYMBOL RIGHT-HAND OPEN DUG
U+1B75	BALINESE MUSICAL SYMBOL RIGHT-HAND OPEN DAG
U+1B76	BALINESE MUSICAL SYMBOL RIGHT-HAND CLOSED TUK
U+1B77	BALINESE MUSICAL SYMBOL RIGHT-HAND CLOSED TAK
U+1B78	BALINESE MUSICAL SYMBOL LEFT-HAND OPEN PANG
U+1B79	BALINESE MUSICAL SYMBOL LEFT-HAND OPEN PUNG
U+1B7A	BALINESE MUSICAL SYMBOL LEFT-HAND CLOSED PLAK
U+1B7B	BALINESE MUSICAL SYMBOL LEFT-HAND CLOSED PLUK
U+1B7C	BALINESE MUSICAL SYMBOL LEFT-HAND OPEN PING

Balinese musical pieces are usually taught orally, but sometimes they are written down. In the latter case, tones may be annotated in at least three different ways: fully spell the tone name in Latin script (ding, dong, déng, etc), numeral cipher (1, 2, 3, etc), or symbols based on Balinese characters (or *aksara Bali*). *Aksara*-based notation is comprised of several systems, but to the best of the author's knowledge there has been no publication which offers extensive documentation of these systems. The systems described below are based on sources accessible to the author but are not meant to be exhaustive.

2.1. Ding-dong Notation

One of the most common *aksara*-based notations used in Bali today is called the *Ding-dong* notation. The system was formalized in 1939 by I Wayan Djirna with I Wayan Ruma and underwent some

modification by instructors at Kokar (Konservasi Karawitan Bali, Conservatory of Balinese Karawitan).[1] According to Hood (2016: 62):

> *[the Ding-dong notation] is used by conservatory trained musicians, professional composers and amateur performers in both traditional and modern contexts. In this way,* notasi ding dong *has multiple applications and exists on a broad expanse of the notation continuum between preservation and innovation.*

The characters used for Ding-dong are simply Balinese diacritics (*panganggé,* which normally must be attached to a base consonant) repurposed as standalone spacing characters. The basic system can be illustrated as follow:

Table 2. Characters used in Ding-dong notation. Adapted from Hood (2016: 63), Suhaedi et al (1993: 2), and Sukerta (2001: 31).

	Lower octave (*éndép/agung*)		Main octave							Higher octave (*tegeh/alit*)	
Tone name	Dang		Ding	Dong	Déng	Déung	Dung	Dang		Daing	Ding	Dong
Character name	Cecak	Surang	Ulu	Tedong	Taling	Suku ilut	Suku	Cecak	Surang	Pepet	Ulu	Tedong
Character	᭤	᭥	᭦	᭡	᭢	᭨	᭣	᭤	᭥	᭧	᭦̇	᭡̇
Code point	U+1B64 U+1B6C	U+1B65 U+1B6C	U+1B66	U+1B61	U+1B62	U+1B68	U+1B63	U+1B64	U+1B65	U+1B67	U+1B66 U+1B6B	U+1B61 U+1B6B
Cipher	6̣		1	2	3	4	5	6		7	1̇	2̇

* Symbols in light grey cells are not used in pentatonic music.

Ding-dong has seven to eight symbols which stand for seven basic tones named ding, dong, déng, déung, dung, dang, and daing in Balinese.[2] Figure 1 to 4 show their arrangement in several Balinese sources. Because most Balinese music is pentatonic, the 4th (déung) and 7th (daing) tones are often omitted.[3] Various sources concur that the 7th tone symbol is shaped like U+1B42 VOWEL SIGN PEPET and is called "daing."[4] Inexplicably, the original proposal identified PEPET-shaped U+1B67 as "daeng" while "daing" was given to U+1B69, a symbol for which the author failed to find any attestation.

The 6th (dang) tone seems to have two variant glyphs, U+1B64 DANG or U+1B65 DANG SURANG. The table in figure 3 suggests that DANG and DANG SURANG are interchangeable, as they have identical numeral cipher. But alternatively, the table may have been mislabeled and DANG SURANG was meant to represent lower octave dang. At least in one publication shown in figure 6 (Madera, 1950), DANG and DANG SURANG seem to be used for distinct tones while other publications only use one or the other.

Dots encoded as U+1B6B COMBINING TEGEH (above base) and U+1B6C COMBINING ENDEP (below base) indicate higher and lower octaves respectively when combined with the base symbols. Figure 2 shows uniform placement for these marks, but figure 3 shows a curious exception in which the TEGEH is placed within U+1B66 DING rather than above it. It is unclear if this was intentional or haphazard rendering, as explanatory texts are lacking.

