Comments on the Proposal for Encoding Western Music Symbols in ISO/IEC 10646

Andrew Hodgson

I have looked over the proposal in detail with regard to its completeness and usefulness for the purpose of supporting plain text which talks about music. My comments are all in Arial font and thus should stand out from the original clearly. In many cases I am simply providing commentary without actually suggesting changes. Any paragraph which actually suggests a change has been highlighted, by starting it with "***", so you can easily skip straight to these.

A set of symbols for music has (at least) the following potential uses:
1. To provide those symbols needed for the description of music in plain text.
1. To provide a set of symbols which can be used with higher level protocols, to create a graphic rendition of music.
1. To provide a set of code values which can encode the semantics of music.

I believe this proposal, as part of the Unicode standard, must be useful for #1, and I have a few suggested extensions to support this. This proposal is also useful for #2. It is not at all suitable for #3. The text should emphasis the true value of the coded set and not attempt to boost the apparent value with claims which cannot be supported.

I have relatively minor comments on the proposed set of symbols. My comments on the surrounding text are more significant. These fall into two categories.
1. Objections to suggestions that this set of symbols could be used for the third purpose noted above. This includes suggestion that this is the ideal notation for storage, processing and interchange of music data. This set of symbols can be the basis for the storage and encoding of musical *graphics*, not musical data. There are also suggestions that this can be the basis for the encoding of pitch. I disagree. The encoding of vertical positioning of gylphs on a staff is not the same as the encoding of pitch.
2. Comments on the extent to which this set of symbols is used in plain text are exaggerated.

I have not been able to do a comprehensive study of musical literature, however I have gone through the following works looking for usage of musical symbols in plain text:

[1] Edward Dannreuther, Musical Ornamentation Part I, Edwin F. Kalmus
[2] The Basis of Music, Frederick J. Horwood, Thompson
[3] Keys to Music Rudiments, Berlin Sclater & Sinclair, Thompson
[4] The Classical Style, Charles Rosen, Norton
[5] Harmony, Walter Piston 4th edition, Norton
[6] The Concise Oxford Dictionary of Music, Percy A. Scholes 2nd edition, Oxford

These are referred to in my comments.

I cannot claim to have found 100% of the musical symbols in these texts, given that I spent less than 1 second per page during the scan. I do believe that I have, however, a reasonably good idea of what is represented. These all, of course, represent Classical (primarily 18th and 19th century) music, so the symbols found need to be extended to include similar symbols found in more contemporary repertoire as well as music dating back to the 14th century.

Some general comments on these works:
[1]   A discussion of musical ornamentation, covering music from the 15th to the 17th century. 210 pages of which 40 contained musical symbols in plain text. I had expected more ornaments in the text, but most of them appear as part of full musical examples.

[2]   An elementary music theory text. 75 pages. 8 contained music symbols in plain text. These occurred in chapter 1 and the start of chapters on accidentals, intervals and time signatures.

[3]   Another elementary music theory text. 102 pages - 14 with music symbols in plain text. Similar to [2].

[4]   A discussion of the music of Mozart, Haydn and Beethoven, filled with musical examples and detailed discussion of the examples. Many pages contain the accidentals, which are used to reference to specific notes in the works discussed. In the 465 pages there are only 10 pages that contain other musical symbols.

[5]   A well known harmony text book. The main use of musical symbols is figured chord symbols, which occur on roughly 75 of the 594 pages (I stopped counting). The chapter on harmonic rhythm has 7 pages which contain musical notes in plain text, in order to describe various rhythms. There were three other cases of musical symbols in plain text found in the book.

[6]   A well known musical dictionary. The introductory pages (xiii to xxix in particular) contain many musical symbols, in various tables. In the remaining 636 pages I found 28 which contained musical symbols in plain text.

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Proposal for Encoding Western Music Symbols in ISO/IEC 10646

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While nearly all of the symbols used to display music are technically "glyphs", they are nevertheless used world-wide in a more-or-less standard manner by a very large user group and their usefulness would be improved if they were encoded in a compact way, that is, as character codes. The symbols frequently occur in running text and may be treated as simple spacing characters with no special properties, with a few exceptions which are described below.

*** *Some* of these symbols occur frequently in running text …

Examples of contexts for the use of music characters include, but are not limited to, theoretical works, pedagogical texts, terminological dictionaries, bibliographic databases, thematic catalogs, and databases of musical data.

I'm not sure that all of this list stands up to scrutiny. Bibliographies frequently contain no musical samples at all, focusing on the life and times of the composer or performer in question. Thematic catalogs would require a full representation of music, and if they were to be searchable you would want a semantic representation, not a graphical one. The same applies to "databases of musical data".

The adoption of a standard group of character names would facilitate future pseudo-textual musical encoding systems that offer efficient storage and high parsability and portability.

*** How can you justify "high parsability", or even "efficient storage and portability"? Since the codes encode musical glyphs rather than musical semantics I would suggest that in fact parsability will be rather poor. When combined with a "higher level protocol" you will have parsability and efficient storage roughly equal to a Postscript document.

Even though page layout and formatting are beyond the scope of ISO/IEC 10646, the proposed characters could be used within higher-level protocols, i.e. music description languages and file formats for the representation of musical data and musical scores.

*** … representation of musical *graphics* and musical scores.

I believe that the proposal here is for a set of glyphs, and the "higher level protocol" intended is a set of gylph positioning sequences. The symbols here do not represent musical semantics, and thus do not represent the ideal way of storing musical data. They can, however, provide a basis for page layouts of musical glyphs - which is useful, but not the same thing.

Character Set Description

The proposed Western Musical Symbols character set consists of 220 characters. These are drawn primarily from Common Music Notation (CMN) and its antecedents, mensural notation and plainchant (or Gregorian) notation. In addition, commonly recognized additions to the CMN repertoire, such as quarter-tone accidentals, cluster noteheads, and shape-note noteheads have also been included. Symbols were compiled from several sources:

- Read, Gardner. Music Notation.
- Heussenstamm, George. Norton Manual of Music Notation.
- Rastall, Richard. Notation of Western Music.
- Stone, Kurt. Music Notation in the Twentieth Century.
- Gradual Sacrosanctae Romanae ...
- a wide range of musical scores from the 16th-20th centuries
- existing music fonts

Not part of the Western Musical Symbols character set are "graphical score" elements, which are pictographs usually created for a specific repertoire (sometimes even a single piece) and characters which have some specialized meaning in music but are found in other character sets, i.e. numbers for time signatures and figured basses or letters for section labels and Roman numeral harmonic analysis, etc.

