

Web Delivering of Music Scores

WEDELMUSIC Editor and Integrator USER MANUAL

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Chap.1 Introduction

Libraries, theatres, orchestras, music schools, music distributors, recording studios, blind people need interactive music; that is, music that can be manipulated: arranged, transposed, modified, reformatted, searched in the context, formatted, printed, listened, played and viewed at the same time, printed on Braille, navigated via hypermedia links, synchronised with video, documents, images, etc.

The real added value of new music archives for music distribution via Internet is the possibility of providing music for exploiting new functionalities with a particular attention to the aspects related to the interactivity in the respect of the owner rights.

In order to cope with the above mentioned problems the WEDELMUSIC (WEB Delivering of Music Scores) solutions have been developed (www.wedelmusic.org). WEDELMUSIC was designed to allow publishers, distributors and consumers (theatres, orchestras, music schools, libraries, music shops, musicians) to manage and share interactive music.

WEDELMUSIC solution proposes some techniques for storing, retrieval and distributing multimedia musical objects. WEDELMUSIC objects present an integration of XML format including symbolic notation, images of music sheets, audio files, etc., and a set of protection mechanisms. Each WEDEL object presents several components covering different aspects of a music piece such as identification, classification, protection, printing documents, lyrics, videos, images and audio. WEDEL format is XML compliant. These components are strongly related to:

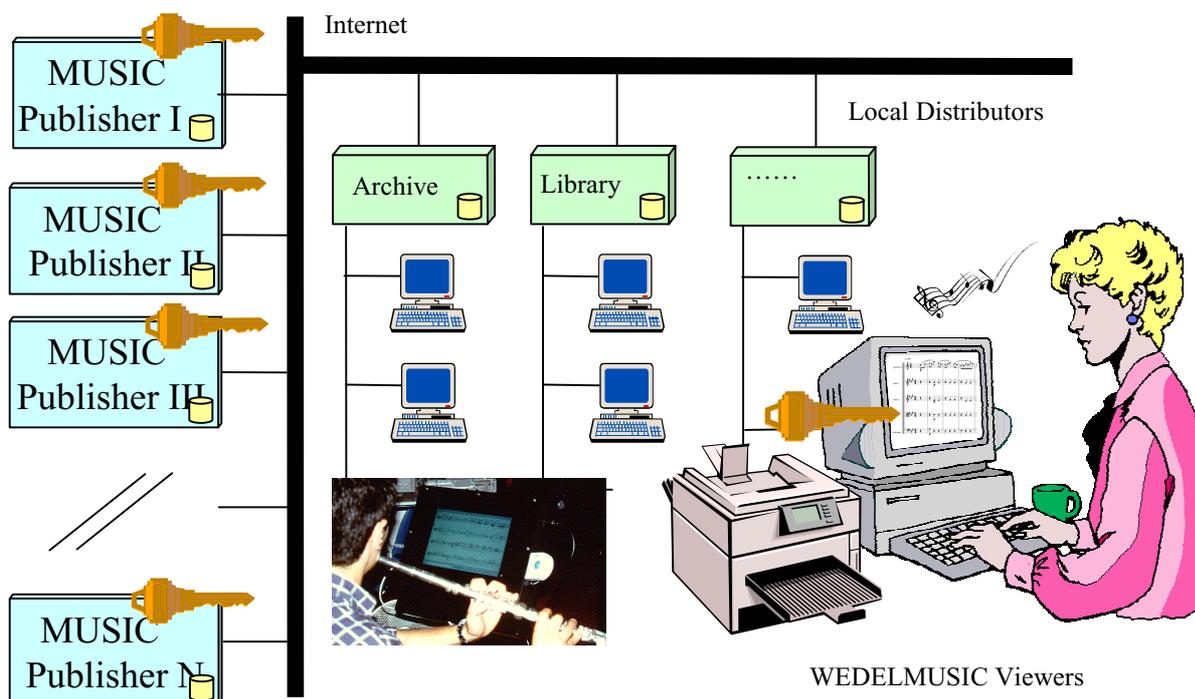
- **Symbolic Music** section describes the scoring information, musical notation symbols, in any format: FINALE, SIBELIUS, IGOR, SCORE, WEDELMUSIC, etc.
- **Image of Music Sheets** section allows integrating images of music scores into the music object. This allows building musical objects, so as to compare original music score with revised and currently used symbolic versions, which at the same results in a valorisation of antique music archives.

In each WEDEL object, several relationships among its components can be established. They allow the definition and exploitation of new functionalities. For example, it is possible to: pass from a music notation symbol to a document, video file, image file and audio file; to listen to real audio performance synchronously with the visualisation of images of the music score or the symbolic music notation; modify music notation symbols: formatting, arranging, fingering, adding/deleting notes, transposition, editing multilingual lyric, managing versioning, etc; to print music score or other components; to analyse music score, comparing and searching into the database, performing a piano reduction; to extract excerpts of the music score, audio, and images of the music score; to execute music notation generating MIDI file or audio; to edit music for visually impaired people, to print music in Braille, to get a verbal description of music score; to acquire music from other formats FINALE, SCORE, MIDI; to search music into the database according to its content (music melody, lyric, documents, etc.), to search music components and objects on the account of classification and identification.

Most of the above listed features are innovative and only possible on WEDELMUSIC model. Other classical features have to be considered all the same innovative since in WEDELMUSIC they are allowed respect of the owner rights. In general, provided the market availability of such functionalities, we found ourselves constrained to design a sophisticated set of tools to protect WEDEL objects, while at the same time permitting and controlling the exploitation of such new functionalities.

Today, Arcipelago Musica and Active Music Mediateques have adopted WEDELMUSIC solution.

Big publishers are beginning to exploit Internet potentialities for music distribution. Systems, such as NAPSTER and GNUTELLA, are rapidly transforming the distribution of audio files, they adopt a Business-to-Consumer model, B2C. Digital Music is also music scores, music related documents, music cataloguing management, documents about lyric, music videos, etc. The digitalisation of historical music archives can be a way to gain access to the Internet market and at the same time to save the cultural heritage. In fact, in many cases, the archives of institutions, conservatories, foundations, and of big publishers have also historical music which undergoes the risk of being lost as time goes by. This huge of music information, which is a real cultural heritage, should be saved in digital and valorised.



WEDELMUSIC offers a solution to cope with the above problems by providing something that allows on the one hand to valorise your content in a multimedia framework and on the other hand to distribute it in a protected way.

1.1 WEDELMUSIC as a Fully Integrated Solution

WEDELMUSIC presents:

- Model for distributing **interactive** symbolic **music** (music that can be manipulated: transposed, arranged, modified, etc.). Such model includes images of music sheets and audio files in an integrated manner, respecting copyright protection aspects and owner rights, according to the **WEDELMUSIC format**;
- **WEDELMUSIC Servers** to prepare and deliver) WEDELMUSIC objects considering protection and account procedures, fast retrieval of any component: images of music sheets, scores, audio files, documents, video, etc. (see WEDELMUSIC Server User Manual);
- **Local Distributors** for locally storing, sharing and distributing music in the local area, which fits for **music shops, theatre archives, music schools, conservatories, libraries**, etc. The proper tool for distributing music under the license of the publisher and at no storing charges. You will pay for what you sell/buy; (see WEDELMUSIC Local Distributor User Manual);

- **Secure transaction** between the Servers and the Local Distributor and from the latter to clients; protection mechanisms that answer for the secure distribution and sharing for a time duration much longer than that covered by rights.
- **Recovering the owner identification** by including hidden watermarks into audio and music sheets;
- **Music editors** and view devices for:
 - **editing music** by using a wide set of music notation symbols, always in the respect of protection aspects and allowing even personalization on protected WEDELMUSIC objects;
 - **viewing** music scores (from symbolic or image score format) and at the same time **listening** to any related audio files chosen, **controlling velocity** in order to learn and study music pieces; **automating the turning of pages**;
- **Music manipulation**: transposition, piano reduction, reformatting, adding/deleting single symbols, measures, parts, etc., manipulation up to 4 voices per staff, systems for harp, piano, organ, tablatures, percussions, duration checking, note head definition, custom symbol definition, etc.
- **Printing music** on the account of clients needs and formats, at any resolution;
- **Printing music in Braille** format;
- **Extracting excerpts** of score music and audio files according to user needs;
- **Adding lyrics** by considering multilingual aspects;
- **Formatting music** either in an automatic way or by imposing personal formatting: justification, positioning, etc., on the on the ground of a set of MILLA rules which can be modified by the user;
- Allowing the building of **multimedia objects** with audio, music scores, documents, etc.
- **Listening to music description** for visually impaired people;
- **Editing music** for visually impaired people;
- **Analysing music scores** from huge databases: comparison, searching, etc.;
- **Converting music** from the most common-use formats (FINALE, MIDI, etc.) to WEDELMUSIC format;
- **Reducing time, costs and prices**:
 - when modifying main scores and parts for rehearsals at **theatres and music schools**;
 - **when delivering music scores from publishers** to their distribution agents;
 - so as to set up virtually huge **music shops and libraries**;

Please note that several other functionalities are available.

If you are interested in attending the annual WEDELMUSIC International Conference on WEB Delivering of Music, please visit the WEDELMUSIC web-site: www.wedelmusic.org.

For any information and if you are interested in making [your tool WEDELMUSIC compliant](#) or if you want to be included in our beta tester and user groups, please contact us via email: wedelmusic@dsi.unifi.it.

For building WEDELMUSIC compliant tools and solutions you can use the WEDELMUSIC Tool Kit, please read the overview at the end of this manual and ask us to receive WEDEL Tool Kit, WTK. It allows:

- producing music related applications by exploiting all the above mentioned functionalities and protection facilities.
- bringing your music applications in the era of Internet adding and managing on your behalf the multimedia and protection aspects which are missing in your tools.

If you want to be informed about the WEDELMUSIC tools, their evolution and in general about music distribution issues, please subscribe to our list by sending an email to WEDELlist@dsi.unifi.it

1.2 Acknowledgements

WEDELMUSIC architecture, solutions and tools have been defined and developed during a Research and Development project with partners: DSI, University of Florence (I), ARTEC (B), Casa Ricordi BMG Group (I), FNB (NL), SVB at the beginning of the project, Scuola di Musica di Fiesole (I), IRCAM (Fr), FHG-IGD (DE), ILSP (GR), CESVIT (I), SUGARMUSIC (I) (Suvini Zerboni at the beginning of the project). In these institutions and companies many people contributed to the definition of the requirements of the tools described and some of them contributed to develop parts of this tool. It is thanks to their valuable contribution that WEDELMUSIC tools today are a reality.

In addition, we would like to express our thanks to the people that have been part of the WEDELMUSIC User Group. They contributed in identifying the most useful requirements and in validating the solutions chosen.

We also would like to thank people that collaborated with WEDELMUSIC staff during the first WEDELMUSIC conference, while offering their contribution for the organisation of the second in 2002. Many authors who read their papers at the conference, dealing with music distribution and a large audience of skilled attendees made the conference a great success and at the same time gave us the the chance of validating our results. We owe many also to the project reviewers and to the project officer for their useful suggestions

Today, WEDELMUSIC solution is adopted by some Mediateques, so as share WEDELMUSIC objects both internally and with other mediateques:

- Arcipelago Musica in Milan, Italy, and
- Active Music in Fiesole, Firenze, Italy.

Several hundreds of beta testers are assessing this tool and provide us with suggestions to improve it. We would like to thank them, too.

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Chap.2 The WEDELMUSIC Objects

WEDELMUSIC format consists of a perfect format fitting for both the old and new multimedia applications of music which are expected to be achieved in the next years: multimedia music archives, didactical CD ROMs, distance and remote music teaching and learning, electronic stands or lecterns, the home TV (WEB tv) as a a means of playing or reading, virtual orchestras, etc.

These innovative features are possible thanks to the definition and realisation of:

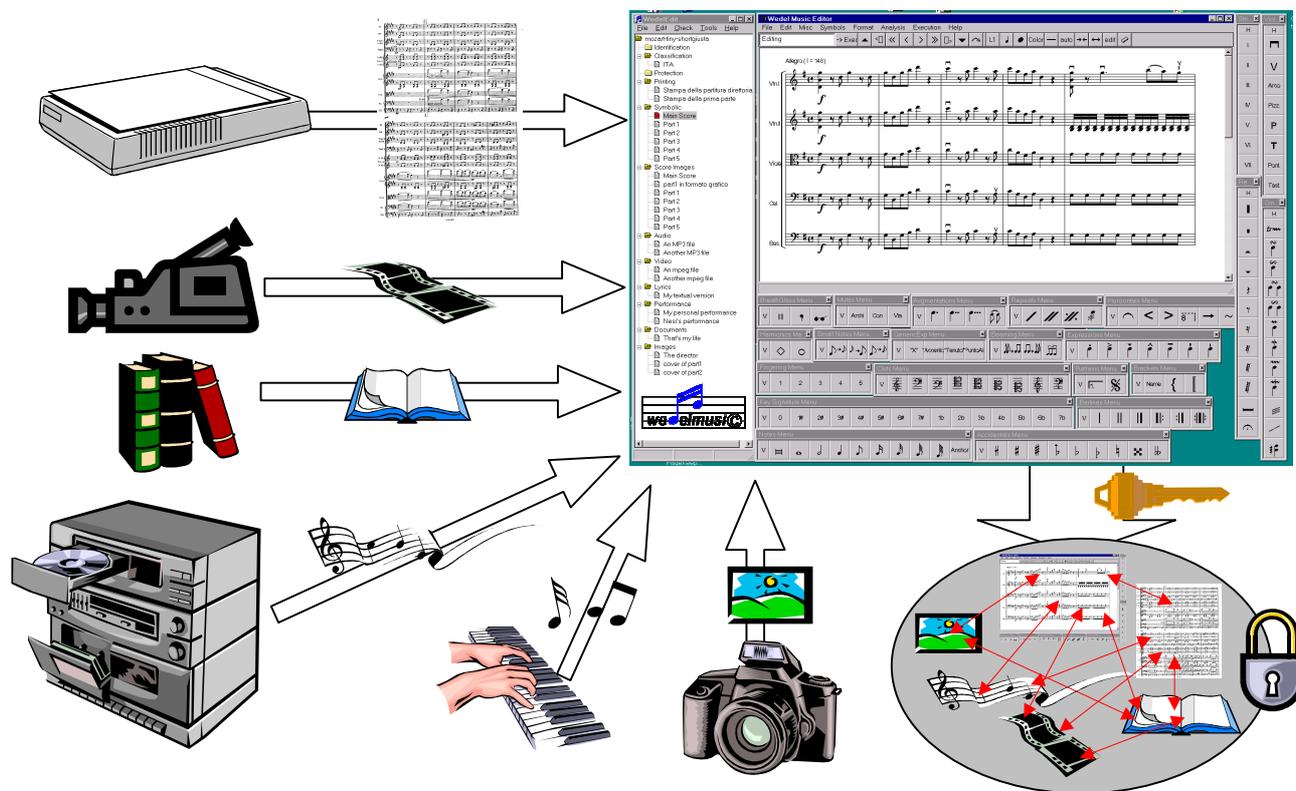
a unified format WEDELMUSIC for music modelling that includes audio, symbolic, images, documents, videos, etc. Such format is based on XML, which is the referring standard for the distribution of structured information and documents on the web.

reliable mechanisms for protecting music in audio, symbolic and image formats. The protection model integrates tools for marking music and for the encryption of WEDELMUSIC objects with multiple keys. In this way it is possible for publishers to demonstrate/claim their rights on the music piece and find out eventually the author of a violation. Such protection tools are accompanied by a refined technique for keeping trace of each single operation performed on each music piece, this allowing eventually to credit these operations (print, transposition, execution, visualisation, notation, etc.). These functionalities go far beyond the limits of the SDMI (Secure Digital Music Initiative).

WEDELMUSIC XML Format includes constructs for the integrated description of the following aspects:

- Identification
- Classification
- Protection
- Printing
- Symbolic Music
- Image Score
- Other Symbolic
- Performance
- Documents
- Lyric

- Audio
- Video
- Image

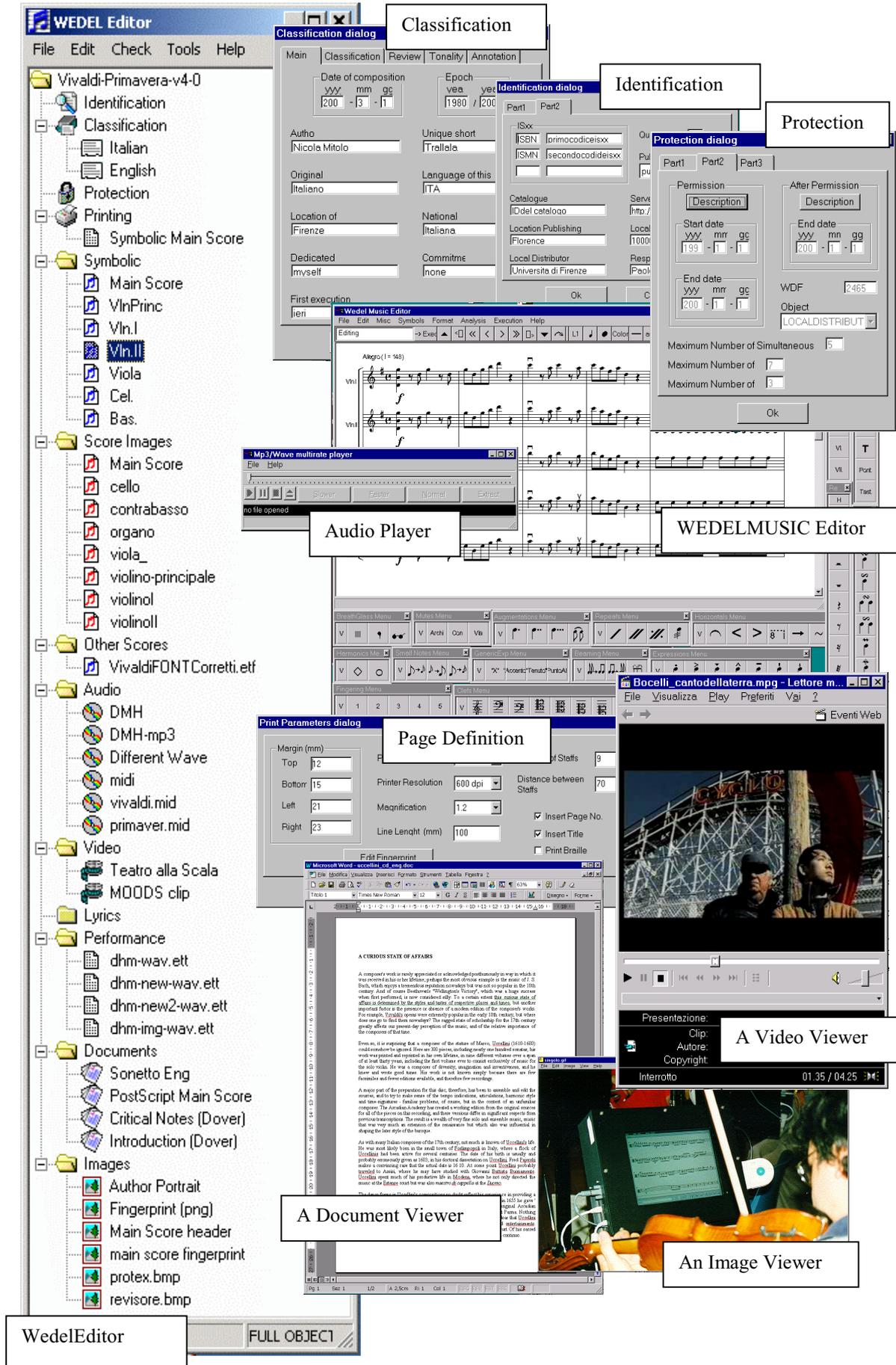


Hereafter, each aspect has only been shortly discussed, while detailed treatment of each subject is given in separate sections. These aspects are structurally managed by the so called WEDEL Editor.

1. **Identification**, which allows the identification of the WEDELMUSIC object. Typical identification mechanisms may include ISMN, ISBN or whatever else you may need. Moreover, each WEDELMUSIC object may have a unique WDFID (WEDELMUSIC Identification code), like each one of its component.
2. **Classification**, which allows the classification of WEDELMUSIC objects according to standard archive criteria. The general classification is multilingual meaning that more than one classification record can be present in the same WEDELMUSIC Object. The classification schema is made of the union of UNIMARK and Z39.50. This classification is for the whole WEDELMUSIC object and should not be confused with the classification of components: symbolic, image score, audio files, etc. Each WEDELMUSIC object component may have its specific classification.
3. **Protection** makes use of technologies of encryption and watermark. The protection includes a formal description of the functionalities that can be exploited for each WEDELMUSIC object, any aspects related to the permission to manipulate music during the different stages of the WEDELMUSIC object: when it is demo, when it is held on lease, when it has already been sold, when the lease period is over. The Protection section includes all aspects for the Digital Right Management, DRM, of the objects. In the automatic mechanism for WEDELMUSIC object distribution, the Permission Tables are generated by the WEDELMUSIC Server while delivering and according to the Local Distributors that make the orders.
4. **Printing** includes the default description for printing the music contained in the WDF object. Such object includes format, presence of cover, set of documents to be printed, specific fingerprints. Details about printing of symbolic, image score and Braille can be possible. (this part is not yet complete in current version).
5. **Symbolic Music**, which describes the scoring information, musical notation symbols and their relationships. The adopted model for symbolic music produces the main score on the account of any single part. Both for each part and main score it is possible to have
 - A classification and identification including also a specific WDFCID (WEDELMUSIC Component Identification code) which is automatically generated;
 - Synchronisations with audio files in WAVE, MP3 or MIDI formats;

- *A logic description* in a file for each part and one for the main score, a support to the symbolic indexing and a specific logic mechanism for identifying univocally each music notation symbol regardless of its visual position;
 - The main score is obtained using parts and its *visualisation rules*, coded in MILLA language are described hereafter. MILLA formatting rules can be different for each WEDELMUSIC object.
 - *Fonts* can be different for each WEDELMUSIC object. Standard fonts can be used. Specific fonts can be defined and attached to the WEDELMUSIC object. The definition of new fonts can be performed to add a custom font/symbol.
 - *Relationships* with other components of the WEDELMUSIC object, with the images of music sheets, between notes and documents, audio, video, HTML pages, and images.
6. **Performance.** This aspect deals with the execution rate of music during a performance aiming at providing on the computer screen the symbolic or the image score version of music notation synchronously with the selected audio file. These components are directly generated by the synchronisation tool.
 7. **Image of Music Sheets**, which allows to distribute images of music scores without converting them into symbolic format. thanks to those images of music scores it is possible to make presentation slides to be shown during the execution of a real performance audio file. In addition, several relationships can be defined among these image scores and other components of the WEDELMUSIC object: symbolic notation notes, documents, audio, video, HTML pages, and images.
 8. **Other Symbolic Formats**, which allows the insertion of music notation files of any format into the WEDELMUSIC object. Each file has its WDFCID, a classification, identification and some further information. They can be opened with specific editors and not with the WEDELMUSIC. Please note that WEDELMUSIC editor can load XML music notation files produced by the WEDELMUSIC Plug in for Finale 2000, 2001 and 2002.
 9. **Documents.** Each WEDELMUSIC object may include either no structured documents, only one or more structured documents. Each documents has its WDFCID, a classification, identification and some further information as described hereafter. Such documents can be of any format.
 10. **Lyric.** Each lyric has its WDFCID, a classification and so forth. Each music piece may have no lyrics one and more lyrics associated with. In general terms, a lyric can be associated with
 - A symbolic part, a symbolic score may have a lyric line for each part. In effect, a single part may have even 4 distinct lyric lines. In this case, the specific lyric is linked by using symbolic links to the corresponding part. The single lyric line in a score can be related to the presence of a refrain or the presence of more than one voice. In such latter case, it is more likely to have different music score parts.
 - An image score music, even when there are no symbolic parts, in order to read the lyric, for example for the operas.
 - The audio even when there are no symbolic parts or image score parts, in order to read the lyric, for example for the operas.
 - More than one version of the same lyric may be available to support different languages, if the symbolic part is left the same.
 11. **Audio.** A WEDELMUSIC object may include either no audio files or audio files. Each audio file has its WDFCID, a classification, identification and additional information. Their format can be WAVE, MIDI, MP3, SND, etc. are imposed on their format, but only WAVE, MIDI and MP3 file can be used for the synchronisation with symbolic or image music. Audio files of different languages could be included as well. The synchronisation of audio file allows to adjust the execution rate during visualisation while listening to the music score with the selected audio.
 12. **Video.** A WEDELMUSIC object may include either no video files or video files. Each video file has its WDFCID, a classification, identification and additional information. No limits are imposed on their format: AVI, MPEG, etc., nor on their size and image rate. This depends on the hardware and software available with the publisher and client computers.
 13. **Image.** A WEDELMUSIC object may include either no images or. Each image file has its WDFCID, a classification, identification and additional information. Such images must be kept clearly distinct from the images of the music score. The former are typically used like captions or other didactical purposes such as showing the portrait of the author/performer, a picture related to that music piece or opera, or performer, the hometown of the author/performer, a picture of the instrument, a cover page, the cover of a CD rom, etc. No limits are imposed on their format: GIF, TIF, BMP, PCX, etc.

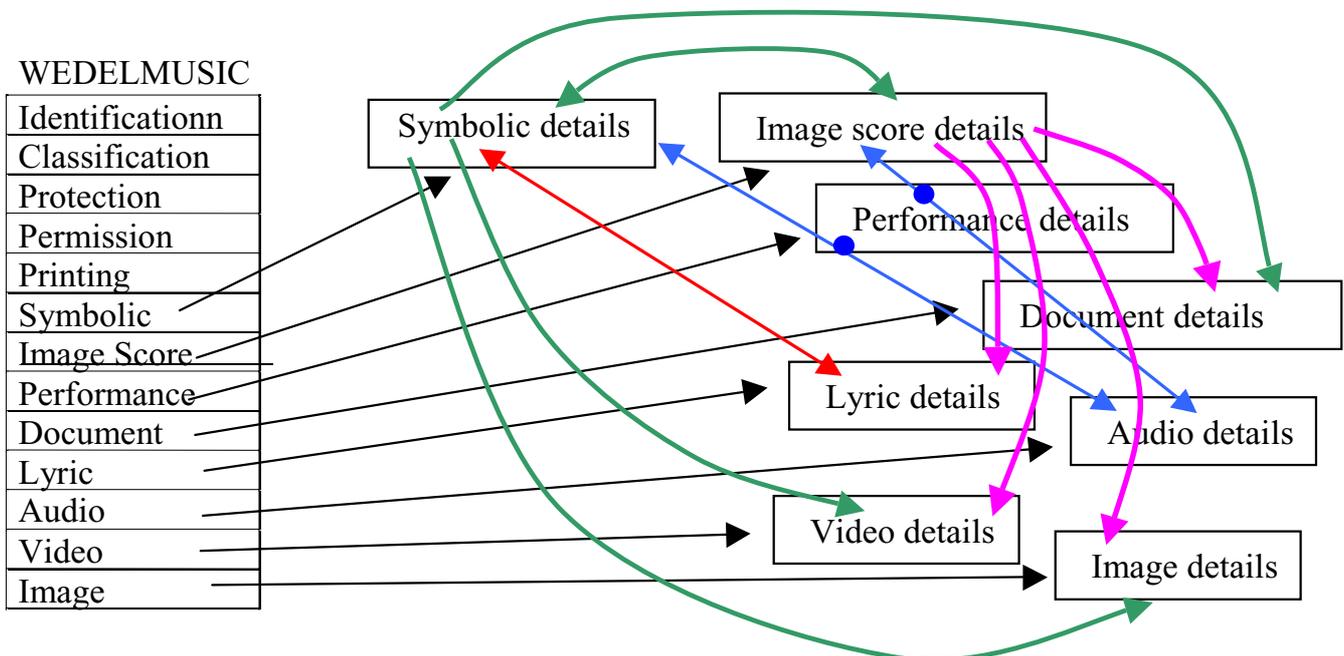
Each component of what has been described above may be missing except for some parts of the identification and classification sections. Depending on what is missing the available functionalities can be different. Details on these aspects are reported hereafter.



2.1 Integration Aspects

In this section, the discussion focusses on the integration problems of music in symbolic and image score formats, together with the audio produced by the symbolic format (for example in MIDI) or acquired as auxiliary audio files. Selected relationships among WEDELMUSIC Object Components are:

- Symbolic to lyric: different lyric files can be referred to the same symbolic file. Each Symbolic part refers to a default lyric component.
- Symbolic to image score: the relationship is performed through the number of measures
- Image score to symbolic: the relationship is performed through the number of measures
- Symbolic to images: through hyperlinks that can be assigned to music notation elements
- Symbolic to documents: through hyperlinks that can be assigned to music notation elements
- Symbolic to audio files: through hyperlinks that can be assigned to music notation elements
- Symbolic to other symbolic music files: through hyperlinks that can be assigned to music notation elements



- Symbolic to videos: through hyperlinks that can be assigned to music notation elements
- Symbolic to audio through performance: each audio file can be synchronised with the single symbolic score contained in the WEDELMUSIC object.
- Image score to video: through hyperlinks that can be assigned to images
- Image score to audio files: through hyperlinks that can be assigned to images
- Image score to images: through hyperlinks that can be assigned to images
- Image score to other symbolic music files: through hyperlinks that can be assigned to images
- Image score to lyric: through hyperlinks that can be assigned to images
- Image score to documents: through hyperlinks that can be assigned to images
- Image score to audio through performance: each audio file can be synchronised with the single image score modelling the music sheet contained in the WEDELMUSIC object.

2.2 Images of music scores/sheets and symbolic music

The integration or the conversion of images of music scores and music in symbolic format is a big problem. Symbolic music presents a collection of information related to the music notation symbols and their relationships and semantics, whereas images have no semantics of notation, at all.

Subsequently, in symbolic music it is possible to

- Reformat music according to different page dimension, relationships among symbols and other user needs.

- Modify music by adding/removing/changing music notation elements.
- Transpose music in several ways.
- Format/Visualize music for a different page shape or computer screen.
- Generate a MIDI output so as to produce computer music.
- Analyse music content on the basis of music notation symbols relationships.
- Search on the account of music melody and structure.
- Print music in the desired format and resolution.
- Re-justify music score according to justification parameters and micro spacing defined by the user.
- Main score can be built on the account of the information contained in the parts (brackets grouping staff systems and other annotations by the conductor have to added).
- Parts can be obtained from main score (however, some details have to be added in some instances).
- To select parts for execution.
- Execution of music presenting the right score image in the right time instant directly on the computer screen
- Etc.

Images of music scores present a strongly limited number of functionalities, and some relevant drawback. The main problems are:

- The dimension of the files containing images when compared to the space needed for containing the same amount of music in symbolic is about 1/1000. This ration depends on the resolution used. To visualise an image of music on the computer screen 80 dpi is what is considered necessary, to print such image at least 300 dpi are needed. The delivering of image score should be at print resolution, only provided it is needed. It is also possible to use high-resolution images on the computer screen if a conversion process is applied whenever needed (this means that a real time conversion is necessary). The solution is found in acquiring image of music score at higher resolution, so as to be sure to get a master at a resolution which can be used for all purposes. The correct resolution can be 600 dpi or 1200 dpi.
- The symbolic version of a main score can be produced by merging parts. This is impossible for image scores. A different set of images has to be provided to distribute main score and parts. A set of image for main score and a set of images for each (and every) part.

The above functionalities which are achievable for symbolic music turn out to be completely infeasible when it comes to images of music scores. Provided that format, it is only possible to:

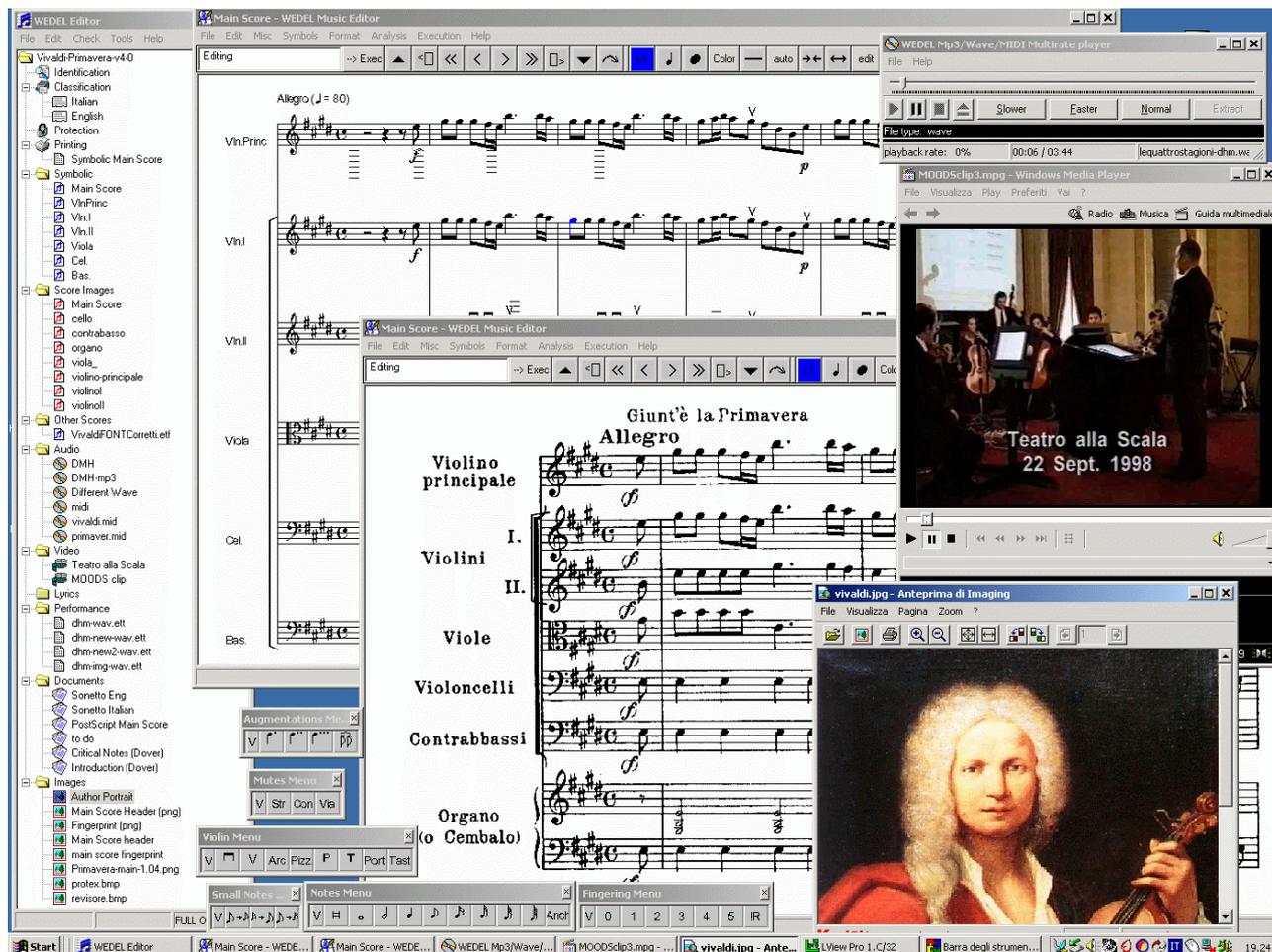
- Print music sheets at the image resolution (typically lower than printers)
- Visualise music in a rigid way according to the original formatting the music has on the music sheet. Line breaking has to be maintained otherwise the composition of single measures produces line staff of different lengths. This is totally unacceptable for both musicians and publishers.
- Execution of music by using images of music score cannot be performed without a time code or an auxiliary audio. In any way the paging mechanism can be similar to that of MOODS. The alignment of image score and audio can be quite unrefined.

Images of music scores present some advantages with respect to symbolic music. Image of music scores:

- are available at a lower cost for the publisher. They have archives of master music scores in paper version in most cases.
- can be distributed on the internet in a quite secure way. An image is unlikely to be easily manipulated at low cost, therefore we can suppose images remain the same all their life long. It is quite difficult to modify music by modifying images of music sheets.
- represent the only way to distribute some music piece. For instance: (i) very antique music pieces, (ii) music pieces with strange modern or antique notations, (iii) manually written music pieces.
- may present hand written music scores, meaning manuscripts by the composer. They sometimes have great value.

This analysis shows that both formats, images of music sheets and symbolic music, are needed. At present the former is much more interesting for publishers since it means low cost to go on the Internet distribution. The latter may replace the former in the future, and yet it is unlikely it could do that for all the aspects. Very ancient and hand written scores could be kept in paper or image formats for several years or maybe forever. That is the reason why the WEDELMUSIC format becomes so interesting for music Distribution, being able to integrate both aspects.

In a WEDEMUSIC Object, the images of music scores are prepared to allow the organisation of the single staff lines on the computer screen. In addition, the resolution of the image is arranged according to the screen dimensions and beginning with a strong enough resolution. In this way the visualisation of images of music is more flexible, thus reducing the problems related to images of music scores. This allows the implementation of an acceptable mechanism for visualising images of score music on the account of an audio file of a real performance.



In previous example, a WEDELMUSIC object presenting “the Spring of Vivaldi” is reported. As everyone can see, there is the symbolic representation of music scores, the audio player, a video player (Microsoft Multimedia Player) (presenting the video of the execution of that music piece at the Teatro alla Scala in the 1998 for MOODS project of DSI), an image viewer (presenting the author's portrait) and the WEDELMUSIC editor presenting the Image Score of the original score sheet which belongs to Casa Ricordi, some symbol menus. Please note on the left the WEDEL Editor presenting the structure of the WEDELMUSIC object and its components.

The following example presents a piece of Uccellini. It is visible on the on the right the original music score sheet, the original dedication to "Serenissimo Principe", the cover of the Basso Continuo, the page sheet ready to be printed in WEDELMUSIC format with the internal music editor, the internal audio player under execution. Please note on the left the WEDEL Editor presenting the structure of the WEDELMUSIC object and its components.

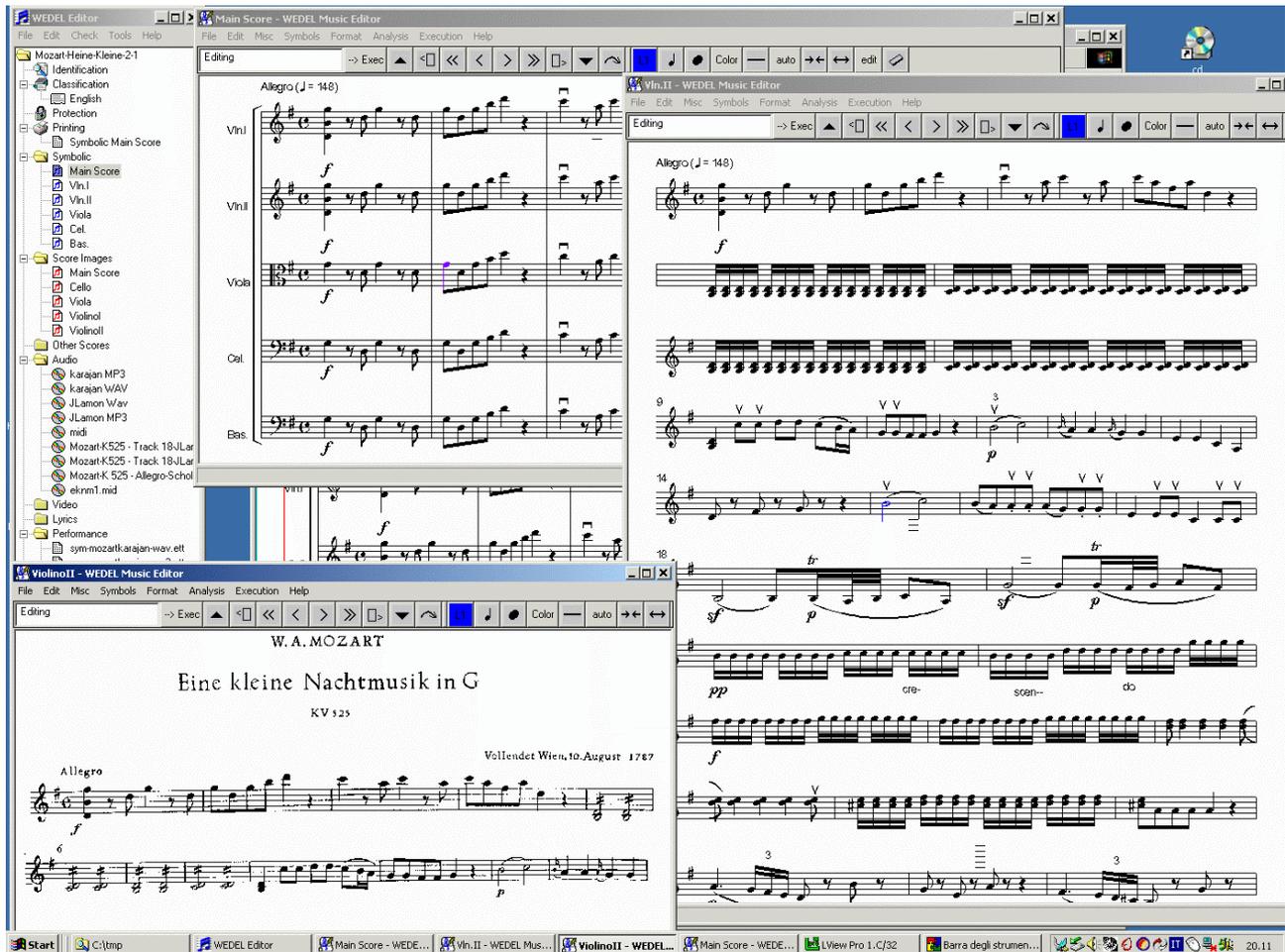


In a WEDELMUSIC object the integration of symbolic music and image score music is defined by using several links:

- common audio files that can be synchronised with both formats;
- common measure numbers;
- common effects (audio, video, documents, images, etc.) that can be executed, visualised from both solutions.

The definition of relationships between symbolic elements, such as measures, and the specific image which contains the corresponding measure, is very useful to many purposes. For example: (i) to show the correct/modified/arranged music notation code of possible critical pieces in the original music score (changing from music image to symbolic); (ii) to see the original notation or passages related to a symbolic aspect (passing from the symbolic notation to the corresponding image part).

The following view is a WEDELMUSIC object of Mozart. The example shows the object structure on the left, while in the rest of the screen we can see: the main score in symbolic WEDELMUSIC format, and the single part of Violin II. Please note that a change performed in the score of the part is automatically replicated in the main score, in the print view and viceversa. In the left bottom part of the window you can see the image score taken from the original music sheet of that music piece.

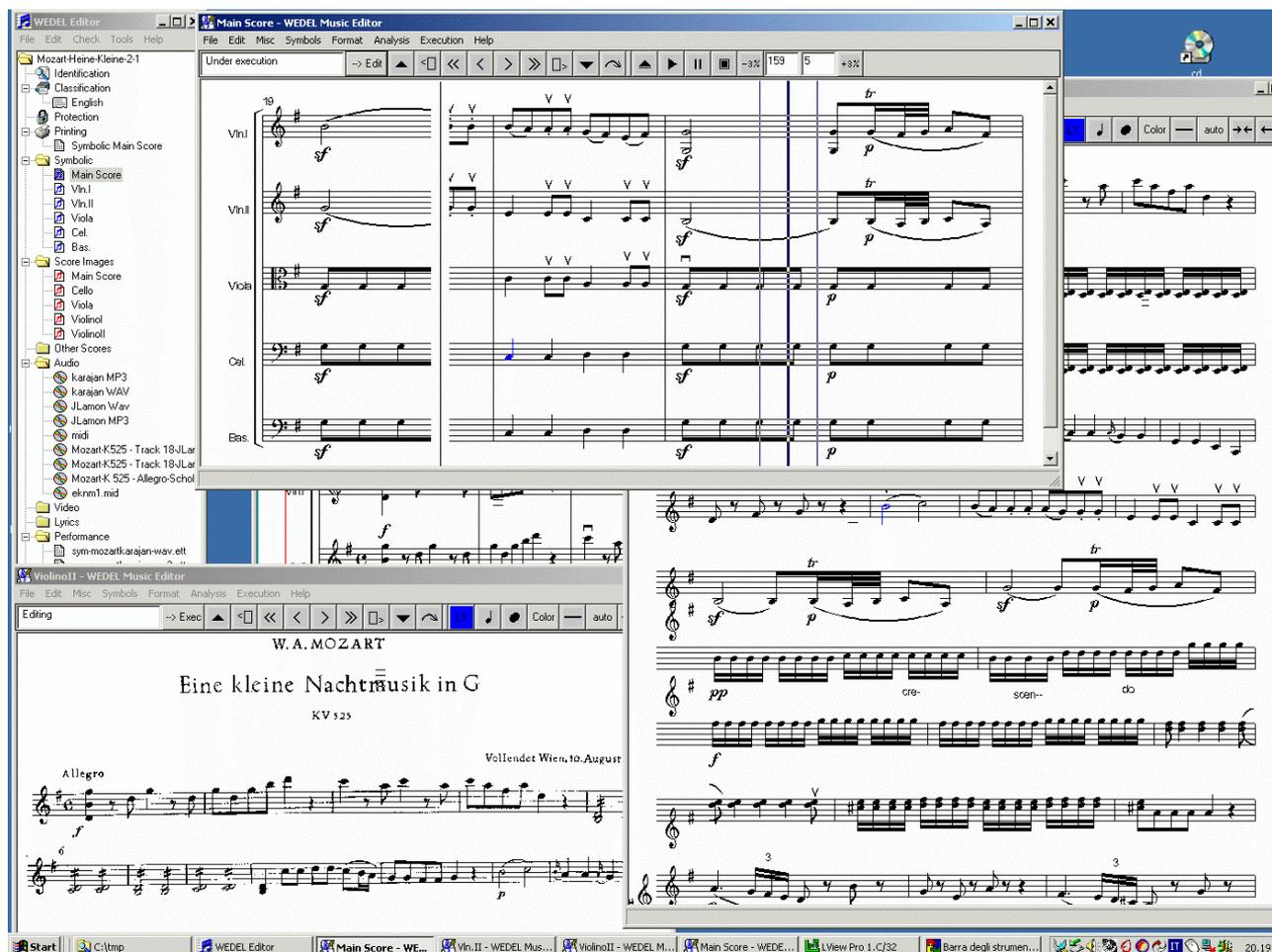


Whenever passing from a measure in the symbolic score to the same in the image score, it is enough to present the image containing the selected measure. For the same reason the synchronisation of a music score image or of a symbolic music at the level of the single figure (note or rest) becomes useless since, during the music score visualisation while listening, the screen presents the set of measures. The synchronisation with images is performed at level of segment of measures.

From such point of view, it must be possible to:

- Include image music score sequences and the corresponding or evolved symbolic music in the same WEDELMUSIC object.
- Select a measure in the symbolic representation and jump to image representation of that page including the selected measure.
- Select a measure in the image score music and jump to symbolic representation.
- Visualise symbolic music and image score music on the same computer and at the same time in different windows.
- Execute image music score by providing the right music page at the correct time instant according to the selected audio. This can be done through an audio file. From the user perspective, it must be also possible to increase and decrease the execution rate of both image score and audio file. This has a specific relevance for music school and libraries.

Following example shows an instant representing the synchronous execution of the music score while listening to the real performance. Please note the visualisation modality of the execution. Details are given in the section focussing on the music score execution.



2.3 Integration of music notation sources and audio formats

In this section the integration of audio files and music in (i) symbolic format, and (ii) images of music score is briefly commented. Please note that the production of MIDI files from symbolic music does not present problems of synchronisation and it is given for granted since it is an operation available in all music editors. MIDI files can be produced, stored and played in a second phase or can be played while produced.

In WEDELMUSIC model and tools the following innovative functionalities are possible:

- 1) To synchronise music in symbolic format with an audio file in order to present on the screen music pages and listen to the audio produced by famous authors and conductors.
- 2) To synchronise music in symbolic format with several different audio files. This allows the user to compare different performances of different musicians and orchestras.
- 3) To synchronise music in image score format with an audio file for presenting on the screen music pages and listening the audio produced by famous authors and conductors.
- 4) To reproduce music in both image and symbolic format synchronised with the audio and allow the presentation of the right music piece in the right time instant according to the synchronisation decided.
- 5) To allow the decrement and increment of execution velocity, by adjusting the velocity of audio and of the music presented on the screen.

It is quite obvious that the synchronisation of an audio with symbolic score can be much more precise than the one with the images of the music score. In fact, each image or image slice may contain more measures and not only one.

Chap.3 WEDELMUSIC Architecture and Solution

WEDELMUSIC allows archives, publishers and consumers (theatres, orchestras, music schools, libraries, music shops, musicians) to manage and share interactive music; that is, music that can be manipulated: arranged, transposed, modified, reformatted, printed, executed, synchronised, etc., in the complete respect of the copyright. It is an innovative support for preparing performances, studying and analysing music, learning instruments, sharing and distributing music at low cost, etc. The same music objects can be available for traditional media and Braille. These innovative features are possible thanks to the WEDELMUSIC solutions which include:

- (i) a unified XML-based format for modelling music. It includes audio, symbolic music, image of music scores, documents, videos, lyric, colour images, cataloguing information, which can be associated with a music piece. The several components of each WEDELMUSIC object present relationships that allow the navigation among them and the exploitation of new functionalities;
- (ii) reliable mechanisms for protecting music:
 - transaction model for safe distribution of digital music objects,
 - symbolic format including protection aspects such as the watermark of music sheets while printing them,
 - images of music sheets including watermark,
 - audio files in different formats including watermark;
- (iii) sophisticated mechanisms for DRM which go far beyond the limits of the SDMI (Secure Digital Music Initiative):
 - protected music that can be manipulated: transposed, arranged, modified, etc., while respecting the owners' rights,
 - formal definition of the allowed functionalities for the integrated multimedia WEDELMUSIC objects,
 - formal definition of the temporal exploitation for the permitted or inhibited functionalities,
 - supporting transaction models, for selling, retailing, renting and demo distribution,
 - tracing (for statistical purposes) and accounting of exploited functionalities.

To distribute and receive music in symbolic format also allows to exploit new functionalities for music consumers.

3.1 WEDELMUSIC Architecture

The WEDELMUSIC solution is based on several tools.

- A WEDELMUSIC editor and generator of music in WEDELMUSIC format integrating audio, images and symbolic formats coming from different sources. Libraries may need this kind of tool in order to prepare material for self-controlled services dealing with WEDELMUSIC objects sharing.
- A WEDELMUSIC Server it allows the distribution of music through the Internet and elsewhere but always in a protected way. It integrates tools for watermarking, reading watermarks, encrypting, decrypting, managing the identification keys, managing the transaction, Digital Right Management, etc.
- A WEDELMUSIC Local Distributor for interfacing the corporate music consumers (libraries, music schools, theatres, etc.) with the general servers and for supplying the internal corporate consumer workstations with music in WEDELMUSIC objects. The Local Distributor manages the protection rights and the transaction together with the Server.
- A Music Analyser and Processor -- A music Analysers and processor to make the piano reduction, music analysis, content query, etc. This is implemented as a specific WEDELMUSIC Editor Plug-in. For details please read the User Manual of the Music Analyser.
- Music Viewer and Listener -- A music Viewer and Listener to visualize music in WEDELMUSIC format in the computer of the music consumer/end user. In a transaction model, when the WEDELMUSIC objects are protected, the WEDELMUSIC viewer and Listener is the only tool which can open the protected files by getting the required permission from the Local Distributor and from the Server.
- Interfaces for Blind People -- A set of interfaces which make possible the adoption of music in WEDELMUSIC format for blind people. This is implemented as a specific WEDELMUSIC Editor Plug-in. For details see the User Manual of the WEDELMUSIC editor for Visually Impaired People.

The E-commerce for music distribution cannot be accepted by publishers without the support of suitable protection mechanisms. WEDELMUSIC enables publishers, distributors, content providers, to protect their music/content and at the same time to allow the users (to exploit) the above-mentioned functionalities of WEDELMUSIC objects according to permissions and prices defined by publishers. To cope with these issues, WEDELMUSIC offers specific mechanisms to protect musical objects.

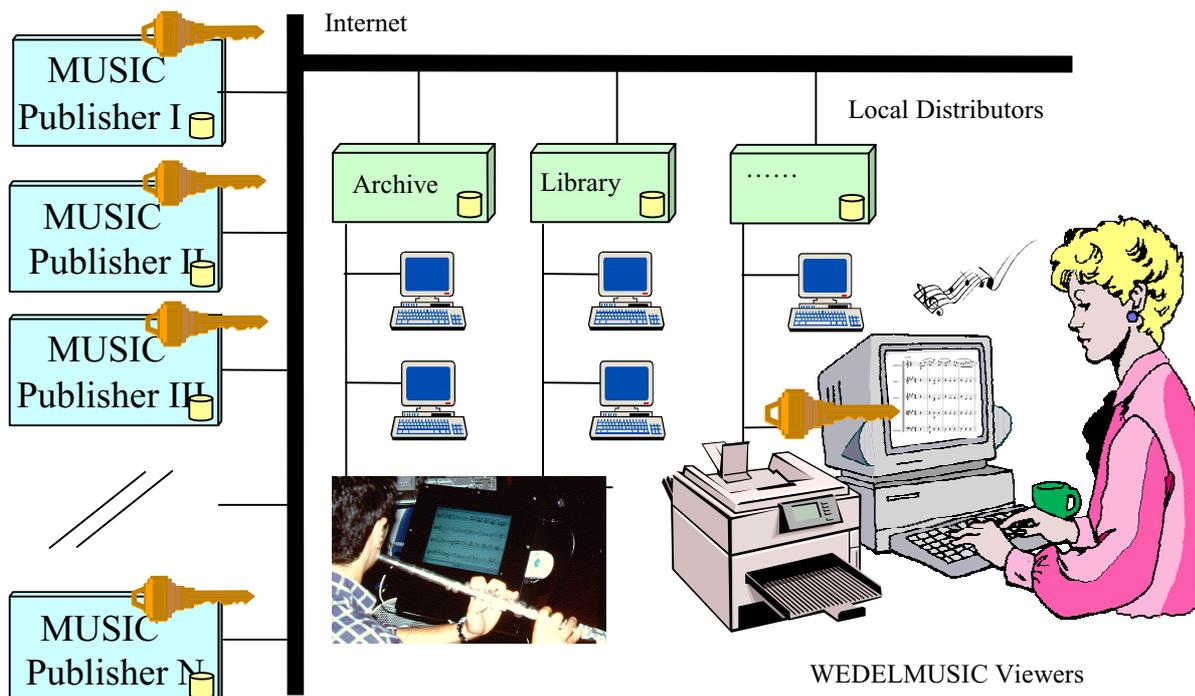
They include:

1. encryption techniques to support the transferring and storage of WEDELMUSIC objects;
2. watermarking audio files in different formats;
3. watermarking images of music score sheets;
4. watermarking music sheets while they are printed from symbolic notation files;
5. definition of Digital Rights Management policies.

In this section, point 1 is discussed, while points 2, 3 and 4 are discussed later on.

WEDELMUSIC transaction model is based on the distribution of music from Publishers/Content Distributors to customers (end-users) by means of the Local Distributors, LD.

- They can be mediateques, archives, libraries, theatres, conservatories, music schools, music shops, recording studios, foundations, etc.,
- They are WEDELMUSIC registered institutions with authorised and certified client computers;
- They collect and distribute WEDELMUSIC objects coming from several publishers;
- They store the WEDELMUSIC objects into their local database in an encrypted form. This grants the privilege of absolute safety to Local Distributors, which are far from being considered confidence inspiring environments;
- They may also collect WEDELMUSIC objects and components in a non-protected format. This allows to use the WEDELMUSIC local server (the local Digital Asset Management) for all the digital music of the Local Distributor;



WEDELMUSIC transaction model, servers, Local Distributors and clients.

- They support the retrieval of WEDELMUSIC objects on the account of classification, identification, and content aspects. The content analysis is performed thanks to the capability of the WEDELMUSIC editor to process and compare music scores.

The WEDELMUSIC transaction model is mainly based on Business-to-Business (B2B) model, so as to have at a second level a Business-to-Consumer transaction, B2C. WEDELMUSIC objects may range from very simple to complete and large (with high-resolution audio, image, and video files). Depending on their dimension and on the transmission capabilities, they can be transferred in a range of time going from few minutes/seconds up to hours. The WEDELMUSIC transaction model allows to to customise completely the music distribution service.

3.2 WEDELMUSIC Object Distribution

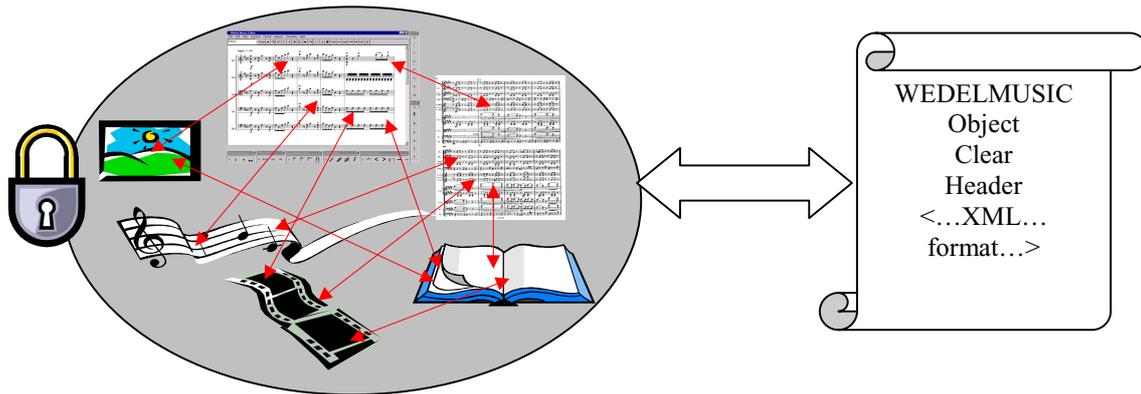
The Local Distributor manager may navigate via Internet on the WEB pages of the Publisher WEDELMUSIC Servers in order to select the WEDELMUSIC objects that he would like to have on the LD. This is simply performed by working with the WWW pages of the WEDELMUSIC servers.

The Clients/Visitors of the LD are allowed to make queries to the LD database on the account of cataloguing, identification and content aspects (such latter functionality is possible with the Music Analyser). This is performed via the WEDELMUSIC Local Distributor WEB Server. The Local Distributor Clients use the WEDELMUSIC viewer and listener for both the visualising and editing of WEDELMUSIC objects (WEDEL Editor, WEDEL Music Editor, Audio player, image score viewer, video player, image viewer, lyric editor/viewer, editor for visually impaired people, music analyser, etc).

WEDELMUSIC objects are built and encrypted on the publisher site (on the Server) by using a specific key for each LD they are sent to.

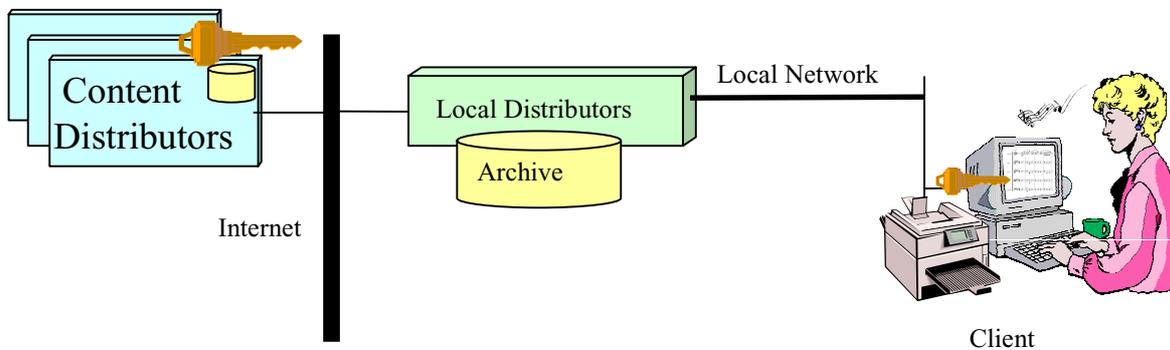
Each protected WEDELMUSIC object is delivered to the LD:

- encrypted in several distinct modules. Besides it has:
- an information file in XML standard format (called WEDEL Clear Header).



Protected files can only be opened by registered WEDELMUSIC Editor clients, the Local Distributor being present in the local network or in the presence of certified service connection with the Server to authorise certification.

Non protected WEDELMUSIC objects are delivered as the collection of the object components. Even in this case the WEDELMUSIC object contains the clear header file.



The differences between protected and protected WEDELMUSIC objects are totally transparent for the Client-Users who receive the objects from the Local Distributor and use them. The differences are obviously on the use they make of the object. With non-protected objects all functionalities are possible.

The WEDEL Clear Header includes the cataloguing and identification information and it is used for storing and indexing the WEDELMUSIC object into the LD database/archive. If the WEDELMUSIC object has several components, it can be partially stored into the LD, for example when the WEDELMUSIC object is only partially bought from the Content Distributor Server. The rest may be left on the Server so that it can be downloaded/requested when needed.

The distribution of the WEDELMUSIC object and its components is very flexible and support supports different modalities. The distribution can be performed by sending:

- WEDELMUSIC objects from Server to the Local Distributor via CDs or DVDs, the permissions and the licenses to open objects can be obtained when needed via Internet. This is the recommended mechanism when the library is created for the first time.
- WEDELMUSIC objects from Server to the Local Distributor via Internet, the permissions and the licenses to open objects can be obtained when needed via Internet. This is the suggested distribution when the objects are small or for updating current objects.
- the Clear Header of the WEDELMUSIC objects the user is interested in from Server to the Local Distributor. The real content can be acquired in a second moment according to the Local Distributor request. This can speed up any ordering of new objects.

For these reasons the B2B transaction model of WEDELMUSIC ranges from on-line to off-line transaction, with the on-line to the off-line distribution of digital objects.

The Local Distributor Clients may browse the internal main components of the WEDELMUSIC objects with the WEDEL Editor. This is possible provided you have either the real WEDELMUSC object or the simple Clear Header. Whenever the client attempts (at opening) a component of a WEDELMUSIC object, the encrypted WEDELMUSIC object is sent from the LD to the client.

