

**Ponomar Project**  
**Slavonic Computing Initiative**

# Proposal to Encode Znamenny Musical Notation in Unicode

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The authors request the addition of a new block, entitled Znamenny Musical Notation, to the Unicode Standard for the consistent computer representation of the characters used to record Znamenny Chant and related forms of liturgical music. A block of 208 codepoints in the Supplemental Multilingual Plane is requested. The remainder of this document describes the writing system, its character repertoire, and the encoding principles.

## 1 Description of Writing System

Znamenny Chant is a form of unison, melismatic, liturgical singing that developed in Kievan Rus sometime in the 11<sup>th</sup> century [1, p. 58]. Until the rise of Western musical influence in the late 17<sup>th</sup> century, Znamenny Chant was the predominant form of liturgical music used in Russia and Ukraine. Following the 17<sup>th</sup> century, it remained in use by Russian Old Ritualists as well as some monasteries and parishes within the mainline Russian Orthodox Church. In recent years, beginning with the work of musicologists and liturgiologists in the late 19<sup>th</sup> century, Znamenny Chant has also become the subject of academic research [2, pp. 8-46].

Traditionally Znamenny Chant is recorded using a neumatic musical notation system (in other words, a musical notation system that does not use a lined staff) called Znamenny Notation, or Stolp (“systematic”) Notation, also known, by the characteristic shape of its symbols, as Kryuki (“hooks”)<sup>2</sup>. While derived from a form of early Byzantine musical notation called Coislin notation [3, ch. 11][4, ch. 3], Znamenny Notation underwent a lengthy period of development over the course of five centuries, and came to form an absolutely unique writing system, graphically and theoretically distinct from the Byzantine Music Notation already encoded in Unicode.

### 1.1 Classification

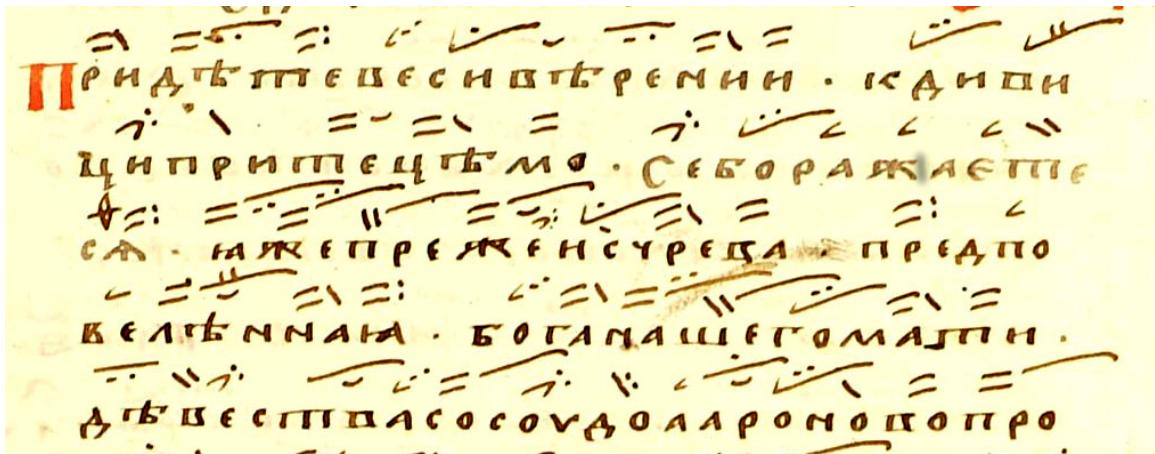
Modern Znamenny Notation can be grouped into three varieties, which, following Gardner [5], we call Types A, B and C. The earliest of these is the Type C Notation, which occurs in musical manuscripts from the 15<sup>th</sup> century onward and lacks any markings indicating pitch. We present an example of this notation in Figure 1. In the first half of the 17<sup>th</sup> century, special marks indicating pitch and dynamics

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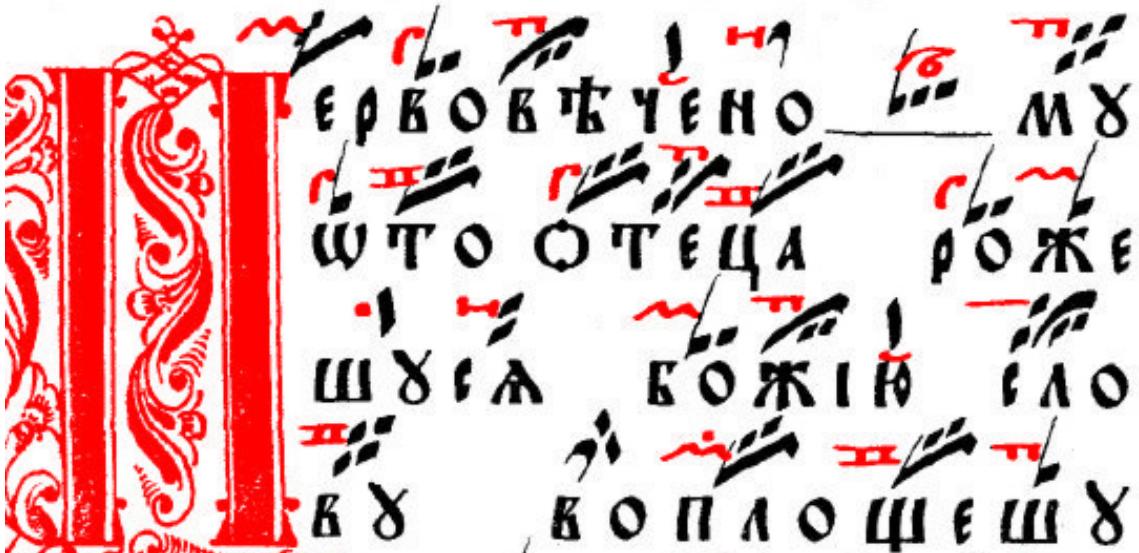
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<sup>2</sup>The term “Znamenny Notation” is a tautology, the word “znamenny” meaning “notational” in Church Slavonic; nonetheless, this term has become widely accepted in the literature.

**Figure 1:** Example of Type C Notation. Source: *Sticherarion*, beginning of the 16<sup>th</sup> century; Russian State Library, coll. 304.I, ms. #411.



**Figure 2:** Example of Type B Notation. Source: *Octoechos*. Moscow, 1913–1914.



were introduced; these markings make use of combining stylized lowercase Cyrillic letters and other symbols, which are added to the base neume. The marks are made in red ink, and are thus called Cinnabar Marks or Shaidur Marks, after a certain Ivan Shaidur, who was credited with creating the system. Manuscripts from 1600 to about 1650 may make use of a variety of such Cinnabar Marks, and several potentially competing systems may have existed at one time. We propose for encoding primarily the system of marks that is explained in the 1670 treatise *Izveshchenie o soglasneyshikh pometakh* by Aleksandr Mezenets and has become standard since then. We also propose for encoding some characters from earlier marking systems, but, since the earlier systems have not been adequately researched, we are presently unable to propose a complete repertoire; in any case, these additional markings are of interest only to a narrow group of specialists [6, pp. 96-141][7]. We call Znamenny Notation bearing any kind of Cinnabar Marks Type B Notation. We present an example of this notation in Figure 2.

In the late 17<sup>th</sup> century, the need arose for typesetting Znamenny Notation on the printing press. Since contemporary type technology did not allow for the simultaneous printing of neumes in black and

**Figure 3:** Example of Type A Notation. Source: *Octoechos*. Moscow, 1913.



red ink, a monochrome system of alternative pitch marks was devised. This system uses small dashes (called priznaki) located in various places on the neume for the indication of pitch. The system was also standardized by Mezenets in the *Izveshchenie* [6, pp. 143-164]. For a variety of reasons, Znamenny chantbooks did not make it to press until the 20<sup>th</sup> century, when the problem of color became a non-issue. The priznaki, nonetheless, became widely accepted, and came to be used in manuscripts alongside the Cinnabar Marks<sup>3</sup>. Notation bearing both the priznaki and the Cinnabar Marks we call Type A Notation. We present an example of this notation in Figure 3.

Aside from the use of a system for indicating pitch, the character repertoire of Type A, B and C Notations is nearly identical. Certain visual differences in the appearance of neumes are insignificant, and best handled at the font level. Thus, all three systems form one unified writing system.

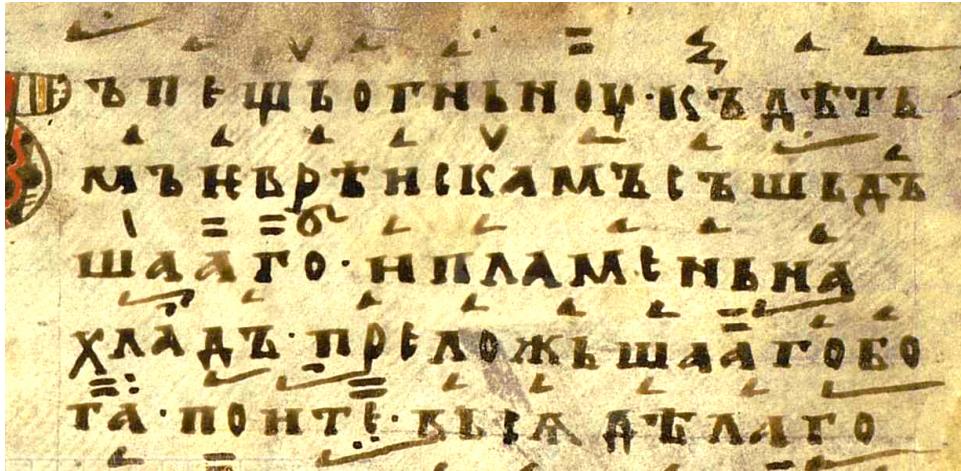
## 1.2 Archaic Znamenny Notation

In addition, we also consider Znamenny Notation of the earliest period, which occurs in manuscripts dating from the 11<sup>th</sup> to the 14<sup>th</sup> centuries. Such sources include additional archaic neumes, which went out of use during the liturgical and musical reforms of the 15<sup>th</sup> century [8, pp. 120-125]. The determination of the full character repertoire of this archaic system is more difficult, given that no systematic catalog of characters has remained from the time period (the earliest Znamenny catalogs that have come down to us date only to the 15<sup>th</sup> century [9]). Thus, to establish the repertoire of characters, we have analyzed some of the musical manuscripts characteristic of the era, both published (see [10], [11], [12], [13], [14]) and unpublished. We present an example of Archaic Znamenny Notation in Figure 4.

An analysis of this character repertoire reveals that archaic characters may be grouped into families together with the characters of modern Znamenny Notation based on their main graphical features [15, esp. p. 30.]. Many of these characters should be treated as identical to their later analogs, and any graphical distinctions should be handled at the font level. A number of additional archaic characters are also encountered; these include especially the “hook-based arrows” (*kryukovye strelы*), which ceased to be used in the notation system in the 15<sup>th</sup> century, as well as a number of additional “arrows” with various bases. We propose for encoding also the main forms of these characters. Since no catalogs of neumes have come down from this period, no names for these characters exist. We use the hypothetical

<sup>3</sup>This is in fact a pleonasm, as the Cinnabar Marks and the Priznaki indicate the same thing and the latter were invented to replace the former.

**Figure 4:** Example of Archaic Znamenny Notation. Source: *Hirmologion*, 12<sup>th</sup> century; Russian State Archive of Ancient Documents, coll. 381, ms. #150.



names that have been proposed by researchers in this field, for example, in the works of Smolensky [10, p. 15]. Sometimes we are forced to introduce new names that serve to graphically describe the character.

In addition to archaic Znamenny Notation, the earliest period of Slavic music is marked by the use of another notational system called Kondakarian Notation [16]. This system uses a character repertoire that is distinct from Znamenny Notation. The authors plan to submit a separate proposal for the encoding of Kondakarian Notation symbols.

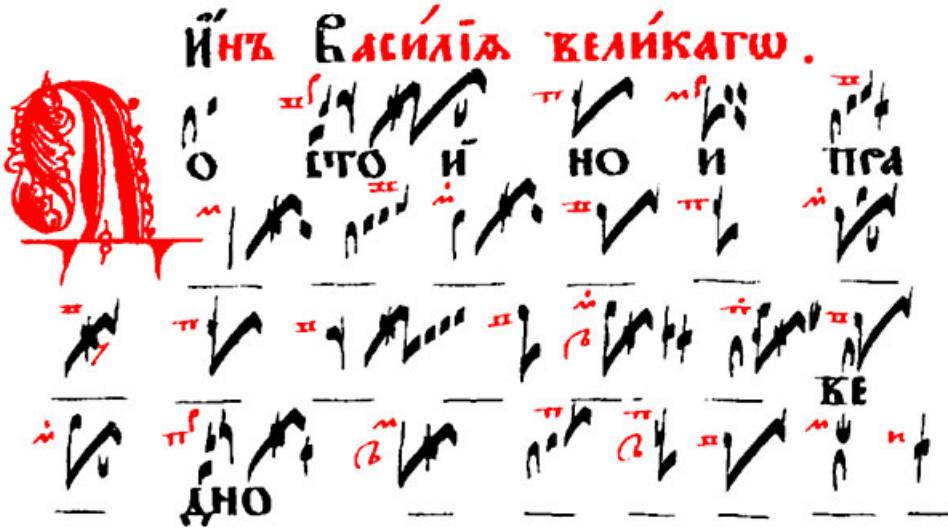
### 1.3 Demestvenny / Put Notation

Starting with the late 15<sup>th</sup> century and through the end of the 17<sup>th</sup> century, a number of forms of melismatic vocal music flourished in Russia side-by-side with Znamenny Chant, but with a more limited repertoire. These forms of chant, which also included forms of polyphony quite distinct from the Western-style harmonized chant that emerged at the end of the 17<sup>th</sup> century, went by a variety of names, including Demestvenny Chant, Put Chant and [Multiple] Lined Polyphony (*strochnoe mnogogolosie*). This style of music largely went out of use at the end of the 17<sup>th</sup> century, though Demestvenny Chant (in only its monophonic form) continued to be cultivated in the 18<sup>th</sup> and 19<sup>th</sup> centuries among the Russian Old Ritualist communities.

This form of music has been recorded with a special form of neumatic musical notation, which scholars have called by a variety of names, including Demestvenny Notation [18, p. 265], Put Notation [5, p. 456] and Kazan Notation [1, p. 184]. It is now generally accepted that all of these terms refer to one notational system derived from Znamenny Notation through the addition of supplementary neumes and a number of other features [17]. This notational system first appeared in manuscripts in the late 16<sup>th</sup> century, went out of use in the mainline Russian Orthodox Church at the end of the 17<sup>th</sup> century, but continues to be used by Old Ritualists today, especially in two chantbooks, the *Demestvennik* and the *Obednitsa* [19, pp. 53-67]. An example from the *Obednitsa* is presented in Figure 5. We present another example of this notation from a 17<sup>th</sup> century manuscript of Put Chant in Figure 6. The typesetting of these materials on the computer is also of interest to musicologists; we present an example of Kazan Notation used in academic writing (due to a lack of an encoding scheme, the neumes were rendered graphically) in Figure 7.

Since Demestvenny / Put Notation shares many neumes with Znamenny Notation, we propose to

**Figure 5:** Example of Demestvenny / Put Notation (printed). Source: *Obednitsa Znamennogo i Demestvennogo rospeva*, Kiev, 1909.



encode it together with Znamenny Notation as one writing system. Where a neume has a different name in catalogs of Put or Demestvenny neumes, we provide the alternative name in an annotation. We also propose for encoding additional neumes used exclusively in Demestvenny / Put Notation. In assembling the repertoire of such neumes, we have followed [20], [21], [19, pp. 378-400], as well as the catalog (*Azbuka*) of Kalashnikov, published by Old Ritualists in 1911 [22]. No comprehensive catalog of neumes used in Put Notation is available in the academic literature; we have based our repertoire of neumes on a number of existing publications ([23], [24], [17], [25]), as well as manuscript sources.

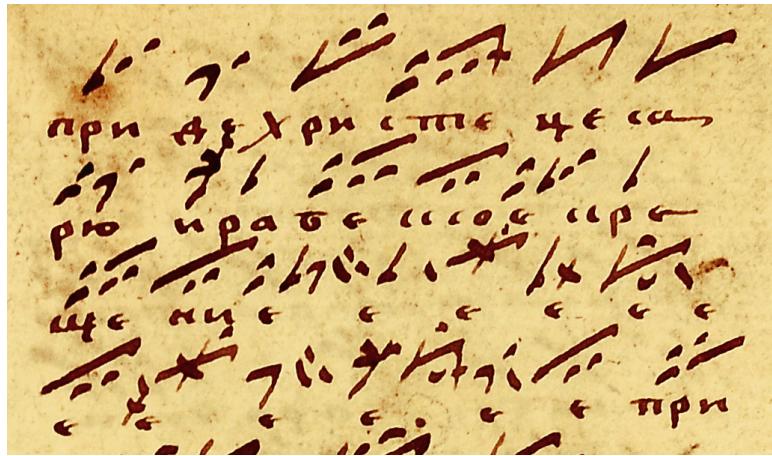
## 1.4 Current Usage

Today, Type A Notation and Demestvenny Notation are used by small minorities in the mainline Russian Orthodox Church as well as by the “priested” Old Ritualists and Yedinovertsy (Old Ritualists in communion with the mainline Russian Orthodox Church). Type B Notation is used by Priestless Old-Ritualists (Bezpopovsty). Type C Notation and Archaic Notation are presently not used, but are of interest to musicologists and liturgiologists studying medieval Znamenny Chant manuscripts. Adding all the usage groups together, we estimate that the number of active users of the notation is several hundred thousand worldwide.

