

Lanna Unicode: A Draft Proposal

L2/04-351

M. Hosken

Introduction

This initial, incomplete, proposal is presented for public review in anticipation of a full submission once appropriate consultation has been made among interested parties. Please send all comments and questions to me martin_hosken@sil.org

The encoding proposed here has been designed to be sufficient for modern texts in Northern Thai, Tai Lue and Khün. There is outstanding testing to be done to ensure renderability and sorting and also sufficiency for ancient texts, before this encoding is ready for final proposal.

Proposal Form

A. Administrative

1. Title: <u>Lanna</u>
2. Requester's name: <u>Martin Hosken</u>
3. Requester type (Member body/Liaison/Individual contribution): <u>Individual contribution</u>
4. Submission date: <u>28 Jun 2004</u>
5. Requester's reference (if applicable): _____
6. (Choose one of the following:)
This is a complete proposal: <u>yes</u>
or, More information will be provided later: _____

B. Technical - General

1. (Choose one of the following:)
a. This proposal is for a new script (set of characters): <u>yes</u>
Proposed name of script: <u>Lanna</u>
b. The proposal is for addition of character(s) to an existing block: _____
Name of the existing block: _____
2. Number of characters in proposal: <u>90</u>
3. Proposed category (see section II, Character Categories): <u>A</u>
4. Proposed Level of Implementation (1, 2 or 3) (see clause 14, ISO/IEC 10646-1: 2000): _____
Is a rationale provided for the choice? _____
If Yes, reference: _____
5. Is a repertoire including character names provided? <u>yes</u>
a. If YES, are the names in accordance with the 'character naming guidelines in Annex L of ISO/IEC 10646-1: 2000? _____
b. Are the character shapes attached in a legible form suitable for review? <u>yes</u>
6. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard? <u>Martin Hosken</u>
If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used: _____
7. References:
a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided? _____
b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached? _____
8. Special encoding issues:
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)?
<u>presentation</u>

9. Additional Information:

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 <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.

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? No _____
If YES explain _____
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? not yet _____
If YES, with whom? _____
If YES, available relevant documents: _____
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? yes _____
Reference: _____
4. The context of use for the proposed characters (type of use; common or rare) uncommon _____
Reference: _____ to be provided _____
5. Are the proposed characters in current use by the user community? yes _____
If YES, where? Reference: _____ to be provided _____
6. After giving due considerations to the principles in *Principles and Procedures document* (a WG 2 standing document) must the proposed characters be entirely in the BMP? yes _____
If YES, is a rationale provided? Already pipelined for BMP _____
If YES, reference: _____
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)? yes, since one script _____
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? no _____
If YES, is a rationale for its inclusion provided? _____
If YES, reference: _____
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? no _____
If YES, is a rationale for its inclusion provided? _____
If YES, reference: _____
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? yes _____
If YES, is a rationale for its inclusion provided? yes _____
If YES, reference: _____
11. 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 _____
If YES, is a rationale for such use provided? yes _____
If YES, reference: _____
Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? yes _____
If YES, reference: _____

12. Does the proposal contain characters with any special properties such as control function or similar semantics?	_____ yes _____
If YES, describe in detail (include attachment if necessary)	_____ included _____
13. Does the proposal contain any Ideographic compatibility character(s)?	_____ no _____
If YES, is the equivalent corresponding unified ideographic character(s) identified?	_____

If YES, reference: _____	

Sociolinguistic Situation

Lanna script is used for three languages: Northern Thai, Tai Lue and Khün. There are 6 million speakers of Northern Thai of whom very few are literate in Lanna script, although there is some resurgent interest in the script among the young. There are 500,000 speakers of Tai Lue of whom those born before 1950 are literate in Lanna script. The script has also continued to be taught in the monasteries. There are 100,000 speakers of Khün for which Lanna is the only script.

Script Description

The Lanna script has many functional correspondences with the Myanmar script. It has subjoined forms for medial consonants and for syllable chaining. In addition, syllable final consonants are often subjoined and combined with diacritic vowels. This can result in a complex system of vertical stacking of characters.

