Chapter 1:
War of the Keyboards

Learning from mistakes is a good thing,
Teaching mistakes is fooling around.

QWERTY, The Sequel

After two decades of neglect for the Armenian language support in the Windows operating systems series, Microsoft finally included the minimal support in their January 2007 release of their new Windows Vista operating systems. It is ironic how Microsoft has again introduced the inevitable sequel of an old scandal whereby a standard is created for the purpose to de-standardize the obvious. Let me make myself clear. In Windows Vista, not only do we have a keyboard for the Armenian language, but thanks to the generosity of Microsoft Corp., we now have two keyboards, namely, Western Armenian and Eastern Armenian keyboards. Did you get the point? Western Armenian keyboard to be used for the Western dialect, while the Eastern Armenian keyboard for the Eastern dialect. It may make sense, if it were not the fact that both dialects use precisely the same character sets. So why is Microsoft trying to confuse us by artificially creating a wedge between the Armenian users? I can only doubt an answer in the realms of two extremes, that of ignorance and that of carelessness wherever the commercial strategy radar does not blink.

The real scandal however, is not so much of the confusion of the concept of dialects of a natural language with their common character set encoding mechanization, but rather the fact that both of these Microsoft keyboard drivers assume that QWERTY ergonomics fits the Armenian language typing like a glove. As if QWERTY was so successful for the English language that someone in Microsoft assumed that it will share the same fortune for the Armenian language. In fact, as we will find out shortly, given that QWERTY was designed to be highly inefficient for the English language, based on pure probability factors it cannot hold this same high record in the case of the Armenian, or for that matter any non-English language. Meaning, the inefficiency must be less, thereby concluding that, indeed QWERTY will be more efficient in the case of Armenian compared to the English language. This is quite absurd, are we after the ergonomic efficiency or inefficiency when designing a keyboard?

History of QWERTY

Whereas in the world of musical instruments, the ideal interface design was to maximize the ergonomic efficiency

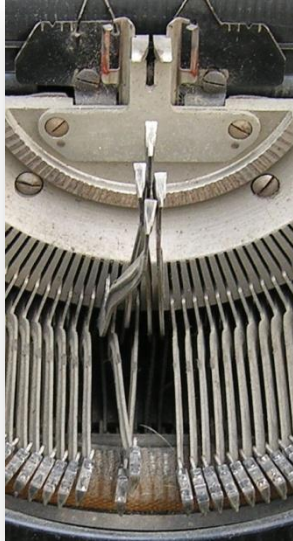

Figure 1 QWERTY keyboard

Figure 2 Type-bar jam

of the instrument, in the computer interface design, especially at its early stages of development, lagged considerably towards ergonomic efficiency of the main input device, namely, the keyboard. The reason for this is indeed a historic paradox, and goes back to the days of the invention of the first mechanical typewriter. The "legend" has it that, in 1860's when mechanical typewriters were being developed and used, a problem soon became eminent. The problem occurred when typists typed text very fast, in which case the neighboring metal arms (or type-bars) of the machine jammed into each other (see Figure 2). In 1870, Christopher Sholes, a newspaper editor and printer in Milwaukee, devised a new keyboard arrangement based on the studies of the educator Amos Densmore on the letter-pair frequency of the English language. The Sholes keyboard solved the type-bar jam problem, and later became a great success in the chronicles of the typewriter world. Alas, the evolution spread over all manufactured typewriters, and the world of typists became so chronical to the QWERTY system, that when the computer age was born, in the English world it had no option but to adopt the anomalies of the QWERTY input system. Only the professional typist had some reasons to object, in which case the Dvorak keyboard and other remedies came into existence (see Figure 3).
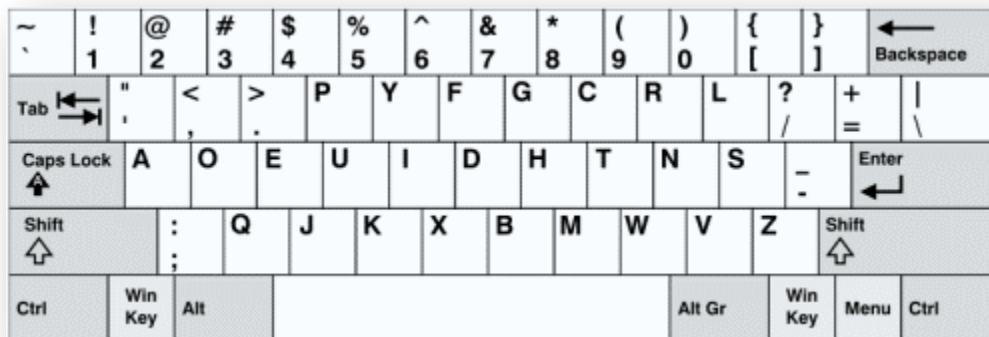