## 1.5 Typesetting the Writing System

The first attempts at printing Znamenny Notation were made in Moscow in 1652, when Fedor Ivanov Popov was ordered to make the technical arrangements for producing Znamenny chantbooks on the printing press [26, p. 194]. The requirement to print neumes in black and red simultaneously proved insurmountable and the project was abandoned. The standardization of priznaki as an alternative method for indicating pitch made printing neumes in monochrome possible. In 1671, a project to print the *Hirmologion* – a common chant book used in the Byzantine Rite – was undertaken in Moscow; the movable type for the project was cast, but, for unknown reasons, the project was never carried out [26, p. 209]. In the 18<sup>th</sup> century, the linear Kievan music notation system (see [27]) replaced Znamenny Notation as the predominant system of notating music in the Russian Orthodox Church, and the corpus of Znamenny

**Figure 6:** Example of Demestvenny / Put Notation (manuscript). Source: Russian State Library coll. 379, ms. 30 (second half of the 17<sup>th</sup> century).



**Figure 7:** Example of Demestvenny / Put Notation in an academic setting. Source: [17]

В «греческой» нотации обе графические формы верхнего признака всегда имеют только одно описанное выше местоположение. В знаменной нотации признак в виде вертикальной черточки размещается обычно с левой или правой стороны начертания и, таким образом, имеет два местоположения: и . Признак в виде толстой черточки также имеет два местоположения: он ставится в середине или сверху вертикальной черты знака: и . Последний случай является единственным примером совпадения местоположения признака в знаменной и «греческой» нотации.

Другое отличие в использовании признаков в рассматриваемых нотациях заключается в том, что все знаки алфавита «греческой» нотации принимают в начертание тот или иной признак, тогда как в знаменном алфавите имеется значительная группа певческих знаков, всегда употребляемых без признаков: сложение (), чашка () голубчик борзый () голубчик тихий () переводка () стрела громная ()

chantbooks was finally printed, but in Kievan notation, in 1772 [2, pp. 135-138]. Znamenny Notation continued to be used in manuscripts produced by Old Ritualists. Only in the early 20<sup>th</sup> century was the corpus of chantbooks in Znamenny Notation printed by Old Ritualist publishers.

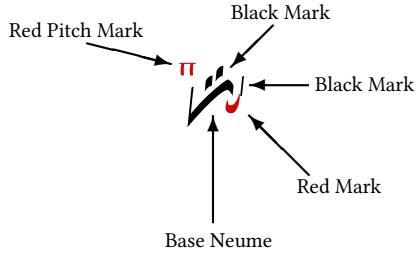
The 20<sup>th</sup> century also witnessed a growth of academic interest in Znamenny Notation among scholars of liturgy, musicologists, and historians, both in the Soviet Union and among Russian émigrés. Several academic works were published (see, for example, [28], [29], [30], [5], [18]), in which, for a lack of adequate fonts to represent the notation system, Znamenny neumes were hand-drawn or processed graphically.

In recent years, there has been a renewed interest in Znamenny Chant. This has resulted in a variety of resources in Znamenny Notation appearing on the Internet<sup>4</sup>. Since no method for representing the notation exists in any national codepage or international encoding standard, the neumes have been typeset in a variety of formats, either graphically or using *ad hoc* solutions. The most popular approach uses a combination of an *ad hoc* 8-bit codepage, a pre-processing software, and markup language<sup>5</sup>. The multiplication of digital resources for the representation, storage, and processing of Znamenny Chant online makes the encoding of Znamenny Notation in Unicode absolutely essential.

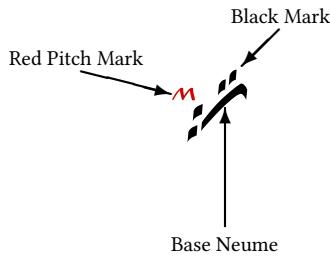
<sup>4</sup>For example: <http://www.znamen.ru/>, <http://dyak-oko.mrezha.ru/>, <http://synaxis.info/>.

<sup>5</sup>See <http://znamen.ru/fmt-znam.htm> (in Russian).

**Figure 8:** A neume and modifying marks (Type B Notation)



**Figure 9:** A complex neume and modifying marks (Type B Notation)



## 2 Proposed Encoding Model

### 2.1 Base Neumes

The basic building block of Znamenny Notation is the *neume*, a single character consisting of one or more strokes. Unlike the notes used in Common Music Notation (CMN), the neume does not represent precise pitch and duration, but rather indicates a melodic formula. Neumes are recorded from left to right with text (lyrics) recorded underneath the neume. Adjacent neumes may be grouped into larger structures called *melodic kernels* (Slav. *popevki*). The exact musical meaning of a neume is straightforward for some simpler neumes; for the more complex neumes, it may depend on the position of the neume inside a melodic kernel, and on various music-theoretical properties inherited from Byzantine music. In this way, the writing system may be viewed as combining alphabetic and ideographic features.

The base Znamenny neume may be modified by a number of combining symbols (characters) that are placed above, below, to the left of, to the right of, or overlaying the base neume, and are used to indicate pitch, duration, dynamics, or other performance techniques. Some of these characters appear in black type and are called *black modifying marks*. In Type A and Type B Notations, additional such characters appear in red type and are called *red modifying marks* or *cinnabar marks*. The basic structure of a neume and its modifying marks is presented in Figure 8.

The neume in Figure 8 is drawn with a single stroke of the pen, but other neumes may consist of multiple strokes or may even include multiple components. We propose to encode as standalone characters all neumes that are listed and named in traditional catalogs (Slav. *Azbuki*) of Znamenny neumes. In Figure 9, we provide an example of a neume that is drawn using three strokes. The base neume should not be decomposed into its strokes (components), since by themselves these components are not valid characters and have no meaning. The base neumes of the notation systems are proposed for encoding between U+1CF50 and U+1CFC4. The remaining unused positions are reserved for a possible future encoding of additional archaic characters.

**Table 1:** The use of Tonal Range Marks

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 <i>Kryuk Mrachny</i> composed as  + 	 <i>Statya Mrachnaya</i> composed as  and 	 <i>Statya Svetlaya</i> composed as  or 	 <i>Strela Mrachnaya</i> composed as  and 
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### 2.1.1 Black Modifying Marks

A number of black modifying marks may attach above, below, or to the right of the main neume. These marks modify the musical meaning of the neume by affecting the duration of notes or adding additional notes to the base meaning of the neume.

In addition, one class of black marks, called *tonal range marks*, is used to indicate pitch. Unlike the red marks discussed below, rather than providing the exact pitch information, these marks only identify a range of possible pitches along the traditional Obikhod Scale (discussed below). We give these marks the names Tonal Range Mark Mrachno ()<sup>1</sup>, Tonal Range Mark Svetlo ()<sup>2</sup>, and Tonal Range Mark Tresvetlo ()<sup>3</sup>; the Tresvetlo Range is usually called Nepostoyanno in Put / Demestvenny notation.

Typically, the Tonal Range Marks act like combining characters that position above the main neume, as can be seen in the left panel of Table 1. However, for some neumes, Tonal Range Marks may stack in different ways to form ligatures (see the central panel of Table 1). For the Skameytsa, the Tonal Range Marks actually form a part of the main neume and are positioned below the diagonal element. Because the Skameytsa can also take additional Tonal Range Marks above the neume, we encode the three varieties of the Skameytsa – the Mrachnaya, the Svetlaya, and the Tresvetlaya – as standalone characters. Note that the same Tonal Range Marks are also used as modifying marks for the Strelly (as can be seen in the right panel of Table 1), though they have a different function, indicating the number of sounds in the Strela, rather than the tonal range.

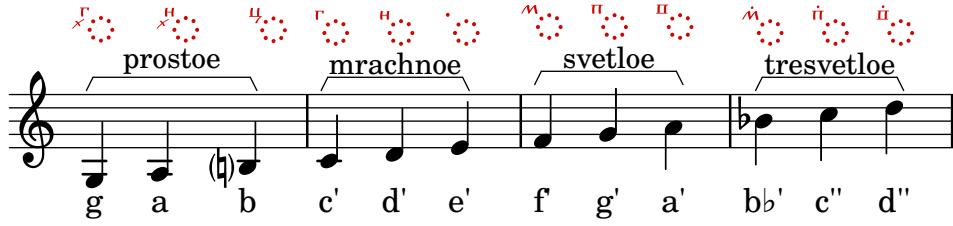
The black marks are proposed for encoding between U+1CF30 and U+1CF40. In order to avoid reordering of the combining marks under the Unicode Normalization Algorithm, we propose to set their Combining Class property to 0. See the section on order of encoding on p. 15 for more details. Note that, despite similar appearance, U+1CF40 Combining Znamenny Mark Kryzh is distinct from U+1CF81 Znamenny Neume Kryzh: U+1CF40 is a diacritical mark, used only in Demestvenny / Put Notation, that either attaches to the base neume (see #63 Kryuk with Kryzh in Appendix 2) or stacks to the right of a base neume (see #187 Stopitsa with Kryzh in Appendix 2); U+1CF81 is a base character that functions as a standalone neume (see #59 in Appendix 1, #60 in Appendix 2), sometimes forming a ligature with the previous neume (see #14 in Appendix 1).

### 2.1.2 Indication of Pitch

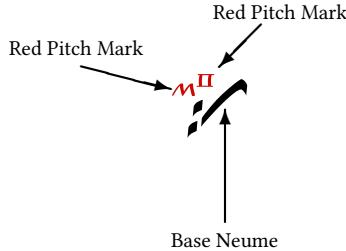
Type B and Type A notations use additional red marks (called Cinnabar Marks or Shaidur Marks) to indicate pitch. The red pitch mark *povyshe* may be observed in Figure 8 and a red pitch mark *malo povyshe* – in Figure 9. The Cinnabar Marks are given the traditional pitch names used in Church Slavonic [7, p. 47]. The red marks are proposed for encoding between U+1CF00 and U+1CF0B. In instances where the neumes are typeset in red (for example, when notating polyphony or notating both Znamenny and Demestvenny Notations), the pitch marks are typeset in black (see Figure 12 for an example).

All of the pitch marks indicate scale degrees along the Obikhod Scale, a gamut that provides the series of possible notes used in Znamenny Chant. The system is diatonic and consists of four tetrachords,

**Figure 10:** The Obikhod Scale and Red Pitch Marks



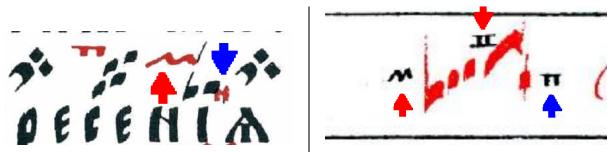
**Figure 11:** Several red modifying marks along one neume (Type B Notation)



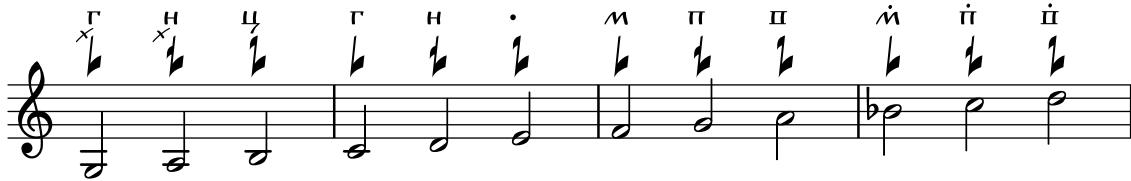
called *soglosiya* (tonal ranges). A fifth tetrachord above the fourth tetrachord is mentioned in the 17<sup>th</sup> century theoretical treatise *Klyuch Razumeniya*, but is not encountered in practice, and so its pitch marks are not proposed for encoding [31]. By modern convention, the pitch *gorazdo nizko* (indicated using the mark  $\text{r}\circ\circ$ ) is tuned to Middle C. The Obikhod Scale and the red pitch marks are demonstrated in Figure 10.

Multiple red pitch marks may be applied to a single neume, in which case the marks interact typographically and are stacked. The stacking behavior may actually be quite complex and may depend on context; for purposes of simplicity, we propose that by default the marks should stack from left to right, diagonally along the base neume, as illustrated in Figure 11. In some instances, instead of stacking with respect to a previous mark, a secondary pitch mark may attach on the right side of a base neume. This behavior is optional in Znamenny Notation, and is generally used as an explanatory aid for the performer (see the left panel of Figure 12, where the primary pitch mark is indicated with a red arrow, and a secondary pitch mark, attaching on the right, is indicated with a blue arrow). In Demestvenny Notation this behavior is required, and is used to indicate the pitch structure of a complex neume (see the right panel of Figure 12, where the two left-attaching pitch marks, marked by red arrows, stack, while another pitch mark, marked by a blue arrow, attaches on the right). In order to support this functionality, a set of right-attaching pitch marks is proposed for encoding at U+1CF0C to U+1CF17. Consult Appendix 2 for more examples of the usage of right-attaching pitch marks.

**Figure 12:** Left-attaching (indicated with red arrows) and right-attaching (indicated with blue arrows) pitch marks, as used in Znamenny Notation (on left, source: [32]) and Demestvenny Notation (on right, source: [22])



**Figure 13:** Example of Priznaki



### 2.1.3 Priznaki in Znamenny and Late Demestvenny Notations

The system of priznaki<sup>6</sup> was standardized by Aleksandr Mezenets to indicate pitch without the use of cinnabar marks [7]. In this system, the priznaki – tiny markers (narrow slashes or dashes) – are added to the base neume to clarify its pitch within a Tonal Range (tetrachord). We demonstrate the usage of priznaki in Figure 13. For neumes pitched at the first scale degree of a Tonal Range (as indicated by a cinnabar mark  $\textcircled{1}$ ,  $\textcircled{2}$ ,  $\textcircled{3}$ , or  $\textcircled{4}$ ), no additional mark is added. For neumes pitched at the second scale degree (as indicated by a cinnabar mark  $\textcircled{5}$ ,  $\textcircled{6}$ ,  $\textcircled{7}$ , or  $\textcircled{8}$ ), a mark is placed on the left or lower part of the neume. For neumes pitched at the third scale degree (as indicated by a cinnabar mark  $\textcircled{9}$ ,  $\textcircled{10}$ ,  $\textcircled{11}$ , or  $\textcircled{12}$ ), a mark is placed on the right or upper part of the neume. For some neumes, the priznaki may attach to the tonal range markers placed above the neume rather than to the base neume itself.

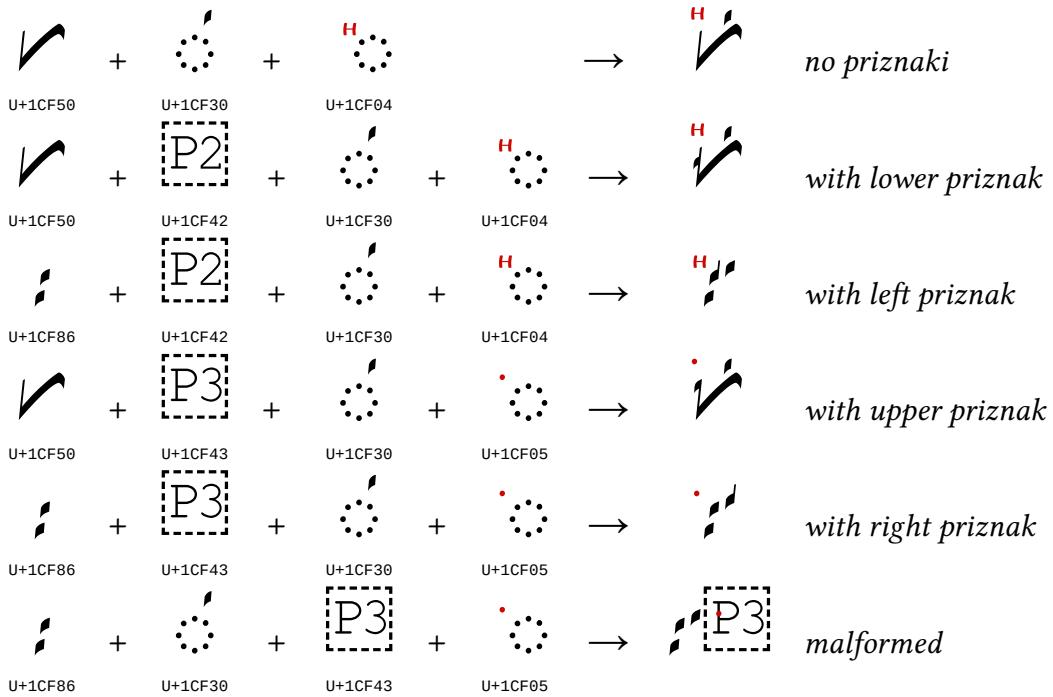
Priznaki are used only in Type A notation. Moreover, since the placement of both priznaki and cinnabar marks is redundant, the usage of priznaki seems to be somewhat optional in modern typesetting. Encoding separate priznakified versions of each neume would add an unnecessary level of complexity; on the other hand, the system is sufficiently complicated so that the priznaki cannot be invoked from context in a text-only environment. We thus propose to support the priznaki using control characters. We encode two control characters, U+1CF42 Znamenny Priznak Modifier Level 2 and U+1CF43 Znamenny Priznak Modifier Level 3, which are used to indicate the second and third scale degrees, respectively. The presence of a Priznak Modifier indicates that a priznak for the given scale degree should be turned on. The absence of a Priznak Modifier indicates either that a neume is pitched at the first scale degree of a tonal range (which is indicated by an absence of priznaki) or that Type B or Type C Notation is being encoded (where priznaki are not used at all). Software should interpret the Priznak Modifiers as control codes that graphically modify the neume in an appropriate manner. In fonts, this can be handled using glyph substitution via the Glyph Composition (*ccmp*) feature of OpenType.

