Background. In December 2002 the United Nations Development Programme Country Office for Afghanistan commissioned a report on the language support required for Pashto and Dari, Afghanistan’s official languages. In addition, the Project Team (Michael Everson of Everson Typography, Dublin, and Roozbeh Pournader of the FarsiWeb Project, Tehran) was successful in collecting similar information for a number of other languages of Afghanistan, namely, Southern Uzbek and Brahui. (The survey sought information on other languages, such as Hazaragi, Aimaq, Southwest Pashai, Western Balochi, and Turkmen, but conclusive responses were not available.)

Need for support. The reason this report has been commissioned is that none of the major computer software providers currently supports any of these languages – adequately or at all – and this causes serious constraints and problems for all aspects of information technology for the entire country. Language support involves inputting, display and printing, processing, and provision of a user’s locale format information.

Fonts: alphabets and glyph shapes. This document presents information on the letters required to support the languages of Afghanistan, and the minimum shaping behaviour required for correct rendering. We urge software manufacturers in the strongest possible terms to update their Arabic and Persian fonts to include the letters and combinations which are missing. A summary of these forms is found at the end of the document.

Input: keyboard layouts. This document also proposes keyboard layouts suitable for inputting the languages of Afghanistan. Responses to our questionnaire did not address keyboard layout issues; however, we did receive word-of-mouth comments during the interviews we held at the University of Kabul, the Afghanistan Academy of Sciences, and the Afghanistan Assistance Coordination Authority. Most people were using old Iranian-made mechanical typewriters based on the Iranian standard ISIRI 820:1973 (Character arrangement on keyboards of Persian typewriters), and because they were used to them, they said that they preferred these to anything else. Because, however, that layout is glyph-based and makes use of two to four keys to form each letter, it does not suit modern computer-based entry mechanisms which use one key per letter. Accordingly, we determined that it was necessary to develop practical keyboard layouts for Afghanistan. The ISIRI 2901:1994 (Keyboard layout for Farsi: Characters in Computer) layout, which we used in the Farsi sample in the questionnaires, resembles the general layout of ISIRI 820 quite closely, and is modernized for current usage. Therefore, we used the general layout of ISIRI 2901 to develop the Dari layout, and then modified that to derive the Pashto and Uzbek layouts to minimize the learning curve for users as much as possible. Each of the keyboard layouts enables the user to input characters used in each of the languages supported by this report. The basic letters of the language for which the keyboard layout is designed are always on the plain and shifted keys. In some software environments the AltGr keys may not be supported.
**Computer Locale Requirements for Afghanistan**

**Locales: ICU data.** Additional data we collected has been formatted in locale specifications via the ICU (International Components for Unicode) website hosted at “http://oss.software.ibm.com/icu/”. In this way, the Afghan preferred formats for language, date format (including month and day names and calendar), time format, number format, and currency format will be available to vendors who can provide software which will be of use to the people of Afghanistan, at governmental, business, academic, and local level. Whenever ICU locale data format is adequate for describing a part of the locale information, the data in the ICU registry should be consulted for normative and accurate data. The specifications shown in this report are only informative examples in comparison with the ICU data files we have provided. However, in areas such as the Afghan calendar, which ICU locales cannot specify, the text in this report should be considered normative. (Note that the ICU files we have prepared are not standalone. They must be used in combination with other locale data, most importantly the “fa.txt” and “root.txt” files from ICU itself.)

**Ordering.** Sorting order specification is also provided with the ICU locales. This deserves some additional discussion here. In our analysis of the Pashto, Dari, and Uzbek alphabets provided to us, together with our analysis of authoritative Pashto-English and Pashto-Pashto dictionaries, as well as comparison of a Dari-English dictionary with a number of bilingual and monolingual Persian dictionaries, we discovered that, with the exception of the treatment of hamza, the alphabets were all mutually compatible with respect to ordering. Because the ordering of “singular” hamza (ـ) is of little consequence – it is rare and typically comes toward the end of a word – we determined that placing it between alef and beh would have two advantages: first, it would allow all of the languages of Afghanistan to avail of a single unified sort order, and second, it would enable the closely-related Persian languages, Dari and Farsi, to be sorted in the same way. It should be mentioned, however, that the order shown in this report is only the general ordering for letters, and does not show the ordering of less significant elements like the ordering of vowel marks or the handling of punctuation or Unicode control characters. The complete and exact ordering is the one specified in the ICU locale data files.