There is no visual virama type letter as such, but the encoding introduces a control character U+1A80 LANNA SIGN SUBJOINER which has the function of subjoining the following consonant character, be it a medial, final or new syllable initial. If no subjoiner sign precedes a consonant, the consonant is rendered as a full base character and is treated as the start of a new syllable. Since it is not necessary to render a final consonant in a subjoined form, the character U+1ADF LANNA SIGN SYLLABLE JOINER may be used to indicate that a following base form consonant is in fact part of the previous syllable.

The basic encoding order is:

C (S C)? T? V? T? (S C)?

Where C is a consonant (from the range U+1A81 .. U+1AAB); S is the subjoiner; V is a dependent vowel (from the range U+1AB0 .. U+1ABF) and T is a tone mark (from the range U+1AC0 .. U+1AC4). Notice that the tone mark may occur in two different positions dependent upon which vowel is used. For a spacing vowel (U+1AB0, U+1AB4, U+1ABB .. U+1ABE) the tone occurs before the vowel, otherwise it occurs after the vowel. This keeps the diacritic storage order in keeping with the principle of those closest to the base character being stored first.

There are two sets of numbers used in Lanna. The first is listed here in the range U+1AD0 .. U+1AD9. The second is the Myanmar set taken from the Myanmar block (U+1040 .. U+1049).

Independent vowels (U+1ADA .. U+1ADE) are treated as consonants for all intents and purposes, except that independent vowels may only be used at the start of a syllable. Unless listed here, an independent vowel may be created by using the consonant U+1AAA LANNA LETTER QA followed by the dependent form of the vowel. The independent vowels U+1ADD LANNA VOWEL LETTER I and U+1ADE LANNA VOWEL LETTER II may be represented using the sequences: U+1A9C U+1A80 U+1A8C and U+1A9C U+1A80 U+1A8C U+1A80 U+1AA1 respectively in Northern Thai and in Tai Lue, but not in Khün. The reason for not making them canonically equivalent is that

The ligatures (U+1AAC .. U+1AAE) act as full syllables in their own right. They are not canonically equivalent to their corresponding full spellings due to having a significantly different form and being optional.

In some cases one of the diacritic signs may have more than one function in the language. This ambiguity, inherent in the writing system, is not resolved in the encoding due to reasons of difficulty in resolving the ambiguity during data entry, etc. Thus, for example, U+1AC7 LANNA MARK MAI KANG is used both to indicate a final nasal and also to mark that a following subjoined character is in

fact the start of a new syllable rather than a medial (in this case it would be stored before the subjoined consonant in question). In Tai Lue, U+1AC5 LANNA MARK LAHAAM may also be used as a final -n (or -r pronounced -n).

Note: Not all encoding order issues have been resolved yet.

Subjoined Forms

The following table lists the subjoined form for each base character.

	1A81	1A82	1A84	1A86	1A87	1A88	1A89	1A8A	1A8C	1A8D	1A8E
base	ဝ	ခ	ဂ	ဃ	င	စ	ဆ	ဇ	ည	ဉ	ဋ
subjoined	ဝံ	ခံ	ဂံ	ဃံ	ငံ	စံ	ဆံ	ဇံ	ညံ	ဉံ	ဋံ

	1A90	1A91	1A92	1A93	1A94	1A95	1A96	1A97	1A98	1A99	1A9A
base	ဉ	ဃ	လ	တ	ဒ	ဇ	ဝ	ဋ	ပ	ဖ	ဗ
subjoined	ဉံ	ဃံ	လံ	တံ	ဒံ	ဇံ	ဝံ	ဋံ	ပံ	ဖံ	ဗံ

	1A9C	1A9F	1AA0	1AA2	1AA3	1AA4	1AA5	1AA6	1AA7	1AA8
base	လ	မ	ဃ	န	လ	ဝ	ဇ	သ	သ	လ
subjoined	လံ	မံ	ဃံ	နံ	လံ	ဝံ	ဇံ	သံ	သံ	လံ

Notes

Not all consonants have a subjoined form. If a U+1A80 LANNA SIGN SUBJOINER is followed by any other character than a consonant that has a subjoined form, the U+1A80 is treated as U+1ADF LANNA SIGN SYLLABLE JOINER.