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[1] See Hood (2016: 62-64), Suryanegara (2018).
[2] This is akin to Western solfège (do, re, mi, fa, sol, la, ti). Sometimes, the names are pronounced with initial nasals so that in Mawan & Putra (2019: 26) they are called nding, ndong, ndéng, ndéung, ndung, ndang, and ndaing.
[3] See figure 18 for an example sheet which uses the two tones.
[4] Mawan & Putra (2019: 26), Sukerta (2001: 2, 223), Suryanegara (2018), and Everson & Suatjana (2005: figure 5). The names seem to indicate the tone's position on the basic heptatonic scale; d**ai**ng is between d**a**ng and d**i**ng. Similarly, d**éu**ng is between d**é**ng and d**u**ng. However, the author could not find a source which confirm this explicitly.
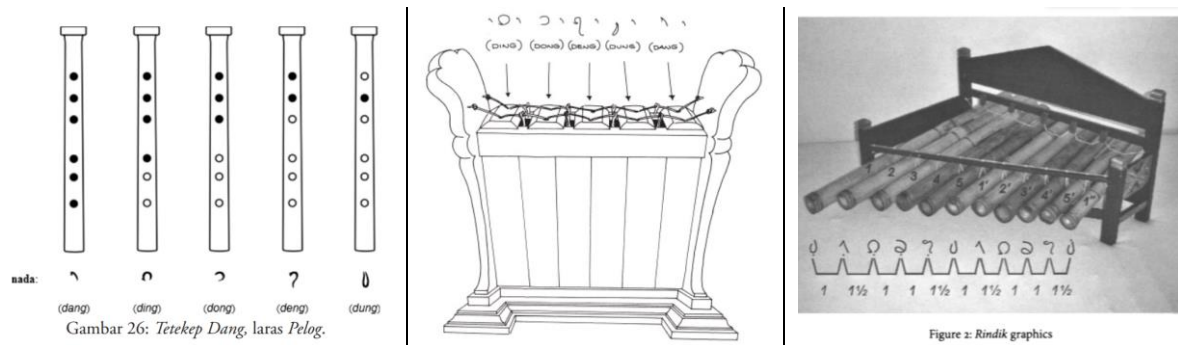
Figure 1. Ding-dong symbols used to indicate tones in musical instruments, from Ardana (2020: 20), Eiseman (2011: 335), and Stepputat (2006: 90).

Figure 2. Table of Ding-dong symbols with higher and lower octaves from Everson & Suatjana (2005: figure 5). Compare DING + dots combinations in red square with those in figure 3.

Figure 3. Table of Ding-dong symbols from Suhaedi et al (1993: 2).
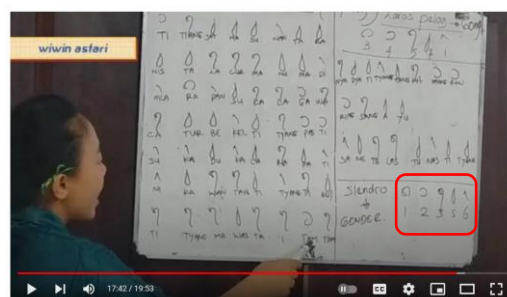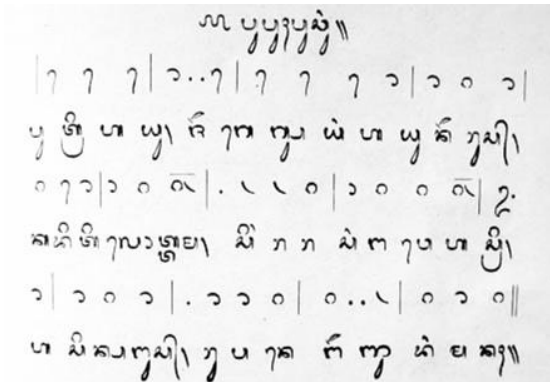
Figure 4. Video tutorial from [Youtube](#) with a music sheet and basic tones (red square).

Combining marks U+1B6D to U+1B73 are not used to modify tones, but denote the sounding of *kempul*, *kempli*, *jegogan*, *bende*, and *gong* as the character names suggest. These are instruments of colotomy, which mark circular segments or cycles in gamelan music.[5] Most of the time, a base symbol only holds one combining mark. The only instances where the author has encountered multiple combining marks are in music sheets where combining double macron is used (see figure 6).

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[5] Downing (2008: 304), Tenzer & Reich (2000: 7).

U+1B74 RIGHT-HAND OPEN DUG to U+1B7C LEFT-HAND OPEN PING are technically not part of the Ding-dong notation, but a parallel system used for *gupekan* (hand drumming as opposed to mallet drumming) for both male (*lanang*) and female (*wadon*) drums.[6]

A typical music sheet can mostly be reproduced using already encoded symbols in Unicode. More detailed sheets would use various supplemental characters beside the basic tone symbols. Supplemental characters however can be graphically ambiguous and their correspondence with encoded characters may not be obvious. In modern printed sheets especially, intended characters may be replaced by characters outside of the Balinese block which only share superficial visual similarities, as Balinese users often still rely on non-Unicode fonts and adhoc input methods.[7] Below are several examples.

Figure 5. Example of a music sheet from from http://www.babadbali.com/aksarabali/art2-c.htm, with transcription. The title reads "Pupuh Pucung."

Figure 6. Example of a music sheet from Madera (1950:16), with transcription.

At the end of line 2 in figure 5, U+1B09 LETTER UKARA is used. The author is unsure of its function. Upper lines spanning symbol pairs are a common occurrence, and the author transcribed them using combining double macron (◌̅). In line 2 of figure 6, the character in the red box could be a graphic variant of U+1B7A LEFT-HAND CLOSED PLAK or a plus sign (+), which in Balinese texts may also be recognized as *tapak dara*.[8] Again, the author is unsure of its function. The character in the blue box looks similar to U+1B37 SIGN ULU SARI. Presumably, this is combination of U+1B66 DING with U+1B6B COMBINING TEGEH seen in Suhaedi et al (1993: 2).