We commend this report to the software vendors of the world, and trust that its specifications will be implemented as a matter of urgency, so that the people Afghanistan can avail of the essential tools which many of us take for granted.

Michael Everson  
Everson Typography, Dublin  
www.evertype.com  

Roozbeh Pournader  
FarsiWeb Project, Tehran  
www.farsiweb.info

The latest version of this report, updates, and other resources (such as keyboard layout specifications in data files conformant to ISO/IEC 9995, Information Technology – Keyboard layouts for text and office systems, and ICU data files based on this report) are available at “http://www.evertype.com/standards/af/”.

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*Latest update: 2003-05-08*
The table below lists the letters used to write Pashto, including loanwords from Arabic. Our survey indicated a number of different sorting orders for Pashto. All respondents said that the alphabetic order was (reading from left to right) Ꝑ > ꝑ > ꝓ > ꝕ > ꝕ > Ꝕ. This is the order agreed on at a 1991 meeting of Pashto experts in Peshawar. It should be noted that the most authoritative dictionary, the *Paštó-Paštó Descriptive Dictionary*, 4 volumes (Department of Linguistics, Institute of Languages and Literature, Academy of Sciences of Afghanistan, 1979–1987) uses the order Ꝑ > ꝑ > ꝕ > ꝕ > ꝕ > Ꝕ, as does Rahimi and Rohi’s *Pashto-English Dictionary* (1979). Materials for schoolchildren collected in Kabul, on the other hand, gave this same sequence as Ꝑ > ꝑ > ꝕ > ꝕ > ꝕ > Ꝕ. Nevertheless, we suggest that the order agreed at the 1991 Peshawar meeting is the best to follow.

In the list below, the Unicode letters which sort as separate letters at the first level are given flush to the left margin, and letters which sort at the second level are indented. We have also given the Urdu letters which are used in older Pashto orthographies to show how Pashto data in that orthography will sort.

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**Note.** Since the shapes of the نـ initial and ـن medial forms of the Pashto letters ی (U+06CC) and ې (U+064A) are exactly the same, to avoid encoding ambiguities in Pashto data – and its known implications in security-related issues including possible Pashto domain names – we recommend that the Unicode character for ې, namely U+064A, never be used in initial and medial forms in Pashto data. Where input data is explicitly known to be in Pashto, applications should automatically replace such usage in the input data (for example, in keyboard input) with the normal ې character, namely U+06CC. Applications may not automatically change U+064A to U+06CC in Pashto input if it is used in final or isolated forms.
The table below lists the letters used to write Dari, including loanwords from Arabic. In the list below, the Unicode letters which sort as separate letters at the first level are given flush to the left margin, and letters which sort at the second level are indented. We have also given the Urdu letters which are used in older Pashto orthographies to show how Pashto data in that orthography will sort.

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The table below lists the letters used to write Southern Uzbek, including loanwords from Arabic. This is a new official orthography the development of which was inspired by the UNDP project. In the list below, the Unicode letters which sort as separate letters at the first level are given flush to the left margin, and letters which sort at the second level are indented. We have also given the Urdu letters which are used in older Pashto orthographies to show how Pashto data in that orthography will sort.

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**Note.** To avoid encoding ambiguities in Uzbek data, and its known implications in security-related issues including possible Uzbek Internet domain names, we recommend that the Uzbek letter у always be encoded as ُ ین U+06C7 and never as a sequence of ۆ ۆ and ە ە. Where input data is explicitly known to be in Uzbek, applications should automatically replace a ۆ followed by a ە in the input data (for example, in keyboard input) with the U+06C7 character.
The Brahui Alphabet

The table below lists the letters used to write Brahui, including loanwords from Arabic. Brahui is not widely written either in Pakistan, where most Brahui speakers live, or in Afghanistan. An expert respondent informed us that in Pakistan, Brahui speakers use Urdu orthography with the addition of one letter, لاء lhâm. If Brahui is written in Afghanistan, it may prefer the Pashto letters such as ته te to the corresponding Urdu ته te. We have no evidence of this, but have given the Brahui alphabet here in order to ensure the support of its own unique letter.