In Figure 14 we provide examples of how the priznaki are encoded and handled at the font level. Note that the control character must be encoded immediately after the base neume. Appendix 3 provides tables listing the possible combinations of base neumes with priznaki control characters. Demestvenny Notation in the Old Ritualist chantbooks (*Demestvennik* and *Obednitsa*) also uses the system of priznaki found in the Type A Znamenny Notation, thus the priznaki of this notational system are implemented in the same manner.

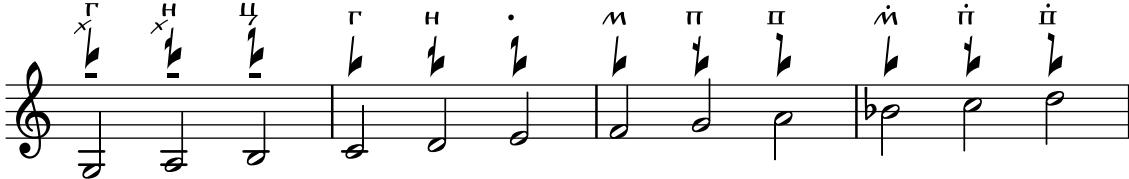
A second, more advanced system of priznaki appears in a number of Old Ritualist sources such as the *Krug Tserkovnago Drevnyago Znamennago Peniya* published in St. Petersburg in the late 19<sup>th</sup> century under the patronage of A. Morozov (see, for example, [33, vol. 1, f. 2]). This system employs a finer gradation of the priznaki markers. For neumes that occur in the lower two tonal ranges (the *prostoe* and the *mrachnoe*), the priznaki markers face downward, just as in the system of Mezenets. However, for neumes that occur in the upper two tonal ranges (the *svetloe* and the *tresvetloe*), the direction is flipped and the priznaki markers face upwards. This behavior is demonstrated in Figure 15. Note that priznaki

<sup>6</sup>The Church Slavonic term “priznaki” (sing. “priznak”) is pronounced with the stress on the second syllable, unlike its modern Russian paronym.

**Figure 14:** Encoding model for Priznaki



**Figure 15:** The Usage of Priznaki in the *Krug* of Arseny Morozov

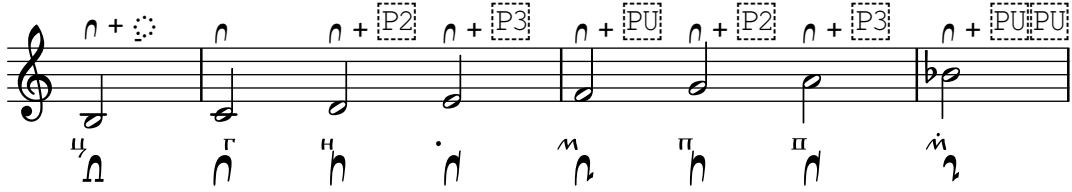


markers only change direction for those neumes where they are positioned along the left vertical beam (for example, the Kryuk and the Stopitsa). The direction of priznaki positioned along the diagonal element does not change, as in the system of Mezenets. In addition to changes in the direction of the priznaki, this system also uses a small underline mark to indicate the lowest tonal range. The mark is either positioned directly below the neume or attaches to the lower part of the neume. The name of this mark is not known, so we call it U+1CF41 Combining Lower Tonal Range Indicator. Note that this mark always appears in black type.

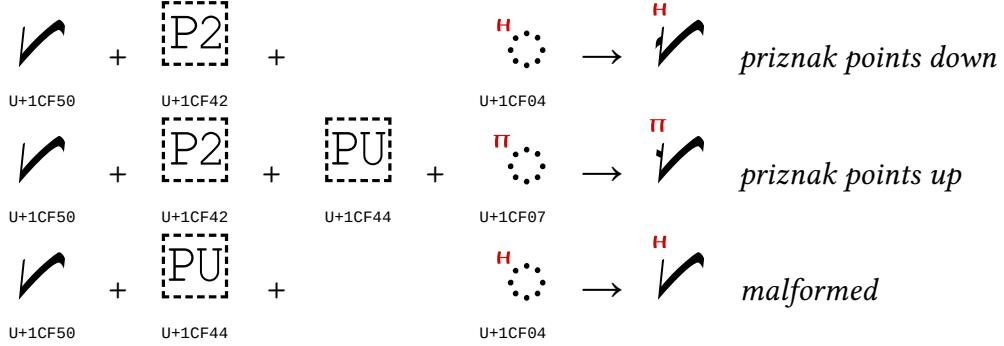
Additionally, in the system of priznaki used in the *Krug*, one character – the Zapyataya – accepts tonal range-specific modifications even when it occurs on the first scale degree of a tonal range (where priznaki are not used). In the *svetloe* tonal range, it receives a rightward-facing priznak, and in the *tresvetloe* tonal range, the shape of the neume itself is modified. This usage of the Zapyataya is demonstrated in Figure 16, along with the proposed encoding methodology.

The usage of separate control characters for the system of priznaki as given in the *Krug* of Morozov seems to be impractical, as it would require encoding four additional control characters: two for the Level 2 and Level 3 “flipped” versions of the priznaki occurring in the *svetloe* and *tresvetloe* tonal ranges, and two more for accessing the variant forms of the Zapyataya and its derivative neumes. Instead, we propose to encode one additional control character, U+1CF44 Znamenny Priznak Modifier Direction Flip, which acts to change the direction of a priznak. The presence of this character, entered immedi-

**Figure 16:** The Zapyataya with Different Prznaki in the *Krug*



**Figure 17:** Encoding model for Prznaki as used in the *Krug*



ately following one of the two priznak Level Modifiers, informs the rendering system that the direction of the priznak on the neume needs to be pointed upward. The presence of this character entered immediately following the Zapyataya indicates that the version of the Zapyataya without priznaki needs to be rendered in the shape used in the *svetloe* or *tresvetloe* tonal ranges (see again Figure 16). The benefit of this approach is that a one-to-one relationship is maintained between the pitch level within a tonal range and the presence of Priznak Modifier control characters. The usage of all of these control characters is demonstrated in Figure 17. This usage of two control characters to affect the appearance of priznaki is similar to the use of fill and rotation controls to specify the orientation and appearance of symbols in Sutton SignWriting (see [34, p. 3–5.]).

#### 2.1.4 Prznaki in Kazan Notation

An alternative system of indicating relative pitch was used in early manuscripts of Put Chant (Kazan Notation). This system received its earliest theoretical formulation in the *Klyuch Znamennoy*, a treatise dated to 1604 [23, p. 117], and was subsequently used in various chantbooks and music theoretical treatises [25]. This system consists of two prznaki: a stylized cross (Slavonic *kryzh*) attached to the left lower part of a neume, which is used to indicate downward vocal movement, and a stylized horn (Slavonic *rog* or *rozhok*) attached to the upper part or diagonal part of a neume, which is used to indicate upward vocal movement. For the support of these prznaki we propose to encode two additional control characters, U+1CF45 Znamenny Priznak Modifier Kryzh and U+1CF46 Znamenny Priznak Modifier Rog, which may be used to indicate to the rendering system that a given neume needs to be drawn with the relevant priznak. One theoretical treatise on Kazan Notation makes a further distinction between a *rog* priznak attached to the left side of the Stopitsa and a *rog* priznak attached to the right side of the Stopitsa [17, p. 261]. We propose to render the right-bearing *rog* priznak by use of the control character Znamenny Priznak Modifier Direction Flip, as described above for the system of prznaki used in the *Krug* of A. Morozov. Note that not encoding the Direction Flip control character would require us to encode an additional character for this one exceptional case. Also note that control characters used for

**Figure 18:** Priznaki used in Kazan Notation

		$\rightarrow$		<i>no priznaki</i>			
	+		$\rightarrow$		<i>with kryzh priznak</i>		
	+		$\rightarrow$		<i>with rog priznak</i>		
	+		$\rightarrow$		<i>Stopitsa with left rog priznak</i>		
	+		+		$\rightarrow$		<i>Stopitsa with right rog priznak</i>

**Figure 19:** The use of peculiar marks; source: [36, p. 26]. Note the use of a peculiar flat (boxed in red), which lowers the tuning of the pitch and results in a subsequent modulation out of the Obikhod Scale



encoding the priznaki of Type A Znamenny Notation cannot be used to encode priznaki used in Kazan Notation because this would result in ambiguities. The expected behavior of these control characters is illustrated in Figure 18.

### 2.1.5 Further Modification Marks: ‘Peculiar’ Marks

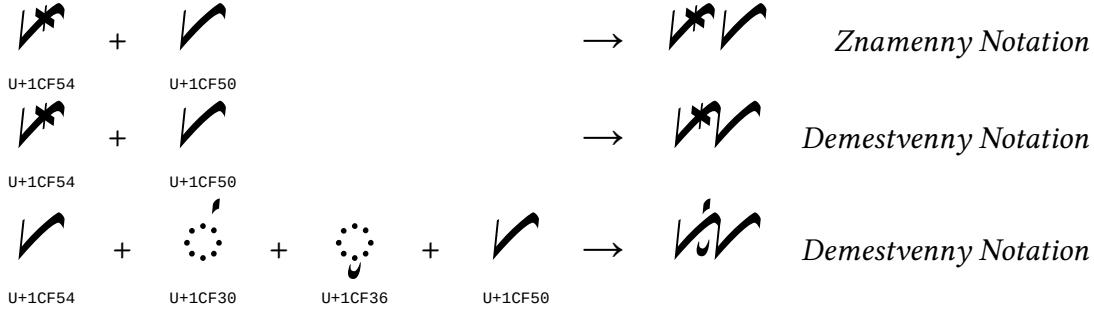
Generally speaking, Znamenny Chanted is executed within the Obikhod Scale. However, some 17<sup>th</sup> century manuscripts and theoretical treatises do allow for modulation out of the Obikhod Scale. Some modulation out of the Obikhod Scale may also be observed in modern Old Ritualist performance practice. Modulation may be indicated by the use of additional red pitch marks called *stranny'e pomety* (“peculiar marks”). These markings usually consist of a cinnabar mark with an attached or detached stylized red cross (“peculiar flats”) or a compound mark of a stylized Cyrillic Small Letter Es and a red pitch mark (“peculiar sharps”). See Figure 19 for an example.

It must be recognized that the system of peculiar marks is presently not very well documented or understood. We propose to encode in the range U+1CF10 to U+1CF17 those peculiar marks that are mentioned in the 17<sup>th</sup> century theoretical treatise *Klyuch Razumeniya* [35]. We also encode a separate combining character U+1CF1F Znamenny Combining Red Mark Kryzh, which may be entered in combination with other red marks to create more peculiar marks.

**Figure 20:** Use of explanatory marks in Znamenny Notation



**Figure 21:** The use of ligatures in Demestvenny Notation



## 2.1.6 Explanatory Marks

Explanatory marks, also called “similarity marks” (*podobnye pomyty*) [37, p. 41], are a neume (potentially with modifying marks) or series of neumes set in smaller type and placed above (or sometimes below) a main neume. These explanatory marks are almost always rendered in red. They serve to explain a difficult or unusual musical meaning of the base neume. Since these marks are functionally analogous to ruby, a method used in East Asian scripts to indicate phonetic transcriptions of obscure or unfamiliar ideographs, we propose to use ruby for the representation of Explanatory Marks as well. Ruby annotation may be handled through a variety of existing standards. In plain text contexts where markup is unavailable, a user may use the Interlinear Annotation Characters, U+FFF9 through U+FFFB, to set off explanatory marks (see Figure 20 for an example).

## 2.1.7 Ligatures in Demestvenny / Put Notation

One additional characteristic feature of Demestvenny Notation is the use of ligatures. A sequence of two, three or four neumes, plus combining black and red marks, may be drawn together, effectively forming a ligature. Since the repertoire of ligated combinations is fixed and the ligatures are largely context-specific, we propose to handle ligatures at the font level using cursive attachment or kerning. Any black or red modifying marks are also attached to the relevant ligature component and positioned at the font level. Font designers may offer precomposed forms of such ligatures in the Private Use Area. The implementation of ligatures is demonstrated in Figure 21 and in numerous examples in Appendix 2.2.

## 2.2 Character Names and Codepoint Order

All characters in our encoding model are given names according to the standard usage of Znamenny neume catalogs (*Azbuki*). In assembling the repertoire of characters used in modern Znamenny Notation (since the 16<sup>th</sup> century), we have relied on the listings provided by Razumovsky [1, pp. 269ff], Metallov [38, pp. 32ff], Kalashnikov [39, pp. 10ff] and Ye. Grigor'ev [37, pp. 241ff]. In some instances, neumes may have multiple names or the name used in modern Old Ritualist practice may differ from the historical name or the name used by academics. In such cases, we have specified the alternative

name in the annotations. In all cases, the Church Slavonic names for the neumes and various marks are preserved, but are given in Latin characters using the BGN/PCGN Cyrillic romanization scheme for Russian.

An analysis of historical Znamenny neume catalogs reveals that no two manuscripts agree on the order in which characters are sorted (the “alphabetical order” of the writing system). The only academic attempt to create an alphabetic ordering for Znamenny Notation was proposed by Brazhnikov, but has not been widely accepted [40][41]. We propose the following ordering. First, we place the commonly used neumes following a loose system of radicals. These neumes are: the Kryuk (and same-radical characters Paraklit, Dva v Chelnu, Klyuch, and Zanozhek); the Stopitsa (and same-radical characters Perevodka and Chelyustka); the Palka; the Zapyatya (and same-radical characters Golubchik, Vrakhiya, Derbitsa, and Khamilo); the Chashka and Podchashie; the Skameytsa (all varieties); and, finally, the Slozhitie. Then we place the neumes primarily used for the formation of complex melodic formulæ (called *litsa* and *fity*). These are best placed at this point because the Slozhitie belongs to both the common radical group and the group of neumes used to form complex formulæ. The ordering of the neumes in this grouping is: Kryzh, Rog, Fita, Kobyla, and Zmeytsa.

In the third group, we place all variants of the complex neumes Statya and Strela. The ordering within the group is again based on a system of radicals. Finally, we place complex neumes that have unique functions and appearances. These neumes are almost always placed toward the end of the catalog in the manuscript tradition; they include the Duda, Truba, Nemka and Pauk.

The codepoint order for the base neumes of the notation is thus specified in Figure 22. For the modifying marks, we propose a logical sort order. The red pitch marks are encoded in order of ascending pitch, starting with Gorazdo Nizko s Kryzhem (tuned to g on the Obikhod Scale). Following the red pitch marks, we encode the peculiar marks, also in order of ascending pitch.

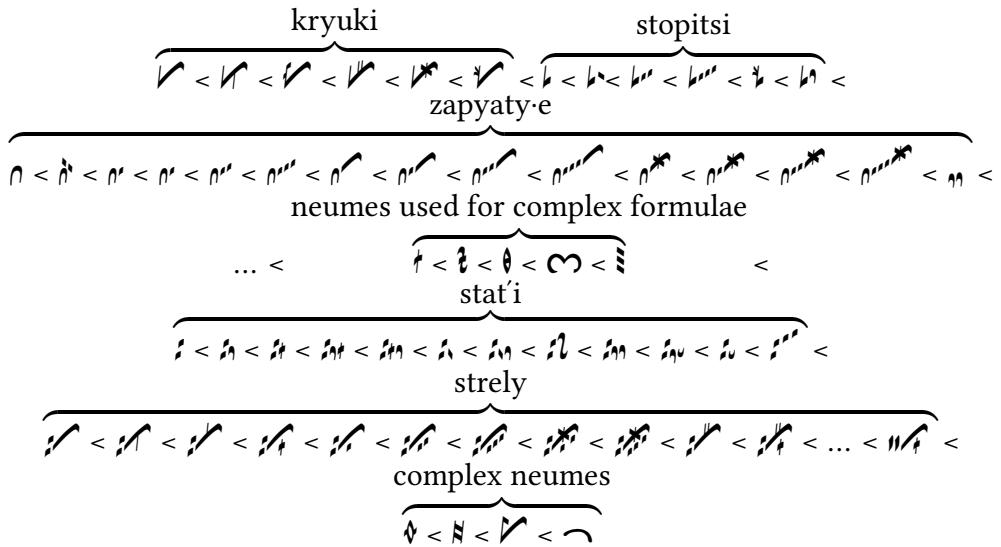
Next, we order the red modifying marks. We first classify these marks by function: marks indicating duration and marks indicating movement. We order the duration marks from long to short (Tikhaya, Borzaya, and Udarka); then we order the movement marks in the way that they are typically presented in traditional catalogs – by frequency of usage (Podvertka, Lomka, etc.). We encode the black modifying marks following the red modifying marks. Here we order first the Tonal Range Markers (in order of ascending pitch). Then, we again classify the marks by function, and order the marks indicating duration from long to short (Zaderzhka, Otsechka) and the marks indicating movement in the order typically presented in traditional catalogs (Podchashie, Oblachko, etc). The result is an ordering that is useful for collation because it captures the common features of the manuscript tradition, but is also intuitive for lookup since it places next to each other characters that are similar in function or appearance.