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[8] The name *Tapak Dara* or *Tampak Dara* is used when plus-like symbol is used as *Aksara Modre* or holy letters in Balinese sources. According to Kaler (1982), it is a solar symbol which has the sound value equivalent to U+1B2B LETTER MA and may be attached with U+1B01 SIGN ULU CANDRA. More research into *Aksara Modre* is needed before further determining the properties of this letter/symbol.

Figure 7. Example of music sheets from Rai S. (2022: 61, 67, 87), with transcription.

Various sheets in Rai S. (2022), shown in figure 7, use Balinese characters for the basic tones but evidently use repurposed Latin characters for other symbols, presumably due to font limitations. In line 2 of *Pengisep* for example, the spacing caret (^) is a substitute for U+1B74 RIGHT-HAND OPEN DUG.[9] Combining marks seem not to be typed at all but use overlaid thumbnails. Based on visual similarities,[10] plus (**+**), rectangle (**▬**), triangle (**▲**), five-pointed star (**★**), and six-pointed star (**✳**) marks are perhaps substitutions for U+1B6D COMBINING KEMPUL, U+1B6E COMBINING KEMPLI, U+1B6F COMBINING JEGOGAN, U+1B71 COMBINING KEMPLI WITH JEGOGAN, and U+1B70 COMBINING KEMPUL WITH JEGOGAN respectively.

2.2.   Gambang Notation

Gambang is an older system of Balinese notation which never underwent formal standardization. Similar to Ding-dong, the basic notation uses seven characters for seven tones, but different regions may use slightly varying characters. The system below is a version used in Tebola village, Sidemen in the Eastern part of Bali, noted by Hood (2016: 60-62):

Table 3. Characters used in Gambang notation of Tebola village noted by Hood (2016: 60-62). Tone and character names from the same source.

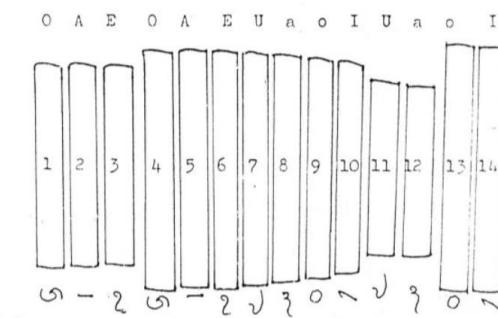| Tone name	DING	DONG	DANG	DENG	DUNG	dang	dong
Character name	Cecak	Wa	Guru	Taling	Kapal	Bisah	Windu
Character	᭔	ᬯ	᭸	ᬢ	ᬨ	᭪	᭵
Code point	U+1B64	U+1B2F	U+1B78	U+1B62	U+1B28	U+1B6A	U+1B75
Cipher	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Figure 8. Example use of Gambang notation in the keys of gambang *instrument from Hood (2016: 60-62).*

Another version noted by Sumardika (2019: 188-189) slightly differs in glyph shapes and names:

Table 4. Characters used for Gambang notation noted by Sumardika (2019: 188). Tone and character names from the same source.

Tone name	Ding	Dong ageng	Dang ageng	Déng	Dung	Dang alit	Dong alit
Character name	Cecak	Pa kapal	Guet	Taling	Suku	Bisah	Matan titiran
Character	◌	◌	◌	◌	◌	◌	◌
Code point	U+1B64	U+1B28	U+1B78	U+1B62	U+1B63	U+1B6A	U+1B75
Cipher	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Sumardika (2019: 189) also described a rather complicated system of equivalence in *kidung* poetry where the character glyphs may be changed when the original heptatonic scale (generally called *saih pitu*) is converted into pentatonic scale. For example, the dang alit tone is represented by U+1B6A in the *saih pitu* scale. But if the *kidung* piece uses *pélog selisir* scale, the same tone is represented by U+1B64. In the *pélog sunarén* scale the same tone is represented by U+1B11 LETTER OKARA. See table 5. Such complicated equivalences, as Sumardika (2019: 190) remarked, are why *kidung* pieces are often difficult to parse.

Table 5. Comparison of tone values and their symbols in three scales according to Sumardika (2019).

Tone name	Ding	Dong ageng	Dang ageng	Déng	Dung	Dang alit	Dong alit
Cipher	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Characters in *saih pitu*	U+1B64	U+1B28	U+1B78	U+1B62	U+1B63	U+1B6A	U+1B75
Characters in *pélog selisir*	U+1B66	U+1B11	U+1B62		U+1B63	U+1B64	
Characters in *pélog sunarén*		U+1B63	U+1B64		U+1B66	U+1B11	U+1B62

Regardless of the varying tone values, typical music sheets as shown in figure 9 to 11 can mostly be reproduced using already encoded symbols in Unicode. Examples can be seen below:

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Line 1 ᬰ ᭜ ᬁᬰᬶᬏᬶᬫᬸᬮᬮᬾᬶᬫᬶᬳᬵᬲᬶᬮ ᭝ ᭝ ᭝ ᭞ ᭞ — ᭞ — ᭝ — ᭝ ᭞ ᭚ ᭜ ᭜ ᭞ ᭚ ᭝ ᭝ ᭝ — ᭝ ᭜ ᭚