Several characters resemble ones available in other sets. For example, the SHARP character looks somewhat like the octothorpe, FLAT resembles the lowercase 'b', REPEAT DOTS look like a colon, UP BOW seems to be a letter 'V', etc. While repeated usage of the ASCII 'lookalikes' in the absence of genuine music characters has conditioned our acceptance of them, careful examination reveals that the similarities are only superficial. Character sizes, baselines, line widths and other visual characteristics of the music characters are subtly different from their more common 'lookalikes'. Furthermore, their function and meaning are radically different, enough to consider them separate characters.

*** Great lengths are taken to justify the SHARP and FLAT as distinct symbols, but no effort is made to justify RINFORZANDO, SUBITO, Z, DAL SEGNO, DA CAPO, PIANO, MEZZO or FORTE. These all look like and act like letters and, in my opinion they are just different presentation forms of existing letters.

Because of the complexities of layout and of pitch representation in general, the encoding of musical pitch is intentionally outside the scope of this proposal. In addition to character data, considerable structure, including detailed specification of vertical and horizontal relationships between graphical elements, is required to properly represent musical scores. This character encoding provides a common set of elements for interchange and processing.
*** It is useful for interchange of text about music (which is of value). If a high-level protocol is based on this, and becomes commonly used, it will be a basis for interchange of musical graphics as well. It is *not* useful for processing - try writing a transposition program using this set of symbols.
*** "The complexities of full musical semantics are beyond the scope of this proposal and the encoding of many things, including musical pitch, is intentionally outside the scope of this proposal. This character encoding adds to the Unicode standard a common set of elements for useful for the discussion of music in plain text, and may act as the basis for the interchange of musical graphics."

The characters encoded here, in conjunction with all the other facilities of the character encoding (including alphabets and so forth), can be used for the transfer, storage, and other representation of all sorts of common musical data.

*** … common musical *graphics.*

 In that sense, this set forms a **complete basis** for the specification of all musical parameters, with the conspicuous exception of pitch encoding itself.

*** It is not "complete", you already mention that, and it is not the ideal "basis" for the encoding of the semantics of music. It provides a symbology which may be used in textual descriptions of music and may be used as a basis for the graphical presentation of music.

Encoding of pitch, and layout of resulting musical structure, involves not only specifications for the vertical relationship between multiple notes simultaneously, but in multiple staves, between instrumental parts, and so forth. These musical features are expected to be handled entirely in higher-level protocols making use of the proposed graphical elements. Lack of pitch encoding is thus not to be viewed as a shortcoming of the proposal, but as a necessary feature of the encoding.

*** Do you expect the "higher level protocol" to encode pitch, or vertical position on the staff? You mention both at various times. These are not the same thing at all. I am assuming you intend to encode vertical positions, since the symbol set is appropriate for this. Suggestions that pitch can be encoded should be removed.

Three characters (SHARP, FLAT, and NATURAL) which occur frequently in music notation are already encoded in Unicode as symbols elsewhere. To assist implementations, it is proposed that reserved codepoints be left in the music notation block and cross-referenced back to the real symbols. In addition, the existing characters U+2669 (QUARTER NOTE), U+266A (EIGHTH NOTE) and the beamed note symbols U+266B and U+266C are to be interpreted strictly as Miscellaneous Symbols or dingbats, not as representing actual musical notes. They could be cross-referenced to this Western Musical Notation block.

It is essential to correct musical interpretation that a distinction be maintained in musical contexts between the augmentation dot (a combining, but spacing character) and the staccato dot, which is a non-spacing character. Furthermore, a distinction must be maintained between the staccato dot and the regular combining dot-above (U+0307), since both may occur in the same context (overdots on vocal texts near staccato dots on notes) and they require different glyphs (the staccato dot generally being heavier at a comparable font size than a combining dot-above).

Most Western Music Notation symbols can be thought of as simple spacing characters when used in-line within texts and examples, even though they behave in a more complex manner in full musical layout. Some characters are meant only to be combined with others to produce combined character sequences, representing musical notes and their particular articulations. A complete list of the character properties and combining priorities is given below.

Character Names List

For the purpose of discussion I have created groupings of symbols. This has facilitated the addition of my comments. I suggest that the proposal be augmented with these, or similar groupings (some name changes are probably in order). In some cases I have suggested changes in the groupings. In some cases I am not familiar with the usage of the symbols, so I may have them under completely inappropriate headings.

ACCIDENTALS
These are used frequently in discussions about music, to refer to specific works (e.g. Sonata in Bb) and specific notes. See, for example [4].
```
0001 xx00 RESERVED X --> U+266F MUSIC SHARP SIGN
0001 xx01 RESERVED X --> U+266D MUSIC FLAT SIGN
0001 xx02 RESERVED X --> U+266E MUSIC NATURAL SIGN
0001 xx03 WESTERN MUSICAL SYMBOL DOUBLE SHARP
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0001 xx04 WESTERN MUSICAL SYMBOL DOUBLE FLAT
0001 xx05 WESTERN MUSICAL SYMBOL FLAT UP
0001 xx06 WESTERN MUSICAL SYMBOL FLAT DOWN
0001 xx07 WESTERN MUSICAL SYMBOL NATURAL UP
0001 xx08 WESTERN MUSICAL SYMBOL NATURAL DOWN
0001 xx09 WESTERN MUSICAL SYMBOL SHARP UP
0001 xx0A WESTERN MUSICAL SYMBOL SHARP DOWN
0001 xx0B WESTERN MUSICAL SYMBOL QUARTER TONE SHARP
0001 xx0C WESTERN MUSICAL SYMBOL QUARTER TONE FLAT
```

SCHOENBERG SYMBOLS

These were invented by the Arnold Schoenberg early in the 20th century. As far as I know they are found only in the works of Schoenberg and his student Alban Berg.

The symbols in the proposal are the opening symbols. There is a corresponding closing symbol used (I will call it the ENDESTIMME here), which looks like U+2513 BOX DRAWINGS HEAVY DOWN AND LEFT.

Berg, in his ViolinKonzert created similar symbols for Hauptrhythmus and Choralmelodie. These are probably less used and the latter is almost certainly unique to that score.

*** I would suggest that one of the following be done:

1) These be dropped on the grounds that they are "graphical score" elements.
2) These be augmented by addition of the "ENDESTIMME" mark.
3) A reference be made to the need for an "ENDESTIMME mark pointing out that U+2513 should be used. This will at least allow font makers to match the line weights for these symbols.

I regret that I have no better name for the "ENDESTIMME". Schoenberg does not name it. The score for variationen für orchester contains the following text (the symbols are shown as <H>, <N> and <E>):

"<H> bedeutet: Hauptstimme, <N> bedeutet Nebenstimme deren Ende durch <E> bezeichnet ist."

```
0001 xx0D WESTERN MUSICAL SYMBOL HAUPTSTIMME
0001 xx0E WESTERN MUSICAL SYMBOL NEBENSTIMME
```

ARTICULATION MARKS

I'm not familiar with xx0F and I may have it in an inappropriate group.