There are two characters each that have two subjoined forms. U+1AA2 LANNA LETTER RA may also take the form ဝံ and U+1AA3 LANNA LETTER LA may take the form ဝံ. In each case, the alternative form is used when following a vowel or U+1AC7 LANNA MARK MAI KANG, since it is used only at the start of a new syllable. If this behaviour needs to be changed in a particular text, then the letter is followed by a variant select (U+FE00 VARIATION SELECTOR-1) which swaps the form that is displayed. This approach is taken to make the occurrence of the variant selector rare in text while supporting texts that do not follow the above rendering conventions .

The subjoined form for U+1A99 LANNA LETTER HIGH PA is used to represent the Pali variant associated with U+1A9C LANNA LETTER LOW PA. The subjoined form is only used with the following characters: U+1A8E LANNA LETTER LATHA, U+1A92 LANNA LETTER LANA, U+1A9C LANNA LETTER LOW PA and U+1A9F LANNA LETTER MA, otherwise the U+1A80 character is treated as U+1ADF LANNA SIGN SYLLABLE JOINER.

Ligatures and Contextual Forms

There are 3 ligatures used in Lanna script:

U+1AA8 ... U+1A80 U+1AA8	သ
U+1A97 ... U+1AB4	ဋ
U+1A8D ... U+1A80 U+1A8D	ဉ

¹ Should this be a font selection rather than a variant selector?

Note that any sequence of diacritics and other subjoined forms may occur in the ligature sequence as marked by the ellipsis, so long as the principle of a single cluster is not broken.

U+1AB4 LANNA VOWEL MAI KAA takes two forms. The default form is as presented. There is also a tall form (ᨧ) used when the character follows: U+1A84 LANNA LETTER LOW KA, U+1A94 LANNA LETTER HIGH THA, U+1A96 LANNA LETTER LOW THA, U+1A98 LANNA LETTER BA, U+1AA4 LANNA LETTER WA.

Issues

The independent vowels U+1ADD LANNA VOWEL LETTER I and U+1ADE LANNA VOWEL LETTER II may be represented using the sequences: U+1A9C U+1A80 U+1A8C and U+1A9C U+1A80 U+1A8C U+1A80 U+1AA1 respectively in Northern Thai and in Lue, but not in Khün. The reason for not making them canonically equivalent is that they are not equivalent in all languages and the sequence represents a full syllable (all be it an incomprehensible one) whereas the independent vowel acts as an initial consonant only.

Bibliography

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	1A8	1A9	1AA	1AB	1AC	1AD
0	◌ 1A80	๒ 1A90	๒ 1AA0	๓ 1AB0	◌ 1AC0	0 1AD0
1	๓ 1A81	๒ 1A91	๒ 1AA1	◌ 1AB1	◌ 1AC1	๑ 1AD1
2	๓ 1A82	๓ 1A92	๓ 1AA2	◌ 1AB2	◌ 1AC2	๓ 1AD2
3	๓ 1A83	๓ 1A93	๓ 1AA3	◌ 1AB3	◌ 1AC3	๓ 1AD3
4	๓ 1A84	๓ 1A94	๓ 1AA4	๓ 1AB4	◌ 1AC4	๓ 1AD4
5	๓ 1A85	๓ 1A95	๓ 1AA5	◌ 1AB5	◌ 1AC5	๓ 1AD5
6	๓ 1A86	๓ 1A96	๓ 1AA6	◌ 1AB6	◌ 1AC6	๓ 1AD6
7	๓ 1A87	๓ 1A97	๓ 1AA7	◌ 1AB7	◌ 1AC7	๓ 1AD7
8	๓ 1A88	๓ 1A98	๓ 1AA8	◌ 1AB8	◌ 1AC8	๓ 1AD8
9	๓ 1A89	๓ 1A99	๓ 1AA9	◌ 1AB9	◌ 1AC9	๓ 1AD9
A	๓ 1A8A	๓ 1A9A	๓ 1AAA	◌ 1ABA	◌ 1ACA	๓ 1ADA
B	๓ 1A8B	๓ 1A9B	๓ 1AAB	◌ 1ABB		๓ 1ADB
C	๓ 1A8C	๓ 1A9C	๓ 1AAC	◌ 1ABC		๓ 1ADC
D	๓ 1A8D	๓ 1A9D	๓ 1AAD	◌ 1ABD		๓ 1ADD
E	๓ 1A8E	๓ 1A9E	๓ 1AAE	◌ 1ABE		๓ 1ADE
F	๓ 1A8F	๓ 1A9F		◌ 1ABF		◌ 1ADF