Line 2 ᭝ ᭚ ᭝ ᭚ ᭝ — ᭝ ᭝ ᭝ ᭚ ᭜ ᭞ ᭜ ᭝ ᭝ ᭜ ᭚ ᭝ — ᭞ ᭜ ᭚ ᭚ᬏᬶᬏ ᭝ ᭝ ᭝ — ᭞ ᭜ — ᭝

Line 3 ᭜ ᭝ ᭚ — ᭞ ᭜ ᭚ ᭝ — ᭚ ᭜ ᭝ ᭝ ᭚ ᭚ ᭜ — ᭞ ᭜ ᭚ ᭝ ᬁᬰᬶᬏᬶᬫᬏᬶᬰ ᭜ ᭞ — ᭚ — ᭞ ᭚ —

Line 4 — ᭝ ᭜ ᭞ — ᭜ ᭚ ᭞ ᭜ ᭚ ᭚ ᭞ — ᭜ ᭚ ᭞ ᭜ ᭚ ᭞ — ᭞ ᭚ ᭝ ᭝ ᭝ — —ᬏᬶ — ᭚ ᭞ — ᭝ ᭜ ᭚ ᭚

Figure 9. Example of lontar music sheet using Gambang notation, kept in Perpustakaan Dokbud Provinsi Bali, titled Gagerantangan Gambang*, with transcription. Embedded texts between musical symbols are section titles.*

Figure 10. Example of lontar music sheet using Gambang notation, kept in Perpustakaan Dokbud Provinsi Bali, titled Gegrantangan Kidung*, with transcription.*

Presumed tone	Ding	Dong	Dang	Déng	Dung	Dang alit	Dong alit	Unknown	
Character	᭝	᭜	—	᭞	᭚	᭚	᭜	∟ or ᭙	⊹ or +
Code point	U+1B64	U+1B28	U+1B78	U+1B62	U+1B63	U+1B6A	U+1B75	U+1B79 or U+1B0F	U+1B7A or U+002B

Figure 11. Example of music sheet using nine symbols, from a lontar manuscript kept in Perpustakaan Dokbud Provinsi Bali, titled Gambang Gita Gagrantangan*.*

Unlike Ding-dong, Gambang notation does not seem to use combining marks and can be better represented in plain text. Tones beyond the basic seven use additional characters, although the author could not find documentation of all possible characters. Figure 11 is an example which uses nine symbols. Seven of them correspond to the symbols attested in table 3 and 4, but there are two additional

symbols representing unknown tones to the author. It is unclear from this example what encoded characters best represent them. The character in the red box could be a graphic variant of U+1B79 LEFT-HAND OPEN PUNG or U+1B0F LETTER EKARA. The character in the blue box could be a graphic variant of U+1B7A LEFT-HAND CLOSED PLAK or a plus sign (+).

2.3.   Layout Issues

Balinese notation does not vary in vertical positioning like Western notation. However, like in Western musical sheets, lines of notations are often accompanied by lines of lyrics to be sung. In such cases, the spacing in both lines commonly needs to be adjusted to align notes with the text.

Disregarding lyrics, music sheets written in lontar (figure 9 to 11) tend to use simple layout that can be represented in plain text. Recent music sheets are more varied in their complexity, from relatively plain (figure 4) to detailed (figure 7). The more detailed sheets might better be represented as formatted text as opposed to plain texts, similar to Western musical notation and math formulae. Some sheets in Rai S. (2022) for example have multiple upper lines which span two to four symbols (red box in figure 12). This may warrant higher-level protocols of encoding such as XML tags that describe the units denoted by the upper lines, and a rendering mechanism for the lines.

Figure 12. Example of a music sheet from Rai S. (2022: 61).

2.4.   Font Design Issues

Musical symbols tend to be written with even spacing, which also helps in the alignment of multiple lines. A font may replicate this by making all spacing symbols of equal width, ie monospaced. However, "regular" Balinese characters that are sometimes used in notations, shown in table 6, would inadvertently cause misalignments when inserted between musical symbols. Forcing the width of regular characters to conform with musical symbols would also not be ideal, as the former would look jarring in regular texts. Due to this issue, separate fonts for musical sheets and regular texts may be warranted.

Table 6. "Regular" Balinese characters also used as musical symbols.

Character	ᬉ	ᬑ	ᬨ	ᬯ
Code point	U+1B09 LETTER UKARA	U+1B11 LETTER OKARA	U+1B28 LETTER PA KAPAL	U+1B2F LETTER WA

Lontar musical sheets may infrequently use characters outside of the Balinese block. One musical sheet kept in Perpustakaan Nasional Indonesia for example uses a character that resemble the CJK reference mark U+203B ※, seemingly to mark start of stanzas (figure 13). More recent sheets like figure 6-7 tend to adapt characters from Western musical sheets. Table 7 shows at least six of such characters that occur frequently. It is unclear at this point how many more characters should be included to support the full range of musical notation.
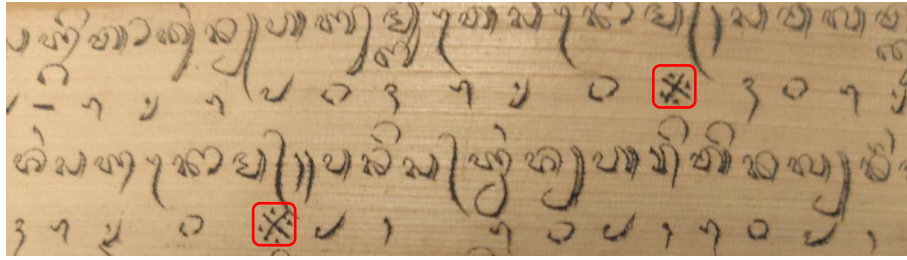
Figure 13. Example of music sheet using a character that resemble the CJK reference mark U+203B ※, seemingly to mark start of stanzas.