I found very few examples of these in plain text.

```
0001 xx0F WESTERN MUSICAL SYMBOL DEGREE SLASH
0001 xx10 WESTERN MUSICAL SYMBOL ACCENT
0001 xx11 WESTERN MUSICAL SYMBOL STACCATO
0001 xx12 WESTERN MUSICAL SYMBOL TENUTO
0001 xx13 WESTERN MUSICAL SYMBOL STACCATISSIMO
0001 xx14 WESTERN MUSICAL SYMBOL MARCATO
0001 xx15 WESTERN MUSICAL SYMBOL MARCATO-STACCATO
0001 xx16 WESTERN MUSICAL SYMBOL ACCENT-STACCATO
0001 xx17 WESTERN MUSICAL SYMBOL LOURE
0001 xx18 WESTERN MUSICAL SYMBOL ARPEGGIATO UP
0001 xx19 WESTERN MUSICAL SYMBOL ARPEGGIATO DOWN
0001 xx1A WESTERN MUSICAL SYMBOL DOIT
0001 xx1B WESTERN MUSICAL SYMBOL RIP
0001 xx1C WESTERN MUSICAL SYMBOL FLIP
0001 xx1D WESTERN MUSICAL SYMBOL SMEAR
0001 xx1E WESTERN MUSICAL SYMBOL BEND
```

```
0001 xx1F WESTERN MUSICAL SYMBOL DOUBLE TONGUE
0001 xx20 WESTERN MUSICAL SYMBOL TRIPLE TONGUE
```

*** Aren't these just the letters 'r', 'f', and 'z'?
*** If they are in the set shouldn't they be grouped with Piano, Mezzo and Forte, since they are used with them (e.g. sfz).

```
0001 xx21 WESTERN MUSICAL SYMBOL RINFORZANDO
0001 xx22 WESTERN MUSICAL SYMBOL SUBITO
0001 xx23 WESTERN MUSICAL SYMBOL Z
```

BARLINES
These occur occasionally in plain text, in conjunction with notes and *time signatures.*

```
0001 xx24 WESTERN MUSICAL SYMBOL SINGLE BARLINE
0001 xx25 WESTERN MUSICAL SYMBOL DOUBLE BARLINE
0001 xx26 WESTERN MUSICAL SYMBOL FINAL BARLINE
0001 xx27 WESTERN MUSICAL SYMBOL REVERSE FINAL BARLINE
0001 xx28 WESTERN MUSICAL SYMBOL DASHED BARLINE
0001 xx29 WESTERN MUSICAL SYMBOL SHORT BARLINE
0001 xx2A WESTERN MUSICAL SYMBOL LEFT REPEAT SIGN
0001 xx2B WESTERN MUSICAL SYMBOL RIGHT REPEAT SIGN
0001 xx2C WESTERN MUSICAL SYMBOL REPEAT DOTS
```

FOR MARKING LOCATIONS TO BE JUMPED TO
*** "D.S." and "D.C." look like text ligatures to me.
*** If these are justified what about "rit." and "rall." and "cres." etc. etc.?

```
0001 xx2D WESTERN MUSICAL SYMBOL DAL SEGNO
0001 xx2E WESTERN MUSICAL SYMBOL DA CAPO
0001 xx2F WESTERN MUSICAL SYMBOL SEGNO
0001 xx30 WESTERN MUSICAL SYMBOL CODA
```

REPEAT SYMBOLS
```
0001 xx31 WESTERN MUSICAL SYMBOL REPEATED FIGURE ONE
0001 xx32 WESTERN MUSICAL SYMBOL REPEATED FIGURE TWO
0001 xx33 WESTERN MUSICAL SYMBOL REPEATED FIGURE THREE
```

```
0001 xx34 WESTERN MUSICAL SYMBOL FERMATA
```
*** FERMATE UNDER is just a presentation form of FERMATA. It should be removed.
If it is considered appropriate then the "under" forms of all the articulation marks would have to be added as well.
```
0001 xx35 WESTERN MUSICAL SYMBOL FERMATA UNDER
```

*** ANOTHER ARTICULATION MARKS - should they be moved?
```
0001 xx36 WESTERN MUSICAL SYMBOL BREATH MARK
```

```
0001 xx37 WESTERN MUSICAL SYMBOL CAESURA
```

BRACE AND BRACKET
I don't think these ever occur in plain text. They always show up next to a staff.
*** Are these two really different? Are they not simply different presentation forms of the same thing? A score contains one or the other generally - not both.
```
0001 xx38 WESTERN MUSICAL SYMBOL BRACE
0001 xx39 WESTERN MUSICAL SYMBOL BRACKET
```

CLEFS

The only example of these I found in plain text was in the "Great Staff" entry in [6]. I note that there is another in your samples.

These symbols are meaningless by themselves. They impart meaning to the lines of a staff depending on where on the staff they are placed. As a result, even in elementary theory texts, these are most often presented on a full staff.

Rick, you mentioned that you would like to have these symbols so you did not have to encode things like $trebleclef$. You do not have a treble clef here. You have a G clef which may be a treble clef or a soprano clef, depending on its position on the staff.

Rick, how did the system you built handle the C-clefs? Did you encode $cclef$ plus positioning sequences, or did you encode $altoclef$ and $tenorclef$.

All this said, I don't object to these. They are a necessary part of a repertoire of glyphs needed for the presentation of music.

```
0001 xx3A WESTERN MUSICAL SYMBOL G CLEF
0001 xx3B WESTERN MUSICAL SYMBOL G CLEF OTTAVA ALTA
0001 xx3C WESTERN MUSICAL SYMBOL G CLEF OTTAVA BASSA
0001 xx3D WESTERN MUSICAL SYMBOL C CLEF
```

*** I think the "OLD C CLEF" is just an alternate form of the "C CLEF". I have seen scores with one or the other, but never both together. There are additional forms as well, but there should only be one in the standard.

```
0001 xx3E WESTERN MUSICAL SYMBOL OLD C CLEF
0001 xx3F WESTERN MUSICAL SYMBOL F CLEF
0001 xx40 WESTERN MUSICAL SYMBOL F CLEF OTTAVA ALTA
0001 xx41 WESTERN MUSICAL SYMBOL F CLEF OTTAVA BASSA
0001 xx42 WESTERN MUSICAL SYMBOL DRUM CLEF ONE
0001 xx43 WESTERN MUSICAL SYMBOL DRUM CLEF TWO
```