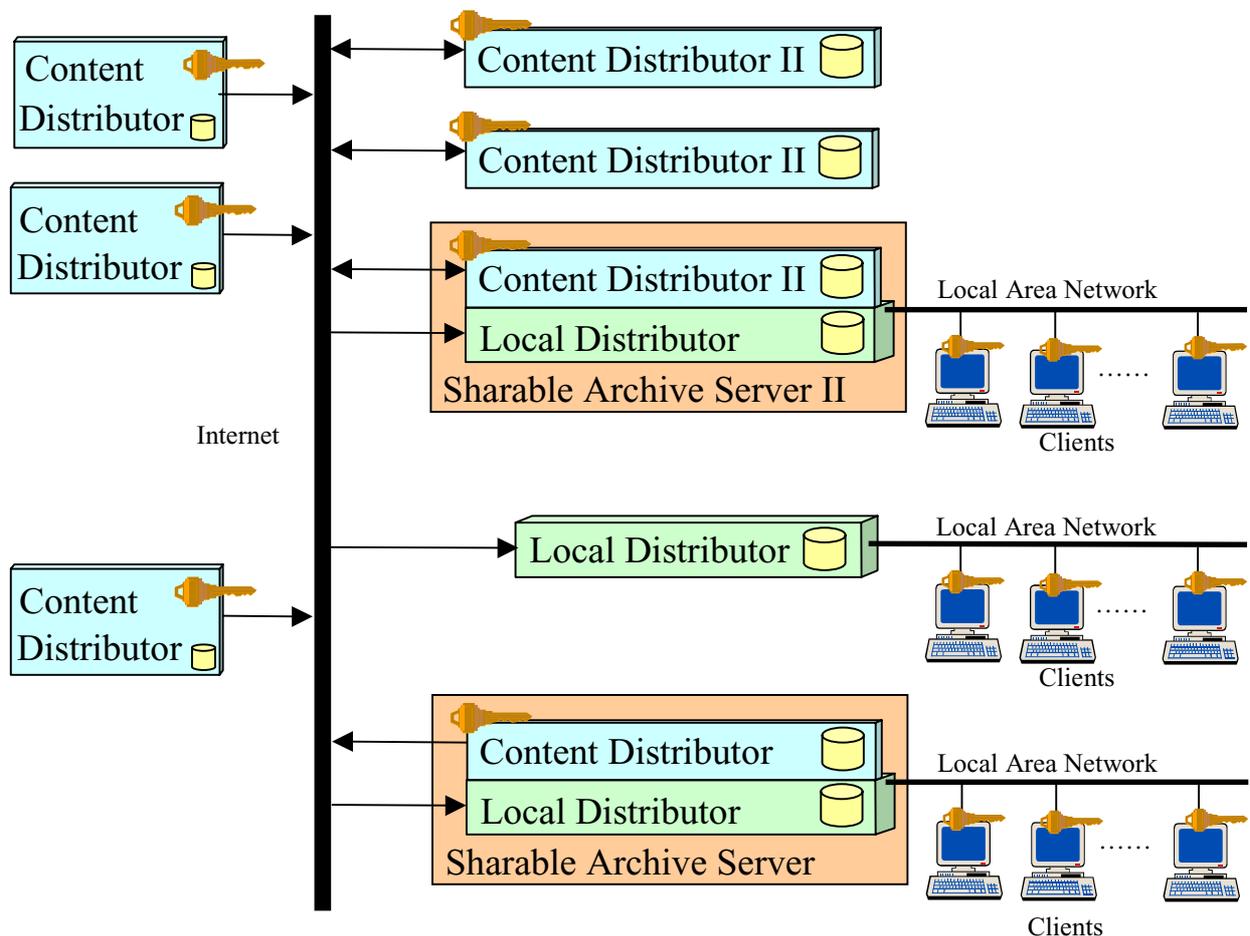
3.3 Sharing WEDELMUSIC Object for Mediateques

The above mechanisms can be used for building a large variety of solutions for multimedia and music content distribution. One of them allows the sharing among corporate institutions and in any case among content distributors. Content Distributors can be archives, mediateques, second publishers, music shops, associations, etc.

In this case, we have several content providers/distributors that hold their WEDELMUSIC objects and thus are able to protect them and distribute them to Local Distributors. In the figure, they are simple Content Distributor. To perform their task, they need to have the WEDELMUSIC server and the WEDELMUSIC Editor for building WEDELMUSIC objects.

They are also interested in getting music from other content providers to become second distributors of those contents. This means that they have interest in getting WEDELMUSIC objects and redistribute such objects to other Local Distributors. In the figure, they are called Content Distributor II. Also in this case, to perform their job they need to have the WEDELMUSIC server and the WEDELMUSIC Editor for building WEDELMUSIC objects.

Sometimes simple Content Distributors or Content Distributors II can be interested also in playing the role of Local Distributors in their own location. In this case, they need to have with them the Local Distributor and the corresponding clients. In the figure, they are called Sharable Archive Server and Sharable Archive Server II. Also in this case, to perform their job they need to have the WEDELMUSIC server and the WEDELMUSIC Editor for building WEDELMUSIC objects.



Please note that in the Figure the arrows that connect the tools with Internet stand for the direction of the content. Needless to say, the distribution of content in a certain direction also implies the reception of orders in the opposite one.

Sharable archive servers allow the implementation of a synergetic mechanism through which each archive may produce content that can be shared by others this enlarging the potential catalogue of the archive.

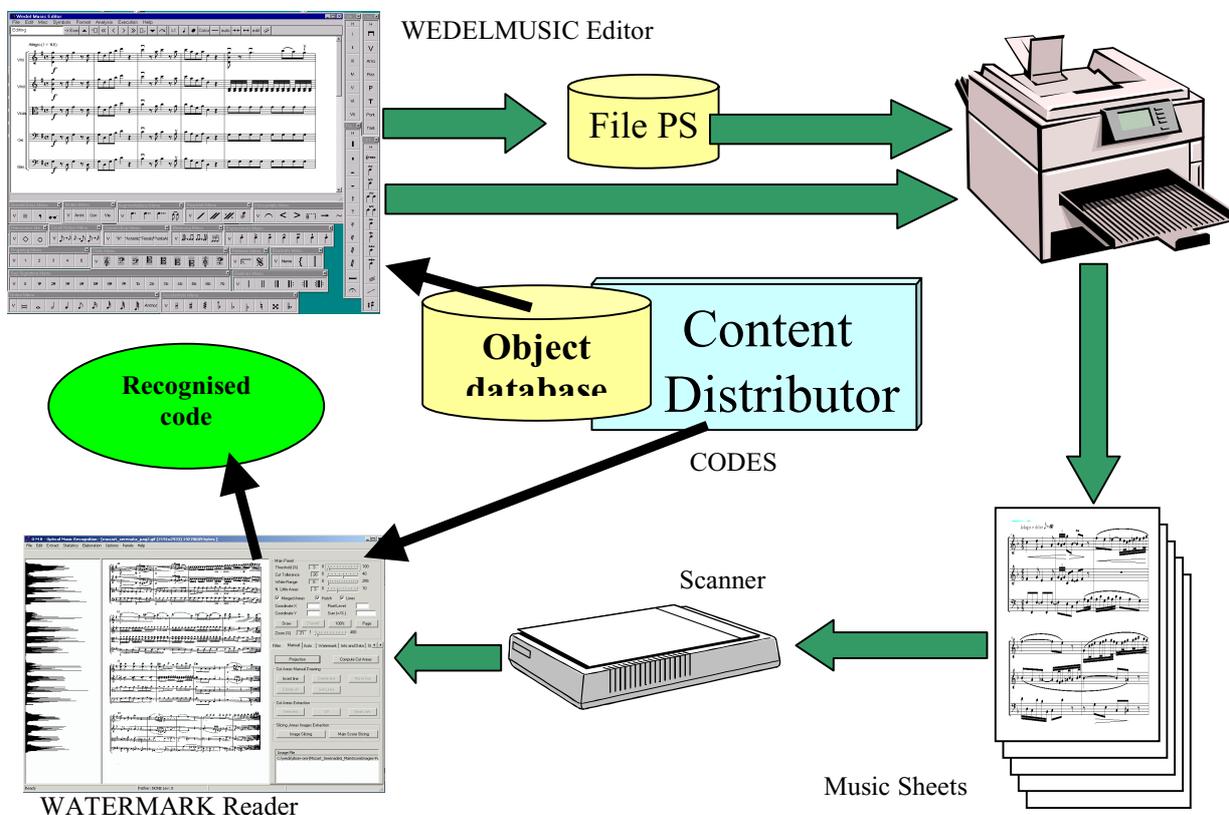
The above configurations, Content Distributor, Content Distributor II and Sharable Archive Server can be reached incrementally according to the evolution and need of the industry or corporate institution.

In this architecture, each Content Distributor produces WEDELMUSIC Objects with different IDs and they may be used by all Local Distributors clients. When a client performs a certain operation, the permission is granted from the

Content Distributor (normal or II) that delivered the object to the Local Distributor. In this way, the accounting mechanisms contained in the Local Distributors and in the Servers (Content Distributors) allow to trace the functionalities used in each location and therefore allow the tracing and accounting of performed operations. In this architecture, the use of a client such as the WEDELMUSIC Editor can be also permitted for direct connection from the client to the Content Distributors provided specific customisation/adaptation of the transaction model is performed.

3.4 Watermarking Music

Watermarking allows to hide information into digital objects such as images, videos, audio files and text pages. These techniques are adopted to hide codes which can be used to demonstrate the ownership of the digital object, whenever a verification of possible copyright infringement is needed. To this end the hidden code has the publisher identification code, the music piece code, and the LD identification code. The possibility of hiding such information and reading it after many kinds of attack makes watermark suitable for property right protection. Watermarking tools are supported by a watermark reader, to read the hidden code from a grabbed music sheet or audio file.



In the distribution of digital music, like in WEDELMUSIC, the music sheets are printed at the client’s location with traditional systems. Such music sheets may be distributed with a simple fingerprint reporting the music code, the publisher name, etc. In these conditions, the insertion of a hidden watermark becomes the key part for music protection. New techniques for watermarking music (in image format and/or during the printing of music sheets) were implemented in order to protect the WEDELMUSIC printed sheets. Those solutions were obtained on the ground of a deep analysis about any possible solutions to hide data code into music sheets.

WEDELMUSIC techniques for watermark have been designed aiming at possessing the following features:

- The watermark inserted in the printed sheet should not disturb the normal process of music reading and playing.
- The watermark inserted into audio files should not interfere with the normal process of music listening.
- The watermark in music scores
 - remains readable after music sheets are grabbed by the scanner and after any reprint, as well as after photocopies with distortions, some filtering, rotations, cropping, noise addition, etc.
 - resists against the attacks or against copying during sheet manipulation, until the music printed is considered no longer readable.

- to try to remove the watermark through image processing techniques is more expensive than buying that same music sheet.

In WEDELMUSIC, the WEDELMUSIC editor can insert WATERMARKED music sheets using two different algorithms. This means that the music score printed with WEDELMUSIC editor includes a hidden code which allows to verify the identity of the Content Distributor and of the Local Distributor. Such identification can be done by processing the image of the music score obtained by scanning it with a simple scanner. The tool performing this operation is called watermark reader. Depending on the algorithm used, the watermark reader can read directly the code or verify the presence of a given code assigned to an object of a certain Content Distributor. This tool can be used to demonstrate the ownership of a given music sheet.

3.5 Digital Rights Management

Client computers may print protected music sheets (original and customised). Visitors/clients of Local Distributors may work on a large WEDELMUSIC database located at the Local Distributor's. Each Local Distributor may concentrate the WEDELMUSIC objects coming from several publishers.

The visitors may perform several different operations without violating the copyright and the permissions imposed on the available WEDELMUSIC objects: processing music, arranging, transposing, reducing for piano, listening, printing, querying, converting, extracting excerpts, etc., according to the allowed operations, etc. Each formalised operation which can be carried out on a WEDELMUSIC object can be (either) permitted or inhibited. More than 50 different multimedia functionalities have been identified and may be managed in a separate way by the publisher. The allowed operations are listed in a so-called Permission Table. This is the protection profile which explains what can be done, according to which price.

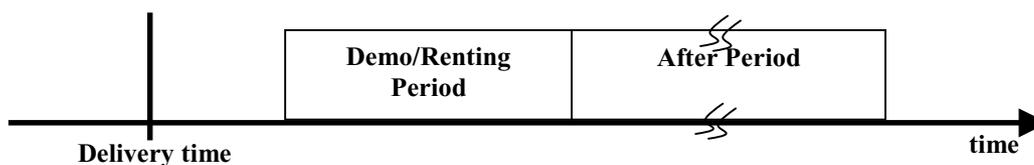
A permission table is available to be used according to specific Digital Right Management policies. A price can be associated with each permitted operation. When the WEDELMUSIC object is opened on the WEDELMUSIC editor, many enabled operations can be performed. Each time the user attempts at performing a controlled operation, the WEDELMUSIC editor informs the user of the price and if it is accepted the operation is performed communicating the action to both the Server and the Local Distributor. Unsupported operations of a WEDELMUSIC object can be requested on-line and obtained when needed from the publisher. This allows both the publishers and the Local Distributors to keep trace of the most used functionalities. The publisher can use such information for:

- updating the account of the Local Distributor,
- being aware of the most interested and requested functionalities. It allows to analyse the needs of the end-users with statistic tools,
- assessing the clients' interest on the ground of their profile. This can be communicated in an impersonal way from the Local Distributor.

WEDELMUSIC allows the clients/visitors of the Local Distributors to navigate on the Local Distributor archive in order to look for their preferred music. The selected music can be listened to, visualized and eventually printed at specific costs. When compared to traditional distribution, a clear advantage consists in what follows:

- the music score can be visualised and listened (real performance audio, not the simple MIDI) at the same time;
- the music score can be transposed and modified (annotated, arranged, etc.) before printing;
- the music score can be identified by performing a search on the account of the content (a melody described as a sequence of notes). In this case, the WEDEL editor employs a simplified notation description of each music piece stored into the Local Distributor database;
- the music score can be printed even partially: a single part, the main score only with some selected parts, etc.;
- the music score can be printed by performing the piano reduction;
- the music score (in symbolic or in images) is accompanied by many other pieces of information such as documents, images, etc., which can be printed to produce a dossier of the selected music.

Specific transaction policies may be defined according to the publisher's needs and interests. The permission table depends on the different conditions of the WEDELMUSIC object: demo, object held on lease (specifically set up for theatres), sold object, when the renting period is over.



Temporal management of the permission tables

The publisher may define two different permission tables and a general behaviour table. The general behaviour will be applied starting from the delivery time to the starting of the demo or lease period, and from the end of the After Period. The Demo/Renting profile is identified by two dates, whereas the After Period is identified only by its closing date because its starting date is considered to be the same as the ending date of the Demo/Renting Period.

3.6 WEDELMUSIC Editor and Integrator Architecture

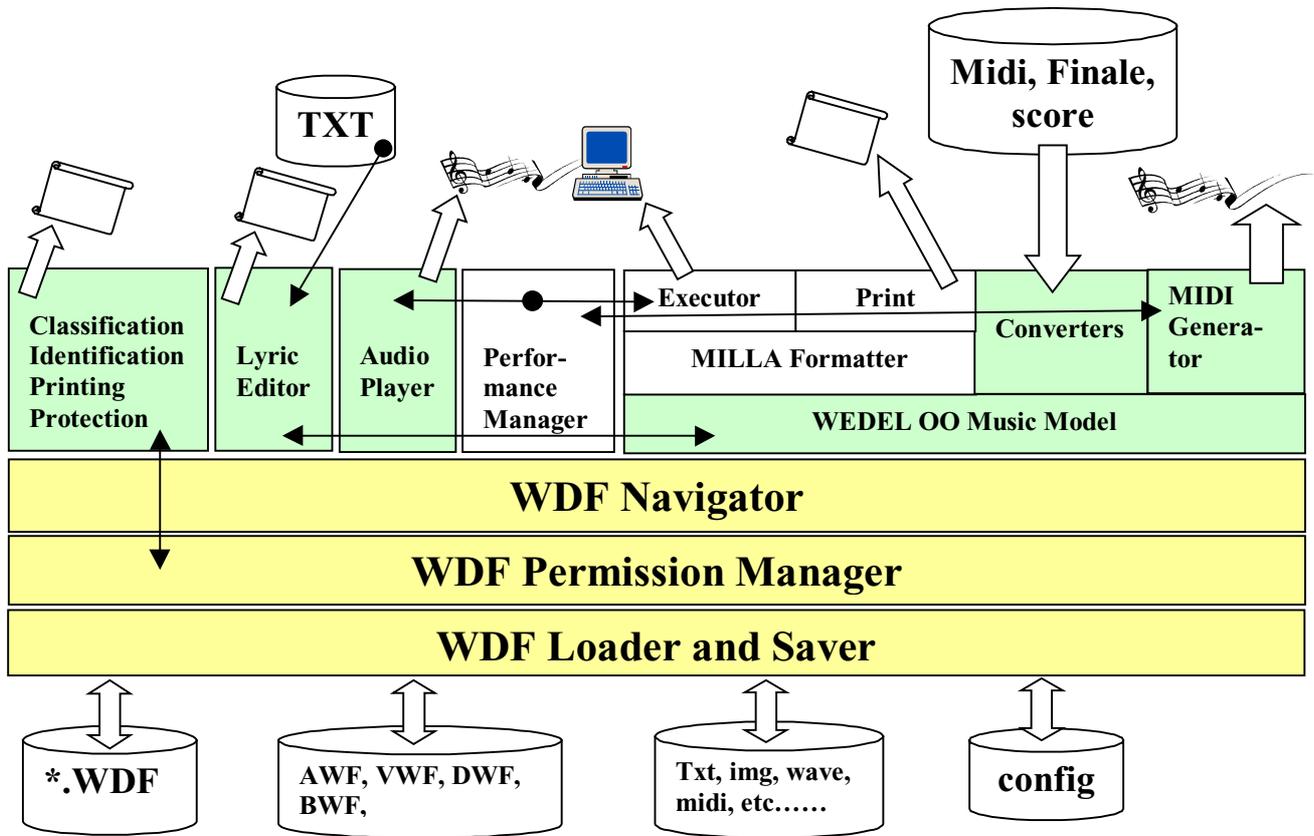
The WEDELMUSIC editor includes the aspects related to WEDELMUSIC objects' creating, manipulating, verifying, saving, loading, printing, etc.. To this end, several aspects have to be considered: music editing, music conversion, component integration, lyric management, printing capabilities, versioning, formatting, execution, user interface, etc. Such aspects are sometimes edited and manipulated by separate components.

Next Figure depicts the general architecture of the WEDELMUSIC Editor and integrator.

In the following figure the main relationships among the various components are shown:

- **WDF Loader and Saver** -- A loader for the XML format of WEDELMUSIC objects. It is able of loading both encrypted and non-protected files.
- **WDF Protection Manager** -- This module imposes the limitations according to the rules enforced into the WEDELMUSIC object loaded. Each protected functionality may be associated with an assigned price.
- **WDF Navigator** -- a tool for navigating amongst the components of the WEDELMUSIC object including: navigator in the structure, viewer for classification, viewer for identification, etc. It is used for activating audio player, video player, lyric Editor and Visualizer, document viewers, image viewer. It is also used for opening symbolic music Editor and Visualizer or for opening the image score format Viewer and Visualizer. Some of these viewers are external standard utilities of the operating system.
- **Classification, Identification, Protection, Printing Manager** -- for editing and visualising the corresponding aspects.
- **Lyric Editor** -- A tool for editing, importing and printing lyric. Lyric is related to the object oriented model of the music score.
- **Audio Player** -- A player for WAVE, MP3, and MIDI files. It is used by the Performance Manager during the execution synchronised with symbolic or image score.
- **Performance Manager** -- A module for generating, loading, saving, defining synchronisations of executions based on either image score or symbolic formats.
- **WEDELOMM**: WEDEL Object Oriented Music Model including all functionalities of music modelling, printing, playing, transposing, copying, cutting, executing, etc.
- **MILLA Formatter** -- An engine for automatic formatting music on the account of given rules. It has several sub-components for positioning, ordering, justification, beam orientation, stem orientation, etc.
- **Executor** -- The executor for providing the right pages according to the Performance trend defined or on the ground of the Metronomic Indication. This produces the right music score pages in both symbolic or Image score formats.
- **Print (Music)** -- An utility for printing music. It is based on Milla positioning system.
- **Converters (symbolic Music)** -- A set of converters from other symbolic formats such as MIDI, Finale to WEDELMUSIC format. MIDI Converter is included into the WEDELMUSIC editor, while Finale Converter is a Finale Plug-in through which you can save Finale Music in WEDELMUSIC format.
- **MIDI Generator** -- A generator of MIDI sequence of commands from the WEDEL Object Oriented Music Model of the WDF object. It includes orchestration aspects.

If you would like to implement WEDELMUSIC compliant applications, most of the above components are available in the WEDELMUSIC tool kit.



Chap.4 WEDELMUSIC Editor and Tools Installation

4.1 WEDELMUSIC Editor and Tools

The full package of the WEDELMUSIC editor and productivity tools is comprised of several components:

- **WEDELMUSIC Editor:** the WEDEL Editor for producing and reading WEDELMUSIC objects with the internal WEDELMUSIC Editor. It supports protected and non-protected WEDELMUSIC formats, while it fully supports the WEDELMUSIC XML format for coding music and related objects. It allows the integration among symbolic music (WEDELMUSIC format and any other format: IGOR, Sibelius, Finale, etc.), images of music scores (PNG format), documents (any format), audio files (any format), videos (any format), performance, classification, identification, etc. It also includes the possibility of printing music with and without watermark. The WEDELMUSIC editor includes a help in which you can find the user manual and several suggestions on how to build WEDEL Objects.
- **FretBoard Editor:** the editor for building fretboard chords for string instruments such as guitars. It supports the building of fretboards from 2 to 9 strings. Each defined fretboard can be included in the music from the WEDELMUSIC editor.
- **Image Slicer:** the tool for slicing images of music sheets in order to import them into the WEDELMUSIC editor. It is also used for indexing image slices on the basis of their measure number. This component is only present in its full version in the full version of the WEDELMUSIC editor. It is not present in the WEDELMUSIC View and Listener.
- **WEDELMUSIC Finale Plug-in:** A Finale Plug in for saving in WEDELMUSIC XML format files loaded in Finale 2000, 2001, 2002. Those files can be directly loaded into the WEDELMUSIC editor as the other WEDELMUSIC objects. This component can be separately downloaded from the WWW site.
- **Documentation:** this is a collection of documents including the user manuals of other components of the WEDELMUSIC architecture: the Sever, the Local Distributor, the music analyser and the WEDELMUSIC Editor for visually impaired people. README and LICENCE files are also considered in this group.
- **Presentation:** a general presentation of the WEDELMUSIC architecture. Document produced from the slides in PPT.

- **Music Sheet demos:** some demonstrative music sheets in PostScript and/or PDF formats produced by the WEDELMUSIC editor.
- **Examples of WEDELMUSIC objects:** several examples of complete and partial WEDELMUSIC objects that can be opened by any WEDELMUSIC editor. Some of them are simple files for demonstrating the potentiality of the music editor others are more complete files containing several components. These examples are automatically installed during the installation of the WEDELMUSIC editor.
- **GhostView and GhostScript:** a couple of shareware utilities that should be used for printing Postscript and PDF files on any printer. They can be found in the WWW site of WEDELMUSIC, in the CDrom or directly from their original producers.
- **WWW pages of General Overview:** this set of www pages is only present in the CD-rom. Quite similar pages can be found on the WWW site of WEDELMUSIC.
- This manual: it can be found in the WWW site and in the CD-rom in PDF format.

For most of the above components you can find specific Chapters and Sections in this manual and in the on-line help of the WEDELMUSIC editor. In the on-line help, you can perform full search into the manual.

4.2 Installation Procedure

For the full installation, it is suggested to install the

- WEDELMUSIC Editor (including fretboard editor, image slicer, some examples of the WEDELMUSIC editor, some MIDI examples). For the installation details please see in the following.
- WEDELMUSIC Finale Plug-in: details about this installation can be recovered in the specific chapter about WEDELMUSIC Finale Plug-in.
- GhostView and GhostScript utilities.

After the installation of the above tools it is suggested the sending of the License agreement to the WEDELMUSIC main location. The License file is contained in the CD-rom in several directories. A MS-WORD version is also present in the Documents directory.

4.3 System Requirements

The system requirements for the installation are not extreme:

- Windows XP, Windows 2000, Windows NT or Windows 98.
- 90 Mbytes of free Hard Disk before the installation
- 16 Mbytes of RAM is the minimum amount. When large WEDELMUSIC objects are loaded with: hundreds of measures, tens of parts, a full collection of Image Score Sheets having tens of pages for the main scores and parts, then 256 Mbytes of RAM are suggested;
- An audio card as strong you like;
- A video adapter.
 - The program is faster and light in the memory usage if the number of colours per pixel is limited to 256. Higher values of the number of colours per pixel lead to a very intensive usage of memory when Image Scores sequences are loaded and executed.
 - The resolution can range from 800x600 to any larger screen dimension. For who is interested to work at the construction of WEDELMUSIC objects it is suggested to use at least 1280x1024, higher resolutions may help you in working faster.

4.4 CD ROM version

The CD version of WEDELMUSIC editor has an automatic mechanism for starting the initial installation page. From that page you can find references to install:

- WEDELMUSIC Editor (including fretboard editor, image slicer, some examples of the WEDELMUSIC editor, some MIDI examples). For the installation details please see in the following.
- WEDELMUSIC Finale Plug-in: details about this installation can be recovered in the specific chapter about WEDELMUSIC Finale Plug-in.
- GhostView and GhostScript utilities.

The CD-rom also contains several other components with respect to the above mentioned. Some of them are not installed during the installation of the above components. They are only available on the CD and can be manually copied in your computer or by the CD-rom:

- Documentation;
- Presentation;
- Music Sheet Demos;
- WWW pages of General Overview.

Please note that the CD-rom full version contains a larger set of examples of WEDELMUSIC objects with respect to the downloadable version. The fully registered version also contains some utilities for improving productivity in generating WEDELMUSIC objects:

- Fully version of the Image Score Slicer. For details about the full version of the Image Score Slicer please refer to the specific chapter.

4.5 WEDELMUSIC Editor Installation

The Installation of WEDELMUSIC editor is almost automatic. It can be performed from the CD-rom version or from the ZIP file in the same manner.

To launch the installation please executes the SETUP.EXE file. This can be performed with double click on its icon of by using the prompt of an MS-DOS shell.

During the installation, the setup process asks to you to specify the main directory (the path) in which the WEDELMUSIC tools have to be installed. The Directories that will be created from that Path are:

- **MDS:** that contains the examples of the WEDELMUSIC object;
- **Errmsg:** that contains the error files and the directory containing the help files, the help is accessible from the WEDELMUSIC editor with a suitable interface;
- **Images:** some sample images for the Image Score Slicer;
- **Font:** that contains the fonts and derived files for the WEDELMUSIC editor, see the specific chapter for details about font files;
- **MIDI:** some examples of MIDI files.

MIDI and MDS directories contain input and data files for the WEDELMUSIC editor. They can be changed by means of a specific dialog from the WEDELMUSIC editor as described in the next sections of this chapter. MDS directory contains a directory having WDF extension for each WEDELMUSIC Object. Directories without the WDF extensions are directories created by the user or WEDELMUSIC special directories as described in the following.

Special WEDELMUSIC directories are created in the directory MDS for specific use:

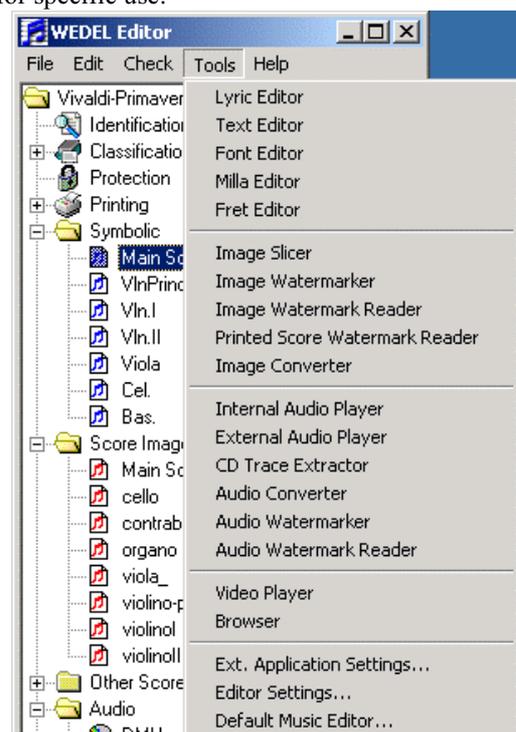
- **export:** directory that has to be shared with the Server Computer to send new WEDELMUSIC objects and files into the WEDELMUSIC Server database. For details see the User Manual of the Server database.
- **Import:** directory that has to be shared with the Server Computer to receive WEDELMUSIC objects from the WEDELMUSIC Server database. For details see the User Manual of the Server database.
- **Components:** directory used by the WEDELMUSIC editor to store WEDELMUSIC components comprised of XML description and your content. The components can be saved in this directory for a further reuse in other WEDELMUSIC objects. See details in the description of the WEDEL Editor.

4.5.1 Tools General Settings

The above mentioned paths can be changed from the user interface of the WEDEL Editor and in particular from the tools menu.

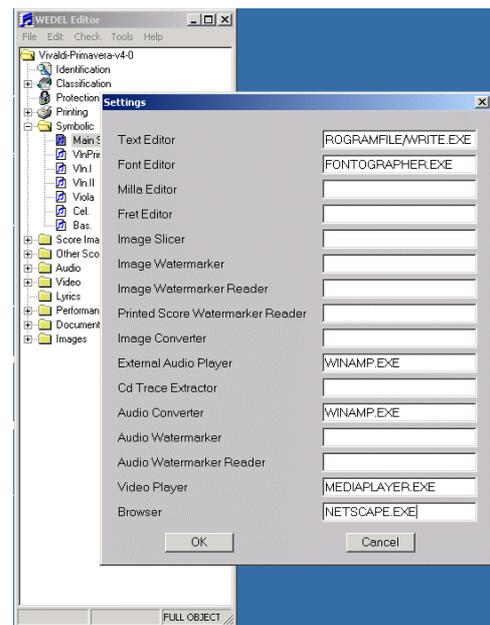
The menu tools has the following items:

- **Text Editor** --to open a text editor
- **Font Editor** - to open the font editor. It can be a commercial font editor for True Type fonts such as Fontographer. It is the editor launched when an internal font with extension PFA or



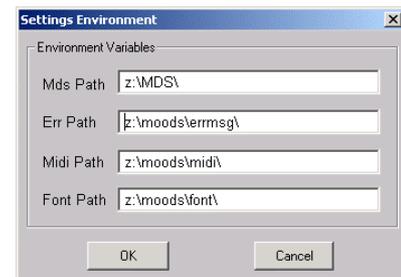
FOG is selected.

- **MILLA Editor** - to open the default version of the file in which the MILLA rules for automatic formatting of music are contained, see specific chapter about music formatting.
- **Fret Editor** - to open the fretboard editor, see corresponding chapter.
- **Image Slicer** - to open the image slicer (see the corresponding chapter). A tool for semiautomatic slicing images of music scores to prepare them for the import by the WEDEL Music editor. This functionalities can be performed even manual by using a classical Image editor such as Photoed.exe of Windows NT.
- **Image Watermarker** - A tool for watermarking images of music scores on the basis of the parameters currently imposed on the loaded object.
- **Image Watermark reader** - The tool for reading the watermark from an images of an image score.
- **Printed Score Watermark reader** - A tool for reading the watermark from an image of a printed score from symbolic. This tool is delivered separately with respect to the others WEDELMUSIC tools.
- **Image Converter** - A commercial or shareware tool for converting simple images among the several formats.
- **Internal Audio Player** - To open the internal audio player.
- **External Audio Player** - An external Audio Player.
- **CD trace extractor** - A commercial or shareware tool for extracting traces from CDs.
- **Audio Converter** - A commercial tool for making conversions among several formats of audio files.
- **Audio Watermarker** - The tool for watermarking an audio file on the basis of the parameters imposed by the current WDF object loaded, implemented by the FHGIGD.
- **Audio Watermark Reader** - The tool for reading the watermark from an audio file, implemented by the FHGIGD.
- **Video Player** - A commercial or shareware tool for playing video files, such as AVI or MPEG1. It can be the classical Multimedia player or Windows.
- **Browser** - A commercial or shareware HTML browser for editing excerpts.
- **External Application Settings** - to set the paths and the execution file names of most of the above listed applications.



External Application Settings

- **Editor Settings** - With this selection of the menu, the following dialog for setting the path appears. The paths are those mentioned before and referring the root of the WEDELMUSIC objects, the directory containing the error log files and the help files, the path of your MIDI files and the path of default font files.



Editor Settings

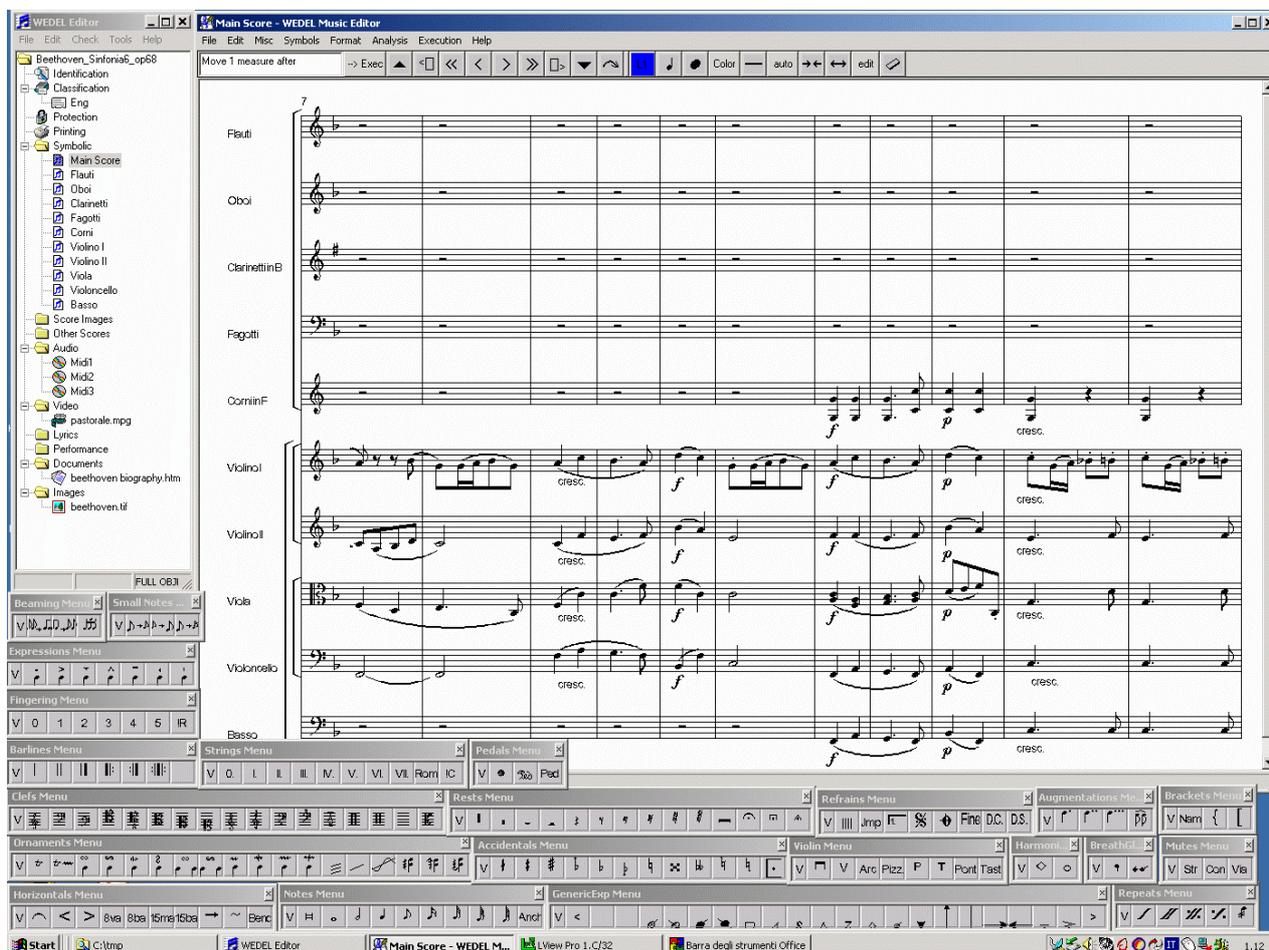
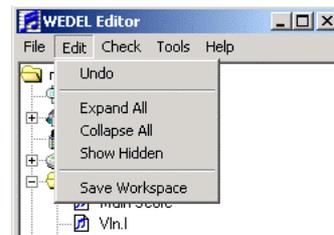
- **Default Music Editor** – this dialog allows you to selected from more than one music editor associated with the opening of symbolic information contained into the WEDELMUSIC object. In each WEDELMUSIC object you may have a symbolic



4.5.2 Saving the User Interface Workspace

In order to customise the User Interface of the WEDEL Editor, the user may define the position and the size of the main windows and the position of the menu tools of the Music Editor. The process to perform the customisation is to arrange the windows and the menu are required and then select the item Save Workspace in the menu Edit of the WEDEL Editor:

An example of workspace can be observed in the following example.



4.5.3 The MIME types of WINDOWS

In the present version the visualisation and execution of some WEDELMUSIC components is performed by using players and viewers which are present in your computer. This is true for:

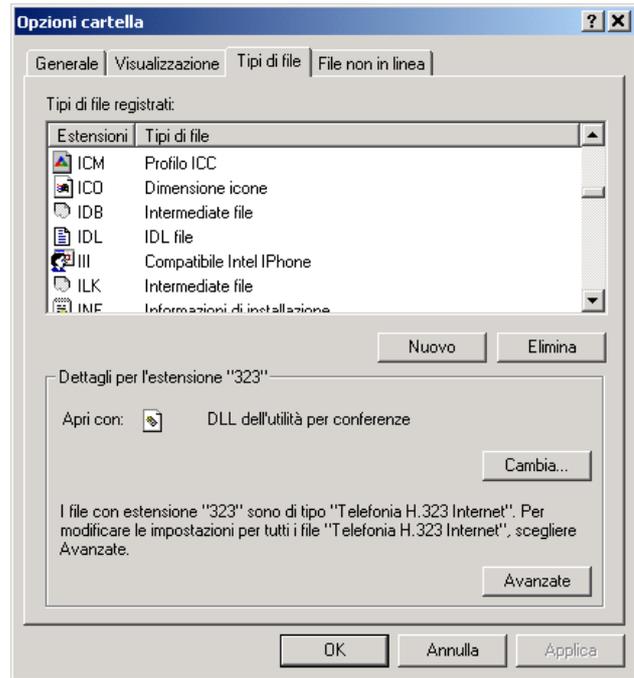
- Documents files with extensions: PS, EPS, HTM, HTML, DOC, PDF, TXT, WK1, WK2, WK3, WK4, RTF, ASC, PAB, SCD, ANS, WPS, WPD, WRI, XLS.
- Video files with extensions: MPG, AVI.
- Image files with extensions: PNG, BMP, JPG, TIF, TIFF, GIF, TGA, PCX, PCD..
- Other Symbolic music notation files: MUS, SIB, ETF.
- Audio files with extensions different from: MID, WAV, MP3; for these formats the internal audio player is used for default, for the rest of audio files the default player of the operating systems is used: RMI, SND.

The players used by the WEDELMUSIC editor to visualise these files depend on the extension of the corresponding files according to the mechanism of the operating system used. In WINDOWS the selection is performed by means of the so-called MIME extensions.

The further version of the WEDELMUSIC Editor allows to customise the extensions associated with each type of components and to add any type of extensions the user needs.

If you would like to perform a different association with respect to those that are set by default in your computer you can perform that changes by using the Explore Options. In that Dialog Box please select the File Type folder and there select the required extension. After that, to change the program that opens the files with that extension please push the button Advanced and change the open path.

In some cases, problems occur in opening files that present names or paths containing spaces. This depends on definition of the opening command by the operating system or by the installer of the specific program: for example of acrobat reader, Internet explorer, paint shop, etc. It is the same problem that you may have in trying to open a file by a double click. If your computer refuse to open files containing spaces in the name or path this problem can be solved by adding a couple of " in the open command of the advanced section of the above dialog.



Where the application used is reported write:

C:\WINNT\system32\notepad.exe "%1"

or

"C:\WINNT\system32\notepad.exe" "%1"

At the place of:

C:\WINNT\system32\notepad.exe %1

Chap.5 Generating WEDELMUSIC Objects

In this section, the main features of the WEDELMUSIC editor are reviewed in order to give you an overview of the main potentialities of the tools. The overview is given with the intention to present the tools that are needed for exploiting the most important functionalities of WEDELMUSIC system and to give you an idea of what can be done for accelerating the process of generation of your WEDELMUSIC objects.

5.1 The Production Process and the Available Content

The generation of WEDELMUSIC objects is a quite simple process. WEDELMUSIC objects may range from:

- **simple objects** containing only a single digital content: an audio file, a document, a simple classification description, a video, an image, with some Kbytes of memory usage to
- **huge objects** that may contains tens of different components and hundreds of elements for Gbytes of memory usage of your computer.

On this regard, WEDELMUSIC is extremely flexible, and its capable to associate to any type of object of any complexity the specific usage rules for its Digital Right Management. Any type of WEDELMUSIC object may be protected or not. In any case, the WEDELMUSIC object are created in non protected manner and are protected by the WEDELMUSIC Server when they are distributed in

- the Local Area Network, in the Intranet for your customers and/or attendees or for
- the Internet Distribution.

The production process can be organised in different manners depending on the available content. Typically the WEDELMUSIC objects are created around a main component that represents the key lecture of the digital object and may be of your collection. For example:

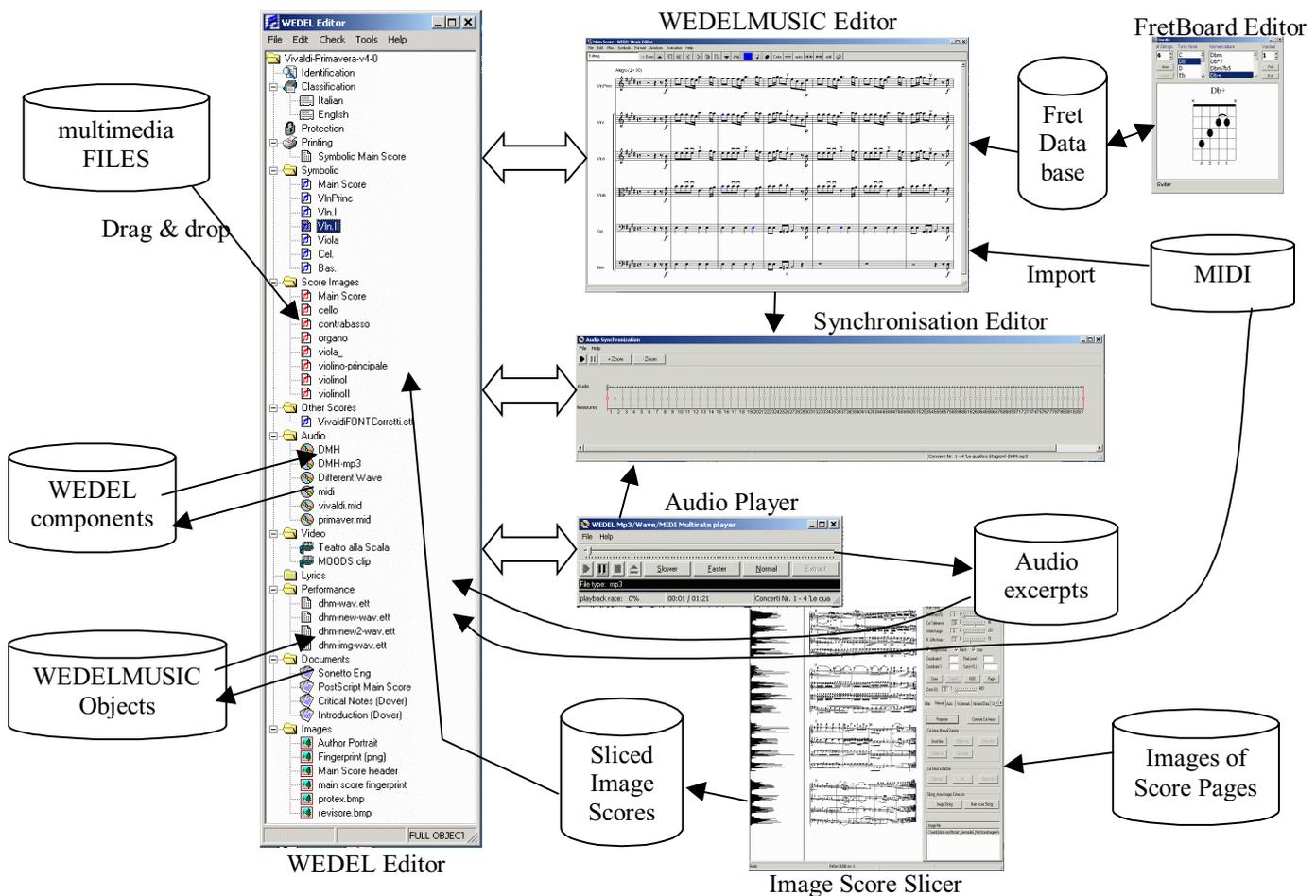
- All aspects of music piece: identification, classification, main score with parts, the original version of the main score as score images, the document describing the author biography, some images, a video of a live presentation, some audio files of different executions, the lyric, some synchronisations, etc. On this collection several different functionalities can be exploited and defined according to the WEDELMUSIC model;

- An object presenting the hand written main score and parts of a modern music piece with live audio and some pictures of the concert, the audio and the images can be synchronised for the simultaneous visualisation and listening of the piece;
- All aspects of an opera: as above plus the document reporting the text of the songs, a document reporting the historical moment, the picture of the actor in the scene, the structure of the scene, the description of the scene, the details of the director, some special effects, etc.;
- A collection of Audio files accompanied or not by other components;
- A collection of document files accompanied or not by other components;
- A collection of images accompanied or not by other components;
- A collection of Video files accompanied or not by other components;
- A music exercise, the aim of the exercise, the posture of the hands, the music to be played, the comments associated with specific music notation symbols, specific audio files associated with music notation parts, the video presenting the execution of the teacher, etc.;
- A music exercise describing the method concepts related to music transposition;
- An object comparing different styles of music notation or execution;
- An object comparing different executions of the same music score;
- An object presenting old music notation (Gregorian or other) as image score sequence, one or more audio files of different executions, and the same music in modern notation in document of symbolic formats.
- etc.

5.2 WEDELMUSIC Tools Organisation

The production of the above WEDELMUSIC objects may be performed by following different modalities. The most powerful tools for the WEDELMUSIC object production are:

- **Drag & Drop:** The drag and drop facility of WEDEL Editor presented in the previous Section for inserting new component files (videos, documents, images, music notation files in other formats, audio files).
- **Finale Plug-in:** The generation of Music Notation score starting from the WEDELMUSIC XML format music notation scores produced by using the WEDELMUSIC plug-in for Finale 2000-2. This is a fast process to obtain main score and WEDELMUSIC objects if you have Finale Files. Please note that your Finale files can be directly included into the WEDELMUSIC object by using the drag and drop process. In that case, they are arranged in the category of Other Symbolic files.
- **MIDI Input:** The generation of a new Music Notation score importing a MIDI file and arranging its tonality and clef by using transposition facilities of the WEDELMUSIC editor.
- **Music Formatting:** the WEDELMUSIC editor present a set of tools for the automatic reformatting of your music. It allows to perform (i) several types of transpositions, (ii) the automatic definition of the position of several symbols with respect to the position of the staff (up/down) for several symbols from note step to makers, (iii) the automatic definition of position of several symbols, (iv) the automatic beaming of notes, (v) the automatic justification of main score and/or parts according to a large number of flexible parameters, (vi) the automatic line-breaking of score lines in main score and parts. Most of the above formatting process depend on the a set of rules called MILLA. The change of the rules allow reformatting music without music notation manipulation.
- **Music Editing with the WEDELMUSIC Editor:** The generation of a new Music Notation score by editing it from scratch with the WEDELMUSIC Editor facilities, the preparation of the print view for the fast printing of the main score.
- **Management of Layers/voices:** the management of layers, in the WEDELMUSIC editor it is possible to (i) merge two parts in one and viceversa, (ii) merge two parts in a multistaff part such as the piano and viceversa.
- **Generation of score Parts:** The immediate availability of the parts in the WEDELMUSIC editor when the main score is present.
- **Image Score Slicer:** The generation of sequences of Image Scores fully indexed for navigation by using the Image Score Slicer tool of WEDELMUSIC package. These can be easily imported in the Image Score section of the WEDEL Editor. The images of score pages can be of Main Scores or of single parts. They can be of different format and can be obtained also from Postscript or PDF files of music scores. The sliced image scores are visualised into the WEDELMUSIC editor.



- **Excerpts of Music Notation:** the WEDELMUSIC editor permits to extract excerpts from the music score (if it is generated from symbolic file or from an image score). These score excerpt are saved into the clipboard and can be also included as images in documents and in other WEDELMUSIC objects.
- **Audio Player and Audio Excerpts:** The production of audio excerpts from audio files. They are saved as simple audio files. They can be in turn included into the WEDELMUSIC object and associated with music notation symbols for didactical purpose.
- **WEDEL Components:** The possibility of saving WEDEL components in a repository for their further and multiple reuse in other WEDELMUSIC objects. For example, the biography of a composer can be used in each object in which your music is present.
- **Other Programs Invocation:** The possibility of associating several other tools with the WEDEL Editor for their direct execution/invocation: watermarking tools for reading and inserting the watermark, conversion tools for audio, video or images, etc. This possibility has been explained in the section of Installation.
- **Synchronisations:** The production of synchronisations between audio files of real performances and music notation in symbolic format or in Image score format. The synchronisation is needed to allow playing the corresponding audio file with the synchronous visualisation of the music notation score (main score) in the WEDELMUSIC editor.
- **Music Printing and Printing View:** The preparation of music score pages including in the page images (logos) and text. This is useful for the professional preparation of music score pages. The WEDELMUSIC editor is capable of printing in professional manner main score and parts in PostScript. In order to print the produced music in Postscript on any other printer the Ghostview utilities mentioned in the installation can be used.
- **Saving and Loading:** all the above features are saved into a unique XML model and format. It can be associated with identification and classification aspects and protected for controlled and safe distribution and transaction.
- ..

Chap.6 Image Score Slicer

6.1 Process Overview

The goal of the Image Slicer is to prepare the Images Score sequences for the WEDELMUSIC editor. To this goal, the Slicer needs to import a sequence of images representing music score pages. These can be main scores or parts. Please note that the slicing criteria is different if main score or single parts are considered, so different mechanisms have to be used. In fact for main score, each image slice has to contain a staff line system while for single part each image slice is a staff (see the next figure in which a single part page is sliced in several image slices).

Once an image score page is loaded into the Image Score Slicer, according to the process described in this chapter, the Slicer is capable of slicing the image in sub-images corresponding to the single staff lines (for example when the single parts are selected) or systems (when the main score image is loaded). For each slicing process an information file is produced describing the relationships among the slices. For example the following figure shows the steps passed to create a set of images from a single part.



With the Image Slicer is possible to slice the images of music scores by using

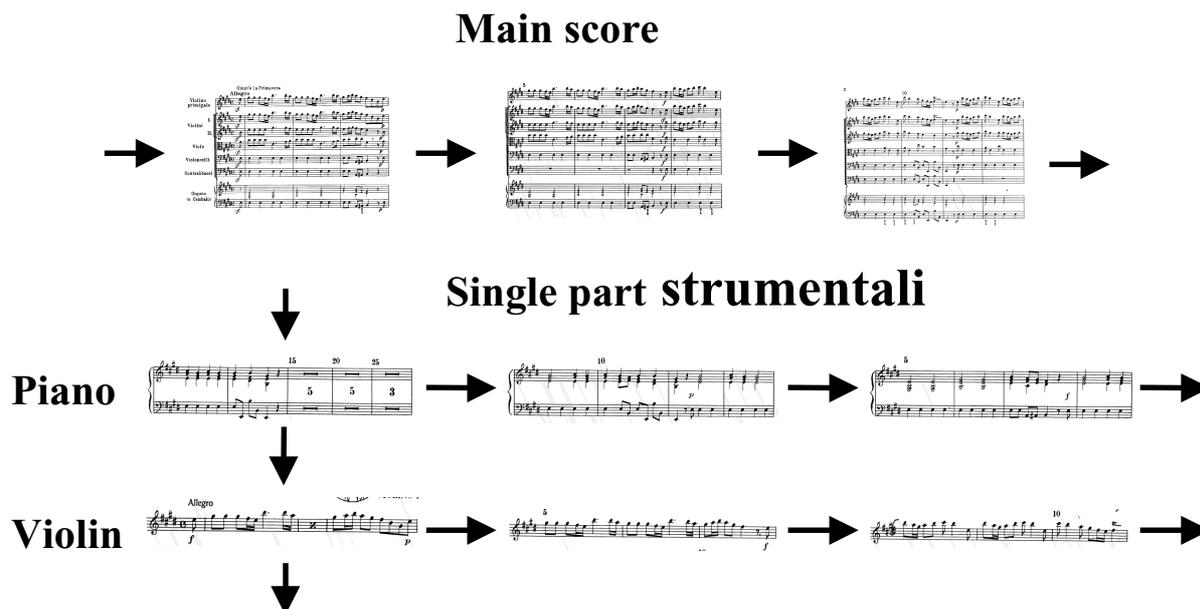
- manual or
- automatic process, or a

- supervised semiautomatic mechanism.

Please be careful that in this chapter all mechanisms are described. In the first case, the user fixes the parameters for slicing the image area including a staff or a system, in the second case and extraction is remanded to an automatic staff recognition and identification process that uses Optical Music Recognition techniques. In this case, image is analysed to find positions of staves and then slices are calculated. In the supervised semiautomatic modality, it is possible to correct manually the slices defined by the automatic process.

In the extraction phase of the process, all the images obtained are saved on disk in PNG format (Portable Network Graphic) as shown in the following. For each process of slicing, the user has to fix the name of instrument (if it is a single part), number of the staff, number of measures in the slice, number of the starting (first) measure of the slice and the number of measures in the slice. This information is used to indexing the slices into the WEDELMUSIC editor.

The following figure shows the relationships among image slices when main score or single parts are processed. The connected image segments are the slices produced by the Image Score Slicer.



6.2 The Image Score Slicer Overview

The Image Slicer tool can manage GIF, BMP, TIF and PNG image file formats while the produced image slices are saved in the PNG format. PNG is a compressed format without lost of information. Formats such as JPG and other are formats produce a lost in the information. The Loading of TIF file is at risk since there are several different TIF formats and only few are supported by the tool.

This tool can process single or sequences of images representing pages of image score acquired from a scanner or produced from a PDF or Postscript file via the Ghostview tool as described in the following.

When the Image Score Slicer processes a sequence of images they are supposed to belong to the same main score or to the same part. In both cases, they have to be loaded/processed into the Image Slicer in same order of the measures contained in the images.

All images produced by the Slicer are stored in the same directory of the original images. To keep them separate from the original images, the directory “Opere” is automatically created in order to collect all new image files/slices of the opera. In details, a folder with the name of the Opera is created and a folder for each instrument and a folder for the main score are created in that directory. For the single part, the folder assumes the name of the instrument (as assigned by the user) while for main score the folder is called “Main” for default. This structure aids the importing phase in the WEDELMUSIC Editor in order to include image score sequences in a WEDELMUSIC object.

It is absolutely better for the WEDELMUSIC editor to load in a unique process all image Slices of the main score and of parts. Please note that in WEDELMUSIC object you can load only a Main Score with all its parts.

The User Interface of the Image Score Slicer is shown in the following figure. Please note that the present Image Score Slicer contains several other functionalities that are not strictly related to the score slicing but can be used for image score restoring and processing image scores in other occasions and for other purposes.

In the Window of the Image Score Slicer, three main sections are highlighted: The Menu Bar, the Image Visualisation Area and the Slicing Panel. Each of these areas is described in the following sections and at the same time steps to realise a slicing process are illustrated.

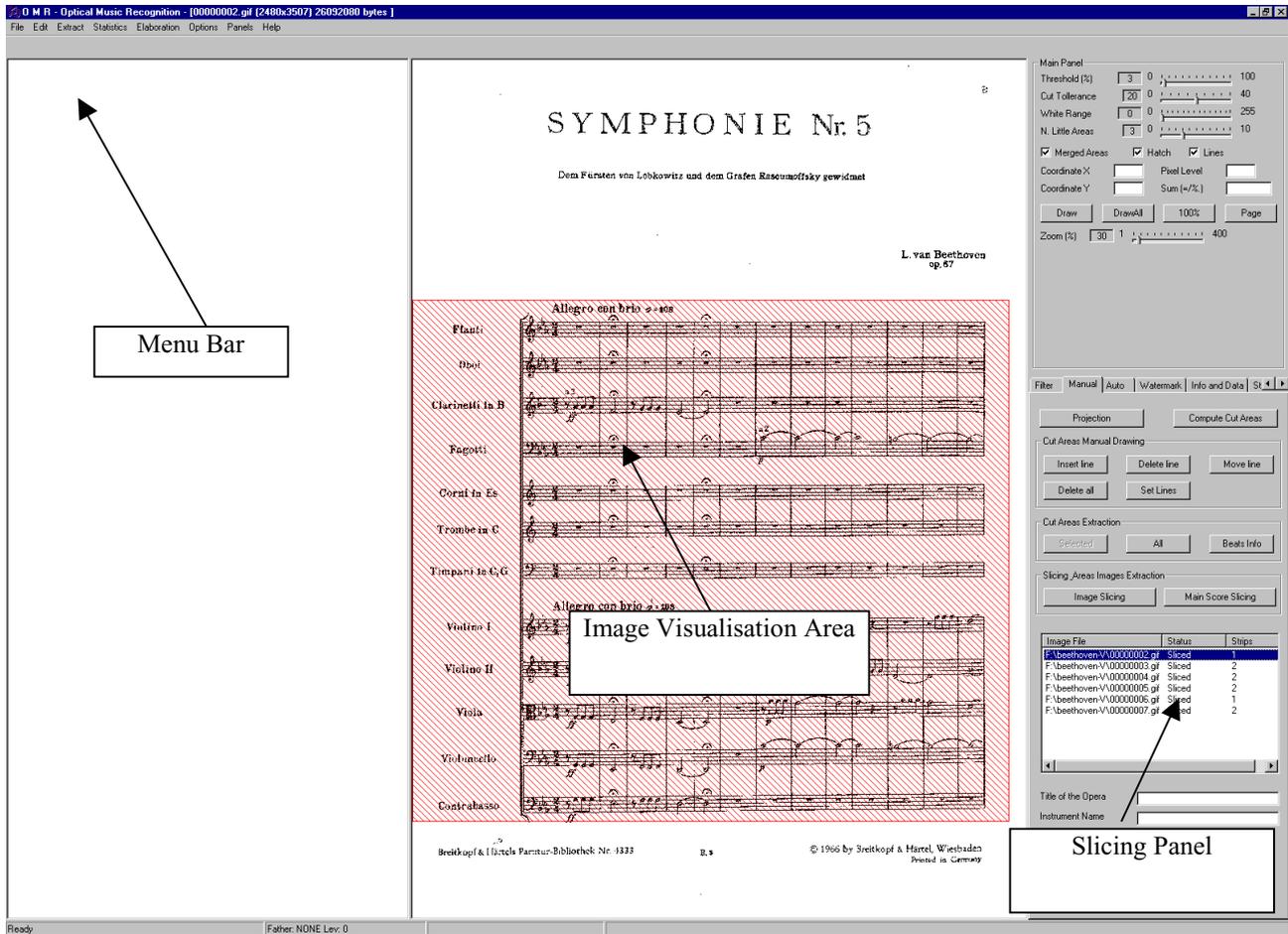


Fig. 6.1 -The Image Score Slicer

The slicing panel is one of the folders which are present in the right side of the window. It can be selected with the mouse clicking on the label "Manual". In that folder, disregarding its name, the commands buttons for the

- manual,
- automatic and
- semiautomatic processes of Image Score slicing are present.

The next section, firstly the main functionalities are presented in systematic manner, then the process of image slicing is shown and discussed.

6.3 The Menu Bar

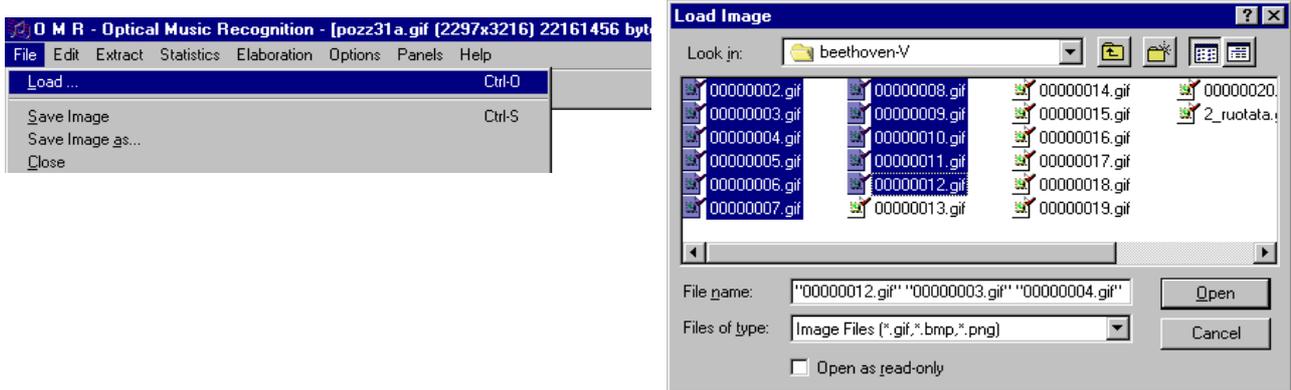
The menu bar of the main window of the Image Score Slicer present several functionalities that are not strictly related to the score slicing but can be used for restoring and processing image scores.



For the Slicing process, the only needed functionality which is present on the Menu is that related to the selection of the image that have to be processed.

In order to load single or sequences of images to be processed in the Slice the following steps have to be followed:

1. Select File from Menu Bar and then select Load to access at the Load Image dialog.
2. Select the folder where images have been stored.
3. Make a single or multi selection with the mechanisms of the operating system.
4. Push the Open button to continue or Cancel to stop.



6.4 The “Manual” Panel for Slicing

The “Manual” Panel for Slicing is shown in the next figure disregarding its name, the commands buttons for the manual, automatic and semiautomatic processes of Image Score slicing are present. The sections of the panel are listed below referring from top to bottom:

- Cut Areas Manual Drawing
- Cut Areas Extraction (not relevant)
- Slicing Areas Images Extraction
- List of image files
- Parameters Section
- Score Type
- Go and Save Images Buttons

6.4.1 Cut Areas Manual Drawing

Five buttons are present, each of them act in the image score visualisation area as described in the following:

Insert Line allows manually inserting lines that define the image slice that includeS the staff of the system of staves. Each image slice is a red rectangle. To insert one or more new line(s) is enough to click on the image visualisation area where the line has to be introduced after have pressed the button.

Delete Line allows deleting a line by time. To the end, please select with the mouse and click the line or lines that have to be deleted.

Delete All allows deleting all the lines and then to cancel all image segments. This action is performed with the clicking of the button.

Move Line allows moving a line to fix a new position. To this end you have to select with the mouse the line to be moved and click another time in the Image Visualisation area to select the new position.

Set Lines allows storing the position of all image segments.

At the end of each operation that has changed the number of lines or their position (erasing or moving), it is needed to push the *SetLines* button to store modifications or the slicing result, see the next section with some examples.

6.4.2 Inserting Line

There is not a rule to choose the start point in the image from which you can start to inserting cutting/slicing lines. In order to process the page in a simple and systematic manner, we suggest to slice from top to bottom. The operation can be made by using the mouse for positioning in the image the point and clicking the left button to fix the line.

The inserting line process guidelines for a main score image is described in the following table.