Table 7. Characters outside of the Balinese block used in musical sheets from Madera (1950) and Rai S. (2022)

Madera (1950)						
Rai S. (2022)						
Character	◌͞	|	‖	(	)	╱
Code point	U+035E COMBINING DOUBLE MACRON	U+007C VERTICAL BAR	U+2016 DOUBLE VERTICAL LINE	U+0028 LEFT PARENTHESIS	U+0029 RIGHT PARENTHESIS	U+0337 COMBINING SHORT SOLIDUS OVERLAY

Lastly, some characters in musical sheets are graphically ambiguous and may correspond to multiple encoded characters. Unfortunately, the still common use of non-Unicode fonts and adhoc input methods further add to this confusion. Some of these confusables can be seen in table 8 below.

Table 8. Confusable characters in attested music sheets.

Image	Possible characters			Image	Possible characters	
	U+1B11 LETTER OKARA	U+1B53 DIGIT THREE			U+1B7A LEFT-HAND CLOSED PLAK	U+002B PLUS SIGN
	U+1B0F LETTER EKARA	U+1B56 DIGIT SIX	U+1B79 LEFT-HAND OPEN PUNG		U+1B5D CARIK PAMUNGKAH	U+003A COLON
	U+1B28 LETTER PA KAPAL	U+1B58 DIGIT EIGHT			U+1B7C LEFT-HAND OPEN PING	U+00B7 MIDDLE DOT
	U+1B50 DIGIT ZERO	U+1B5C WINDU	U+1B75 RIGHT-HAND OPEN DAG		U+1B74 RIGHT-HAND OPEN DUG	U+2038 CARET

2.5. Characters Without Usage Attestation

The above survey has not found attested use for six characters:

Table 9. Encoded musical symbols without usage attestation.

Character	᭩	᭲	᭳	᭶	᭷	᭻
Code point	U+1B69	U+1B72	U+1B73	U+1B76	U+1B77	U+1B7B

While the author is unable to verify their attestations,[11] Made Mantle Hood reported that these characters can be found in real music sheets with the following functions:[12]

U+1B69 ᴅᴀɪɴɢ is a tone symbol which can be found in *kidung* poetry, although Hood could not recall the symbol's value.

U+1B72 ᴄᴏᴍʙɪɴɪɴɢ ʙᴇɴᴅᴇ and U+1B73 ᴄᴏᴍʙɪɴɪɴɢ ɢᴏɴɢ indicate the sounding of colotomic instruments *bende* and *gong* respectively. The former is usually found in *lelambatan* composition.

U+1B76 ʀɪɢʜᴛ-ʜᴀɴᴅ ᴄʟᴏꜱᴇᴅ ᴛᴜᴋ, U+1B77 ʀɪɢʜᴛ-ʜᴀɴᴅ ᴄʟᴏꜱᴇᴅ ᴛᴀᴋ, and U+1B7B ʟᴇꜰᴛ-ʜᴀɴᴅ ᴄʟᴏꜱᴇᴅ ᴘʟᴜᴋ all relate to hand drumming where each symbol indicates a particular striking quality, in accordance with what Everson & Suatjana (2005: 4) have described.

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[11] U+1B76 and U+1B77 seem to be used in figure 19, but the author is unable to verify this due to the source's distorted rendering.
[12] Personal communication 29 April 2023.

3. SASAK CHARACTERS

As of Unicode 15.0.0 (The Unicode Consortium, 2022), the Balinese block provided 1 sign and 7 letters that are commonly understood to accommodate Sasak writings, marked blue below:

Table 10. Sasak characters encoded in the Balinese block.

U+1B3x	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
U+1B3x	ᬀ	ᬁ	ᬂ	ᬃ	ᬄ	ᬅ	ᬆ	ᬇ	ᬈ	ᬉ	ᬊ	ᬋ	ᬌ	ᬍ	ᬎ	ᬏ
U+1B4x	ᬐ	ᬑ	ᬒ	ᬓ	ᬔ	ᬕ	ᬖ	ᬗ	ᬘ	ᬙ	ᬚ	ᬛ	ᬜ			

Code point	Name
U+1B34	BALINESE SIGN REREKAN

Code point	Name
U+1B45	BALINESE LETTER KAF SASAK
U+1B46	BALINESE LETTER KHOT SASAK
U+1B47	BALINESE LETTER TZIR SASAK
U+1B48	BALINESE LETTER EF SASAK
U+1B49	BALINESE LETTER VE SASAK
U+1B4A	BALINESE LETTER ZAL SASAK
U+1B4B	BALINESE LETTER ASYURA SASAK

The Sasaks are the dominant ethnic group in Lombok, Bali's eastern neighboring island. Historic influences from Bali established the use of Java-Balinese script in the Sasak literary tradition, where it is also called *Aksara Sasak* or *Jejawan*.[13] According to Meij (1996: 8):

> *It appears that writing manuscripts was an activity greatly enjoyed by the Sasak people of Lombok […] Writing manuscripts is an activity engaged in by the ordinary people and executed without the supervision of people thought to be experts in the field.*

Curiously, attested Sasak literature rarely use the "Sasak" characters encoded in the Balinese block, making their function ambiguous.