## 2.3 Order of Encoding

In the Unicode Standard (see Section 2.11) all combining characters are to be used in sequence following the character to which they apply, regardless of how the positioning of the combining mark ultimately takes place. Combining characters that position on the left of a base neume are generally presented to the left of the dotted circle in Unicode codecharts. In Znamenny Notation, combining Cinnabar Marks will usually position to the left of the base character, while other combining marks may position above, below, to the right of, or overlaying the base character. In addition to the technical aspect, we also consider how Znamenny neumes are typically drawn by hand in manuscripts. Commonly, one first draws the base neume (in black ink), then the tonal range markers (if present), then the remaining black modification marks, from left to right. Then, one picks up a red pen, and draws first the cinnabar pitch marks and then the remaining red modification marks, from left to right.

Therefore we propose the order of encoding, from left to right, given in Table 2. Note that the

**Figure 22:** Codepoint (and collation) order for Znamenny Notation



Priznak Modifier control characters, if present, must be encoded immediately after the base neume (even if they modify the tonal range markers in actual graphical appearance). Multiple left-attaching red pitch marks are encoded in sequence and by default stack diagonally along the base neume from left to right. Right-attaching red pitch marks are encoded following all other combining red marks.

**Table 2:** Order of encoding (from left to right)

### 3 Unicode Character Properties

1CF00;ZNAMENNY COMBINING MARK GORAZDO NIZKO S KRYZHEM ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF01;ZNAMENNY COMBINING MARK NIZKO S KRYZHEM ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF02;ZNAMENNY COMBINING MARK TSATA ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF03;ZNAMENNY COMBINING MARK GORAZDO NIZKO ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF04;ZNAMENNY COMBINING MARK NIZKO ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF05;ZNAMENNY COMBINING MARK SREDNE ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF06;ZNAMENNY COMBINING MARK MALO POVYSHE ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF07;ZNAMENNY COMBINING MARK POVYSHE ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF08;ZNAMENNY COMBINING MARK VYSOKO ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF09;ZNAMENNY COMBINING MARK MALO POVYSHE S KHOKHLOM ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF0A;ZNAMENNY COMBINING MARK POVYSHE S KHOKHLOM ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF0B;ZNAMENNY COMBINING MARK VYSOKO S KHOKHLOM ON LEFT;Mn;0;NSM;;;;N;;;;;  
1CF0C;ZNAMENNY COMBINING MARK GORAZDO NIZKO S KRYZHEM ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF0D;ZNAMENNY COMBINING MARK NIZKO S KRYZHEM ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF0E;ZNAMENNY COMBINING MARK TSATA ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF0F;ZNAMENNY COMBINING MARK GORAZDO NIZKO ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF10;ZNAMENNY COMBINING MARK NIZKO ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF11;ZNAMENNY COMBINING MARK SREDNE ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF12;ZNAMENNY COMBINING MARK MALO POVYSHE ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF13;ZNAMENNY COMBINING MARK POVYSHE ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF14;ZNAMENNY COMBINING MARK VYSOKO ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF15;ZNAMENNY COMBINING MARK MALO POVYSHE S KHOKHLOM ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF16;ZNAMENNY COMBINING MARK POVYSHE S KHOKHLOM ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF17;ZNAMENNY COMBINING MARK VYSOKO S KHOKHLOM ON RIGHT;Mn;0;NSM;;;;N;;;;;  
1CF18;ZNAMENNY COMBINING MARK TSATA S KRYZHEM;Mn;0;NSM;;;;N;;;;;  
1CF19;ZNAMENNY COMBINING MARK MALO POVYSHE S KRYZHEM;Mn;0;NSM;;;;N;;;;;  
1CF1A;ZNAMENNY COMBINING MARK STRANNO MALO POVYSHE;Mn;0;NSM;;;;N;;;;;  
1CF1B;ZNAMENNY COMBINING MARK POVYSHE S KRYZHEM;Mn;0;NSM;;;;N;;;;;  
1CF1C;ZNAMENNY COMBINING MARK POVYSHE STRANNO;Mn;0;NSM;;;;N;;;;;  
1CF1D;ZNAMENNY COMBINING MARK VYSOKO S KRYZHEM;Mn;0;NSM;;;;N;;;;;  
1CF1E;ZNAMENNY COMBINING MARK MALO POVYSHE STRANNO;Mn;0;NSM;;;;N;;;;;  
1CF1F;ZNAMENNY COMBINING MARK GORAZDO VYSOKO;Mn;0;NSM;;;;N;;;;;  
1CF20;ZNAMENNY COMBINING MARK ZELO;Mn;0;NSM;;;;N;;;;;  
1CF21;ZNAMENNY COMBINING MARK ON;Mn;0;NSM;;;;N;;;;;  
1CF22;ZNAMENNY COMBINING MARK RAVNO;Mn;0;NSM;;;;N;;;;;  
1CF23;ZNAMENNY COMBINING MARK TIKHAYA;Mn;0;NSM;;;;N;;;;;  
1CF24;ZNAMENNY COMBINING MARK BORZAYA;Mn;0;NSM;;;;N;;;;;  
1CF25;ZNAMENNY COMBINING MARK UDARKA;Mn;0;NSM;;;;N;;;;;  
1CF26;ZNAMENNY COMBINING MARK PODVERTKA;Mn;0;NSM;;;;N;;;;;  
1CF27;ZNAMENNY COMBINING MARK LOMKA;Mn;0;NSM;;;;N;;;;;  
1CF28;ZNAMENNY COMBINING MARK KUPNAYA;Mn;0;NSM;;;;N;;;;;  
1CF29;ZNAMENNY COMBINING MARK KACHKA;Mn;0;NSM;;;;N;;;;;  
1CF2A;ZNAMENNY COMBINING MARK ZEVOK;Mn;0;NSM;;;;N;;;;;  
1CF2B;ZNAMENNY COMBINING MARK SKOBA;Mn;0;NSM;;;;N;;;;;  
1CF2C;ZNAMENNY COMBINING MARK RAZSEKA;Mn;0;NSM;;;;N;;;;;  
1CF2D;ZNAMENNY COMBINING MARK KRYZH;Mn;0;NSM;;;;N;;;;;  
1CF30;ZNAMENNY COMBINING TONAL RANGE MARK MRACHNO;Mn;0;NSM;;;;N;;;;;  
1CF31;ZNAMENNY COMBINING TONAL RANGE MARK SVETLO;Mn;0;NSM;;;;N;;;;;

1CF32;ZNAMENNY COMBINING TONAL RANGE MARK TRESVETLO;Mn;0;NSM;;;;N;;;;  
1CF33;ZNAMENNY COMBINING MARK ZADERZHKA;Mn;0;NSM;;;;N;;;;  
1CF34;ZNAMENNY COMBINING MARK DEMESTVENNY ZADERZHKA;Mn;0;NSM;;;;N;;;;  
1CF35;ZNAMENNY COMBINING MARK OTSECHKA;Mn;0;NSM;;;;N;;;;  
1CF36;ZNAMENNY COMBINING MARK PODCHASHIE;Mn;0;NSM;;;;N;;;;  
1CF37;ZNAMENNY COMBINING MARK PODCHASHIE WITH VERTICAL STROKE;Mn;0;NSM;;;;N;;;;  
1CF38;ZNAMENNY COMBINING MARK CHASHKA;Mn;0;NSM;;;;N;;;;  
1CF39;ZNAMENNY COMBINING MARK CHASHKA POLNAYA;Mn;0;NSM;;;;N;;;;  
1CF3A;ZNAMENNY COMBINING MARK OBLACHKO;Mn;0;NSM;;;;N;;;;  
1CF3B;ZNAMENNY COMBINING MARK SOROCHYA NOZHKA;Mn;0;NSM;;;;N;;;;  
1CF3C;ZNAMENNY COMBINING MARK TOCHKA;Mn;0;NSM;;;;N;;;;  
1CF3D;ZNAMENNY COMBINING MARK DVOETOCHIE;Mn;0;NSM;;;;N;;;;  
1CF3E;ZNAMENNY COMBINING ATTACHING VERTICAL OMET;Mn;0;NSM;;;;N;;;;  
1CF3F;ZNAMENNY COMBINING MARK CURVED OMET;Mn;0;NSM;;;;N;;;;  
1CF40;ZNAMENNY COMBINING MARK KRYZH;Mn;0;NSM;;;;N;;;;  
1CF41;ZNAMENNY COMBINING LOWER TONAL RANGE INDICATOR;Mn;0;NSM;;;;N;;;;  
1CF42;ZNAMENNY PRIZNAK MODIFIER LEVEL 2;Cf;0;BN;;;;N;;;;  
1CF43;ZNAMENNY PRIZNAK MODIFIER LEVEL 3;Cf;0;BN;;;;N;;;;  
1CF44;ZNAMENNY PRIZNAK MODIFIER DIRECTION FLIP;Cf;0;BN;;;;N;;;;  
1CF45;ZNAMENNY PRIZNAK MODIFIER KRYZH;Cf;0;BN;;;;N;;;;  
1CF46;ZNAMENNY PRIZNAK MODIFIER ROG;Cf;0;BN;;;;N;;;;  
1CF50;ZNAMENNY NEUME KRYUK;So;0;L;;;;N;;;;  
1CF51;ZNAMENNY NEUME KRYUK TIKHY;So;0;L;;;;N;;;;  
1CF52;ZNAMENNY NEUME PARAKLIT;So;0;L;;;;N;;;;  
1CF53;ZNAMENNY NEUME DVA V CHELNU;So;0;L;;;;N;;;;  
1CF54;ZNAMENNY NEUME KLYUCH;So;0;L;;;;N;;;;  
1CF55;ZNAMENNY NEUME ZANOZHEK;So;0;L;;;;N;;;;  
1CF56;ZNAMENNY NEUME STOPITSA;So;0;L;;;;N;;;;  
1CF57;ZNAMENNY NEUME STOPITSA S OCHKOM;So;0;L;;;;N;;;;  
1CF58;ZNAMENNY NEUME PEREVODKA;So;0;L;;;;N;;;;  
1CF59;ZNAMENNY NEUME PEREVODKA NEPOSTOYANNAYA;So;0;L;;;;N;;;;  
1CF5A;ZNAMENNY NEUME STOPITSA WITH SOROCHYA NOZHKA;So;0;L;;;;N;;;;  
1CF5B;ZNAMENNY NEUME CHELYUSTKA;So;0;L;;;;N;;;;  
1CF5C;ZNAMENNY NEUME PALKA;So;0;L;;;;N;;;;  
1CF5D;ZNAMENNY NEUME ZAPYATAYA;So;0;L;;;;N;;;;  
1CF5E;ZNAMENNY NEUME GOLUBCHIK BORZY;So;0;L;;;;N;;;;  
1CF5F;ZNAMENNY NEUME GOLUBCHIK TIKHY;So;0;L;;;;N;;;;  
1CF60;ZNAMENNY NEUME GOLUBCHIK MRACHNY;So;0;L;;;;N;;;;  
1CF61;ZNAMENNY NEUME GOLUBCHIK SVETLY;So;0;L;;;;N;;;;  
1CF62;ZNAMENNY NEUME GOLUBCHIK TRESVETLY;So;0;L;;;;N;;;;  
1CF63;ZNAMENNY NEUME VRAKHIYA PROSTAYA;So;0;L;;;;N;;;;  
1CF64;ZNAMENNY NEUME VRAKHIYA MRACHNAYA;So;0;L;;;;N;;;;  
1CF65;ZNAMENNY NEUME VRAKHIYA SVETLAYA;So;0;L;;;;N;;;;  
1CF66;ZNAMENNY NEUME VRAKHIYA TRESVETLAYA;So;0;L;;;;N;;;;  
1CF67;ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA PROSTAYA;So;0;L;;;;N;;;;  
1CF68;ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA MRACHNAYA;So;0;L;;;;N;;;;  
1CF69;ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA SVETLAYA;So;0;L;;;;N;;;;  
1CF6A;ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA TRESVETLAYA;So;0;L;;;;N;;;;  
1CF6B;ZNAMENNY NEUME DOUBLE ZAPYATAYA;So;0;L;;;;N;;;;  
1CF6C;ZNAMENNY NEUME REVERSED CHELYUSTKA;So;0;L;;;;N;;;;

1CF6D;ZNAMENNY NEUME DERBITSA;So;0;L;;;;N;;;;;  
1CF6E;ZNAMENNY NEUME KHAMIRO;So;0;L;;;;N;;;;;  
1CF6F;ZNAMENNY NEUME CHASHKA;So;0;L;;;;N;;;;;  
1CF70;ZNAMENNY NEUME PODCHASHIE;So;0;L;;;;N;;;;;  
1CF71;ZNAMENNY NEUME SKAMEYTS A MRACHNAYA;So;0;L;;;;N;;;;;  
1CF72;ZNAMENNY NEUME SKAMEYTS A SVETLAYA;So;0;L;;;;N;;;;;  
1CF73;ZNAMENNY NEUME SKAMEYTS A TRESVETLAYA;So;0;L;;;;N;;;;;  
1CF74;ZNAMENNY NEUME SKAMEYTS A TIKHAYA;So;0;L;;;;N;;;;;  
1CF75;ZNAMENNY NEUME DEMESTVENNY KLYUCH;So;0;L;;;;N;;;;;  
1CF76;ZNAMENNY NEUME SKAMEYTS A KLYUCHEVAYA SVETLAYA;So;0;L;;;;N;;;;;  
1CF77;ZNAMENNY NEUME SKAMEYTS A KLYUCHENEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CF78;ZNAMENNY NEUME SKAMEYTS A KLYUCHEVAYA TIKHAYA;So;0;L;;;;N;;;;;  
1CF79;ZNAMENNY NEUME SKAMEYTS A DVOECHELNAYA PROSTAYA;So;0;L;;;;N;;;;;  
1CF7A;ZNAMENNY NEUME SKAMEYTS A DVOECHELNAYA SVETLAYA;So;0;L;;;;N;;;;;  
1CF7B;ZNAMENNY NEUME SKAMEYTS A DVOECHELNAYA NEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CF7C;ZNAMENNY NEUME SKAMEYTS A DVOECHELNAYA KLYUCHEVAYA;So;0;L;;;;N;;;;;  
1CF7D;ZNAMENNY NEUME SLOZHITIE;So;0;L;;;;N;;;;;  
1CF7E;ZNAMENNY NEUME SLOZHITIE S ZAPYATOY;So;0;L;;;;N;;;;;  
1CF7F;ZNAMENNY NEUME SLOZHITIE ZAKRYTOE;So;0;L;;;;N;;;;;  
1CF80;ZNAMENNY NEUME SLOZHITIE S KRYZHEM;So;0;L;;;;N;;;;;  
1CF81;ZNAMENNY NEUME KRYZH;So;0;L;;;;N;;;;;  
1CF82;ZNAMENNY NEUME ROG;So;0;L;;;;N;;;;;  
1CF83;ZNAMENNY NEUME FITA;So;0;L;;;;N;;;;;  
1CF84;ZNAMENNY NEUME KOBYLA;So;0;L;;;;N;;;;;  
1CF85;ZNAMENNY NEUME ZMEYTS A;So;0;L;;;;N;;;;;  
1CF86;ZNAMENNY NEUME STATYA;So;0;L;;;;N;;;;;  
1CF87;ZNAMENNY NEUME STATYA S ZAPYATOY;So;0;L;;;;N;;;;;  
1CF88;ZNAMENNY NEUME STATYA S KRYZHEM;So;0;L;;;;N;;;;;  
1CF89;ZNAMENNY NEUME STATYA S ZAPYATOY I KRYZHEM;So;0;L;;;;N;;;;;  
1CF8A;ZNAMENNY NEUME STATYA S KRYZHEM I ZAPYATOY;So;0;L;;;;N;;;;;  
1CF8B;ZNAMENNY NEUME STATYA ZAKRYTAYA;So;0;L;;;;N;;;;;  
1CF8C;ZNAMENNY NEUME STATYA ZAKRYTAYA S ZAPYATOY;So;0;L;;;;N;;;;;  
1CF8D;ZNAMENNY NEUME STATYA S ROGOM;So;0;L;;;;N;;;;;  
1CF8E;ZNAMENNY NEUME STATYA S DVUMYA ZAPYATYMI;So;0;L;;;;N;;;;;  
1CF8F;ZNAMENNY NEUME STATYA S ZAPYATOY I PODCHASHIEM;So;0;L;;;;N;;;;;  
1CF90;ZNAMENNY NEUME POLKULIZMY;So;0;L;;;;N;;;;;  
1CF91;ZNAMENNY NEUME STATYA NEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CF92;ZNAMENNY NEUME STRELA PROSTAYA;So;0;L;;;;N;;;;;  
1CF93;ZNAMENNY NEUME STRELA MRACHNOTIKHAYA;So;0;L;;;;N;;;;;  
1CF94;ZNAMENNY NEUME STRELA KRYZHEVAYA;So;0;L;;;;N;;;;;  
1CF95;ZNAMENNY NEUME STRELA POLUPOVODNAYA;So;0;L;;;;N;;;;;  
1CF96;ZNAMENNY NEUME STRELA POVODNAYA;So;0;L;;;;N;;;;;  
1CF97;ZNAMENNY NEUME STRELA NEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CF98;ZNAMENNY NEUME STRELA KLYUCHEPOVODNAYA;So;0;L;;;;N;;;;;  
1CF99;ZNAMENNY NEUME STRELA KLYUCHENEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CF9A;ZNAMENNY NEUME STRELA TIKHAYA PUTNAYA;So;0;L;;;;N;;;;;  
1CF9B;ZNAMENNY NEUME STRELA DVOECHELNAYA;So;0;L;;;;N;;;;;  
1CF9C;ZNAMENNY NEUME STRELA DVOECHELNOKRYZHEVAYA;So;0;L;;;;N;;;;;  
1CF9D;ZNAMENNY NEUME STRELA DVOECHELNOPOVODNAYA;So;0;L;;;;N;;;;;  
1CF9E;ZNAMENNY NEUME STRELA DVOECHELNAYA KLYUCHEVAYA;So;0;L;;;;N;;;;;