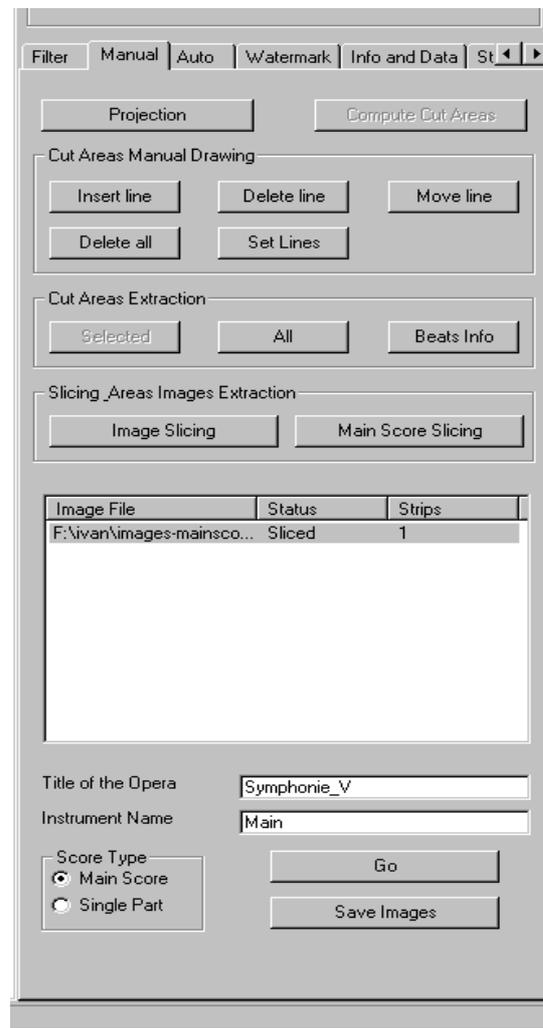
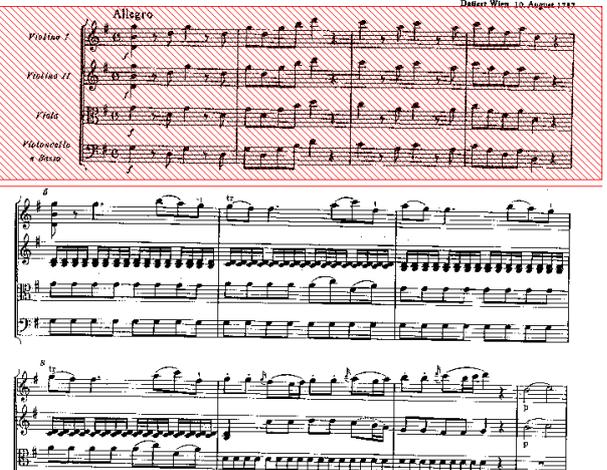
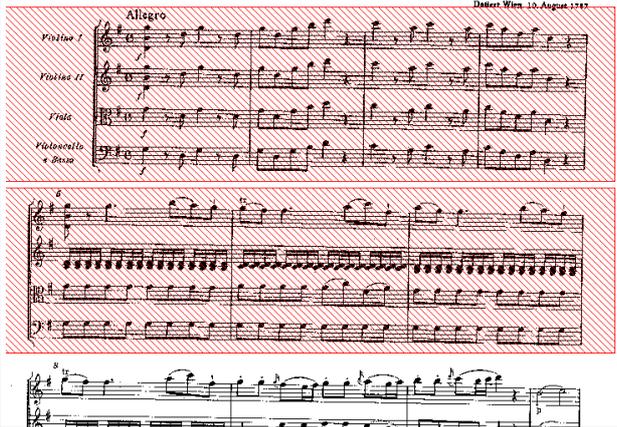


Fig. 6.1 - Manual Panel for Slicing

<p>13/847</p> <p style="text-align: center;">Serenade in G 43</p> <p style="text-align: center;">Eine kleine Nachtmusik für zwei Violinen, Viola, Violoncello und Kontrabaß KV 525 Dattler Wien 10. August 1787</p> <p style="text-align: center;">Allegro</p> 	<p>Insertion of the first line for the top bound of the area that includes the first system of staves. The Header of the page has been separated from the first system of staves by the line already inserted. In some cases, you may be interested in maintaining the header visualised with the first systems of the main score.</p>
<p>13/847</p> <p style="text-align: center;">Serenade in G 43</p> <p style="text-align: center;">Eine kleine Nachtmusik für zwei Violinen, Viola, Violoncello und Kontrabaß KV 525 Dattler Wien 10. August 1787</p> <p style="text-align: center;">Allegro</p> 	<p>Insertion of the second line for the bottom bound of the area that includes the first system of staves. Every time that the second line is inserted the red rectangle including the system of staves is displayed and the slices are grouped at couple starting from the top to the bottom. Each couple of line identify a slice disregarding the order in which they have been placed and using only the positioning order from top to bottom for defining the couples.</p>
<p>13/847</p> <p style="text-align: center;">Serenade in G 43</p> <p style="text-align: center;">Eine kleine Nachtmusik für zwei Violinen, Viola, Violoncello und Kontrabaß KV 525 Dattler Wien 10. August 1787</p> <p style="text-align: center;">Allegro</p> 	<p>Insertion of the first line for the top bound of the area that will include the second system of staves.</p>

<p style="text-align: center;">Eine kleine Nachtmusik für zwei Violinen, Viola, Violoncello und Kontrabaß KV 525 Wolfgang Amadeus Mozart Dietrich Wilm, 10. August 1787</p> 	<p>Insertion of the second line for the bottom bound of the area that includes the second system of staves. As for the first system, the second insertion produces a new red rectangle including the second system of staves.</p>
---	---

This procedure is valid also for images representing single part as shown in the following:

	<p>Insertion of the first line for the top bound of the area that includes the first staff.</p>
	<p>Insertion of the second line for the bottom bound of the area that includes the second staff. Every time that a second line is inserted the red rectangle including the staff is displayed and slice is defined with the previous line.</p>
	<p>Insertion of the first line for the top bound of the area that includes the second staff.</p>
	<p>Insertion of the second line for the bottom bound of the area that includes the second system of staves. As for the first system, the second insertion produces a new red rectangle including the second staff.</p>

What happen starting from a different point of the score?

	<p>Insertion of the first line for the top bound of the area that includes the second staff.</p>
	<p>Insertion of the second line for the bottom bound of the area that includes the second staff. The new insertion produce the area correctly.</p>
	<p>Insertion of the first line for the top bound of the area that includes the first staff. Let note that the new inserted line has been associated with the first line for the top bound of the second staff instead of the second staff. So, in the next step we have to define necessary a new line to get a couple of rectangles that include the first and the second staff.</p>
<p>1)</p>  <p>2)</p> 	<p>There two possibilities in this case (see line A in the previous figure):</p> <ol style="list-style-type: none"> 1) The line can be inserted a bit over line A, thus the line is associated with the first staff. 2) The line can be inserted a bit under line A, thus the line is associated with the second staff. <p>To see the difference between two cases, compare the dimension of red rectangles. Every time that the second line is inserted the red rectangle including the system of staves is displayed and the slices are grouped at couple starting from the top to the bottom. Each couple of line identify a slice disregarding the order in which they have been placed and using only the positioning order from top to bottom for defining the couples.</p>

6.4.3 Deleting Line

The way to operate is very similar to the inserting line procedure. The operation is made by using mouse for positioning up to the line and clicking with the left button for erasing the line. Please note that the line to be deleted has to be precisely selected with the mouse click.

	<p>In this example, we want to delete the top line of the rectangle including the second staff.</p>
---	---

	<p>The image shows what happen after the line removal, the red rectangle of the second staff disappears, and the bottom line remains orphan from its previous line that formed with it the couple.</p>
---	--

6.4.4 Deleting All Lines

It allows deleting all the lines and then to cancel all image segments. This action is performed with the clicking of the button.

6.4.5 Moving Line

Pressing the *Move Line* button allows moving a line to fix a new position. To this end you have to select with the mouse the line to be moved and click another time in the Image Visualisation area to select the new position. This operation allows re-positioning of the horizontal and vertical lines (borderlines of red rectangles) one by one and then correcting the image segment areas as shown in the following examples:

	<p>In this example, the right border of the red rectangle can be adjusted in order to reduce the right white margin. By positioning with the mouse cursor on the vertical line (as indicated by the black arrows) and clicking with the left mouse button, the line is selected.</p>
	<p>The second step is to fix the new position for the vertical line. The operation can be made by using the mouse for positioning in the image the point and clicking the left button to fix the line.</p>

The operation described for the vertical lines is valid also for the horizontal lines, please note that the change of position for a vertical line impact to all vertical line of each image segment. This is necessary to have the image segments with same width.

6.4.6 Setting Lines

It is necessary to store the position all image segments. At the end of each operation that has changed the number of lines or their position (erasing or moving), it is needed to push the *SetLines* button to store modifications or the slicing result.

6.4.7 Cut Areas Extraction

For the Slicing process this functionality of the Image Score Slicer is not relevant.

6.4.8 Slicing Areas Images Extraction

In the Slicing Area Image Extraction of the panel “Manual”, two buttons are presented. They allow performing:

Image Slicing: for automatic slicing of single parts. This operation is suggested for single part with one staff per voice. This operation can be done when the image is loaded. The result is shown in the Fig. 6.2.a.

Main Score Slicing: for the automatic slicing of main score. This operation is suggested for main score images or single part images with multistaff parts such as piano, harp, organ. This operation can be done when the image is loaded. The different results are shown in the Fig. 6.2.b.



a) Slicing effect for a single part

b) Slicing effect for a Main Score

Fig. 6.2 - a) Image Slicing; b) Main Score Slicing

6.4.9 List of image files

In the middle part of the panel “Manual” a the list of loaded image page files is shown. For each image, the absolute path (*Image File*), the *Status* and the number of slices (*strips*) are shown. Each item of the list has a specific menu that can be activated by clicking the line corresponding to an image name with the right button of your mouse.

Image File	Status	Strips
F:\beethoven-V\00000002.gif	Sliced	1
F:\beethoven-V\00000003.gif	View Image	2
F:\beethoven-V\00000004.gif	Slice Image	2
F:\beethoven-V\00000005.gif	View Beats Info	2
F:\beethoven-V\00000006.gif	View Image Strips	1
F:\beethoven-V\00000007.gif	Hide Image Strips	2

Fig. 6.3 – The Popup Menu in the List of images Area

Referring to the Fig. 6.3:

- **View Image:** By selecting the *view image* option, the selected image is loaded and displayed.
- **Slice Image:** By selecting the *Slice Image* option, the current image is sliced automatically.
- **View Beats Info:** The *View Beat Info* option allows opening the **Extraction Beats Information dialog**.
- **View Image Strip & Hide Image Strip:** The *Hide Strip* or *View Strips* allow respectively to hide or display the image page with slicing produced by the slicing process.

6.4.10 Sorting images in the list

In the above mentioned list of images, the user change their ordering in order to create a right sequence of images corresponding to that of the measures in the score pages or booklet. Please note that the process is simple if you have collected the images of pages with an alphabetic or numeric order such those reported in the example.

By pressing the *Image File* button in the image list area (see Fig. 6.3), the image files will be sorted alphabetically.

<table border="1"> <thead> <tr> <th>Image File</th> <th>Status</th> <th>Strips</th> </tr> </thead> <tbody> <tr> <td>F:\beethoven-V\00000002.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000003.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000004.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000005.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000006.gif</td> <td>Ready</td> <td>NULL</td> </tr> </tbody> </table>	Image File	Status	Strips	F:\beethoven-V\00000002.gif	Ready	NULL	F:\beethoven-V\00000003.gif	Ready	NULL	F:\beethoven-V\00000004.gif	Ready	NULL	F:\beethoven-V\00000005.gif	Ready	NULL	F:\beethoven-V\00000006.gif	Ready	NULL	The list of images is sorted alphabetically in the direct ordered by default
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If the alphabetic order is not the right sorting criteria, it is possible to perform a manual sorting by moving rows of the list with classical the drag and drop method (see the following figure).

<table border="1"> <thead> <tr> <th>Image File</th> <th>Status</th> <th>Strips</th> </tr> </thead> <tbody> <tr> <td>F:\beethoven-V\00000002.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000003.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000004.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000005.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000006.gif</td> <td>Ready</td> <td>NULL</td> </tr> </tbody> </table>	Image File	Status	Strips	F:\beethoven-V\00000002.gif	Ready	NULL	F:\beethoven-V\00000003.gif	Ready	NULL	F:\beethoven-V\00000004.gif	Ready	NULL	F:\beethoven-V\00000005.gif	Ready	NULL	F:\beethoven-V\00000006.gif	Ready	NULL	<table border="1"> <thead> <tr> <th>Image File</th> <th>Status</th> <th>Strips</th> </tr> </thead> <tbody> <tr> <td>F:\beethoven-V\00000002.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000005.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000003.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000004.gif</td> <td>Ready</td> <td>NULL</td> </tr> <tr> <td>F:\beethoven-V\00000006.gif</td> <td>Ready</td> <td>NULL</td> </tr> </tbody> </table>	Image File	Status	Strips	F:\beethoven-V\00000002.gif	Ready	NULL	F:\beethoven-V\00000005.gif	Ready	NULL	F:\beethoven-V\00000003.gif	Ready	NULL	F:\beethoven-V\00000004.gif	Ready	NULL	F:\beethoven-V\00000006.gif	Ready	NULL
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6.4.11 Inserting parameters

Before to start the slicing process, fill the *Title of the Opera* and the *Instrument* fields related to image score and choose the *Score Type*.

6.4.12 Score Type

Choosing the Score Type is very important in the batch mode for slicing since it allows setting up the algorithm for the image slices generation. For main score or multistaff part the *Main Score* option is suggested, while the other option covers the single part single staff. The default option is fixed to Main Score.

6.4.13 Title of the Opera

The name of the Opera has to be written in the *Title of the Opera* field as shown in the Fig. 6.4.

6.4.14 Instrument Name

The name of the instrument related to the images that are to be sliced has to be written in the *Instrument Name* field as shown in the Fig. 6.4. In case of image related to the Main Score please use the *Main* word while in all other cases it is enough to write the name of instrument.

Fig. 6.4 - Score Type, Title of the Opera and Istrument name data inserting

6.4.15 Go and Save Images Buttons

The *Go* button starts the batch mode for automatic slicing of images. The process is started for main scores or for parts according to the set type on the left. In the automatic process the parameters of slicing which are present on the left top part of the window are automatically estimated.

The images listed in the above list are sliced sequentially respect to the order in the list of file. At the end of each slicing, the status and number of strip fields are updated,. In this way it is possible to control the slicing process. At the end of the batch process, the *Save Images* button is enabled. It allows storing on disk the image segments of each image score. The saving process starts from the first image score and follows a sequential order.

6.4.16 Extraction Beats Information dialog

Before to produce on the disk the sliced image score, the *Extraction Beats Information* related to the visualised image is shown, In this dialog the user has to fill fields for the *Starting measure* related to the staff or system of staves indicated by the *Staff number*. By means the Next and Previous button the user may browse and change staff numbers of system of staves. As soon as the process reaches the last staff/slice, the Ok button is enabled. By pushing that button, the inserted values are stored and the value for the last measure on the page is asked. This value is needed to calculate the range of measure related to the last staff or system.

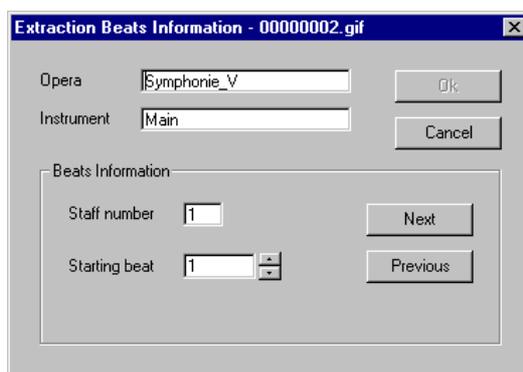


Fig. 6.5 - Extraction Beat Information Dialog

6.5 Automatic slicing

In the following, steps for slicing main score or single part images are described.

6.5.1 Main Score and Multistaff Parts

In order to perform an automatic or supervised image score slicing for main scores images or single parts containing multistaff parts the following steps have to be followed:

1. Load images (see Section 6.3)
2. If necessary, sort the list of images (see Section 6.4.10).
3. Define the Score Type, in this case select Main Score (see Section 6.4.12).
4. Fill the fields for the Name of Opera and Instrument. In this case the Name of Opera has to be fixed at Main if the image represents a Main score or at the name of instrument if the image represents a multistaff part (see Sections 6.4.13 and 6.4.14).
5. Push the *GO* button (see Section 6.4.12)
6. At the end of slicing process, it is possible to visually verify the results before to start with to save the image slices/segments on the disk. To this end, please select the image to be controlled in the list of image pages and by pushing the right button of the mouse a menu is shown (see Section 6.4.9). In that menu, please select *View Image Strip*. This allows you to preview the image score slicing process. If the slicing process has correctly sliced the image pass to step 8, otherwise continue with the next step in which you can make the needed changes.
7. To do manual changes to the image segment highlighted see Sections 6.4.2 and 6.4.3
8. Press the *Save Images* button to start the image extraction
9. For each image segments fill the fields in the Extraction Beat Info dialog: entry the start beat for each staff (see Section 6.4.16).

6.5.2 Single parts

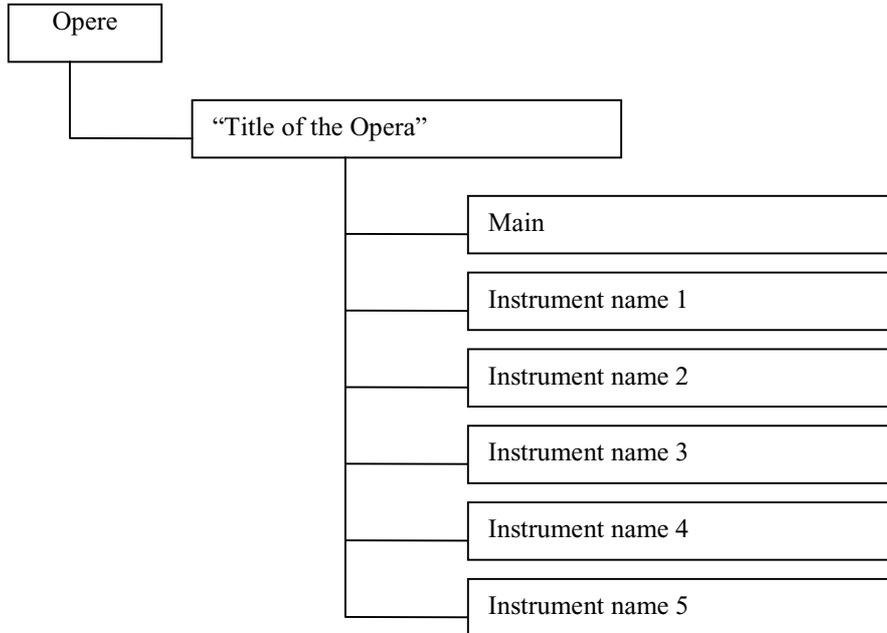
In order to perform an automatic or supervised image score slicing for image containing single parts the following steps have to be followed:

1. Load images (see Section 6.3)
2. If necessary, sort the list of images (see Section 6.4.10).
3. Define the Score Type, in this case select *Single Part* (see Section 6.4.12).
4. Fill the fields for the Name of Opera and Instrument (see Sections 6.4.13 and 6.4.14).
5. Push the *GO* button
6. It is possible to control the result of slicing process before to start with the save the image segments. To do that, select the image to be controlled in the list of image and by pushing the right button of the mouse a menu will be shown (see Section 6.4.9). In the menu select *View Image Strip*. This allows you to preview the image score slicing process. If the slicing process has correctly sliced the image pass to step 8, otherwise continue with the next step in which you can make the needed changes.
7. To do manual changes to the image segment highlighted see Sections 6.4.2 and 6.4.3
8. Press the *Save Images* button to start the image extraction
9. For each image segments fill the fields in the Extraction Beat Info dialog: entry the start beat for each staff (see Section 6.4.16).

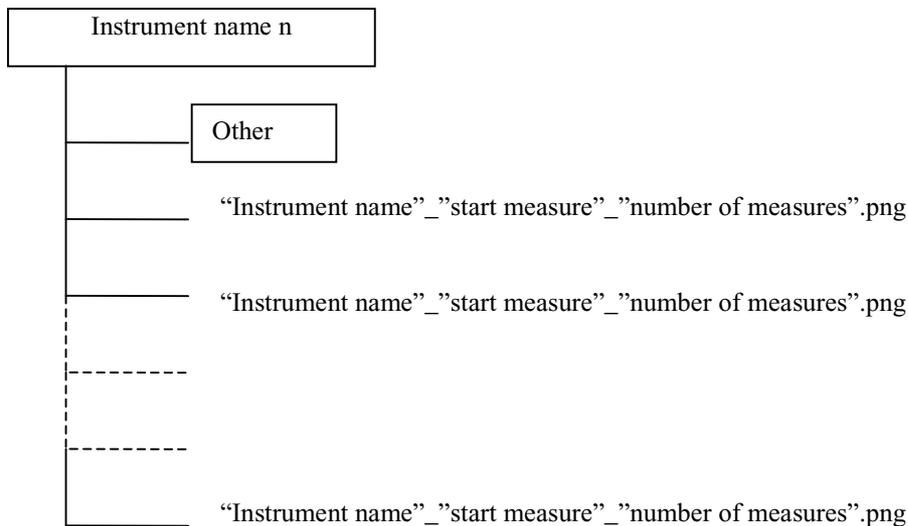
6.6 Structure of Generated Images

All images produced by the Slicer are stored in the same directory of the images or sequence that has been loaded. In particular, in the phase of slice saving, the directory "*Opere*" is created in order to collect all the slice image files of the opera. In details, a folder with the name of the Opera is created and a folder for each instrument and the main score is created in it. For the single part, the folder assumes the name of the instrument while for main score the folder is called "Main".

For example, if the Opera is composed by a main score and five parts, in the folder in which images of opera are, the slicer generates the following folders:



For each folder related to the Main Score or Single Part, the following structure is defined. In the process a specific file containing details of the sliced images is produced.



In the case of Main Score, the "Instrument Name" is replaced by "Main".

The folder called “Other” includes the residual images coming from the slicing process, these images generally are the **header**, the **footer**, the **right** and **left margin** and the **space slices** between staves (see Fig. 6.6).

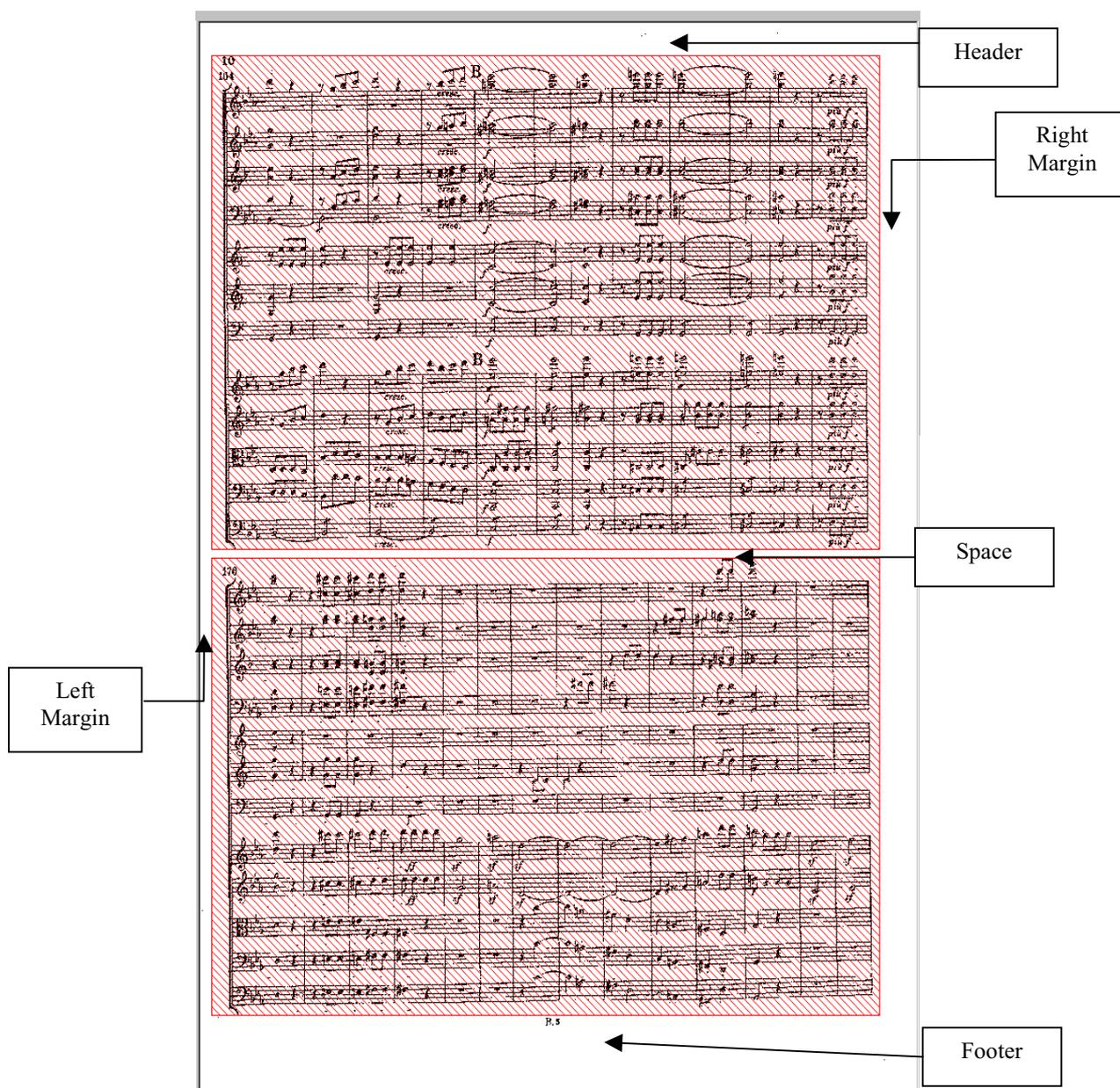


Fig. 6.6 - Header, Footer and Space

All these images are listed and sorted in the file “Index.txt” in order to maintain the sequentiality of images when they are loaded into the WEDELMUSIC editor. The “Index.txt” is located in the Other folder.

The structure of the file name for this kind of images is described in the following:

Header, Footer, Left Margin and Right Margin case:

<Instrument Name>_<Type>_<number of page>.png

Space case:

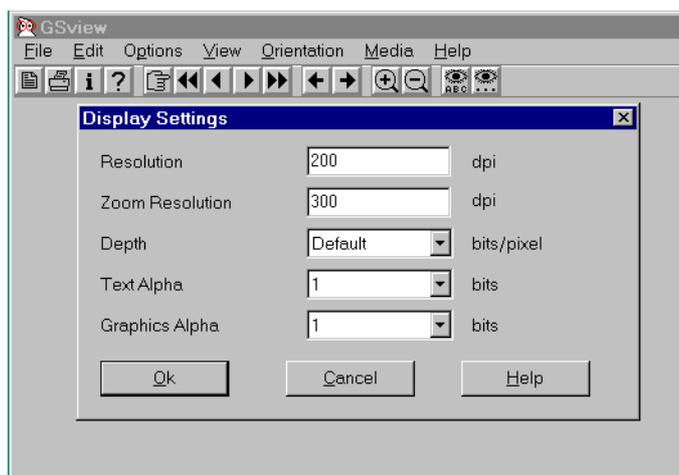
<Instrument Name>_<Space>_<number of page>_<number of order>.png

In the case of Main Score, the “Instrument Name” is replaced by “Main”.

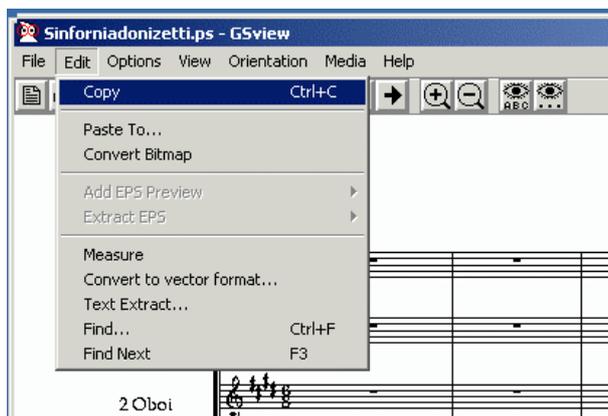
6.7 From PS/PDF to Images

If you have Postscript or PDF files it is possible to produce image score files. The process to produce the bitmap of the image can be performed in the following manner: (i) loading the PS , EPS, or PRDF file into the GhostView. Once loaded the file and selected the page to be saved into a an image file please select, from the "Media" menu, the item "Display Settings...". After that the depicted dialog is visualised. This dialog allows you to set the resolution of the visualised page. Good resolution is of 200 dpi for the image scores pages.

If the image pages and slices have to be printed from the WEDELMUSIC editor it is suggested to used at least 200 dpi. If the image scores are used only for visualisation of the screen a resolution of 100 dpi is more than enough.



After have set the resolution, the image score page can be saved into a bitmap file. To this end, please select "Copy" item in the menu edit. After that action the item "Paste to" e "Convert Bitmap" are activated. With the copy action you have saved the file into the clipboard, this means that you can make a past in any image manipulation programme to save the image in any format. The suggested programs for that task can be LviewPro or Photoeditor. LviewPro can load even very large files and its cost is quite low. In any case, the GhostView can save the image of the page in BMP format into your hard disk by using the command "Paste to".



6.8 Conversion of Images

For conversion of images that you have there are several tools. The photoeditor or the image viewer are typically included into the operating system. Commercial tools can be the Lviewpro or the MegaView. They can be found by making a query on some Internet browser.

6.9 Importing images in the WEDELMUSIC Editor

In order to import the produced slices of the image scores into the WEDELMUSIC editor it is absolutely needed to consider these aspects:

- They can be loaded from the WEDEL Editor in the menu associated to the folder Image Score
- Only one opera can be loaded for each WEDELMUSIC object, this means only one main score with all its parts
- Main score and parts have to be prepared in advance and loaded all at the same time.

Chap.7 WEDEL Editor

WEDELMUSIC Editor has the following look. It's the main entry for constructing WEDEL objects. Each WEDEL object is comprised of several components. The WEDELMUSIC Editor allows to see these components as a sort of tree such as in the figure.

7.1 General Overview

The functionalities are provided via a classical menu and single menus that can be opened on the several elements of the three by clicking with the right button of the mouse.

Not allowed fields of the above menus are inhibited at run time according to the allowed operations, even considering the permissions imposed if the object is encrypted. If the object is under construction the permissions are not considered.

The WEDELMUSIC Editor has the following main functionalities.

- Showing the WEDELMUSIC object in a sort of a tree
- Inserting/removing a component
- Inspecting the single component for classification, protection, ID and context
- Generating the WEDELMUSIC HEADER for bibliography purpose
- Visualizing/Editing the classification details
- Visualizing/Editing the identification details
- Visualizing/Editing the protection details
- Inspecting audio files such as MP3 etc by using a commercial program
- Inspecting HTML files by using a standard browser
- Inspecting Inspecting video files by using a standard browser
- Inspecting DOC files by using WORD or an its visualizer
- Save and load a WEDELMUSIC object
- Export/import a WEDELMUSIC object to/from the database
- It has to be possible to open the symbolic version of the score with all its parts and at the same time to have the image score version with all its parts. In general, it is better to load only the parts needed and not all parts. This can be feasible and more relevant for image version of music scores. Since the amount of memory needed for each image can be high.image files by using a standard browser

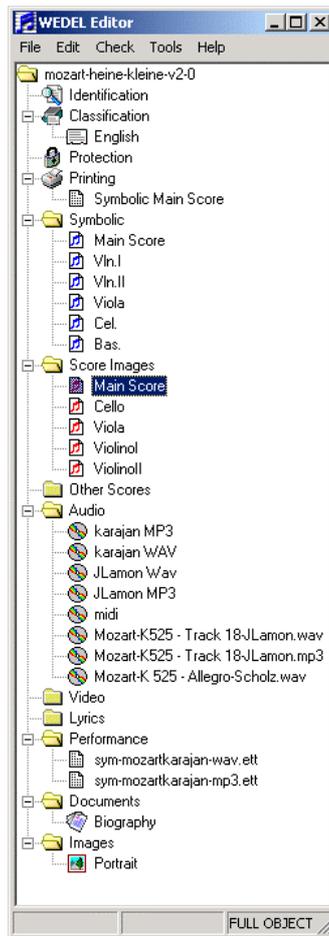


Fig. 7.1 - WEDELMUSIC tree

- Addition of an audio file in WAVE format
- Addition of an audio file in MP3 etc. format. In this case, the MP3 file is converted in WAVE before the execution.
- Addition of a textual file for making from it a lyric file
- Addition of video file in AVI format.
- Addition of images files in any known format.
- Addition of Document files
- Addition of an image score version to a current WEDELMUSIC object.
- Addition of a symbolic music to a WEDELMUSIC containing an image music score.
- Add an image music score to a WEDELMUSIC containing a symbolic music.
- Visualize symbolic music and image score music on the same computer at the same time in different windows.
- Etc.

The structure of a WEDELMUSIC object will be shown with a tree that replicates the WEDELMUSIC structure. For each element of the WEDELMUSIC is possible to create a new element with NEW and ADD.

New (item) (see Fig. 7.2)

A new element will be created asking for the related mandatory information. In addition, for documents, lyric, audio, video, image means also to select a file. This is copied into the virtual/physical directory hierarchy of the current WEDELMUSIC object.

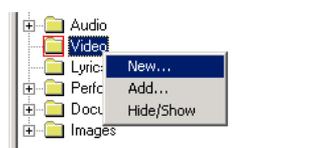


Fig. 7.2 - New command



Fig. 7.3 - Add command

Add (item) (see Fig. 7.3)

Add to the current WEDELMUSIC object an already present component on the disk.

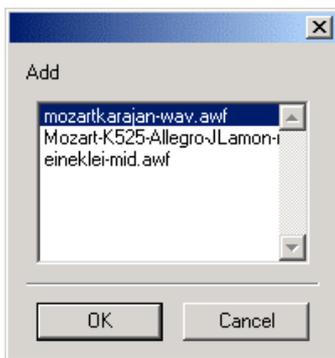


Fig. 7.4 - Add Audio Dialog

In the components directory (Fig. 7.5) there are all file that are been saved but in the dialog box (Fig.7.4), only components that can be added are visualized: in this case Audio file.

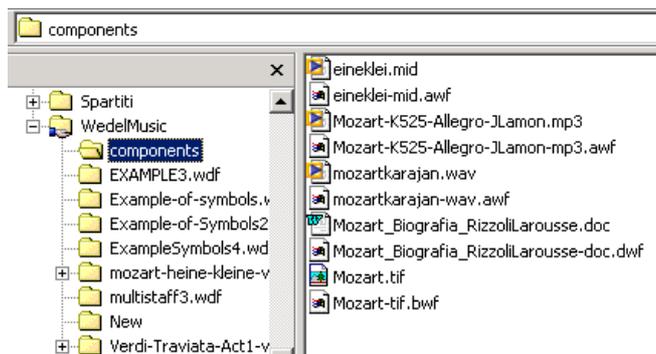


Fig. 7.5 - Components Directory

Hide/Show (item) (see Fig. 7.4)

It is possible to hide an already present component on the disk. It can be visualized again with the *Show Hidden* command on the Edit Menu (see Section 7.2.2)



Fig. 7.6 - Hide command

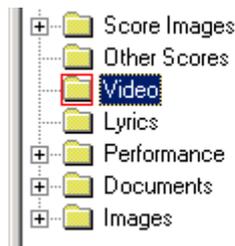


Fig. 7.7 - Audio Hidden

With the Hide command we can deleted any kind of file from the object tree, but not from hard disk.

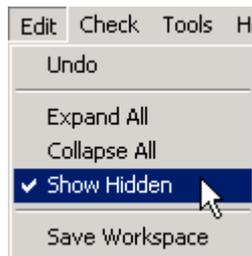


Fig. 7.8 - "Show Hidden" command

The effect of "Show Hidden" command is obvious in Figure 7.9.

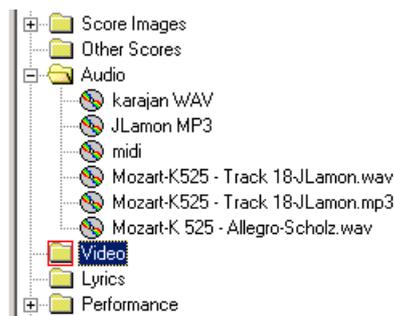


Fig. 7.9 - Resumed Audio

7.2 General Architecture

In the following subsections the descriptions of the functionalities which are behind the single items of the main WEDELEditor window are reported.

7.2.1 Menu File

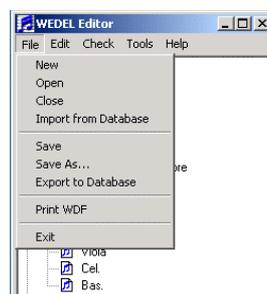


Fig. 7.10 - Menu File

New : New WEDELMUSIC objects, this means that if a WEDELMUSIC object is open it is discharged asking to the user if has to be done or not. Ask for a name. On this name a directory is made on the current path.

Open : Open a WEDELMUSIC object. Search for a directory.



Fig. 7.11 - Menu File: Open command

Close : Close the current WEDELMUSIC object losing the last changes, it has to be discharged asking to the user if has to be done or not.

Import from Database : Open a WEDELMUSIC object from a special directory/location sharing data placed from the database.

Save : Save the current WEDELMUSIC object updating data. This means that each aspects of the WEDELMUSIC object is updated on the disk.

Save as : Save the current WEDELMUSIC object asking for a new name. This means that each aspects of the WEDELMUSIC object is copied on the disk with a new name and location. The current name is set to the new name.

Export to Database : Save WEDELMUSIC object into a special directory/location sharing data with the database. This selection is inhibited since the Packaging Check is not performed with success.

Print WDF : Print the WEDELMUSIC details: Identification, classification, protection, printing, or part of them for reference. (Not Available in this version)

Exit : Exiting from the application, verification of the saving of the current WEDELMUSIC object.

7.2.2 Menu Edit

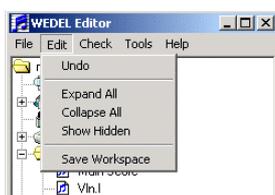


Fig. 7.12 - Menu Edit

Undo : undo of the last delete. (Not Available in this version)

Expand All : expanding all levels and components of the WEDELMUSIC object tree. The effect of this command is shown in figure 7.8.

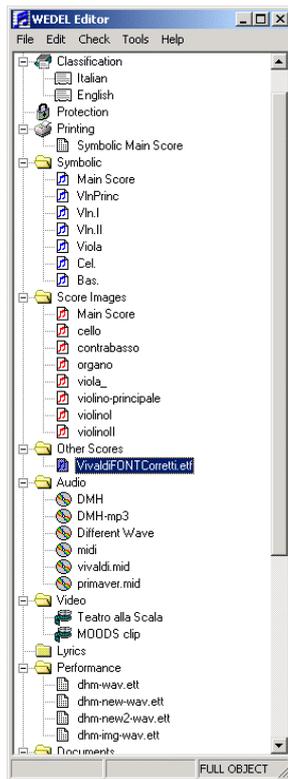


Fig. 7.13 - WEDELMUSIC Tree Expanded

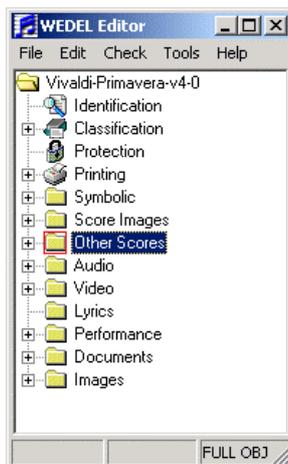


Fig. 7.14 - WEDELMUSIC Tree Collapsed

Collapse All : close all levels of the WEDELMUSIC object tree (Fig. 7.14)

Show Hidden : show the hidden components.

Save Workspace : save the position/size of the menus and windows of the whole application. Menus and windows non opened maintain the last values. (See the installation chapter).

7.2.3 Menu Check



Fig. 7.15 - Menu check

(ALL THE FOLLOWING OPTIONS OF CHECK MENU ARE NOT AVAILBLE IN THIS VERSION)

ID Consistency : Controlling the WDF consistency of defined ID. In this case the consistency of all the ID codes disseminated into the WDF object is performed. This means for instance verify that:

- each components has to point to the father in the correct manner
- each EWF has to point to available elements
- each link contained has to refers to available components
- each LWF has to point to available WDFCID
- each ?WF file that refers to external files has to point to existing files.

Protection : Controlling the protection permission consistency. A report about the available permission is performed by inspecting the permission stated into the WEDELMUSIC and those of the components. The availability of watermarked or not files is also detected according to the information inserted during the object preparation.

Packaging Check : Controlling the WEDELMUSIC object for completeness and consistency before preparing it for the delivering or database packaging. The presence of all mandatory fields and the ID Consistency is verified.

7.2.4 Menu Tools

See Description in Installation Chapter.

7.2.5 Menu Help



Fig. 7.16 - Menu help

Help : See Help (Section 7.2.6)

About : See Figure 7.17



Fig. 7.17 - WEDELMUSIC version

7.2.6 Help

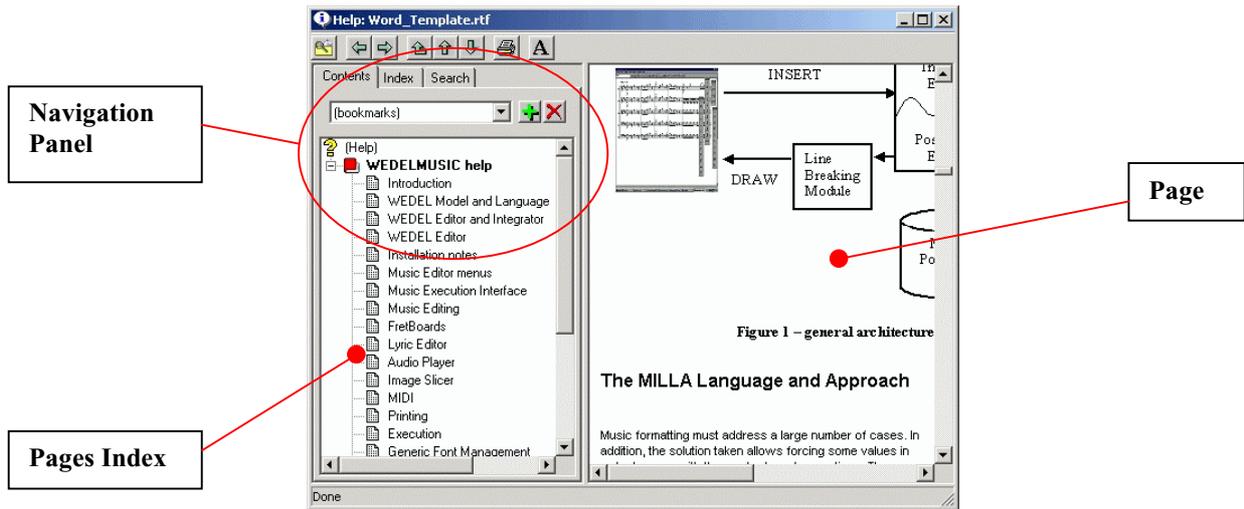


Fig. 7.18 - WEDELMUSIC editor: help



Fig. 7.19 - Help Toolbar

On the toolbar (Fig.7.14) are presents the following functionalities:

-  Show/Hide navigation panel
-  Go back / Go forward
-  Go one level up in document hierarchy
-  Previous page/Next page
-  Print the current page
-  Display options dialog (Fig. 7.20).

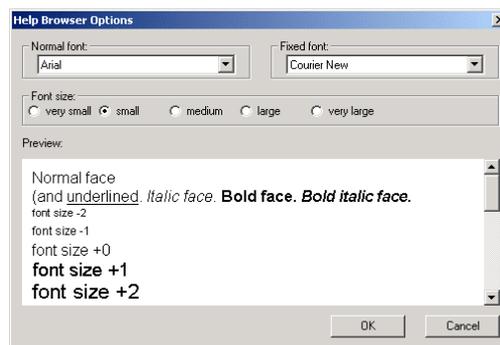


Fig. 7.20 - Help Browser Options

Add Button

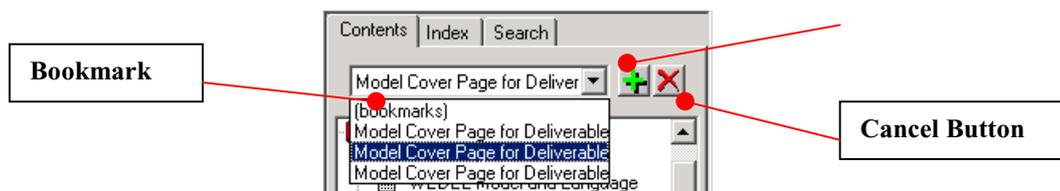


Fig. 7.21 - Contents options

In the Contents section (Fig. 7.21) are present the following functionalities:

- Add Button: add current page to bookmark
- Cancel Button: remove current page from bookmark

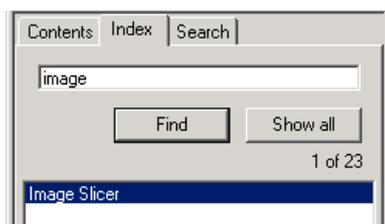


Fig. 7.22 - Index Section Dialog

In the Index section (Fig. 7.22) the research is carried out on the title of help pages, while in Search section (Fig. 7.23) is carried out on the help text.

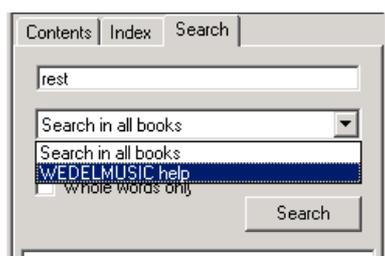


Fig. 7.23 - Search Section Dialog

7.3 Identification

Identification allows the identification of the WEDELMUSIC piece. Typical identification mechanisms have to be used such as ISMN. In addition, each WEDELMUSIC has a unique WDFID, such as every its component WDFCID. The Identification section of the WEDELMUSIC object contains several identification details. The same structure is contained into the WEDELMUSIC components, for instance into the symbolic main score and parts and into the image score: main score and parts.

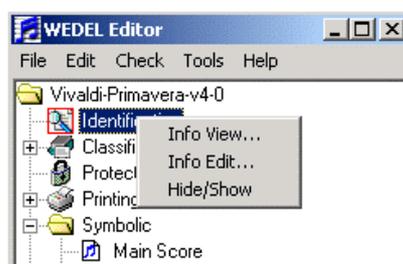


Fig. 7.24 - Identification menu

The Info view/Info edit item shows/edit some parameters and informations about this WEDELMUSIC object. In the first section (Fig.7.25) we have:

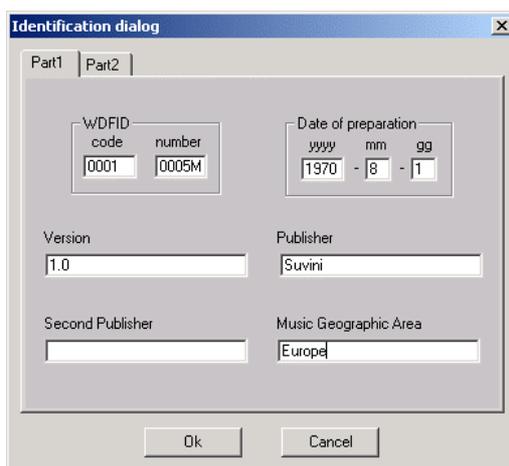


Fig. 7.25 - Identification dialog part1

WDFID: object identification number.

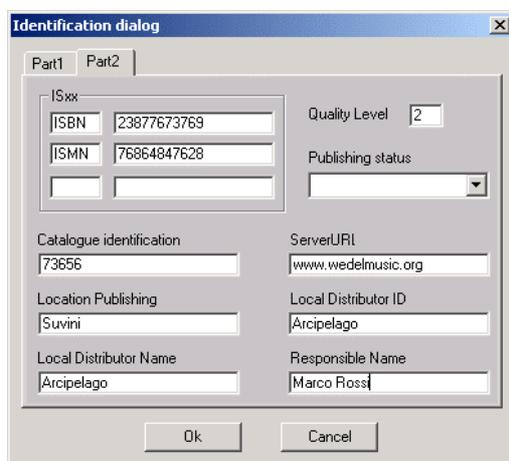


Fig. 7.26 - Identification dialog part2

ISBN, ISMN with related number identify certain information regarding file, like country, series kind (periodical). The third line is available to the operator.

The Publishing status of execution (Fig.7.27) must be specified in the relative dialog box (Fig.7.27). It is an obligatory field.

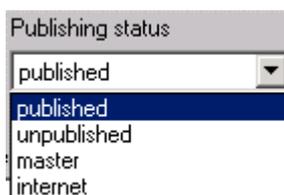


Fig. 7.27 - Publishing status options

Quality level

7.4 Classification

Multilingual

Classification allows the classification of a WEDELMUSIC piece according to archive mechanisms. The information included into the classification is general, no details about the single components of the WEDELMUSIC have to be included. These are contained in the specific classifications of components. This classification is only for the whole object and it does not confused with the classification of the symbolic version, image score version, audio files, etc. which are the components of the WEDELMUSIC object.

All the following fields of classification record are much more important for Libraries, and conservatories rather than for publishers. They typically need less information for cataloguing their music. On the other hand, that information is

needed when the music is printed. The information is typically included in printed music. For this reason it has to be included also into the WDF objects classification records.

The fields included have been selected from the above reviewed classification mechanisms and formats and according to the discussions performed with the end-users which are present into the projects as partners. The classification record contains information that can be present at level of WDF object and also at level of each component. These description/header files are moved together with the specific component file. In the classification structure Z39.50 and UNIMARK standards have been included.

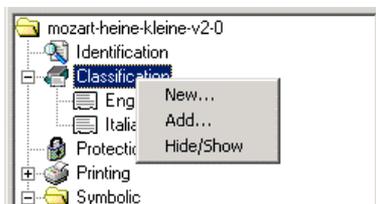


Fig. 7.28 - Classification Menu

To create a new classification with a different language, the "new command" must be selected and a certain kind of language must be inserted in the following dialog. It is also possible to load a file previously created and saved in components directory, with "add command".

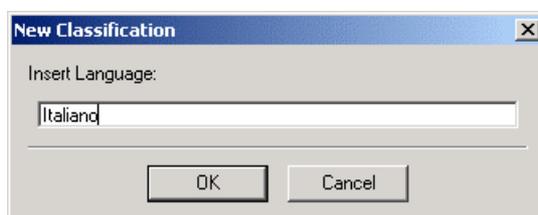


Fig. 7.29 - Classification menu: new command

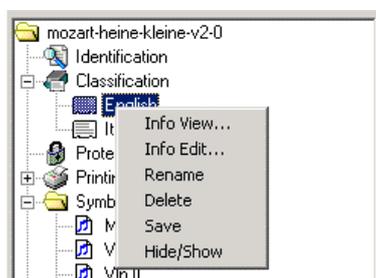


Fig. 7.30 - Language Menu

Info View/Edit: visualized / edited a lot of informations about the performance and the file own.
 (See Fig. 7.25 - 7.26 - 7.27 - 7.28 – 7.29)

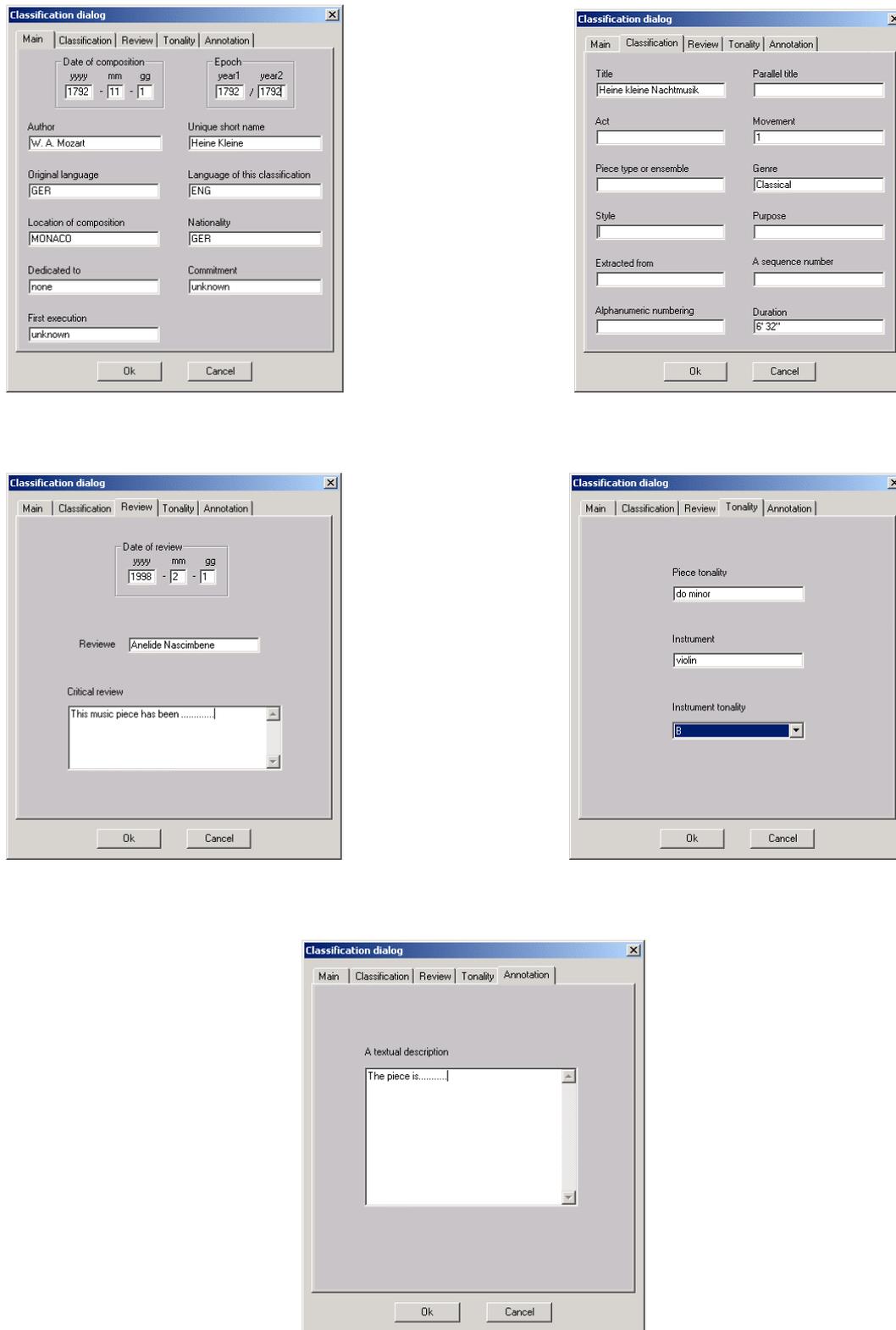


Fig. 7.31 - Classification dialog

7.5 Protection

This component includes the protection aspects of encryption, watermark at high level, only the codes are stored. In addition, a table about the manipulation permission is available. This part will also include the aspects related to the permission of music manipulation in the several state of the WEDELMUSIC object. When it is demo, when it is a rented object, when it has been sold, when the renting period has been expired.

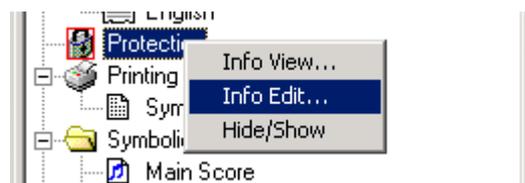


Fig. 7.32 - Protection component

7.6 Printing

NOT AVAILBLE IN THIS VERSION

7.7 Symbolic Music

Symbolic Music describes the scoring information, musical notation symbols, and their relationships.

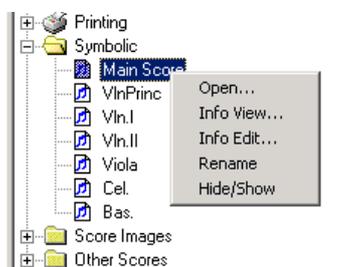


Fig. 7.33 - Symbolic Menu

The structure of a WEDELMUSIC object is shown with a tree that replicates the WEDELMUSIC structure.

Open

Open the music editor. This is also activated by clicking twice on the item with the left button.

Info View

Visualisation of related data: if any for the corresponding component, plus specific information related to its data according to the tables reported in the previous sections.

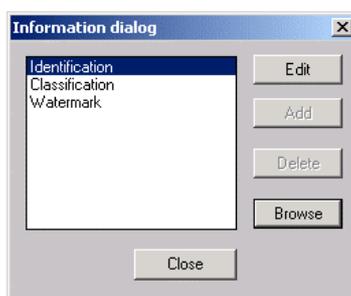


Fig. 7.34 - Information Dialog

InfoEdit

Editing of the information View and mentioned in the previous point. For View and InfoEdit several information can be viewed or edited, for this reason a dialog box containing a listbox listing this information is reported. The user has to selecte the specific item to see or edit the corresponding information.

Rename

Changing the description associated to the WEDELMUSIC item. This is also possible by using the standard modality of windows, by clicking on the right button on the name.

Delete

Remove the selected item from the WEDELMUSIC. The file is not removed from the directory in which the WDF item and related files is included. This can be used for deleting links and making a smaller object by saving it with a different name.

The other general functions have been described in a previous section.

7.7.1 MILLA File

In the symbolic section also Milla files can be inserted. When Milla file is not present in the object, then the default one is used.

For details see "Milla rules and engine" Chapter.

7.7.2 Font files

See "Fonts management" Chapter.

7.8 Performances



Fig. 7.35 - Performance in WDF tree

They are generated by the synchronization process. This aspect deals with the execution rate of music during a performance with the aim of providing on the computer screen the symbolic or the image version of music synchronously with the available auxiliary audio files or with a generated MIDI from the symbolic music. To this end, a solution similar to that has been proposed for the same purpose in WEDELMUSIC has been adopted. It is based on the definition of a synchronisation file that include cross references between the symbolic/image version and the auxiliary file. This files contain the so called Execution Time Trend, ETT. It includes aspects related to the generation of sounds and for page turning during performances; These aspect put in relationship symbolic score with audio, or the image score with an audio file. Audio files can be MIDI, WAVE and MP3 in any cases the execution is performed with the WAVE format or MIDI. Each ETT has an ID, a reference to the WDFID, a description, a reference to the synchronised files and a type.

For details see "Music execution and synchronisation" Chapter.

7.9 Lyric Files

In the WEDELMUSIC object can be present lyric files in more different languages.

For details see "Lyric Editor" Chapter.

7.10 Other Symbolic Scores

In this section is possible to add files containing symbolic music in other formats such Sibelius, Finale, IGOR, etc. They can be inserted by drag and drop.

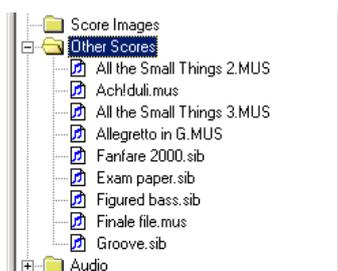


Fig. 7.36 - Other scores (Finale, Sibelius)

7.11 Image Score

Image of Music Sheets allows to distribute images of music scores without converting them into symbolic format. The idea is to allow also in this case the execution in WEDELMUSIC manner presenting the score pages with a replacement mechanism on a large set of visualization device types, allowing the synchronisation of audio files provided in WAVE, MIDI or MP3 formats. Images of Music Sheets can be distributed in GIF or compressed TIF formats starting from PDF, TIFF, BMP, GIF, PIC, PCX, TGA, etc. and any other image format. Images of music scores can be at different resolution depending on the purpose for which the WEDELMUSIC is acquired from the publishers. These can be from 1200/600 dpi (master image) to 100/70 dpi (computer screen resolution). The resolution also influences the printing quality and reliability/robustness of watermark. Images of music sheets have to be protected with a specific watermark. Each image has to be accompanied by a description file, which includes an ID, a reference to the WDFID, a description, a type and other information to maintain images of music sheet linked to the rest of the WEDELMUSIC components. Images can be of main score and of parts. Single images include a staff line (comprised of several measures) for single parts or a the single systems of parts for the main score. For each score image the number of included measures is collected. Mechanism for reducing their dimensions according to the adopted computer have to be provided. This allow to present music in image format in a suitable manner according to the dimension of the computer used for visualising the music. In addition in this manner a more detailed control on the music consumption/execution can be performed since each small piece of image have a range of included measures.



Fig. 7.37 - Score images: right button menu

In WEDELMUSIC format, only png images can be imported, such in the figure below

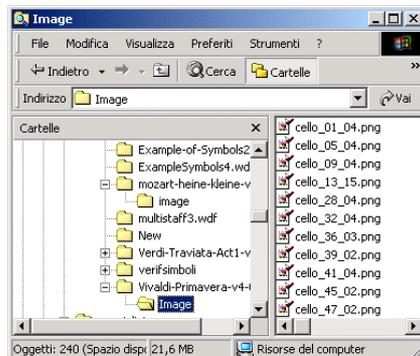


Fig. 7.38 - Png Images

After select "import score images" command, we must select the sub directory image (Fig.7.39), in the own WEDELMUSIC object, and all image slicer contained are loaded in "Score Images" folder.

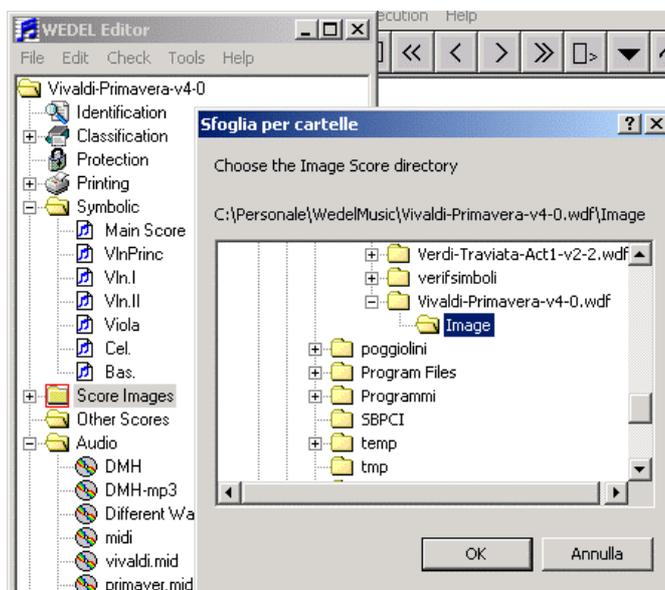


Fig. 7.39

For details see "Image score slicer" Chapter.

7.12 Audio files

A WEDELMUSIC file may include none, one or more audio files. Each audio file has an ID, a description, the ID of the WEDELMUSIC owner, and a type. Their format In general, their format can be WAVE, MIDI, MP3, SND, etc. No limitations are imposed on their format, only WAVE, MIDI and MP3 file can be used for the synchronisation with symbolic or image music. Audio files on different languages could be included as well. The synchronisation of audio file allows the adjusting of execution rate during visualisation and listening of music score with the selected audio.

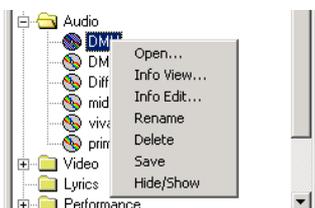


Fig. 7.40 - Audio files: right button menu

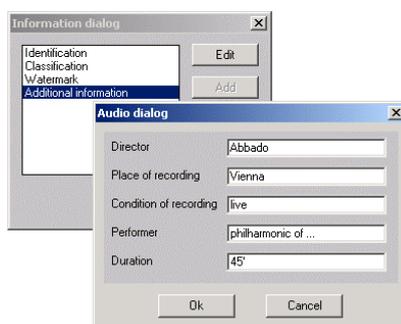


Fig. 7.41 - Additional information in audio files

The first four items in the audio information dialog (Fig. 7.41) are strings, while *Duration* must be an integer number. They can be inserted by drag and drop.

7.13 Video Files



Fig. 7.42 - Video Component in WEDEL Object

A WEDELMUSIC file may include none, one or more video files. Each video file has an ID, a description, the WDFID, and a type. These may be included via HTML files. No limitations are imposed on their format: AVI, MPEG, etc., size and image rate. This depends on the hardware and software available on the publisher and client sites. Video files can include their audio this could be synchronized with music score. This aspect is out of the scope of the project. With this synchronization not be possible to adjusting the execution rate during visualization of music score and the visualization of video and listening of the selected video.