3.1. Rerekan Sign

REREKAN is succinctly described in Everson & Suatjana (2005) as a sign to extend the character repertoire for foreign sounds. This is similar in function to U+A9B3 JAVANESE SIGN CECAK TELU and the forthcoming U+11F5A KAWI SIGN NUKTA (proposed by Nasrullah (2022), accepted for Unicode 16.0). The use of REREKAN is specific to Lombok texts. While REREKAN can theoretically be used in Balinese settings, common Balinese users would not be familiar with the sign and normally render foreign consonants using the nearest sounding native sound without any additional markings.[14]

According to Wayan Jarrah Sastrawan, REREKAN can be found in traditional Lombok manuscripts, but its use is sporadic and inconsistent.[15] An example can be seen in an unstudied lontar titled *Geguritan*

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[13] The Sasak extension discussed here is encoded in the Balinese block of Unicode, although some writers such as Meij (1996: 8) differentiate certain scripts in Sasak manuscripts as "a local form of Javanese script" distinct from Balinese script.

[14] For example, in the colophon of this *Usadha Rare* copy, February is written *pébruarī* ᬧᬾᬩᬺᬯᬭᬷ instead of *fébruarī* ᬧᬾᬪᬺᬯᬭᬷ with REREKAN on the first syllable. See also Tangkas (2020) and Tinggen (1994) that lists some common native equivalence, such as ᬧ for /f/ or /v/.

[15] Pers. comm. 6 December 2022. Muhammad Wira Sentana (pers. comm. 1 May 2023) concurs with this and said that REREKAN saw more use in contemporary materials.

Bandar Halim in the collection of Balai Bahasa Bali, where the sign occurs in Arabic terms such as *Al-Fatihah* الْفَاتِحَة and *Allah* الله.[16] Unexpectedly, the REREKAN is attached to U+1B33 LETTER HA, seemingly with no effect on pronunciation. The [fa] in *Al-Fatihah* also do not use the expected combination LETTER PA + REREKAN. In that manuscript at least, REREKAN seem to be used to mark foreign words, but it does not necessarily change the pronunciation of the letter it is attached to.
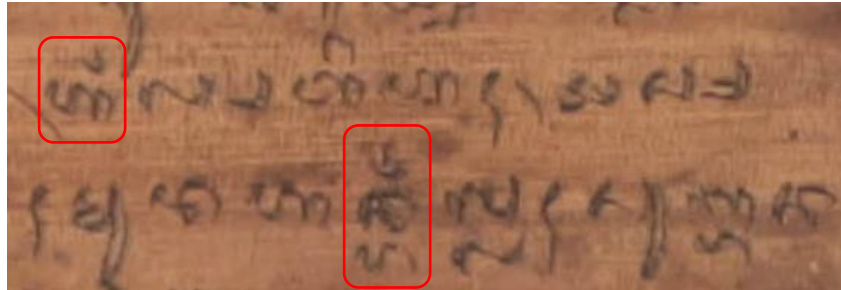

Figure 14. Example of possible REREKAN *from a lontar manuscript kept in Balai Bahasa Bali, titled* <u>Geguritan Bandar Halim</u>.

Dutch linguist van der Tuuk was aware of REREKAN, and his Kawi-Balinese-Dutch dictionary included some typeset examples along with information of variant usage. For example, in van der Tuuk (1897: voorloopige lijst 10), he noted that the Arabic name Khadijah خَدِيجَة is sometimes spelled with as LETTER HA + REREKAN and sometimes as LETTER KA + REREKAN.[17] Judging from the typographic style, the printers used an existing Javanese *cecak telu* punch rather than creating a stylistically distinct punch for Balinese texts.
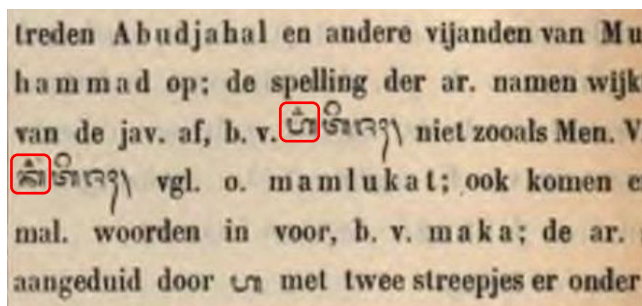
Figure 15. Example of typeset characters with REREKAN *from Van der Tuuk (1897: voorloopige lijst 10; 1901: 2)*

Recent tables, including in official publications like Fathurrahman (2013),[18] often implied that REREKAN can only be used with five letters: U+1B13 LETTER KA, U+1B15 LETTER GA, U+1B1A LETTER JA, U+1B24 LETTER DA, U+1B27 LETTER PA. When applied, REREKAN change their pronunciation into /xa/, /ɣa/, /za/, /ða/, and /fa/ (or /va/) respectively. But as can be seen in the *Geguritan Bandar Halim* and Van der Tuuk's dictionary, REREKAN may combine with characters outside of current official tables.

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[16] ᬳᬭᬦ᭄ᬤᬃᬳᬮᬶᬫ᭄ and ᬳᬮᬄ respectively.

[17] ᬳᬥᬶᬚᬄ and ᬔᬥᬶᬚᬄ respectively.

[18] This is a brief outline of the script published by Museum Negeri NTB (Provincial Museum of Nusa Tenggara Barat). Despite the official nature of the publisher, it contains some basic errors such as ◌ U+1B3A having value /ra/ instead of /rə/ (Fathurrahman 2013:8).