DYNAMIC MARKS

*** Why are these here at all? Are they not just stylize forms of the letters 'p', 'm' and 'f'?
*** If these are not letter forms then they need to be augmented to handle sforzato (sf) and sforzando (sfz) (or is that the intention of xx21 - xx23?).

```
0001 xx44 WESTERN MUSICAL SYMBOL PIANO
0001 xx45 WESTERN MUSICAL SYMBOL MEZZO
0001 xx46 WESTERN MUSICAL SYMBOL FORTE
```

I found two cases of this - both were descriptions of the symbols.

```
0001 xx47 WESTERN MUSICAL SYMBOL CRESCENDO
0001 xx48 WESTERN MUSICAL SYMBOL DECRESCENDO
```

14th Century Notation

I am not familiar with 14th century notation so I cannot comment on these.

```
0001 xx49 WESTERN MUSICAL SYMBOL GREGORIAN C CLEF
0001 xx4A WESTERN MUSICAL SYMBOL GREGORIAN F CLEF
0001 xx4B WESTERN MUSICAL SYMBOL SQUARE B
0001 xx4C WESTERN MUSICAL SYMBOL VIRGA
0001 xx4D WESTERN MUSICAL SYMBOL PODATUS
0001 xx4E WESTERN MUSICAL SYMBOL CLIVIS
0001 xx4F WESTERN MUSICAL SYMBOL SCANDICUS
0001 xx50 WESTERN MUSICAL SYMBOL CLIMACUS
0001 xx51 WESTERN MUSICAL SYMBOL TORCULUS
0001 xx52 WESTERN MUSICAL SYMBOL PORRECTUS
0001 xx53 WESTERN MUSICAL SYMBOL PORRECTUS FLEXUS
0001 xx54 WESTERN MUSICAL SYMBOL SCANDICUS FLEXUS
0001 xx55 WESTERN MUSICAL SYMBOL TORCULUS RESUPINUS
0001 xx56 WESTERN MUSICAL SYMBOL PES SUBPUNCTIS
```

*** More articulation marks. Perhaps this is extending the definition of articulation a bit, but they would certainly be better placed with other articulation than between PES SUBPUNCTIS and MAXIMA.

```
0001 xx57 WESTERN MUSICAL SYMBOL DOWN BOW
0001 xx58 WESTERN MUSICAL SYMBOL UP BOW
0001 xx59 WESTERN MUSICAL SYMBOL HARMONIC
0001 xx5A WESTERN MUSICAL SYMBOL SNAP PIZZICATO
0001 xx5B WESTERN MUSICAL SYMBOL PEDAL MARK
0001 xx5C WESTERN MUSICAL SYMBOL PEDAL UP MARK
0001 xx5D WESTERN MUSICAL SYMBOL HALF PEDAL MARK
0001 xx5E WESTERN MUSICAL SYMBOL GLISSANDO UP
0001 xx5F WESTERN MUSICAL SYMBOL GLISSANDO DOWN
0001 xx60 WESTERN MUSICAL SYMBOL WITH FINGERNAILS
0001 xx61 WESTERN MUSICAL SYMBOL DAMP
0001 xx62 WESTERN MUSICAL SYMBOL DAMP ALL
```

More Early Music Notation
Should these be grouped with other 14th C stuff above - or are these simply different presentation forms of the Contemporary Notes? I'm not sure.

```
0001 xx63 WESTERN MUSICAL SYMBOL MAXIMA
0001 xx64 WESTERN MUSICAL SYMBOL LONGA
0001 xx65 WESTERN MUSICAL SYMBOL BREVIS
0001 xx66 WESTERN MUSICAL SYMBOL SEMIBREVIS WHITE
0001 xx67 WESTERN MUSICAL SYMBOL SEMIBREVIS BLACK
0001 xx68 WESTERN MUSICAL SYMBOL MINIMA
0001 xx69 WESTERN MUSICAL SYMBOL MINIMA BLACK
0001 xx6A WESTERN MUSICAL SYMBOL SEMIMINIMA WHITE
0001 xx6B WESTERN MUSICAL SYMBOL SEMIMINIMA BLACK
0001 xx6C WESTERN MUSICAL SYMBOL FUSA WHITE
0001 xx6D WESTERN MUSICAL SYMBOL FUSA BLACK
0001 xx6E WESTERN MUSICAL SYMBOL LONGA PERFECTA REST
0001 xx6F WESTERN MUSICAL SYMBOL LONGA IMPERFECTA REST
0001 xx70 WESTERN MUSICAL SYMBOL BREVIS REST
0001 xx71 WESTERN MUSICAL SYMBOL SEMIBREVIS REST
0001 xx72 WESTERN MUSICAL SYMBOL MINIMA REST
0001 xx73 WESTERN MUSICAL SYMBOL SEMIMINIMA REST
0001 xx74 WESTERN MUSICAL SYMBOL TEMPUS PERFECTUM CUM PROLATIONE
PERFECTA
0001 xx75 WESTERN MUSICAL SYMBOL TEMPUS PERFECTUM CUM PROLATIONE
IMPERFECTA
0001 xx76 WESTERN MUSICAL SYMBOL TEMPUS PERFECTUM CUM PROLATIONE
PERFECTA DIMINUTION ONE
0001 xx77 WESTERN MUSICAL SYMBOL TEMPUS IMPERFECTUM CUM PROLATIONE
PERFECTA
0001 xx78 WESTERN MUSICAL SYMBOL TEMPUS IMPERFECTUM CUM PROLATIONE
IMPERFECTA
0001 xx79 WESTERN MUSICAL SYMBOL TEMPUS IMPERFECTUM CUM PROLATIONE
IMPERFECTA DIMINUTION ONE
0001 xx7A WESTERN MUSICAL SYMBOL TEMPUS IMPERFECTUM CUM PROLATIONE
IMPERFECTA DIMINUTION TWO
0001 xx7B WESTERN MUSICAL SYMBOL TEMPUS IMPERFECTUM CUM PROLATIONE
IMPERFECTA DIMINUTION THREE
0001 xx7C WESTERN MUSICAL SYMBOL CROIX
```

Notehead Forms

Are **all** of these really needed?

I know special note heads are used in various scores, but I am not aware of any consistent semantics for these note heads. I am also not aware of any score that would need such a huge variety.

I suspect that these are drawn from various fonts, and thus are rather close to being "graphical score elements", which you claim to not be using.