Consonants

1A80	◌	LANNA SIGN SUBJOINER
	•	not rendered, no shape
1A81	◌	LANNA LETTER HIGH KA
1A82	◌	LANNA LETTER HIGH KHA
1A83	◌	LANNA LETTER HIGH KHAA
1A84	◌	LANNA LETTER LOW KA
1A85	◌	LANNA LETTER LOW KHA
1A86	◌	LANNA LETTER LOW KHAA
1A87	◌	LANNA LETTER LOW NGA
1A88	◌	LANNA LETTER HIGH JA
1A89	◌	LANNA LETTER HIGH SA
1A8A	◌	LANNA LETTER LOW JA
1A8B	◌	LANNA LETTER LOW SA
1A8C	◌	LANNA LETTER LOW SAA
1A8D	◌	LANNA LETTER HIGH NYA
1A8E	◌	LANNA LETTER LATHA
1A8F	◌	LANNA LETTER HIGH LATHA
1A90	◌	LANNA LETTER DA
1A91	◌	LANNA LETTER LOW LATHA
1A92	◌	LANNA LETTER LANA
1A93	◌	LANNA LETTER HIGH TA
1A94	◌	LANNA LETTER HIGH THA
1A95	◌	LANNA LETTER LOW TA
1A96	◌	LANNA LETTER LOW THA
1A97	◌	LANNA LETTER NA
1A98	◌	LANNA LETTER BA
1A99	◌	LANNA LETTER HIGH PA
1A9A	◌	LANNA LETTER HIGH PHA
1A9B	◌	LANNA LETTER HIGH FA
1A9C	◌	LANNA LETTER LOW PA
1A9D	◌	LANNA LETTER LOW FA
1A9E	◌	LANNA LETTER LOW PHA
1A9F	◌	LANNA LETTER MA
1AA0	◌	LANNA LETTER LOW NYA
1AA1	◌	LANNA LETTER YA
1AA2	◌	LANNA LETTER RA
1AA3	◌	LANNA LETTER LA
1AA4	◌	LANNA LETTER WA
1AA5	◌	LANNA LETTER HIGH SAA
1AA6	◌	LANNA LETTER HIGH SAA2
1AA7	◌	LANNA LETTER HIGH SAA3
1AA8	◌	LANNA LETTER HIGH HA
1AA9	◌	LANNA LETTER LAA
1AAA	◌	LANNA LETTER QA
1AAB	◌	LANNA LETTER LOW HA

Ligatures

1AAC	◌	LANNA LETTER LU
1AAD	◌	LANNA LETTER LUU
1AAE	◌	LANNA LETTER LE

Dependent Vowel Signs

1AB0	◌	LANNA VOWEL MAI KA
1AB1	◌	LANNA VOWEL MAI KANG
1AB2	◌	LANNA VOWEL MAI KER
1AB3	◌	LANNA VOWEL MAI SAT
1AB4	◌	LANNA VOWEL MAI KAA
1AB5	◌	LANNA VOWEL MAI KI
1AB6	◌	LANNA VOWEL MAI KII
1AB7	◌	LANNA VOWEL MAI KUE
1AB8	◌	LANNA VOWEL MAI KUUE
1AB9	◌	LANNA VOWEL MAI KU
1ABA	◌	LANNA VOWEL MAI KUU
1ABB	◌	LANNA VOWEL MAI KE
	•	stands to the left of the consonant
1ABC	◌	LANNA VOWEL MAI KEE
	•	stands to the left of the consonant
1ABD	◌	LANNA VOWEL MAI KO
	•	stands to the left of the consonant
1ABE	◌	LANNA VOWEL MAI KOO
	•	stands to the left of the consonant
1ABF	◌	LANNA VOWEL MAI KAW