Figure 3 Dvorak keyboard layout used by professional typists

Of course, the question pops in our minds – What has American typewriter chronicles have to do with Armenian language typists? The QWERTY advocates will jump into discussion and will point the problem to the Armenian computer users that never had the chance to paste Armenian character labels on their English or other keyboards, and therefore, there was a need to incorporate a transliterated version of their existing QWERTY keyboards, thereby inflicting the creation of the "ԽՎԵՐՏՅ" or "ԽԻԵՐԹՅ" (i.e. kh-w/v-e-r-t/d-y?). That may be acceptable if it were not the case that the English alphabet has 12 letters missing when compared with the Armenian, and besides, what about the Armenian users that utilize French or Russian keyboards. Finally, there were already well designed Armenian electronic typewriter devices in use all over the world prior to 1985.

In other words, the Armenian typists were already using a keyboard layout that was unique to the Armenian language typing. The older generation may still remember the famous "ՄՈՒԿԸ/ԱՆԻ" (i.e. m-o-u-k-e/a-n-i) keyboard layout, which is so ergonomically efficient for the Armenian language that the user, literally speaking, can use only the right hand for extremely fast typing while continuously holding the Armenian coffee cup with the other seemingly extra hand.

Armenian Typewriter Keyboard Layout

The Armenian Typewriter keyboard layout is the recommended standardized (Armenian Standards reference #: ՀՍՏ 34.001-06) keyboard that all Armenian language users must use, especially, if the user is a beginner in Armenian typing. Note that even if one is professional English typist, utilizing her/his QWERTY typing skill will not help a bit in learning how to smoothly type in Armenian. This is because a trained typist may have more difficulty in compromising her/his typing skill when trying to compensate for the missing 12 Armenian letters. It is much easier to take the initiative to learn an entirely new keyboard layout for Armenian typing. Experience has shown that adapting the QWERTY typist skills and extending it to the additional 12 Armenian characters, does in most cases take more time than learning the Armenian Typewriter keyboard layout from scratch. Also, the change of modality being less clearly defined does create more confusion for multilingual typing when switching between the languages.

The Armenian Typewriter keyboard layout is statistically designed to have the best ergonomics when typing Armenian text. The layout of the keyboard is shown in Figure 4 below:

Figure 4 Armenian Typewriter keyboard layout

A first glance at the layout shows that it has nothing to do with QWERTY system. In fact, using the same name calling methodology, it may be identified as a "ՁՓԲՍՄՈ" keyboard, or what I like to call, a "ՄՈՒԿԸ/ԱՆԻ" keyboard. More detailed investigation reveals some obvious ergonomic basis of the keyboard. For example, "Ո" is next to "Ի", similarly "ԵԱՆ" and "ԿԸ" are contiguous, the low occurrent alphabet such as "Ֆ", "Ձ" and punctuations are further away from the right-hand center, while high occurrent alphabet such as "Մ", "Ն", "Ա", "Ե" and "Ի" are at the center to be accessible by either hand.

The alphabet keys occupy all the three major rows of the keyboard, with the exception of the rightmost key of the first row, which is used for the Armenian double-quote characters "«" and "»". From the topmost row (i.e. digits row) of the keyboard, only the keys for "1" and "2" on the left, and "0", "-" and "=", are used for the remaining Armenian alphabet. The remaining 8 keys of the top row are allocated for the punctuation symbols of the Armenian language. The following table outlines the exact mapping for each of these 8 keys.