I would think that a few "alternate notehead" values would be appropriate - the exact form of which would be a font choice - but I could be wrong.

```
0001 xx7D WESTERN MUSICAL SYMBOL X NOTEHEAD
0001 xx7E WESTERN MUSICAL SYMBOL PLUS NOTEHEAD
0001 xx7F WESTERN MUSICAL SYMBOL CIRCLE X NOTEHEAD
0001 xx80 WESTERN MUSICAL SYMBOL SQUARE NOTEHEAD WHITE
0001 xx81 WESTERN MUSICAL SYMBOL SQUARE NOTEHEAD BLACK
0001 xx82 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD UP WHITE
0001 xx83 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD UP BLACK
0001 xx84 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD LEFT WHITE
0001 xx85 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD LEFT BLACK
0001 xx86 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD RIGHT WHITE
0001 xx87 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD RIGHT BLACK
0001 xx88 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD DOWN WHITE
0001 xx89 WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD DOWN BLACK
0001 xx8A WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD UP RIGHT WHITE
0001 xx8B WESTERN MUSICAL SYMBOL TRIANGLE NOTEHEAD UP RIGHT BLACK
0001 xx8C WESTERN MUSICAL SYMBOL MOON NOTEHEAD WHITE
0001 xx8D WESTERN MUSICAL SYMBOL MOON NOTEHEAD BLACK
0001 xx8E WESTERN MUSICAL SYMBOL TRIANGLE-ROUND NOTEHEAD DOWN WHITE
0001 xx8F WESTERN MUSICAL SYMBOL TRIANGLE-ROUND NOTEHEAD DOWN BLACK
0001 xx90 WESTERN MUSICAL SYMBOL PARENTHESIS NOTEHEAD
0001 xx91 WESTERN MUSICAL SYMBOL VOID NOTEHEAD
0001 xx92 WESTERN MUSICAL SYMBOL NULL NOTEHEAD
0001 xx93 WESTERN MUSICAL SYMBOL NOTEHEAD BLACK
0001 xx94 WESTERN MUSICAL SYMBOL CLUSTER NOTEHEAD WHITE
0001 xx95 WESTERN MUSICAL SYMBOL CLUSTER NOTEHEAD BLACK
```
*** Shouldn't xx96 & xx97 be with the other stems?
```
0001 xx96 WESTERN MUSICAL SYMBOL STEM
0001 xx97 WESTERN MUSICAL SYMBOL SPRECHGESANG STEM
```

TREMOLO MARKS

*** These should not be combined with stems. They are also used with whole notes, and in this context there is no stem. The stem, if it exists, is part of the note, not part of the tremolo.

I was surprised to find about 20 samples of these in [1] (many without stems). In the music described (English music of Byrde, Bull and Gibbons) these symbols apparently did not mean tremolo. I gather the meanings have varied and include: "slide", "shake" (trill?) and "upper accessory".

```
0001 xx98 WESTERN MUSICAL SYMBOL TREMOLO STEM ONE
0001 xx99 WESTERN MUSICAL SYMBOL TREMOLO STEM TWO
0001 xx9A WESTERN MUSICAL SYMBOL TREMOLO STEM THREE
```
*** If the stems are not combined, xx9B becomes redundant.
```
0001 xx9B WESTERN MUSICAL SYMBOL FINGERED TREMOLO
```

`Contemporary Notes`

These occur occasionally in plain text descriptions of musical rhythm.

Example from [4] - page 128:

"Meanwhile the rhythm of the opening measure <notes> which we may call (a), appears …"

They may appear alone or on a one-line staff.

When they do appear values less than a quarter note are generally beamed.
They are often preceded by a *time signature.*

```
0001 xx9C  WESTERN MUSICAL SYMBOL BREVE
0001 xx9D  WESTERN MUSICAL SYMBOL WHOLE NOTE
0001 xx9E  WESTERN MUSICAL SYMBOL HALF NOTE
0001 xx9F  WESTERN MUSICAL SYMBOL QUARTER NOTE
0001 xxA0  WESTERN MUSICAL SYMBOL EIGHTH NOTE
0001 xxA1  WESTERN MUSICAL SYMBOL SIXTEENTH NOTE
0001 xxA2  WESTERN MUSICAL SYMBOL THIRTY-SECOND NOTE
0001 xxA3  WESTERN MUSICAL SYMBOL SIXTY-FOURTH NOTE
0001 xxA4  WESTERN MUSICAL SYMBOL ONE HUNDRED TWENTY-EIGHTH NOTE
0001 xxA5  WESTERN MUSICAL SYMBOL AUGMENTATION DOT
```

Ties, Phrases and Beams
Was any thought given to having simply a TIE, rather than TIE-START and TIE-END?
A TIE always joins the previous note to the following note. Thus NOTE, TIE, NOTE and even
NOTE, TIE, BARLINE, NOTE is completely unambiguous.

```
0001 xxA6  WESTERN MUSICAL SYMBOL TIE-START
0001 xxA7  WESTERN MUSICAL SYMBOL TIE-END
0001 xxA8  WESTERN MUSICAL SYMBOL BEAM-START
0001 xxA9  WESTERN MUSICAL SYMBOL BEAM-END
0001 xxAA  WESTERN MUSICAL SYMBOL SLUR-START
0001 xxAB  WESTERN MUSICAL SYMBOL SLUR-END
0001 xxAC  WESTERN MUSICAL SYMBOL PHRASE-START
0001 xxAD  WESTERN MUSICAL SYMBOL PHRASE-END
```

OTTAVA SYMBOLS
```
0001 xxAE  WESTERN MUSICAL SYMBOL OTTAVA ALTA
0001 xxAF  WESTERN MUSICAL SYMBOL OTTAVA BASSA
0001 xxB0  WESTERN MUSICAL SYMBOL QUINDICESIMA ALTA
0001 xxB1  WESTERN MUSICAL SYMBOL QUINDICESIMA BASSA
```

ORNAMENTATIONS
I should check to see if all of the ornaments in [1] can be represented with this set, but I haven't
yet.
```
0001 xxB2  WESTERN MUSICAL SYMBOL GRACE NOTE SLASH
0001 xxB3  WESTERN MUSICAL SYMBOL GRACE NOTE NO SLASH
0001 xxB4  WESTERN MUSICAL SYMBOL TR
0001 xxB5  WESTERN MUSICAL SYMBOL TURN
0001 xxB6  WESTERN MUSICAL SYMBOL INVERTED TURN
0001 xxB7  WESTERN MUSICAL SYMBOL TURN SLASH
0001 xxB8  WESTERN MUSICAL SYMBOL TURN UP
0001 xxB9  WESTERN MUSICAL SYMBOL ORNAMENT STROKE ONE
0001 xxBA  WESTERN MUSICAL SYMBOL ORNAMENT STROKE TWO
0001 xxBB  WESTERN MUSICAL SYMBOL ORNAMENT STROKE THREE
0001 xxBC  WESTERN MUSICAL SYMBOL ORNAMENT STROKE FOUR
0001 xxBD  WESTERN MUSICAL SYMBOL ORNAMENT STROKE FIVE
0001 xxBE  WESTERN MUSICAL SYMBOL ORNAMENT STROKE SIX
0001 xxBF  WESTERN MUSICAL SYMBOL ORNAMENT STROKE SEVEN
0001 xxC0  WESTERN MUSICAL SYMBOL ORNAMENT STROKE EIGHT
0001 xxC1  WESTERN MUSICAL SYMBOL ORNAMENT STROKE NINE
0001 xxC2  WESTERN MUSICAL SYMBOL ORNAMENT STROKE TEN
```

```
0001 xxC3 WESTERN MUSICAL SYMBOL ORNAMENT STROKE ELEVEN
```