Fig. 7.43 – Menu

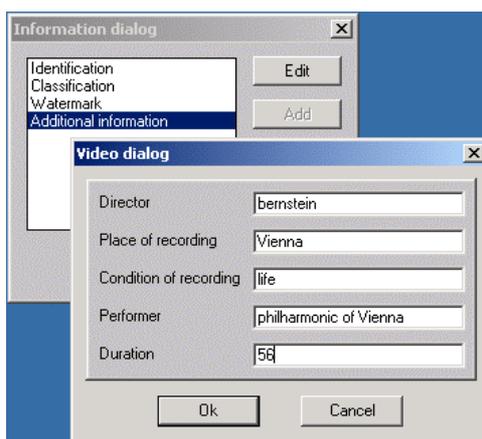


Fig. 7.44 - Video Information Dialog

The first four items in the video information dialog (Fig. 7.44) are strings, while *Duration* must be an integer number. They can be inserted by drag and drop.

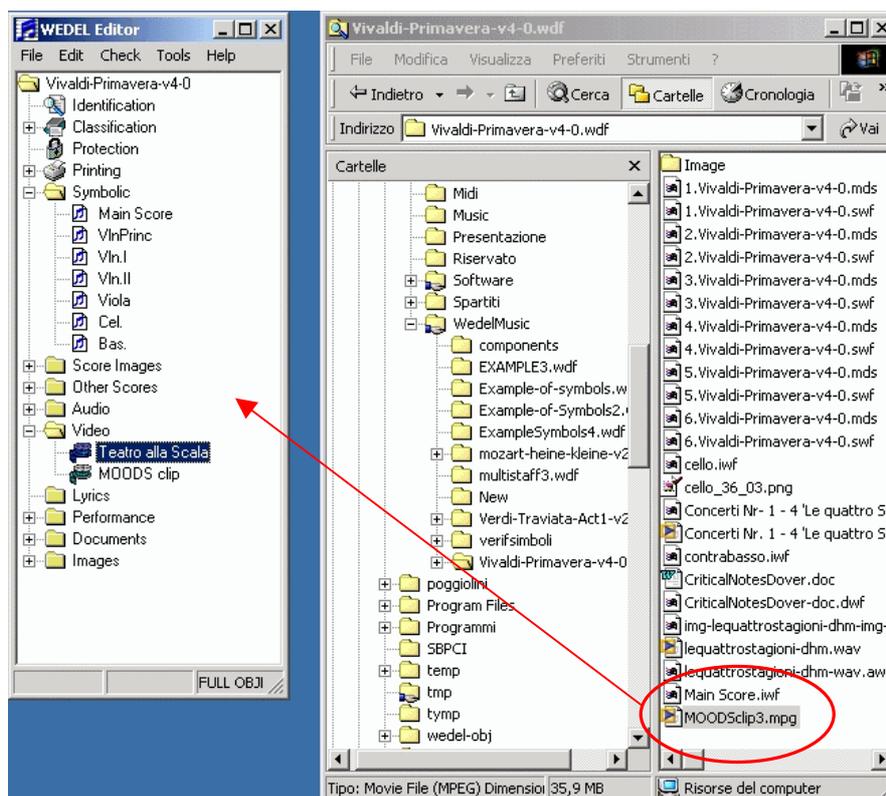


Fig. 7.4 - Drag and Drop for Video

7.14 Documents

Each WEDELMUSIC file may include none, one or more structured documents. Each documents has an ID, the ID of the owner WEDELMUSIC, a description and a type, etc. These may include author biography, critical description of the piece, description of the music piece, description of the performing orchestras, etc. For this reason several documents can be included for each WDF file. In general, their format can be PDF, DOC, Textual (TXT, in ASCII), HTML, etc. No limitation are imposed on their format. Documents on different languages could be included as well. This section could include also a document version of the Music score. It can be in PDF or PostScript as well.

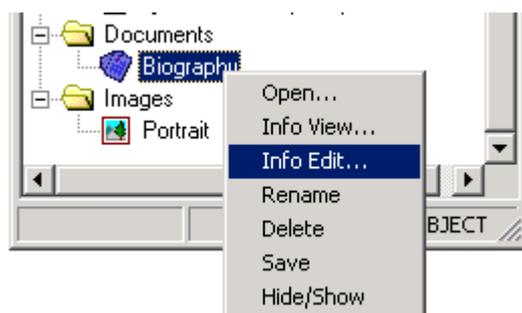


Fig. 7.5 - Documents in WDF file

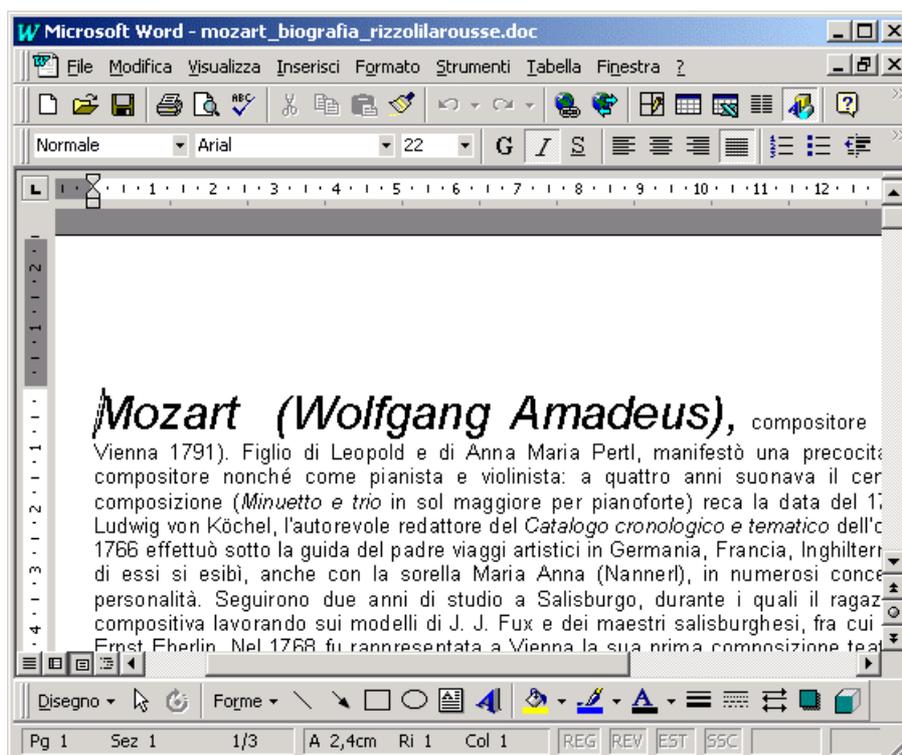


Fig. 7.6 - Exemple of document

Trough info edit command can be edited some features and additional information too.

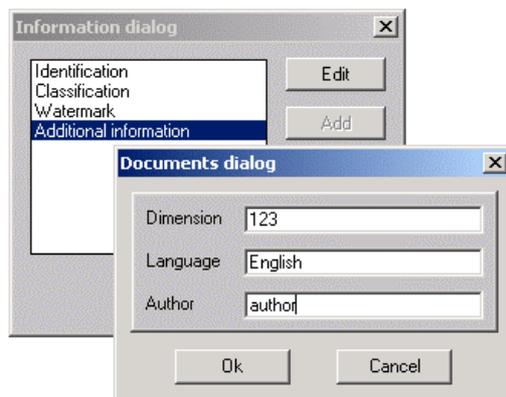


Fig. 7.7 - Document information dialog

They can be inserted by drag and drop (see Fig....)

7.15 Images

A WEDELMUSIC file may include none, one or more images. Each image file has an ID, a description, the WDFID, and a type. These images has to be distinguished from the images of music score. The first are typically used for showing the portrait of the author/performer, the picture related to the music or opera, or performer, the home/city of the author/performer, a picture of the instrument. These may be visualised via HTML files. No limitation are imposed on their format: GIF, TIF, BMP, PCX, etc. The same images can be referred by the document section.



Fig. 7.8 - Image in WDF file

Trough info edit command can be edited some features and additional information too.

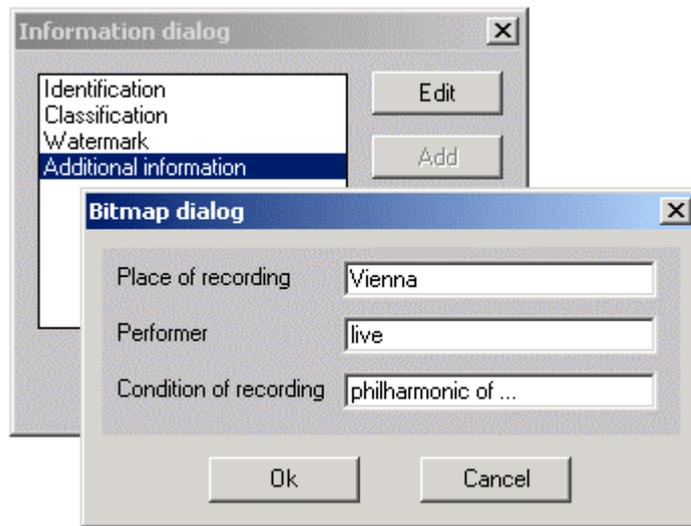


Fig. 7.9 - Image information dialog

They can be inserted by drag and drop.

Chap.8 Audio Player

The Audio player is the tool to execute audio files included as components of WEDELMUSIC object. It is totally integrated into the WEDELMUSIC application. It can read audio files in MP3, WAVE and MIDI formats even taken from the Hard Disk of your computer.

8.1 General Overview

The main functionalities of the audio player as they appear from the user interface Fig. 8.1 are:

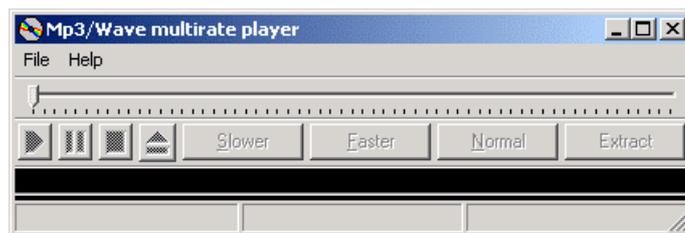


Fig. 8.1 - The Audio Player Panel

8.1.1 Menu Bar

In the menu bar are present two voices: File and Help as shown in Fig. 6.2:

- Open:** open an audio file in MP3 WAVE or MIDI formats
- Close:** exit from the audio player application
- Help:** call the help on line



Fig. 8.2 - Menu Bar of Audio Player

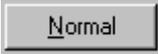
8.1.2 Command

- Play**  : starting the execution of the currently loaded audio file
- Pause**  : block execution in a point and at the release execution continues from that point
- Stop**  : Reset the execution to the starting point.
- Eject**  : Reset the audio player

Jump to  : jump to a point of the execution by dragging the cursor on the time slider.

Slower  : to decrease the execution rate

Faster  : to increase the execution rate

Normal  : to return back at the original execution rate.

Extract and save (only for WAVE files)  : it provides to extract an excerpt from an audio file and then to save it in a WAVE file (only if user has the permission to do this).

8.1.3 Indications

Playback rate: Visualizing the execution rate with respect of the original velocity.

Time Duration: Visualizing the time duration of the audio file

File name: Visualize the name of the audio file

8.2 Accepted Audio Formats

The accepted audio file formats are:

- Wave (*.wav) and Mp3 (*.mp3)
- MIDI (Music Instrument Digital Interface) file in 1 or 0 format.

8.3 Accelerating and decelerating audio files

The audio player allows the user to control the execution by accelerating and decelerating the velocity. These effects are obtaining by pushing:

- the **Slower** button, the velocity of the execution is reduced
- the **Faster** button, the velocity of the execution is increased
- the **Normal** button, the execution is reset to the normal velocity.



8.4 Audio Excerpts

It provides to extract a piece of audio file and then to save it in a wave format file (only if user has the permission to do this). To do this it is necessary to make the following steps:

STEP 1: Stop the performance if the execution is running and push the EXTRACT button on the panel

STEP 2: Introduction of the audio excerpt file name in the dialog (see Fig.8.3) then push OK to continue or Cancel to stop the operation

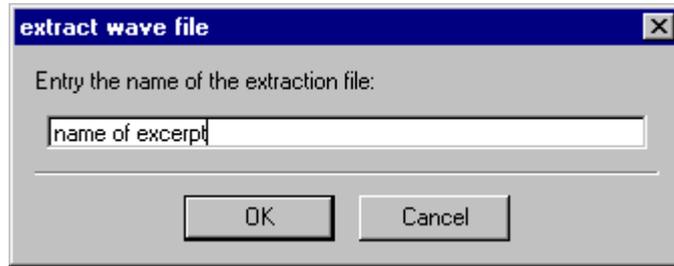


Fig. 8.3 - Entry excerpt name dialog

STEP 3: Definition of the extraction STARTING time (expressed in seconds) in the dialog (see Fig. 8.4) by using the up/down button to control the input value, then push OK to continue or Cancel to stop the operation

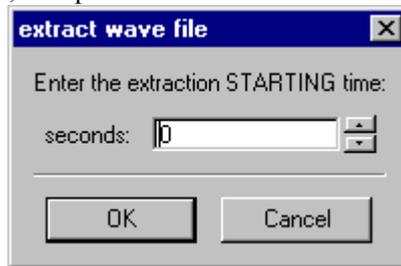


Fig. 8.4 - Entry starting time dialog

STEP 4: Definition of the extraction ENDING time (expressed in seconds) in the dialog (see Fig. 8.5) by using the up/down button to control the input value then push OK to continue or Cancel to stop the operation

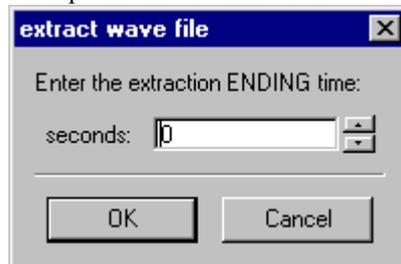


Fig. 8.5 - Entry ending time dialog

Chap.9 WEDELMUSIC Editor

9.1 Music Editing overview

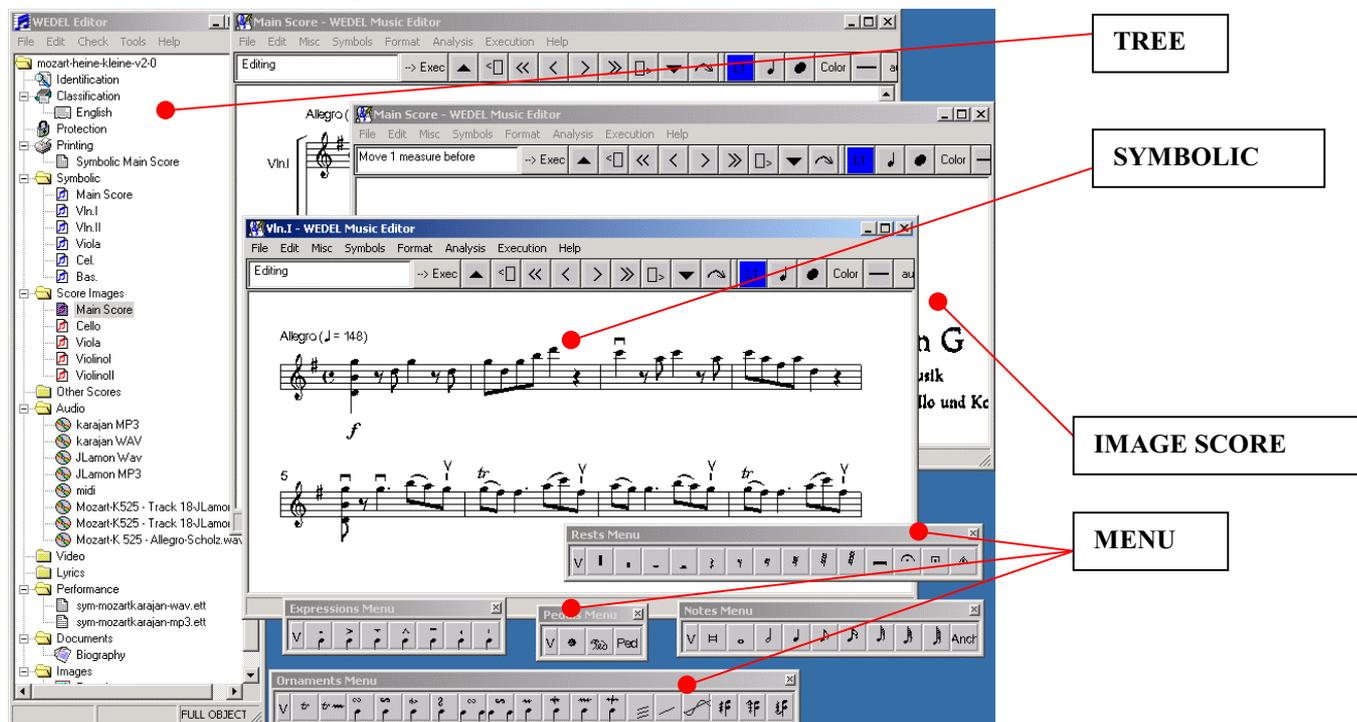


Fig. 9.1 - WEDELMUSIC editor overview

9.1.1 Menu overview



Fig. 9.2 - Menu overview

9.1.2 Toolbar editing

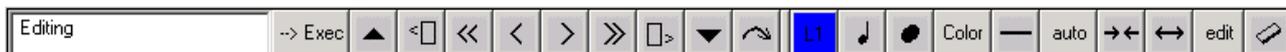


Fig. 9.3 - Toolbar editing

Message: a message for helping the user to perform the selected operation, it describe the next step **Edit/execution:** a toggle button to activate the edit or execution menus



Top, -5, -1, +1, +5, Bottom: navigation buttons to at the first measure of the current music piece, to move 5 measures back, one measure back, one measure forward, five measures forward and at the last page of the music piece.



-Pag, +Pag: is needed to move one page forward or backward on the video. It can be used in both the visualization modality, in Computer view and Print View. -1 page: move one page after. +1 page: move of one page before.



Jump: a JUMP dialog box is opened. In this way the jump can be performed by stating a specific measure number, on the top or bottom of the music score or at a predefined label. In this last case a list box showing the activated labels is presented. The user has to select of them to make the jump (see figures below).



Fig. 9.4 - Jump dialog

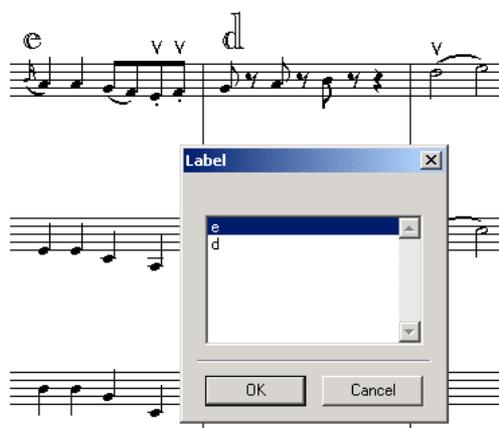


Fig. 9.5 - Jump to label

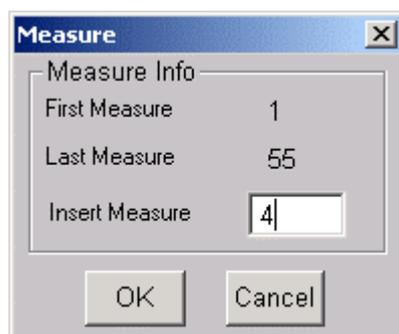


Fig. 9.6 - Jump to measure

For the others buttons on the toolbar, see Chapter.13.

9.2 Menu

9.2.1 Menu File

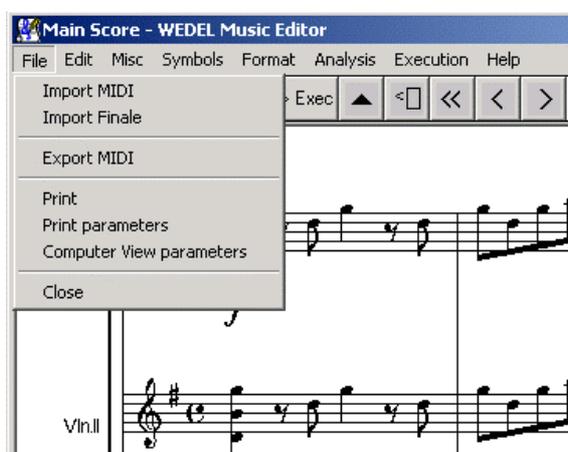


Fig. 9.7 - WEDELMUSIC editor: menu file

Menu file is comprised of the following functionalities:

Import MIDI: importing a MIDI file. This activates a standard browsing dialog box, once the file is opened. (See Ch.21 "MIDI input output and orchestration")

Import Finale: Please note that files of Finale can be saved in WEDELMUSIC format through Finale tool by using WEDELMUSIC Plug-in as expand in Chapter 25.

Export MIDI: export in MIDI. This activate a standard browsing dialog box for Save As. (the extension is MID or MIDI). (See Ch.21 "MIDI input output and orchestration")

Print: printing current part. (See Ch.26 "music score printing")

Print parameters: editing print parameters (See Ch.26 "music score printing ")

Computer view parameters: editing parameters for computer view.

This allows to pass from the Print View to the Computer View. The computer view is the classical visualisation in which it can be set margin in any direction and the staff distance. (See Fig. 9.9)

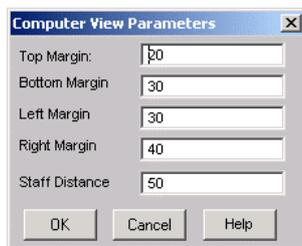


Fig.9.8 - Computer View Parameters Dialog

- Top Margin: it's able to increase or to diminish the distance to the top of page.
- Bottom Margin: it's able to increase or to diminish the distance to the bottom of page.
- Left Margin: it's able to increase or to diminish the distance to the left of page.
- Right Margin: it's able to increase or to diminish the distance to the right of page.
- Staff Distance: it's able to increase or to diminish the distance between staffs.

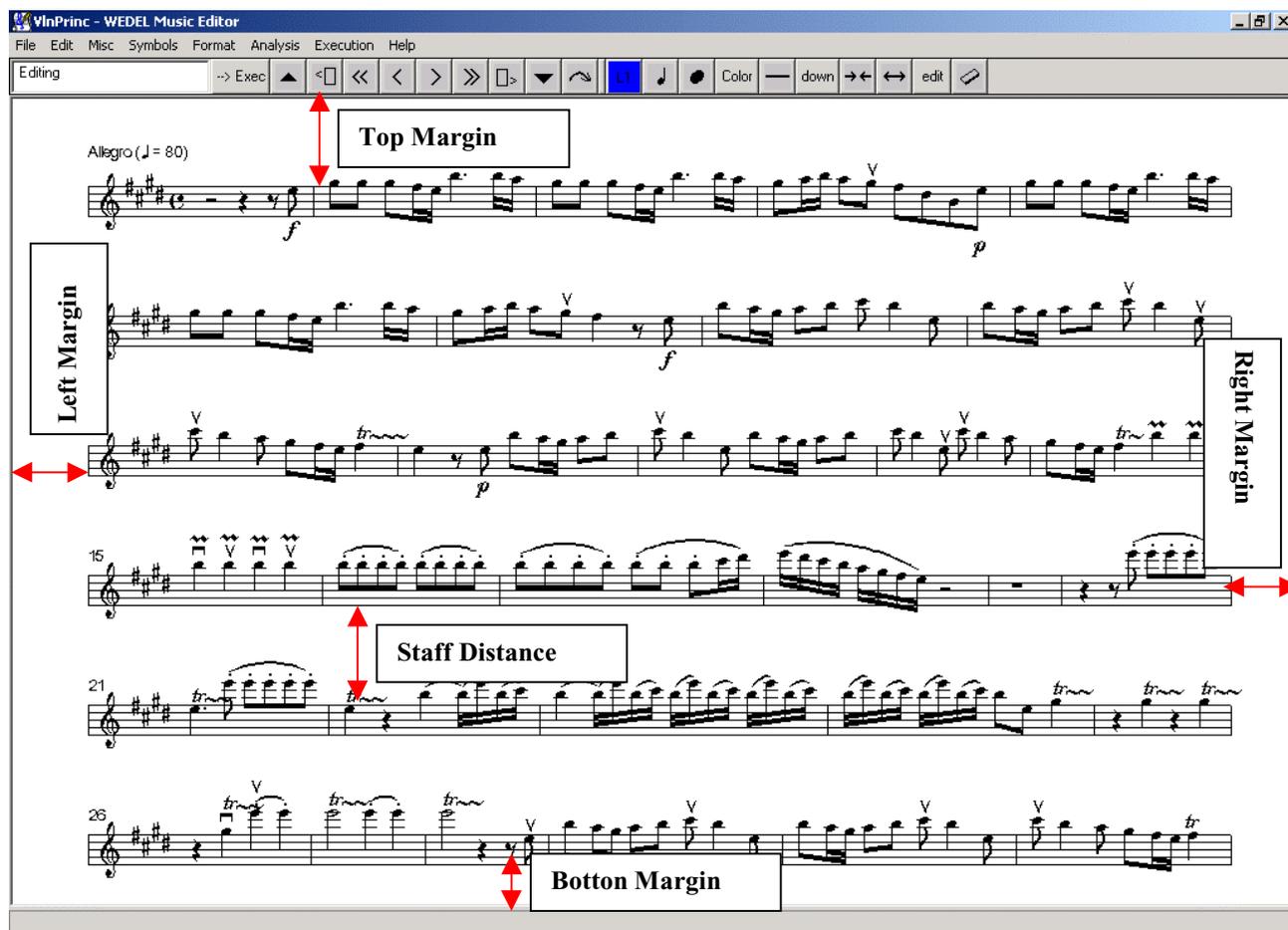


Fig. 9.9

In the case of main score, the left margin is imposed by the window size, and the bottom margin is imposed by the number of parts if the window size is not enough a scrollbar is added. The view is based on the basis of the computer view parameters. In the case of a part, all the margins are imposed by the window size.

9.2.2 Menu Edit

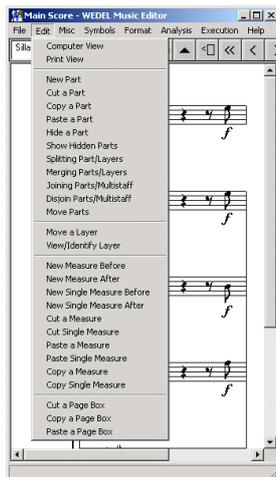
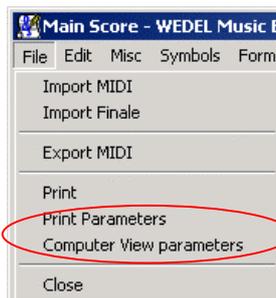


Fig. 9.8 - WEDELMUSIC editor: menu edit

Computer View: This allow to pass from the Print View to the Computer View. The computer view is the classical visualisation in which:

- In the case of main score, the left margin is imposed by the window size, and the bottom margin is imposed by the number of parts if the window size is not enough a scrollbar is added. The view is based on the basis of the computer view parameters.
- In the case of a part, all the margins are imposed by the window size. Plus the computer view parameters.

Print View: This allows to have a preview of the music page when it is printed. The view is performed according to the printing parameters: page size, margins, scales, etc.



Computer View parameters: To set the margins in the computer view. They are edited in the dialog shown in Fig. 10.11

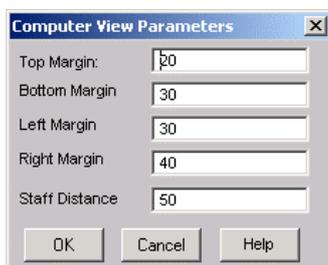


Fig. 9.9 - Edited parameters in Computer View

Print parameters: When the client decide to print a sheet the first decision to be taken is what he want to print:

- Main score
- A specific part
- An empty page for main

- An empty page for a part

The first step for printing is to select the main or a single part. Main score by ticking the radio button, while the part by selecting the specific part. Then the user should select on from "Real" or "Empty". If real was selected then the print module prints the symbolic else (if Empty was selected) an empty page of staff is printed according to the part shown for clefs and brackets (in the case of main score), while in the case of part the set of staves of the same type of the selected part is printed. If the part is has a pentagram, then a set of pentagrams is shown.

When the user decide to print something he can modify the page shape setting if the permission allow him to do that. In this order the "OK" button should open the window presented following (Print Parameters). All the parameters should be evaluated in the print preview modality from the music editor.

For the main part the available parameters are:

- Left, right, top and bottom margin (Fig.10.13 - 10.14)
- Page format
- Print resolution
- Magnification
- Line Length
- Number of staves and systems to print in one page
- Distance between the staves
- Insert or not the page number in the top of any page

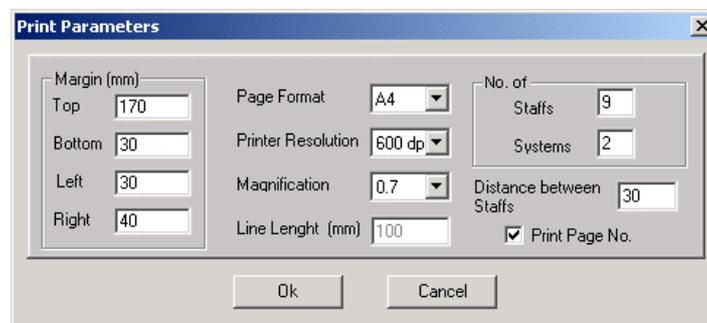


Fig. 9.10 - Print Parameters Dialog

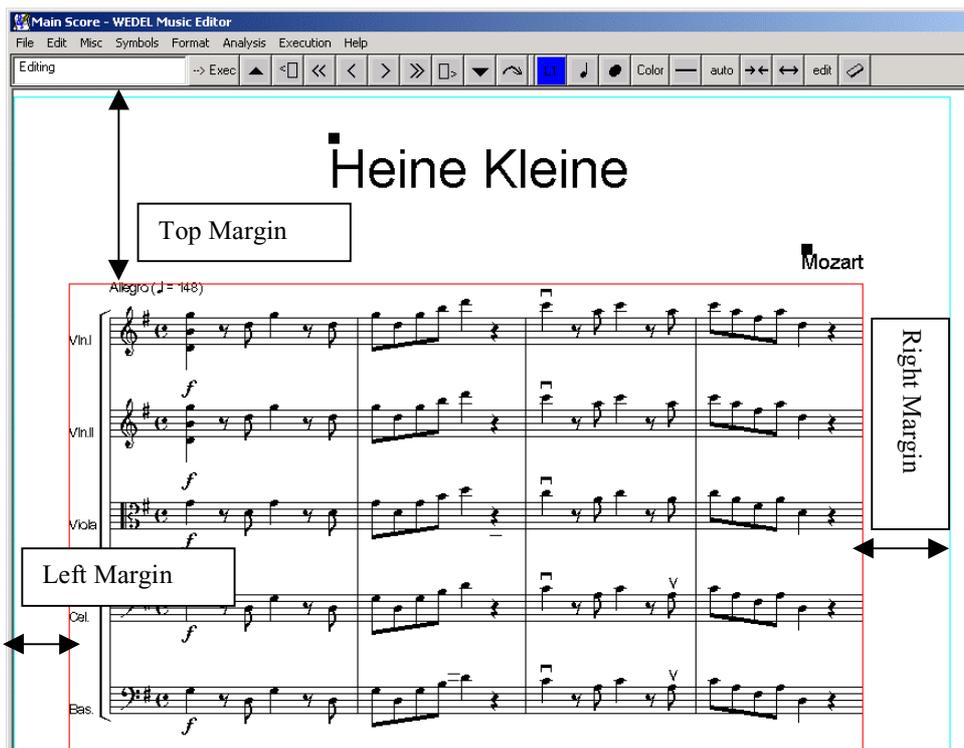


Fig. 9.11 - Margins in print view

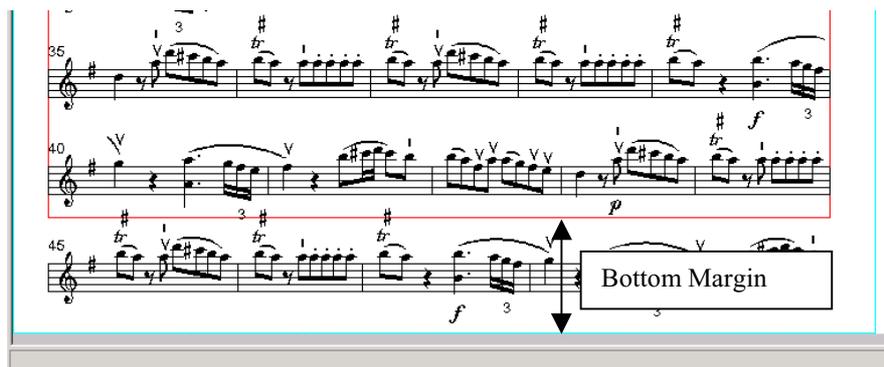


Fig. 9.12

If print empty page was selected the user may set:

- Left, right, top and bottom margin
- Page format
- Magnification
- Number of staves to print in one page (for single part)
- Number of systems (for main score)
- Distance between the staves
- Insert or not the title (a text field) in the top of any page
- Insert or not the page number in the top of any page
- Number of pages to be printed

(See Fig.9.13)

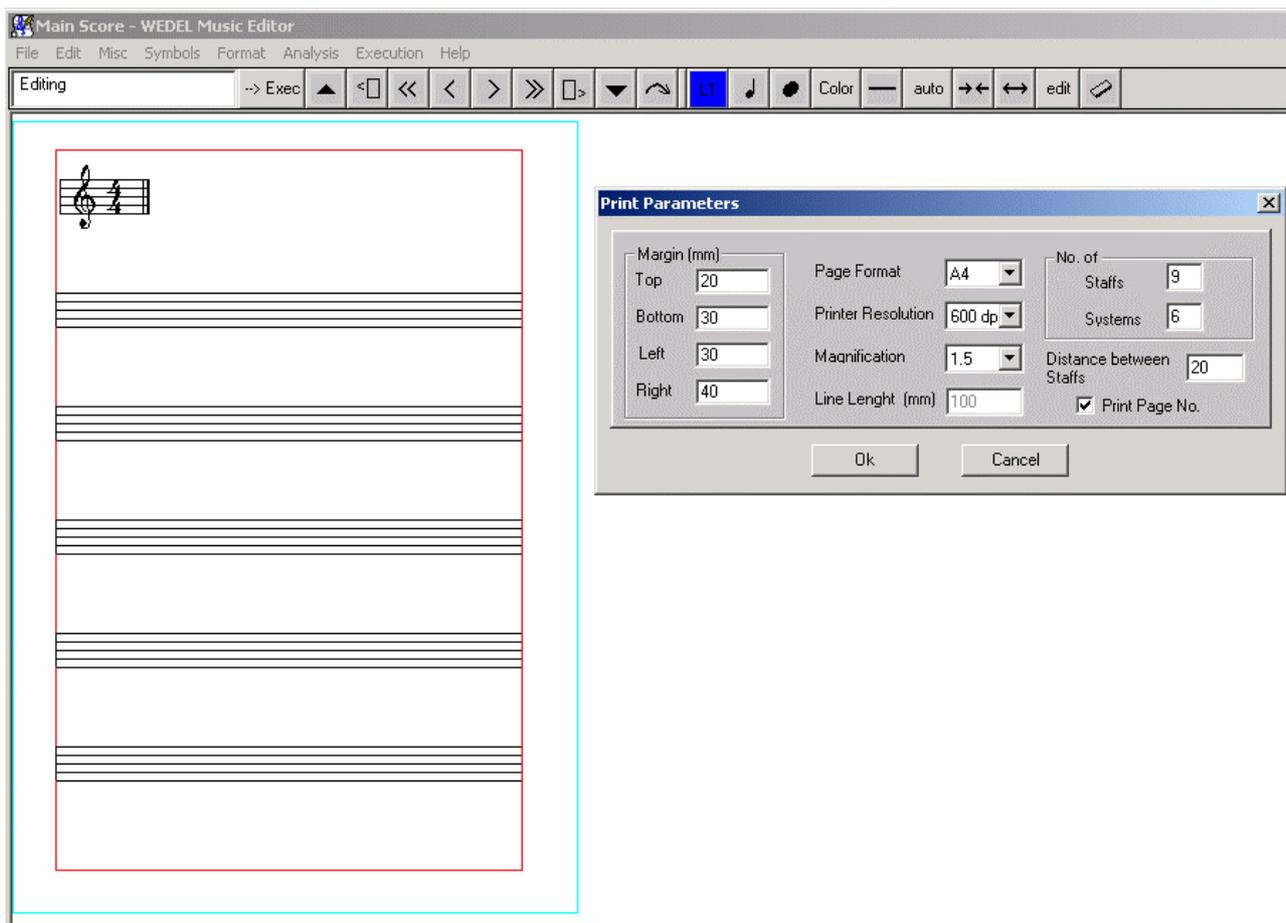


Fig. 9.13 - Printing empty page

- Cut a Page Box**
- Copy a Page Box**
- Paste a Page Box**

The last three commands refer to fact that images and text can be inserted in print view (See Fig. 9.18 and Ch.10) Additionally this menu includes commands to manipulate parts, layers and measures. (See Chapter.11)

9.2.3 Menu Misc

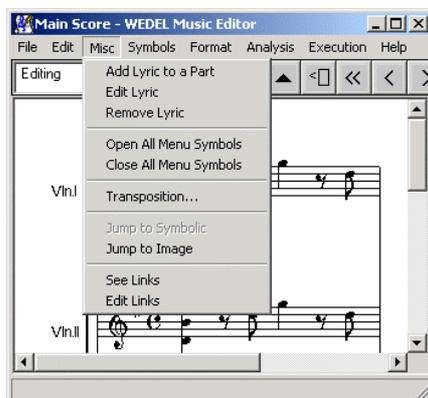


Fig. 9.14 - WEDELMUSIC editor: menu miscellaneous

Add Lyric to a Part: to add a lyric file to a part. First the identified part has to be selected. This menu item open the lyric editor from which it is possible to import a TEXTual file for building the lyric. In addition, it is also possible to make the lyric from scratch by editing it on the Lyric Editor. The sequence of action is illustrated in the pictures below.



Fig. 9.15 - Add Lyric Command

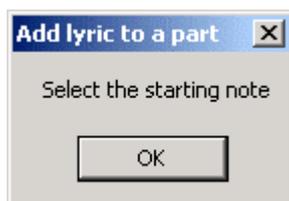


Fig. 9.16 - Confirm Box



Fig. 9.17 - Selected Note

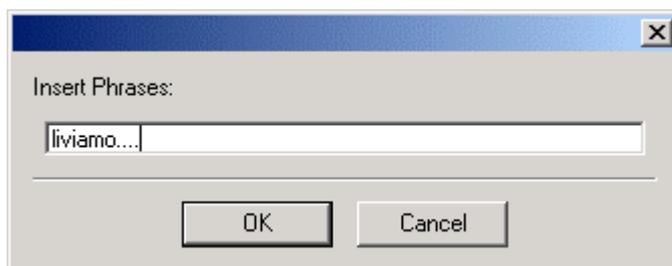


Fig. 9.18 - Insert Text Dialog



Fig. 9.19 - Text inserted

For details see Ch.23 "Lyric Editor".

Edit Lyric: selecting this item then is possible to select a part with the lyric to edit it. The lyric editor is opened and the current lyric text is presented to be modified and reassigned by user. (Not available in this version)

Remove Lyric: selecting this item and then the part its lyric is removed asking confirmation before to go on. (Not available in this version)

Open All: open all menus related to symbols according to the last workspace configuration.

Close All: close all menus related to symbols.

Transposition:

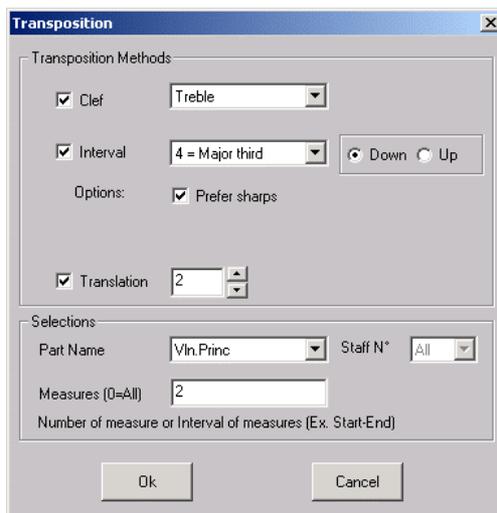


Fig. 9.20 - Transposition Dialog

See Ch.18 "Music checking and transposition"

Jump to Image: this is performed by jumping at the corresponding image score of the same part and measure.

See links: this option that can be activated or not highlights with a different colour the figures that have a link. This selection enable for the navigation via the link. This means that when the figures are active for the link the user can click on them to navigate towards the link. This menu item has to be selected every time the user would like to navigate on.

Edit Link: this is performed in two phases. Firstly the user has to select this menu item. Then selecting with the mouse the figure a message box in which a string can be written stating the link that one would like to modify is opened. The mentioned documents have to be present and the related markers set. The Message Box is equal to the above presented one for setting a link. (See Fig. 9.16).

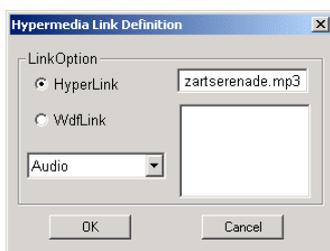


Fig. 9.21 - Hypermedia Link Dialog



Fig. 9.22 - Note with associated link

9.2.4 Menu Symbols

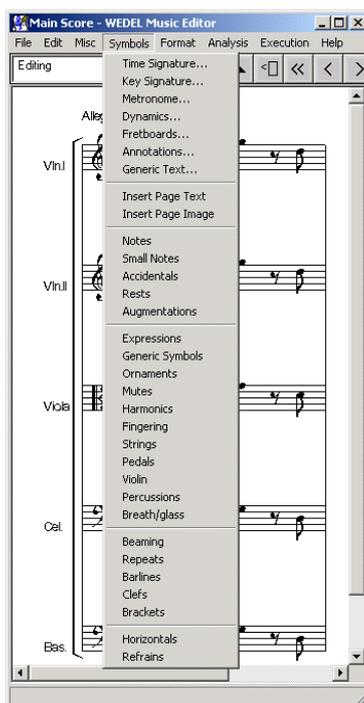


Fig. 9.23 - WEDELMUSIC editor: menu symbols

Time Signature: This opens the following dialog box. Please note that the time indication can be inserted in several ways. After the insertion it is necessary to select with the mouse the measure that uses the time signature imposed, since the command has effect only for the selected barline/measure. The change is replicated along the music part until a change of Time Signature is encountered. (See also Chapter 11, "Time Signature" section)

Key Signature: this opens a dialog containing a list box with the following options: Major C# (7 sharps); Major F# (6 sharps); Major B (5 sharps); Major E (4 sharps); Major A (3 sharps); Major D (2 sharps); Major G (1 sharp); Major C; Major F (1 flat); Major Bb (2 flat); Major Eb (3 flat); Major Ab (4 flat); Major Db (5 flat); Major Gb (6 flat); Major Cb (7 flat); None; Minor A# (7 sharps); Minor D# (6 sharps); Minor G# (5 sharps); Minor C# (4 sharps); Minor F# (3 sharps); Minor B (2 sharps); Minor E (1 sharp); Minor A; Minor D (1 flat); Minor G (2 flat); Minor C (3 flat); Minor F (4 flat); Minor Bb (5 flat); Minor Eb (6 flat); Minor Ab (7 flat). (See also Chapter 11, "Key Signature" section)

Metronome: this opens the following dialog box. The dialog has to provide an empty line in the list box on the left. Selecting that line allows to have a time indication without a metronomic indication. In the list on the left it has to be possible to select the word NONE. In this case, the metronomic indication is given without reporting the number of figures per minute, but only the movement string. (See also Chapter 11)

Dynamics: the following are all the possible values of dynamic text: f, ff, fff, ffff, fffff, ffffff, ffp, ffpp, fp, fpp, fz, mf, mp, p, pp, ppp, pppp, ppppp, pppppp, rf, rfz, sf, sff, sfff, sffp, sffz, sfp, sfpp, sfz, sp. They could be listed in a simple list box instead of a text box. See also Chapter 14.

Annotation: these are textual annotations. Presently it is possible to have two textual annotations. It should be possible to edit also the font among three different fonts and stating the size among four different levels implemented.

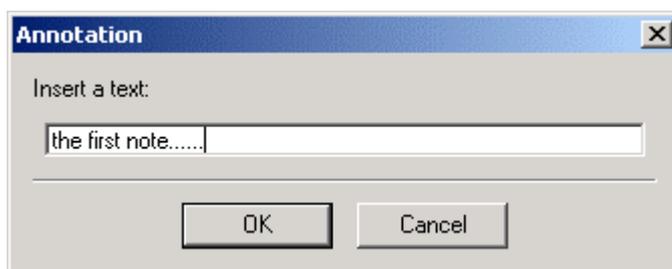


Fig. 9.24 - Annotation dialog



Fig. 9.25 - The Text begins under selected figure

Generic text: as above but centered with respect to the figure.

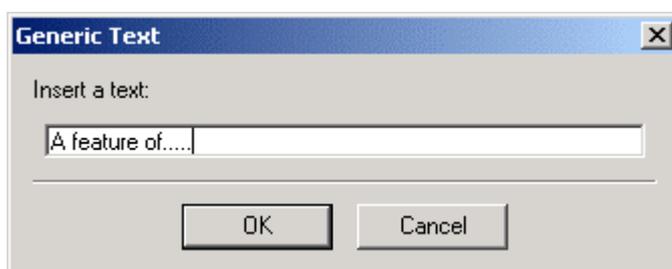


Fig. 9.26 - Generic Text dialog



Fig. 9.27 - Advertised Text under the selected figure

Fretboards: a dialog for choosing a chord to be inserted is opened. It allows the visualization of the chosen chord on the right corner. The selection of the chord is possible on the basis of the chord name, type, bass and number of strings. The search is performed on a database containing all definition of fretboards. This is build and managed by the fretboard editor as discussed in the sequel.

The actually available menus are:

- Horizontals
- Expressions
- Barlines
- Harmonics
- Repeats
- Ornaments
- Mutes
- Generic Expressions
- Breath and Glasses
- Strings

- Refrains
- Augmentations
- Notes
- Rests
- Small Notes
- Brackets
- Fingering
- Violin
- Clefs
- Beaming
- Pedals
- Accidentals

Each one of these items activates a corresponding icon menus presenting a list of symbols. These menus can be moved in any location around the computer screen. They can be oriented vertically or horizontally and their position can be saved. Every time that a menu is activate it is opened in the last saved position. (See Fig...)

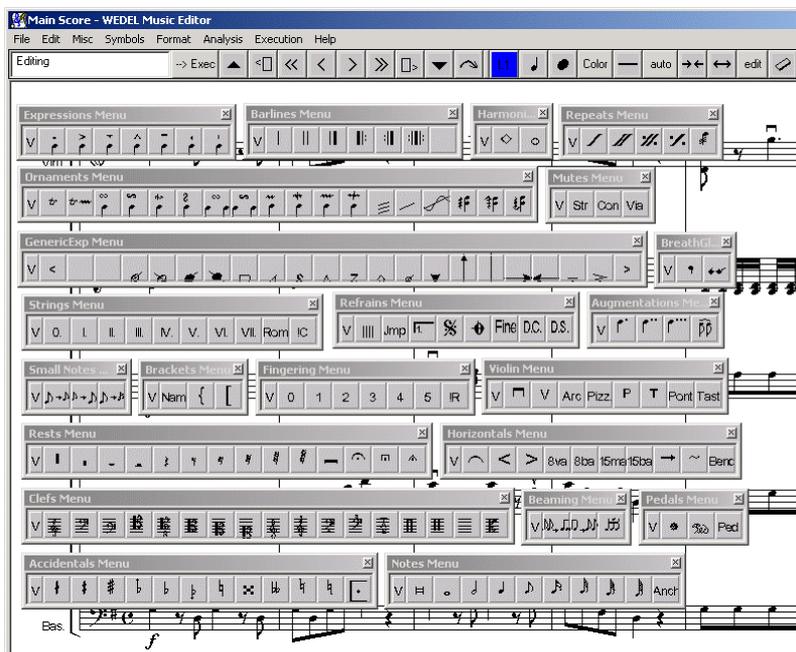


Fig. 9.28 - Menu overview

9.2.5 Menu Format

For the following functions of Format Menu see Chapter.19-20

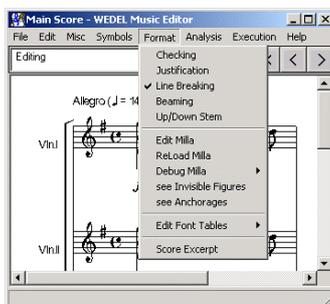


Fig. 9.29 - WEDELMUSIC editor: menu format

Checking: see Chapter "Music checking and transposition"

Justification, Line Breaking, Beaming, Up/Down Stem, Edit Milla, Reload Milla, Debug Milla: see Chapter 19 "Music score formatting" and Chapter 20 "Milla rules and engine".

See Invisible figures, See anchorages: see Chapter 13 "Editing music and its symbols"

Edit Font table: see Chapter 16 "Fonts management" and Chapter 32 "Font tables".

Score Excerpt: In symbolic and images editor is possible to selection a region of visualized part and to execute a "copy and past" operation in any other one image editor. We can select a region as in Fig.9. and when we leave the left mouse button, the selected zone is copied in clipboard.



Fig. 9.30 - Selected region



Fig. 9.31 - Image copied in clipboard

Now image can be pasted in any editor (Fig.9.27).

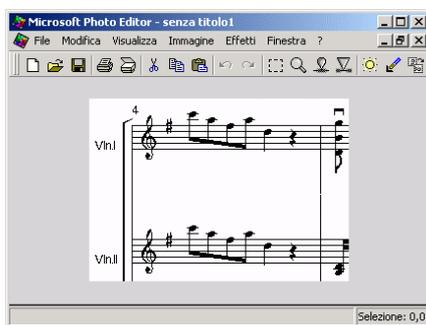


Fig. 9.32 - Image pasted in Photo Editor

9.2.6 Menu Analysis

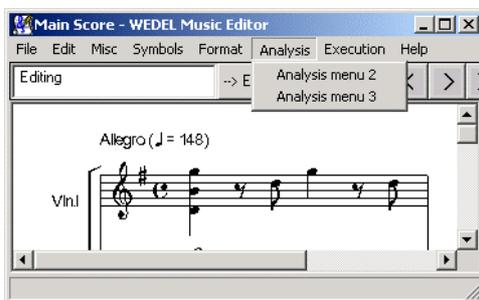


Fig. 9.33 - WEDELMUSIC editor: menu analysis

This is present only in the version that contains the Music Analyser too. See a specific manual for the functionalities of Music Analyser.

9.2.7 Menu Execution

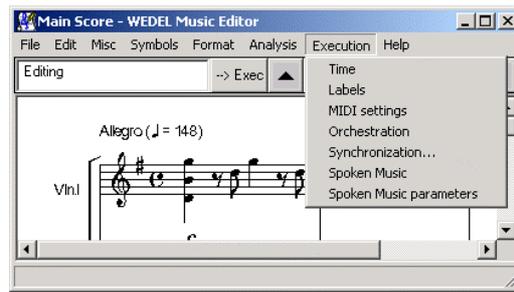


Fig. 9.34 - WEDELMUSIC editor: menu execution

Time: the setting of the metronomic indication for execution and printing. This is performed as above described.

Labels: the definition of classical labels associated with measures/barlines. In this case the following dialog box is presented. Inserting a Letter in textbox at the bottom of the dialog is possible to insert a new label. It becomes active once closing the dialog the user click a measure. On the measure the corresponding label is placed with a quite big font. These labels can be used for jumping on them. See also Chapter 11.

MIDI settings: the association of standards MIDI instruments to the available channels of the MIDI device. It also set the related volume. The opening of the following dialog box on which the instruments are associated with channels selecting the right arrow. Every time an association is performed the channel is removed. The de-selection is also possible representing the deselected channel. (See Chapter 21 for details)

Orchestration: The opening of the following dialog box on which the layers are associated with voices selecting the right arrow. Every time an association is performed the layer is removed. The de-selection is also possible representing the deselected layer. (See Chapter 21 for details)

Synchronisation: this allow the definition of the synchronisation between the current image score pr symbolic music score with and audio file. In this way the saving of an EWF file is also possible. This can be even only a simple tick to be imposed the related actions can be performed directly on the execution menu. It is only a set of a status passing from sync to play and vice versa. (See Chapter 15 for details)

Spoken Music: this allow to generate a spoken description of Music. See specification part III for details.

Spoken Music Paramters: this allow to define the spoken Music Parameters for example the change of the language. See specification part III for detail

9.2.8 Menu Help

See Chapter 7- Section 2.5 for details

Chap.10 WEDELMUSIC Editor: Image Music Score

10.1 Menu File

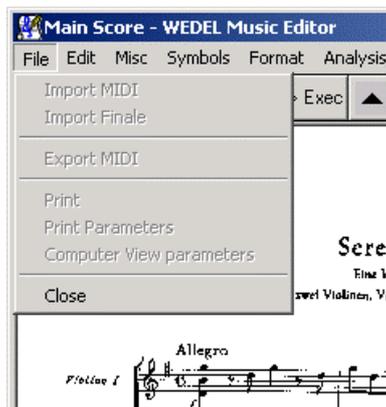


Fig. 10.1 - Menu File in Image Music Score

10.2 Menu Edit

In the Edit Menu "Computer View" voice only is enabled (see Chapter 10.3)



Fig. 10.2 - Menu Edit in Image Music Score

10.3 Menu Misc

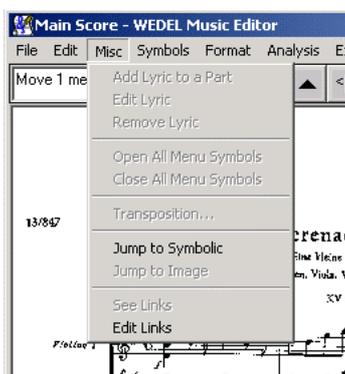


Fig. 10.3 - Menu Misc in Image Music Score

Jump to Symbolic: this is performed by jumping at the corresponding symbolic score of the same part and measure.

See Links: it appears if any link exists.

Edit Links: see Misc Menu in symbolic score (see Chapter 9).

10.4 Menu Symbols

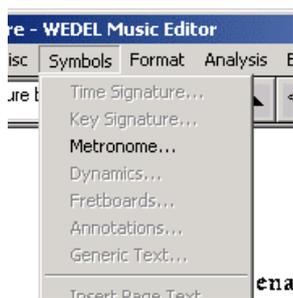


Fig. 10.4 - Menu Symbols in Image Music Score

Metronome: it servants in order to supply some parameters to execution, for example

- the value of the notes one like of time

- the punctual value of the note 

See also Chapter "Music execution and synchronisation".

10.5 Menu Format

Also in image score editor is possible to selection a region of visualized part and to execute a "copy and past" operation in anyone image editor. The command is visualized in Format Menu (Fig. 10.6).

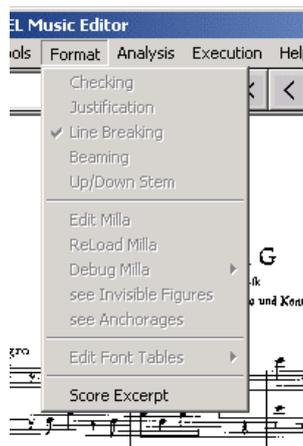


Fig. 10.5 - Menu Format in Image Music Score

Then we can select a region as in figure 10.7 and when we leave the left button of mouse, the selected image is copied in clipboard (Fig.10.8).



Fig. 10.6 - Selected Region

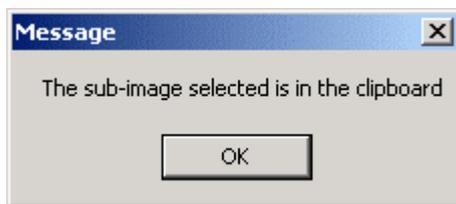


Fig. 10.7 - Image copied in clipboard

Now image can be pasted in anyone editor (Fig. 10 9).

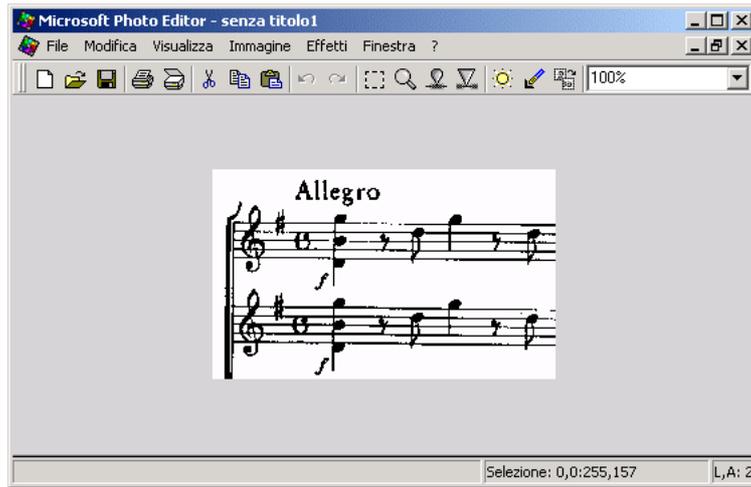


Fig. 10.8 - Image pasted in Photo Editor

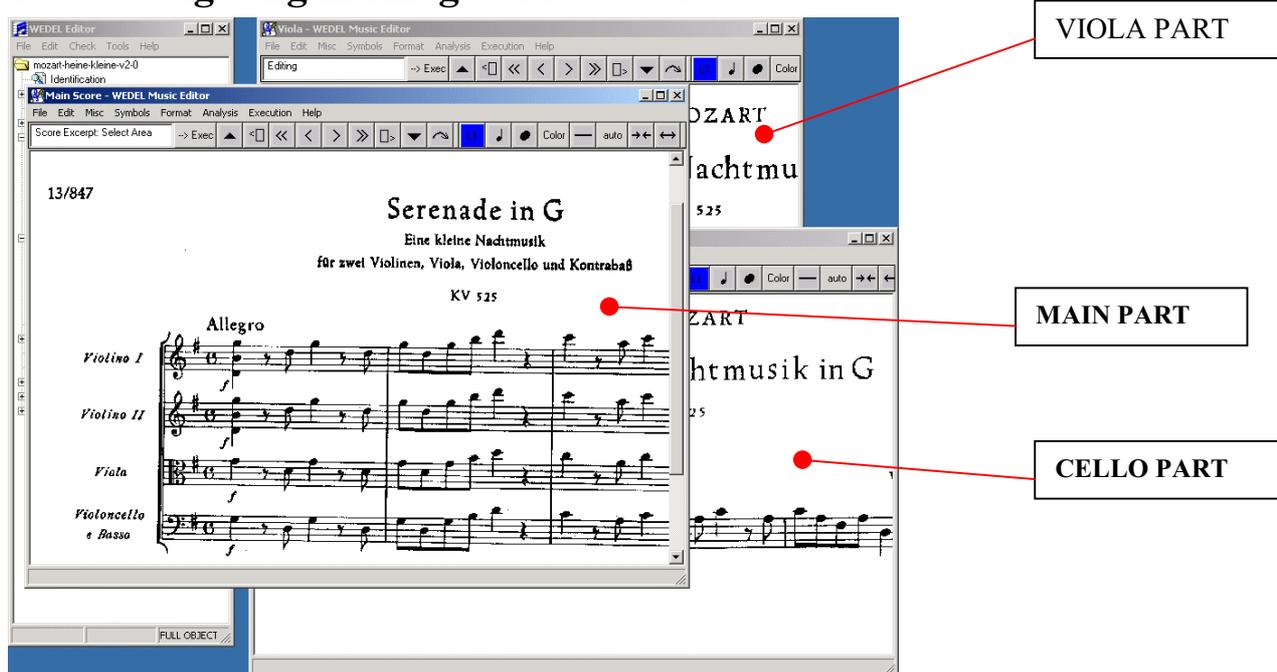
10.6 Menu Execution



Fig. 10.9 - Menu Execution in Image Music Score

Synchronization: see Chapter 15.

10.7 Navigating in Image Music Scores



10.8 Main Score and Parts

In main score

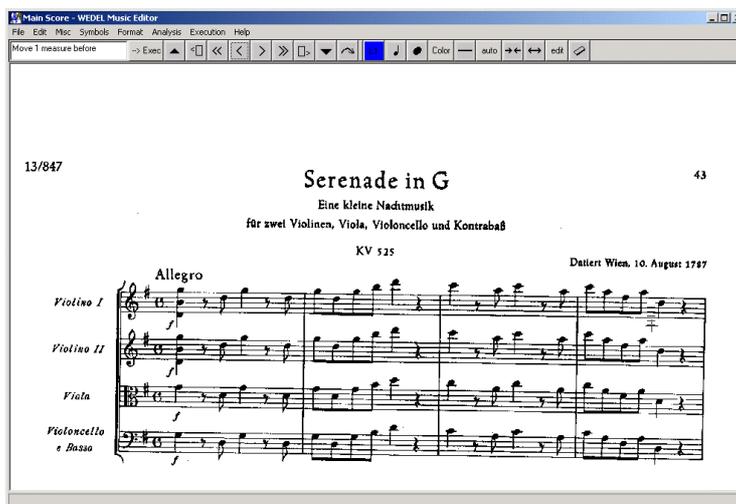
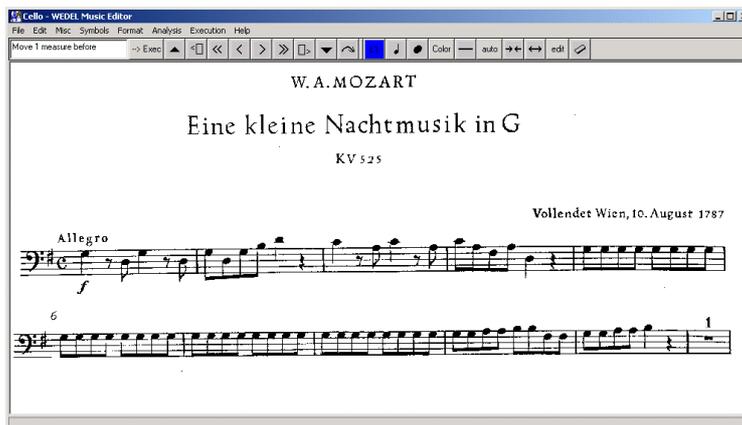
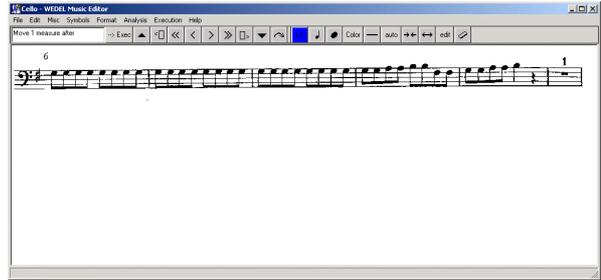


Fig. 10.10 - Main score





Chap.11 WEDELMUSIC Editor: Music Editing

11.1 Manipulating Parts

The manipulation of parts occurs through some commands of the edit menu.