In the list below, the Unicode letters which sort as separate letters at the first level are given flush to the left margin, and letters which sort at the second level are indented. We have also given the Urdu letters which are used in older Pashto orthographies to show how Pashto data in that orthography will sort.

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Almost all of the languages used in Afghanistan require the use of diacritical marks which follow a base letter, to make pronunciation or grammar usage clear. These marks are known by different names in the different languages of Afghanistan, but are listed here with their Unicode character names. Font and application developers should ensure that they support these marks in their products. The zvaracakay at the bottom of the list is used in some Pashto educational materials, and as a result of this survey is now being proposed for addition to the Unicode Standard. Until such time as it has been formally encoded, we recommend the Private Use Area code position U+E659 for the zvaracakay.

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<td>fatha</td>
<td>0654</td>
<td>hamza above</td>
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<td>damma</td>
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<td>kasra</td>
<td>(E659)</td>
<td>zvaracakay</td>
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One additional character appears to be in wide use by local banks and accountants in Afghanistan, namely the afghani sign, ې. This character is also being proposed for addition to the Unicode Standard. Until such time as it has been formally encoded, we recommend the Private Use Area code position U+E0B4 for the afghani sign. It should be noted that glyph variants for this character exist, for example ۍ and ې, but in our discussions several experts indicated that the first one shown above is the most original and may therefore be more appropriate. Research on the best glyph shape is still ongoing. As of this writing, neither the Ministry of Finance nor Da Afghanistan Bank had formally adopted this symbol for use, although it is in use in both the public and private sectors.

It should also be mentioned that certain punctuation marks and control characters are used in Afghan computing. We have listed all of these characters on the collectively-equivalent keyboard layouts. Font developers are expected to include all of these additional characters in fonts which are intended to support Afghan languages.
Guide to the key assignments, reading top-down and left-right

Unshifted:
- ZWI, one, two, three, four, five, six, seven, eight, nine, zero, hyphen, equals
- zwá, swá, se, qáf, fe, ğáyn, 'ayn, he, xe, he, jím, če
- ší, ší, ye, be, lám, alíf, te, nun, mim, káf, gáf, backslash
- zwe, twe, ze, re, zál, dál, re, váv, ze, slash

Shifted:
- hamza-above, exclamation, thousands, decimals, afghàn, percent, multiplication, guillemet, guillemet, parenthesis, parenthesis, kashida, plus
- sukun, dammata, kasrata, fathata, dama, kasra, fatha, shadda, je, ce, square-bracket, square-bracket
- šín, šájína-ye, šáxta-ye, pe, alif-hamza, ā, ī, ùn, ġarďa-ye, colon, semicolon, asterisk
- pasta-ye, fe'li-ye, že, hamza, zwíñí, dál, wáw-hamza, comma, full-stop, question

Alt-Gr:
- grave, tilde, at, number, dollar, percent, circumflex, ampersand, 5-star, bullet, degree, underscore, division
euro, alif-waslà, alif-maksura, LRM, RLM, maddah, zwarakay, alif-above, apostrophe, quote, curly-bracket, curly-bracket
- —, —, urdu-ye, nun-ghunna, brahuí-thám, alif-hamza-below, urdu-te, less-than, greater-than, arabic-káf, persian-gáf, vertical-bar
- question, semicolon, —, —, urdu-ţił, urdu-re, comma, uzbek-u, uzbek-o
# Computer Locale Requirements for Afghanistan

## Keyboard layouts for Afghanistan

Key assignments for Pashto, using ISO/IEC 9995 notation:

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Dari keyboard layout for Afghanistan
by Michael Everson & Roozbeh Pournader