Tone Marks

1AC0	◌	LANNA TONE MAI EK
1AC1	◌	LANNA TONE MAI THO
1AC2	◌	LANNA KHUN TONE THREE
	•	only in Khün
1AC3	◌	LANNA KHUN TONE FOUR
	•	only in Khün
1AC4	◌	LANNA KHUN TONE FIVE
	•	only in Khün

Various Signs

1AC5	◌	LANNA MARK LAHAAM
	•	cancellation mark
1AC6	◌	LANNA MARK MAI SAM
	•	repetition

Final Consonant Signs

1AC7	◌	LANNA MARK MAI KANG
1AC8	◌	LANNA MARK MAI KANG LAI
1AC9	◌	LANNA LETTER FINAL N
	•	only in Tai Lue
1ACA	◌	LANNA LETTER FINAL NGA
	•	only in Tai Lue

Digits

1AD0	◌	LANNA DIGIT ZERO
1AD1	◌	LANNA DIGIT ONE

1AD2 𑌒 LANNA DIGIT TWO
 1AD3 𑌓 LANNA DIGIT THREE
 1AD4 𑌔 LANNA DIGIT FOUR
 1AD5 𑌕 LANNA DIGIT FIVE
 1AD6 𑌖 LANNA DIGIT SIX
 1AD7 𑌗 LANNA DIGIT SEVEN
 1AD8 𑌘 LANNA DIGIT EIGHT
 1AD9 𑌙 LANNA DIGIT NINE

Independent Vowels

1ADA 𑌚 LANNA VOWEL LETTER U
 1ADB 𑌛 LANNA VOWEL LETTER UU
 1ADC 𑌜 LANNA VOWEL LETTER EE
 1ADD 𑌝 LANNA VOWEL LETTER I
 1ADE 𑌞 LANNA VOWEL LETTER II

Special Signs

1ADF 𑌟 LANNA SIGN SYLLABLE JOINER
 • not rendered, no shape

1AB0;LANNA VOWEL MAI KA;Lo;0;L; ; ; ;N; ; ; ;
 1AB1;LANNA VOWEL MAI KANG;Mn;0;L; ; ; ;N; ; ; ;
 1AB2;LANNA VOWEL MAI KER;Mn;0;L; ; ; ;N; ; ; ;
 1AB3;LANNA VOWEL MAI SAT;Mn;0;L; ; ; ;N; ; ; ;
 1AB4;LANNA VOWEL MAI KAA;Lo;0;L; ; ; ;N; ; ; ;
 1AB5;LANNA VOWEL MAI KI;Mn;0;L; ; ; ;N; ; ; ;
 1AB6;LANNA VOWEL MAI KII;Mn;0;L; ; ; ;N; ; ; ;
 1AB7;LANNA VOWEL MAI KUE;Mn;0;L; ; ; ;N; ; ; ;
 1AB8;LANNA VOWEL MAI KUUE;Mn;0;L; ; ; ;N; ; ; ;
 1AB9;LANNA VOWEL MAI KU;Mn;0;L; ; ; ;N; ; ; ;
 1ABA;LANNA VOWEL MAI KUU;Mn;0;L; ; ; ;N; ; ; ;
 1ABB;LANNA VOWEL MAI KE;Mc;0;L; ; ; ;N; ; ; ;
 1ABC;LANNA VOWEL MAI KEE;Mc;0;L; ; ; ;N; ; ; ;
 1ABD;LANNA VOWEL MAI KO;Mc;0;L; ; ; ;N; ; ; ;
 1ABE;LANNA VOWEL MAI KOO;Mc;0;L; ; ; ;N; ; ; ;
 1ABF;LANNA VOWEL MAI KAW;Mn;0;L; ; ; ;N; ; ; ;
 1AC0;LANNA TONE MAI EK;Mn;0;L; ; ; ;N; ; ; ;
 1AC1;LANNA TONE MAI THO;Mn;0;L; ; ; ;N; ; ; ;
 1AC2;LANNA KHUN TONE THREE;Mn;0;L; ; ; ;N; ; ; ;
 1AC3;LANNA KHUN TONE FOUR;Mn;0;L; ; ; ;N; ; ; ;
 1AC4;LANNA KHUN TONE FIVE;Mn;0;L; ; ; ;N; ; ; ;
 1AC5;LANNA MARK LAHAAM;Mn;0;L; ; ; ;N; ; ; ;
 1AC6;LANNA MARK MAI SAM;Mn;0;L; ; ; ;N; ; ; ;
 1AC7;LANNA MARK MAI KANG;Mn;0;L; ; ; ;N; ; ; ;
 1AC8;LANNA MARK MAI KANG LAI;Mn;0;L; ; ; ;N; ; ; ;
 1AC9;LANNA LETTER FINAL N;Mn;0;L; ; ; ;N; ; ; ;
 1ACA;LANNA LETTER FINAL NGA;Mn;0;L; ; ; ;N; ; ; ;