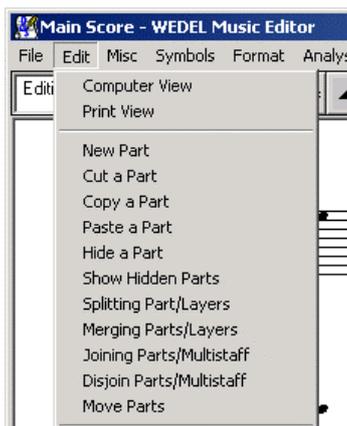


Fig. 11.1 - Menu Edit: Manipulating parts commands

New Part: producing a new part. A message box asking for the number of staff lines is provided. Valid numbers are from 1 to 7. This action is performed only once every time the menu item is selected.

Cut a Part: delete a part. Each deleted part is saved into a temporary file. Select this menu item and then select the part to be deleted. This action is performed only once every time the menu item is selected.

Copy a part: inserting selected part in the clipboard.

Past a Part: past the part that has been deleted. Reload the part that has been deleted from the temporary file and putting it in the last position of the Main Score. It can be moved by using a specific command described later. This action is performed only once every time the menu item is selected.

Hide a Part: avoid the visualization of a part even if it remains in the model and can not be played by the MIDI. Select this menu item and then select the part that has to be hidden. This action is performed only once every time the menu item is selected.

Show hidden parts: showing the hidden parts.

Splitting Part: dividing a part with 2, 3, 4 voices/layer extracting the selected layer. The layer is selected by selecting a note belonging to that layer. The splitting causes the production of a new part with the extracted layer inside. Select this menu item and the part from which the layer has to be extracted by using the following dialog box. The extracted layer is placed in a new part at the end of the main score.

Merging Parts: two parts that present at most 2 layers each can be fused into a single part with 4 layers. The original two parts are not deleted. This operation is left to the user. The part obtained by merging is placed at the end of the list of parts. This operation is performed by selecting this menu item and then the two parts to be merged. This action is performed only once every time the menu item is selected.

Joining Parts: This operation allows the inclusion of special symbols passing from a staff to another. Parts can be joined together at groups of 2 or 3 for preparing piano, harp, and organ systems of staves. After the join operation the 2-3 staff is considered as a single part for the visualisation on the windows for parts, for print, and for movements on the main score. The Joint is performed by selecting on a submenu item 2 or 3 (for junctions with 2 or 3 staves), then the parts to be joined has to be selected with the mouse. They have to be consecutive in the main score. This action is performed only once every time the menu item is selected.

Disjoin Parts: dividing two staves that are joined. This is possible only if they do not present symbols that link them strictly such as beams passing from a staff the other and slurs with the same behaviour. This is performed by selecting one of the joined parts and then this menu item. This action is performed only once every time the menu item is selected.

Move Parts: this allows the user to move up or down the selected part of a place. This is performed by selecting the submenu: UP, DOWN of this menu item. Then each part selected with the mous does a movement on the basis of the selection chosen. Several UP or DOWN movements can be done after a single selection of the menu item.

11.2 Brackets of Parts

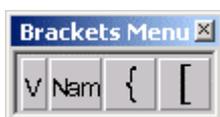


Fig. 11.2 - Brackets Menu

First command assigns a name to a part. We insert the name throught a dialog box (Fig. 11.4), and then we must select the part to name (Fig 11.5 - 11.6)

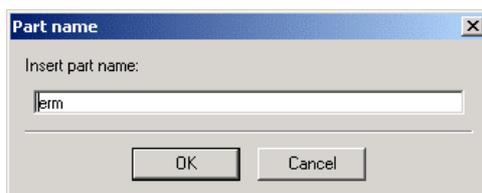


Fig. 11.3 - Part name dialog

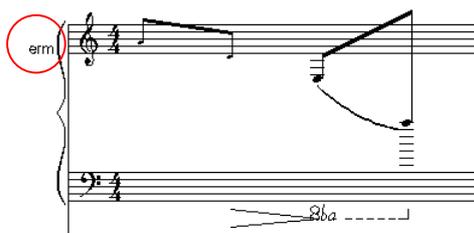


Fig. 11.4

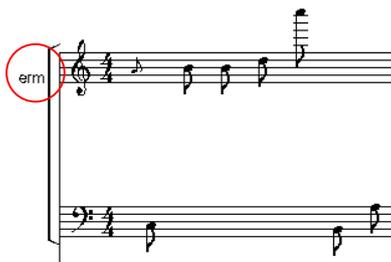


Fig. 11.5

The using of this menu allows inserting new part, changing the name of the part, inserting brackets and deleting parts, in particular from left to right we have: **Assign** or change the **part name**; **Brace**: inserts a brace bracket used for grouping parts; **Quadra**: inserts a square bracket used for grouping parts.

11.3 Manipulating Layers/Voices

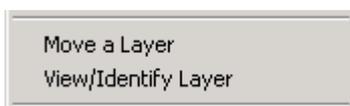


Fig. 11.6 - Menu Edit: Manipulating Layers commands

Move a Layer: this allows to exchange the layer each other: the layers are referred to a part. Then firstly the needed menu subitem has to be selected then the part has to be selected via the mouse for the application. This action is performed only once every time the menu item is selected.

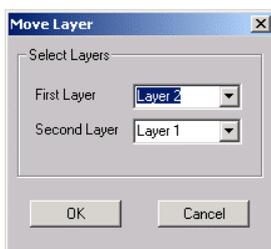


Fig. 11.7 - Move Layer Dialog

View/Identify Layer: this identifies a layer, and visualizes it in any colors.

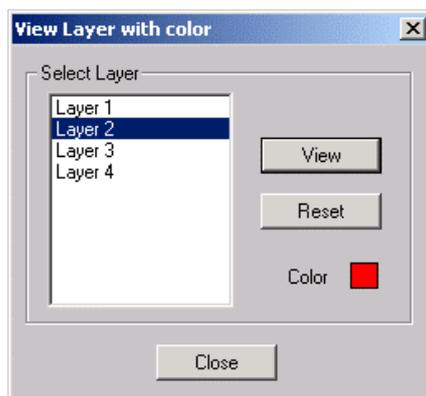


Fig. 11.8 - View Layer Dialog

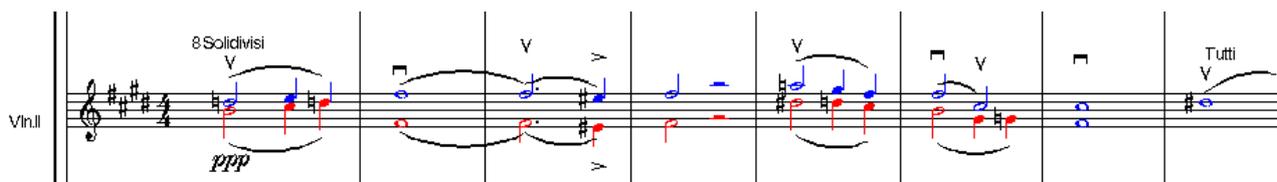


Fig. 11.9 - Evidenced Layers

11.4 Multistaff Parts

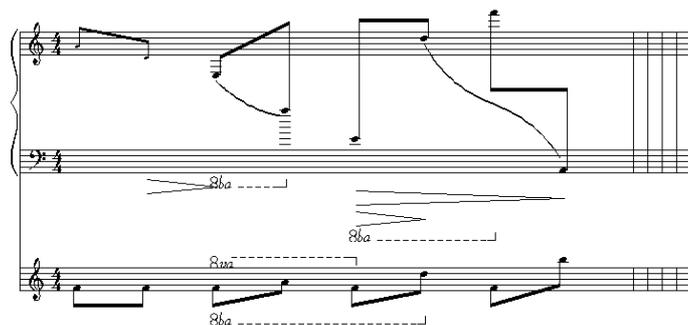


Fig. 11.10 - A multistaff part

11.5 Manipulating Measures



Fig. 11.11 - Menu Edit: Manipulating Measures commands

- **New Measure Before:** to insert a new measure before the selected one, in this case a column of measures are included. If the editor is working at level of Main Score this is immediately visible. This is performed by selecting this item and then by identifying the point in which the measure has to be inserted. Several new measures can be inserted after a single selection of this menu item.
- **New Measure After:** to insert a new measure after the selected one, in this case a column of measures are included. If the editor is working at level of Main Score this is immediately visible. This is performed by selecting this item and then by identifying the point in which the measure has to be inserted. Several new measures can be inserted after a single selection of this menu item.
- **New Single Measure before:** to insert a new measure dis-aligning the parts before the selected one. Several new measures can be inserted after a single selection of this menu item.
- **New Single Measure after:** to insert a new measure dis-aligning the parts after the selected one. Several new measures can be inserted after a single selection of this menu item.
- **Cut Measure:** to delete a column of measures if the editor is working on the main score or a single measure otherwise. Several new measures can be inserted after a single selection of this menu item.
- **Cut Single Measure:** to delete a new measure dis-aligning the parts. Several new measures can be inserted after a single selection of this menu item.
- **Past Measure:** to past the deleted column of measures. Several new measures can be inserted after a single selection of this menu item.

- **Past Single Measure:** to past the deleted measure dis-aligning the parts. Several new measures can be inserted after a single selection of this menu item.
- **Copy Measure:** to copy a column of measures if the editor is working on the main score or a single measure otherwise. Several new measures can be inserted after a single selection of this menu item.
- **Copy Single Measure:** to copy a new measure dis-aligning the parts. Several new measures can be inserted after a single selection of this menu item.

11.5.1 Clefs



The using of this menu allows inserting and to modifying clefs, in particular the buttons from left to right perform the following operations: Insert a G clef, Treble; Insert a F clef, Bass; Insert a Baritone clef; Insert a Tenor clef; Insert An octave Tenor clef; Insert an Alto clef; Insert a Mezzo-soprano clef; Insert a Soprano clef; Insert an Octave G clef, Tenorized Treble; Insert an Octave F clef... The last are for Tablatures, percussions and the empty clef.

11.5.2 Time Signature

This open the following dialog box. Please note that the time indication can be inserted in several ways. After the insertion it is necessary to select with the mouse the measure that uses the time signature imposed, since the command has effect only for the selected barline/measure. The change is replicated along the music part until a change of Time Signature in encountered.

First field of the following dialog (Fig. 11.13) contains the time duration of measure, then the second one contains the effective time duration of measure. It appears when there are irregular groups and the time signature is to be considered the result of irregular duration notes.

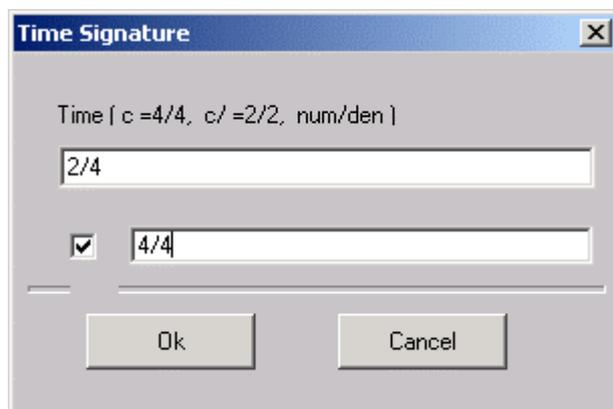


Fig. 11.12 - Time Signature Dialog

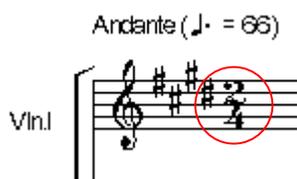


Fig. 11.13

Since different parts can be present in the partiture, each of which with a different time signature, it is important to understand which is the minimum common multiple of the number of measures of these different parts. This is very important for visual formatting and to present the music in a correct way.

In addition to different time signatures it is possible to find time signatures which refer to irregular values: this means that the basis unit for the measure is intended to be grouped together to form an irregular group. For example: a time

signature of 3/8 should mean that in the measure are presented figures for a total value of 3/8, that correspond to 1/4 plus another 1/8. This is not always true, because usually odd time signatures like 3/8 refer to an irregular group, in this case composed by 3 figures for a total value of 1/4.

In the partiture "Don Giovanni", written by W.A.Mozart, there are parts written in irregular 3/8, parts in 2/4 and parts in 3/4. We can consider a base unit for visual formatting composed by three measures of the parts in 2/4, two measures for the parts in 3/4 and six measures for the parts in 3/8, since each of these measures has a real duration of 1/4.

These numbers of measures for each part can be considered a fixed unit base of alignment: this means that in a page only a multiple of this base unit of alignment can be inserted, and that justification is carried out formatting together a group of measures composing a base unit of alignment.

This is the reason for which some additional information is needed in order to evaluate the measure: in the dialog box of time signature signing a checkbox indicating that the time signature is intended as an irregular group enables another Text Control which receives in input the real duration of the measure. While the first time signature is used in the head measure of the page, the real duration for irregular time signatures is used in formatting calculation of justification and line breaking.

11.5.3 Measure Labels

The command to insert labels is in the execution menu (Fig.11.14)



Fig. 11.14 - Inserting labels command

Labels are required for marking measures in order to realize a fast mechanism to search them.



Fig. 11.15 - Labels dialog

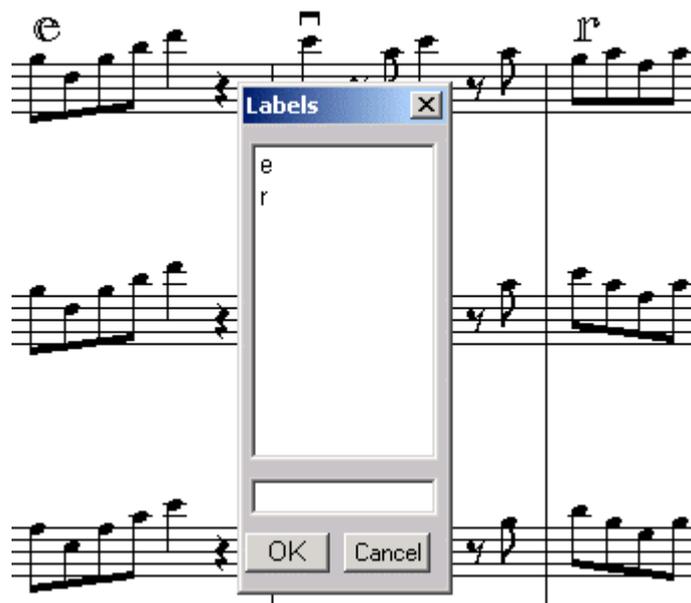


Fig. 11.16 - Labels in the score

To research measure we can use "Jump button" on the toolbar



11.5.4 Refrains



Fig. 11.17 - Refrains Menu

 This button opens the following dialog



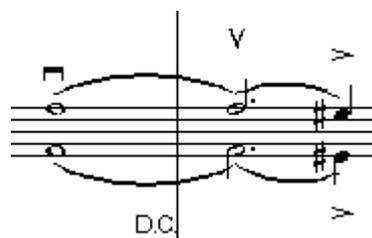
Fig. 11.18



Fig. 11.19



Fig. 11.20



11.5.5 Repeat Symbols



Fig. 11.21 - Repeat Symbols Menu

The using of this menu allows inserting repeats, in particular from left to right we have: Beat repeat, Half measure repeat, Measure repeat, repeated notes. In the last 2 cases a dialog asking for a number has to be opened. In the first case the number is placed over the symbol, in the last case the number corresponds to the number of lines on the stem.



Fig. 11.22 - Repeat symbols: exemple

11.5.6 Metronomic Indication

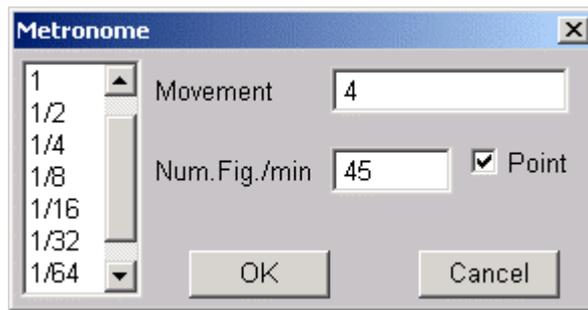


Fig. 11.23 - Metronome dialog

11.6 Music Symbol Editing

To be done.....

11.7 Tablatures

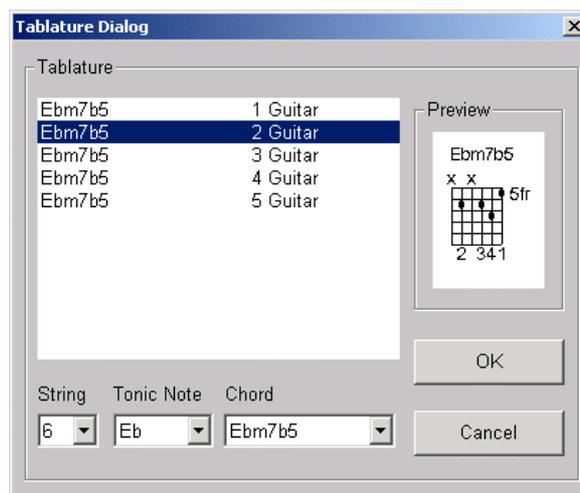


Fig. 11.24 - Tablature dialog box

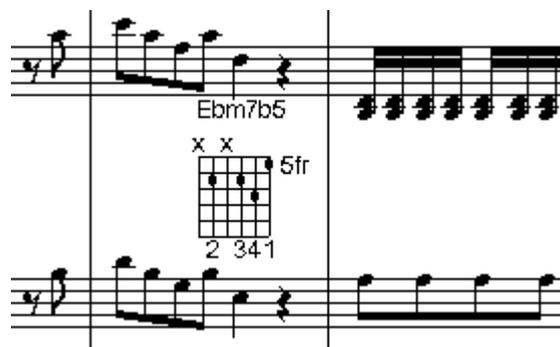


Fig. 11.25 - Example of tablature

11.8 Percussion parts

NOT AVAILBLE IN THIS VERSION

11.9 Key Signature

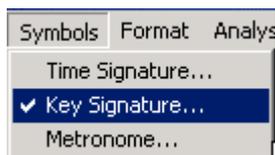


Fig. 11.26 - Command on the Symbols Menu

This command open a dialog containing a list box with the following options:

Major C# (7 sharps);	DO_maggiore	DOM
Major F# (6 sharps);	SOL_maggiore	SOLM
Major B (5 sharps);	RE_maggiore	REM
Major E (4 sharps);	LA_maggiore	LAM
Major A (3 sharps);	MI_maggiore	MIM
Major D (2 sharps);	SI_maggiore	SIM
Major G (1 sharp);	FAd_maggiore	FAdM
Major C;	DOD_maggiore	DODM
Major F (1 flat);	FA_maggiore	FAM
Major Bb (2 flat);	SIb_maggiore	SIbM
Major Eb (3 flat);	MIb_maggiore	MIbM
Major Ab (4 flat);	LAB_maggiore	LABM
Major Db (5 flat);	REb_maggiore	REbM
Major Gb (6 flat);	SOLb_maggiore	SOLbM
Major Cb (7 flat);	DOb_maggiore	DObM
None;		
Minor A# (7 sharps);	DO_minore	DOm
Minor D# (6 sharps);	SOL_minore	SOLm
Minor G# (5 sharps);	RE_minore	REm
Minor C# (4 sharps);	LA_minore	LAm
Minor F# (3 sharps);	MI_minore	MIm
Minor B (2 sharps);	SI_minore	SIm
Minor E (1 sharp);	FAd_minore	FAdm
Minor A;	DOD_minore	DODm
Minor D (1 flat);	FA_minore	FAm
Minor G (2 flat);	SIb_minore	SIbm
Minor C (3 flat);	MIb_minore	MIbm
Minor F (4 flat);	LAd_minore	LAdm
Minor Bb (5 flat);	REd_minore	REdm
Minor Eb (6 flat);	SOLd_minore	SOLdm
Minor Ab (7 flat).		

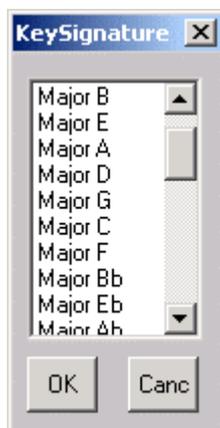


Fig. 11.27 - Key signature dialog

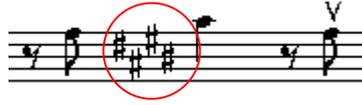


Fig. 11.28 - Key Signature

Chap.12 Music Notation Overview

In this section, a brief overview of basic music notation is reported. This overview is mainly focused on highlighting the structure of music from the point of view of its meanings for the executor, and the visual representation and syntax of the notation. In this context, only classical music is considered (e.g., Rossini, Bellini, Donizetti, Verdi, Vivaldi, Scarlatti, Puccini, Bach, Beethoven, etc.). In modern music (e.g., Berio, Corghi, Donatoni, Grisey, Guarnieri, Huber, Maderna, Manzoni, Nono, Nunes, Pennisi, Sciarrino, Vacchi, etc.), several other symbols have to be added with respect to those of classical music.

On the other hand, the proliferation of symbols is mainly due to the fantasy of composers rather than to real needs; since, in most cases, the new symbols are proposed for expressing effects that can be described even with the classical notation. Publishers tend to limit the adoption of new symbols to those that are adopted by at least a group of composers since the current trend of composers is to create several personal new symbols for each new composition.

For these reasons to consider only classical symbols is not a limitation. On the other hand, from the point of view of publishers, schools of music, and theatres the music notation is that is published, taught and executed in front of large stalls.

This limitation is totally overcome in WEDEMUSIC Editor since you can add in the section of Image score any kind of manuscript reporting music scores in any format. This is very important for disseminating new ideas and for distributing modern music.

In this section, a quite simple overview of music notation is reported. This overview is a simplification of the actual music notation used into the WEDELMUSIC Editor but can be a nice starting point for who is starting to work with a music editor and to uniform the terminology used in this manual. More detailed description of music notation rules can be found in classical manuals such as [.....], [.....].

12.1 Figures and their Attributes

The basic element of music notation is the *figure*. The figure can be a *note* or a *rest*. The sound is associated with notes, while a rest is a pause in the sound. The figures are read from left to right. Before to discuss about the organisation of music figures in the music score a more detailed description of the basic elements related to figures is needed.

The concept of *note* in the music notation is not directly connected to that of pitch in sound, since the sound of a note can be deduced from its representation on the basis of:

- the position of the *notehead* on the *staff* (for some instruments the staff can be comprised from 1 to 12 lines, in the case of 5 lines the staff is also called *pentagram*); When the staff has 1-3 lines it is typically used for Percussion, when it has 4 or 6 and from 6 to 15 or more lines it is typically a tablature, that is the representation of the instrument strings or other.
- the *clef* sign (see after);
- the presence of *accidentals* (also called *chromatic inflections*) close to the note or in the *key signature*. For example, sharp and flat, accidentals.

The high of a note in the staff represents its sound in a certain context. Please note that the example in Fig. 12.1, it is strongly exasperate and thus the position of the symbols above and below the note could be performed by following other rules. The rules used in critical cases depend on experience and they are not reported on any book, neither in those mentioned as the handbooks for music engraving (especially for fingering and instrumental symbols which are discussed in the following). This knowledge is verbally inherited and strictly maintained by publishers.

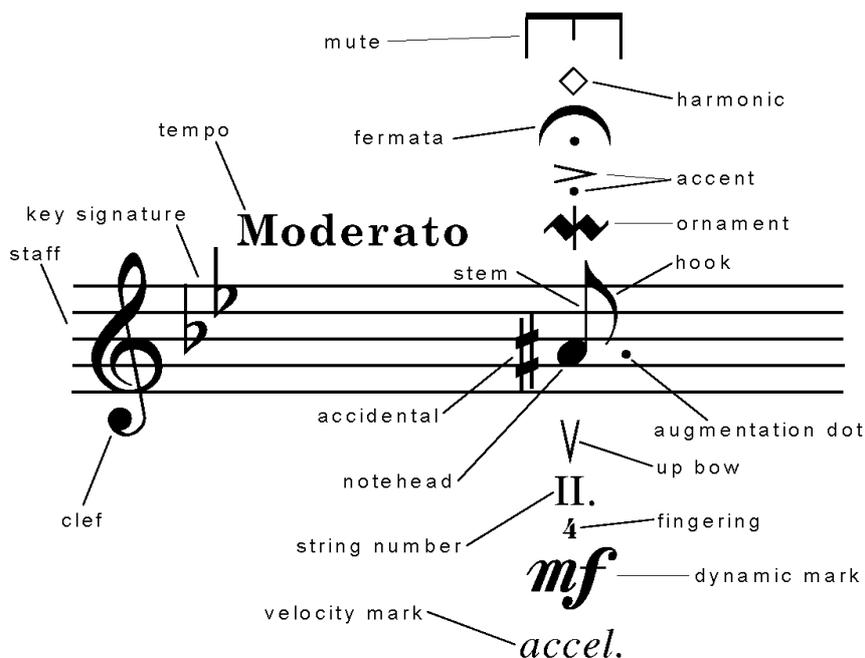


Fig. 12.1 - Figures in music notation

The *duration* of a note is conventionally represented by a relative value of the beat -- e.g., a note of an eighth (8th), a note of a quarter (4th), etc.

The number of beats is stated on the basis of indications of *tempo*.

The effective value of duration depends on:

- kind of notehead (open or filled);
- the presence or not of the *stem*;
- the presence or not of *hooks* (in groups of notes, beams, they are converted in bars);
- the presence of symbols for *changing duration* -- e.g., augmentation dots, a *fermata*.
- the inclusion of the note in a *touple* that change the duration according to structure of a group of other figures.

Moreover, the real duration of a note has to be evaluated considering these aspects and the context in which the note is inserted since the *tempo* (stating the absolute reference of the execution rate), can be different. Visually the form and the

position of the notehead and the direction of the stem (if any) of the note follows well defined rules. The position of other symbols around the note frequently depends on the orientation of the stem.

For the duration of *rests* similar but simpler rules are applied. The *tempo* of a musician performance is described by a textual specification -- i.e., *grave*, *largo*, *larghetto*, *lento*, *adagio*, *andante*, *andantino*, *moderato*, *allegretto*, *allegro*, *allegro assai*, *vivace*, *presto*, *prestissimo* (often called *agogic* indications), etc. This specification symbols change the context of the music execution. These indications are often accompanied by adjectives or attributes to better describes the general trend such as *solenne*, *sostenuto*, *maestoso*, *marziale*, *grazioso*, *scherzando*, *giocoso*, *con fuoco*, *dolce*, *tranquillo*, *impetuoso*, *agitato*, *appassionato*, *deciso*, *con moto* (sometime are translated in the other languages). In general, these specifications are subjected to interpretation, when an absolute precise value is required a metronomic indication can be used, fixing in this way the number of beats per minute) remain valid until a different indication is given.

Along the score other indications -- e.g., *rallentando* (*rall.*), *allargando* (*allarg.*) -- are relative changes totally subjective in their realisation. These indications are frequently given by means of special graphic symbols -- e.g., an arrow \rightarrow or a wave for *rall.*

A note may have *ornaments* (*abbellimenti*) such as: *appoggiatura*, *grace notes*, *mordent*, *trill*, *glissando*, *turn*, *backturn*, *tremolo*, etc. These symbols are associated with the note in order to ornate its sound adding in this way a specific expression to the music phrase. For instance, the *trill* may consist in to alternate the sound of the note with a sound closely higher. Typically, these symbols produce an effect only on the note in which are added. The graphical representation of some of these symbols can be very useful for expressing duration of the effect such as for the *trill*. It states with length the point in which the effect starts and ends.

A note may have *accents* (even called *articulations*) to specify the expression of the note: such as *martellato*, *staccato* (*dot* (truncated), *accent*, *tenuto* (legato, smooth), *sforzato*). The sequence and the relative position of the accents follow a set of well-defined visual rules. In general, the accents affect the duration and in some case also the dynamics. For instance, *martellato* is represented by using a small filled wedge towards the notehead specifying that the sound must be as that of a hammer; *staccato* is represented with a dot over above the note and reduces the note duration of about one half. These accents can be put up or below the note. The position depends on the position of the notehead on the staff; usually on the opposite side of the stem, if any. Each note (in classical music) may present several of these accents at the same time -- e.g., *staccato tenuto sforzato*. Even in this case the visual representation and symbol position give a direct idea of the desired effect. Moreover, many other accents have been recently defined in the modern music.

The *dynamics* is a relative concept to specify the loudness of the sound. For example different gradations of, soft: *pppppp*, *ppppp*, *pppp*, *ppp* or *pp*; loud: *f*, *ff*, *fff*, *ffff*, *fffff* or *ffffff* and middle way values: halfsoft *mp*, halfloud *mf*, and many others: *sf*, *fp*, *fz*, *ffz*, etc. The symbols of dynamics are typically placed below the staff. The dynamics is a relative specification since it depends on the context. The same dynamics have a different meaning if it is applied to *a solo* or to an orchestra; since in an orchestra the loudness is combined with those of the other instruments. These symbols change the context of the interpretation and remain valid until a different indication is stated. Moreover, the general dynamics can be changed on the basis of relative and local indications for increasing (*crescendo*) or decreasing the dynamics (*diminuendo*). These can be formally stated by either textual (e.g., *dimin.*) or graphical symbols. Graphical symbols are much more effective since they have an immediate interpretation. Their direction states if the dynamic has to be increased or decreased, while the application points (starting and ending note) state exactly the range of application. On these bases, with graphical symbols instead of using textual versions other more sophisticated affects can be stated -- e.g., a *crescendo* smoothly connected with a *diminuendo*: \diamond .

12.2 Aggregations of Symbols

According to the music notation there are five main types of mechanisms on the basis of which the figures are grouped or group of figures are represented. Their meaning is strongly different.

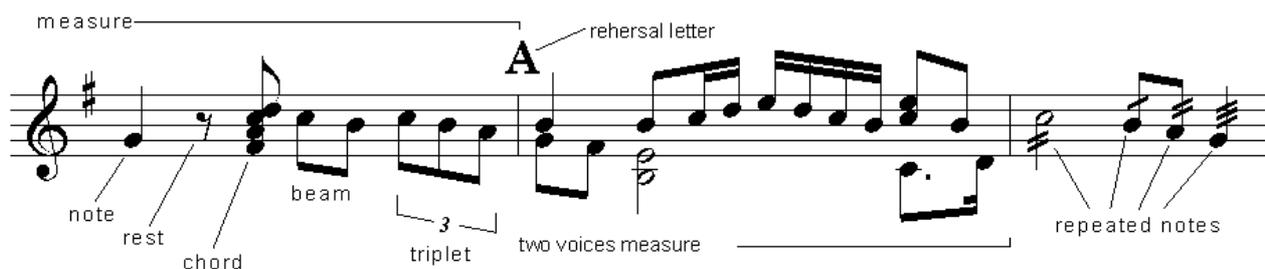


Fig. 12.2 - Symbols aggregation

- The *chords* are groups of notes (placed on the same stem or aligned on the same column) that as to be executed simultaneously. Instruments like piano can execute chord. The relative position of the notehead depends on specific rules. Chords may present ornaments such as *arpeggiato* from up to down or down to up, depending on the direction of the arrow. In some cases, a different way of representing chords is used. In example the main note on the staff is specified while the other notes of the chord are left to the decision of the musician, or otherwise specified by using their relative numbers: 3, 5 for the 3rd and the 5th note after the dominant.
- The *beams* are groups of notes connected with a large transversal line (simple of multiple depending on the hook value of the notes belonging to the beam). It is a different way to visualize set of notes to make easier the read of the notes but without a counterpart in the execution. The orientation of the bar among the notes is defined on the basis of well-known rules.
- The *tuplets* are irregular groups of notes. A tuplet is comprised by notes which total value exceeded (do not fill) the value assigned in the measure. For instance a triplet if comprised of 3 notes of 1/4 and they have to be executed in a 2/4. These irregular groups may include rests.
- The presence of more than one *voice* is depicted by drawing one sequence of notes for each voice on the same staff. This is used for instruments with more than one voice or in main scores for representing two or more parts on the same staff.
- The *repeated symbols* are frequently used for representing in a concise manner a piece of music. In particular, the presence of one, two, three and sometimes four small lines means that a note must be interpreted as a sequence of distinct notes of 8th, 16th, 32nd and 64th, respectively. This visual representation allows the writing of complex scores in small space. For this reason, it is frequently used for producing the scores of classical music.

Chords, voices, repeated symbols and groups could be considered figures as well. On the other hand, each note in these structures can have all the above mentioned features.

12.3 The Structure of Music Scores

According to the music notation, the figures are organised in measures limited by bars (barlines), sometime the barline and measure are used as synonyms. Please see the score reported in the Fig. 12.2, it presents three measures.

Each measure is comprised of a defined number of beats depending on the meter (e.g., 4/4, 2/4, 6/8). The numerator of the meter represents the number of beats. For instance 3/4 means that one can needs 3 notes of a 1/4th for filling the measure. Therefore, the measure has to be consistent in terms of figure durations that it contains.

The ordered collection of measures represents a *score*. It may contain references to jump from a point to another, from a measure to another for repeating parts (e.g., *ritornelli*), etc. Some special kinds of barlines are defined for marking the start and end of *ritornelli*. In some cases, characters are used for labeling points from which the orchestra has to restart during rehearsals -- for instance, for studying the most difficult pieces of music.

Typically, if the score is for a group of instruments/musicians there a score (a part) is present for each instrument and these are aligned each other being aligned the respective measures. When an instrument has to be quite, it has rests as the 3rd measure of the violin in Fig. 12.3. Therefore, in orchestras, the director reads the main score observing the measures of all instruments on the same column; while the musician can see only their respective part. In the main score, similar instruments are collected by using a graph or squared parenthesis. The placement of figures on aligned measures depends on the measure length and on the value of the figures.

At the beginning of a score, and when is needed, the *clef* has to be declared -- for example: *G, F, baritone, tenor, alto, mezzo-soprano, soprano* clef. Each clef has to be placed in well specific position on the staff, and not everywhere as allowed by several computer-based music-editors. The clef specifies the current interpretation of the lines and holes of the staff, this interpretation is fixed until a new clef or key signature is placed. The clef may present a key signature

(e.g., a group of sharp or flat) for stating changes on the meaning of notes placed on the staff. A new clef, for changing the current one, can be used in instant along the measures, even in the middle.

Fig. 12.3 - Music score example

Depending on the instrument staff may be grouped. For example, the music for a piano is presented by two joined staves, while for harp and organ three staves are needed. In some cases, for guitar the tablature with 6 strings (6 lines) is joined with the classical pentagram.

Moreover, the music observed by the director on the main score is typically formatted differently with respect to that observed by musicians. In fact, it is different since:

- The parts are printed by using compressed versions of music notation symbols - e.g., (i) multi measure rests are represented with a unique symbol on the parts while in the main score a rest for each measure is given; (ii) the adoption of the above mentioned repeated symbols (which in some cases are also present in the main score).
- The parts usually present the above mentioned *general symbols* and several *instrumental symbols* which are excluded from the main score. Moreover, other interpretation/personal symbols may be present in the parts.

- The main score may present some specific textual note or symbol for helping the director.
- The main score may present on a unique staff more than one part, in these cases, they are treated as distinct voices on the same staff. For instance the first and the second violin.

In the parts, other indications are added for better coordinating musicians -- for instance, the replication of pieces of score in a smaller size (called guides, cue notes) for helping a musician to restart the execution synchronously with the execution of some specific notes of another musician, etc.

12.4 Horizontal Music Notation Symbols

Up to now, only simple relationships among symbols have been described. Please note that some of the components of music notation are typically referred to a couple of points along the staff.

These points can belong to different measures and in some cases to different scores, for instruments reading music on more than one score:

- The symbols already discussed with the *dynamics* such as *diminuendo*.
- The already discussed local indications for *tempo* such as: *rallentando*, *accelerando* with their graphical representation *wave* and *arrow*.
- The *octave sign* is placed above/below the staff and is similar to a dashed horizontal half square bracket for stating the comprised notes must be considered at an octave above/below the current. The adoption of this symbol to improve readability of the music since reduces the needs of using additional lines above/below the staff.
- The *tie* is an arc between two notes at the same high. It states that the two notes must be considered as a unique note with duration equal to the sum of the durations of the notes linked. Using an arc among the note visually specifies it. A tie can be cut off at the end of the page, in this case it has to restart from middle of the arc;
- The *slur* is an arc between two notes even if these do not have the same high. A slur between two notes means that these must be executed without discontinuities making smoother (or *legato*) the execution of music.

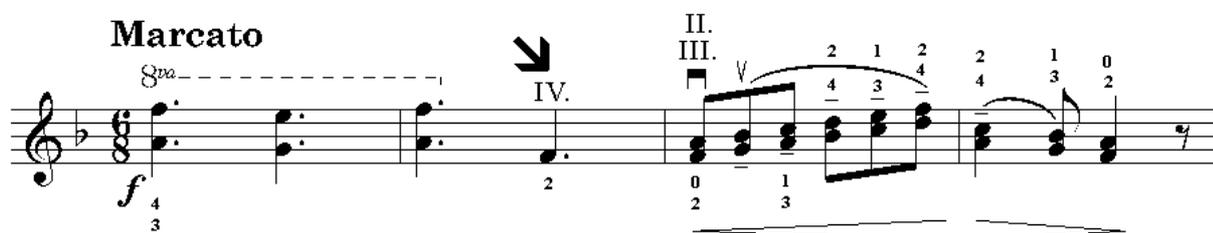


Fig. 12.4 - Horizontal symbols

12.5 General and Instrumental Symbols

In effectively executed music several other symbols are typically added. These symbols can be classified in two main categories:

The *general symbols*. For example, a symbols for stating that:

- a 2/4 measure will be beat by the director in 4/4 or vice versa (with 4 lines distributed along the measure);
- the musician has to be careful in a specific point (a couple of small glasses or a transversal big arrow);
- the musician has to take breath (a comma, a V or a |);

The *instrumental symbols*.

- For strings: *bridge*, *string number* (in Roman numbers), *finger number* (in Arabic numbers), *bow point*, *bow hell*, *bow up*, *bow down*, *pizzicato*.
- For timpani: the regulation to the next tone.
- For harp and piano the pressing of pedals.
- For brass: the adoption of specific registers for producing certain notes (e.g., oboe mark).
- For drums the adoption of several kind of stick: *soft*, *metal*, *wire-brush*, etc.

- For several instruments the presence or not of the mute, or the production of harmonic sounds.

Several other symbols have to be added for satisfying the needs of all instruments of a large orchestra.

Most symbols of this last set assume different graphical or textual representations on the basis of the instrument for which they are used. For example the inserting and the removing of the mute can be graphically represented by using a horizontal “E” for strings, or with a "+" (plus, to insert the mute) or a "-" (minus, to remove the mute) for brass, or with a textual indication: *con sordina*, *via sordina*. The latter are frequently written in the language used by the musician that is playing. Some of these symbols change the context of the interpretation/execution. For example, *with mute* means to insert the mute and in some place will be written *remove mute*.

On the other hand, several interpretation symbols, which are typically neglected in computer music editor, are really relevant during the actual execution of music in theatres and during lessons in schools of music.

Chap.13 Editing Music and its Symbols



Fig. 13.1 - Editing Menu

Layer: toggle button to select the current layer on which we work for the edit.

Chord/note: toggle button to select the insertion as chord or as separate notes (the button has to show a simple quarter note or a chord).

Notehead: toggle button to select the current notehead among the available. The list is reported in the following. The selection of the notehead in the following menu of notehead has to imply the change of the status style for the notehead reported in this menu bar.

Colour: (Not available in this version) toggle button to select among a predefined set of 16 colours: yellow, blue, orange, green, purple, light blue, black (the default), white, grey light, grey dark, etc....

Line style: toggle button to select the current line style for slurs, crescendo, brackets, etc. among: continuous, dashed and dotted.

Auto: toggle button, passing from Auto, up or Down positioning of steps and position of symbols. Auto is automatic according to MILLA, Up is in the direction of up the staff or directly up the staff, down is the opposite behaviour.

-Space, +space: insertion of micro spaces for adjusting justification. See the comments on the justification dialog box: these permit to the user to fine tuning the justified, or even not justified, measures, in order to maintain a complete control on the formatting of the score. This feature with the powerful automatic formatting engine provides a complete set for the arrangement of spaces on the screen and on the page for printing. This microspacing is influenced by the layer active at the moment.

Edit: this allows to edit parameters of symbols. It is also activated by clicking the symbol in Edit modality. The program enters in this modality by the “Edit button” (see next figure) on the Toolbar.



Fig. 13.2 - Edit button

The editing can be for changing feature of the following symbols:

13.1 General Classification

The WEDELMUSIC symbols can be bunched in the following way:

13.1.1 Figures

This kind of symbols includes notes, rests and anchorages. To insert a figure on the screen it's necessary to select it on the corresponding menu

13.1.2 Anchorages

Some symbols extend on a series of figures, and their beginning and end corresponding to a figure. For this reason it has been created a particular kind of invisible figure, called "Anchorage", that can be associated to all these symbols that attached to a note or rest. For example, in the next sequence of figures is represented an insertion of anchorage and his management.



Fig. 13.3 - Notes Menu

To insert an anchorage it's necessary to select his corresponding icon in the notes menu (Fig.13.3) and to position it on the screen (Fig.13.4).

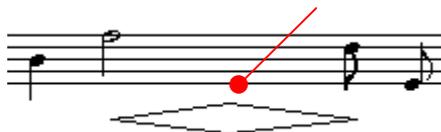


Fig. 13.4 - Invisible Anchorage

To edited anchorage there's a command on the Format Menu, "See Anchorage" (Fig.13.5), and so anchorage can be visualized, deleted, etc (Fig.13.6).

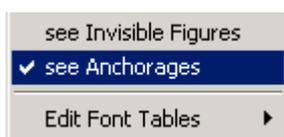


Fig. 13.5 - Edit Anchorages Command



Fig. 13.6 - Edited Anchorage

13.1.3 Markers

This category of symbols includes all things that can be associated to notes:

- Ornaments
- Fingering
- Mutes
- Harmonics

- Breath
- Pedals

To insert a marker on the screen, it's necessary to select it in the corresponding menu and then to select the note to which it has to be associated. The markers can be positioned on the note or under the note previously acting on the buttons below sited on the toolbar.



For particular descriptions and examples see the next chapter.

13.1.4 Horizontals

These symbols extend on a series of figures. To insert an horizontal symbol on the part, first it's necessary to select it in Horizontal Menu, then we must select two figure on the screen: interval starts on the first selection and finish on the second one.

- Slur
- Bend
- Pedal
- Octaves
- Quindicesime
- Trill



Also in this case the button on the toolbar indicates if horizontals must be represented up or under the group of figures. For particular descriptions and examples see the paragraph 13.14.

13.2 Notes and Rests



Fig. 13.7 - Notes Menu

The using of this menu allows the insertion of all kind of notes, in particular the buttons from left to right perform the following operations: Insert a Double whole note; Insert a Whole note; Insert a Half note; Insert a Quarter note; Insert a Eight note; Insert a Sixteenth note; Insert a Thirty-second note; Insert a Sixty-fourth note; Insert a One hundred twenty-eight note;

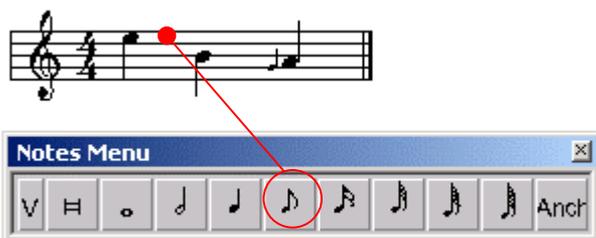


Fig. 13.8 - Insert method



Fig. 13.9 - Inserted note

To insert a note or a rest in a part, first it's necessary to select it on the corresponding menu (Fig.13.7)(Fig.13.10), then we can position the note/rest on a staff line. Previously, if it's a note, the kind of insertion depends from a serial of parameters to set:

- Line: which line staff the note must occupy
- Layer  : choosing to which layer the note must belong

- Color  : there's a choice of sixteen different colors
- Chord  : permit to insert note in a chord
- Headnote  : in this case
- Stem  : we can choose if the stem of note must be up or down



Fig. 13.10 - Rests Menu

The using of this menu allows the insertion of all kind of rest, and the insertion of spaces, in particular the buttons from left to right perform the following operations: Insert a Four measure rest; Insert a Two measure rest; Insert a Whole rest; Insert a Half rest; Insert a Quarter rest; Insert a Eighth rest; Insert a Sixteenth rest; Insert a Thirty-second rest; Insert a Sixty-fourth rest; Insert a One hundred twenty-eight rest; Insert a Multiple-measure rest; Three versions of fermata symbols with the same meaning.

To insert a rest in a part, first it's necessary to select it on the corresponding menu (Fig.13.7)(Fig.13.10), then we can insert the rest on the part. Previously, the kind of insertion depends from a serial of parameters to set:

- Layer: choosing to which layer the rest must belong.
- Color: there's a choice of sixteen different colors

The rests can be even hidden, in the sense that it is needed to insert rests that do not have to be visualised. This is needed when the rest have to be inserted for satisfy the processing of measure checking in duration, but do not have to be visualised since the convention is to place a unique rest for all the measure even if the measure is not covered. This happen quite frequently in the presence of polyphonic music, when more voices are present.

13.3 Small Notes



Fig. 13.11 - Small Notes Menu

The using of this menu (Fig.13.11) allows changing a normal note in a little one and viceversa, in particular from left to right we have: From normal note to little;

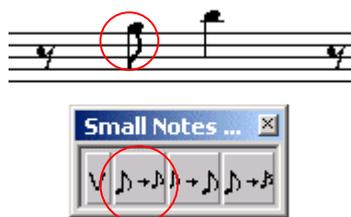


Fig. 13.12 - Button to select

In particular, the action to insert a small note on the screen is the following: first a normal note must be inserted in the right position (Fig. 13.12a), then we must select the button "Normal to Small" (Fig.13.12b) and select the note to became small. The effect is visible in Figure 13.13.



Fig. 13.13 - Small Note Croma

From Small Note to normal; From normal note to small note with acciaccatura; by default, a small note is inserted as a grace note (see Fig.13.12). It has to be possible to grace also beam (see Fig.13.13) and chords. Small and normal size.

There are also small notes that have to be considered as notes of full duration differently from the grace notes. This is imposed via editing the note (See Par.13.12).

13.4 Grace Notes

Some examples of grace notes can be the follow.



Fig. 13.14 - Appoggiatura



Fig. 13.15 - Small Beams

13.5 Hidden Notes

The figures can be even hidden, in the sense that it is needed to insert rests that do not have to be visualised. This is needed when the rest have to be inserted for satisfy the processing of measure checking in duration, but do not have to be visualised since the convention is to place a unique rest for all the measure even if the measure is not covered. This happen quite frequently in the presence of polyphonic music, when more voices are present.



Fig. 13.16 - Hidden Rest in the first layer

The “See Invisible figures” command in the Edit Menu is able to show the hidden figures in the screen with red color



Fig. 13.17 - Menu Edit: See invisible figures



Fig. 13.18 - Hidden rest in red

13.6 Ghosted Notes

The figures can be even ghosted, in the sense that it is needed to insert rests or notes that do not have to be visualised and not have a full temporal consistence. Also this kind of figures is shown by the “See Invisible Figures” command in the Edit Menu.



Fig. 13.19 - Ghosted rests in the first measure



Fig. 13.20 - Ghosted rests visualized with red color

13.7 Different Notehead

Since different styles of music are represented often using the instruments or the graphical layout coming from the historical period when those styles were conceived, it is a subject of interest to make possible the change of the type of headnote used, for historical reasons. For example in music of 17th century it was common used a special headnote not rounded, but squared, and the music score and parts of baroque music are best represented with such graphical layout. This is valid also for publisher, to produce printed scores with the maximum flexibility. The possible Types of Notehead are listed in the description of the user interface of the WEDEL Music Editor and in the previously presented list of symbols.



Different noteheads in the button on toolbar.

Among the possible Types of Noteheads there are:

- NORMAL
- CROSS
- DIAMOND
- TRIANGLE
- CLUSTER
- MOON
- DDIESIS
- NUMBER+
- ...

To insert a note with a particular notehead, we must select the corresponding notehead on the toolbar and then execute a standard insertion.

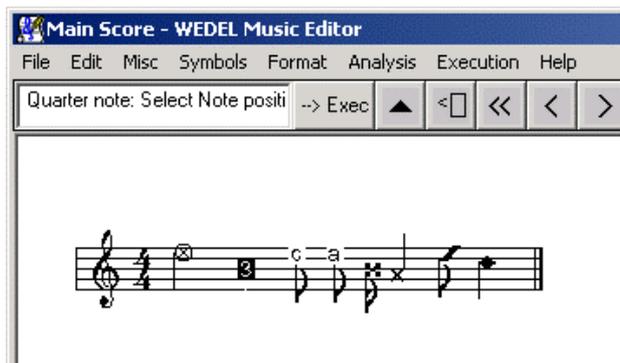


Fig. 13.21 - Different kind of noteheads on the WEDELMUSIC editor

13.8 Chords

In WEDELMUSIC Editor, to insert a chord, the button in Fig.13.22 must be set in the following position:



Fig. 13.22 - Chord command on the toolbar

Then we have to position, through cursor (Fig.13.23), the note in the staff.



Fig. 13.23 - Selected position on staff

In the last picture (Fig. 13.24) we can see how the chord appears after insertion.



Fig. 13.24 - Inserted chord

13.9 Beaming and Multistaff Beaming



Fig. 13.25 - Beams Menu

To beam single notes together you can click the button on the beam menu and then drag a rectangle keeping pushed the left button of the mouse (Fig. 13.27). The effect is visible in Fig. 13.28



Fig. 13.26



Fig. 13.27

Is also possible to create multistaff beams or beams with chords (see Figures 13.29 - 13.30)

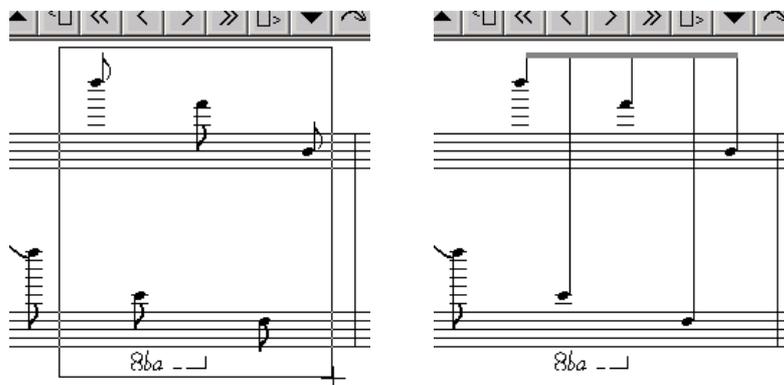


Fig. 13.28 - Multistaff Beam



Fig. 13.29 - Beam and Chords in WEDELMUSIC Editor

13.10 Accidentals, normal and small



Fig. 13.30 - Accidentals Menu

The using of this menu allows the insertion of accidentals on notes, in particular from left to right we have:

- Inserts a quarter Sharp on a note;
- Inserts a Sharp on a note;
- Inserts a Three quarter sharp on a note;
- Inserts a quarter Flat on a note;
- Inserts a Flat on a note;
- Inserts a Three quarter Flat on a note;
- Inserts a Natural on a note;
- Inserts a Double sharp on a note;

- Inserts a Double flat on a note, natural down, natural up.

To insert an accidental symbol it's necessary to select the accidental in the own menu (Fig.13.27) and then to select the note that is associated (Fig.13.28). All the above symbols can be present in big and small size, with () or without () (Fig.13.28). If the note that is associated is small, accidental is represented small too. The last button of accidentals menu indicates if accidental must be beetwin clefs or not.

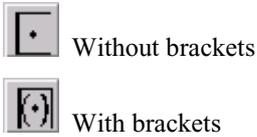


Fig. 13.31 - Accidentals

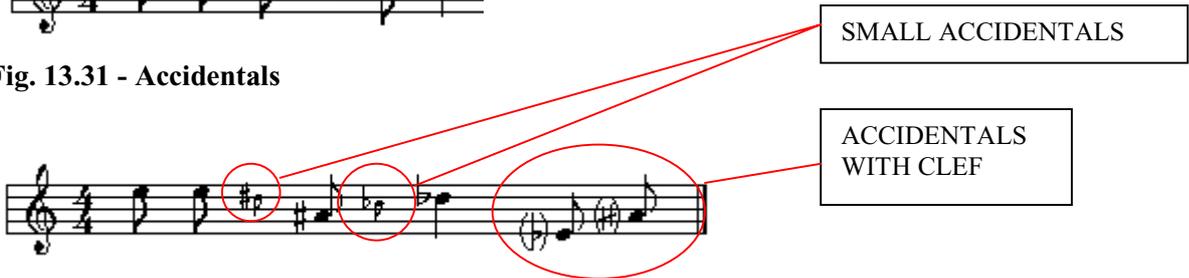


Fig. 13.32 - Accidentals with Brackets and Small Accidentals

Is also possible to insert an accidental on a note with ornament (Fig.13.33)



Fig. 13.33 - Accidentals and Ornaments

13.11 Editing Notes, Chords and Beams

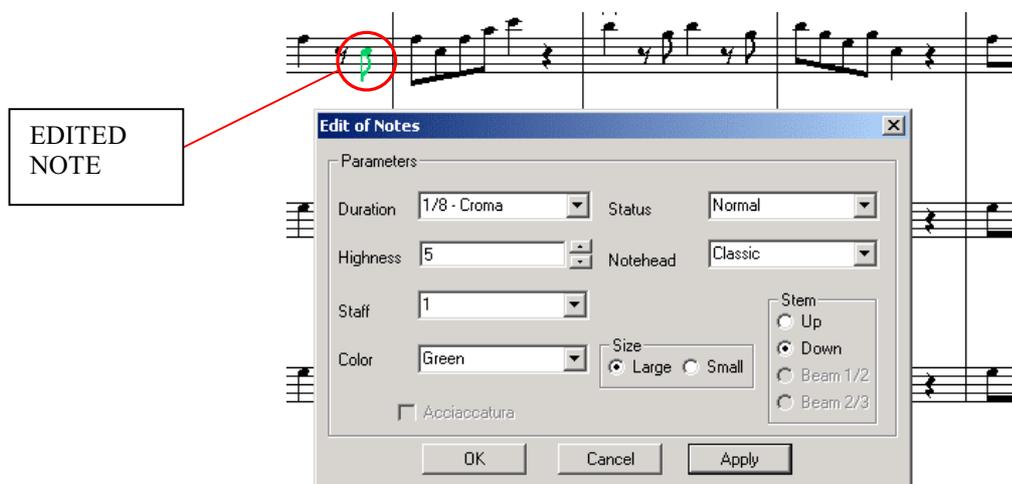


Fig. 13.34 - Editing Notes dialog

The features of notes, rests, horizontals and marker, can be changed also when the symbol is just inserted on the screen.

We can edit these features through the "Edit" button on the toolbar . After we can select any symbol and a dialog box is opened with relative values.

The editing dialog box for notes, chords and beams is the same (Fig. 13.34). And the features edited are:

- **Duration:** there are nine different time duration (Fig. 13.35). In case of chord, the duration is referred to all chord. In case of beam, duration is referred to the single note.



Fig. 13.35 - Options for Duration

- **Color:** this attribute is always referred to the single note, also in case of chord or beam.



Fig. 13.36 – Colour options

- **Status:** The rest can be: (1) visible or invisible, (2) time consuming or no time consuming. In the first case they are used for compensating voices when one of the two voices has a rest this is typically omitted but the justification algorithm need it, so a invisible state for that rest is needed. In the second case they are used when there are measure starting in "levare" or for the presence of "inizio-fine" refrain in the middle of a measure. In that cases the rests have to be added to make the measure time consistent but they have not to be visible. For these reasons, notes and rests may be in the following status (Fig. 1.21):

- Visible and time/space consuming (normal condition)
- Visible and no time/space consuming (graced)
- Invisible and time/space consuming (hidden)
- Invisible and no time/space consuming (ghosted)

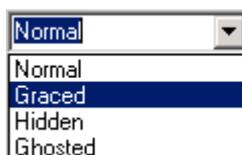


Fig. 13.37 - Status options

This is referred to all notes of chord or beam.

- **NoteHead:** this is referred to the single note.

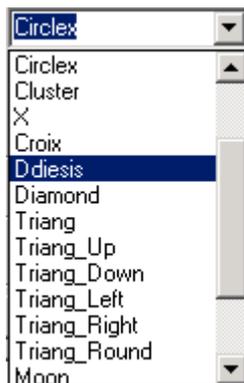


Fig. 13.38 - Notehead options

- **Highness:** this parameter sets the highness of the note or the rest in the staff



Fig. 13.39 - Highness Dialog

- **Staff:** in case of parts multistaff, this option can change the staff for a note or a rest.



- **Stem:** Indicate the direction (up or down) of the stem in a note, in a chord or in a beam. In case of beam there's also possibility to change the position in the following way (Fig.13.40 -). The edited note is coloured in red.

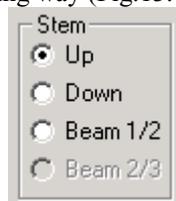


Fig. 13.40 - Stem Up

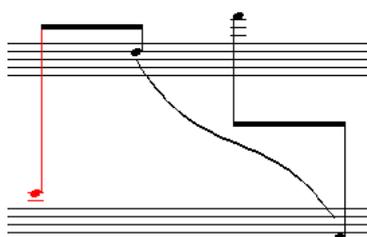


Fig. 13.41 - Beam Up

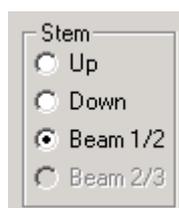


Fig. 13.42 - Stem 1/2

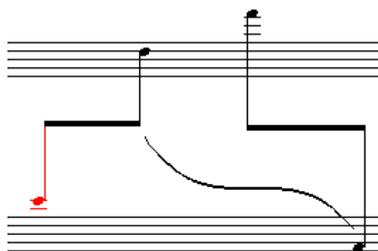


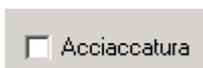
Fig. 13.43 - Beam in the meddle

- **Size:** the options are Large or Small



Fig. 13.44 - Size Options

- **Acciaccatura:** this options is anable only if *Size* is Small.



13.11.1 Cancel button

In this case, Cancel button is a kind of local undo, meaning this command set the parameters with initially edited values and close the windows dialog.



Fig. 13.45 - Cancel button

13.12 Editing Rests

In the editing of rests, the parameters that can be changed are:

- Duration

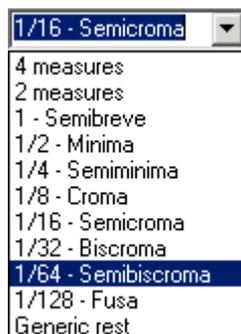


Fig. 13.46 - Rest duration dialog box

- Highness
- Status
- Color
- Size
- Staff

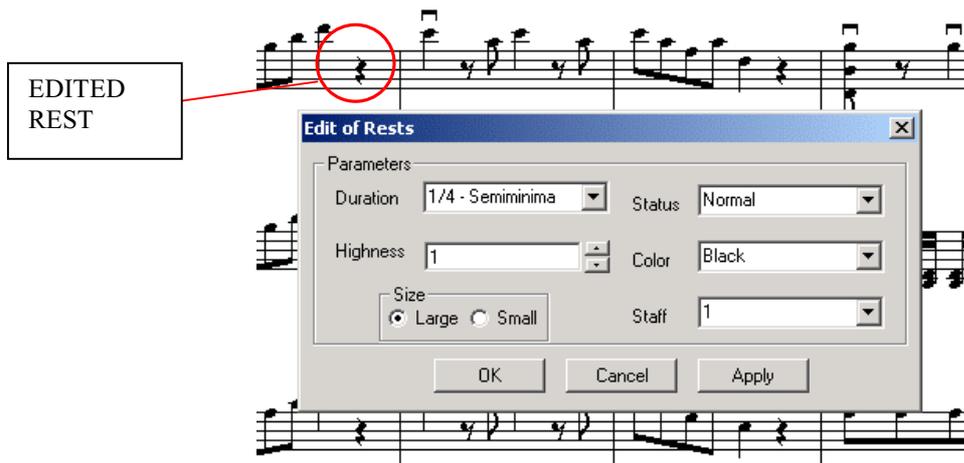


Fig. 13.47 - Editing Rests dialog

13.13 Tuple

The using of this menu allows changing a normal note to a note beam, in particular from left to right we have: Converts some notes to beam; Converts a beam to separated notes. Beam a Measure, beam a Part, Beam all the score with all parts are provided into the formatting menu.



Fig. 13.48 - Beaming Menu

For tuples a dialog box appear to:

- **insert the number:** user fix the value of the tuplet

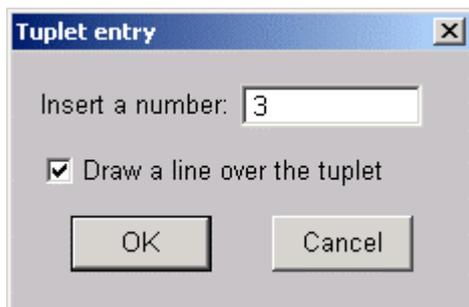


Fig. 13.49 - Tuplet Dialog Box

- **draw a line over the tuplet:** user can decide if it has to be with or without the line

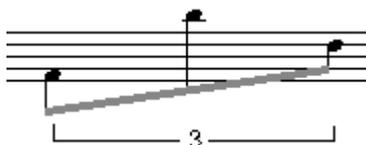


Fig. 13.50 - Tuplet

13.14 Horizontal Symbols

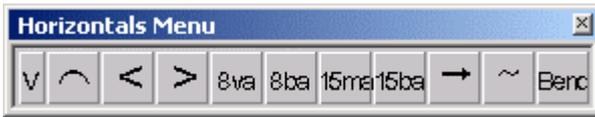


Fig. 13.51 - Horizontal Symbols Menu

This menu allows inserting the Horizontal symbols like slur, crescendo, diminuendo and others that involve a group of symbols such as octaves and 15-esimes. From left to right the buttons performing the following operations: Crescendo: inserts a crescendo symbol among a group of notes; Diminuendo: inserts a diminuendo symbol among a group of notes; 15ma is used when in over the staff and 15mb when is under. 8va is used when is over the staff and 8ba when is under. All the above symbols (apart for the wave and the change of octave and 15-esime) can be in continuous, dashed or dotted lines. For this reason the best solution is to have toggle buttons to pass from a version to another, see status line, line style button. According to that solution the first two buttons are only for round slurs and squared slurs depending on the status of the line type.

To insert an horizontal symbol on the part, first it's necessary to select it in Horizontal Menu, then we must select two figure on the screen: interval starts on the first selection and finish on the second one.

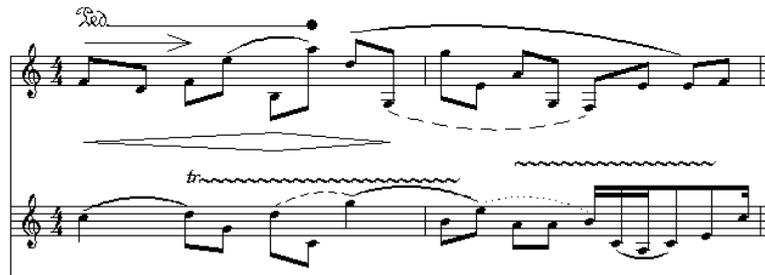


Fig. 13.52 - Horizontal Symbols in WEDELMUSIC

13.14.1 Octaves and Quindicesime

Octaves and Quindicesime are two other symbols of horizontal category. If these symbols are represented under the group of figures, became 8ba and 15ba (Fig. 13.53).