Figure 16. Example of REREKAN *use from* https://sites.google.com/site/uptdikdaspraya/wisata-pradja. *The* REREKAN *in the last word is inexplicably missing.*

Figure 17. Example of REREKAN *from Fathurrahman (2013: 17-18).*

3.2. Novel Sasak Letters

Seven encoded characters with SASAK in their names are explained in Everson & Suatjana (2005: 3) as follow:

> *In recent times, Sasak users abandoned the use of the Javanese-influenced REREKAN*
> *in favour of the series of modified letters given in the last two lines of the chart on*
> *the first page of this document, making use, in addition, of some of unused Kawi*
> *letters for these Arabic sounds.*

The statement suggests that these letters are a novel creation at the time of the proposal, which could only be found in non-traditional materials such as school primers. Fathurrahman (2013: 2) claims that the repertoire was formalized as part of some standardization effort in 1998,[19] although Fathurrahman

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[19] "Adaptasi pengaruh Islam menyebabkan aksara jejawan atau aksara Sasak ini harus mengadaptasi beberapa pelafalan arab tertentu yaitu hamzah, qaf, dzal, tsa, sywin dan kha menyebabkan perlu adanya aksara baru Aksara baru ini disepakai [sic] pada standarisasi aksara Sasak sebagai bagian dari proyek bantuan mesin susun huruf Sasak tahun 1998, …"
Adaption of Islamic influence prompted Jejawan or Sasak script to adapt certain Arabic pronunciation, which include hamzah, qaf, dzal, tsa, sywin and kha, and also prompted the creation of new letters which was agreed in a Sasak script standardization effort as part of a project to create a Sasak sort [typesetting?] machine in 1998, …

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himself never shows or uses these novel characters. There are quite a few cases in Indonesian script revival efforts in which novel characters are grafted into traditional repertoires without adequate analysis or sustained use.[20] The author suspects that these novel Sasak letters are among those short-lived grafts. Jamaluddin and Muhammad Wira Sentana, who have conducted much research into Sasak writing culture, also reported that they have never seen these characters in circulating materials.[21] Everson & Suatjana (2005: fig 3) only provide one example shown below. The source was not specified, but it seems to come from Parman (1994: 13), an outdated elementary school reading primer.
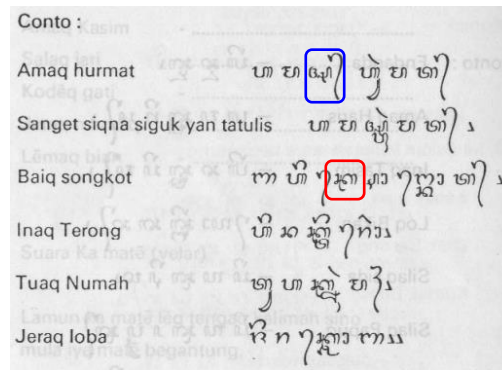
Figure 18. The only substantial use of Sasak letters provided by Everson & Suatjana (2005), showing U+1B45 LETTER KAF SASAK (red square) to indicate glottal stop. This is identical in fuction with U+1B05 LETTER AKARA with attached U+1B44 ADEG ADEG (blue square).

Throughout Parman (1994), only one novel Sasak letter is used: U+1B45 LETTER KAF SASAK, indicating the glottal stop /ʔ/, which is almost always romanized as [q].[22] The book however also uses another method to indicate glottal stop: U+1B05 LETTER AKARA with attached U+1B44 ADEG ADEG (a visible *virama*) or conjunct. The modified AKARA method (also called *atul* in Sasak) is historically attested in both Balinese and Lombok texts before the 20th century,[23] while KAF SASAK seems to be the more recent invention with a somewhat redundant function. Neither Everson & Suatjana nor Parman provided explanation when users should use KAF SASAK or whether it is mandatory at all. In fact, Parman seems to have forgotten that KAF SASAK exists after page 17 and rendered almost every instance of glottal stop onward with *atul*.

Even by limiting the scope to schoolbooks, they are a somewhat unreliable source. As Austin (2014: 18) reports:

> *Some Sasaks I have interviewed were exposed to the script at school but none of them, apart from individuals who are interested in reading lontar, have a functional knowledge of the script and are able to read and write it. I understand that it is no longer being taught in most schools in Lombok, even though under* autonomi daerah *'regional autonomy' local culturally and linguistically significant materials can be included in school curricula... [when it is taught] the approach to teaching* Aksara Sasak *is rather unengaging and rushes through the principles of the script in very few pages ...*

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[20] See Kozok (2009:92) for the case in Batak, Perdana et al (2022) for the case in Lampung, and Nurwansah (2021) for the case in Sundanese.

[21] Personal communication 1 May 2023

[22] The sole exception in the book is the word ꦏꦸꦂꦲꦤ꧀ Qur'an which used apostrophe ['] in its romanization of glottal stop.

[23] Examples include letters such as this letter from Raja of Buleleng to Lord Minto and even literary work such as this copy of *Gaguritan Nengah Jimbaran*. Van der Tuuk (1897: 1) also describe this usage in his dictionary.