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</table>

Guide to the key assignments, reading top-down and left-right

**Unshifted:**

- `ZWJ`: one, two, three, four, five, six, seven, eight, nine, zero, hyphen, equals
- `ād, sād, se, qāf, fā, qāyn, ayn, he, xe, he, jim, če`
- `šīn, sin, ye, be, lām, alef, te, nūn, mīm, kāf, gāf, backslash`
- `zā, tā, ze, re, ūz, dāl, pe, vāv, full-stop, slash`

**Shifted:**

- division, exclamation, thousands, decimals, afghani, percent, multiplication, comma, asterisk, parenthesis, parenthesis, kashida, plus
- sukun, dammatan, kasratan, fathatan, damma, kasra, fatha, shadda, square-bracket, square-bracket, curly-bracket, curly-bracket
- `vāv-hamza, ye-hamza, sawt-ye, alif-hamza-below, alif-hamza, šī, tī, mīm`
- `ūn, mīm`
- `īm, kāf, gāf`
- `āf, gāf, backslash`

**Alt-Gr:**

- grave, tilde, at, number, dollar, percent, circumflex, ampersand, 5-star, bullet, degree, underscore, —
- euro, alef-wasla, alef-e-maqsura, `lrm`, `rml`, maddah, zvarakay, —, apostrophe, quote, pashto-je, pashto-ce
- `pashto-sin, šajina-ye, pasta-ye, —, brahui-lhām, —, pashto-še, pashto-šēn,nūn-gluenna, semicolon, pashto-gāf, question`
- `urdu-ye, urdu-še, pashto-še, urdu-dāl, pashto-dāl, urdu-še, comma, uzbek-u, uzbek-o`
### Keyboard layouts for Afghanistan

Key assignments for Dari, using ISO/IEC 9995 notation:

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Guide to the key assignments, reading top-down and left-right

Unshifted:
ZWJ, one, two, three, four, five, six, seven, eight, nine, zero, hyphen, equals
zjad, sad, seh, qaf, feh, ghain, 'ain, heh, kheh, heh, jeem, cheh
shin, sin, yih, beh, lam, alef, teh, nuun, meem, kaf, gaf, backslash
zuy, tay, zeh, reh, zal, dal, peh, waw, full-stop, slash

Shifted:
division, exclamation, thousands, decimals, afghani, percent, multiplication, comma, asterisk, parenthesis, parenthesis, kashida, plus
sukun, dammatan, kasratan, fathatan, damma, kasra, fatha, shadda, square-bracket, square-bracket, curly-bracket, curly-bracket
waw-hamza, yih-hamza, yeeh, yeh, alef-hamza, alef-madha, teh marbuta, guillemet, guillemet, colon, semicolon, vertical-bar
o', u, zheh, alef-hamza-below, ZWNJ, hamza-above, hamza, less-than, greater-than, question

Alt-Gr:
grave, tilde, at, number, dollar, percent, circumflex, ampersand, 5-star, bullet, degree, underscore, —
euro, alef-wasla, alef-maksura, leem, rilm, maddah, zwarakay, —, apostrophe, quote, pashto-jeheh, pashto-jeheh
pashto-šin, şajina-ših, arabic-kaf, —, brahui-lham, —, pashto-jeheh, pashto-нуun, nuun-ghunna, semicolon, pashto-gaf, question
urdu-yih, urdu-řeh, pashto-ţeh, pashto-řeh, urdu-dal, pashto-dal, urdu-ţeh, comma, —,
### Computer Locale Requirements for Afghanistan

#### Keyboard layouts for Afghanistan

Key assignments for Southern Uzbek, using ISO/IEC 9995 notation:

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The official calendar of Afghanistan is the solar Islamic calendar (also known as the Persian calendar or the hejri-e šamsī calendar). This calendar counts up from the year of the Hegira of Muhammad. The Gregorian calendar is used in international activities or occasions, and the Lunar Islamic calendar (also known as hejri-e qamarî) is used for religious ceremonies and some of the holidays.