RESTS
```
0001 xxC4 WESTERN MUSICAL SYMBOL MULTI REST
0001 xxC5 WESTERN MUSICAL SYMBOL WHOLE REST
0001 xxC6 WESTERN MUSICAL SYMBOL HALF REST
0001 xxC7 WESTERN MUSICAL SYMBOL QUARTER REST
0001 xxC8 WESTERN MUSICAL SYMBOL EIGHTH REST
0001 xxC9 WESTERN MUSICAL SYMBOL SIXTEENTH REST
0001 xxCA WESTERN MUSICAL SYMBOL THIRTY-SECOND REST
0001 xxCB WESTERN MUSICAL SYMBOL SIXTY-FOURTH REST
0001 xxCC WESTERN MUSICAL SYMBOL ONE HUNDRED TWENTY-EIGHTH REST
```

STAVES
*** These are in no sense what-so-ever characters - spacing or otherwise - or even glyphs. They should not be here.
I know they appear in some toy fonts, and in that context they are goofy, useless and an embarrassment to any trained musician.
(You may notice I feel strongly about this.)
```
0001 xxCD WESTERN MUSICAL SYMBOL ONE-LINE STAFF
0001 xxCE WESTERN MUSICAL SYMBOL TWO-LINE STAFF
0001 xxCF WESTERN MUSICAL SYMBOL THREE-LINE STAFF
0001 xxD0 WESTERN MUSICAL SYMBOL FOUR-LINE STAFF
0001 xxD1 WESTERN MUSICAL SYMBOL FIVE-LINE STAFF
0001 xxD2 WESTERN MUSICAL SYMBOL SIX-LINE STAFF
```

Stems
```
0001 xxD3 WESTERN MUSICAL SYMBOL STEM PLUS FLAG ONE
0001 xxD4 WESTERN MUSICAL SYMBOL STEM PLUS FLAG TWO
0001 xxD5 WESTERN MUSICAL SYMBOL STEM PLUS FLAG THREE
0001 xxD6 WESTERN MUSICAL SYMBOL STEM PLUS FLAG FOUR
0001 xxD7 WESTERN MUSICAL SYMBOL STEM PLUS FLAG FIVE
```

Guitar Symbols
```
0001 xxD8 WESTERN MUSICAL SYMBOL SIX-STRING FRETBOARD
0001 xxD9 WESTERN MUSICAL SYMBOL FOUR-STRING FRETBOARD
```

Time Signatures
```
0001 xxDA WESTERN MUSICAL SYMBOL COMMON TIME
0001 xxDB WESTERN MUSICAL SYMBOL CUT TIME
```

*** ADDITIONS
Interval- and Chord-Type Symbols
Interval may be diminished, augmented, major, minor or perfect. Triads may be all of these except for perfect. Perfect is generally represented with the letter 'P'. Major and minor may be represented with '+' and '-'. Augmented is generally represented with the double-sharp symbol. There is no need to repeat any of these symbols here. Diminished, however, is represented with a small circle. In some texts [2] a lower case 'O' is used and in others [3] a special symbol which looks like a degree sign, but is positioned somewhat lower is used. Neither the 'O' nor the degree sign are satisfactory for all the reasons cited above against the representation of flat and sharp with 'b' and '#'.

These symbols are never used in musical scores, however they are used in texts which describe music and music theory. It is also true that there are many different traditions for the representation of these, including the use of maj., min., aug., dim. etc. I have been told (very

recently) that the use of these is now largely restricted to Canada (which, from my perspective means it is important!) and I am attempting to determine the truth of this.

All this said I suggest it may be worthwhile to add the DIMINISHED SIGN.

Time Signatures
I understand that this proposal does not wish to stray in any way, towards the representation of positioning of symbols on a musical staff and I agree with this. I strongly suggest, however, that the full support of the description of music in plain text is incomplete without some way of representing time signatures. You have already included the COMMON TIME and CUT COMMON TIME symbols. The set should be complted.

Time signatures in plain text are generally represented clearly as a number over another number. The upper and/or lower number may have one or two digits. They are not represented as words (e.g.) "three four", nor is the use of the slash favoured (3/4) since these are not fractions (although this is the choice of representation in [4]).

When notes are used they are often accompanied by time signatures. In the introductory pages of [6] there are 6 pages which contain plain-text notes. Of these, 3 combine the notes with time signatures.   In the rest of [6] notes are almost always accompanied by time signatures, and time signatures occur without notes. See "Breve", "Cracovienne", "Deux Temps" and "Gigue".

In [4], which is the best example of a discussion of music, 5 of the 10 pages containing musical symbols other than accidentals, contained time signatures. In [1] 6 of the 40 samples are time signatures. In [5], the harmony text, discounting chord symbols, 3 of 7 pages containing plain-text music symbols contain time signatures. Thus time signatures would be more useful in plain-text than almost anything else in the proposal, with the exception of accidentals.

All this said, I do not have a proposal for how this should be represented. I have considered and discarded a few ideas so far. I think the debate about whether these are really needed should take place first. The solution can be found later.

Figured Chord Symbols
Harmony texts such as [5] contain many, many figured chord symbols. These combine a roman numeral with numbers and accidentals, placed vertically to the right of the roman numeral.

Obviously there is no need to repeat the encoding of roman numerals. There is a need to encode the vertical stacking of numbers and accidentals. This is similar to the problems of representing time signatures and perhaps one solution will work for both cases.

Figured chords are not used universally in harmony texts. They are common in American and Canadian texts. British texts use lower-case letters to indicate chord inversions; a system which is easier to typeset but significantly less rich and flexible. (I don't know about French, German or Italian texts - I can check).

Figured chord symbols are not a part of musical scores, but they are common in texts which describe or teach music harmony. In [5] figured chords appear on more than 70 pages, while all other musical symbols combined can be found on just 10 pages. A proposal which intends to support descriptions of music in text would be incomplete without support for figured chord symbols.