Key	"`"	"3"	"4"	"5"	"6"	"7"	"8"	"9"
Shift	´ (երկար)	—	… (բազմակէտ)	_(տողադարձ)	(դրամի նշան)	և (եւ)	՚ (ապաթարց)	(
	` (բութ)	–	, (ստորակէտ)	: (վերջակէտ)	՞ (հարցմանշան)	․ (միջակէտ)	՛ (շեշտ)	)

Armenian Hyphen Key and the En-dash Character

An important character that is often misused is the Unicode Armenian hyphen and the Unicode Latin hyphen and the En-dash characters. Some Armenian authors do not really distinguish between these different characters, and sometimes carelessly use the Latin hyphen instead of the word-divider dash. On the other hand, other users use the en-dash for manual hyphenation instead of the hyphen character. The fallbacks of such usage may not be eminent until when proofing tools are about to be used. In particular, HySpell Armenian Spell checker always adheres to the Armenian encoding standards and will assume multiple word joins via Armenian or Latin hyphen characters as a single Armenian word. For example, the expression "ծառ-ծաղիկ", will be assumed as the single word "ծառծաղիկ" (which is not a legal Armenian word), in the same way the expression "ինն-դրել" is assumed to be "ինդրել" (which is a legal word). To be more accurate, in the first expression instead of hyphen, the user should have used the en-dash character, as follows: "ծառ–ծաղիկ". Proper usage of the en-dash in Armenian text is when specifying dates or numeric ordinals, for example: 2–րդ, 3–րդ, 4–րդ, and 1967–ին. Note that it is extremely important that typist refrain from using hyphen characters where en-dash must be used. To type hyphen character in Armenian Typewriter keyboard, simply press and hold the Alt-Gr and then press the "-" key (note that the Alt-Gr is the right-side Alt key as shown in Figure 4), and for typing the en-dash character in this same keyboard, use the "3" key.

The Alt-Gr Mode

The HySpell.com designed Armenian Typewriter keyboards expose much more characters when the Alt-Gr mode is used (This keyboard among other keyboard drivers is available at HySpell.com for free download). Since the numerals and other important symbols did not fit on the standard PC keyboard, mainly because of the 38 Armenian characters, I have implemented the Alt-Gr mode in the Armenian Typewriter keyboard. In particular, when the Alt-Gr key is pressed and hold, the entire mapping goes into a secondary mode, where the top row behaves just like the US English keyboard yielding access to all numerals and US symbols (i.e. characters 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, `, ~, !, @, #, $, %, ^, &, *, (,), −, _, = and +). In addition, the English punctuation keys will also behave just like the US keyboard, which covers the characters {, }, [,], \, |, ;, :, ', ", <, >, ?, /, *comma* and the *period* characters. Finally, lots of other special characters and symbols are also available via the

remaining other keys on the keyboard, covering useful symbols: ✿, €, ™, ®, №, £, ‰, √, †, ∞, ‡, ▪, Ø, ×, …, ≠, æ, Æ, §, ¥, ©, ¢, ≤, ≥, ¼, ½, ¾, ˋ, ¶ and a few others. These characters are outlined in green over their respective keys of the keyboard layout in Figure 4. The user may get more familiar to their location by typing the various keys while pressing and holding the Alt-Gr key, as well as the Alt-Gr+Shift key combination.

In particular, numerals in the extended Armenian keyboard may be accessed by the numeric pad, or alternately via the top row of the main section of the keyboard via the Alt-Gr mode.

Typists QWERTY-Syndrome

In order not to alienate the unfortunate users that have been typing Armenian via the faulty Microsoft Windows Vista Armenian keyboards for a long time, we have also implemented the extended Alt-Gr mode in the HySpell version of these same keyboards. The keyboard installers are available at HySpell.com website for free download and will install under the names WesternX or EasternX. The Alt-Gr mode layout mapping for the extended characters is essentially the same as in the case of the Armenian Typewriter layout. Microsoft's faulty keyboard layouts however, do not adhere to the Armenian Standards, and therefore are not recommended for professional use.