1CF9F;ZNAMENNY NEUME STRELA DVOECHELNOPOVODNAYA KLYUCHEVAYA;So;0;L;;;;N;;;;;  
1CFA0;ZNAMENNY NEUME STRELA GROMNAYA WITH SINGLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFA1;ZNAMENNY NEUME STRELA GROMOPOVODNAYA WITH SINGLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFA2;ZNAMENNY NEUME STRELA GROMNAYA;So;0;L;;;;N;;;;;  
1CFA3;ZNAMENNY NEUME STRELA GROMOPOVODNAYA;So;0;L;;;;N;;;;;  
1CFA4;ZNAMENNY NEUME STRELA GROMOPOVODNAYA WITH DOUBLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFA5;ZNAMENNY NEUME STRELA GROMOKRYZHEVAYA;So;0;L;;;;N;;;;;  
1CFA6;ZNAMENNY NEUME STRELA GROMOKRYZHEVAYA POVODNAYA;So;0;L;;;;N;;;;;  
1CFA7;ZNAMENNY NEUME MECHIK;So;0;L;;;;N;;;;;  
1CFA8;ZNAMENNY NEUME MECHIK POVODNY;So;0;L;;;;N;;;;;  
1CFA9;ZNAMENNY NEUME MECHIK KLYUCHEVOY;So;0;L;;;;N;;;;;  
1CFAA;ZNAMENNY NEUME MECHIK KLYUCHEPOVODNY;So;0;L;;;;N;;;;;  
1CFAB;ZNAMENNY NEUME MECHIK KLYUCHENEPOSTOYANNY;So;0;L;;;;N;;;;;  
1CFAC;ZNAMENNY NEUME STRELA TRYASOGLASNAYA;So;0;L;;;;N;;;;;  
1CFAD;ZNAMENNY NEUME STRELA TRYASOPOVODNAYA;So;0;L;;;;N;;;;;  
1CFAE;ZNAMENNY NEUME STRELA TRYASOSTRELNAYA;So;0;L;;;;N;;;;;  
1CFAF;ZNAMENNY NEUME OSOKA;So;0;L;;;;N;;;;;  
1CFB0;ZNAMENNY NEUME OSOKA SVETLAYA;So;0;L;;;;N;;;;;  
1CFB1;ZNAMENNY NEUME OSOKA TRESVETLAYA;So;0;L;;;;N;;;;;  
1CFB2;ZNAMENNY NEUME OSOKA KRYUKOVAYA SVETLAYA;So;0;L;;;;N;;;;;  
1CFB3;ZNAMENNY NEUME OSOKA KLYUCHEVAYA SVETLAYA;So;0;L;;;;N;;;;;  
1CFB4;ZNAMENNY NEUME OSOKA KLYUCHEVAYA NEPOSTOYANNAYA;So;0;L;;;;N;;;;;  
1CFB5;ZNAMENNY NEUME STRELA KRYUKOVAYA;So;0;L;;;;N;;;;;  
1CFB6;ZNAMENNY NEUME STRELA KRYUKOVAYA POVODNAYA;So;0;L;;;;N;;;;;  
1CFB7;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMNAYA WITH SINGLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFB8;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA WITH SINGLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFB9;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMNAYA;So;0;L;;;;N;;;;;  
1CFBA;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA;So;0;L;;;;N;;;;;  
1CFBB;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA WITH DOUBLE ZAPYATAYA;So;0;L;;;;N;;;;;  
1CFBC;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOKRYZHEVAYA;So;0;L;;;;N;;;;;  
1CFBD;ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOKRYZHEVAYA POVODNAYA;So;0;L;;;;N;;;;;  
1CFBE;ZNAMENNY NEUME STRELA KRYUKOVAYA TRYASKA;So;0;L;;;;N;;;;;  
1CFBF;ZNAMENNY NEUME ROZHEK;So;0;L;;;;N;;;;;  
1CFC0;ZNAMENNY NEUME STRELA ROZHNAYA;So;0;L;;;;N;;;;;  
1CFC1;ZNAMENNY NEUME DUDA;So;0;L;;;;N;;;;;  
1CFC2;ZNAMENNY NEUME NEMKA;So;0;L;;;;N;;;;;  
1CFC3;ZNAMENNY NEUME PAUK;So;0;L;;;;N;;;;;  
1CFC4;ZNAMENNY NEUME OBLAKO;So;0;L;;;;N;;;;;

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1CF00

## Znamenny Musical Notation

1CFCF

	1CF0	1CF1	1CF2	1CF3	1CF4	1CF5	1CF6	1CF7	1CF8	1CF9	1CFA	1CFB	1FC
0													
1													
2													
3													
4													
5													
6													
7													
8													
9													
A													
B													
C													
D													
E													
F													

**Combining Red Marks**

1CF00	◌○	ZNAMENNY COMBINING MARK GORAZDO NIZKO S KRYZHEM ON LEFT
1CF01	◌○	ZNAMENNY COMBINING MARK NIZKO S KRYZHEM ON LEFT
1CF02	◌○	ZNAMENNY COMBINING MARK TSATA ON LEFT
1CF03	◌○	ZNAMENNY COMBINING MARK GORAZDO NIZKO ON LEFT
1CF04	◌○	ZNAMENNY COMBINING MARK NIZKO ON LEFT
1CF05	◌○	ZNAMENNY COMBINING MARK SREDNE ON LEFT
1CF06	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE ON LEFT
1CF07	◌○	ZNAMENNY COMBINING MARK POVYSHE ON LEFT
1CF08	◌○	ZNAMENNY COMBINING MARK VYSOKO ON LEFT
1CF09	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE S KHOKHLOM ON LEFT
1CF0A	◌○	ZNAMENNY COMBINING MARK POVYSHE S KHOKHLOM ON LEFT
1CF0B	◌○	ZNAMENNY COMBINING MARK VYSOKO S KHOKHLOM ON LEFT
1CF0C	◌○	ZNAMENNY COMBINING MARK GORAZDO NIZKO S KRYZHEM ON RIGHT
1CF0D	◌○	ZNAMENNY COMBINING MARK NIZKO S KRYZHEM ON RIGHT
1CF0E	◌○	ZNAMENNY COMBINING MARK TSATA ON RIGHT
1CF0F	◌○	ZNAMENNY COMBINING MARK GORAZDO NIZKO ON RIGHT
1CF10	◌○	ZNAMENNY COMBINING MARK NIZKO ON RIGHT
1CF11	◌○	ZNAMENNY COMBINING MARK SREDNE ON RIGHT
1CF12	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE ON RIGHT
1CF13	◌○	ZNAMENNY COMBINING MARK POVYSHE ON RIGHT
1CF14	◌○	ZNAMENNY COMBINING MARK VYSOKO ON RIGHT
1CF15	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE S KHOKHLOM ON RIGHT
1CF16	◌○	ZNAMENNY COMBINING MARK POVYSHE S KHOKHLOM ON RIGHT
1CF17	◌○	ZNAMENNY COMBINING MARK VYSOKO S KHOKHLOM ON RIGHT
1CF18	◌○	ZNAMENNY COMBINING MARK TSATA S KRYZHEM
1CF19	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE S KRYZHEM
1CF1A	◌○	ZNAMENNY COMBINING MARK STRANNO MALO POVYSHE
1CF1B	◌○	ZNAMENNY COMBINING MARK POVYSHE S KRYZHEM
1CF1C	◌○	ZNAMENNY COMBINING MARK POVYSHE STRANNO
1CF1D	◌○	ZNAMENNY COMBINING MARK VYSOKO S KRYZHEM
1CF1E	◌○	ZNAMENNY COMBINING MARK MALO POVYSHE STRANNO
1CF1F	◌○	ZNAMENNY COMBINING MARK GORAZDO VYSOKO
1CF20	◌○	ZNAMENNY COMBINING MARK ZELO
1CF21	◌○	ZNAMENNY COMBINING MARK ON
1CF22	◌○	ZNAMENNY COMBINING MARK RAVNO
1CF23	◌○	ZNAMENNY COMBINING MARK TIKHAYA
1CF24	◌○	ZNAMENNY COMBINING MARK BORZAYA
1CF25	◌○	ZNAMENNY COMBINING MARK UDARKA
1CF26	◌○	ZNAMENNY COMBINING MARK PODVERTKA

1CF27	◌○	ZNAMENNY COMBINING MARK LOMKA
1CF28	◌○	ZNAMENNY COMBINING MARK KUPNAYA
1CF29	◌○	ZNAMENNY COMBINING MARK KACHKA
1CF2A	◌○	ZNAMENNY COMBINING MARK ZEVOK
1CF2B	◌○	ZNAMENNY COMBINING MARK SKOBA
1CF2C	◌○	ZNAMENNY COMBINING MARK RAZSEKA
1CF2D	◌○	ZNAMENNY COMBINING MARK KRYZH

**Combining Black Marks**

1CF30	◌○	ZNAMENNY COMBINING TONAL RANGE MARK MRACHNO
1CF31	◌○	ZNAMENNY COMBINING TONAL RANGE MARK SVETLO
1CF32	◌○	ZNAMENNY COMBINING TONAL RANGE MARK TRESVETLO
1CF33	◌○	ZNAMENNY COMBINING MARK ZADERZHKA • Ottiyazhka
1CF34	◌○	ZNAMENNY COMBINING MARK DEMESTVENNY ZADERZHKA
1CF35	◌○	ZNAMENNY COMBINING MARK OTSECHKA
1CF36	◌○	ZNAMENNY COMBINING MARK PODCHASHIE
1CF37	◌○	ZNAMENNY COMBINING MARK PODCHASHIE WITH VERTICAL STROKE
1CF38	◌○	ZNAMENNY COMBINING MARK CHASHKA
1CF39	◌○	ZNAMENNY COMBINING MARK CHASHKA POLNAYA
1CF3A	◌○	ZNAMENNY COMBINING MARK OBLACHKO
1CF3B	◌○	ZNAMENNY COMBINING MARK SOROCHYA NOZHKA • Sokolik
1CF3C	◌○	ZNAMENNY COMBINING MARK TOCHKA
1CF3D	◌○	ZNAMENNY COMBINING MARK DVOETOCHIE
1CF3E	◌○	ZNAMENNY COMBINING ATTACHING VERTICAL OMET
1CF3F	◌○	ZNAMENNY COMBINING MARK CURVED OMET
1CF40	◌○	ZNAMENNY COMBINING MARK KRYZH
1CF41	◌○	ZNAMENNY COMBINING LOWER TONAL RANGE INDICATOR

**Control Characters for Priznaki**

1CF42	PK	ZNAMENNY PRIZNAK MODIFIER LEVEL 2
1CF43	P3	ZNAMENNY PRIZNAK MODIFIER LEVEL 3
1CF44	PU	ZNAMENNY PRIZNAK MODIFIER DIRECTION FLIP
1CF45	PK	ZNAMENNY PRIZNAK MODIFIER KRYZH
1CF46	PR	ZNAMENNY PRIZNAK MODIFIER ROG

**Znamenny Neumes**

1CF50	✓	ZNAMENNY NEUME KRYUK
1CF51	✓	ZNAMENNY NEUME KRYUK TIKHY
1CF52	✓	ZNAMENNY NEUME PARAKLIT
1CF53	✓	ZNAMENNY NEUME DVA V CHELNU
1CF54	✗	ZNAMENNY NEUME KLYUCH • Kryuk Klyuchevoy
1CF55	✓	ZNAMENNY NEUME ZANOZHEK
1CF56	✗	ZNAMENNY NEUME STOPITSA
1CF57	✗	ZNAMENNY NEUME STOPITSA S OCHKOM
1CF58	✗	ZNAMENNY NEUME PEREVODKA
1CF59	✗	ZNAMENNY NEUME PEREVODKA NEPOSTOYANNAYA
1CF5A	✗	ZNAMENNY NEUME STOPITSA WITH SOROCHYA NOZHKA • This is not a decomposable character
1CF5B	✗	ZNAMENNY NEUME CHELYUSTKA

1CF5C	ZNAMENNY NEUME PALKA	1CF85	ZNAMENNY NEUME ZMEYTSIA • Litso
1CF5D	ZNAMENNY NEUME ZAPYATAYA	1CF86	ZNAMENNY NEUME STATYA
1CF5E	ZNAMENNY NEUME GOLUBCHIK BORZY	1CF87	ZNAMENNY NEUME STATYA S ZAPYATOY
1CF5F	ZNAMENNY NEUME GOLUBCHIK TIKHY	1CF88	ZNAMENNY NEUME STATYA S KRYZHEM
1CF60	ZNAMENNY NEUME GOLUBCHIK MRACHNY	1CF89	ZNAMENNY NEUME STATYA S ZAPYATOY I KRYZHEM
1CF61	ZNAMENNY NEUME GOLUBCHIK SVETLY	1CF8A	ZNAMENNY NEUME STATYA S KRYZHEM I ZAPYATOY
1CF62	ZNAMENNY NEUME GOLUBCHIK TRESVETLY • Golubchik Nepostoyanny	1CF8B	ZNAMENNY NEUME STATYA ZAKRYTAYA
1CF63	ZNAMENNY NEUME VRAKHIYA PROSTAYA	1CF8C	ZNAMENNY NEUME STATYA ZAKRYTAYA S ZAPYATOY
1CF64	ZNAMENNY NEUME VRAKHIYA MRACHNAYA	1CF8D	ZNAMENNY NEUME STATYA S ROGOM
1CF65	ZNAMENNY NEUME VRAKHIYA SVETLAYA	1CF8E	ZNAMENNY NEUME STATYA S DVUMYA ZAPYATYMI
1CF66	ZNAMENNY NEUME VRAKHIYA TRESVETLAYA • Vrakhia Nepostoyannaya	1CF8F	ZNAMENNY NEUME STATYA S ZAPYATOY I PODCHASHIEM
1CF67	ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA PROSTAYA	1CF90	ZNAMENNY NEUME POLKULIZMY • This is not a decomposable character
1CF68	ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA MRACHNAYA	1CF91	ZNAMENNY NEUME STATYA NEPOSTOYANNAYA
1CF69	ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA SVETLAYA	1CF92	ZNAMENNY NEUME STRELA PROSTAYA
1CF6A	ZNAMENNY NEUME VRAKHIYA KLYUCHEVAYA TRESVETLAYA • Vrakhia Klyuchevaya Nepostoyannaya	1CF93	ZNAMENNY NEUME STRELA MRACHNOTIKHAYA
1CF6B	ZNAMENNY NEUME DOUBLE ZAPYATAYA	1CF94	ZNAMENNY NEUME STRELA KRYZHEVAYA • Strela Polukryzhevaya
1CF6C	ZNAMENNY NEUME REVERSED CHELYUSTKA	1CF95	ZNAMENNY NEUME STRELA POLUPOVODNAYA
1CF6D	ZNAMENNY NEUME DERBITSA	1CF96	ZNAMENNY NEUME STRELA POVODNAYA
1CF6E	ZNAMENNY NEUME KHAMIRO	1CF97	ZNAMENNY NEUME STRELA NEPOSTOYANNAYA
1CF6F	ZNAMENNY NEUME CHASHKA	1CF98	ZNAMENNY NEUME STRELA KLYUCHEPOVODNAYA
1CF70	ZNAMENNY NEUME PODCHASHIE	1CF99	ZNAMENNY NEUME STRELA KLYUCHENEPOSTOYANNAYA
1CF71	ZNAMENNY NEUME SKAMEYTSIA MRACHNAYA	1CF9A	ZNAMENNY NEUME STRELA TIKHAYA PUTNAYA
1CF72	ZNAMENNY NEUME SKAMEYTSIA SVETLAYA	1CF9B	ZNAMENNY NEUME STRELA DVOECHELNAYA
1CF73	ZNAMENNY NEUME SKAMEYTSIA TRESVETLAYA	1CF9C	ZNAMENNY NEUME STRELA DVOECHELNOKRYZHEVAYA
1CF74	ZNAMENNY NEUME SKAMEYTSIA TIKHAYA	1CF9D	ZNAMENNY NEUME STRELA DVOECHELNOPOVODNAYA
1CF75	ZNAMENNY NEUME DEMESTVENNY KLYUCH • Skameytsa Klyuchevaya	1CF9E	ZNAMENNY NEUME STRELA DVOECHELNAYA KLYUCHEVAYA
1CF76	ZNAMENNY NEUME SKAMEYTSIA KLYUCHEVAYA SVETLAYA	1CF9F	ZNAMENNY NEUME STRELA DVOECHELNOPOVODNAYA KLYUCHEVAYA
1CF77	ZNAMENNY NEUME SKAMEYTSIA KLYUCHENEPOSTOYANNAYA	1CFA0	ZNAMENNY NEUME STRELA GROMNAYA WITH SINGLE ZAPYATAYA
1CF78	ZNAMENNY NEUME SKAMEYTSIA KLYUCHEVAYA TIKHAYA	1CFA1	ZNAMENNY NEUME STRELA GROMOPOVODNAYA WITH SINGLE ZAPYATAYA
1CF79	ZNAMENNY NEUME SKAMEYTSIA DVOECHELNAYA PROSTAYA	1CFA2	ZNAMENNY NEUME STRELA GROMNAYA
1CF7A	ZNAMENNY NEUME SKAMEYTSIA DVOECHELNAYA SVETLAYA	1CFA3	ZNAMENNY NEUME STRELA GROMOPOVODNAYA
1CF7B	ZNAMENNY NEUME SKAMEYTSIA DVOECHELNAYA NEPOSTOYANNAYA	1CFA4	ZNAMENNY NEUME STRELA GROMOPOVODNAYA WITH DOUBLE ZAPYATAYA
1CF7C	ZNAMENNY NEUME SKAMEYTSIA DVOECHELNAYA KLYUCHEVAYA	1CFA5	ZNAMENNY NEUME STRELA GROMOKRYZHEVAYA
1CF7D	ZNAMENNY NEUME SLOZHITIE	1CFA6	ZNAMENNY NEUME STRELA GROMOKRYZHEVAYA POVODNAYA • Strela Gromomrachnaya s Kryzhem
1CF7E	ZNAMENNY NEUME SLOZHITIE S ZAPYATOY	1CFA7	ZNAMENNY NEUME MECHIK
1CF7F	ZNAMENNY NEUME SLOZHITIE ZAKRYTOE	1CFA8	ZNAMENNY NEUME MECHIK POVODNY
1CF80	ZNAMENNY NEUME SLOZHITIE S KRYZHEM	1CFA9	ZNAMENNY NEUME MECHIK KLYUCHEVOY
1CF81	ZNAMENNY NEUME KRYZH	1CFAA	ZNAMENNY NEUME MECHIK KLYUCHEPOVODNY
1CF82	ZNAMENNY NEUME ROG	1CFAB	ZNAMENNY NEUME MECHIK KLYUCHENEPOSTOYANNY
1CF83	ZNAMENNY NEUME FITA		
1CF84	ZNAMENNY NEUME KOBYLA		