The Persian calendar of Afghanistan, although very similar to the Persian calendar of Iran, differs in the algorithm it uses to calculate leap years, which may lead to a one-day difference for some years. There are plans to synchronize these calendars, but the present report only describes the current calendar of Afghanistan. The Persian calendar has 12 months, consisting of 29 to 31 days. The names of the months in Dari and Pashto, together with the number of the days in each month, is given below. Other languages of Afghanistan usually use the Dari names of the months.

<table>
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<tr>
<th>Dari</th>
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<th>Days</th>
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<td>ثور</td>
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<tr>
<td>جوزا</td>
<td>Gbargolay</td>
<td>31</td>
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<td>سرطان</td>
<td>Čungăš</td>
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<td>Marğumay</td>
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<td>دلو</td>
<td>Salwāğa</td>
<td>30</td>
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<tr>
<td>حوت</td>
<td>Kab</td>
<td>29 (30 in leap years)</td>
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</table>

Iranian leap years are computed astronomically, but the Afghan leap years have an arithmetic formula. The formula is for synchronizing with the Gregorian calendar, and is rather simple in that regard: the Persian year $x$ is a leap year if and only if the Gregorian year $x + 621$ is a leap year. For example, the Persian year 1383 will be a leap year in the Afghan Persian calendar, since the Gregorian year 2004 will be a leap year. For the sake of conversion between Gregorian dates and Persian years, one can use the following date for a reference point: 1 Hamal 1382 = 21 March 2003.

The Lunar Islamic calendar used in Afghanistan is a civil Lunar Islamic calendar, based on pre-computation of the months. The number of the days of the months are 29 and 30 days alternatively. Leap years occur every two or three years, and make the month Dhu l-Qa‘da a day longer. The exact algorithm used for leap years is reported to be complicated and was not made available to us. It is worth mentioning that because of the importance of Islamic months Ramadan and Shawwal in Muslim fasting and other ceremonies, the starting day of these two months is as observed by religious or governmental authorities rather than pre-computed. There have been (and will be) frequent cases of one day difference between the pre-computed calendar and the observed one. This difference is usually adjusted at the end of Shawwl, and the pre-computed calendar is used from the next month.
Acknowledgements

This report could not have been produced without the kind and expert assistance of a great many people. Our heartfelt thanks are especially given to Habibullah Rafi and to Said Marjan Zazai, who shared their expertise with great kindness and patience. We apologize to any person whose name we have inadvertently omitted here.

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Hassan Hashemi, Ministry of Finance, Kabul
Horia Samira Hamidi, UNDP Afghanistan, Kabul
Fazl Ahmad Hedayat, Head Office of Geodesy and Cartography, Kabul
Sarmad Hussain, Foundation for Advancement of Science and Technology, Lahore
Shirzad Kamawal, shirzad.de, Berlin
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Ghutay Khawre, Afghanistan Academy of Sciences, Kabul
Alireza Kheirkhahan, FarsiWeb Project, Tehran
Mohammad Alem Kuhkan, Radio Liberty, Kabul
Sayed Mohammad Alem Labib, Institute of Uzbek and Turkmen Languages and Literature, Kabul
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Muhammad Aimal Marjan, Ministry of Communications, Kabul
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Erkan Murat, UNDP Afghanistan, Kabul
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Ah. Farhad Popal, Ministry of Finance, Kabul
Habibullah Rafi, Kelid Magazine, Kabul
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Ghulam Rasoul Yosoufzai, Ministry of Information and Culture, Kabul
Mahmood Zahir, UNDP Afghanistan, Kabul
Abdul Zahir Gulistani, Ministry of Education, Kabul
Said Marjan Zazai, Afghanistan Assistance Coordination Authority, Kabul

We are also grateful to the staff of the following organizations:

Afghanistan Academy of Sciences, Kabul
Afghan National Bank, Kabul
Centre for Dari Language and Literature, University of Kabul
Da Afghanistan Bank, Kabul
Department of Literature and Linguistics, University of Kabul
Department of Turkmen and Uzbek Language and Literature, School of Literature and Human Sciences, Balkh University
Institute of Uzbek and Turkmen Languages & Literature, Afghanistan Academy of Sciences, Kabul
Ministry of Communication, Kabul
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