The fact that Parman (1994) was published earlier than Fathurrahman (2013), and the latter does not show any novel Sasak letters suggest that the statement in Everson & Suatjana (2005: 3) is outdated. From what could be gathered, REREKAN seems to be the historically attested method to accommodate foreign sounds. Sometime in the late 90s to early 2000s, novel letters were conceived to replace the use of REREKAN and were (prematurely) included into Unicode even though their use did not catch on. By 2013, officially produced Sasak material only acknowledges REREKAN. It is of course possible that these novel Sasak letters would saw resurgence of use in the future. But currently they are not an established part of Lombok writing practice as the Unicode Standard implies.

Based on this survey, Section 17.3 Balinese of The Unicode® Standard Version 15.0 – Core Specification is incorrect and needs to be corrected.

3.3.   Keyboard Issues
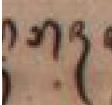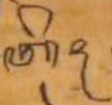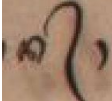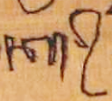
A Lombok literary piece written in Balinese script may use Javanese, Balinese, Old Javanese/Kawi, Sasak, Malay, or some combination of all these languages. In fact, writing only in pure Sasak language is rare. Because of the multivalent language use associated with the Balinese script (in both Bali and Lombok), the author is unsure whether keyboards for Balinese-Balinese and Balinese-Sasak should be separated. If they were, it would be understandable if they were identical. The only minor difference the author could think of is that the Sasak keyboard should provide easier reach for REREKAN and AKARA/KAF SASAK.

3.4.   Font Design Issues

REREKAN may occur together with above-base diacritics, requiring certain positioning rules. There is one instance in figure 17 (from Fathurrahman, 2013: 18) where REREKAN is used together with U+1B36 SIGN ULU, with the latter stacked above the former. This positioning however may be unrepresentative, as in other cases Balinese script usually positions multiple above-base characters in a horizontal arrangement rather than in vertical stacks.

Balinese script has a range of handwriting variations but there is little study to determine whether certain styles are distinct to a region or just individual quirks. Everson & Suatjana (2005: 7) noted "Sasak glyph variants" for U+1B04 SIGN BISAH and U+1B45 ADEG-ADEG used in Parman (1994). But a quick glance of other materials shows that they are either not common in Lombok or easily found in Bali. Designating them as "Sasak variants" may be excessive, and a more thorough survey is needed to determine such variants.

Table 11. Stylistic comparison of two characters in Lombok and Balinese materials.

Code point	Lombok			Bali	
	Parman (1994)	Fathurrahman (2013)	Van Der Meij (1996)	*Perjanjian …*	*Babad Gumi*
U+1B04					
U+1B44					

3.5.   Characters Without Usage Attestation

The above survey has not found attested use for six characters:

Table 12. Sasak characters without usage attestation.

Character	ᭆᬶᬗᬶ	ᭇᬶᬗᬶ	ᭈᬶ	ᭉᬶ	ᭊᬶ	ᭋᬶ
Code point	U+1B46	U+1B47	U+1B48	U+1B49	U+1B4A	U+1B4B

4. ADDITIONAL FIGURES

Figure 14: Dongkang Menek Biyu Grantangan

Figure 19. A composition for gamelan rindik *(bamboo xylophone), from Stepputat (2006: 107). Note the unusually drawn U+1B62 BALINESE MUSICAL SYMBOL DENG.*

Figure 20. A composition from Sukerta (2001: 32) with U+1B67 DAENG (red squares) and U+1B68 DEUNG (blue squares).

Tabuh Pisan Lelambatan Pisang Bali
(Laras Pelog)
Oleh I Gede Yudartha

Pengawit

```
        ‾‾        ‾‾                              ‾
        ∧∧       ∧∧∧ - -      -  ∧  ∧  ∧     ∧ ∧ ∧ (O)

 - 7 - 3 +   - 7 - 3 ‾   1 7 5 4   5 7 1 (3)
 - ∧ - o     - ∧ - o     ∧ O ∧ O ∧   O ∧ ∧ o

 - 7̄1̄3̄ 3 +  - 71̄3̄ 3 ‾  - 713̄ 3̄   5 7 1 (3)
 ∧  ∧ O ∧   ∧  O ∧ ∧    O ∧ O ∧O   ∧ O ∧ O∧
```

Pengibe

```
                              ✳
 - 4 - 5   - 4 - 3   - 4 5 7   5 4 3 7
 - ∧  ∧ O   ∧ - - O   ∧ O ∧ -   - - - O

 3 1 7 1 _  3 4 5 4 ✳  5 4 3 71 3̄3̄ 1̄7̄ 5̄7̄(5)
 ∧-∧-O-∧-   ∧-O-∧-∧-   O-∧-O-∧- ∧∧O ∧∧O ∧∧O

 - 5 - 7   - 7 - 5   - 7 - 5   - 4 - 3
 - - - ∧   - ∧ - O   - ∧ - -   - - - O

 - 3 - 3   - 4 5 7   - 5 - 4   - 7 - 5
 ↗ - - ∧   - - - O   - - - ∧   - - - -
```

Figure 21. A composition by Yudartha (nd). Parallels to encoded characters are observed but their form and combining properties are distorted by the use of makeshift characters and misalignments.
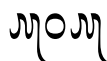
MS M. 53, *Nabi Aparas*, f. 3b

MS M. 53, *Nabi Aparas*, f. 4a

Figure 22. Pages of a Nabi Aparas *lontar manuscript from Lombok, discussed in Meij (1996)*

5. ACKNOWLEDGEMENTS

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