1CFAC	〃✓	ZNAMENNY NEUME STRELA TRYASOGLASNAYA
1CFAD	〃✓	ZNAMENNY NEUME STRELA TRYASOPOVODNAYA
1CFAE	〃✓	ZNAMENNY NEUME STRELA TRYASOSTRELNAYA
1CFAF	✓	ZNAMENNY NEUME OSOKA
1CFB0	✓✓	ZNAMENNY NEUME OSOKA SVETLAYA
1CFB1	✓✓	ZNAMENNY NEUME OSOKA TRESVETLAYA • Osoka Nepostoyannaya
1CFB2	✓✓	ZNAMENNY NEUME OSOKA KRYUKOVAYA SVETLAYA
1CFB3	✓✓	ZNAMENNY NEUME OSOKA KLYUCHEVAYA SVETLAYA
1CFB4	✓✓	ZNAMENNY NEUME OSOKA KLYUCHEVAYA NEPOSTOYANNAYA
1CFB5	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA
1CFB6	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA POVODNAYA
1CFB7	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMNAYA WITH SINGLE ZAPYATAYA
1CFB8	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA WITH SINGLE ZAPYATAYA
1CFB9	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMNAYA
1CFBA	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA
1CFBB	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOPOVODNAYA WITH DOUBLE ZAPYATAYA
1CFBC	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOKRYZHEVAYA
1CFBD	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA GROMOKRYZHEVAYA POVODNAYA • Strela Kryukovaya Gromomrachnaya s Kryzhem
1CFBE	✓✓	ZNAMENNY NEUME STRELA KRYUKOVAYA TRYASKA
1CFBF	✓	ZNAMENNY NEUME ROZHEK
1CFC0	✓✓	ZNAMENNY NEUME STRELA ROZHNAYA
1CFC1	♦	ZNAMENNY NEUME DUDA
1CFC2	§	ZNAMENNY NEUME NEMKA
1CFC3	✓	ZNAMENNY NEUME PAUK
1CFC4	~	ZNAMENNY NEUME OBLAKO

# Appendix 1 Znamenny Notation Neumes and Combinations

Based on: L. F. Kalashnikov. *Azbuka Tserkovnago Znamennago Peniya.* 3<sup>rd</sup> rev. ed. Moscow, 1915.

No.	Neume	Components
1	✓	✓ 1CF50
2	✓'	✓ 1CF50 1CF35
3	✓'	✓ 1CF50 1CF33
4	✓' ✓'	✓ 1CF51 1CF31 1CF07 1CF27
5	✓' ✓'	✓ 1CF50 1CF31 1CF36 1CF06
6	✓' ✓'	✓ 1CF50 1CF31 1CF06 1CF26
7	✓'	✓ 1CF52 1CF06
8	✓' ✓'	✓ 1CF52 1CF35 1CF06
9	✓' ✓'	✓ 1CF52 1CF33 1CF06
10	✓' ✓'	✓ 1CF52 1CF36 1CF06
11	✓' ✓'	✓ 1CF52 1CF26 1CF06
12	□	□ 1CF5D 1CF03
13	□'	□ 1CF5D 1CF35 1CF03
14	□' □'	□ 1CF5D 1CF03 1CF81
15	↓	↓ 1CF56 1CF06
16	↓'	↓ 1CF56 1CF35 1CF06
17	↓'	↓ 1CF57 1CF06
18	✓' ✓'	✓ 1CF54 1CF06
19	↓'	↓ 1CF5B 1CF06
20	✓' ✓'	✓ 1CF70 1CF31 1CF06
21	↑	↑ 1CF5C 1CF06
22	↑'	↑ 1CF5C 1CF35 1CF06
23	↑'	↑ 1CF5C 1CF06 1CF26
24	↑'	↑ 1CF5C 1CF3D
25	↑' ✓'	↑ 1CF5C 1CF3D 1CF26 1CF06 1CF29

26		1CF71	1CF72	1CF06	1CF73		
27		1CF74	1CF06				
28		1CF72	1CF24				
29		1CF72	1CF23				
30		1CF72	1CF33	1CF23			
31		1CF6D	1CF08	1CF24			
32		1CF58	1CF24				
33		1CF58	1CF05	1CF27			
34		1CF58	1CF26	1CF27			
35		1CF58	1CF05	1CF25			
36		1CF5E					
37		1CF5F	1CF23				
38		1CF6F	1CF06				
39		1CF6F	1CF05	1CF27			
(39a)		1CF6F	1CF2B				
40		1CF6F	1CF3C	1CF05			
41		1CF86	1CF03				
42		1CF87	1CF03				
43		1CF87	1CF05	1CF23			
44		1CF88	1CF04				
45		1CF90	1CF23	1CF05			
46		1CF86	1CF30	1CF05			
47		1CF92	1CF06				
48		1CF92	1CF30	1CF06	1CF22		
49		1CF92	1CF30	1CF3B	1CF05	1CF22	1CF2A
50		1CF92	1CF36	1CF06			
51		1CF92	1CF07	1CF26	1CF24		
52		1CF86	1CF31	1CF06			

53		1CF86 1CF31 1CF08 1CF23
54		1CF86 1CF31 1CF3A 1CF0A 1CF22
55		1CF86 1CF31 1CF3B 1CF09
56		1CF8B 1CF06 1CF22
57		1CF8B 1CF30 1CF08 1CF22
58		1CF8B 1CF30 1CF04 1CF23 1CF22
59		1CF81
60		1CF82
61		1CF7D 1CF06
62		1CF7D 1CF06 1CF28
63		1CF7D 1CF33 1CF06
64		1CF7D 1CF06 1CF26
65		1CF7D 1CF06 1CF26 1CF28
66		1CF7E 1CF06
67		1CF7E 1CF07 1CF23
68		1CF7E 1CF07 1CF26
69		1CF90 1CF30 1CF07
70		1CF53 1CF06 1CF29
71		1CF53 1CF33 1CF06 1CF29
72		1CF53 1CF35 1CF06 1CF29
73		1CF53 1CF06 1CF26 1CF29
74		1CF53 1CF36 1CF06 1CF29
75		1CF01 1CF92 1CF07 1CF23 1CF24
76		1CF01 1CF92 1CF30 1CF3A 1CF07 1CF23 1CF24 1CF22
77		1CF01 1CF87 1CF06
78		1CF01 1CF07
79		1CF02 1CF87 1CF07

80			1CF06	1CF06
81			1CF06	1CF23
82			1CF06	1CF23
83			1CF06	1CF23
84			1CF06	1CF23
85			1CF06	1CF23
86			1CF06	1CF24
87			1CF06	1CF24
88			1CF06	1CF24
89			1CF06	1CF23
90			1CF06	1CF24
91			1CF06	1CF23
92			1CF06	1CF24
93			1CF06	1CF24
93a			1CF05	1CF25
94			1CF06	1CF23
95			1CF06	1CF24
96			1CF06	1CF24
97			1CF07	1CF24
98			1CF07	1CF24
99			1CF07	1CF24
100			1CF07	1CF24
101			1CF07	1CF24
102			1CF07	1CF23
103			1CF07	1CF23

104		1CF92 1CF31 1CF36 1CF07 1CF23
105		1CF93 1CF31 1CF07 1CF23
106		1CF93 1CF31 1CF33 1CF07 1CF23
107		1CF96 1CF30 1CF07 1CF24
108		1CF01
109		1CF04 1CF24
110		1CF06 1CF29
111		1CF06 1CF29
112		1CF06 1CF26 1CF29
113		1CF06 1CF29
114		1CF06 1CF29 1CF2A
115		1CF08 1CF24
116		1CF08 1CF24
117		1CF08 1CF26 1CF24
118		1CF08 1CF24
119		1CF08 1CF24
120		1CF06 1CF23
121		1CF08
122		1CF08 1CF24
123		1CF05 1CF24
124		1CF06 1CF26 1CF24
125		1CF09 1CF24
126		1CF08 1CF24
127		1CF08 1CF24
128		1CF06 1CF24 1CF22
129		1CF08 1CF25

130							
131							
132							
133							
134							
135							
136							
137							
138							
139							
140							
141							
142							

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## Appendix 2 Demestvenny Notation Neumes and Sequences

(1) = G. Pozhidayeva, *Leksikologiya Demestvennogo Peniya*. Moscow, 2010.

(2) = L. Kalashnikov, *Azbuka Demestvennogo Peniya*. Kiev, 1911.

### 2.1 Base Neumes

(1)	(2)	Name	Disp.	Encoding
61	7	Kryuk		1CF50 1CF04
62	16	Kryuk with Sorochiya Nozhka		1CF50 1CF3B 1CF06
73	8,9	Kryuk Ometny		1CF50 1CF3E 1CF08
	7	Kryuk with Kryzh		1CF50 1CF40 1CF07
63		Kryuk with Kryzh		1CF50 1CF40 1CF07 1CF12
66	14	Kryuk Mrachny		1CF50 1CF30 1CF08
67	16b	Kryuk Svetly		1CF50 1CF31 1CF08
74		Kryuk Svetloometny		1CF50 1CF3E 1CF31 1CF08 1CF22 1CF13
74a	23	Kryuk Svetloometny (non-attaching)		1CF50 1CF31 1CF3F 1CF08
68		Kryuk Svetly with Kryzh		1CF50 1CF40 1CF31 1CF06 1CF07 1CF12
71	17	Kryuk Tresvetly		1CF50 1CF32 1CF09
132	13	Kryuk with Podchashie		1CF50 1CF36 1CF08
	13b	Kryuk with Podchashie with Vertical Stroke		1CF50 1CF37 1CF0A
133	14b	Podchashie Mrachnoye		1CF50 1CF30 1CF36 1CF09
137	19	Podchashie Svetloye		1CF50 1CF31 1CF36 1CF09
118	37	Paraklit		1CF52 1CF09
121	41	Paraklit Mrachny		1CF52 1CF30 1CF09
122	38	Paraklit with Podchashie		1CF52 1CF36 1CF09
122a		Paraklit with Podchashie		1CF52 1CF36 1CF09 1CF13
	39	Paraklit with Podchashie with Vertical Stroke		1CF52 1CF37 1CF0A

40	Paraklit with Podchashie and Kryzh					
75	153 Kryuk Klyuchevoy					
	156 Kryuk Klyuchevoy with Borzaya Mark					
	155 Kryuk Klyuchevoy with Sorochya Nozhka					
77	158 Kryuk Klyuchevoy with Kryzh and Borzaya					
76	157 Kryuk Klyuchevoy with Kryzh					
78	159 Kryuk Klyuchevoy with Two Kryzhy					
	160 Kryuk Klyuchevoy with Two Kryzhy					
	161 Kryuk Klyuchevoy with Three Kryzhy Zanozhek (Old style; standard font)					
14	27 Zanozhek (New style variant)					
16	31 Zanozhek Ometny					
15	30 Zanozhek with Kryzh					
	29 Zanozhek with Kryzh					
19	34 Zanozhek Mrachny					
	33 Zanozhek Svetly with Kryzh					
184	51 Stopitsa					
185	47 Stoptisa with Borzaya Mark					
186	47b Stoptisa with Udarka Mark					
187	48 Stoptisa with Kryzh					
188	Stopitsa with Kryzh and Borzaya Mark					
	53 Stopitsa with Two Kryzhy					
189	54 Stopitsa with Two Kryzhy					
	52 Stopitsa with Two Kryzhy					
190	55 Stopitsa with Three Kryzhy					
	57 Stopitsa with Three Kryzhy					

123	95	Perevodka		 1CF58 1CF14
	96	Perevodka with Borzaya Mark		 1CF58 1CF14 1CF24
124	97	Perevodka with Sorochya Nozhka		 1CF58 1CF3B 1CF15
128	98	Perevodka Ometnaya		 1CF58 1CF3F 1CF06 1CF08 1CF25
	100	Perevodka with Kryzh		 1CF58 1CF40 1CF05 1CF10
125	99	Perevodka with Kryzh		 1CF58 1CF40 1CF14
130	107	Perevodka Nepostoyannaya		 1CF59 1CF06 1CF13
131	108	Perevodka Nepostoyannaya with Sorochya Nozhka		 1CF59 1CF3B 1CF04 1CF12
129	109	Perevodka Nepostoyannoometnaya		 1CF59 1CF3F 1CF06 1CF07 1CF12
		Stopitsa with Sorochya Nozhka (Old Style; standard font)		 1CF5A 1CF04 1CF07
159		Stopitsa with Sorochya Nozhka (New Style variant)		 1CF5A 1CF04 1CF07
216	49	Chelyustka		 1CF5B 1CF05
217		Chelyustka with Borzaya Mark		 1CF5B 1CF05 1CF24
117	5	Palka		 1CF5C 1CF06
20	65	Zapyataya		 1CF5D 1CF07
21		Zapyataya with Borzaya Mark		 1CF5D 1CF06 1CF24
156	68	Sokolitse		 1CF5D 1CF3B 1CF06
4		Golubchik		 1CF60 1CF05 1CF06
	66	Golubchik with Tikhaya Mark		 1CF60 1CF23
	67	Golubchik with Borzaya Mark		 1CF60 1CF24
12	73	Golubchik Ometny with Borzaya Mark		 1CF60 1CF3F 1CF09 1CF0A
	75	Golubchik with Kryzh		 1CF60 1CF40 1CF08
5	76	Golubchik with Kryzh and Borzaya Mark		 1CF60 1CF40 1CF08 1CF24
	77	Golubchik with Two Kryzhy and Borzaya Mark		 1CF60 1CF40 1CF40 1CF07
6		Golubchik with Two Kryzhy and Borzaya Mark		 1CF60 1CF40 1CF40 1CF07 1CF24

7	Golubchik Svetly		
82	Golubchik Svetly with Tikhaya Mark		
83	Golubchik Svetly with Borzaya Mark		
84	Golubchik Svetly with Sorochya Nozhka		
8	Golubchik Svetlokryzhny		
8a	Golubchik Svetlokryzhny (variant)		
85	Golubchik Svetlokryzhny with Tikhaya Mark		
9	86 Golubchik Tresvetly		
10	87 Golubchik Tresvetly with Sorochya Nozhka		
89	Golubchik Tresvetloometny with Borzaya		
13	90 Golubchik Tresvetloometny with Udarka		
11	88 Golubchik Tresvetly with Kryzh		
1	Vrakhiya Mrachnaya		
2	78 Vrakhiya Mrachnaya with Tikhaya Mark		
79	Vrakhiya Mrachnaya with Borzaya Mark		
80	Vrakhiya Mrachnaya with Kryzh		
3	81 Vrakhiya Mrachnaya with Kryzh and Tikhaya Mark		
139	Skameytsa		
140	Skameytsa with Podvertka		
118	Skameytsa with Podvertka		
143	114 Skameytsa Mrachnaya		
141	113 Skameytsa with Sorochya Nozhka		
144	116 Skameytsa Nepostoyannaya		
146	119 Skameytsa Mrachnonepostoyannaya		