1AD0;LANNA DIGIT ZERO;Nd;0;L; ; ; ;0;0;0;N; ; ; ;
 1AD1;LANNA DIGIT ONE;Nd;0;L; ; ; ;1;1;1;N; ; ; ;
 1AD2;LANNA DIGIT TWO;Nd;0;L; ; ; ;2;2;2;N; ; ; ;
 1AD3;LANNA DIGIT THREE;Nd;0;L; ; ; ;3;3;3;N; ; ; ;
 1AD4;LANNA DIGIT FOUR;Nd;0;L; ; ; ;4;4;4;N; ; ; ;
 1AD5;LANNA DIGIT FIVE;Nd;0;L; ; ; ;5;5;5;N; ; ; ;
 1AD6;LANNA DIGIT SIX;Nd;0;L; ; ; ;6;6;6;N; ; ; ;
 1AD7;LANNA DIGIT SEVEN;Nd;0;L; ; ; ;7;7;7;N; ; ; ;
 1AD8;LANNA DIGIT EIGHT;Nd;0;L; ; ; ;8;8;8;N; ; ; ;
 1AD9;LANNA DIGIT NINE;Nd;0;L; ; ; ;9;9;9;N; ; ; ;
 1ADA;LANNA VOWEL LETTER U;Lo;0;L; ; ; ;N; ; ; ;
 1ADB;LANNA VOWEL LETTER UU;Lo;0;L; ; ; ;N; ; ; ;
 1ADC;LANNA VOWEL LETTER EE;Lo;0;L; ; ; ;N; ; ; ;
 1ADD;LANNA VOWEL LETTER I;Lo;0;L; ; ; ;N; ; ; ;
 1ADE;LANNA VOWEL LETTER II;Lo;0;L; ; ; ;N; ; ; ;
 1ADF;LANNA SIGN SYLLABLE JOINER;Mn;9;NSM; ; ; ;N; ; ; ;