Character Code Chart

Click on the image for a high-resolution version (79K)

Character Properties List

Controls:
0001 xxA6 WESTERN MUSICAL SYMBOL TIE-START
0001 xxA7 WESTERN MUSICAL SYMBOL TIE-END
0001 xxA8 WESTERN MUSICAL SYMBOL BEAM-START
0001 xxA9 WESTERN MUSICAL SYMBOL BEAM-END
0001 xxAA WESTERN MUSICAL SYMBOL SLUR-START
0001 xxAB WESTERN MUSICAL SYMBOL SLUR-END
0001 xxAC WESTERN MUSICAL SYMBOL PHRASE-START
0001 xxAD WESTERN MUSICAL SYMBOL PHRASE-END
*** Has any thought been given to how one would represent different levels of beaming? For example (there ought to be a graphic here):

Non-spacing marks and their combining classes:
*** For the purpose of plain text, these combine below the note, unless a font selection allows the choice of downward stems, in which case they combine above.
0001 xx10 WESTERN MUSICAL SYMBOL ACCENT (230)
0001 xx11 WESTERN MUSICAL SYMBOL STACCATO (230)
0001 xx12 WESTERN MUSICAL SYMBOL TENUTO (230)
0001 xx13 WESTERN MUSICAL SYMBOL STACCATISSIMO (230)
0001 xx14 WESTERN MUSICAL SYMBOL MARCATO (230)
0001 xx15 WESTERN MUSICAL SYMBOL MARCATO-STACCATO (230)
0001 xx16 WESTERN MUSICAL SYMBOL ACCENT-STACCATO (230)
0001 xx17 WESTERN MUSICAL SYMBOL LOURE (230)
0001 xxBE WESTERN MUSICAL SYMBOL ORNAMENT STROKE SIX (230)
0001 xx59 WESTERN MUSICAL SYMBOL HARMONIC (230)
*These are specified as identical so that "staccato + tenuto" is different from, and is rendered differently than, "tenuto + staccato."
What is the difference? The tenuto is always further from the note than the staccato (either further above or further below). There is no semantic difference between these as far as I know although I have never seen tenuto with staccato on the outside.

Combining marks and their combining classes:
0001 xxA5 WESTERN MUSICAL SYMBOL AUGMENTATION DOT (0)
0001 xx96 WESTERN MUSICAL SYMBOL STEM (1)
0001 xx97 WESTERN MUSICAL SYMBOL SPRECHGESANG STEM (1)
0001 xx98 WESTERN MUSICAL SYMBOL TREMOLO STEM ONE (1)
0001 xx99 WESTERN MUSICAL SYMBOL TREMOLO STEM TWO (1)
0001 xx9A WESTERN MUSICAL SYMBOL TREMOLO STEM THREE (1)
0001 xxD3 WESTERN MUSICAL SYMBOL STEM PLUS FLAG ONE (1)
0001 xxD4 WESTERN MUSICAL SYMBOL STEM PLUS FLAG TWO (1)
0001 xxD5 WESTERN MUSICAL SYMBOL STEM PLUS FLAG THREE (1)
0001 xxD6 WESTERN MUSICAL SYMBOL STEM PLUS FLAG FOUR (1)
0001 xxD7 WESTERN MUSICAL SYMBOL STEM PLUS FLAG FIVE (1)
*Specifying the priority of the augmentation dot as lower than that of the stems assures that it comes canonically after the stem.
*** It is possible to follow a note with 2 or even (in rare cases) three augmentation dots.

Spacing marks:

User Community

Estimating the size of the user community is very difficult. As some indication, however, of the amount of output containing some reference to music (and therefore, potential usage of the proposed character set) the following statistics are offered. Books In Print contains 17,869 entries with the subject heading "music", slightly more than the number of entries with the subject heading "mathematics" (17,388), and nearly double the number for the heading "computer" (only 9775). Repertoire International de Litterature Musicale (RILM) indexed approximately 3500 different journals between 1989 and 1993 covering the field of music in whole or in part. These figures indicate the pervasiveness of music-related writing in our society and the wide range of potential uses of a music character set from popular magazines to scholarly treatises.

*** (My comments) Many of the books written about music, of course, are not aimed at a musically literate audience. These include biographies of performers and composers, descriptions of opera plots etc. These contain no musical examples what-so-ever. I do not know what percentage of the 17,869 this would be, but I guess that it would be significant. In the remaining texts the symbols are most common in elementary music texts and in the opening pages of music dictionaries. Outside of this, and with the exception of accidentals and chord symbols, there is a scattered usage of time-signatures, notes and bar lines in plain-text amounting to roughly one usage in 100 pages. The use of symbols in plain text is extremely rare in comparison with the usage of full musical graphics.
None-the-less, the ability to add accidentals, time signatures, bar lines, beamed notes and figured chord symbols to plain text would be of significant value to those who create texts which describe or teach music. The use of ties, slurs, articulation marks, ornaments and the other symbols will also provide some value, although they are used quite infrequently.

There is an historical interest in music data transmission and storage which began with the increased availability of computers in the 1950s. Over the years, several encoding methods have been proposed, i.e. Bauer-Mengelberg's Digital Alternative Representation of Musical Scores (DARMS) and Brook's Plaine & Easie Code, but these individual efforts have all suffered from the lack of a common nomenclature and method for coding even the most basic elements of music. Adoption of this character set as a standard would help alleviate this problem.

Shouldn't there be some mention here of some of the more contemporary encoding systems, such as Coda's Enigma. I know these are proprietary, but surely there existence should be acknowledged.

Processing

It is anticipated that music characters will be input, processed and displayed in a manner similar to mathematical symbols. Collation of the character set is unnecessary. There is no intrinsic order of symbols. When embedded in text most of the symbols are simple spacing characters with no special properties. There are a few characters with control functions which are described below.

Input of the characters may be accomplished in ways similar to those used for Chinese, Japanese, and Korean. Input can be from an alphanumeric keyboard using character entities, e.g. &treble; or ♭, or assisted with software which allows keyboard mapping, e.g. ALT-G for treble clef.
… but you have no code for "treble clef". You have a "G-clef".
In addition, input methods utilizing pointing devices or piano keyboards could be developed similar to those in existing musical layout systems. For example, using a graphical user interface (GUI), the user could choose symbols from a palette-style menu.
*** I find the phrase "could be developed" confusing. The methods "have been developed" and are widely used. They "could be applied" to this set of codes.

The setting of vocal texts is beyond the scope of this proposal; however, there are no known bi-directional implications of Western Musical Notation. When combined with right-to-left texts, in Hebrew or Arabic for example, the music notation is still written left-to-right as usual, the words being divided into syllables and placed under or above the notes in the same fashion as Latin scripts. The individual words or syllables corresponding to each note, however, are written in the dominant direction of the script.