145	117	Skameytsa Nepostoyannaya with Sorochya Nozhka		 1CF73 1CF3B 1CF07 1CF08
57	210	Klyuch with Udarka	 	 1CF75 1CF08 1CF25
58	212	Klyuch Mrachny (with Udarka)	 	 1CF75 1CF30 1CF08 1CF25
	211	Klyuch Zakryty (with Udarka)	 	 1CF75 1CF3C 1CF08 1CF25
59a		Klyuch with Kryzh	 	 1CF75 1CF40 1CF06 1CF0F
59	213	Klyuch with Kryzh (with Udarka)	 	 1CF75 1CF40 1CF08 1CF25 1CF11
147	215	Skameytsa Klyuchevaya	 	 1CF76 1CF08 1CF29
148	216	Skameytsa Klyuchevaya with Podvertka	 	 1CF76 1CF08 1CF29 1CF26
149	110	Skameytsa Dvoyechelnaya	 	 1CF7A 1CF07
150	111	Skameytsa Dvoyechelnaya with Sorochya Nozhka	 	 1CF7A 1CF3B 1CF06 1CF05 1CF06 1CF07
151	112	Skameytsa Dvoyechelnaya with Podvertka	 	 1CF7A 1CF07 1CF06 1CF07 1CF06 1CF26
154	6	Slozhitie Zakrytoe	 	 1CF7F 1CF06 1CF11
155	6b	Slozhitie s Kryzhem	 	 1CF80 1CF06
60		Kryzh	 	 1CF81 1CF04
138		Rog	 	 1CF82 1CF04
160	1	Statya	 	 1CF86 1CF06
176	2	Statya Mrachnaya	 	 1CF86 1CF30 1CF05
180	1b	Statya Svetlaya	 	 1CF86 1CF31 1CF08
183		Statya with Zapyataya	 	 1CF87 1CF04 1CF0F
177	3	Statya Mrachnaya Polukryzhnaya	 	 1CF88 1CF30 1CF06 1CF11
178		Statya Mrachnaya Pristupnaya (Polukryzhnaya)	 	 1CF88 1CF30 1CF06 1CF11
179		Statya Mrachnaya with Kryzh	 	 1CF88 1CF30 1CF06 1CF11
177a		Statya Mrachnaya Polukryzhnaya	 	 1CF88 1CF30 1CF06 1CF11
	4	Statya Mrachnaya Polukryzhnaya	 	 1CF88 1CF30 1CF06 1CF22

195	126	Strela	1CF92 1CF06
198	139	Strela Mrachnaya	1CF92 1CF30 1CF06 1CF07
196	127	Strela with Sorochya Nozhka	1CF92 1CF3B 1CF08
197a	148	Strela with Kryzh	1CF92 1CF40 1CF05 1CF10
199	149	Strela Mrachnokryzhnaya with Tikhaya Mark	1CF92 1CF40 1CF30 1CF08 1CF22 1CF23
200	150	Strela Svetlokryzhnaya	1CF92 1CF40 1CF31 1CF08 1CF22 1CF13
202		Strela Mrachnotikhaya	1CF93 1CF30 1CF07
	141	Strela Mrachnotikhaya	1CF93 1CF30 1CF07 1CF23
207	138	Strela Polupovodnaya	1CF95 1CF06
203	142	Strela Povodnaya	1CF96 1CF07
208	151	Strela Poezdnaya	1CF96 1CF30 1CF06
	152	Strela Poezdnaya	1CF96 1CF30 1CF06
204	146	Strela Kryzhepovodnaya	1CF96 1CF40 1CF07 1CF29
201	128	Strela Tikhaya	1CF9A 1CF07
209a	129	Strela Dvoechelnaya	1CF9B 1CF04 1CF22 1CF06
	135	Strela Dvoechelnaya with Kryzh	1CF9B 1CF40 1CF06 1CF22 1CF07
211	136	Strela Dvoechelnaya with Kryzh and Sorochya Nozhka	1CF9B 1CF40 1CF3B 1CF06 1CF22 1CF07 1CF12
		Mechik; Mechik Prostoy (Old Style; standard font)	1CF07 1CF07
82	137	Mechik; Mechik Prostoy (New Style variant)	1CF07 1CF06
		Mechik Klyuchevoy (Old Style; standard font)	1CF07 1CF06
83	232	Mechik Klyuchevoy (New Style variant)	1CF07 1CF06
	233	Mechik Mrachnoklyuchevoy	1CF07 1CF06
106		Mechik Mrachnoklyuchevoy Ometny	1CF07 1CF06

105	235	Mechik Mrachnoklyuchevoy Zakryty		 1CF08 1CF3C 1CF30 1CF09
109	255	Mechik Mrachnoklyuchevoy Zakryty with Zaderzhka	 	 1CF08 1CF34 1CF30 1CF09 1CF07 1CF22
	254	Mechik Mrachnoklyuchevoy Zakryty	 	 1CF08 1CF34 1CF3C 1CF07 1CF22
84	234	Mechik Klyuchevoy Zakryty	 	 1CF08 1CF3C 1CF09
88		Mechik Klyuchevoy Ometny	 	 1CF08 1CF3F 1CF06
	238	Mechik Klyuchevoy with Kryzh	 	 1CF08 1CF40 1CF06 1CF0F
85	237	Mechik Klyuchevoy with Kryzh	 	 1CF08 1CF40 1CF07
107		Mechik Mrachnoklyuchevoy with Kryzh	 	 1CF08 1CF40 1CF34 1CF07
	256	Mechik Klyuchepovodny	 	 1CF08 1CF07
	257	Mechik Klyuchepovodny	 	 1CF08 1CF07
111		Mechik Klyuchepovodny	 	 1CF08 1CF06 1CF05 1CF06
	258	Mechik Klyuchepovodny	 	 1CF08 1CF07 1CF06 1CF05 1CF06
	261	Mechik Klyuchepovodny	 	 1CF08 1CF29 1CF12
112	260	Mechik Klyuchepovodny with Sorochya Nozhka <sup>1</sup>	 	 1CF08 1CF3B 1CF08
	259	Mechik Klyuchepovodny with Podvertka	 	 1CF08 1CF26 1CF29 1CF11
110		Mechik Klyuchenepostoyanny	 	 1CF07 1CF06 1CF05 1CF06 1CF07
114	102	Osoka	 	 1CF08
116		Osoka with Tikhaya	 	 1CF08 1CF23
	101	Osoka	 	 1CF08 1CF24
115	103	Osoka with Kryzh	 	 1CF08 1CF40 1CF06 1CF07 1CF08 1CF13

<sup>1</sup>This item in (1) and (2) is erroneously identified as a Mechik Klyuchepovodny with Podvertka ().

## 2.2 Sequences

(1)	(2)	Disp.	Encoding
64			 1CF50 1CF06 1CF56 1CF22
	10		 1CF50 1CF08 1CF56
65			 1CF50 1CF08 1CF56 1CF80 1CF22
69	18		 1CF50 1CF31 1CF06 1CF56
70a	24		 1CF50 1CF31 1CF08 1CF22 1CF5C 1CF07
70			 1CF50 1CF31 1CF08 1CF5C 1CF22 1CF13
72	17b		 1CF50 1CF32 1CF09 1CF5C
136	25		 1CF50 1CF30 1CF36 1CF09 1CF50 1CF30
135	26		 1CF50 1CF30 1CF36 1CF08 1CF09 1CF56 1CF08 1CF80 1CF22
134	15		 1CF50 1CF30 1CF36 1CF08 1CF09 1CF5C 1CF08
119a	44, 45		 1CF52 1CF08 1CF56 1CF07 1CF7F 1CF22
119	43		 1CF52 1CF08 1CF56 1CF7F 1CF22
120a			 1CF52 1CF08 1CF56 1CF07 1CF80 1CF22 1CF12
120	42		 1CF52 1CF08 1CF56 1CF22 1CF80 1CF12
80	164		 1CF54 1CF06 1CF50 1CF08
	165		 1CF54 1CF09 1CF50 1CF36
81	166		 1CF54 1CF06 1CF50 1CF30 1CF08 1CF22 1CF13
	168		 1CF54 1CF54 1CF06 1CF50 1CF36 1CF0F
79a			 1CF54 1CF06 1CF56
79			 1CF54 1CF06 1CF56 1CF22
	162		 1CF54 1CF08 1CF56
	167		 1CF54 1CF09 1CF49 1CF40
170 <sup>2</sup>			 1CF54 1CF09 1CF49 1CF3E 1CF5D 1CF07 1CF75 1CF08 1CF25 1CF5C 1CF06

<sup>2</sup>This sequence contains 1 of 5 graphically contracted character forms, accessible via Stylistic Set 3. Always following another neume, they indicate that the melodic structure of these two neumes in conjunction is also contracted or elided.

171										
169										
17	35									
18	36									
	46									
	205									
	206									
	207									
192	63									
192a										
	61									
192b	60									
	59									
193										
194	58									
194a										
191										
126										
127										
64										
153										
208										
69										
37										
92										
172										
38										

179							
183							
182							
199							
200							
39							
174							
54							
175							
55	176						
180							
40							
42							
181							
32	222						
41							
53							
44							
188							
45	196						
189							
173							
50							
48	186						
51							
49	187						

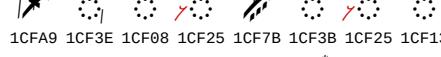
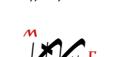
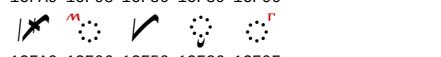
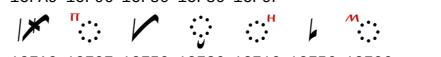
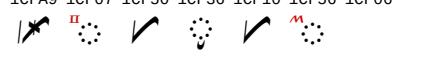
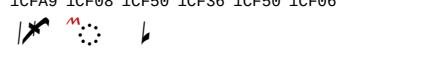
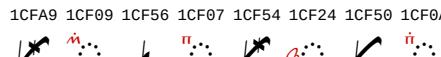
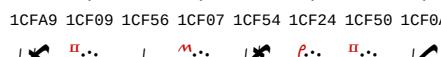
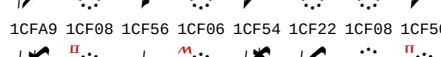
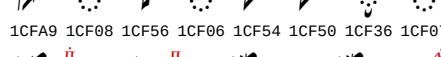
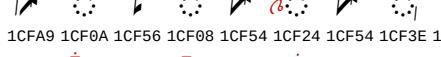
	52	
43	201 <sup>3</sup>	
	202 <sup>3</sup>	
46		
	198	
	184	
	193	
	204 <sup>3</sup>	
	191	
47		
	203	
	197	
	194	
	192	
	185	
	190	
	195	
24		
	217	
25	218	
	219	
36 <sup>3</sup>	229	
34 <sup>3</sup>		
	230 <sup>3</sup>	
	35 <sup>3</sup>	

<sup>3</sup>See footnote 2.

26				1CF5D 1CF07 1CF75 1CF3F 1CF08 1CF25
28	228			1CF5D 1CF07 1CF75 1CF40 1CF08 1CF25 1CF11
31	220			1CF5D 1CF07 1CF75 1CF08 1CF25 1CF50
33	221			1CF5D 1CF07 1CF75 1CF08 1CF25 1CF50 1CF36 1CF11
27	223			1CF5D 1CF06 1CF75 1CF07 1CF25 1CF56
	231			1CF5D 1CF07 1CF75 1CF08 1CF25 1CF56 1CF7F 1CF5A 1CF07 1CF24
	227			1CF5D 1CF06 1CF75 1CF07 1CF5C 1CF05
	226			1CF5D 1CF08 1CF75 1CF09 1CF24 1CF5C 1CF07
29a				1CF5D 1CF08 1CF75 1CF09 1CF25 1CF5C 1CF07
29				1CF5D 1CF09 1CF75 1CF0A 1CF24 1CF5C 1CF08
	225			1CF5D 1CF07 1CF75 1CF08 1CF25 1CF7D
30	224			1CF5D 1CF07 1CF75 1CF08 1CF25 1CF86 1CF06
22	91			1CF5D 1CF7F 1CF06
23				1CF5D 1CF24 1CF7F 1CF06
56	145			1CF5D 1CF06 1CF96 1CF13
157	70			1CF5D 1CF3B 1CF08 1CF7F 1CF22
158	71			1CF5D 1CF3B 1CF08 1CF80 1CF22
	72			1CF5D 1CF3B 1CF08 1CF80 1CF22 1CF13
	74			1CF60 1CF5C 1CF09
	93			1CF61 1CF08 1CF23 1CF50 1CF0A 1CF56 1CF5C 1CF07
	94			1CF61 1CF08 1CF23 1CF79 1CF0A 1CF50 1CF5C 1CF07
142	122			1CF72 1CF08 1CF29 1CF9A 1CF50 1CF36 1CF11
	123			1CF72 1CF06 1CF29 1CF9A 1CF50 1CF36 1CF03 1CF50
	125			1CF72 1CF08 1CF29 1CF9A 1CF50 1CF36 1CF05 1CF50
	214			1CF75 1CF3E 1CF08 1CF25 1CF5D
152	124			1CF7A 1CF06 1CF29 1CF9A 1CF50 1CF36 1CF0F
	209			1CF86 1CF07 1CF54 1CF3E 1CF22 1CF61 1CF07

303			 1CF86 1CF07 1CF75 1CF3E 1CF22 1CF25 1CF5D 1CF05 1CF54 1CF3B 1CF07
298			 1CF86 1CF08 1CF75 1CF22 1CFA9 1CF3C 1CF11
161			 1CF86 1CF0A 1CFA9
162	299		 1CF86 1CF08 1CFA9 1CF3C 1CF22
308			 1CF86 1CF0A 1CFA9 1CF3E 1CF22 1CF5D 1CF08 1CF54 1CF3B 1CF0A
307			 1CF86 1CF07 1CFA9 1CF3E 1CF64 1CF05 1CF07
163			 1CF86 1CF07 1CFA9 1CF40
166			 1CF86 1CF08 1CFA9 1CF50 1CF36
306			 1CF86 1CF08 1CFA9 1CF22 1CF50 1CF36 1CF11 1CF50 1CF07
164	302		 1CF86 1CF0A 1CFA9 1CF22 1CF56 1CF08
165	301		 1CF86 1CF07 1CFA9 1CF22 1CF5C 1CF04
305			 1CF86 1CF08 1CFA9 1CF22 1CF06 1CFA9 1CF3C 1CF05 1CF10
304			 1CF86 1CF0A 1CFA9 1CF22 1CFA9 1CF3E 1CF08 1CF5D 1CF06
167	300		 1CF86 1CF0A 1CFA9 1CF30 1CF3C 1CF22
167a			 1CF86 1CF08 1CFA9 1CF34 1CF3C
310			 1CF86 1CF0A 1CFA9 1CF34 1CF3F 1CF22 1CF22 1CF14
168			 1CF86 1CF0A 1CFA9 1CF34 1CF3F 1CF22 1CF22 1CF14
170			 1CF86 1CF08 1CFA9 1CF34 1CF40 1CF22 1CF22
171	313		 1CF86 1CF08 1CFA9 1CF34 1CF22 1CF22 1CF50
172	315		 1CF86 1CF08 1CFA9 1CF34 1CF22 1CF22 1CF50 1CF30
173	314		 1CF86 1CF08 1CFA9 1CF34 1CF22 1CF22 1CF50 1CF36 1CF11
169			 1CF86 1CF07 1CFA9 1CF34 1CF22 1CF22 1CF5C 1CF05
309			 1CF86 1CF07 1CFA9 1CF34 1CF22 1CF5C 1CF05
316			 1CF86 1CF0A 1CFA9 1CF34 1CF22 1CFA9 1CF3C 1CF08
174			 1CF86 1CF08 1CFA9 1CF34 1CFA9 1CF40
175			 1CF86 1CF0A 1CFA9 1CF30 1CF34 1CF3C 1CF09
312			 1CF86 1CF0A 1CFA9 1CF30 1CF34 1CF3C 1CF22 1CF22 1CF09

181			1CF86 1CF31 1CF08 1CFA9 1CF50 1CF36
182			1CF86 1CF31 1CF0A 1CFA9 1CF40 1CF34
206			1CF96 1CF05 1CF06 1CF07 1CF50
143	144		1CF96 1CF07 1CF50
205	144		1CF96 1CF04 1CF29 1CF56
	131		1CF9B 1CF04 1CF22 1CF06 1CF50
213			1CF9B 1CF09 1CF22 1CF0A 1CF50
215	133		1CF9B 1CF04 1CF22 1CF06 1CF50 1CF30
214	132		1CF9B 1CF04 1CF22 1CF06 1CF50 1CF36
212	130		1CF9B 1CF04 1CF22 1CF06 1CF56
284			1CFA9 1CF3E 1CF0A 1CF14 1CF54 1CF24 1CFA9 1CF09 1CF5C 1CF07
245			1CFA9 1CF3E 1CF06 1CF5D
246			1CFA9 1CF3E 1CF30 1CF08 1CF5D 1CF07
95			1CFA9 1CF3E 1CF07 1CF06 1CF5D 1CF05 1CF54 1CF3B 1CF06 1CF07
273			1CFA9 1CF3E 1CF07 1CF5D 1CF05 1CF54 1CF3B 1CF07
290			1CFA9 1CF3E 1CF07 1CF5D 1CF05 1CF54 1CF3B 1CF07
271			1CFA9 1CF3E 1CF0A 1CF5D 1CF08 1CF54 1CF3B 1CF0A 1CF5D 1CF50 1CF08
272			1CFA9 1CF3E 1CF0A 1CF5D 1CF08 1CF54 1CF3B 1CF0A 1CF5D 1CF3B 1CF08
297			1CFA9 1CF3E 1CF09 1CF5D 1CF07 1CF75 1CF08 1CF25 1CF92 1CF06
103	291		1CFA9 1CF3E 1CF06 1CF62 1CF04 1CF07
	293		1CFA9 1CF3E 1CF08 1CF62 1CF3F 1CF06 1CF09
104			1CFA9 1CF3E 1CF08 1CF62 1CF3F 1CF06 1CF09 1CF14
292			1CFA9 1CF3E 1CF08 1CF62 1CF3F 1CF06 1CF09 1CF25
289			1CFA9 1CF3E 1CF08 1CF62 1CF3F 1CF06 1CF09
288			1CFA9 1CF3E 1CF08 1CF64 1CF05 1CF07 1CF23