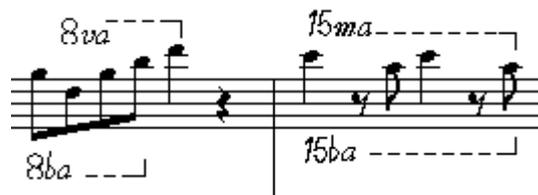


Fig. 13.53 - Octaves and quindicesime

13.14.2 Slurs, Bends



Fig. 13.54 - Slur and Bend

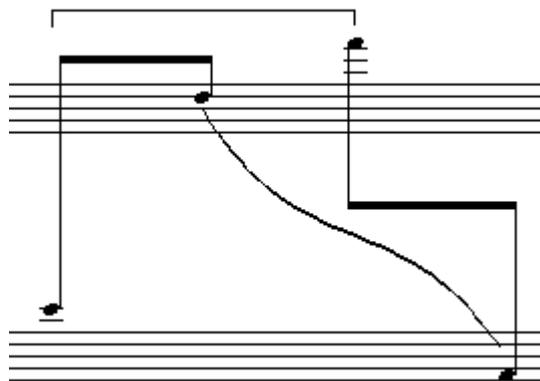


Fig. 13.55 - Slur and Bend on a multistaff part

13.15 Editing Slurs and Bend

About the horizontals, the edited features are:

- Line style: continuous, dashed, dotted.
- Draw up/ Draw down
- Slur Knots (flexion)

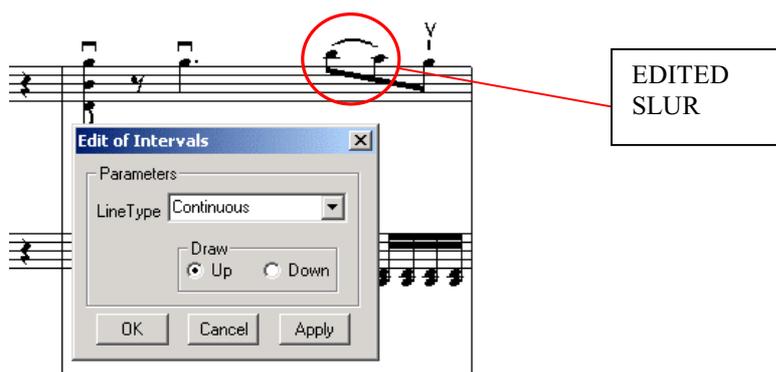


Fig. 13.56 - Editing Slur dialog

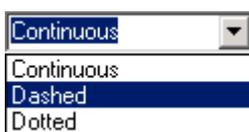
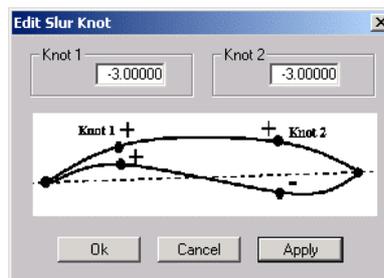
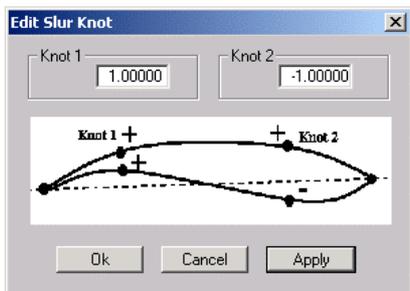
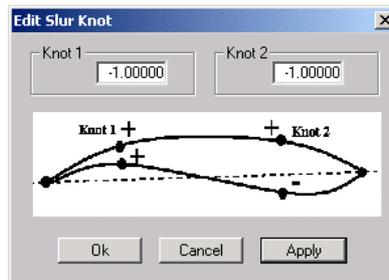
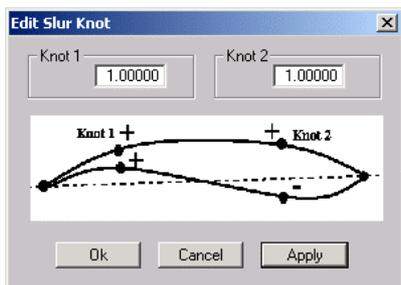


Fig. 13.57 - Line Style dialog box

The effects of the different line styles are evident in the next figure.

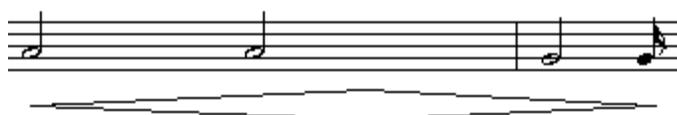


Fig. 13.58 - Different line styles



13.16 Anchorages

To be described



Chap.14 Other Music Notation Symbols

14.1 Dynamics

The following are all the possible values of dynamic text: f, ff, fff, ffff, fffff, ffffff, ffp, ffpp, fp, fpp, fz, mf, mp, p, pp, ppp, pppp, ppppp, pppppp, rf, rfz, sf, sff, sfff, sfff, sffp, sffz, sfp, sfpp, sfz, sp. They are listed in a simple list box instead of a text box

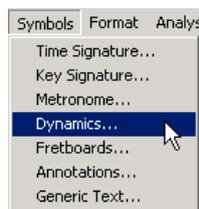


Fig. 14.1 - Dynamics command



Fig. 14.2 - Dynamic text dialog

Dynamics join to the notes and rests and show as in the following figure.



Fig. 14.3 - Dynamics on the notes

In MILLA file, the user can specify the following types of rules for the

- insertion of symbols, such as the estimation of the direction (up/down with respect to the staff or to the notehead) of stems, beam, slurs, etc. (these can be manually imposed if needed).
- positioning of symbols, such as the estimation of stem length, distance with respect to staff lines, beam angle, position of the ornaments, expressions, etc. with respect to the notehead.
- ordering symbols with respect to the presence of neighbouring symbols, ensuring precedence among symbols with respect to the notehead when depicting slurs, accents, markers, etc.;
- justification of measures according to specific algorithms, such as linear, logarithmic, and different scales; considering alignment among voices and parts in main scores, line breaking and page breaking;
- beaming rules for beaming notes on the basis of time signature, etc.

This olds true for all following symbols.

14.2 Fret Boards

A dialog for chosing a chord to be inserted is opened. It allows the visualisation of the chosen chord on the right corner. The selection of the chord is possible on the basis of the chord name, type, bass and number of strings. The search is performed on a database containing all definition of fretboards. This is build and managed by t he fretboard editor as discussed in the sequel.

14.3 Text

It's possible to insert a generic text in the part. It join to notes and rests.

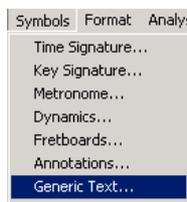


Fig. 14.4 - Generic text command

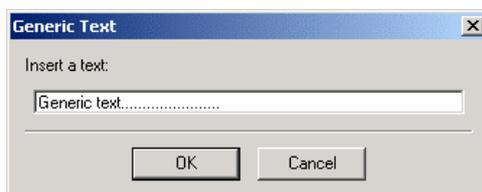


Fig. 14.5 - Text Dialog

The selected note turns out in the middle of text (Fig.14.6).



Fig. 14.6 - Inserted Text

14.4 Ornaments



Fig. 14.7 - Ornaments Menu

The using of this menu allows inserting ornaments on notes, in particular from left to right we have:

Trill: inserts a trill symbol on the note or rest.

Trill and Waves: inserts a trill symbol with an user defined number of waves; it should be managed as a interval symbol since its length depends on the positioning of the last point.

Turn: inserts a turn symbol on a note.

Backturn: inserts a backturn on a note;

Turn Slash: inserts a turn slash on a note;

Turn Up: inserts a turn up on a note;

Turn: inserts a turn symbol between notes;

Backturn: inserts a turn symbol between notes;

SuperiorMordent: inserts a superior mordent symbol on a note;

InferiorMordent: inserts an inferior mordent symbol on a note;

DoubleSuperior Mordent: inserts a double superior mordent symbol on a note;

Double InferiorMordent: inserts a double superior mordent symbol on a note;

Tremolo: inserts a tremolo symbol on a note (a parameter N is asked to get the number of lines); **Glissando:** inserts a glissando symbol on a note;

Glissonda/ GlissWave: inserts a glissando which is drawn with a wave;

Arpeggiato: inserts an arpeggiato symbol on a chord; It can be up or down with the v;

Arpeggiato UP

Arpeggiato Down

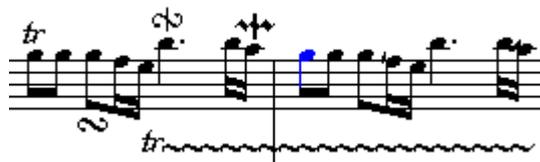


Fig. 14.8 - Examples of Ornaments

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.5 Expressions



Fig. 14.9 - Expressions Menu

This menu allows to insert expression symbols. These can be composed according to the rules state in Milla. It is possible to insert at most 10 different Expressions symbols on the same note including generic expressions that a re-expression symbols defined by the user.



Fig. 14.10 - Expression symbols

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.6 Pedals



Fig. 14.11 - Pedals Menu

- **Ped.:** Insertion of the Pedal Symbol for Piano.
- **Ped___:** Insertion of the Pedal Symbol for Piano with a continuous line that graphically states the point in which the pedal released
- *****: An asterisk that is placed in the place in which the Piano Pedal is released. It is typically used with Ped. While the Ped___ does not need to use this symbol.



Fig. 14.12 - Pedal symbols

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.7 Violin Symbols

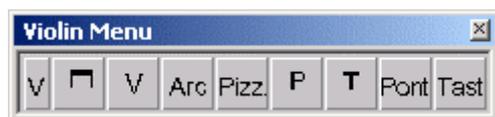


Fig. 14.13 - Violin Menu

- **Bow up;**
- **Bow down;**
- **Arco:** the note must be played with arc;
- **Pizz.:** play in Pizzicato way;
- **Bow Point;**
- **Bow Hell;**
- **Pont:** the note must be played on bridge;
- **Tast:** the note must be played on fingerboard;

Violins can be inserted up or under a note, previously selection of up/down button on the toolbar. (Fig.14.13)

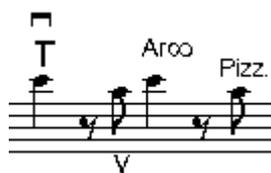


Fig. 14.14 - Violin Symbols

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.8 Harmonics



Fig. 14.15 - Harmonics Menu

Typically, harmonics symbols can appear in different ways.

- o as external marker on the notes, up or down the note such accents
- \diamond can appear as a notehead with stem, etc. or in chords

Harmonics can be inserted up or under a note, previously selection of up/down button on the toolbar. (Fig. 14.14)



Fig. 14.16 - Harmonics

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.9 Mutes



Fig. 14.17 - Mutes Menu

Mute menu provides some buttons for inserting symbols related to mute. In particular from left to right we find:

- **Archi**: a three state button for selecting different types of mute: Arcs, Flutes, Textual version;
- **Con**: inserts the symbol (selected with Archi button) that specifies to put the mute on.
- **Via**: inserts the symbol (selected with Archi button) that specifies to put the mute off.

Please note that the mute symbol is different with respect to the first button selection – e.g. Arcs use a fork like symbol, while flutes adopt a + or – sign; the textual version is represented by *con sordina* and *via sordina*.

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.10 Percussions

NOT YET IMPLEMENTED.

14.11 Breath and Glasses



Fig. 14.18 - BreathGlasses Menu

These symbols are only for remembering to the musicians to take care (Glasses) or a breath (comma). The last is to remember that the measure is beat in 4 beats (in N beats as state during the symbol insertion) by the orchestra conductor.

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.12 Fingerings



Fig. 14.19 - Fingering Menu

The last button is a toggle button that states if the finger number inserted are rounded, non rounded or heavy rounded.



Fig. 14.20 - Some fingerings on the notes

All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.13 Strings



Fig. 14.21 - Strings Menu with Roman Number



Fig. 14.22 - Strings Menu with Decimal Number

I,II,III,IV,V, VI, VII: notes to be played with the marked string number.

0: is the empty string in both cases.

1, 2, 3, 4, 5, 6, 7: in some cases the string are numbered .

The last two buttons in drawings are toggle buttons that are used for selecting:

- from roman to normal numbers, there is a 1 presently.
- from alone number, rounded with square, circled numbers and heavy circled numbers. In this case the configurations are reported in the same large button.



Fig. 14.23 - Strings Example

The string position depends only on the command "Up/Down" in the toolbar.
All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

14.14 Generic Expressions



Fig. 14.24 - Generic Expressions Menu

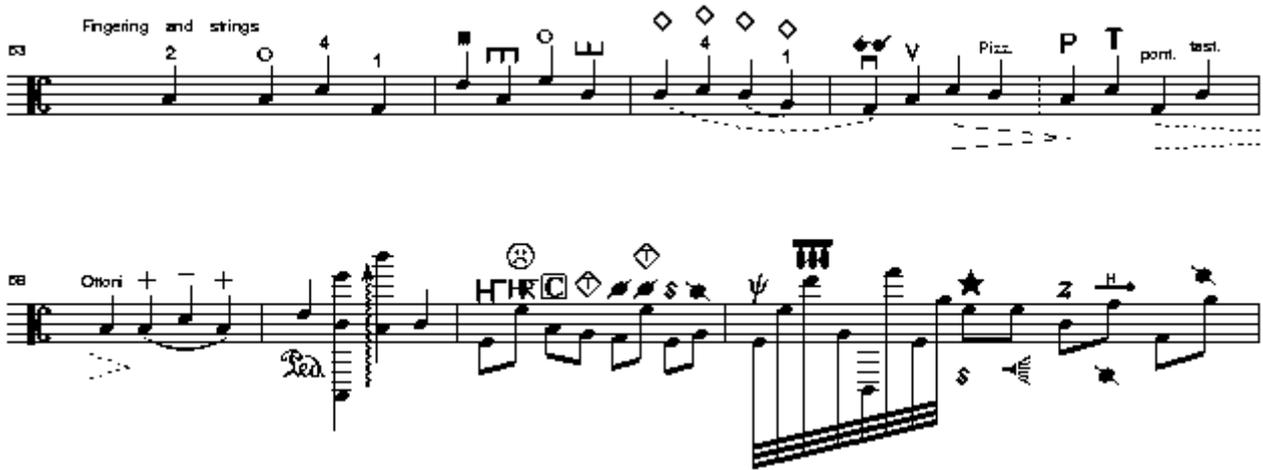


Fig. 14.25 - Example of Generic Expression and other symbols

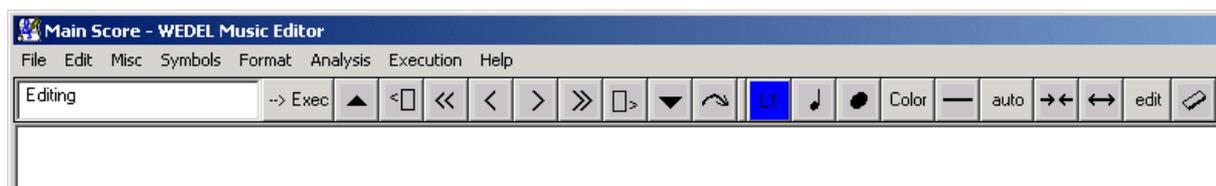
All these symbols are mapped and described in Milla File and their features can be changed by editing of that file.

Chap.15 Music Score Execution and Synchronisation

One of the most interesting features of the WEDELMUSIC editor is the possibility of visualizing music scores synchronously with the audio playing. The user may listen his preferred music piece and automatically visualize the music score. This is extremely useful for training people to understand music and listen music. For these reasons the main functionalities associated to this aspect are the synchronous execution and the synchronization process. The first is of interest for any WEDELMUSIC user, while the second only for those that intend to build WEDELMUSIC objects.

15.1 Execution Toolbar

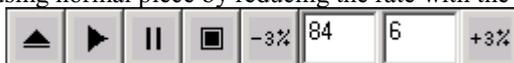
When the windows of the WEDELMUSIC editor is opened on a main score it start in the modality of EDITING. This can be observed by reading the message from the text message box or by observing the presence of editing tools in the tool bar, for example the notes, the layers, the color, the line, the cancel, etc.



In order to pass in the modality of execution button  has to be pressed. After that action, the toolbar of execution is visualized as follow.



In the tool bar several buttons are present that allow you to prepare the execution, to start it, to pause and stop the execution. In addition, you can change the execution velocity for limited percentages without change the tonality of the music piece. This is very useful for training people at music listening and tracking starting with low rate (low number of beats per minute) or by using normal piece by reducing the rate with the tool.

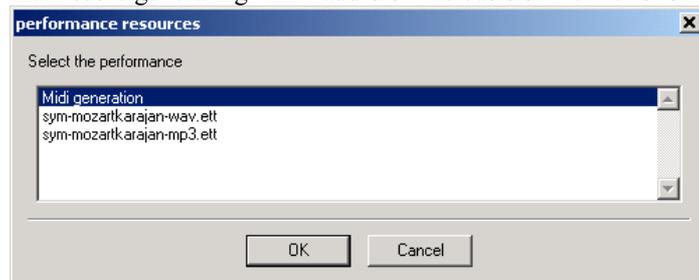


In the execution toolbar:

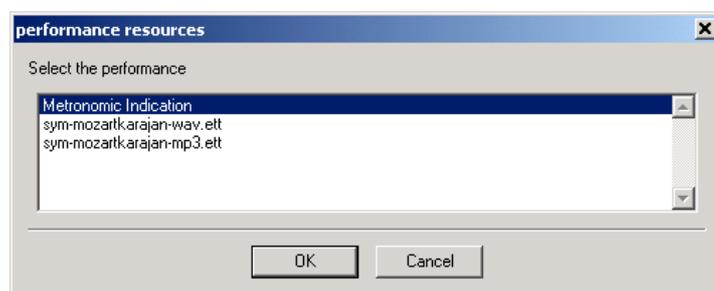


to perform the initialization phase (also called compiling phase), this button has to be used before the playing the music piece. It allows the initialization of the execution process. When this button is pushed a dialog is visualized to allow you to select the execution that you like. Possible executions are:

- ◆ Execution of symbolic main score generating MIDI audio on the basis of the metronomic indication.



- ◆ Execution of symbolic main score on the basis of the metronomic indication, without MIDI or with partial MIDI audio production. This is useful for didactical purpose for playing music during visualization/execution. This modality can be obtained by selecting the MIDI execution and imposing in the MIDI orchestration (the orchestration appear after selected the play button) a volume equal 0 to each voice that has not to be executed. Please remember that the execution can be even performed by selecting some of the voices keeping the others mute. It is important to select in any case the execution of the first part. According to the mechanisms explained in the WEDELMUSIC editor chapter, it is also possible to hide some parts. This allows to show during the execution on the parts that have to visualized on the screen.
- ◆ Execution of symbolic main score synchronized with one of the audio files contained in the WEDELMUSIC object in any format they are, in this version: MP3, WAVE. Several different synchronizations may be present in your WEDELMUSIC object, they may differ for precision or for the audio file used.
- ◆ Execution of a sequence of Score Images of the main score with one of the audio files contained in the WEDELMUSIC object in any format they are, in this version: MP3, WAVE. Several different synchronizations may be present in your WEDELMUSIC object, they may differ for precision or for the audio file used.
- ◆ Execution of the sequence of image score (main score) on the basis of the metronomic indication without the production of audio. This is useful for didactical purpose and for playing music during visualization.



The list reported in the dialog depends on the number of synchronizations that you have in your WEDELMUSIC object. There are no limits about the number of synchronizations that can be included into a WEDELMUSIC object.

After the selection the initialization process starts. For symbolic music scores this process may take some seconds in order to define the shape of all the pages that will be shown during the execution. For image score this process is practically immediate.

Please note that the selection of the execution of symbolic music score and of Image score depends on the music editor that you have opened. If you have opened the main score of the image score section the execution will be an execution for the image score. If you have opened the main score of the symbolic section of the WEDELMUSIC object the execution will be an execution for the symbolic main score.



to start the execution phase.

- ◆ If you have selected an execution based on MIDI the orchestration dialog is presented and at its closure the execution is started. You can in this dialog select the volume of each trace and thus permit the execution without audio or with some voices that may be useful to accompanying you playing while reading music on the computer screen.
- ◆ If you have selected an execution based on symbolic or image score the execution starts at the pressing of the button.



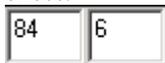
to pause the execution. After a pause the execution can be recovered from the same position by pushing again the same button.



to stop the execution. After this command the process of execution has to be started again.



to increase/decrease the execution rate of 3%. The buttons are active only during the execution. This percentage is referred to the current metronomic indication. They can be more or less reactive depending which type of execution are you performing. They are more reactive in MIDI and less reactive during the execution of image score slices.



These numbers are influenced by the changes of the execution rate. The first on the left side represent the metronomic indication in terms of beats per minute, the second the percentage of increment (when positive) or decrement (when negative) with respect to the metronomic indication imposed for the music piece.

15.2 Execution Paging

The mechanism of paging divides the visualized page in two parts (left and right) divided by a vertical separation. On the right side, a portion of the page containing the current measure is shown. The current execution point is highlighted with a blue thick line in the middle at two thin blue lines. On the left side, the beginning of the next page is gradually shown as the measures of the current page are executed/consumed.



In the case of execution with audio MIDI generation, the blue lines are not shown since the current played notes are evidenced in red.

In page tuning, the precision up to a single note is not really needed, it is enough to visualise the current measure plus some measures in advance since the musicians typically read the following 3-4 measures while executing current one. This condition is abundantly met even when a musician plays the last measure page, since subsequent measures are available on the left. The automatic page turning has several advantages such as: (i) musicians and conductor do not lose their concentration because of page turning, (ii) the prevention of any noise produced by turning pages, and (iii) the reduction of discontinuities in the sound due to the turning of pages.

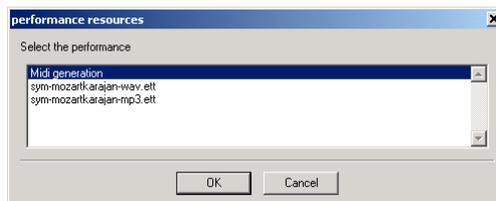
15.3 Music Execution with audio MIDI generation

The execution of a symbolic music score (main score) with the generation of MIDI audio can be easily performed.

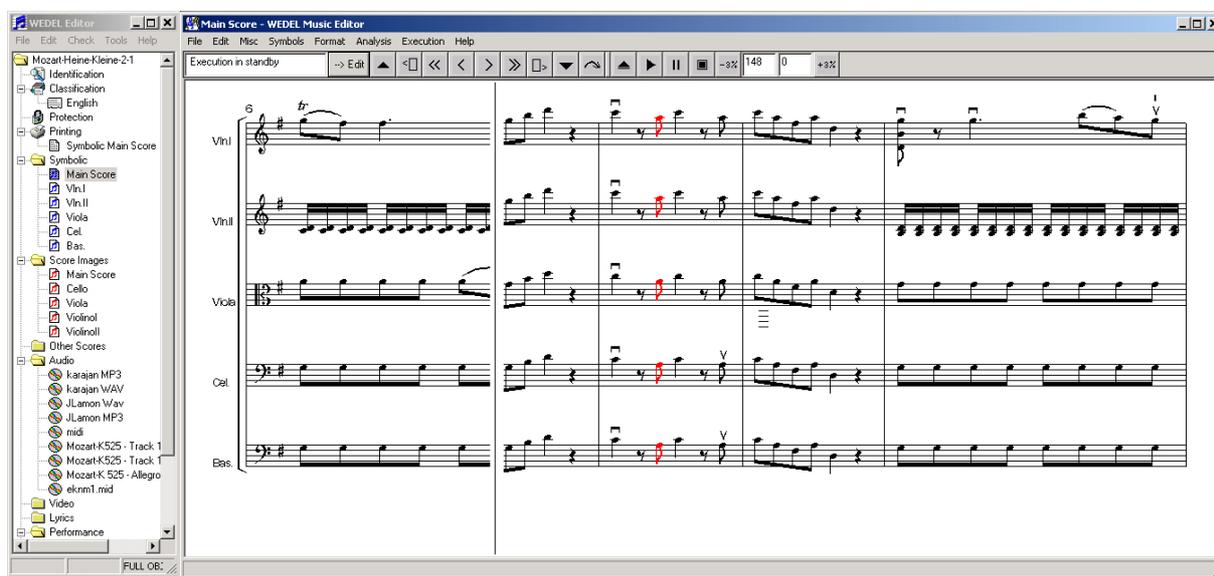
1. Set the metronomic indication and assign it at the first measure of the of the first part of the main score. This can be done by item Metronome of the Menu Symbols in the WEDELMUSIC editor window. If the metronomic indication is already present you can skip this phase. Please note that the metronomic indication may change any times you need along the music score.

2. Pass in execution mode by selecting the button  in the tool bar.

3. Initializing the execution process with . In this case you have to select the first choice of the list that refers to the MIDI execution:



4. Start the execution with , this will ask to you to define the orchestration. For details about the orchestration the see the chapter of MIDI generation. During the execution you can pause, stop or change the execution rate with the buttons contained in the execution toolbar.



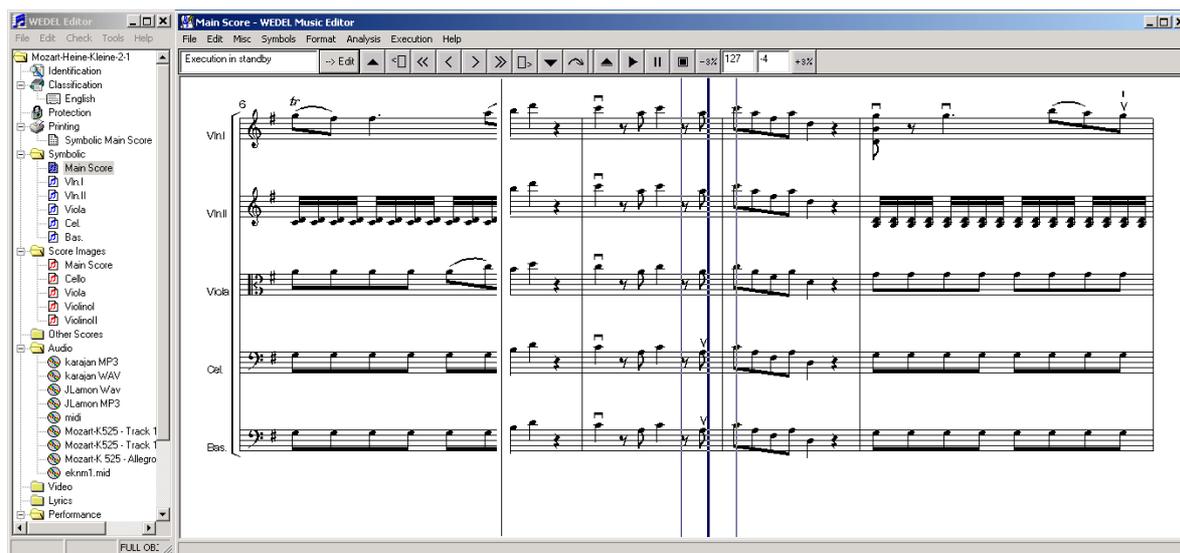
15.4 Symbolic Music Execution with Selected Audio

The synchronous execution of a symbolic music score (main score) with an audio of a real performance can be easily performed with the following steps.

1. Pass in execution mode by selecting the button  in the tool bar.

2. Initializing the execution process with . In this case you may select any listed synchronization except that referred to MIDI. If no synchronization is present means that they have not been included into the WEDELMUSIC object. In order to build a synchronization please refer to the following specific section of this chapter.

3. Start the execution with . During the execution you can pause, stop or change the execution rate with the buttons contained in the execution toolbar.

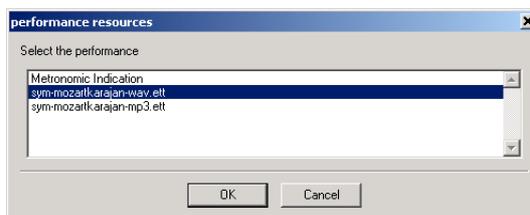


15.5 Image Music Score Execution with Selected Audio

The synchronous execution of a sequence of image scores (main score) with an audio of a real performance can be easily performed with the following steps.

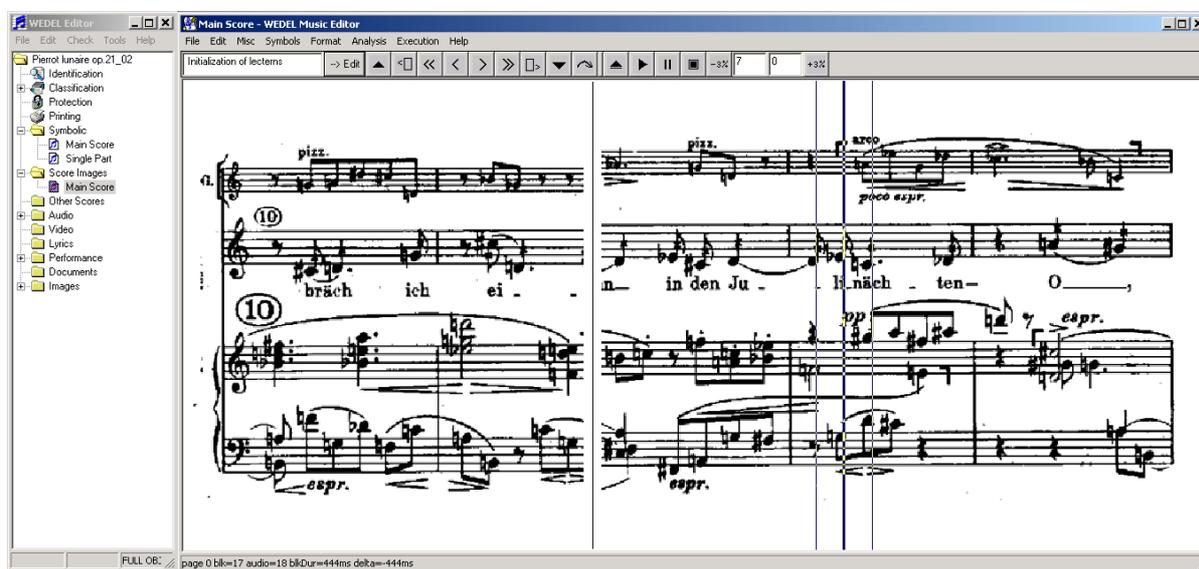
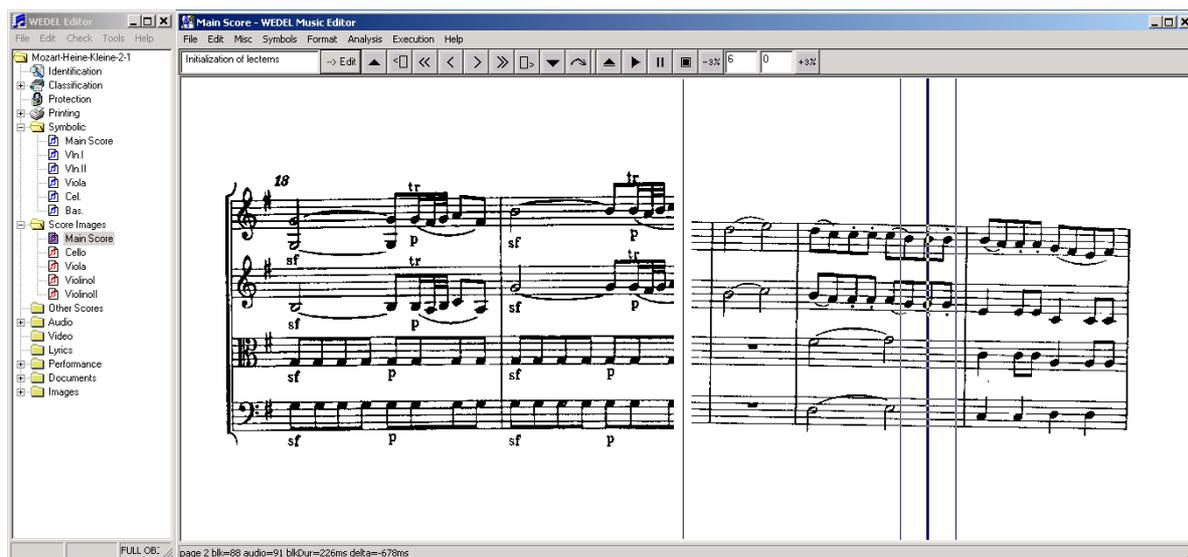
1. Pass in execution mode by selecting the button  in the tool bar

2. Initializing the execution process with . In this case you may select any listed synchronization except for the MIDI that is not present. The first item of the list activate the execution without any synchronization with real audio file. If no synchronizations is present means that they have not been included into the WEDELMUSIC object. In order to build a synchronization please refer to the following specific section of this chapter. The initialization of pages for execution may takes in this case several seconds or minutes depending on the size and the number of the images. The available image slices are loaded and sized at the resolution of your monitor, please wait! A dialog presenting the status of the process is shown during image loading.



3. If the Metronome Indication is selected, the user has to insert the metronomic value for the execution. For details about the meaning of metronomic indication dialog box please refer to the WEDELMUSIC editor chapter.

4. Start the execution with . During the execution you can, stop or change the execution rate with the buttons contained in the execution toolbar.



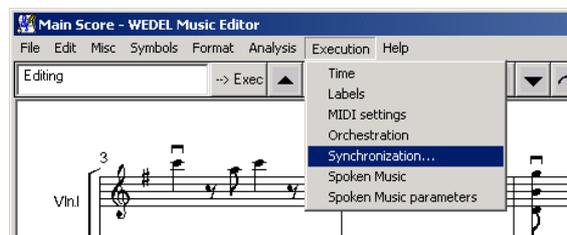
15.6 Activating Synchronisation Process

In this section, it is explained how the synchronization can be performed between:

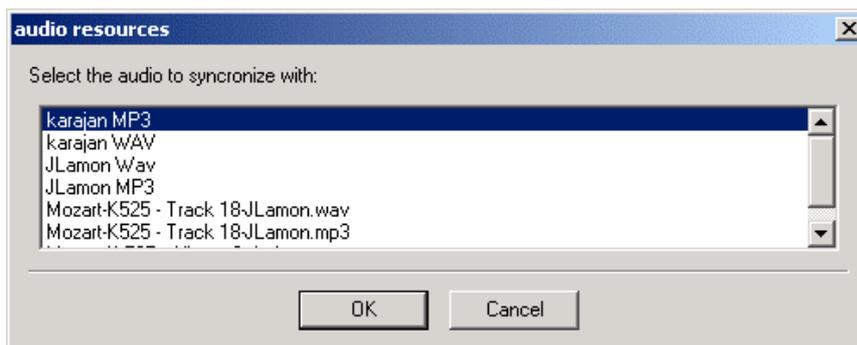
- ◆ Symbolic music score and an audio file
- ◆ Symbolic music score and a video file (not yet available)
- ◆ Image score music and an audio file
- ◆ Image score music and a video file (not yet available)

In order to define the synchronization you have to open the main score of the music notation that you have (image score or symbolic notation).

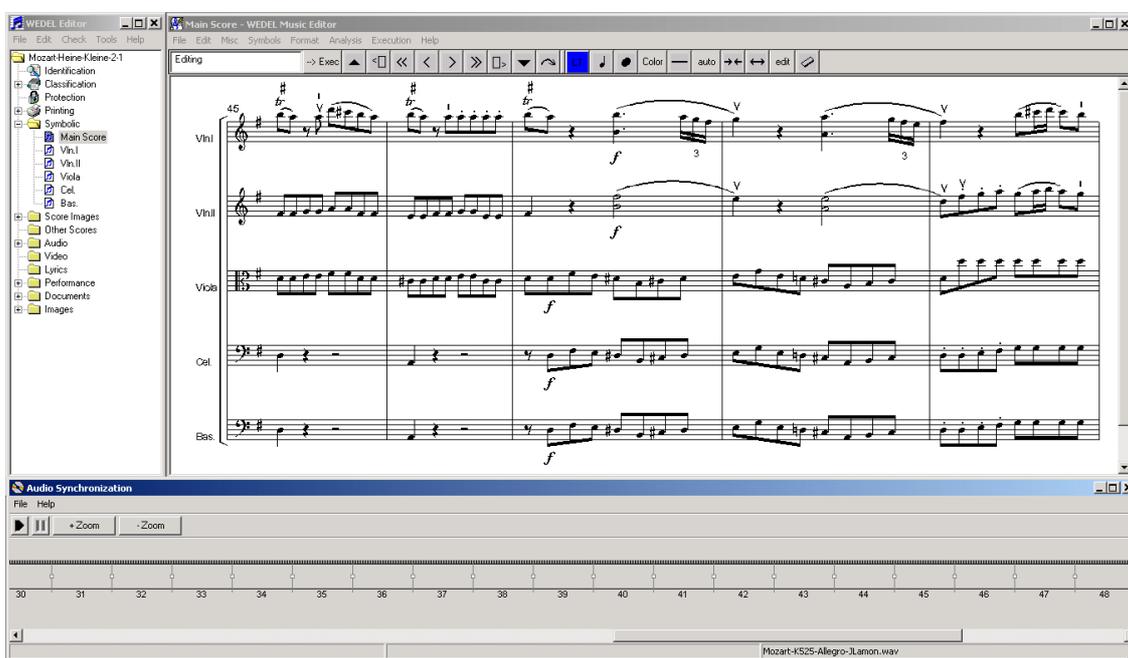
1. Pass in the synchronization activity by selecting synchronization item of Menu execution as depicted in the following figure.



2. Select the audio or video file (in the next version) that you would like to synchronize with the score. The names reported in the list are those which are present in the structure of the WEDELMUSIC object and thus in the WEDEL editor structural tree of the object.



After this selection the Synchronization Window is opened as depicted in the following figure. In this case, it is suggested to arrange the synchronization window and the music score in a manner that may facilitate your work. If you would like to save this configuration of arrangement of windows you can use the command Save Workspace from the Edit Menu of the WEDEL Editor on the left side of the desktop.

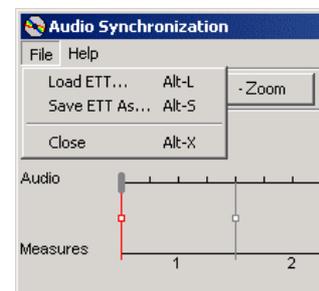


15.7 Audio Synchronisation Window

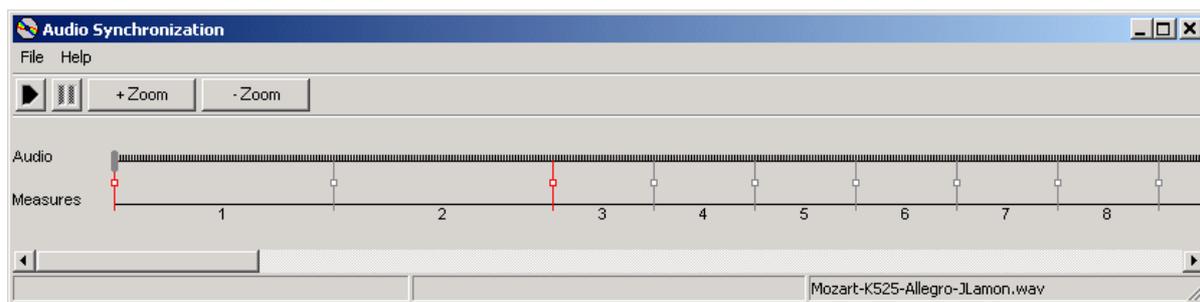
The audio synchronization window permits the generation of the so called Execution Time Trend, ETT description. They are the synchronization between a music score and an audio or video.

The window presents a menu from which you can:

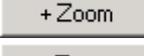
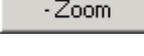
- ◆ Load an already present synchronization to change/improve it. Only synchronization related to the audio or video file selected in the list before to open the window can be loaded.
- ◆ Save the loaded or the new synchronization under editing;
- ◆ Close the synchronization windows



When the Synchronization window is opened a new synchronization is automatically produced and before to close the window it has to be saved giving to it a specific name. The name will appear at any execution to select the synchronized execution. These names may contains spaces, etc., and can be changed on the WEDEL editor tree.



As depicted in the previous figure, the synchronization window presents a toolbar and the synchronization diagram. The tool bar present the following commands:

- ◆  Play -- to start the play of the selected audio file before the opening of the synchronization window;
- ◆  Pause -- to pause the play of the selected audio file;
- ◆  +Zoom -- to zoom in the visualization of the synchronization diagram.
- ◆  -Zoom -- to zoom out the visualization of the synchronization diagram.

Please note that, on the left side of the bottom of the window, the name of the audio file used in the synchronization.

15.7.1 The synchronisation diagram

The synchronization diagram presents two horizontal lines.

- ◆ **Audio:** temporal execution/track of the audio file from its begin (on the left) its end to the right.
- ◆ **Measures:** linear representation of the measures as depicted in the symbolic representation of music or in the image score. The measures are reported with their number and with their temporal duration. Please note that by clicking with the left button of the mouse it is possible to see on the music score window the corresponding measure.

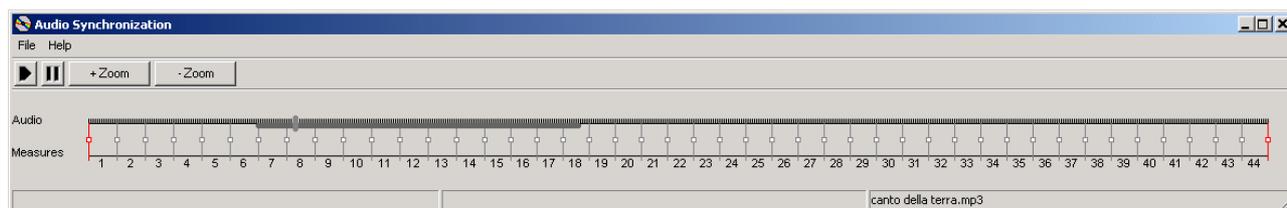
The two lines are joined by the so-called synchronization lines. Each synchronization line states at which time instant of the audio track a given measure has to be executed, visualized, synchronized.

The goal of the synchronization process is to assign the position of the measures with respect to the audio track. This goal can be reached assigning the position of all the synchronization lines that start from the beginning of each measure. On the other hand, to assign all synchronization is a very expensive and time boring process. In order to reduce this work at few seconds for each music pieces of several minutes a specific mechanism has been defined. It requires you to identify and set up only few synchronization points and from them the internal synchronizer estimates the rest of the synchronization line positions. The suggested process is reported in the Section called Synchronization Process.

15.7.2 Audio Line in the Synchronisation diagram

On the audio line, several activities can be performed for the execution of the audio track and for the alignment of the measures to specific points of the audio track:

- ◆ Definition of the starting point from which the music contained in the audio track has to be executed: click with the left button of the mouse, the play is automatically started. During the execution you can stop the execution with the pause button.
- ◆ Definition of an audio segment to be played: click the left button of the mouse and drag until the segment is not defined of length that you prefer. The selected segment is marked with a larger line. In the next figure, the segment of the audio track has been defined from measure 7 to middle of measure 17. Once you have selected the segment to play, the play is automatically started and the following features are available:
 - ◆ The point of execution is marked with a running cursor as that which is present in the following figure in measure 8.
 - ◆ To play again the same selection uses the play button in the tool bar even if it has not finished.
 - ◆ To pause the play uses the pause button in the tool bar.



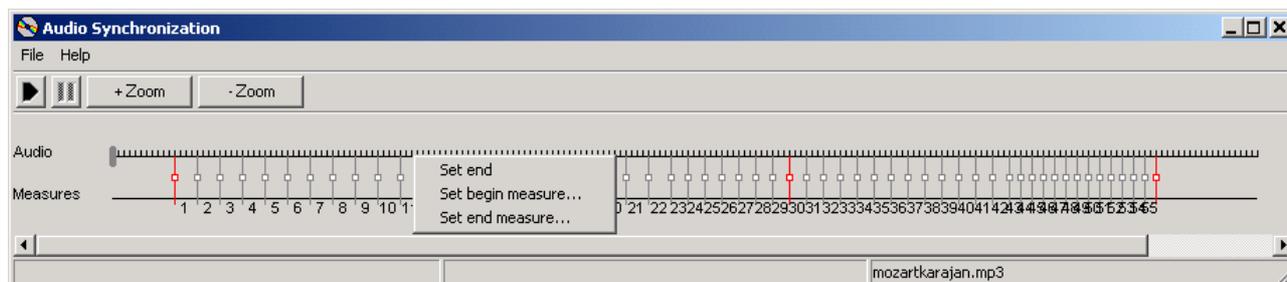
The audio track presents a specific menu for each point. It can be activated by selecting with the mouse the audio track and clicking with the right button of the mouse. Details can be found in the next section regarding the Synchronization lines.

15.7.3 Synchronisation Lines

The synchronization lines can be automatically and/or manually assigned to each specific point of the audio track. For this reason they are drawn by using two different colors:

- ◆ Red, lines placed by the user to align the measure to a specific point of the audio track.
- ◆ Gray, lines automatically calculated by the tool.

The synchronization lines can be selected and dragged with the mouse in order to align them with specific point of the audio track. Once selected and dragged a synchronization line, at its release it results to be fixed and its color is set to red.



The following features are useful for setting the synchronization lines:

- ◆ Imposing the synchronization of audio segment with the begin of a measure: click on the selected point of the audio track with the left button of the mouse and chose "set begin measure...". See the above figure in which the menu associated to the audio track point is visible.
- ◆ Imposing the synchronization of audio segment with the end of a measure: click on the selected point of the audio track with the left button of the mouse and chose "set end measure...". See the above figure in which the menu associated to the audio track point is visible.
- ◆ Releasing a synchronization line: click on the synchronization line with the right button of the mouse
- ◆ Setting the position of the last measure to a corresponding point of the audio file: click on the selected point of the audio track with the left button of the mouse and chose "set end".
- ◆ Moving the position of the last measure to a corresponding point in audio file: selecting and dragging the synchronization line with the left button of the mouse.
- ◆ Setting the position of the first measure to the corresponding point of the audio file: selecting and dragging the synchronization line with the left button of the mouse.

In the above figure, it can be noted that the measures are synchronized with the audio track starting from a certain point of the audio track and ending before the effective end of the audio file. In addition, the first part of the music piece presents a slower execution rate (a lower number of measures for minute are consumed) as it can be noted by observing the distance from successive synchronization lines at the left and at the right of the red synchronization line between measure 29 and 30.

15.7.4 Measure Line in the Synchronisation diagram

The measures are repeated with their number and with their temporal duration.

- ◆ Visualizing the certain measure on the basis of its number: click with the left button of the mouse on the measure number. This is possible for both image score of symbolic music. In both cases, it is visualized the page in which the selected measure is present.

15.8 Synchronisation Process

15.8.1 Automatic Synchronisation

- ◆ start the synchronization window
- ◆ Select the audio file to be synchronized with the image score or with the symbolic music that you have.
- ◆ Align the begin of the first measure with the point of the audio file in which the corresponding audio starts
- ◆ Align the end of the last measure of the piece with the point of the audio file in which the measure ends
- ◆ After this phase a first version of the synchronization is automatically generated and can be saved by giving it a name.
 - ◆ To test this synchronization is possible by using the execution mechanism previously described.
 - ◆ To improve and refine the produced synchronization is possible, as any other synchronization.

15.8.2 Synchronisation Improvement

Typically the improvement is needed when the music piece contains relevant acceleration and/or decelerations. They are typically located in few points of the music piece, and marked with specific music notation symbols or annotations: *rallentando*, *accelerando*, etc.

If you are in that case, you may use the knowledge of the position of these points to align the measure start or end to the point in which the audio present the change.

- ◆ open the synchronisation window
- ◆ Select the audio file to be synchronized with the image score or with the symbolic music that you have.
- ◆ Load the already available synchronization by using the load item of file menu of synchronization window.
- ◆ After that action the synchronization status is shown. The loaded synchronization present synchronization lines in red and gray if they have been imposed or calculated during the synchronization.
- ◆ You can align the measures in which the mentioned relevant changes are present to assign them to the points in the audio in which they start. In this way, the measures among the fixed synchronization points are automatically realigned producing the synchronization for you.

If you do not have any idea of the music piece, the synchronization can be performed in a more systematic manner as reported in the following

- ◆ Identify an easy recognizable measure in your score close to the middle of your file and remember its number. Easy detectable and synchronizable measures are those that present significant changes such as:
 - ◆ Change of rhythms
 - ◆ Change of number of instruments, the attach of some instruments or the beginning of a rest for others.
 - ◆ Presence of dynamics: *p*, *pp*, *f*, *ff*, *fff*, etc.
 - ◆ Presence of a voice singing specific words
 - ◆ Etc.
- ◆ play a large audio segment in the middle your file, starting some measures before and ending some measures after the point in which the selected measure is located.
- ◆ When you have identified the point by listening the audio, please click with the right button of the mouse on the audio line. In this way a menu is activated. With the menu you can choice to align at that point the beginning or the end of the selected measure. Typically the begin if you have taken the suggestion of selecting a measure in which a change start.
- ◆ Selecting the item to setting the begin measure, the number of the measure is requested with a small dialog box.
- ◆ After this action, all the measures which are located between two synchronization points are automatically distributed and aligned with the audio for you.
- ◆ This means that you need to fix only few points even for a long music piece.

After to have synchronized the mentioned middle point the process can proceed by identifying other points in the middle of the segment marked by synchronization points. This activity is suggested only if the synchronization is not acceptable. Typically we have observed that for pieces in which the changes are non relevant, such as in classical music, one synchronization point every 30 measures can be more than enough.

Chap.16 Fonts Management

In WEDELMUSIC several font files are used for covering the high number of music symbols. By using software for font manipulation all the WEDELMUSIC characters can be modified.

The files related to the font are present in tree formats:

- **.FON** files containing the characters used for music display on screen
- **.PFA** files containing the font in vectorial format for printing purposes
- **.TBL** files containing positioning information for the associated font

The fonts used in WEDELMUSIC (version 6.2) are:

- **musica__.fon** – contains the main musical symbols
- **musica2_.fon** – contains other musical symbols
- **bigtext_.fon** – contains a big font for labels
- **arial__.fon** – contains the font for lyrics
- **generic1.fon** – user font 1
- **generic2.fon** – user font 2
- **generic3.fon** – user font 3
- **percuss1.fon** – specific percussion instruments font
- **pedalss1.fon** – specific pedal instruments font

All the font files have to be present in the current WEDELMUSIC object location otherwise the default font files located in the FONT path (see section of installation) are taken. If a font is missing then the fonts founded in moods/font directory are used.

16.1 Font positioning

During the use of the WEDELMUSIC editor the user may want to perform some changes to the musical symbol position. This is possible by using the “Table of Font Details” dialog window. It is displayed after choose the font from the “Format”, “Edit Font Tables” (see Fig. 16.1).

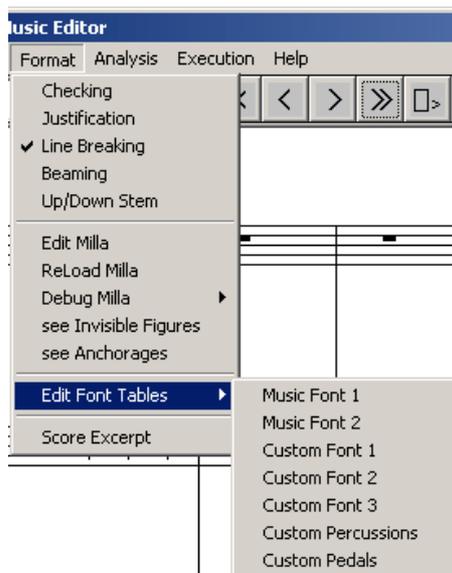


Fig. 16.1 – “Edit Font Tables” command from the “Format” menu

The list of symbols managed by the table is shown considering their graphic representation if it is possible.

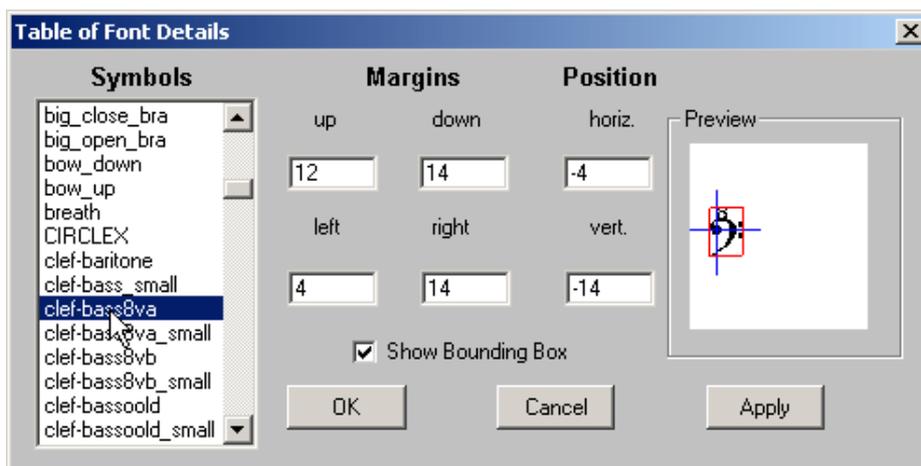


Fig. 16.2 – Table of Font Details dialog window. The Show Bounding Box check box is activated

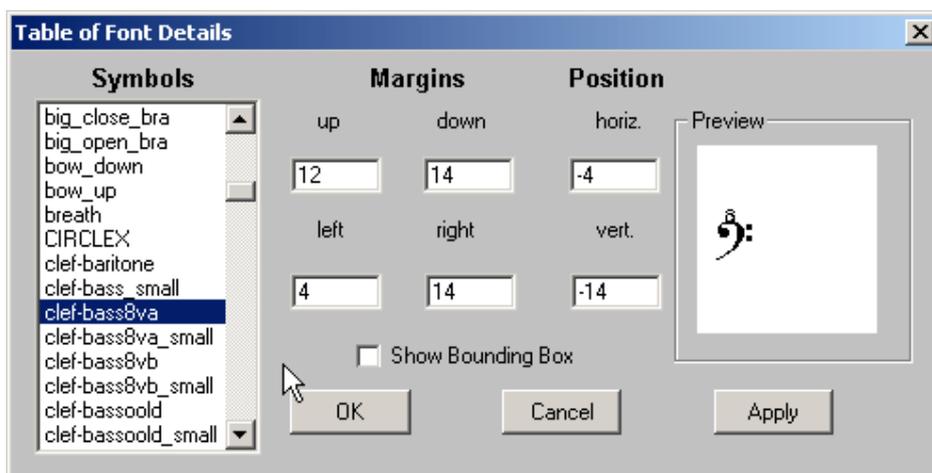


Fig. 16.3 – Table of Font Details dialog window. The Show Bounding Box check box is not activated

Once a symbol is selected from the left list, its six parameters numbers are shown on the central top side of the dialog box. These values can be modified according to the user needs. Button “Ok” allows applying the performed changes, saving the changes into the file and close the dialog window. “Apply” button makes the changes into the file if the corresponding permission is available. “Cancel” button return to the calling menu without any change (if “Apply” button was not pressed).

The Preview depicted in the right part of the dialog window helps users to understand what symbol is modified and evaluates the new position. The rectangle around the symbol identifies the symbol selection area (the area on which a right mouse click will select the symbol).

All the characters displayed are positioned referring to a base line (see Fig. 16.4). The base line is the same for all the characters from the font. When **vert** is equal zero the horizontal blue line reported in the preview represent the base line. The vertical line is the reference of the central position of the symbol. In most cases it is better to have it centered with respect to the symbol.

There are two groups of parameters to set for a character in a font. The first is related to the position and the second is related to the margins of the selection area.

Position parameters (see Fig. 16.4):

- dx - give the x position of the centre of the character from the basepoint (pixels)
- dy - give the y position of the centre of the character from the basepoint (pixels)

There are no exact rule defining the centre of a symbol. Generally it is placed in the symmetry centre of the figure but in case of non symmetric one it should be placed in the bottom-left corner.

Margins parameters are used to define the "selected area". That means a rectangle where a mouse click is considered as an action on the symbol.

- left/right/up/down - defines the distance (in pixels) between the symbol centre and the left/right/up/down margin of the rectangle.

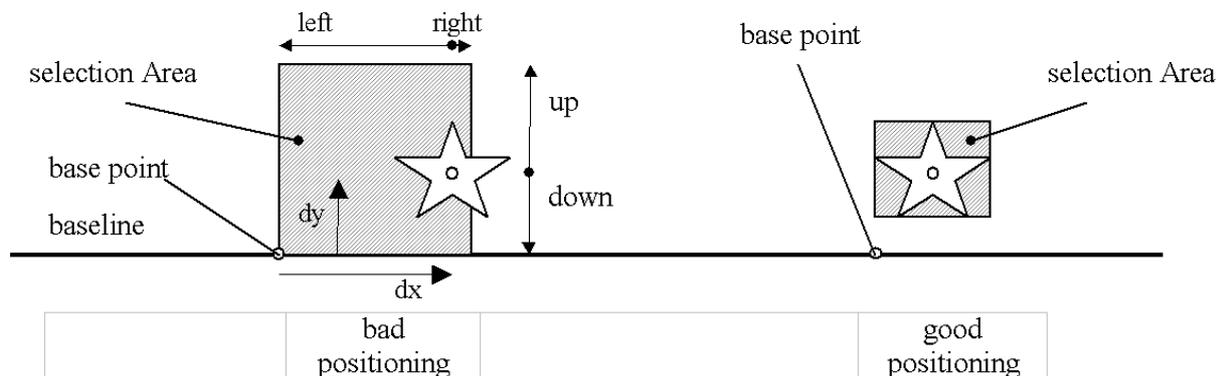


Fig. 16.4 – Symbols parameters

By default, the editor uses valid values for all parameters, but the user can modify them for a particular stile or for adjusting incorrect positioning.

As an example let consider the “FP” dynamic symbol (see Fig. 16.5).



Fig. 16.5 – Original positioning of the *fp* symbol

The parameters shown in the table are shown in the next figure (Fig. 16.6).

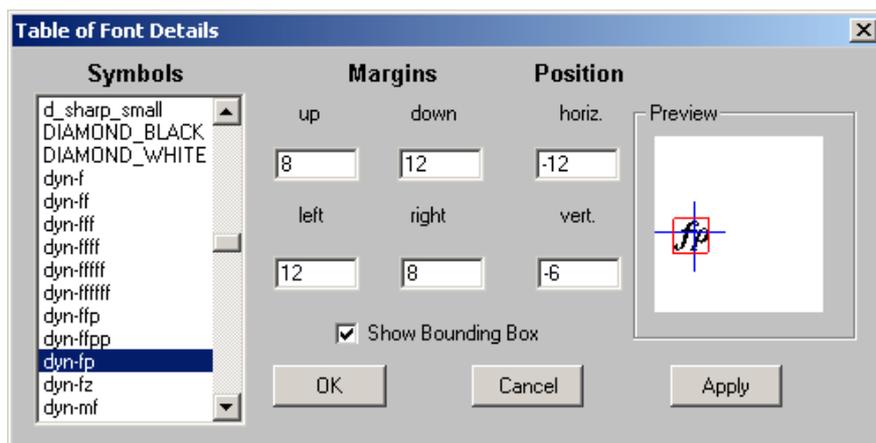


Fig. 16.6 – Original symbol parameters

The vertical line in the preview box shows that the symbol is positioned centred on respect with the associated notehead.

If the user, for some reason, want to move the symbol on left it is sufficient to edit the “Horiz” position parameters.

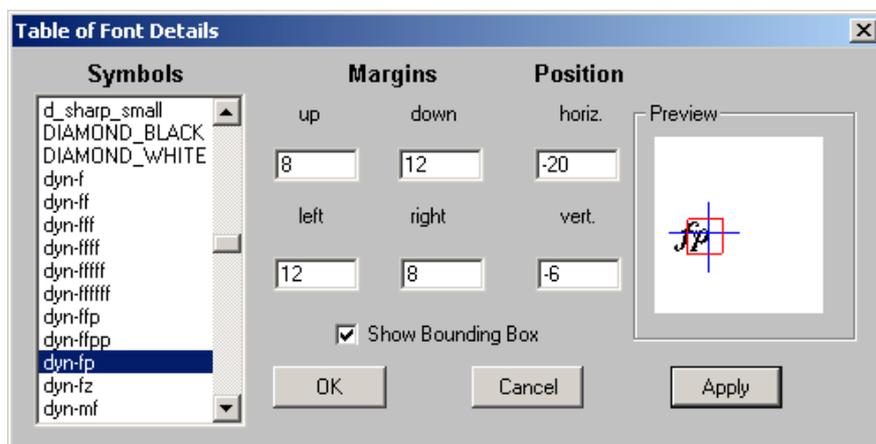


Fig. 16.7 – The dialog table after the “Horiz.” positioning parameter

In the preview box two things have to be noted:

- The symbol is no more aligned with the notehead (the vertical line reported in the preview of the symbol).
- The selection box does not cover in the right manner the symbol (for solving this the right margin has to be reduced and the left one has to be increased)

The result of the changes performed is shown in Fig. 16.8.

Fig. 16.8 – The *fp* symbol was moved to left

The numbers related to the symbol positioning and margins are saved in the associated *.tbl* file

16.2 Font Manipulation

Starting from the *.pfa* file all the fonts can be manipulated by the user in order to better fit the personal necessities. The procedure has to be performed in several steps:

Step 1 – individuate the *pfu* file that contains the symbol to be modified

Step 2 – open the file with a font manipulation software (Macromedia Fontographer)

Step 3 – save the new font

Step 4 – generate the font files

Step 5 – copy the *.pfu* and the *.fon* file on the WEDEL object directory (moods/font in version 6.2)

Step 6 – Launch the WEDELMUSIC editor and correct the table by using the “Table of Font Details” dialog window

Please refer to the next chapter for details on font manipulation.

16.3 Symbols associated with the font files

See Appendix A for the table of fonts

Chap.17 Definition of New Symbols

In the WEDELMUSIC editor there is the possibility to insert several user defined symbols.

In this section, the instructions for a successful creation/modification of the user-defined symbols and font (also called generic font) are presented. User defined Symbols are also called Generic fonts or Generic Expressions. In WEDELMUSIC Editor it is presently only possible to create generic symbols that can be associated to figures. To this end, three 3 generic fonts are prearranged. They contains some symbols as examples and can be fully customised by the user.

The files that the user can modify are:

- generic1.fog, generic2.fog and generic3.fog (Fontographer source)
- generic1.fon, generic2.fon and generic3.fon (fon file for screen view)
- generic1.pfa, generic2.pfa and generic3.pfa (file for PS generation)
- generic1.tbl, generic2.tbl and generic3.tbl (file containing the table of font positioning)

Fontographer font editor allows editing both FON and PFA files. Typically, in the WEDELMUSIC object only PFA files are included.

