

## Gregorian chant in abc

It would seem to require very little extension to abc to enable it to represent the traditional notation of Gregorian Chant. For those that don't know this notation, there is a description of it at:

<http://www.netaxs.com/~rmk/Chant/index.html>

Briefly, it's written on a four-line staff using (mostly) square notes. It's non-metric, so programs will have to accept

M:none

as a valid metre field. (BarFly does this already, making the default note length an eighth).

There are two clefs, the Doh clef and the Fa clef, and each can be placed on any of the four lines, specifying the position of c and F respectively. Of course there is no pitch standard for this music, so 'c' and 'F' mean whatever the choirmaster thinks they mean, but the modern pitches will do fine for our purposes, and the placing of the clef defines the scale used. The music uses the same modes that we are familiar with in folk music. The only key signature used is a single Bb (rarely), so the K: field should specify only keys which yield either a null key signature (C, Am, DDor etc) or those that give a single flat (F, Dm etc). To specify the clef, I add a single digit, giving eight possibilities:

Doh1 ... Doh4  
and Fa1 to Fa4

where the number indicates the staff line on which it is to be placed, counting from the bottom up. The key signature will look like this:

K:GMix Doh3

In BarFly, the presence of the Gregorian clef specifier forces the program to use square-note notation, so you can switch from this to modern notation simply by commenting this out by placing a percent symbol before it. Then you can use the Command-z key to undo this and switch back and forward between the two notations.

Chant is notated using neumes. Neumes are groups of 1 to 4 notes, all of which fall on the same syllable of the text. They are similar to beams in modern music, but each pattern of intervals has a separate symbol which is used to represent it. There are about twenty of these and they all have Latin names. For example, where you have three notes and the intervals go down-up the neume used is called a Porrectus, and looks like a capital N: a thin stem leading up to the position of the first note, a thick slightly curving line downwards to the second note, a thin vertical stem upward to the right hand edge of the last note which is drawn as a square.

In abc we can specify that the notes be grouped into neumes using exactly the same mechanism which we use for beams i.e. write the notes without spaces between them. The program looks at the pattern of intervals to determine which neume to draw.

```
X:1
T:The Neumes
M:none
K:C Fa3
%Single- and two-note Neumes
E vE (FG) (GF) |
w:Punctum Virga Podatus* Clivis
%Three-note Neumes
(CDE) (EDC) (DED) (FEF) |
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w:Scandicus\*\* Climacus\*\* Torculus\*\* Porrectus  
 %Four-note Neumes  
 (CDEC) (FD FE) (EDCD) (DEDE) |  
 w:ScandicusÊflexus\*\*\*PorrectusÊflexus\*\*\*ClimacusÊresupinus\*\*\*TorculusÊresupinus  
 (DEDC) (FEDC) (CDEF) (EDEF) |  
 w:PesÊsubtripunctis\*\*\*VirgaÊsubtripunctis\*\*\*VirgaÊpractipunctis\*\*\*PorrectusÊresupinus  
 %Liquescent Neumes  
 (D{E}) (F{D}) (CF{D}) (ED{F}) y (CD{F}) (D{E}F) |  
 w:Epiphonus\*Cephalicus\*Pinnosa\*\*PorrectusÊliquescens\*\*ScandicusÊliquescens\*\*Quilisma

Where there is more than one neume on the same syllable they should be drawn hard up against each other, which makes for a problem - if the program is presented with a group of six notes, how should it split them up? This is handled using slurs. Slurs are not used in chant notation, but in modern notation the neumes would be written with a slur, so we can use slur brackets to divide up sequences of notes into individual neumes. This can lead to the odd situation of having a slur bracket around a single note (A). It doesn't faze BarFly, but it may cause problems for other programs.

Chant is very hard to transcribe into modern notation, because in the absence of any beat, the actual note-lengths are quite flexible, and tend to follow the speech rhythms of the words. The traditional notation neatly sidesteps this problem by giving hardly any information about the note lengths. All notes are written the same way, except that you can indicate a slightly longer note by means of a dot (as in modern music). Very long notes are represented as a repercussive neume, which is a succession of two or more notes at the same pitch. This is equivalent to a tie in modern music, and we can represent it the same way: A-A-A. Notes can also be repercussively tied into or out of other neumes, as in the first note of the example below.

Single notes can be written either with (virga) or without (punctum) a downward tail. The tail is for visual effect only, and is most frequently used when there are two or more successive notes on the same pitch - the second and subsequent notes are given tails to emphasise that these are separate notes, rather than a repercussive neume.

Some neumes contain a short note which we would represent as a grace note in modern notation (although in a sense all the notes are grace notes since their exact timing is undefined). We can represent these 'liquescent' neumes using abc's notation for gracenotes.

So, when writing chant in abc, you can use any time value up to a quarter note; notes of an eighth or less are all represented the same (a punctum) notes between an eighth and a quarter are shown with a single dot, notes of a quarter or more are illegal, and should be represented repercussively. The text which accompanies the music is a vital part of the notation, since the natural stresses on the words determine the note lengths as actually sung. It is important use the w: field so that the words align accurately. In modern examples of Gregorian chant notation the stressed syllable in longer words is marked with an accent, e.g. miseric\ordiae.

Bar lines (single or double) are used as phrase markers, and there are also two shorter phrase marks which can be represented in abc by the symbols S and Q. There is no bar line at the end of a line of music; instead there is a half-width note with an upward stem, called a custos. This is not sung, instead it serves as a visual cue to the pitch of the first note on the next line. BarFly as always requires a bar line at the end of each line of abc, but in this case it is not drawn, and the custos is drawn instead (except on the last line, of course).

The only accidental in this music is Bb, and its effect lasts until the end of the word in which it occurs. In BarFly, you will have to place a bar line somewhere before the next occurrence of a B in order to cancel it in the player, as there is no natural sign.

There are two accent symbols, the vertical and horizontal episemata. These are specified by the letters L and K respectively. L signifies an accent mark (>) in modern notation, and is drawn as a vertical line below the note here. K is ignored in modern notation, and produces a horizontal line above a neume in Gregorian notation. L can be placed

only on single notes, while K is placed before the first note of the neume to which it applies. As usual, the symbols can be assigned to different letters if necessary, using the U: field.

Many of the constructions of abc are not used in this music. There are no repeat marks (write that Kyrie out in full!), chords, triplets etc. The program will not complain if you put these in, but as usual the principle of Garbage In Garbage Out applies.

Here is a fairly complex example which demonstrates most aspects of the notation:

```
X:2
T:Salve Regina
N:XII century
N:A primis Vesperis Festi Ss. Trinitatis usque ad Nonam Sabbati ante
Adventum inclusive.
M:none
K:DDor Doh4
(A-)(AGA) D x SAG (FE)(FGF) ED xQC D DC D EF G DEC D3/x || (A-)(AGA) D |
w:Sal-***ve, Re*gi-****na,* ma- ter mi-*se-ri-*c\or-di-***ae: Vi-****ta,
AG (FE)(FGF) ED xQC y D EF G yDEC D3/ x|| DF A yG GFA E |
w:dul-*c\e-****do,* et spes no*stra, sal-***ve. Ad* te cla-*m\ a-*mus,
G F EDG xSC D EDG FE D x|| DF A y c G- GFG A x Q D yF{G} G D |
w:\exsu-***les,* fi-li-i** He-*vae. Ad* te sus-pi-*r\ a-*mus, ge-m\ent-*es et
FED C x QD DCF GA G FE G y F{E} DCDx || (F-)(FG) F G{A} A xSc G AGF |
w:flen-***tes in hac** lac-*ri m\ a-*rum val-*le.** E-***ia* er-go, Ad-vo c\ a-***
D yG A Qd d cBcd A Sd c A GFA G DE F EDC QCD F G{F} |
w:ta nos-tra, il-los tu-***os mi-se-ri-c\or-***des \o-*cu-los**ad* nos* con-
DCD D x|| D yA, CD SD DE ED- D y C y G y F y E{D} G FE DCD |
w:v\er-***te Et Jes um,* be-ne-*di-***ctum fruc-tum vent-*ris tu-* i,
DA_B A SAGF G y D F FE DC EFE D D x|| (A-)(AG)(ABc) BAG A x|| (GABc)(cB) |
w:no-***bis post** hoc ex si-li-*um* os-***t\ende* O*****cle-***mens: O
AG GA x|| (AD)(FEDC)(D)(SDEFG) G{F} GA D C D (DGF-)(F) ED || |
w:pi-*a:* O*****dul*cis* Virgo* Ma-ri-***a.
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(You can see the original of this as printed in the Liber Usualis at:

[http://www.mcn.net/~relbooks/gf\\_salve.gif](http://www.mcn.net/~relbooks/gf_salve.gif)

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