Extensive ligature-like beams are used frequently in music notation between groups of notes having short values. The practice is widespread and very regular, and is amenable to algorithmic handling.
*** The practice is widespread and given a time signatures, bar lines and a system which is able to retain the time signature context, it is amenable to algorithmic handling. It is expected, however, that many systems will not choose to maintain the amount of contextual information required to do this, and thus the BEAM-START and BEAM-END marks will be need to be manually added by the user. In the context of plain text notes may be used without a time signature, in which case algorithmic handling is impossible.
*** A description of how these act in plain text is needed. Do they bracket a group of notes (as <BEAM-START><EIGHTH><EIGHTH><BEAM-END> for two beamed quarter notes), or do they bind to the preceding note (as <EIGHTH><BEAM-START><EIGHTH><BEAM-END>)?
If it is the latter, they are acting more like combining characters and should have a combining class for the purpose of canonical ordering. The same applies to slurs and phrases.
The control characters BEAM-START and BEAM-END can be used to indicate the extents of beam groupings and these are easily parsed.
In some exceptional cases, beams are left-unclosed on one end. This can be indicated with a "null note" (0001 xx92 WESTERN MUSICAL SYMBOL NULL NOTEHEAD) character if no stem is to appear at the end of the beam.

Similarly, control codes have been provided for other connecting structures. The characters TIE-START, TIE-END, SLUR-START, SLUR-END, PHRASE-START, and PHRASE-END indicate the extent of these features.
Like beaming, these features are easily handled in an algorithmic fashion.
*** Unlike beaming these features can never be handled in an algorithmic fashion. There is no algorithm for automatically adding slurs or phrases to a line of music.

These pairs of characters modify the layout and grouping of notes and phrases in full music notation. When musical examples are written or rendered in plain text without special software, the start/end control characters may be rendered as brackets or left uninterpreted. More sophisticated in-line software may interpret them, to the extent possible, in their actual control capacity, rendering slurs, beams, and so forth as appropriate.
*** Rendering as brackets would not be acceptable as anything more than a prototype. Any example of groups of eighth and sixteenth notes in plain text appears with beams. Using brackets would be as acceptable to musicians as rendering Arabic using only stand-alone forms would be to an Arab.

For maximum flexibility, the character set includes both pre-composed note values and primitives from which complete notes may be constructed. Due to their ubiquity, the pre-composed versions are provided mainly for convenience. In addition to coding ease, their use will also reduce data size. The following table illustrates these canonical equivalents.

```
1. WESTERN MUSICAL SYMBOL HALF NOTE =  WESTERN MUSICAL SYMBOL VOID
NOTEHEAD + WESTERN MUSICAL SYMBOL STEM
2. WESTERN MUSICAL SYMBOL QUARTER NOTE =  WESTERN MUSICAL SYMBOL
NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM
3. WESTERN MUSICAL SYMBOL EIGHTH NOTE =  WESTERN MUSICAL SYMBOL
NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM PLUS FLAG ONE
4. WESTERN MUSICAL SYMBOL SIXTEENTH NOTE =  WESTERN MUSICAL SYMBOL
NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM PLUS FLAG TWO
```

```
5. WESTERN MUSICAL SYMBOL THIRTY-SECOND NOTE =  WESTERN MUSICAL SYMBOL
NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM PLUS FLAG THREE
6. WESTERN MUSICAL SYMBOL SIXTY-FOURTH NOTE =  WESTERN MUSICAL SYMBOL
NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM PLUS FLAG FOUR
7. WESTERN MUSICAL SYMBOL ON HUNDRED TWENTY-EIGHTH NOTE =  WESTERN
MUSICAL SYMBOL NOTEHEAD BLACK + WESTERN MUSICAL SYMBOL STEM PLUS FLAG
FIVE
```

Coding convenience notwithstanding, notes built up from alternative noteheads, stems and flags, and articulation symbols are necessary for complete implementations and complex scores. Examples of their use include American shape-note and modern percussion notations. For example,

```
1. WESTERN MUSICAL SYMBOL SQUARE NOTEHEAD BLACK + WESTERN MUSICAL
SYMBOL STEM
2. WESTERN MUSICAL SYMBOL X NOTEHEAD + WESTERN MUSICAL SYMBOL STEM
```

Augmentation dots and articulation symbols may be appended to either the pre-composed or built-up notes. For example,

```
1. WESTERN MUSICAL SYMBOL EIGHTH NOTE + WESTERN MUSICAL SYMBOL
AUGMENTATION DOT =  WESTERN MUSICAL SYMBOL NOTEHEAD BLACK + WESTERN
MUSICAL SYMBOL STEM PLUS FLAG ONE + WESTERN MUSICAL SYMBOL AUGMENTATION
DOT
2. WESTERN MUSICAL SYMBOL QUARTER NOTE + WESTERN MUSICAL SYMBOL
STACCATO =  WESTERN MUSICAL SYMBOL NOTEHEAD BLACK + WESTERN MUSICAL
SYMBOL STEM + WESTERN MUSICAL SYMBOL STACCATO
```

In addition, augmentation dots and articulation symbols may be repeated as necessary to build a complete note symbol. For example,

```
WESTERN MUSICAL SYMBOL EIGHTH NOTE + WESTERN MUSICAL SYMBOL
AUGMENTATION DOT + WESTERN MUSICAL SYMBOL AUGMENTATION DOT + WESTERN
MUSICAL SYMBOL ACCENT
```

Ornamentation chart

Included below is a list of common 18th-century ornaments and the combining sequences of characters from which they can be generated. Click on the image for a high-resolution version (87k)

*** I am confused by the use of ORNAMENT STROKE SIX. It is placed *after* STROKE TWO or STROKE THREE in the encoding lists, but appears *before* it in the graphics. Does it combine in front? Later, STROKE SIX is combined with SMEAR, and cuts the SMEAR in half.

*** In the first sample, are there three smears or four?

Examples

The following examples demonstrate some current uses of music characters in textual materials. Often, music characters are not included because of the difficulty of integrating them into the text. When they are included, they are frequently drawn in by hand after setting the other text, i.e. the Balaban example. Music characters are also used extensively in creating data tables set apart from the text and single-line rhythmic examples either in the text or set apart from it, i.e. the Kennedy and Ottman examples.

Introduction of a standardized group of characters would undoubtedly change current practices in both number and kind.

From Balaban, ed. Understanding Music with AI, p. 128:

From the Encyclopedia Britannica, v. 24, p. 531:

From the New Harvard Dictionary of Music, p. 212:

From Ottman, Elementary Harmony, 2nd. ed., p. 11:

From Kennedy, Oxford Dictionary of Music, p. 494:

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