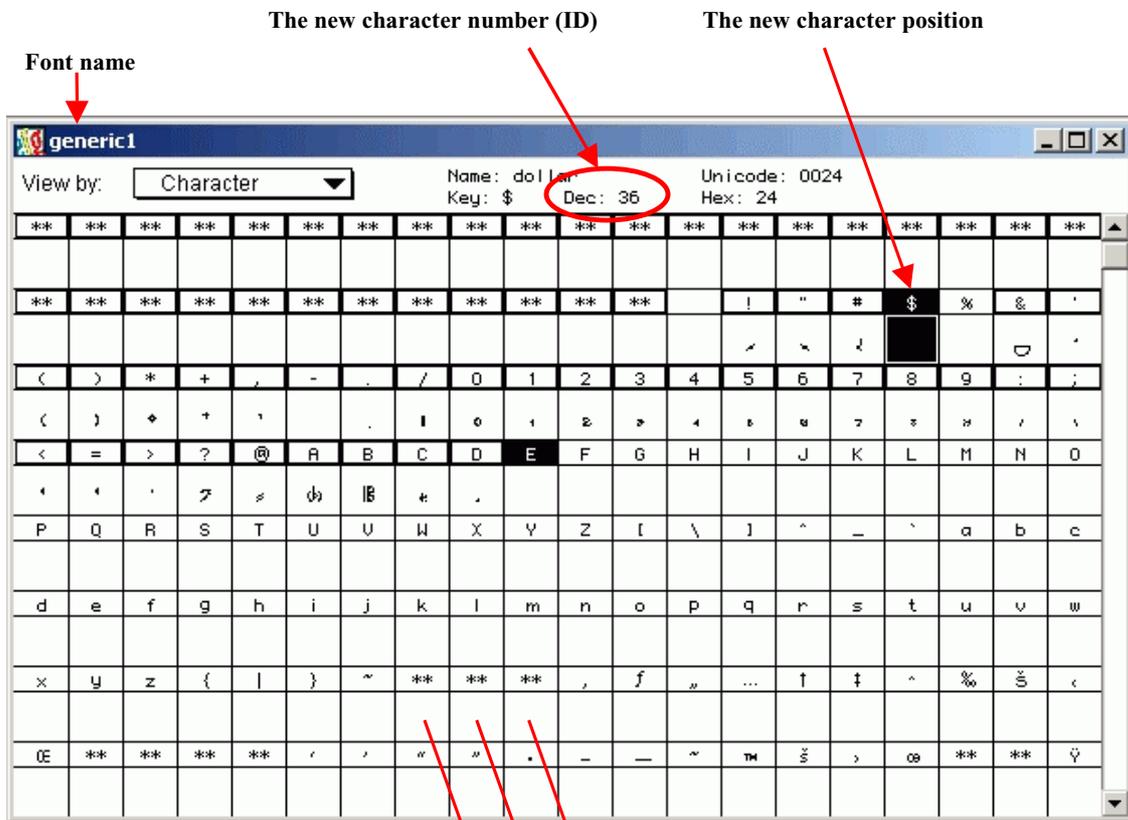
17.1 Symbol definition process

Step to be performed for a new character implementation (in the existing files):

1. Using fontographer the new characters have to be created; .fon and .pfa files have to be generated and saved in moods/font directory
2. *milla* file have to be modified for the management of the new character
3. the .tbl file has to be updated by adding the new symbol parameters
4. char position has to be set from the music editor (command Edit Table)

Step 1 – creation of a new character, generation of the .fon and .pfa files

- Open the .fog file in fontographer (let suppose to open the *generic1.fog* file).
- Make the changes to a character or create a new one (suppose to be char. \$ identified by the dec. 36). (see Fig. 17.1). Pay attention to do not insert new char in the cells identified with **. These chars will not be available in the .fon file.
- When the new char is ready choose the *recalc bitmaps* command from the *Element* menu. Without *recalc bitmaps* the generated file will contain the old characters with no updates. (see Fig. 17.2)
- Try to save the .fog file. If a message as “cannot save the file, disk not available” is displayed use the *save as...* command. If not your file will be loosed (I think that this is an internal Fontographer bug).
- Use the *Generate font files...* command from the *file* menu with the settings shown in the Fig. 17.3. Use a temporary directory as output since a lot of other files are generated. After the files generation copy the .fon and the .pfa files (*generic1.fon* and *generic1.pfa*) in the /moods/font directory
- Please observe that the font have the same name as the file (i.e. the font created in the *generic1.fog* file is named *generic1*)



DON'T PLACE YOUR NEW CHARS IN THE CELLS IDENTIFIED WITH ** (AS 127,128,129)

Fig. 17.1 – Fontographer window for the generic1.fog

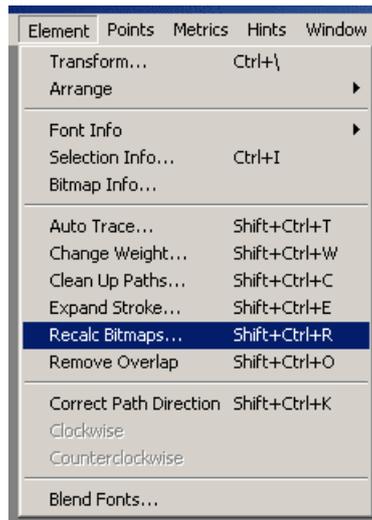


Fig. 17.2 *Recalc Bitmaps ...* command has to be executed before generating the fon/pfa files

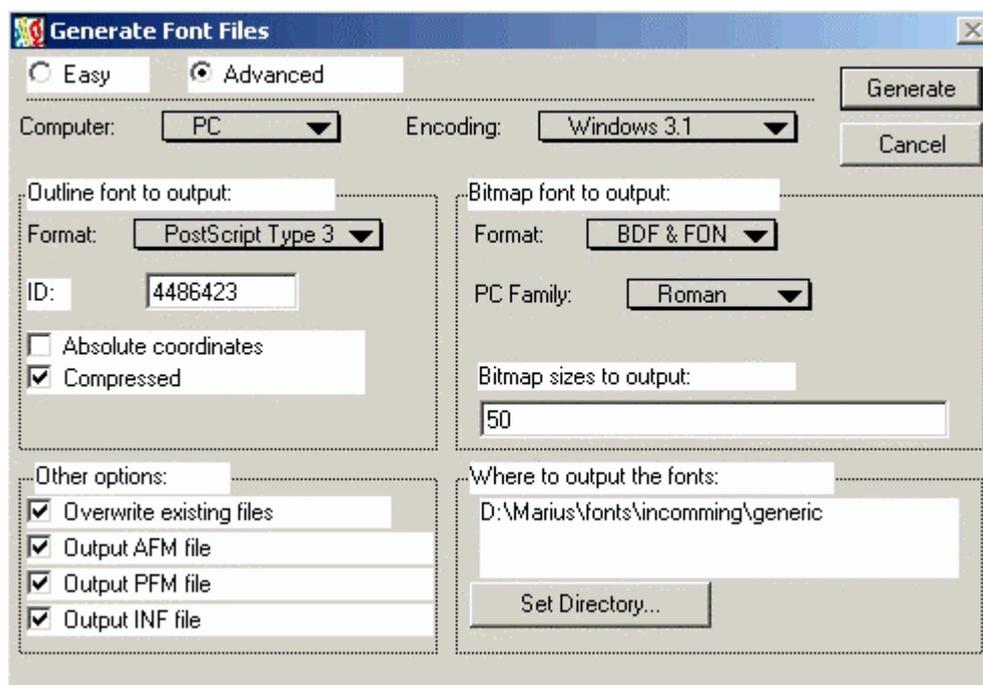


Fig. 17.3 - Options for the *Generate font files* command

At this point the new symbols have to be implemented in the music editor.

Step 2 – editing MILLA file

In order to allow the editor to load the new symbol some changes have to be made in the *MILLA* file. At the beginning of the file the group of generic fonts are defined. The group name has to be the same to the .fon file name. In the case the symbol is located in *generic1.fog* the group will be named *generic1*.

In the next a part of the milla file is shown. The line needed for the char 36 is shown in bold. Since the generic1 group was already present it is not necessary to insert it. The symbol name can be chose by the user, the group is the file name and the code have to be equal to the code displayed in Fontographer (the ASCII code) (we suppose to modify the char '\$' that is the number '36').

```
DEFGROUP "generic1";
```

```

DEFGROUP "generic2";
DEFGROUP "generic3";

/***** Symbols definition *****/
// DEFSYM "gen1s1" GROUP="generic1" CODE=33
DEFSYM "gen1s2" GROUP="generic1" CODE=34 ;
DEFSYM "gen1s3" GROUP="generic1" CODE=35;
DEFSYM "gen1s1" GROUP="generic1" CODE=33;
DEFSYM "gen2s1" GROUP="generic2" CODE=36;
DEFSYM "gen2s2" GROUP="generic2" CODE=37;
DEFSYM "gen2s3" GROUP="generic2" CODE=38;
DEFSYM "gen2s4" GROUP="generic2" CODE=39 ;
DEFSYM "ournewsymbol" GROUP="generic1" CODE=36;
DEFSYM "gen3s1" GROUP="generic3" CODE=33 ;
DEFSYM "gen3s2" GROUP="generic3" CODE=34 ;

/***** Rules for the "generic1 group" *****/
RULEIMM generic10 DEFAULT "generic1" RELNOTA OPPOSITETOSTEM;
RULEIMM generic11 ALTERNATIVE "generic1" RELNOTA ONSTEM;

immIF NOTE INSINGLELAYER THEN generic10;
immIF NOTE INMULTIVOICE THEN generic11;

RULEPOS generic12 "generic1" RELNOTA ONSPACE OUTSIDESTAFF DX=0 DY=0;

posIF OPPOSITETOSTEM THEN generic12;
posIF ONSTEM THEN generic12;

```

Please note that, in order to correctly processing the symbol also the priority rule has to be set into the MILLA file. The section starts with RULEPRI keyword and contains the symbols listed in the order on which they are placed around the figure. If a symbol is not listed into the RULEPRI section than the symbol will not be displayed.

```

RULEPRI STAC TEN LEG MARTF ACCE SFOR MART PUNTOALL ARCO PUNTA TALLONE PONTICELLO
TASTIERA ARCATASU ARCATAGIU CORDA PIZZICATO DITEG TRILLO MORD GRUP ARM CONSORD
VIASORD "smear" "vspace1" "vspace2"
"gen1s3" "gen1s2" "gen1s1" "ournewsymbol" "gen2s1" "gen2s1" "gen2s2" "gen2s3"
"gen2s4" "gen3s1" "gen3s2"

```

Step 3 – editing .tbl file

In order to manage the new symbol it has to be added in the *.tbl* file (i.e. *generic1.tbl*) in the *moods/font* directory. You have only to add the symbol code followed by 6 numbers (you can put 6 zeros) and a '#'

```

33 5 5 5 5 -10 -5 sym33 #
34 8 5 5 5 -9 -9 sym34 #
35 12 10 5 5 -5 -13 sym35 #
36 0 0 0 0 0 0 our_symbol # // line added for the new symbol

```

Step 4 – Position adjustment

At this point the editor manages the new symbol but some adjustment has to be done if it has bad position.

Use *Edit Table* menu from the *Format* menu to perform the changes to the **our_symbol**. Note that the name of the new symbol will be the same string as the one inserted into the *.tbl* file and the symbols are ordered by name in the list shown on the left.

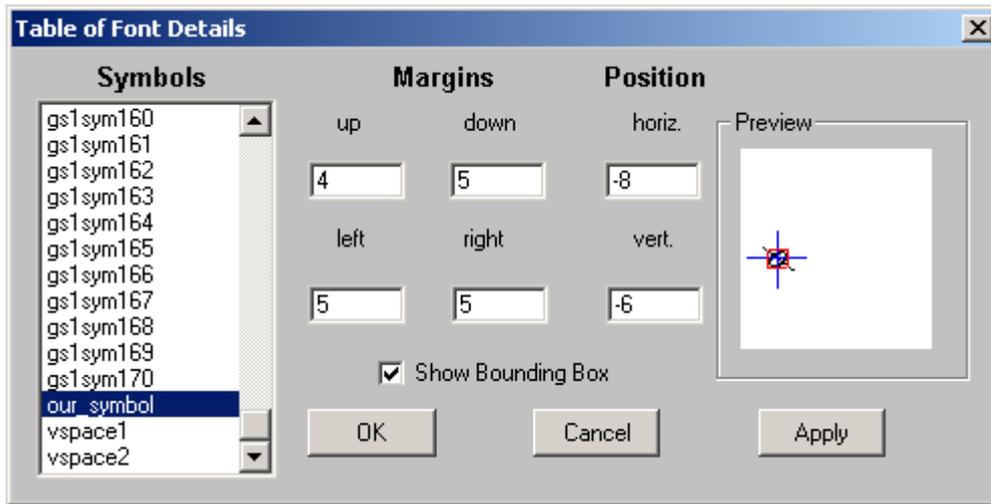


Fig. 17.4 - The dialog window used for symbol position adjustment

For details about the fonts available and their position in the font files and table please consult the general table of font in the previous chapter.

Chap.18 Music Checking and Transposition

18.1 Music Duration Checking

The Music Duration Checking allows to control the consistency of a measure or an interval of measures. The **Checking** functionality is in the **Format** Menu on the Menu Bar of the WEDEL Music Editor (see Fig.19.1).

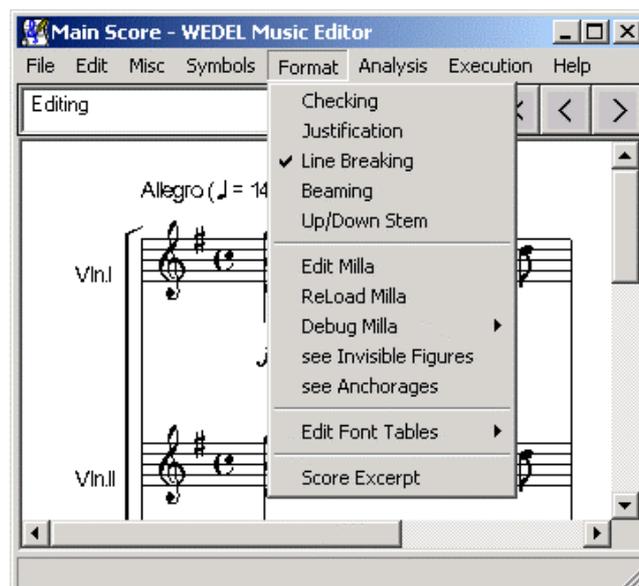


Fig. 18.1 - The Format Menu

18.1.1 Checking Measure Dialog

The Checking Measure Dialog is shown in the Fig. 19.2. Two main areas are present: **Check Control** and **Check Log**.

Check Control

Start: the number of the start measure

End: the number of the end measure

Single: it allows controlling only a measure or an interval of measures.

Check Log

In this window, the result of the checking measures is shown. If the measures are correct the message “Measures are time consistent” is displayed, otherwise the list of incorrect measures are displayed.

The format of messages is:

<Part number>, <measure number>, <Layer number>,
<Gap value>

The Gap value indicates the value of inconsistency of the measure, if it positive the time duration is greater than the time signature, otherwise less than time signature.

By double-clicking the mouse on a message the measure corresponding to the problems is visualised in the Music Editor in order to correct the error.

Check Button

Start the check of measures

Close Button

Close the dialog

18.1.2 Example

Considering the example in the Fig. 19. 3, the measure 4 in the part 1 and the measure 6 in the part 3 are not time consistent, in fact in the first case an 1/8 (-1.0000 respect the unit of the time signature) figure is missing, while in the last case an 1/16 (-0.5000) figure is missing.

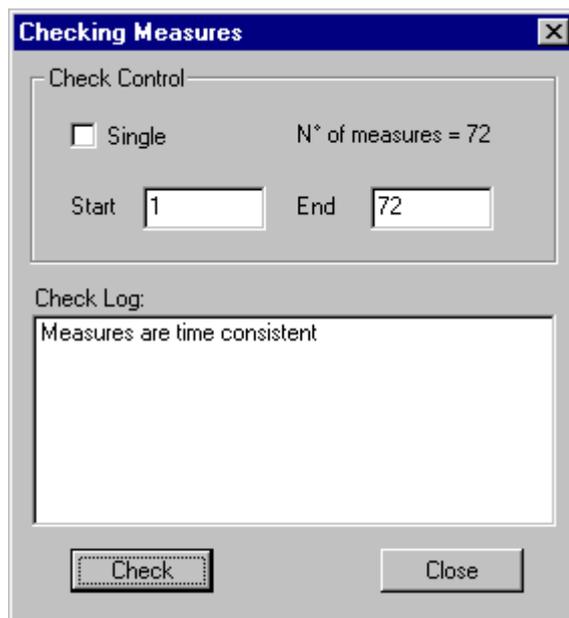


Fig. 18.2 - Checking Measures Dialog

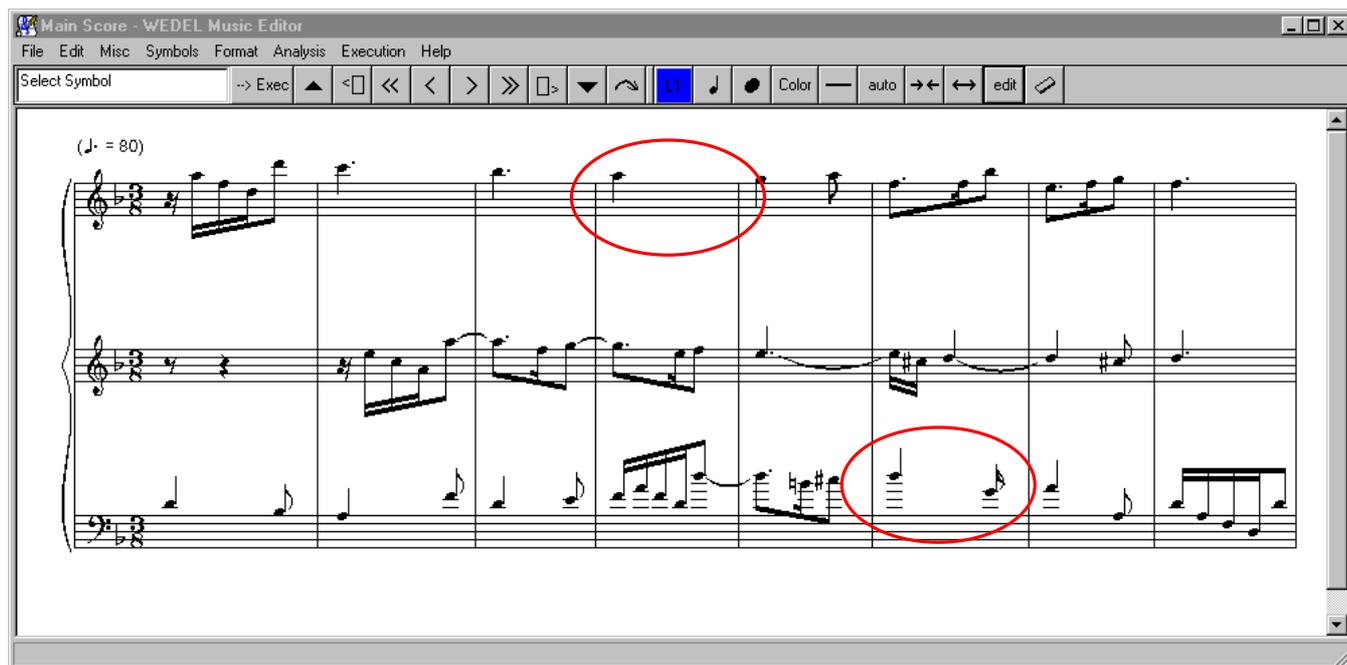


Fig. 18.3 - An example of not time consistent measures

The result of checking measures is shown in the Fig. 19.4 and shows these measures.

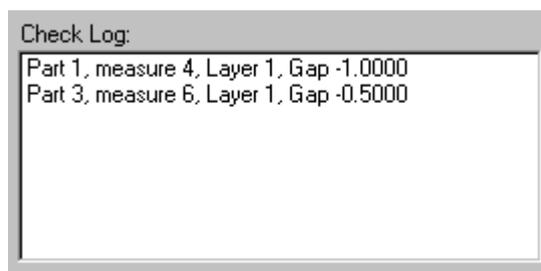


Fig. 18.4 - Results of Checking Measures

18.2 Music Transposition

The transposition session allows to the user operating automatic manipulation on the symbolic piece in both modality Main Score or Single Part view, in this context the following transposition methods are provided:

- **Transposition via clef:** Clef chagement
- **Transposition via intervals:** Tonality chagement by interval transposition
- **Translation of a piece of music:** Pitch chagement

To operate music transpositions, select **Misc** from the menu bar of the WEDELMUSIC Editor (see Fig. 18.5) and then choose **Transposition**.

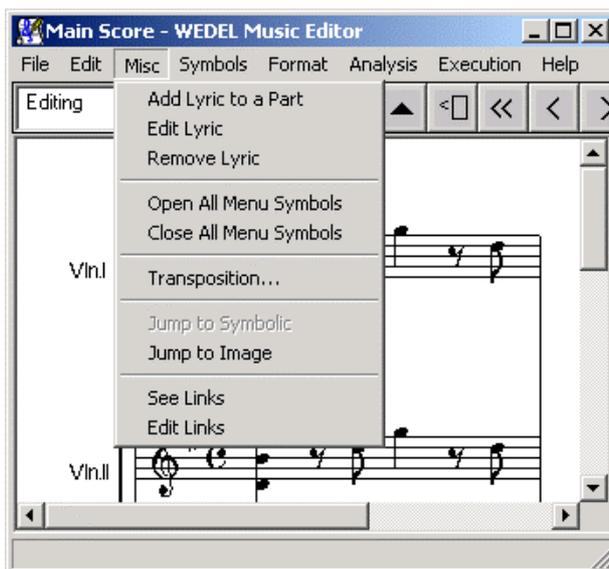


Fig. 18.5 WEDEL Music Editor - Menu Bar and Misc selection

This operation opens the Transposition dialog (see Fig. 18.6) in which a set of parameters are presented.

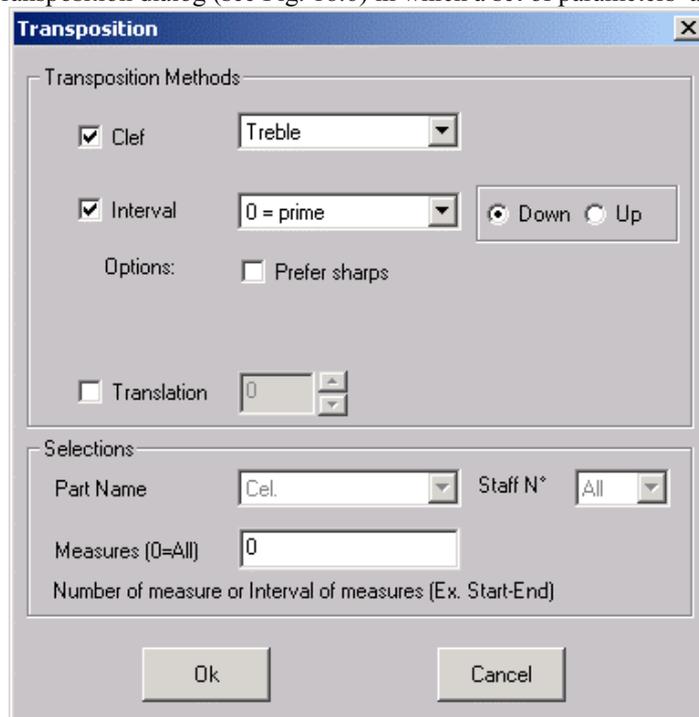


Fig. 18.6 - Transposition Dialog

18.2.1 Transposition Methods

The following methods can be applied in single or combined way. The user can select (see Fig. 18.6) what methods wants to applied by checking/unchecking the related box.

Clef: transposition via clef. The new clef can be selected from the listbox of the 7 clefs as shown in the Fig. 18.7



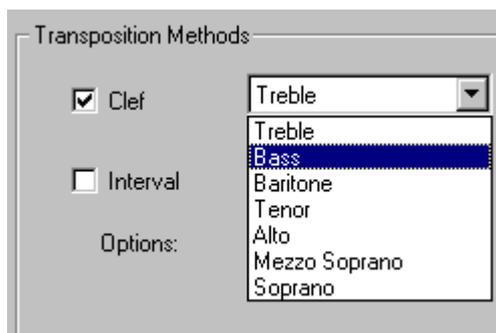


Fig. 18.7 - Clef selection

Interval: transposition via intervals. The user can choose the interval to apply from the list of interval pre-defined as shown in the Fig. 18.8. There are up to 13 possible intervals, they are the set of diatonic intervals sorted per number of semitones. Two ways of application, the Up or Down mode, are also possible. The up or down mode allows to have a tonal increment or decrement that change the pitch of notes and adjust the key signature to the correct obtained from the original by using the cycle of fifths. In this context the possibility to select the **prefer sharps** option allows to discriminate the omphonic tonalities.

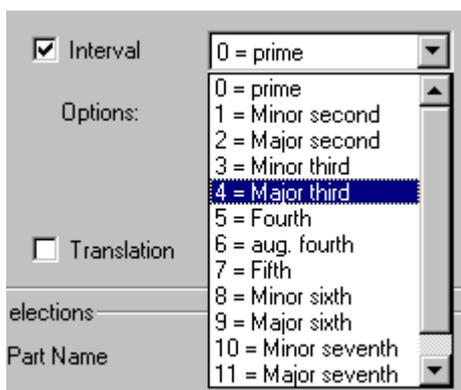
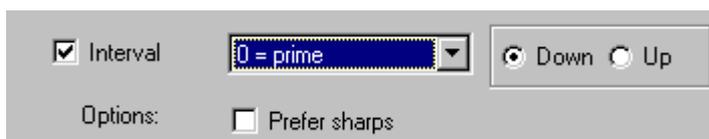


Fig. 18.8 - Interval selection

Translation: translation of a piece of music. The user can select the number of position to translate in accord to the staff representation in the music model (-n,...-1,0,1,2...n).



18.2.2 Selections

The selections area allows defining where to apply the transposition. As shown in the Fig. 18.9 it is possible to fix:

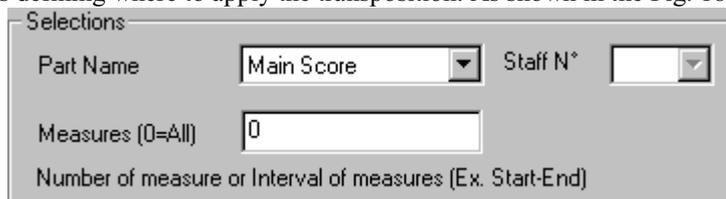


Fig. 18.9 - Selections Panel

Part Name: By selecting the list of parts, it is possible to address the transposition to the Main Score (all parts) or a single part. In the single part score view modality, this field is disabled since it already contains the name of the part.

Staff Number: This voice is enabled when a single multistaff part has been selected otherwise this option is not accessible. In presence of multistaff the number of staff can be selected.

Measures: It is possible to input a single measure by means its number or an intervals of measures, in this last case the format of the input is “start measure-end measure”.

18.2.3 Start transposition

After parameters are setted up, push the OK button to start the transposition, in the contrary the Cancel button allows to close and exit from the dialog.

18.2.4 An example

In the Fig. 18.10 is shown the Main Score of Bach Symphony n°11 in G Minor. A transposition of interval, for example a fith up (+7 semitones), to all the parts will be applied.

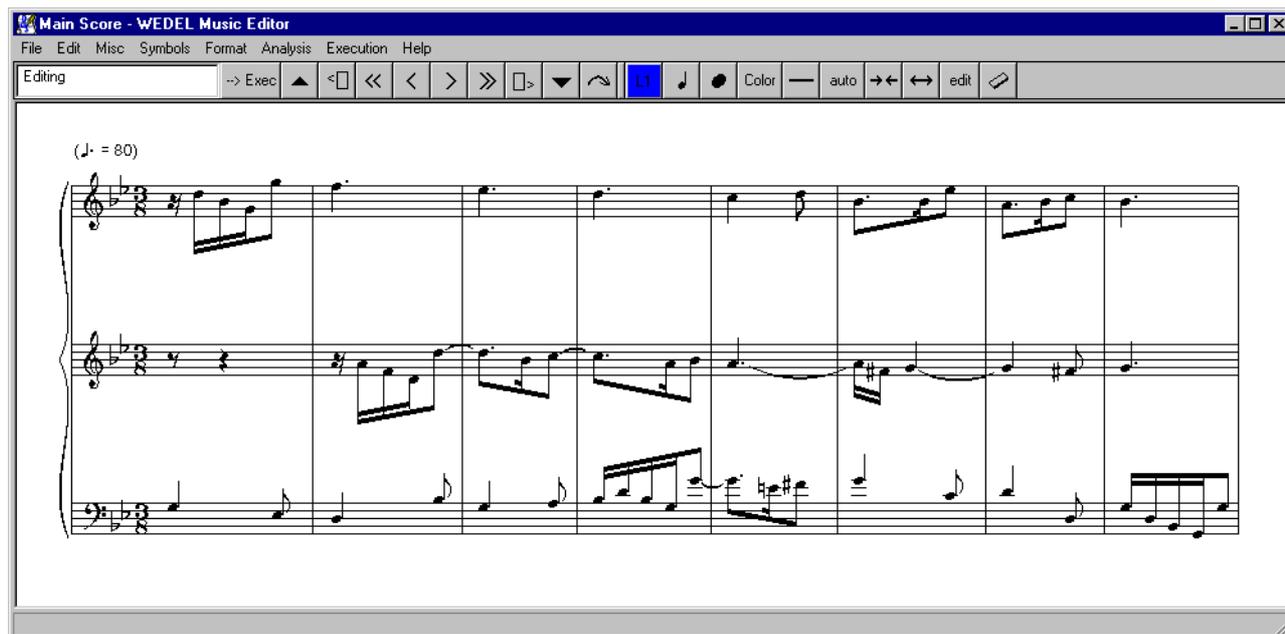


Fig. 18.10 - A piece of Bach in G Minor

In order to perform it, as shown in the Fig. 18.11, the Interval method has been selected, the Fifth value and the Up option have been chosen. To transpose all parts, in the Part Name has been selected “Main Score” and about the measure the default value for all has been fixed.

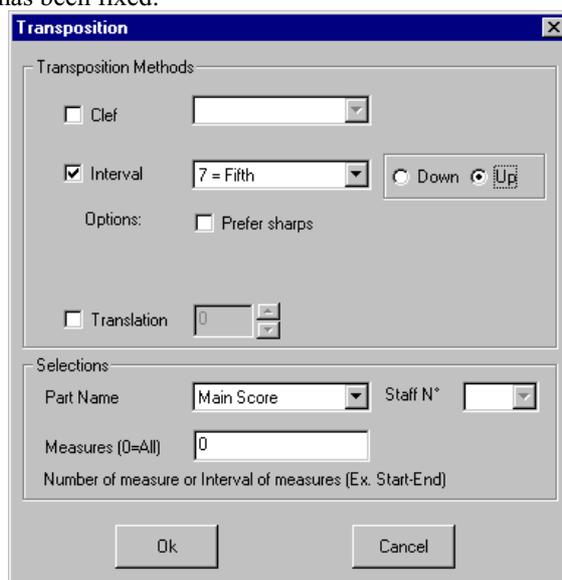


Fig. 18.11 - The setting up of parameters

The Fig. 18.12 shows the effect of transposition: the tonality is D Minor and all notes have been re-calculated.

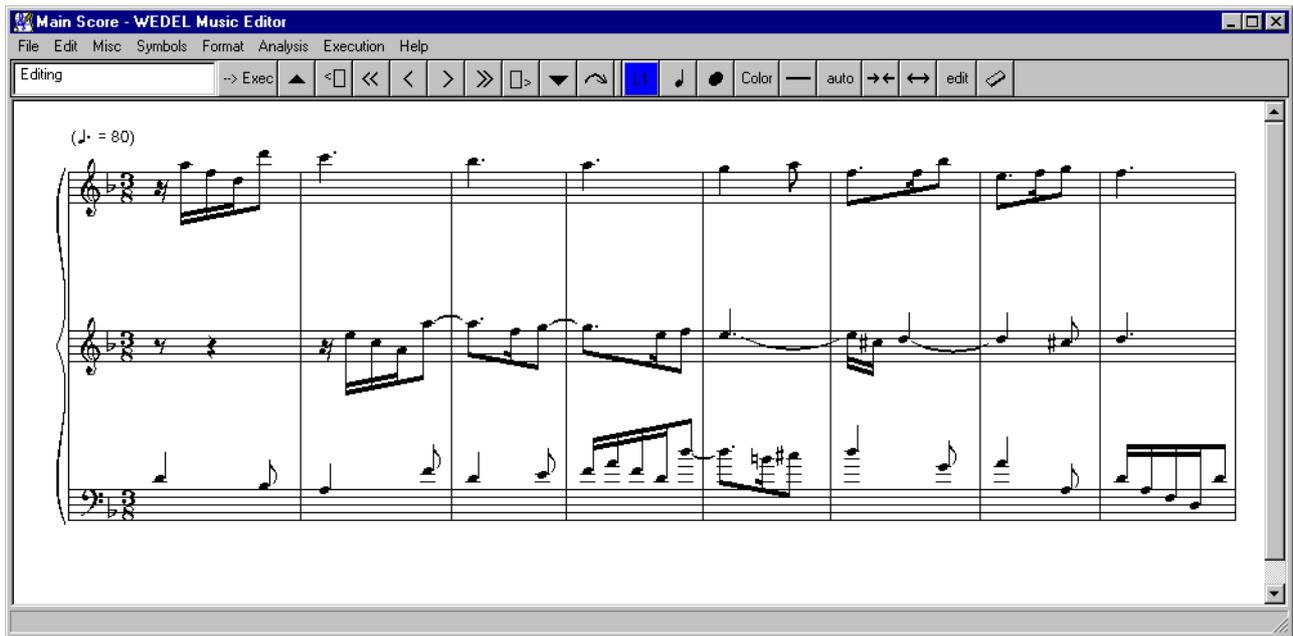


Fig. 18.12 - Effects of the transposition of Fifth Up

Chap.19 Music Score Formatting

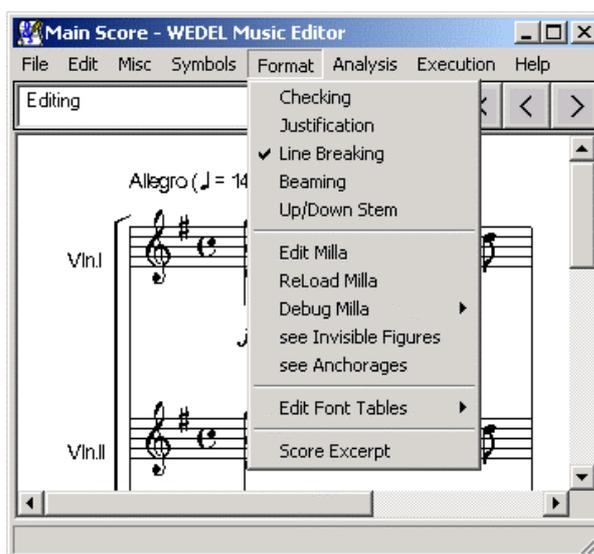
One of the most interesting aspect of WEDEL Editor is its easiness in arranging and re-arranging a piece of music. Music score formatting is divided in two main branches:

- management of the position of the symbols, with respect to the staff or to other symbols (including the note stem length, the beam slope),
- management of the space between the symbols.

There are also two main ways to interact with the system in order to change the symbol position and spaces: setting parameters in dialog boxes and changing the list of MILLA conditions in a text editor. While we will come back to changing MILLA conditions in the next chapter, now we are going to introduce the formatting dialog boxes and see the meaning of the parameters in these dialog boxes.

The editor window is used by the system for displaying the music scores and by the user for sending commands to insert, delete symbols and for the general editing of the music score. The symbol and command selections are performed through the menu and toolbars of the user interface.

The commands in the menu to change the score formatting are under the voice *Format*.



The Format Menu

19.1 Music Formatting Process

WEDELMUSIC Editor has its own internal representation of the music and of the relationships between symbols. The visualisation of this model passes through an intermediate step that is called formatting process. With the formatting process the system sets the visualisation parameters of the music score necessary for correct displaying the score itself. These parameters consist of deciding:

- if the note stem is upward or downward,
- the length of the stem,
- the space that is inserted after the last inserted symbol and
- many others.

All of these parameters can be changed by the user, symbol by symbol or with overall commands.

In WEDELMUSIC editor, the music score is modelled by using an object-oriented model. The single parts are used to build the main score. Music notation symbols retain all the relationships among the notation symbols and music structure in general, without considering the values of graphic details regarding the music formatting on the screen (e.g., relative co-ordinates).

19.2 Positive and Negative Micro Spaces

One of the easiest ways to change the spaces in the score is to add or subtract small spaces (comparable with the width of a pixel in the screen view). The process is simple: push the button in the toolbar to add/subtract single spaces and then click with the mouse between two symbols. A small space will be added or subtracted in the current view of the score. This method is generally useful for fine tuning the result of the justification task.

Please note that:

- several microspaces can be added or subtracted in the same place, cumulating is possible.
- microspaces are inserted in the active layer. The active layer is that one visualised on the coloured button (L1 in the example). You can highlight the figures of a layer by using the specific view in the menu editing.
- Microspaces inserted in the main score in computer view are independent with respect those inserted in the Print View.
- Microspaces inserted in each part are independent with respect to those inserted in the other parts and in the main score.
- Microspaces inserted can be removed by justifying the measure.
- They do not have effect in the other layers/parts if you are editing a multilayer or a main score.



Add/Subtract Small Space

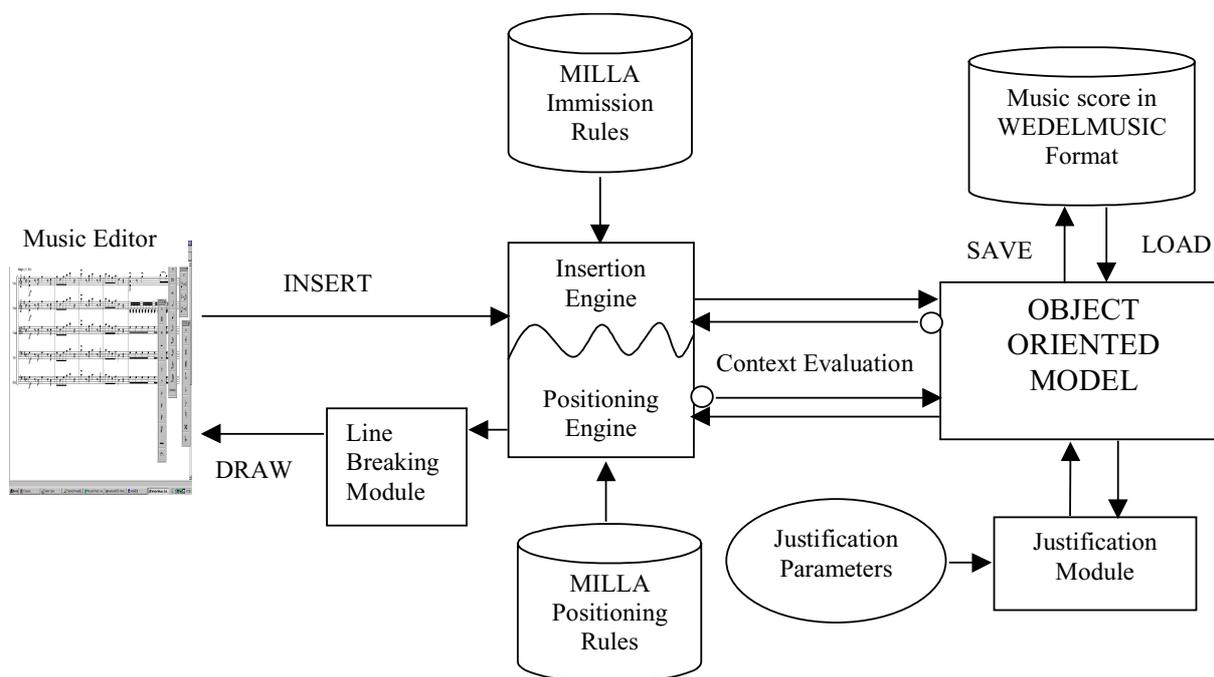
The left button is *Subtract a small space*, while the right button is *Add a small space*.

19.3 Music Formatting via MILLA

The module known as MILLA Formatter is aimed to evaluate the musical context of a certain symbol, evaluating the current musical scenario to set some parameters of the symbol related to its visualisation. For example the stem length of a note or the slope of a beam.

For the insertion and positioning of music notation symbols a Music Intelligence Formatting Language (MILLA) has been defined and implemented. It can be used to describe a series of conditions that are interpreted in real time by an inferential engine in order to apply formatting rules. In MILLA formatting rules, positioning parameters of the symbols are estimated and assigned. For example, a rule may state that the stem must present a certain length under certain conditions. The conditional sentences are tested during symbol insertion and on window redrawing, leading to the

application of certain rules. These sentences are context dependent conditions in the form of assertions about the music context. For example, if a note belongs to a chord and has a certain height, then a corresponding rule for estimating the stem length is activated. The rule activated states the exact length of the stem.



General Architecture

When the MILLA engine for the automatic formatting is activated, the process of inserting a symbol in the score involves some computation of conditions and activates corresponding rules. Conditions depend on the music context, for example the stem direction of notes may depend on the note height in the staff. In the object-oriented model, there are permanent parameters, for which the value is computed only one time at the insertion of the symbol in the score. In addition, some dynamic parameters are computed every time that the editor window is redrawn on the screen.

The MILLA formatting engine can be regarded as divided in two parts:

- the Insertion Engine evaluates permanent parameters and is invoked only at the symbol insertion;
- the Positioning Engine is called every time that the music editor window is redrawn (for example on resizing or on score scrolling). This allows estimating dynamic parameters related to symbols positioning.

On the basis of the music symbol involved, the formatting engine estimates the context needed to assess the conditions. For context evaluation, the MILLA engine makes queries to the object-oriented model of music. The context evaluation permits to identify the rules to be applied for setting the parameters of the symbol being inserted or positioned with the appropriate values. Each activated rule indicates the value to be set for the parameter under evaluation. For example, the stem height, the starting position of the slur, etc.

Conditions and rules are written in MILLA language and reside in a unique file that is loaded when the music editor is opened. The entire set of MILLA rules and conditions can be reloaded to give the possibility to change rules and reapply them to the same music score without the needs of closing the music editor.

Parameters related to the music visualisation are computed by the system at run time, on the basis of the MILLA Positioning conditions. Some formatting parameters of the music notation symbols (for example direction of the note stems) are saved in the file in terms of simple symbolic relationships (for example, up and down of the stem, above and below for expressions with respect to the note they are referred). This is useful in order to cope with exceptions and to save their value once they are computed on the basis of MILLA rules. The context evaluation and the estimation of positioning

parameters are related to the other symbols visualised on the screen. Therefore, the visualisation is strictly dependent on the positioning module of the formatting engine. This is invoked every time the window is resized -- e.g., on score scrolling and in general when the visualisation changes.

The MILLA and justification engines operate independently. The parameters set by the justification engine are the spaces among the symbols of the score and are not related to the formatting parameters set with MILLA rules. When music symbols are horizontally spaced by the justification module and formatted by MILLA positioning engine the line-breaking module is capable of arranging music in order to fill the page/view margins. The three modules set different parameters contributing to the resulting visualisation of the music score.

19.4 Insertion Rules: Up, Down, Automatic

The Insertion Rules generally states if the symbol should be positioned or oriented up/down, above/below, upward/downward with respect to another symbol or to the staff. For example:

- A note with the stem towards the up/down of the staff
- A marker/expression/ornament/pedal/etc. of a note placed up or down with respect to the staff
- A slur/bend oriented up/down with respect to the staff
- A beam with the beam line up or down, etc.
- Etc.

This evaluation is made only at the symbol insertion and not every time that the window is resized, like the Positioning Rules.

Please note that the assigned orientation can be changed by using the editing facilities of the WEDELMUSIC editor.

At the symbol insertion the user can state if this position parameter should be manually or automatically set. In the case of manual setting, the user may impose the values up, above or upward by specifying the *up* value in the button of the toolbar (click until *up* is displayed). When the symbol is inserted its position is upward if the symbol is a note, above the note if the symbol is an expression.



Up/Down/Auto Button, value Up

In the case of manual setting, the user can state the values up, above or upward by specifying the *down* value in the button of the toolbar (click until *down* is displayed). When the symbol is inserted its position is downward if the symbol is a note, below the note if the symbol is an expression.



Up/Down/Auto Button, value Down

In the case of automatic setting, the system states the values up or down, above or below, upward or downward by evaluating the musical context of the new symbol by means of the MILLA conditions written in MILLA file. The user can direct the choices of the system by changing the MILLA conditions for a certain rule, by means of editing the MILLA file. The conditions evaluate the current scenario and lead to a rule that must be applied in that scenario (one rule for *up* and one rule for *down*). When the symbol is inserted, its position is upward or downward if the symbol is a note, above or below the referring note if the symbol is an expression in dependence of the rule applied.



Up/Down/Auto Button, value Auto

19.5 Up/Down Stem

It is possible to re-estimate the static parameter of note stem orientation for a range of measures chosen by the user. The re-estimation is based on the current MILLA file loaded in the system. To invoke the re-estimation of note stem orientation click on Menu Format select there the item Up/Down Stem. Fill the range of measures for which you want the re-estimation to take place (choose Single and fill Start with the measure in case of a single measure re-estimation) and select the part for which you want the re-estimation to take place.

This functionality is very useful when you load a MIDI file or you have joined two voices of two distinct parts in a unique parts or viceversa, etc.

19.6 Beaming

It is possible to re-estimate the parameter of beam slope for a range of measures chosen by the user. The re-estimation is based on the current MILLA file loaded in the system. To invoke the re-estimation of beam slope click on Menu Format, item Beaming. Fill the range of measures for which you want the re-estimation to take place (choose Single and fill Start with the measure in case of a single measure re-estimation) and select the part for which you want the re-estimation to take place. This functionality, as the previous, it is very useful when you load a MIDI file or you have joined two voices of two distinct parts in a unique parts or vice versa, etc.

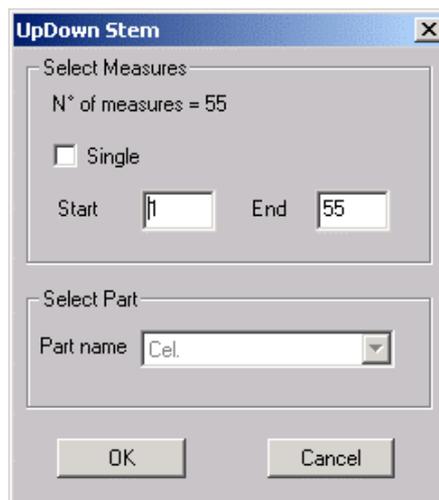
19.7 Music Justification

The estimation of the spaces among music symbols (simply called the justification engine), is composed by the justification and the line breaking modules.

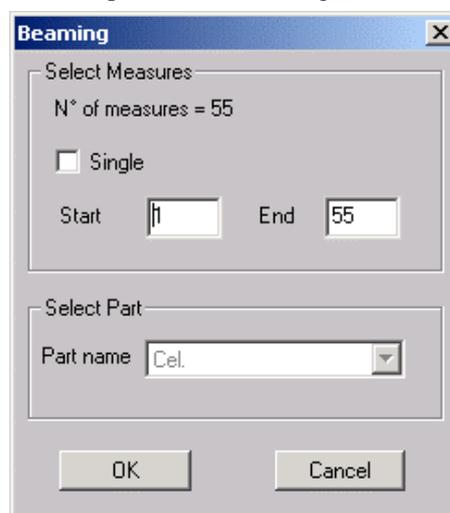
The main reason to justify a music score is for increasing the music readability. Musicians recover at the first glance the sense of rhythm of the music piece from a correctly justified music score. The spacing dramatically impacts on the readability of a music piece, where longer and shorter notes alternate, as well as pauses and quick scales. Music justification regards the task of spacing the symbols contained in a music score following several requirements established by common use during the last centuries. To correctly automate this task these requirements have been focused and divided in simple steps to permit to the engine to handle all the possible cases and exceptions, as well as to take the best decisions regarding the visual arrangement of music notation symbols.

The main characteristics of the justification engine are quite intuitive.

- *Durational spacing.* The spacing algorithm must set the space between the figures. In this way, it is intuitive for the reader to recognise duration of notes and rests, and perceive the sense of rhythm of the piece at the first glance of the music score. The space after a figure must be a function of its duration. This function can be simple or complex. The resulting music score is assessed by musicians in term of appearance, nice layout, readability and compactness.
- *Vertical alignment.* Second requirement for justification engine involves the temporal coincidences among figures. Figures belonging to different voices/parts and falling on the same beat, must be *vertically aligned* because of visual intuitive recognition of temporal coincidences. For the main score, where all the instruments are present, this means aligning the simultaneous symbols of all the single parts. Some exceptions may exist to avoid collisions.



Up/Down Stem dialog box



Beaming dialog box

In the following figure, a main score with two parts of two measures each is reported. The two measures contain the same figures and differ only in spacing. The second measure is correctly justified taking into account vertical alignments of simultaneous symbols and *durational* spacing and is much more readable than the former.



Justified measures

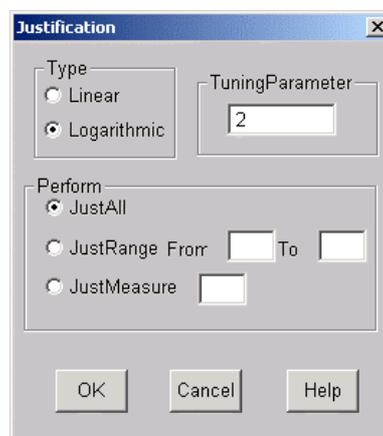
Please note that the justification:

- Can be different for different measures of the same part
- Can be different for main score and parts
- Can be different for each part
- Can be different for computer view and print view for each part and main score
- Of a measure eliminate all microspaces that have been added in the measure in all its layers
- Can be different in measures of the same page Is influence by the process of line breaking. It can be disabled in the format menu if needed.

The dialog box of justification is reported below. It can be accessed from Menu Format item Justification. The dialog presents several parameters that can be set.

The Perform frame (lower part) is intended for specifying the range of measures that have to be justified. The whole score is selected by default (Just All), to justify a range of measures select the second option (Just Range From ... To....) and specify the first and last measures of the range (for example 1 and 10), to justify only one measure select the third option (Just Measure) and insert the progressive number of the measure to justify.

The type frame in the dialog is discussed in the following subsection.



Justification dialog box

19.7.1 Linear and Logarithmic justification

The Type frame permits to select the type of algorithm to use for justification. The choices are Linear and Logarithmic. Both algorithms respect the durational spacing and the vertical alignment of temporal coincidences, but the score results in different spacing arrangements. Please note that the score justified with the Logarithmic algorithm results more compact, while the score justified with the Linear algorithm results more space consuming. The choice on which algorithm to use is left to the user. Please note that you can also alternate measures justified linearly with measures justified logarithmically. You should use Justification when you finished editing a measure of a score to arrange it for printing or for final screen view. Once you finish editing a line of music you should justify it, then you can line-break the score to right margin it, if you want.

In the following figure, the first measure is linearly justified, while the second is logarithmically justified.



Linear justification (first measure) and logarithmic justification (second measure)

19.7.2 Tuning Parameter

It is very important for the copy editor to control the stretching or shrinking of the measure through a parameter tuning -- e.g., bigger is the parameter and wider results the justified measure (see Figure below).

Once that you decided to use Linear or Logarithmic justification you can stretch or shrink the resulting justified measures through setting the tuning parameter. The bigger the parameter the larger will result the resulting justified measure, the lower the parameter the tighter will result the justified measure. Please note that the WEDELMUSIC Editor automatically handle and resolve the symbol overlapping, so even if you give a negative value to the tuning parameter the resulting measure will be at least spaced as to avoid symbols overlap.



Effect of tuning parameter on justification

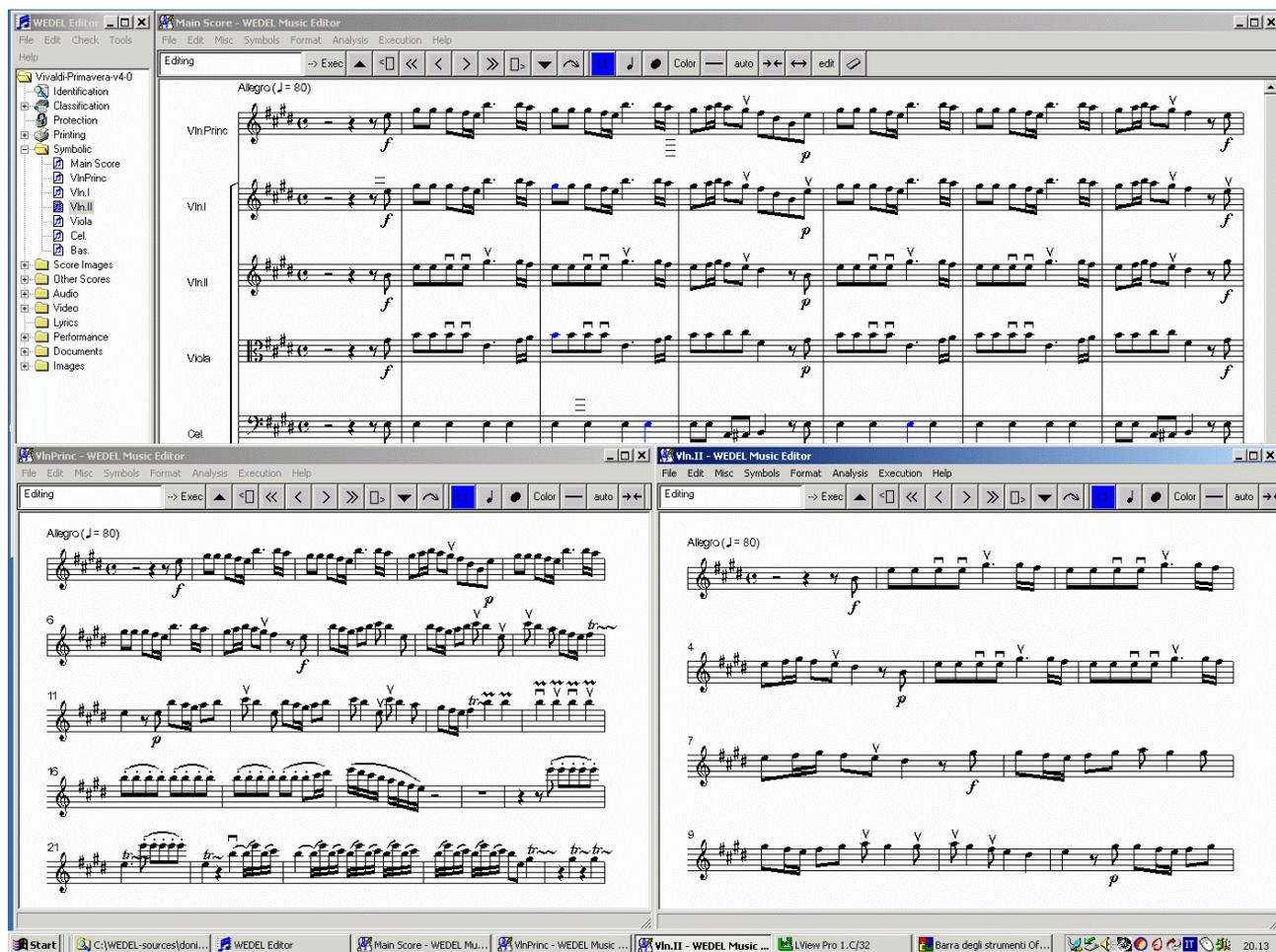
19.8 Line Breaking

The line-breaking process consists in the stretching/compressing the justification of a music line to obtain the alignment with page left-right margins. This is one of the most required features by publishers and musicians to avoid producing score lines with a variable empty space at the end of each row that is confusing and results in less readability. Line-Breaking option in the Format menu is set by default and the score is then automatically right-margined. To visualise the score with its natural widths, deselect it. The line-breaking spaces are dynamically computed, so if the window is resized, the spaces are calculated again to obtain a perfectly right-margined score. Line-breaking spaces are not saved in the WEDELMUSIC object since they are calculated at run-time for both computer view and print view.

19.9 Different Spacing for Different Views and Measures

Please note that changes that you make on the justification of a score have effects only in the current view. This means that you can space the same score in different manners and have a different layout for different views of the same score. The available views of the same score are that of the main score and of the single parts. Each of these views can be seen and edited in Print View and in Screen View.

If you want you can also space the same part in two different ways for the printing and for the screen view. To change the space for a specific view make that view be the current view in the WEDELMUSIC Editor, than apply the Justification with the desired parameters, the Line-Breaking.



Chap.20 MILLA Rules and Engine

Music formatting process must address a large number of cases. The decision process of inserting and positioning the music notation symbols in the music sheets must handle a huge number of variables which characterise the music score context. The MILLA formatting engine is a *rule based system*, on which the rules (stating formatting actions for music notation symbols) are interpreted in real-time. The formatting actions define the values for placing music notation symbols. The actions to be performed are activated by conditions based on the music context of the symbol under insertion and positioning.

For the evaluation of the music context a set of conditions has been defined to take into account the several aspects, such as: “is in polyphony”, or “note belonging to a chord”. These assertions can be true or false depending on the context. On the basis of their values different actions can be applied in different contexts. Single assertions can be combined with logical operators to specify more complex conditions to identify specific contexts in which rules have to be applied. This is a simple mechanism to insert/define specific rules for managing exceptions. They are always motivated and produced by a specific context.

The user can specify the conditions by combining the single assertions available and the rules to be applied in a certain context. This results in the ability of changing the formatting style of the score and thus in a flexibility of the formatting engine. The set of rules and conditions can be planned and programmed in advance, but also changed at run time to test/apply different layouts for a music score. The MILLA language is composed by words belonging to musicians background and the syntax is quite simple and we believe that it can be understood by users without specific background on information technology. This allows to implement different music style sheets according to the publisher and end-users' needs and tastes.

The MILLA formatting engine is invoked at the insertion of each symbol to set static formatting parameters. The rules activated during the insertion are the Insertion rules. If needed, the user can manually force the decisions through the user interface.

The Insertion rules indicate the position of a symbol referred to another symbols. The graphic elements that present values to be imposed by the Insertion formatting engine are reported in the following. For example:

- the stem direction of notes or chords, upward or downward;
- the stem direction for all the notes composing a beamed group;
- the relative position of markers (accents, expressions, ornaments, instrument symbols, bowing, fingering, etc.) with

respect to the (i) note (up/down) they are referred considering or not the direction of the note stem (on stem, opposite to stem), or to the (ii) staff (above/below), etc.;

- the automatic beaming of single notes depending on the time signature.

When redrawing the music editor window, for example for window resizing or for score scrolling, the Positioning formatting engine evaluates the context to set dynamic parameters by applying Positioning rules. Positioning rules indicate the position of symbols in the current visualisation. This is expressed in terms of distance among other symbols in a GUI independent unit of measure. This allows arranging the correct visualisation independently on the visualisation magnitude.

The dynamic parameters estimated by Positioning Rules are, for example:

- the stem length for notes, for chords and for notes and chords belonging to beams;
- the angle/slope of the lines of beamed notes or chords;
- the co-ordinates of the markers with respect to the note they are referred, expressed in terms of distance between the symbol bounding box (an area that define the dimension of the symbol).
- The position of the symbols, inside or outside the staff, on the left of right the note head, etc.
- The co-ordinates of horizontal symbols such as: slurs, bend, crescendo, decrescendo, change of octave, etc.

When more than one marker is associated with a note, a special Priority Rule is used. This specifies the order in which the positioning rules have to be applied to draw symbols. Symbols with higher priority are drawn closer to the note even if they have been added to the score after lower priority symbols. The insertion of a high priority symbols implies the re-estimation of the position of the lower priority symbols. The priority rule has the form of a list, where the symbols have a decreasing order of priority as depicted in the following.

20.1 Syntax of rules and conditions

This section introduces the syntax of MILLA rules. In MILLA, there is a clear distinction between *rules*, which define the actions to be performed on parameters, and the *conditions*, that specifies the context in which the rules are activated.

The general form of conditions is:

`<type>IF <condition> THEN <rule name>`

The conditions can be of Insertion or Positioning. They are distinguished for the `<type>`, which can be *ins* or *pos*, for insertion and positioning, respectively. The `<condition>` is expressed on the basis of a set of assertions in ANDed form among them. For example, INMULTIVOICE and INCHORD, INSINGLELAYER, NUMUP-NUMD>0 and INCHORD, etc. They state the music context as explained with several examples in the following sections. The condition activates the rules identified by the `<rule name>`.

The general form of rules is:

`<type> <rule name> : [DEFAULT] <symbol> <relationship> <value>`

Where:

- `<type>` identifies Insertion and Position rules and can be RULEINS or RULEPOS, respectively;
- `<rule name>` is used to associate the condition with the insertion rule;
- *DEFAULT* is a qualifier used in the case of conflicts among rules. When several conditions are true for the same symbol the MILLA engine considers the condition that presents the highest number of ANDed terms. When two conditions with the same number of terms are true in the same case (depending to the context), the rule with *DEFAULT* qualifier is applied;
- `<symbol>` is the reference symbol of the rule. The rule is going to estimate a parameter for drawing and placing that symbol. For example: STEM, BEAM, TRILL, etc.;
- `<relationship>` states the relationship that the rule is going to fix. For example, RELNOTE is a relationship of `<symbols>` and the note;
- `<value>` is a constraint that states the value to be imposed at the parameter identified by the combination of `<symbol> <relationship>`. For example, `<symbol> STAFF ABOVE`, `<symbol> STAFF BELOW`, `STEM RELNOTE UP`, `STEM RELNOTE DOWN`.

For example, an insertion rule “StemUp”, applied to symbol “STEM” of the note, and with action the set of the stem upward with respect to the notehead can be stated as:

RULEINS StemUp STEM RELNOTE UP

A condition to activate this rule can be very simple. The condition could state that rule “StemUp” is called if the note that has to be inserted is localized below the middle line of the staff (identified with an height equal to 0, see below):

```
insIF NOTE [VAR;0] THEN StemUp
```

The notation $[var;y]$ means that the height of the note is lower than y . Similar meaning have the notations $[y;var]$ and $[x;y]$.

Below the numbers assigned to the note heights referred to the lines and spaces of the staff in MILLA language are reported.

A different condition may state that rule “StemUp” is called if the note belongs to the upper voice for a measure where polyphony (INMULTIVOICEUPPER) is present:

```
insIF NOTE INMULTIVOICEUPPER THEN StemUp
```

20.2 Editing MILLA File

It is possible to edit and change the MILLA file with rules from the WEDELMUSIC Editor. The MILLA file is a text file that can be edited with any text editor. To edit the MILLA file, please select *Edit Milla* in the *Format* menu. The text editor is launched and the MILLA file opened. It is possible to browse the MILLA file, to change, add and delete the conditions and rules if the WEDELMUSIC object is not protected or if this is specifically allowed in a protected object.

This will affect the scenarios in which the rules are applied, and thus the style of the score will result in a change. Please note that the changed MILLA file is not automatically active until you load it again in the system (*Reload Milla*) or re-launch the WEDELMUSIC Editor.

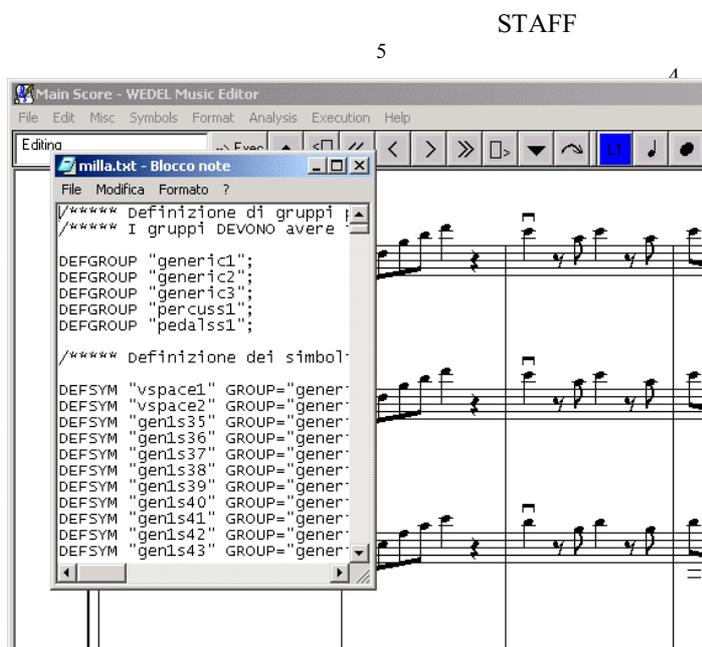


Fig. 20.1 - Edit MILLA

A WEDELMUSIC object may contain its specific MILLA file included into the object. If this private and specific MILLA file is missing the default MILLA file in the FONT directory of your editor is taken and used.