If you are new to Armenian typing, it is highly recommended that you learn typing using the Armenian Typewriter keyboard layout, instead of the ergonomically inefficient Windows Vista Armenian keyboards. For beginner typists, the keyboard layout image in Figure 4 may be all that is needed in order to learn Armenian typing. There is also a high-resolution of this image in the keyboard installer package. Print this image and place it in front of you when typing until you are confident enough to type without looking at the layout. There are also commercially available keyboard labels that you can purchase and place them on your keyboard, but be aware that cluttering your keyboard with labels will work against you in the future. As a precaution, only place small labels that have different color than the color of the keys on your existing keyboard. Figure 5 shows an ideal labeling for the Armenian Typewriter layout on a standard US Dell keyboard.

Figure 5 Standard US Dell keyboard with Armenian labels (the yellow characters)

Note that in the figure, I only have attached lower cases of the Armenian alphabet because of their miniscule sizes. Also note that the yellow color was chosen for the Armenian characters in order to avoid confusing a visual typist (e.g. like me) when switching between English and Armenian.

Armenian Fonts and Encoding Problems

There are many Armenian nice fonts in existence, and most of these were created by well known type-face designers such as Ruben Tarumian, Edik Ghabuzian and others. Some of these fonts have been circulating over Internet and are available at many sites for free download.

Warning: Some of these free font websites are illegally distributing fonts that have not been authorized by their original typeface authors.

I must emphasize that typeface design is not an easy task. Each of these available fonts is in itself a piece of art. The authors of these fonts spent years of efforts to perfect their design (I myself designed a few Armenian fonts back in 1989). Therefore, if you enjoy their creation when using these illegally distributed fonts, it would be nice to follow and contact their original authors and send them some support.

In this regards, HySpell packages have been authorized by Ruben Tarumian (and his group) to include and distribute his Armenian typeface collections needed for professional document creation. The basic collection includes the beautiful Arian AMU, GrkiNor and a few other typefaces. Note that in addition to these fonts, Windows Vista and Windows 7 already come with a few fonts that contain Armenian, e.g. Sylfaen and Arial Unicode MS.

Regardless on how you acquire your set of Armenian typefaces, you must keep in mind that the existing Armenian fonts on the market can be separated into two major groups by their underlying encoding. Namely, the Unicode encoded Armenian fonts (these are the new standard fonts), and the old ARMSCII-8 encoded Armenian fonts (these are supposedly becoming obsolete, but not so fast). There are a few other encodings, but they do not dominate the current Armenian standards. Since the ARMSCII-8 encoded fonts have more history, their number is much more at this time than the ones that are Unicode. Although, current technology is becoming more and more Unicode based, the vast majority of the ARMSCII-8 fonts have not been converted into Unicode yet. This means of course that the old ARMSCII-8 encoding will remain with us for another 5 to 10 years. It would make a great sense if some support is send to the few, still surviving, handful font designers (some of them are becoming old veterans now), so that they can work on the conversion of all the beautiful old font designs into the new Unicode standards. Translating to more layman's terms, this act will indeed make the face of the entire Internet much more Armenian looking than the current discouraging status quo.

How to determine the font encoding?

So how do you know which fonts are Unicode, and which are ARMSCII-8? Before I answer this simple question, please note that the HySpell.com font packages, that you may have installed, contains a sample document that shows the appearances of each font in that particular package. Moreover, the packages already group the fonts separately by their package names.

Once all fonts are installed from both Unicode and ARMSCII packages, to identify them you may utilize the Character Map windows application to view each font (e.g. type CharMap in windows startup **Start Search** edit-box control and hit the enter key to run this application).

Figure 6 shows this application, in which the *ArTarumianErevan* font is displayed, with the Armenian alphabet "Ա" selected. Notice, U+0531 coding shown at the bottom of the dialog shows that the particular selected font is encoded in Unicode, simply because the Unicode encoding for the Armenian language falls in this code range. In contrast the alphabet "Ա" in the ARMSCII-8 encoded font would have code U+00B2.

Knowing the encoding of the font you want to use in your document is important in order to select the correct keyboard driver to type the text with. This brings us back to the subject of the Armenian keyboards, which I will elaborate in the next few paragraphs.

Using the right font

Now that I have introduced the reader to existing Armenian font groups, an obvious question emerges. Which encoding groups should I use? The answer to this question is simple. In general, try to use only Unicode encoded font group, especially when you want to share the document with others over Internet or network. Although the Unicode encoded Armenian fonts are small in number, but there exists a good variety of them to be able to write nice looking documents in Armenian. In this regards, be informed that Windows Vista comes with a default Armenian font already installed. It is called Sylfaen. In general, you should use the Sylfaen font for Armenian especially when you want the text to be embedded in a web page, or if you are writing emails.