101	266 <sup>4</sup>		 1CFA9 1CF3E 1CF08 1CF25 1CF7B 1CF3B 1CF25 1CF13 1CFA9 1CF3E 1CF08 1CF25 1CF7B 1CF3B 1CF25 1CF13
102	265		 1CFA9 1CF3E 1CF08 1CF25 1CF7B 1CF3B 1CF25 1CF13 1CFA9 1CF3E 1CF08 1CF25 1CF7B 1CF3B 1CF25 1CF13
	263 <sup>5</sup>		 1CFA9 1CF08 1CFAB 1CF13 1CFA9 1CF08 1CF29 1CFAB 1CF3B 1CF13
	264 <sup>5</sup>		 1CFA9 1CF3E 1CF08 1CF77 1CF3B 1CF25 1CF13 1CFA9 1CF3E 1CF08 1CF7A 1CF06 1CF07 1CF26
113			 1CFA9 1CF08 1CF50
100 <sup>6</sup>			 1CFA9 1CF08 1CF50 1CF30 1CF06 1CFA9 1CF06 1CF50 1CF36 1CF0F
90	248		 1CFA9 1CF07 1CF50 1CF36 1CF10 1CF56 1CF06 1CFA9 1CF08 1CF50 1CF36 1CF50 1CF06
93	249		 1CFA9 1CF06 1CF50 1CF36 1CF0F
91	247		 1CFA9 1CF07 1CF50 1CF36 1CF10 1CF56 1CF06 1CFA9 1CF08 1CF50 1CF36 1CF50 1CF06
92	250		 1CFA9 1CF06 1CF56
	244		 1CFA9 1CF08 1CF56
	242		 1CFA9 1CF0A 1CF56
86			 1CFA9 1CF08 1CF56 1CF06 1CF54 1CF50 1CF07
	274		 1CFA9 1CF09 1CF56 1CF07 1CF54 1CF24 1CF50 1CF0A
	281		 1CFA9 1CF09 1CF56 1CF07 1CF54 1CF24 1CF50 1CF0A
	282		 1CFA9 1CF08 1CF56 1CF06 1CF54 1CF22 1CF08 1CF50 1CF30 1CF22
	276		 1CFA9 1CF08 1CF56 1CF06 1CF54 1CF50 1CF36 1CF07
	275		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF24 1CF54 1CF3E 1CF09 1CF5D 1CF07
	277		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF09 1CF24 1CF54 1CF3C 1CF13
	280		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF24 1CF50 1CF09 1CF50
	278		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF24 1CF50 1CF09 1CF50
	279		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF24 1CF50 1CF09 1CF50 1CF36 1CF13
	283		 1CFA9 1CF0A 1CF56 1CF08 1CF54 1CF24 1CF50 1CF09 1CF5C 1CF07

<sup>4</sup>This item in (1) and (2) is erroneously recorded with a Skameytsa with Podvertka ().

<sup>5</sup>See footnote 2.

<sup>6</sup>This item in (1) and (2) was recorded with a Skameytsa with Podvertka (, and appears to be incorrect. (As documented, the Podvertka should be a Sorochya Nozhka.) However, it may possibly be correct, and the wrong pitch marks were provided.

87				
	252			
98				
97	285			
99				
287				
286				
267				
268				
270				
269				
89	240			
89a	240			
	253			
108				
295				
296				
96	294			
	262			
<hr/>				
1CFA9	1CF07	1CF56	1CF7F	
1CFA9	1CF08	1CF56	1CF07	1CF7F 1CF11
1CFA9	1CF08	1CF58	1CF3F	
1CFA9	1CF08	1CF59	1CF07	
1CFA9	1CF08	1CF59	1CF3F	1CF06 1CF07
1CFA9	1CF08	1CF59	1CF3F	1CF06 1CF09
1CFA9	1CF08	1CF25	1CF59	1CF3F 1CF06 1CF07
1CFA9	1CF07	1CF5A	1CF07	
1CFA9	1CF0A	1CF5A	1CF0A	
1CFA9	1CF0A	1CF5A	1CF0A	
1CFA9	1CF3C	1CF0A	1CF5A	1CF0A
1CFA9	1CF06	1CF5C	1CF04	
1CFA9	1CF07	1CF5C	1CF04	
1CFA9	1CF34	1CF07	1CF22	1CF5C 1CF05
1CFA9	1CF34	1CF07	1CF22	1CF5C 1CF05
1CFA9	1CF08	1CFA9	1CF10	
1CFA9	1CF08	1CFA9	1CF11	
1CFA9	1CF08	1CFA9	1CF06	1CF10
1CFA9	1CF08	1CF06	1CFAB	1CF07

## Appendix 3 Priznakified Forms of Neumes

### 3.1 Glyphs with Two Priznakified Forms

The following characters have two priznakified forms, a form used at the second level of a soglasie (on the pitches *nizko* and *povyshe*), accessed via U+1CF42 Znamenny Priznak Modifier Level 2, and a form used at the third level of a soglasie (on the pitches *sredne* and *vysoko*), accessed via U+1CF43 Znamenny Priznak Modifier Level 3. In the alternative priznaki system of Morozov, the neumes may also have a variant (“flipped”) form: a flipped form that occurs at the pitch *povyshe* (accessed by invoking the control characters U+1CF42 Znamenny Priznak Modifier Level 2 U+1CF44 Znamenny Priznak Modifier Flip) and a flipped form that occurs at the pitch *vysoko* (accessed by invoking the control characters U+1CF43 Znamenny Priznak Modifier Level 3 U+1CF44 Znamenny Priznak Modifier Flip). All characters have only two priznaki in Kazan Notation, a lower form (accessed via U+1CF45 Znamenny Priznak Modifier Kryzh) and an upper form (accessed via U+1CF46 Znamenny Priznak Modifier Rog). The only exception is U+1CF56 Znamenny Neume Stopitsa, which has an additional “flipped” form bearing the Rog priznak, accessed via U+1CF46 Znamenny Priznak Modifier Rog U+1CF44 Znamenny Priznak Modifier Flip. Many forms are theoretically impossible, or unattested, and so are not included.

	P2 1CF42	P3 1CF43	P2 PU 1CF42 1CF44	P3 PU 1CF43 1CF44	PK 1CF45	PR 1CF46	PR PU 1CF46 1CF44
1CF50	✓	✓	✓	✓	✓	✓	
1CF51	✓	✓	✓	✓	—	—	
1CF52	✓	✓	—	—	✓	—	
1CF53	✓	✓	✓	✓	—	—	
1CF54	✗	✗	✗	✗	✗	✗	
1CF56	↳	↳	↳	↳	↳	↳	↳
1CF57	↳	↳	↳	↳	↳	↳	↳
1CF58	—	—	—	—	↳	↳	↳
1CF59	—	—	—	—	↳	↳	↳
1CF5B	↳	↳	↳	↳	↳	↳	↳
1CF5C	↗	↗	↗	↗	↗	—	
1CF60	—	—	—	—	↗	↗	↗
1CF61	—	—	—	—	↗	↗	↗
1CF62	—	—	—	—	↗	↗	↗
1CF63	—	—	—	—	↗	↗	↗
1CF64	—	—	—	—	↗	↗	↗
1CF65	—	—	—	—	↗	↗	↗
1CF66	—	—	—	—	↗	↗	↗

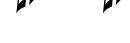
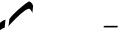
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Continued from previous page

	P2 1CF42	P3 1CF43	P2 PU 1CF42 1CF44	P3 PU 1CF43 1CF44	PK 1CF45	PR 1CF46	PR PU 1CF46 1CF44
1CF67	-	-	-	-			
1CF68	-	-	-	-			
1CF69	-	-	-	-			
1CF6A	-	-	-	-			
1CF6D				-	-	-	-
1CF70			-	-	-	-	-
1CF71			-	-		-	-
1CF72			-	-		-	-
1CF73			-	-		-	-
1CF74					-	-	-
1CF79	-	-	-	-		-	-
1CF7A	-	-	-	-		-	-
1CF7B	-	-	-	-		-	-
1CF7C	-	-	-	-		-	-
1CF81			-	-	-	-	-
1CF82			-	-	-	-	-
1CF86			-	-			
1CF87			-	-	-	-	-
1CF88			-	-	-	-	-
1CF89			-	-	-	-	-
1CF8B			-	-	-	-	-
1CF90			-	-	-	-	-
1CF92				-			
1CF93				-	-	-	-
1CF94				-			
1CF95				-			
1CF96				-			
1CF97				-			

Continued on next page

Continued from previous page

	P2 1CF42	P3 1CF43	P2 PU 1CF42 1CF44	P3 PU 1CF43 1CF44	PK 1CF45	PR 1CF46	PR PU 1CF46 1CF44
1CF98	—	—	—	—			
1CF99	—	—	—	—			
1CF9B	—	—	—	—			
1CF9C	—	—	—	—			
1CF9D	—	—	—	—			
1CF9E	—	—	—	—			
1CF9F	—	—	—	—			
1CFA2			—	—	—	—	
1CFA3			—	—	—	—	
1CFA5			—	—	—	—	
1CFA6			—	—	—	—	
1CFA7			—	—			
1CFA8	—	—	—	—		—	
1CFA8 (ss02)	—	—	—	—		—	
1CFA9	—	—	—	—		—	
1CFAA	—	—	—	—		—	
1CFAB	—	—	—	—		—	
1CFAA (ss02)	—	—	—	—		—	
1CFAB (ss02)	—	—	—	—		—	
1CFAC	—		—	—	—	—	
1CFAD	—		—	—	—	—	
1CFAE	—		—	—	—	—	
1CFAF			—	—		—	
1CFB0	—	—	—	—		—	
1CFB3	—	—	—	—		—	
1CFB4	—	—	—	—		—	
1CFC3			—	—	—	—	

## 3.2 Glyphs with Non-standard Priznakified Forms

In the system of Morozov, two characters have a priznakified form at the first level of the *svetloe soglasie* (on the pitch *malo povyshe*), and sometimes at the first level of the *tresvetloye soglasie* (on the pitch *malo povyshe s khokhlom*). These two forms are accessed by “flipping” the non-priznakified base character form (via U+1CF44 Znamenny Priznak Modifier Flip). The Demestvenny Mechiki used in the system of Kalashnikov (the “new style” forms) also take a priznak at these pitches, in addition to the flipped versions of the Level 2 and Level 3 priznakified forms. All of these glyphs also have only two priznakified forms in Kazan Notation, a lower form (accessed via U+1CF45 Znamenny Priznak Modifier Kryzh) and an upper form (accessed via U+1CF46 Znamenny Priznak Modifier Rog).

	P2 1CF42	P3 1CF43	PU 1CF44	P2 PU 1CF42 1CF44	P3 PU 1CF43 1CF44	PU PU 1CF44 1CF44	PK 1CF45	PR 1CF46
1CF5D	ⓘ	ⓘ	ⓘ	-	-	ⓘ	ⓘ	ⓘ
1CF7E	ⓘ	ⓘ	ⓘ	-	-	-	-	-
1CFA7 (ss02)	⌈	⌈	⌈	⌈	⌈	-	⌈	⌈
1CFA9 (ss02)	⌉	⌉	⌉	⌉	⌉	-	⌉	-

## 3.3 Ligatures

Some ligatures exhibit complex priznakification: the priznak may be positioned on one component for one level and on the other component on another level. Font designers need to provide pre-composed glyphs for these forms.

	P2 1CF42	P3 1CF43	P2 PU 1CF42 1CF44	P3 PU 1CF43 1CF44	PK 1CF45	PR 1CF46
1CF86 1CF30	⌈	⌈	⌈	-	-	-
1CF86 1CF31	⌈	⌈	⌈	-	-	-
1CF86 1CF85	⌈	⌈	⌈	⌈	-	-
1CF86 1CFC3	⌈	⌈	-	-	-	-
1CF87 1CF30	⌈	⌈	⌈	-	-	-
1CF8B 1CF30	⌈	⌈	⌈	-	-	-
1CF8C 1CF30	⌈	⌈	⌈	-	-	-
1CF90 1CF30	⌈	⌈	⌈	-	-	-

**ISO/IEC JTC 1/SC 2/WG 2**  
**PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS**  
**FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646.<sup>1</sup>**

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from <http://std.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://std.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.  
See also <http://std.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest Roadmaps.

#### A. Administrative

1. Title:	<b><i>Proposal to Encode Znamenny Musical Notation in Unicode</i></b>	
2. Requester's name:	<i>Aleksandr Andreev and Nikita Simmons</i>	
3. Requester type (Member body/Liaison/Individual contribution):	<i>Individual contribution</i>	
4. Submission date:	<i>04/17/2019</i>	
5. Requester's reference (if applicable):		
6. Choose one of the following: This is a complete proposal: (or) More information will be provided later:	<i>YES</i>	

#### B. Technical – General

1. Choose one of the following: a. This proposal is for a new script (set of characters): Proposed name of script:	<i>Znamenny Musical Notation</i>	<i>YES</i>
b. The proposal is for addition of character(s) to an existing block: Name of the existing block:		<i>NO</i>
2. Number of characters in proposal:	<i>186</i>	
3. Proposed category (select one from below - see section 2.2 of P&P document): A-Contemporary <input checked="" type="checkbox"/> B.1-Specialized (small collection) <input checked="" type="checkbox"/> B.2-Specialized (large collection) C-Major extinct <input type="checkbox"/> D-Attested extinct <input type="checkbox"/> E-Minor extinct F-Archaic Hieroglyphic or Ideographic <input type="checkbox"/> G-Obscure or questionable usage symbols		
4. Is a repertoire including character names provided? a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? b. Are the character shapes attached in a legible form suitable for review?	<i>YES</i>	
5. Fonts related: a. Who will provide the appropriate computerized font to the Project Editor of 10646 for publishing the standard? <i>Aleksandr Andreev</i>		
b. Identify the party granting a license for use of the font by the editors (include address, e-mail, ftp-site, etc.): <i>Aleksandr.andreev@gmail.com; https://sci.ponomar.net/</i>		
6. 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?	<i>YES</i>	
7. 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)? <i>See sections 2.2 and 2.3</i>	<i>YES</i>	
8. 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 <a href="http://www.unicode.org">http://www.unicode.org</a> for such information on other scripts. Also see Unicode Character Database ( <a href="http://www.unicode.org/reports/tr44/">http://www.unicode.org/reports/tr44/</a> ) and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.		

<sup>1</sup> Form number: N4502-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05, 2009-11, 2011-03, 2012-01)

### C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before?	<input checked="" type="checkbox"/> YES
If YES explain	<i>This is a revised version, based on feedback from Script Ad-Hoc.</i>
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.)?	<input checked="" type="checkbox"/> YES
If YES, with whom?	<i>Proposal was presented at conferences on medieval Russian musicology and posted for scholarly review on academia.edu</i>
If YES, available relevant documents:	<i>E-mail correspondence and web comments</i>
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?	<input checked="" type="checkbox"/> YES
Reference:	<i>Section 1.4 and Section 1.5</i>
4. The context of use for the proposed characters (type of use; common or rare)	<input type="checkbox"/> Rare
Reference:	<i>See Sections 1.1 through 1.3</i>
5. Are the proposed characters in current use by the user community?	<input checked="" type="checkbox"/> YES
If YES, where? Reference:	<i>Russian Orthodox Church; see Section 1.4</i>
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?	<input checked="" type="checkbox"/> NO
If YES, is a rationale provided?	
If YES, reference:	
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?	<input checked="" type="checkbox"/> YES
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?	<input checked="" type="checkbox"/> 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?	<input checked="" type="checkbox"/> NO
If YES, is a rationale for its inclusion provided?	<input type="checkbox"/> N/A
If YES, reference:	
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to, or could be confused with, an existing character?	<input checked="" type="checkbox"/> NO
If YES, is a rationale for its inclusion provided?	
If YES, reference:	
11. Does the proposal include use of combining characters and/or use of composite sequences?	<input checked="" type="checkbox"/> YES
If YES, is a rationale for such use provided?	<input checked="" type="checkbox"/> YES
If YES, reference:	<i>See Section 2.1</i>
Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?	<input checked="" type="checkbox"/> YES
If YES, reference:	<i>See Appendices</i>
12. Does the proposal contain characters with any special properties such as control function or similar semantics?	<input checked="" type="checkbox"/> YES
If YES, describe in detail (include attachment if necessary)	
<i>See Section 2.1 describing use of Control Characters. See Appendix 3 for examples.</i>	
13. Does the proposal contain any Ideographic compatibility characters?	<input checked="" type="checkbox"/> NO
If YES, are the equivalent corresponding unified ideographic characters identified?	
If YES, reference:	