Character Database

1A80;LANNA SIGN SUBJOINER;Mn;9;NSM; ; ; ;N; ; ; ;
 1A81;LANNA LETTER HIGH KA;Lo;0;L; ; ; ;N; ; ; ;
 1A82;LANNA LETTER HIGH KHA;Lo;0;L; ; ; ;N; ; ; ;
 1A83;LANNA LETTER HIGH KHAA;Lo;0;L; ; ; ;N; ; ; ;
 1A84;LANNA LETTER LOW KA;Lo;0;L; ; ; ;N; ; ; ;
 1A85;LANNA LETTER LOW KHA;Lo;0;L; ; ; ;N; ; ; ;
 1A86;LANNA LETTER LOW KHAA;Lo;0;L; ; ; ;N; ; ; ;
 1A87;LANNA LETTER LOW NGA;Lo;0;L; ; ; ;N; ; ; ;
 1A88;LANNA LETTER HIGH JA;Lo;0;L; ; ; ;N; ; ; ;
 1A89;LANNA LETTER HIGH SA;Lo;0;L; ; ; ;N; ; ; ;
 1A8A;LANNA LETTER LOW JA;Lo;0;L; ; ; ;N; ; ; ;
 1A8B;LANNA LETTER LOW SA;Lo;0;L; ; ; ;N; ; ; ;
 1A8C;LANNA LETTER LOW SAA;Lo;0;L; ; ; ;N; ; ; ;
 1A8D;LANNA LETTER HIGH NYA;Lo;0;L; ; ; ;N; ; ; ;
 1A8E;LANNA LETTER LATHA;Lo;0;L; ; ; ;N; ; ; ;
 1A8F;LANNA LETTER HIGH LATHA;Lo;0;L; ; ; ;N; ; ; ;
 1A90;LANNA LETTER DA;Lo;0;L; ; ; ;N; ; ; ;
 1A91;LANNA LETTER LOW LATHA;Lo;0;L; ; ; ;N; ; ; ;
 1A92;LANNA LETTER LANA;Lo;0;L; ; ; ;N; ; ; ;
 1A93;LANNA LETTER HIGH TA;Lo;0;L; ; ; ;N; ; ; ;
 1A94;LANNA LETTER HIGH THA;Lo;0;L; ; ; ;N; ; ; ;
 1A95;LANNA LETTER LOW TA;Lo;0;L; ; ; ;N; ; ; ;
 1A96;LANNA LETTER LOW THA;Lo;0;L; ; ; ;N; ; ; ;
 1A97;LANNA LETTER NA;Lo;0;L; ; ; ;N; ; ; ;
 1A98;LANNA LETTER BA;Lo;0;L; ; ; ;N; ; ; ;
 1A99;LANNA LETTER HIGH PA;Lo;0;L; ; ; ;N; ; ; ;
 1A9A;LANNA LETTER HIGH PHA;Lo;0;L; ; ; ;N; ; ; ;
 1A9B;LANNA LETTER HIGH FA;Lo;0;L; ; ; ;N; ; ; ;
 1A9C;LANNA LETTER LOW PA;Lo;0;L; ; ; ;N; ; ; ;
 1A9D;LANNA LETTER LOW FA;Lo;0;L; ; ; ;N; ; ; ;
 1A9E;LANNA LETTER LOW PHA;Lo;0;L; ; ; ;N; ; ; ;
 1A9F;LANNA LETTER MA;Lo;0;L; ; ; ;N; ; ; ;
 1AA0;LANNA LETTER LOW NYA;Lo;0;L; ; ; ;N; ; ; ;
 1AA1;LANNA LETTER YA;Lo;0;L; ; ; ;N; ; ; ;
 1AA2;LANNA LETTER RA;Lo;0;L; ; ; ;N; ; ; ;
 1AA3;LANNA LETTER LA;Lo;0;L; ; ; ;N; ; ; ;
 1AA4;LANNA LETTER WA;Lo;0;L; ; ; ;N; ; ; ;
 1AA5;LANNA LETTER HIGH SAA;Lo;0;L; ; ; ;N; ; ; ;
 1AA6;LANNA LETTER HIGH SAA2;Lo;0;L; ; ; ;N; ; ; ;
 1AA7;LANNA LETTER HIGH SAA3;Lo;0;L; ; ; ;N; ; ; ;
 1AA8;LANNA LETTER HIGH HA;Lo;0;L; ; ; ;N; ; ; ;
 1AA9;LANNA LETTER LAA;Lo;0;L; ; ; ;N; ; ; ;
 1AAA;LANNA LETTER QA;Lo;0;L; ; ; ;N; ; ; ;
 1AAB;LANNA LETTER LOW HA;Lo;0;L; ; ; ;N; ; ; ;
 1AAC;LANNA LETTER LU;Lo;0;L; ; ; ;N; ; ; ;
 1AAD;LANNA LETTER LUU;Lo;0;L; ; ; ;N; ; ; ;
 1AAE;LANNA LETTER LE;Lo;0;L; ; ; ;N; ; ; ;