Installing the ARMSCII encoded font package is optional, and should be installed only when you want to incorporate more variety of Armenian fonts that probably do not yet exist in Unicode form. Such would be the case, when someone is a professional writer and wants to write an Armenian book (or eBook). In my case, being a mathematician, my needs for Armenian type-face ranges between 10 to 20 font types only for Armenian text (many more are needed for formulas and Latin text). So, it depends on your needs.

Finally, if you want to write an eBook in PDF form, using Microsoft Office Word 2007 is probably the best tool for the purpose, because you can export the resulting document in PDF form, and what is

more important, is the fact that our HySpell Armenian spell checker currently runs only inside Microsoft Word 2007.

Keyboard must match selected font encoding

If you have installed fonts of both Unicode and ARMSCII-8 encodings, in order to be able to use these fonts, you will need to also install both Unicode and ARMSCII-8 keyboard drivers on your system. Recall that all keyboard drivers are available at HySpell.com site for free download. If you chose to use the recommended Armenian Typewriter layout, then you will need to install the *Extended Armenian TypeWriter Keyboard Drivers* package, which includes both Unicode and ARMSCII-8 keyboards. Note that although these are two different keyboard drivers, they have exactly the same keyboard arrangement (i.e. it's the same keyboard layout).

When you want to type text in Unicode using one of the Armenian Unicode fonts, you need to switch your keyboard driver to Armenian (i.e. the Armenian Typewriter keyboard). This can be done by the left-ALT+SHIFT key combination, or using the language setting icon in the windows task bar and by changing the language from EN to HY via the mouse (see Figure 7 for further details). To switch back to English you may use the same left-ALT+SHIFT key combination to toggle between languages.

Caution: if you have installed a single keyboard under each language, then left-ALT+SHIFT key combination will toggle between languages, as well as, their respective keyboards. Otherwise, you can use the pointer device method to also select the keyboard from the windows task bar language/keyboard icons (on the right side of the task bar). You can also define your own key combination sequence to switch between various keyboards. To do this go to Control Panel, double-click on the Regional and Language Options icon, and in the resulting dialog select the **Keyboards and Languages** tab, and then click on the **Change Keyboards** button. In the Text Services and Input Languages dialog select the **Advance Key Settings** tab, and finally set your preferred sequence combination for each available keyboard driver installed on your system. For example, one can set: left-ALT+SHIFT+**0** for English (US) keyboard, left-ALT+SHIFT+**9** for English (ARM-STD) keyboard (this is the ARMSCII-8 keyboard for Armenian), and left-ALT+SHIFT+**8** for Armenian (Armenian) keyboard (this is the UNICODE keyboard for Armenian).
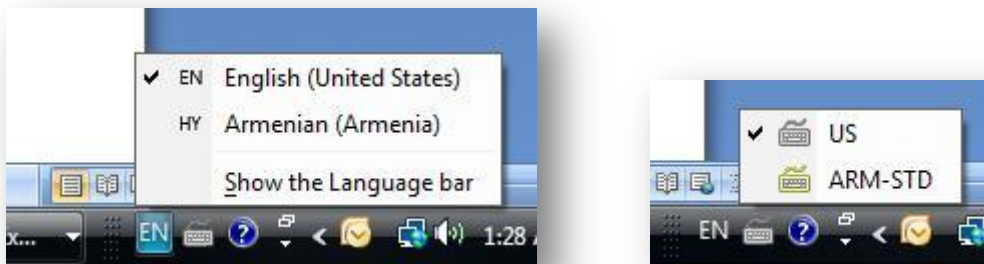

Figure 7 Language and keyboard setting menus in the windows Task Bar

Finally, the basic rule of matching the keyboard for a selected font is to have the encoding of font and keyboard matched. In other words, if you are using a Unicode font, you must select a Unicode

keyboard driver (e.g. Armenian keyboard driver), and if you are using an ARMSCII-8 font, then you must select an ARMSCII-8 keyboard driver (e.g. ARM-STD keyboard driver).