Please note that:

- MILLA file contains also rules for all the fonts, generic, pedals, percussions, etc., if the correct MILLA is not loaded some problems in that fonts can be produced.
- a syntactically wrong MILLA file impede the opening of the WEDELMUSIC editor.

20.3 Reloading MILLA specification

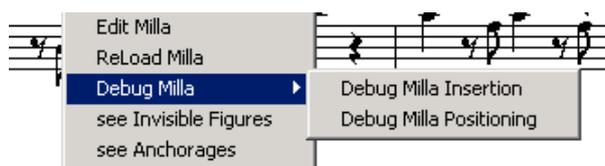
After changing the MILLA file, you want to see the changes in your score. For this aim you must choose *Reload Milla* in the *Format* menu. Please note that only the parameters set by the Positioning Rules will be re-estimated for the symbols yet inserted in the current score. If you changed any condition affecting the Insertion Rules, you won't see them until you insert new symbols in the score. The reason for this is that the Insertion Rules set static parameters while the Positioning Rules set dynamic parameters. The Insertion Rules are applied only when the symbol is inserted while the Positioning Rules are estimated every time there is a change in the visualisation window (for example a resizing). This separation results in a balance between performance (Positioning Rules need lot of CPU time, Insertion Rules need

small CPU time) and flexibility (Positioning Rules are more flexible and can be changed for the whole score, Insertion Rules are static and can be changed only for new symbols).

20.4 Debugging MILLA Rules

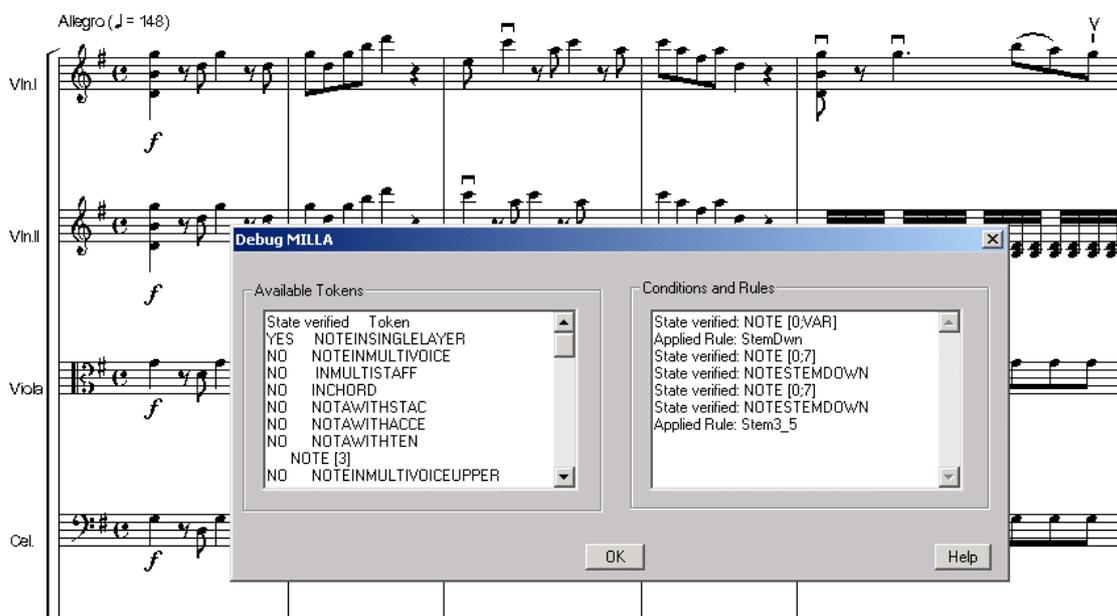
MILLA syntax is simple, anyway a MILLA debugger is a useful tool when it comes to work with changing MILLA conditions, adding new conditions to specify the behaviour of the system in certain scenarios, adding tokens (simple statements) to the existing conditions.

The MILLA debugger is structured like a dialog box and is referred to a certain symbol: it helps the user presenting all the available tokens in the system specifying if those statements are verified or not for the current symbol. The debugger presents also the applied rules for the symbol, specifying also which condition is applied in the current scenario (leading to the applied rule).



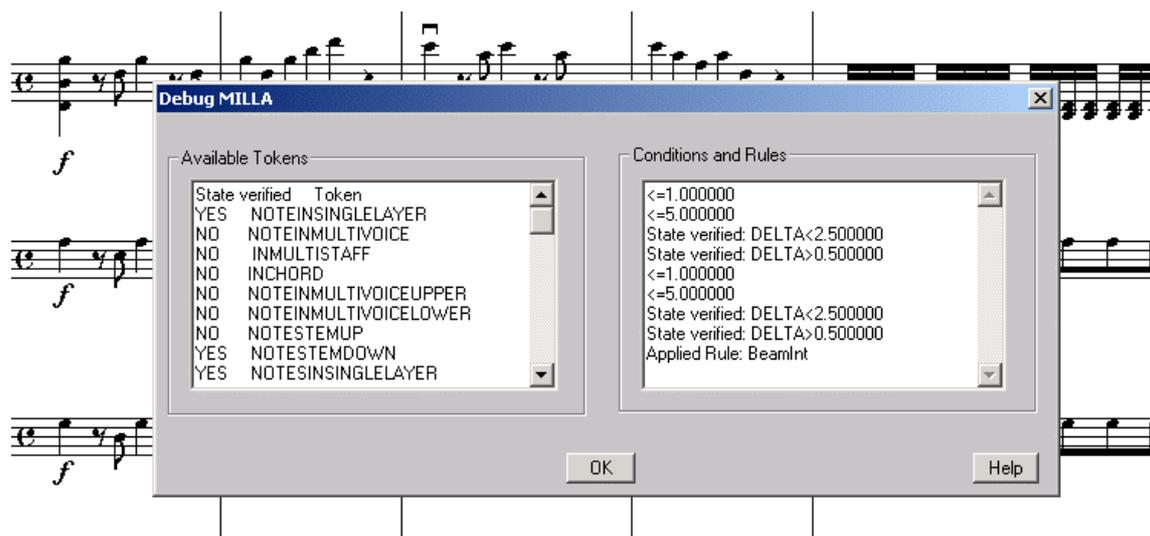
Debug MILLA options in the Format Menu

The Insertion conditions and rules can be debugged only for newly inserted symbols. Click on *Format menu* -> *Debug Milla* -> *Debug Milla Insertion* to set the Debug Milla Insertion state of the system. From this moment, the newly inserted symbol will be debugged for Insertion. For example try to insert a new note in the score. You will be prompted to a Debug Milla Insertion dialog box (click OK to close it) before displaying the score with the new note. The dialog box presents all the information on the scenario of the note you may need to change the conditions in the MILLA file.



Debug MILLA Insertion

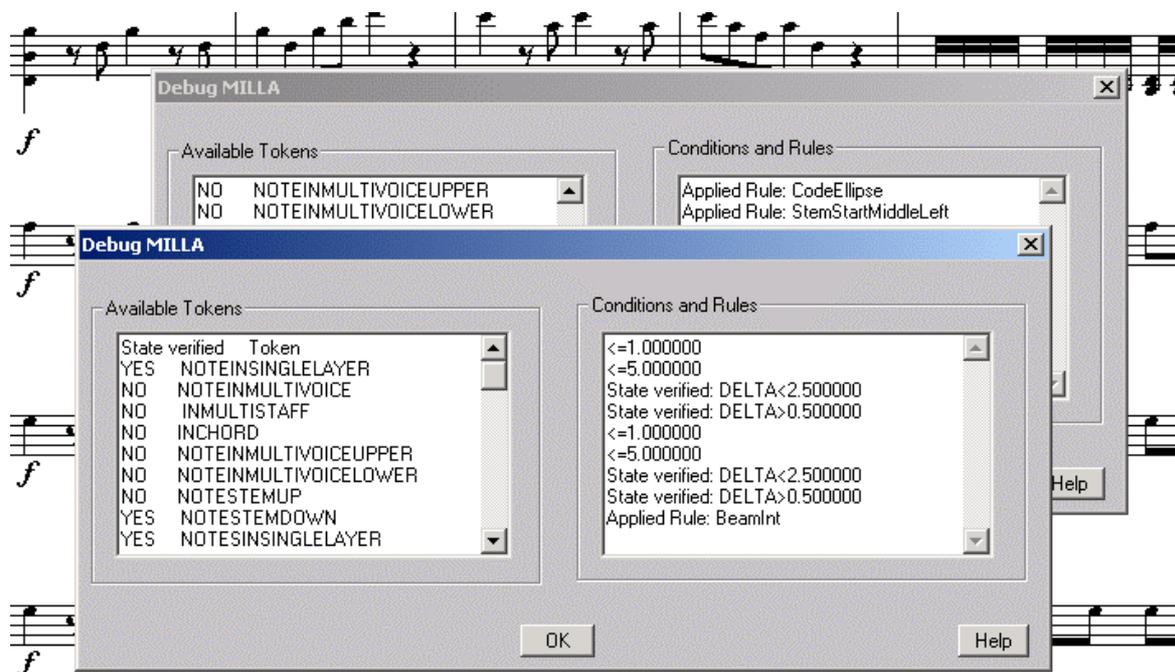
To debug the Positioning rules and conditions click on *Format menu* -> *Debug Milla* -> *Debug Milla Positioning* to set the state of the system in debugging mode for the Positioning rules and conditions. Now you can click on any symbol of the score to display a dialog box similar to that shown above. The information displayed in the dialog box are similar to the information shown in the dialog box of the Debug Milla Insertion: list of all the available tokens in the system specifying also if these tokens are verified or not in the current scenario, list of the rules applied in the current scenario and of the condition leading to the rule application.



Debug MILLA Positioning

Please note that for some parameters like the beam slope some mathematical parameters have to be evaluated: these parameters are related to various controls to check the balance of the beam starting from the height of the notes composing the beam.

In case that a symbol is targeted by more rules, then more dialog boxes of Debug Milla will open. Each dialog is aimed to address and debug related conditions and scenarios.



Debug MILLA Positioning with two debug windows opened by the system

In the above example, clicking a note belonging to a beam leads the system to debug both the rule related to the position of the specific notehead (classic, x-head, sharp-head etc.) and to debug also the Positioning rule related to the slope of the beam (the active window in the Figure).

20.5 Private MILLA Rules

20.5.1 Rules and conditions for note stems

In the following, insertion and positioning rules and conditions are reported.

Insertion Rules and Conditions for note stem

The insertion rules for the notes specify the direction of the stem of a note or chord, which can be upward (UP) or downward (DOWN).

```
RULEINS StemUp STEM RELNOTE UP;
RULEINS StemDwn STEM RELNOTE DOWN;
```

These rules can be activated by the following conditions

```
insIF NOTE [0;VAR] THEN StemDwn;
insIF NOTE [VAR;-1] THEN StemUp;
```

The above two conditions represent the typical situation of note insertion. Condition NOTE [0;VAR] is true when the note highness is comprised between 0 and infinity (VAR). If the note is localized in the middle line of staff or upper (NOTE [0;VAR]) rule “StemDwn” is called. In the opposite case (NOTE [VAR;-1]), rule “StemUp” is activated. These two conditions are applied in the first measure.



The stem of notes and chords in single layer and in polyphony

In the presence of more voices on the same staff, the following conditions can be used:

```
insIF NOTE INMULTIVOICELOWER THEN StemDwn;
insIF NOTE INMULTIVOICEUPPER THEN StemUp;
```

These conditions activate the appropriate rules depending on which voice the note is being inserted. The stem of the notes on the upper voice (INMULTIVOICEUPPER) must be upward, while the stem of the notes in the lower voice (INMULTIVOICELOWER) must be downward. These conditions have been applied in the third measure for the single notes and also for the chords.

Another case is when the note is in a single layer and is included in a chord:

```
insIF NOTE INSINGLELAYER AND INCHORD AND UPESTD-LOWESTD>0 THEN StemDwn;
insIF NOTE INSINGLELAYER AND INCHORD AND UPESTD-LOWESTD<0 THEN StemUp;
```

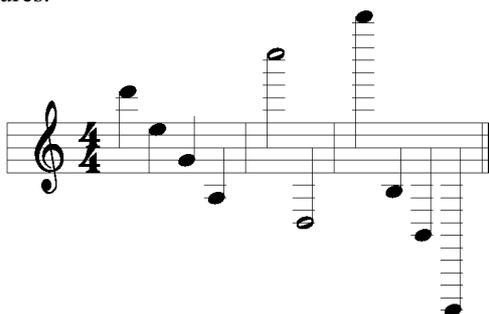
The conditions are satisfied in the second measure. The notes belong to a chord (INCHORD), and only one voice is present (INSINGLELAYER), and the difference between the highest and the lowest notes of the chord locates the "center of gravity" of the chord above or below the middle line, that is (UPESTD-LOWESTD>0). Where: UPESTD is the absolute value of the distance between the highest note of the chord from the middle line of the staff, with the values stated according to the figure. LOWESTD is the absolute value of the distance between the lowest note of the chord from the middle line of the staff.

Positioning Rules and Conditions for note stem

The positioning rules of the stem affect its length. The basic unit for stem length is the *space* defined as the distance between two staff lines. In this way, the standard length of the stem is 3.5 spaces, but it has to assume different values depending on the note height. In figure, the following conditions have been used for some notes:

```
posIF NOTE[0;7] AND NOTE STEMDOWN THEN Stem3_5;
posIF NOTE[8;VAR] AND NOTE STEMDOWN THEN StemHeight;
```

The first condition is verified for the second note of the first measure of following figure, while the second conditions is true for the first notes of all the measures.



The stem length for notes in single layer

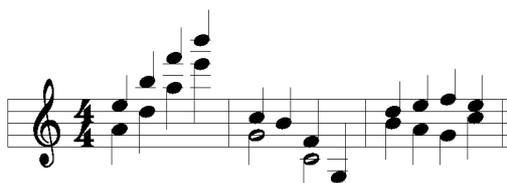
The above-presented conditions are only a small part of those that are needed to manage all the possible scenarios. The positioning rules are defined to impose the stem length:

```
RULEPOS Stem2_5 STEM RELNOTE LENGTH=2.5;
...
RULEPOS Stem3_5 STEM RELNOTE LENGTH=3.5;
...
RULEPOS StemHeight STEM RELNOTE LENGTH=STEMHEIGHT;
```

The last rule is based on a special variable “STEMHEIGHT” that is dynamically estimated as the note height divided by two. This parametric rule is valid for all notes localized above the second additional staff line.

The following condition takes into account the case of polyphony and occurs, for example, in the first note of the first measure of next figure in the upper voice.

```
posIF NOTE[1;VAR] AND NOTE INMULTIVOICEUPPER THEN Stem2_5;
```



The stem length for notes in polyphony

Affect symbol	Token Conditions	Token Rules	Actions
Note Chord	NOTE [x, y] NOTE INMULTIVOICEUPPER NOTE INMULTIVOICELOWER NOTE INMULTIVOICE NOTE INSINGLELAYER INCHORD UPESTD - LOWESTD <operator> <integer number> NOTE STEMUP NOTE STEMDOWN NOTE2 NOTE1 NOTE1_2 NOTE1_4 NOTE1_8 NOTE1_16 NOTE1_32 NOTE1_64 NOTE1_128	STEMUP STEMDOWN LENGTH= <floating point number>	Set Stem direction: Up/Down Set Stem length

	STAFFNUMBER==<floating point number> HEAD==<notehead type> NOTEWITH <marker symbol>		
--	---	--	--

Where the Token Conditions have the following meaning:

- NOTE [x, y] = the note pitch is comprised between values indicate in condition, the pitch is codified as explained, see STAFF figure in previous paragraph. X, Y are two numbers indicating the height of the note
Example (NOTE [0, 3])
- NOTE INMULTIVOICEUPPER = the note belongs to the upper voice, case of polyphony
- NOTE INMULTIVOICELOWER = the note belongs to the lower voice, case of polyphony
- NOTE INMULTIVOICE = the note belongs to a staff where more than a voice is present (polyphony)
- NOTE INSINGLELAYER = the note belongs to a staff where only a voice is present
- INCHORD = the note belongs to a chord
- UPESTD – LOWESTD upper and lower refer to the notes pitch,
<operator> : < | > | =
<number> : an integer number indicating the difference of the height of the highest and lowest notes of a beam. For example (UPESTD – LOWESTD = 0).
- NOTE STEMUP = the stem direction of the note is upward
- NOTE STEMDOWN = the stem direction of the note is downward
- NOTE2 = the duration of the note is two measures
- NOTE1 = the duration of the note is the whole measure
- NOTE1_2 = the duration of the note is 1/2
- NOTE1_4 = the duration of the note is 1/4
- NOTE1_8 = the duration of the note is 1/8 (croma)
- NOTE1_16 = the note is a semicroma (duration 1/16)
- NOTE1_32 = the note is a biscroma (duration 1/32)
- NOTE1_64 = the note is a semibiscroma (duration 1/64)
- NOTE1_128 = the note is a fusa (duration 1/128)
- STAFFNUMBER==<floating point number> the staff systems for piano, arpa etc contains 2 or 3 staves, this token checks on which staff is the note. For example (STAFFNUMBER=1.0 indicates the first staff of a multistaff part)
- NOTE HEAD==<notehead type> type of notehead chosen.
- Currently supported noteheads are: CLASSIC , NOTE BREVE, CIRCLEX, X_HEAD, DDIESIS, DIAMOND, RHYTHMIC, TRIANG, TRIANG_UP, PLUS_HEAD, MOON.
- NOTEWITH <marker symbol> = symbol that can be added to note.
- <marker symbol> : STACCATO | SFORZATO | ACCENT | MARTELLATO | TENUTO | MARTDOLCE | PUNTOALLUNGATO | MORDENT | TURN | TRILL | WITHMUTE | WITHOUTMUTE | HARM | FINGER | TASTIERA | PONTICELLO | PUNTA | TALLONE | BOWUP | BOWDOWN | ARCO | PIZZICATO | STRING.

20.5.2 Rules and conditions for beams

Beamed notes are a group of notes of duration of 1/8 or shorter that are drawn with a beam that groups them together. Beaming makes reading music easier. For beams, it is very important to have flexible rules to impose the automatic beaming and for estimating the slope of the beam.

Insertion Rules and Conditions for beams

Insertion rules for beamed notes have effect on the direction of the note stems belonging to the beam. All the stems of the beamed notes have to present the same direction (except for some specific case, depending on the presence of multistaff parts). The context parameters that have to be evaluated to determine the stem direction of the beam depend on the note heights belonging to the group. For example, the group in the second measure of following figure satisfies the following condition:

```
insIF MEAN<0.0 AND NOTE INSINGLELAYER THEN Beam0;
```

where MEAN is the mean value of note height:

$$MEAN = \frac{\sum \text{note heights}}{\text{number of notes}}$$

in which the *number of notes* is the number of notes in the beam. This parameter is useful to evaluate where the notes belonging to the beam are located in terms of pitch. Where:

- Σ note heights = sum of the heights of all the notes of the group
- number_of_notes = number of notes in the group

In following figure, the effects of the following Insertion Rules for beaming are shown, in the 2nd and 4th measures.

```
RULEINS Beam1 BEAM RELNOTE UP;
RULEINS Beam0 BEAM RELNOTE DOWN;
```



The stem direction of a group of notes

In the estimation of conditions, the status condition BEAMDIS can be used. It is the distance in terms of height/spaces between the position of the highest and lowest notes:

$$BEAMDIS = \text{highest} - \text{lowest}$$

Where:

- Highest = height of the highest note of the group
- Lowest = height of the lowest note of the group (absolute value)

Heights are calculated assuming 0 for the midline. This parameter is useful to evaluate the dispersion of the pitch of the notes of the beam around the third line of the staff.

Positioning Rules and Conditions for beams

Positioning rules are used to impose the slope of the beams. It ranges from 0 (horizontal beam) to 0.5 (maximum slope corresponding to a 45° angle).

In following example, beams with different slopes are shown. The slopes are typically decided on the basis of the values of parameters such as the difference between the heights of the highest and lowest notes of the beam. For example, the following condition is used:

```
posIF DELTA<0.5 THEN BeamMin;
```

where DELTA is calculated as:

$$DELTA = \frac{BEAMDIS}{\text{Number of notes} + 1}$$

where:

- Number_of_int_notes = number of notes composing the beam except the first and the last

This parameter is useful to evaluate the dispersion of the pitch of the notes considering the distance from the note with the highest pitch to the note with the lowest pitch and the number of notes belonging to the beam.

This condition activates the following rule:

```
RULEPOS BeamMin BEAM RELNOTE ANYWHERE ANGLE=0.0;
```

Please note that the qualifier "RELNOTE ANYWHERE" is a <relationship> stating that the beam may cross the staff of can be located every where in or out the staff.



Fig. 20.2 - Some beams with different slopes

The Positioning rule can be used to fix the beam slope assigning a variable value to the ANGLE parameter of the beam:

```
RULEPOS BeamS1 BEAM RELNOTE ANYWHERE ANGLE=BSLOPE;
```

The value of BSLOPE is calculated by dividing the difference between the Y coordinates of the first and last notes of the group on by those on the X-axis.

MHL is calculated as

$$MHL = \frac{Highest + Lowest}{2}$$

This parameter is useful to evaluate the dispersion of the pitch of the notes considering the distance from the note with the highest pitch to the note with the lowest pitch.

Affect symbol	Token Conditions	Token Rules	Actions
Beamed Notes	MEAN <operator> <floating point number> BEAMDIS <operator> <floating point number> NOTES INSINGLELAYER NOTES INMULTIVOICEUPPER NOTES INMULTIVOICELOWER DELTA <operator> <floating point number> MEAN-MHL<operator> <floating point number> NOTE FIRSTLOWER NOTE FIRSTUPPER STAFFNUMBER==<floating point number> NOTE HEAD==<notehead type> NOTEWITH <marker symbol>	STEMUP STEMDOWN ANYWHERE ANGLE <operator> <floating point number>	Set Stem direction of the group of notes: Up/Down Allow the beam to be placed anywhere Set slope of the beam

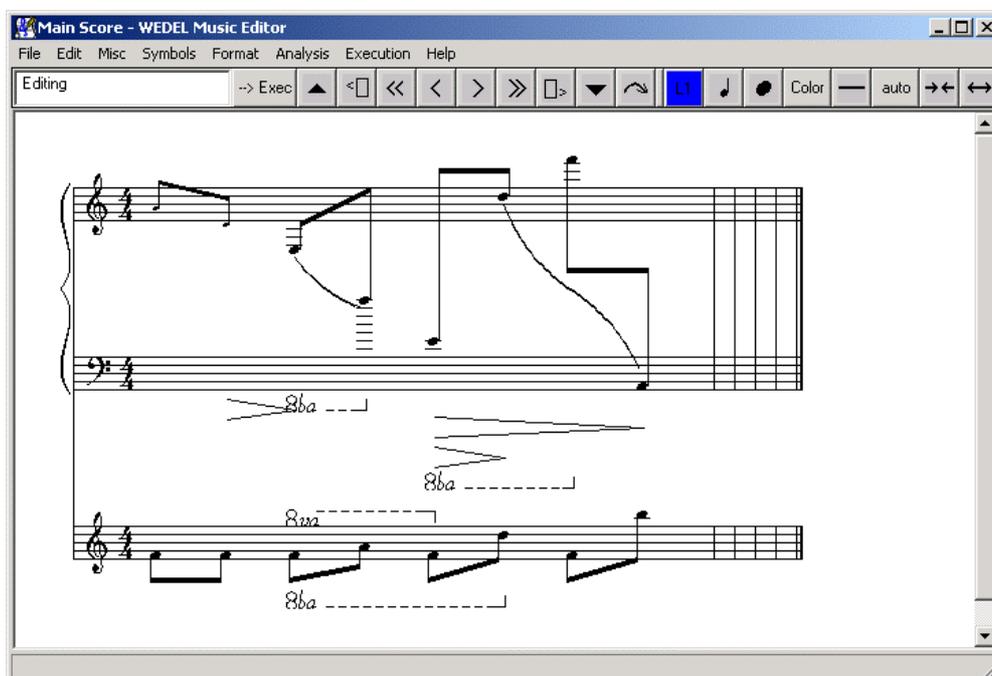
The conditions on the beam refer to parameters extrapolated from the notes belonging to a beam.

- MEAN<operator><floating point number> test if condition is true or not
<operator> : < | > | = | >= | <=
<floating point number> : a floating point number indicating the value of the mean. For example: MEAN>1.0.
- BEAMDIS <operator><floating point number> test if condition is true or not
<operator> : < | > | = | >= | <=
<floating point number> : a floating point number indicating the value of the mean. For example: BEAMDIS>0.0.
- NOTES INSINGLELAYER = the notes belonging to the beam are the only voice on the staff
- NOTES INMULTIVOICEUPPER = the notes belonging to the beam belong to the upper voice of polyphony on the staff

- NOTES INMULTIVOICELOWER = the notes belonging to the beam belong to the lower voice of poliphony on the staff
- DELTA <operator><floating point number> test if condition is true or not
 <operator> : < | > | = | >= | <=
 <floating point number> : a floating point number indicating the value of the mean. For example: DELTA>=0.0
- MEAN-MHL<operator><floating point number> test if condition is true or not
 <operator> : < | > | = | >= | <=
 <floating point number> : a floating point number indicating the value of the mean. For example: MEAN-MHL <1.5.
- NOTE FIRSTLOWER = first note of the beam is also the lower among the notes of the beam
- NOTE FIRSTUPPER = first note of the beam is also the upper among the notes of the beam
- STAFFNUMBER==<floating point number> the staff systems for piano, arpa etc contains 2 or 3 staves, this token checks on which staff is the note. For example (STAFFNUMBER=1.0 indicates the first staff of a multistaff part)
- NOTE HEAD==<notehead type> type of notehead chosen.
 Currently supported noteheads are: CLASSIC , NOTE BREVE, CIRCLEX, X_HEAD, DDIESIS, DIAMOND, RHYTHMIC, TRIANG, TRIANG_UP, PLUS_HEAD, MOON.
- NOTEWITH <marker symbol> = symbol that can be added to note.
 <marker symbol> : STACCATO | SFORZATO | ACCENT | MARTELLATO | TENUTO | MARTDOLCE | PUNTOALLUNGATO | MORDENT | TURN | TRILL | WITHMUTE | WITHOUTMUTE | HARM | FINGER | TASTIERA | PONTICELLO | PUNTA | TALLONE | BOWUP | BOWDOWN | ARCO | PIZZICATO | STRING.

20.5.3 Rules and conditions for beaming multistaff parts

The multistaff music presents more parameters than single staff music scores. In case of multistaff parts it is possible to beam notes residing in different staves. To obtain the exact layout and slope desired you can define MILLA conditions for the beams of your score. You can also choose where to place the beams: in case of three-staves parts you can place the beam above the staves, between the first and second staff, between the second and third staff or below the staves. There are MILLA rules and conditions for both deciding where to place the beam and for deciding the slope of the beam. To estimate these parameters it is necessary to calculate some parameters related to the balance of heights of the notes belonging to the beam.



A score with multistaff part

For stating where to draw a beam and for giving a value to the slope it is necessary to evaluate some parameters related to the balance of the beam. These parameters are similar to those introduced for the beam rules in single staff parts.

The parameters defined below generalise the meaning of the parameters for single staff parts introducing the ability to handle and evaluate the parameters MEAN, BEAMDIS, MHL, DELTA for multistaff parts:

$$MEAN = \frac{\sum \text{note heights}}{\text{number of notes}}$$

Evaluates where the notes belonging to the beam are located.

BEAMDIS = highest - lowest

Evaluates the dispersion of the distance of the notes around the third line of the staff

$$MHL = \frac{\text{Highest} + \text{Lowest}}{2}$$

Evaluates the dispersion of the distance of the notes, considering the note with the maximum height and that with the minimum

$$DELTA = \frac{BEAMDIS}{\text{Number of notes} + 1}$$

Evaluates the dispersion of the distance of the notes in terms of the difference of the heights and the number of notes

Insertion Rules and Conditions for beams in multistaff parts

In the following an example of how these parameters can be used in MILLA conditions:



```
RULEINS Beam12 DEFAULT BEAM RELNOTES BEAM12;
RULEINS Beam23 DEFAULT BEAM RELNOTES BEAM23;
:
insIF INMULTISTAFF AND DELTA>4.0 AND BEAMDIS<-20.0 THEN Beam12;
insIF INMULTISTAFF AND MEAN-MHL>4.0 AND BEAMDIS<-40.0 THEN
Beam23;
```

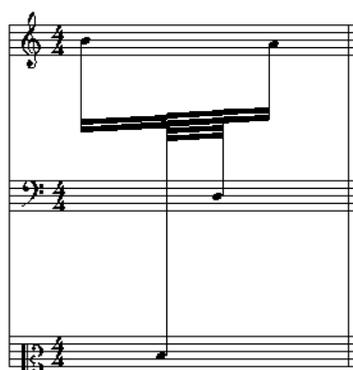
RULES (excerpt)

```
RULEINS Beam12 DEFAULT BEAM RELNOTES BEAM12;
RULEINS Beam23 DEFAULT BEAM RELNOTES BEAM23;
```

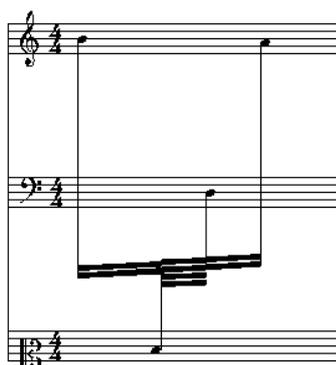
CONDITIONS (excerpt)

```
insIF INMULTISTAFF AND BEAMDIS<=-20.0 AND BEAMDIS>-40.0 THEN Beam12;
insIF INMULTISTAFF AND BEAMDIS<=-40.0 THEN Beam23;
```

In the following some example of MILLA insertion rules for where to place the beam:



Beams between first and second staff



Beams between the second and third staff

Positioning Rules and Conditions for beams in multistaff parts

In the following an example of how parameters defined above can be used in MILLA conditions:



```

RULEPOS BeamInt015 BEAM RELNOTES ANYWHERE ANGLE=[0.0;0.15];
RULEPOS BeamIntM007 BEAM RELNOTES ANYWHERE ANGLE=[0.0;-0.07];
RULEPOS BeamInt007 BEAM RELNOTES ANYWHERE ANGLE=[0.0;0.07];
:
posIF INMULTISTAFF AND DELTA>4.0 AND MEAN-MHL>0.0 AND BEAMDIS>-25.0 THEN
BeamInt015;
posIF INMULTISTAFF AND DELTA>2.5 AND MEAN-MHL>0.0 AND BEAMDIS<-25.0 THEN
BeamIntM007;
....
    
```

RULES (excerpt)

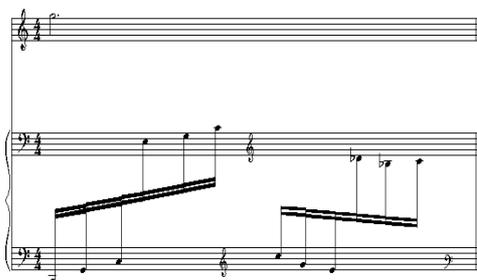
```

RULEPOS BeamInt035 BEAM RELNOTES ANYWHERE ANGLE=[0.3;0.35];
RULEPOS BeamIntM035 BEAM RELNOTES ANYWHERE ANGLE=[-0.3;-0.35];
RULEPOS BeamInt015 BEAM RELNOTES ANYWHERE ANGLE=[0.0;0.15];
    
```

CONDITIONS (excerpt)

```

posIF STAFFNUMBER=1.0 AND STAFFLINES=5.0 AND DELTA=4.0 AND MEAN-MHL=0.0 AND
BEAMDIS=0.0 THEN BeamInt015;
posIF STAFFNUMBER=1.0 AND STAFFLINES=5.0 AND DELTA=9.0 AND MEAN-MHL=0.0 AND
BEAMDIS=-5.0 THEN BeamInt035;
    
```



Different slopes for beams



Slopes almost horizontal

For a more detailed overview of the use of the above parameters in MILLA conditions, please open your current MILLA file.

20.5.4 Rules and conditions for automatic beaming

Depending on the time signature of each measure the MILLA engine automatically beams notes with hook/flag when a precise fraction of the time signature is reached during note insertion. For example, for the time signature of 4/4, the following condition can be imposed to activate rule "NumBeat4":

```
insIF TIME=4;4 THEN NumBeat4;
```

The referred insertion rule imposes the division of the measure in 4 beams:

```
RULEINS NumBeat4 MEASURE RELSTAFF NBEAT=4;
```

The system automatically beams a group of notes when a precise fraction of the time signature is reached.

Affect symbol	Token Conditions	Token Rules	Actions
Beamed Notes	TIME = num;den	BATTUTA RELSTAFF NBEAT= <i><number of beats></i> GTinBEAT=OFF	Minimum number of notes that the system try to beam automatically during editing Automatic beaming of irregular groups

The values of num, den as above specified are the value of numerator and denominator in time signature. For example: num=4, den=4.

The information about time signature is very useful. The time signature of the measure can vary during the piece, in addition time signature could express a real value different. For example a time signature of 6/8 can be intended as two irregular groups for a total duration of 2/4. The time written on the score is 6/8, the real duration time is 2/4. This information is provided by the user through a dialog box. Information about time signature and real duration time is necessary to compute effective duration of the notes for visualisation and midi output.

TIME = Time Signature, expressed as num/den as in the first measure of the part

The rules for the automatic beaming set the parameter of how many beat the measure should contain. The beat are intended in this context as how many groups the system try to make inside the measure.

<number of beats>= an integer value consistent with the time signature

```
RULEPOS NumBeat1 BATTUTA RELSTAFF NBEAT=1 GTinBEAT=OFF;
RULEPOS NumBeat2 BATTUTA RELSTAFF NBEAT=2 GTinBEAT=OFF;
RULEPOS NumBeat3 BATTUTA RELSTAFF NBEAT=3 GTinBEAT=OFF;
RULEPOS NumBeat4 BATTUTA RELSTAFF NBEAT=4 GTinBEAT=OFF;
RULEPOS NumBeat5 BATTUTA RELSTAFF NBEAT=5 GTinBEAT=OFF;
```

```
posIF TIME=3;8 THEN NumBeat1;
posIF TIME=5;8 THEN NumBeat5;
posIF TIME=6;8 THEN NumBeat2;
posIF TIME=4;4 THEN NumBeat4;
...
```

20.5.5 Rules and conditions for markers

There are several symbols (called in this context markers) that can be associated with the note. They are typically positioned above or below the note head. Among them:

- The expression symbols: staccato dot, sforzato, accento, martellato o staccatissimo, tenuto o sostenuto,

martellato dolce, punto allungato, etc.

- The ornaments: turn, turn back, mordent, trill, tremolo, gliss, etc.
- The indication symbols: with mute, without mute, harmonics, fingering, etc.
- The instruments symbols: tastiera, bridge, punta, tallone, bowing, arc, pizzicato, string number, pedals, hell, toe, etc.

The expression symbols are listed below. In parenthesis the name of the related token in MILLA language :

- Staccato dot (STACCATO)
- Sforzato (SFORZATO)
- Accent (ACCENT)
- Martellato o Staccatissimo (MARTELLATO)
- Tenuto o Sostenuto (TENUTO)
- Martellato dolce (MARTDOLCE)
- Punto allungato (PUNTOALLUNGATO)

The (abbellimento) ornament symbols are:

- Mordente (MORDENT)
- Gruppetto (TURN)
- Trill (TRILL)

The indication symbols are:

- In/Via (WITHMUTE, WITHOUTMUTE)
- Armonici (HARM)
- Fingering (FINGER)

The chord instruments symbols are:

- Keyboard (TASTIERA)
- Bridge (PONTICELLO)
- Punta (PUNTA)
- Tallone (TALLONE)
- Bow up (BOWUP)
- Bow down (BOWDOWN)
- Arc (ARCO)
- Pizzicato (PIZZICATO)
- String (STRING)

Some generic symbols can be defined by the user:

- AccentiGen

These symbols are directions to the musician to play in a certain way his/her instrument.

All these symbols indicate a precise way of playing a note to obtain a certain sound. So these symbols are always found related to a note.

Insertion Rules and Conditions for Markers

Insertion rules are used to estimate the position of markers. Their position is typically related to the direction of the note stem, if any. For example, the insertion rule for the staccato-dot has been used by the first note of the first measure of next figure:

```
RULEINS Stac0 STAC RELNOTE OPPOSITETOSTEM;
```

It states that the staccato has to be drawn on the opposite side with respect to the direction of the note stem. The opposite constraint is ONSTEM.



Notes with markers

A condition that activated the above rule is:

```
insIF NOTE INSINGLELAYER THEN Stac0;
```

Positioning Rules and Conditions for Markers

Positioning rules of these symbols are used to impose parameters that state specific relative positions:

- in the space between staff lines or on the staff line: ONSPACE, ONLINE;
- outside or inside the staff: OUTSIDESTAFF, ONSTAFF;
- at an estimated distance from the note stem or from the note head: DX, DY;
- above or below the staff: ABOVE, BELOW.

These constraints can be composed for specifying the exact position of the symbols with respect to the note and the staff. For example, for the staccato dot associated with the first note of the first measure of preceding figure, the following rule has been applied:

```
RULEPOS Stac2 STAC RELNOTE ONSPACE OUTSIDESTAFF DX=0 DY=0;
```

The rule has been activated by condition:

```
posIF OPPOSITETOSTEM THEN Stac2;
```

The above conditions and rules are examples of how is possible with MILLA to transform in rule classical exceptions.

Affect symbol	Token Conditions	Token Rules	Actions
STACCATO SFORZATO ACCENT MARTELLATO TENUTO MARTDOLCE PUNTOALLUNGATO	NOTE INSINGLELAYER NOTE INMULTIVOICE NOTE INMULTIVOICEUPPER NOTE INMULTIVOICELOWER	ONSTEM OPPOSITETOSTEM	Draws the symbol on the stem of the note or on the notehead
Generic Accents	NOTE ABOVE NOTE BELOW ONSTEM OPPOSITETOSTEM NOTE STEMUP NOTE STEMDOWN NOTEWITH ACCE NOTEWITH TEN	ONSPACE OUTSIDESTAFF	States that the symbol cannot be localized across a line States that the symbol must be drawn outside the staff
MORDENT TURN TRILL	NOTE [x, y] TEN PRECEED STAC STAC PRECEED TEN NOTAWITH STAC	ONSTAFF	States that the symbol must be drawn inside the staff
WITHMUTE WITHOUTMUTE HARM FINGER	STAFFNUMBER==<floating point number> STAFFLINES==<integer number> HEAD==<notehead type> NOTEWITH <marker symbol>	DX=<floating point number> DY=<floating point number>	Draws the symbol at the specified distance from the note (stem or notehead)
TASTIERA PONTICELLO			

BOWUP BOWDOWN PUNTA TALLONE PIZZICATO ARCO STRING		ABOVE BELOW	Draws the symbol above or below the staff
---	--	----------------	---

- NOTE INSINGLELAYER = the note which the symbol refers belongs to a voice on the staff that is the only one present
- NOTE INMULTIVOICE = the note which the symbol refers belongs to a voice that is not the only one present on the staff, case of poliphony
- NOTE INMULTIVOICEUPPER = the note which the symbol refers belongs to the upper voice in the staff, case of poliphony
- NOTE INMULTIVOICELOWER = the note which the symbol refers belongs to the lower voice in the staff, case of poliphony
- NOTE ABOVE = the symbol is placed above the note
- NOTE BELOW = the symbol is placed below the note
- ONSTEM = the symbol is placed on the side of the stem of the note
- OPPOSITETOSTEM = the symbol is placed on the side of the headnote of the note
- NOTE STEMUP = the note to which the symbol refer to has the stem direction upward
- NOTE STEMDOWN = the note to which the symbol refer to has the stem direction downward
- NOTEWITH *<marker symbol>* = symbol that can be added to note.
<marker symbol> : STACCATO | SFORZATO | ACCENT | MARTELLATO | TENUTO | MARTDOLCE | PUNTOALLUNGATO | MORDENT | TURN | TRILL | WITHMUTE | WITHOUTMUTE | HARM | FINGER | TASTIERA | PONTICELLO | PUNTA | TALLONE | BOWUP | BOWDOWN | ARCO | PIZZICATO | STRING.
- NOTE [x, y] = the note pitch is comprised between values indicate in condition, the pitch is codified as explained, see STAFF figure in previous paragraph. X, Y are two numbers indicating the height of the note
Example (NOTE [0, 3])
- TEN PRECEED STAC = on the note which the symbol refer to the tenuto symbol proceed the staccato symbol
- STAC PRECEED TEN = on the note which the symbol refer to the staccato symbol proceed the tenuto symbol
- STAFFNUMBER=*<floating point number>* the staff systems for piano, arpa etc contains 2 or 3 staves, this token checks on which staff is the note. For example (STAFFNUMBER=1.0 indicates the first staff of a multistaff part)
- STAFFLINES=*<integer number>* number of lines of the staff
- NOTE HEAD=*<notehead type>* type of notehead chosen.
Currently supported noteheads are: CLASSIC , NOTE BREVE, CIRCLEX, X_HEAD, DDIESIS, DIAMOND, RHYTHMIC, TRIANG, TRIANG_UP, PLUS_HEAD, MOON.

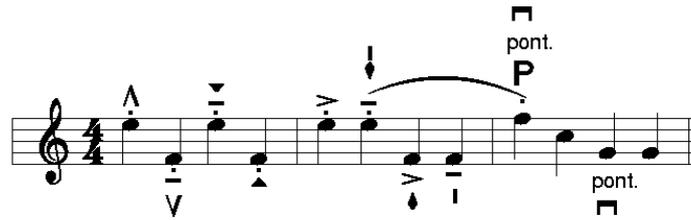
20.5.6 Priority rule for symbols referred to notes

Markers and other symbols may refer to the same note. In these cases, the order in which these symbols are drawn is significant. The Priority Rule states the order of positioning in which the symbols must be drawn above and/or below the note. The positioning is independent on the order in which they have been inserted. The Priority Rule is applied when the editor window is redrawn.

The editing of the priority rule can be used to change the order of symbols without modifying the symbolic description of music score. The form of the priority rule is a list of symbol identifiers in decreasing order of priority. For example,

```
RULEPRI STACCATO TENUTO SLUR MARTELLATO ACCENT SFORZATO MARTDOLCE
PUNTOALLUNGATO ARCO PUNTA TASTIERA BOWUP BOWDOWN STRING PIZZICATO,....., OCTAVE,
....., etc.;
```

The above priority rule is applied in the example in the following figure. The staccato-dot presented a higher priority with respect to the other symbols, as can be seen in the first six notes. The PUNTA (a big P) marker has a higher priority than the PONTICELLO (pont.) marker as results in the first note of the third measure. The slur (SLUR) has less priority than the staccato-dot (STACCATO) and the tenuto marker (TENUTO), but higher than any other symbol as results from the slur between the second and third measure of the next figure..



The order of appearance of the symbols is established in the priority rule

Chap.21 MIDI Input, Output and Orchestration

The MIDI section in the WEDELMUSIC Editor allows importing MIDI files to produce the symbolic representation in the Music Editor, reproducing via Midi Player of music in symbolic format, converting and saving the WEDELMUSIC section of symbolic file in Standard Midi file in 0 or 1 format. The MIDI generation provides a section to manage the Orchestration in order to define the instrument voices.

21.1 MIDI Import

The WEDELMUSIC Editor gives the possibility to import General MIDI file in 1 or 0 format. To do that, the user has to select **File** in the Menu Bar and the choose **Import MIDI** (see Fig. 21.1).

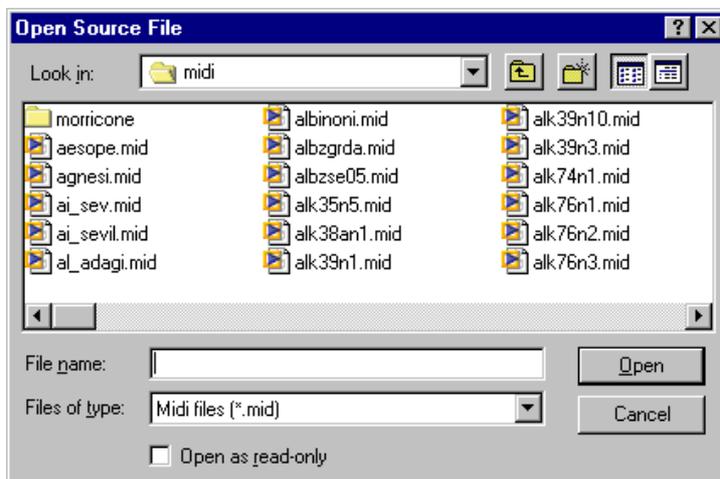
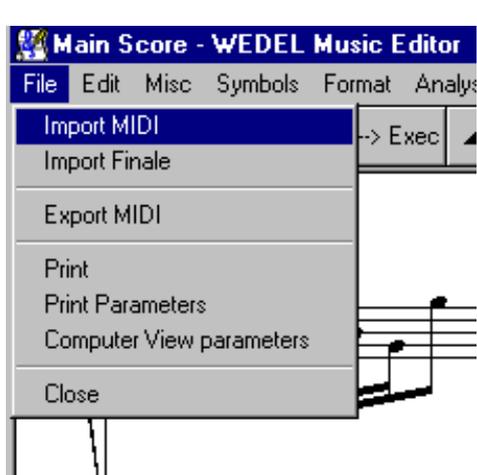
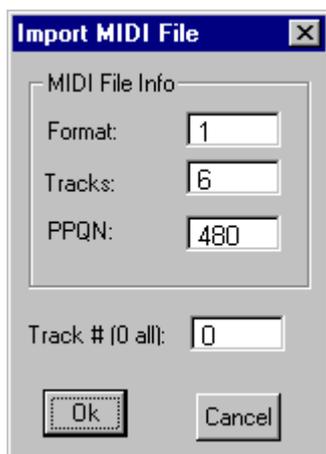
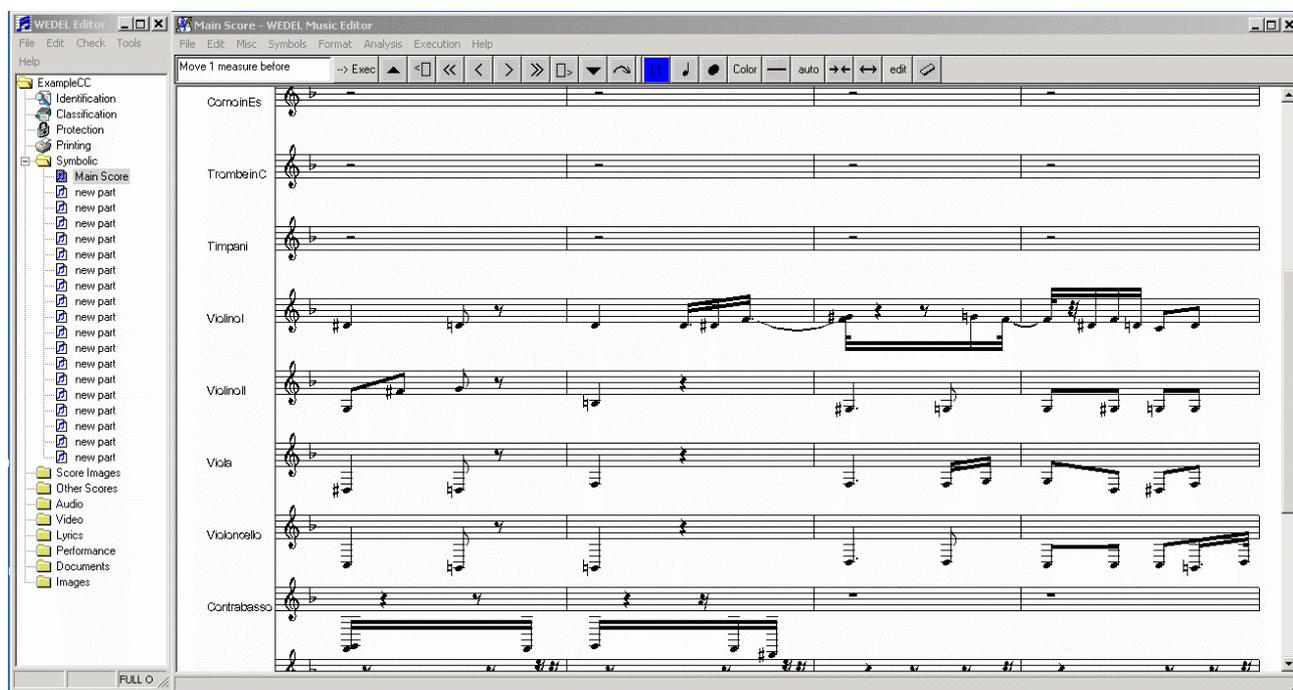


Fig. 21.1 - How to import a Midi File in the WEDEL Music Editor

This operation allows to open the **Open Source File** dialog in order to select the (*.mid) MIDI File. Pushing Open, the WEDELMUSIC Editor starts to import the file. Before to show the symbolic notation, the **Import Midi File** dialog (see Fig. 21.2) shows a summary of the file providing the information in the Header of the file. The information concern: **Format**, number of **Tracks**, **PPQN** (Pulse Per Quarter Note factor). At this phase, the user can select the track number that he wants to import or accept to import all tracks by fixing the track number to 0 (default value for All tracks).

Fig. 21.2 - Import MIDI File

Pushing the OK button the import will be displayed otherwise with Cancel button all import will be lost. Once the file is imported the parts are visible in the WEDEL Editor and can be seen as depicted in the next figure. Each Part is called New Part. The Name recovered from the MIDI will be directly loaded into the WEDEL Editor in a further version of the Editor.



Please note that Clefs and Key signature are recovered from the MIDI file only if these are included into it. If these details are not included into the MIDI file they have to set in a second phase by transposing the parts and/or by changing clefs and key signatures for the parts. To have details about his process please consult the Chapter regarding the Transposition in this manual.

In a further release, it will be possible to impose a tonality in the phase of MIDI file import. By using the Music Analysis Tools it is possible to estimate the optimum tonality of the music piece. This means that once loaded for the first time and estimated the tonality it can be convenient to change it with other tools for MIDI editing and load it again.

In order to verify if the loaded music score has some problems of inconsistencies please use the check facility in the menu format of the WEDELMUSIC editor.

21.2 MIDI Generation, Export in MIDI

The WEDELMUSIC Editor gives the possibility to generate and export General MIDI file in 1 or 0 format. To do that, the user has to select **File** in the Menu Bar and the choose **Export MIDI** (see Fig. 21.3).

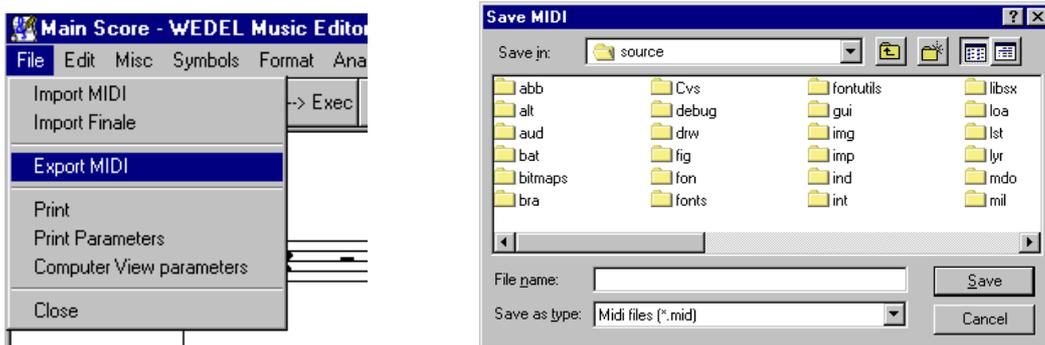


Fig. 21.3 - Export Midi File

A **Save MIDI** dialog will appear in order to input the name of midi file.

Before to generate the Midi File WEDELMUSIC Editor will control if the Orchestration is needed. If the orchestration is missing, it will be request (see the MIDI Orchestration Section 21.3), otherwise the **Midi Format** dialog (see Fig.21.4) is shown, then the user can choose the format for the Midi file.

Two formats are can be user for Export in MIDI: MIDI 0 and MIDI 1.

The Ok button confirms the generation while the Cancel button stops and close the dialog.



Fig. 21.4 - Midi Format Dialog

21.3 MIDI Orchestration

WEDELMUSIC Editor provides to the user the way to set up the MIDI parameters in order to create an orchestration for the execution of the symbolic score. It is possible to manage up to 32 tracks.

The function that allows to do that is called **Orchestration** and it is in the **Execution** Menu on the the Menu Bar (see Fig.21.5)

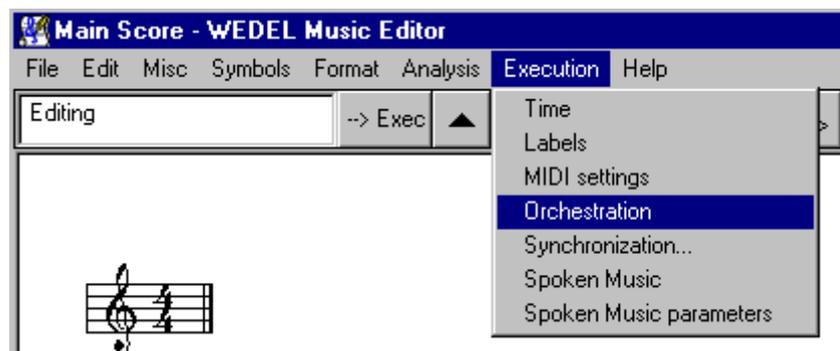


Fig. 21.5 - Execution Menu for Midi Orchestration

Associated with this function the **Orchestration** dialog will be displayed, the dialog is shown in the Fig. 21.6. The Orchestration dialog is also presented when the

Music Score is executed producing MIDI. In that case, the notes under execution are shown as depicted in the Chapter describing the music execution.

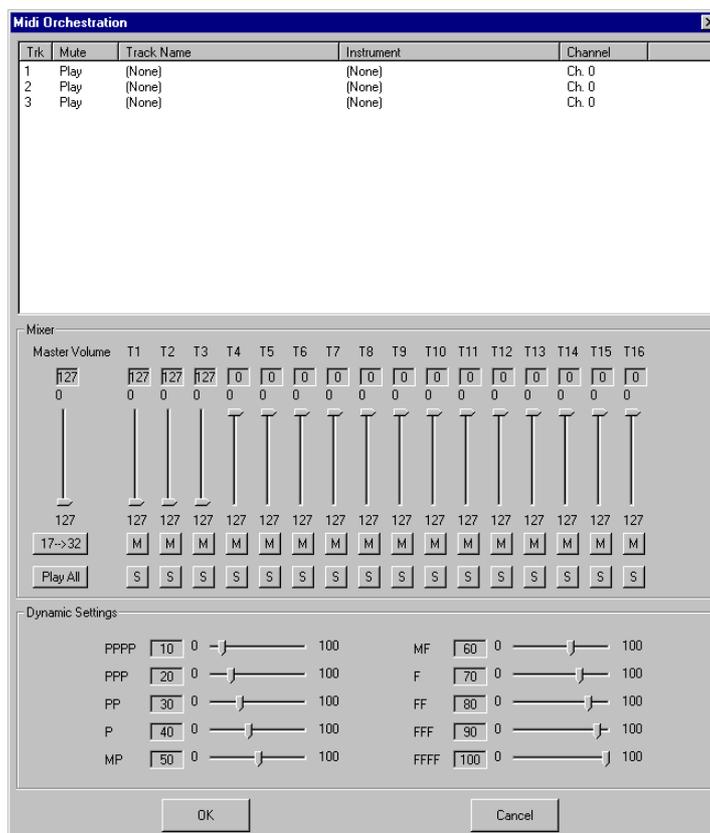


Fig. 21.6 - Orchestration Dialog

21.3.1 Orchestration Dialog

In the dialog are defined three areas: the List of tracks, the Mixer and the Dynamic Settings.

21.3.1.1 List of tracks

The List of Tracks (see 21.11) displays the tracks associated to the visible parts on the symbolic main score. For each track is displayed the number, the status (Mute, Play, Solo), the name of the related symbolic part, the Midi instrument with the Midi code and finally the Midi Channel number. The user can set up the Midi voice and the channel number for each track.

Fig. 21.7 - List of Midi Tracks

Trk	Mute	Track Name	Instrument	Channel
1	Play	StrEnsmbl 1	Ensamble 1 (49)	Ch. 0
2	Play	StrEnsmbl 2	Ensamble 2 (50)	Ch. 2
3	Play	StrEnsmbl 2	Ensamble 2 (50)	Ch. 3
4	Play	StrEnsmbl 2	Ensamble 2 (50)	Ch. 4
5	Play	Pizz Strings	Pizzicato (46)	Ch. 5
6	Play	StrEnsmbl 2	Ensamble 2 (50)	Ch. 6
7	Play	Solo Violin	Violin (41)	Ch. 7
8	Play	ChurchOrgan	Church Organ (20)	Ch. 8
9	Play	ChurchOrgan	Church Organ (20)	Ch. 10
10	Play	ChurchOrgan	Church Organ (20)	Ch. 11

The setting up of the Midi voice is done by clicking with the right button of the mouse inside the Instrument column on the row of the chosen track, after the mouse click a window list will appear, and the user can choose the instrument (see Fig. 21.12)

Trk	Mute	Track Name	Instrument	Channel
1	Play	StrEnsmbl 1		Ch. 0
2	Play	StrEnsmbl 2		Ch. 2
3	Play	StrEnsmbl 2	(None)	Ch. 3
4	Play	StrEnsmbl 2	Acoustic Grand Piano (1)	Ch. 4
5	Play	Pizz Strings	Brite Acoustic Piano (2)	Ch. 5
6	Play	StrEnsmbl 2	Electric Grand Piano (3)	Ch. 6
7	Play	Solo Violin	Honkey-tonk Piano (4)	Ch. 7
8	Play	ChurchOrgan	Electric Piano 1 (5)	Ch. 8
9	Play	ChurchOrgan	Electric Piano 2 (6)	Ch. 10
10	Play	ChurchOrgan	Harpichord (7)	Ch. 11
			Clavi (8)	
			Celesta (9)	
			Glockenspiel (10)	
			Music Box (11)	
			Vibraphone (12)	
			Marimba (13)	

Fig. 21.12 - The list of Midi instruments

The setting up of the Midi channel number can be done by clicking with the right button of the mouse inside the Channel column on the row of the chosen track, after the mouse click a window list will appear, and the user can choose the channel number (see Fig. 21.13).

Trk	Mute	Track Name	Instrument	Channel
1	Play	StrEnsmbl 1	Ensamble 1 (49)	Ch. 0
2	Play	StrEnsmbl 2	Ensamble 2 (50)	
3	Play	StrEnsmbl 2	Ensamble 2 (50)	
4	Play	StrEnsmbl 2	Ensamble 2 (50)	
5	Play	Pizz Strings	Pizzicato (46)	
6	Play	StrEnsmbl 2	Ensamble 2 (50)	
7	Play	Solo Violin	Violin (41)	
8	Play	ChurchOrgan	Church Organ (20)	
9	Play	ChurchOrgan	Church Organ (20)	
10	Play	ChurchOrgan	Church Organ (20)	

Fig. 21.13 - The list of Midi Channel

21.3.2 The Mixer

The Mixer allows to set up a set of parameters described in the following (Fig. 21.14).

Master Volume

By means a slider, the user can set the volume of the ensemble of tracks.

Volume for each track

By means a slider, the user can set the volume of the track .

Status of the track

The M and the S buttons allow to set the status of tracks. By pressing the M button the tracks is muted and Mute will be displayed on the list of track and the M on the button becomes red. To reset this status, the button has to be pressed again and the Play status will be associated.

By pressing the S button only that track will be played, all the other tracks will be muted. On the list of track the solo track will be marked with Solo while the others with Mute. The S on the button will became green and the M on the others track will be coloured on red. To reset all status, it is needed to push the Play All button

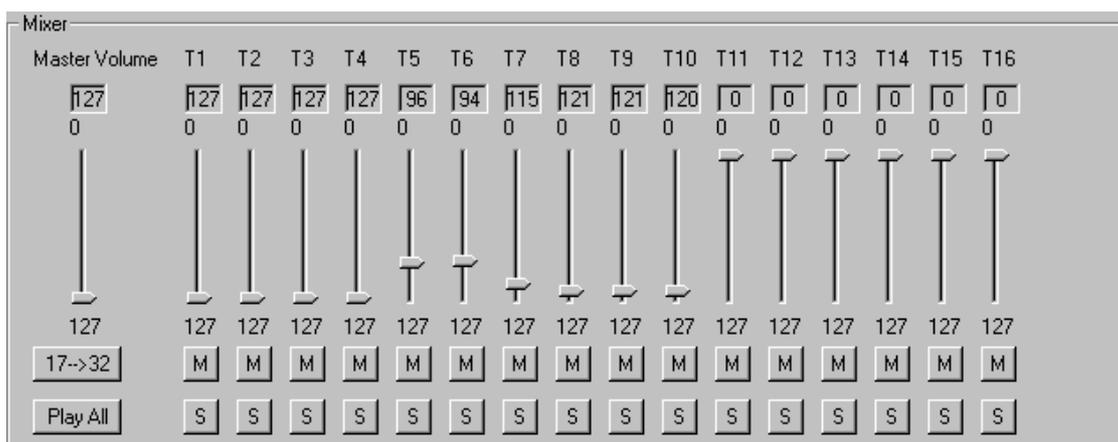
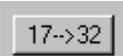


Fig. 21.14 - The Mixer Panel

By means of the  button the user can switch from the first set of 16 tracks (from T1 to T16) to the second set of 16 tracks (from 17T to 32T).

21.3.3 Dynamic Settings

The Dynamic Setting panel allows managing the a set of dynamic indications that can be in the symbolic score. As shown in the Fig. 21.15, ten dynamic indications are provided. The Midi conversion of a dynamic has made by changing the volume of the track, the value associated to each dynamic expresses the percentage of volume that has to be considered and it is referred to the value defined in the Mixer. For example: in case of a P (piano) with value equal to 40%, if the track volume has been fixed to 100 the execution will play with volume equal to 40.

The default settings realise a linear scale.

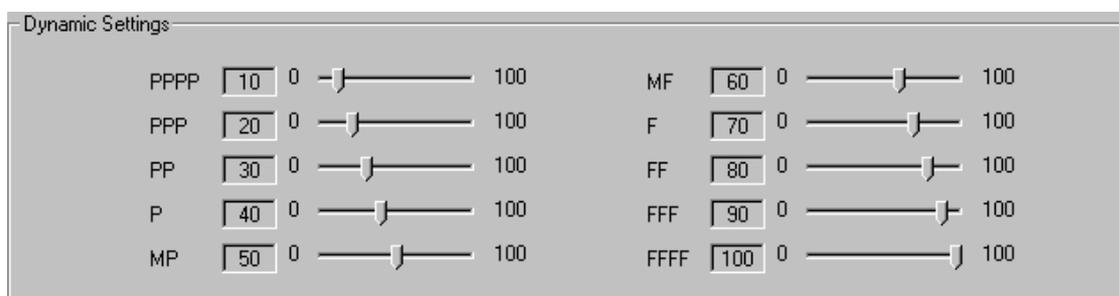


Fig. 21.15 - The Dynamic Settings Panel

Chap.22 Fret Editor Tool

Fret Editor allows visualising, modifying, storing and creating new fretboards that can be used by WEDELMUSIC Music Editor to insert chords configuration inside the symbolic version of music score. The aspect of the GUI is shown in the following figure on the right.

The first step to activate the tool is to select the archive of fretboards by using the busson on the right site name FILE. Default extension of the archive file is *.dat.

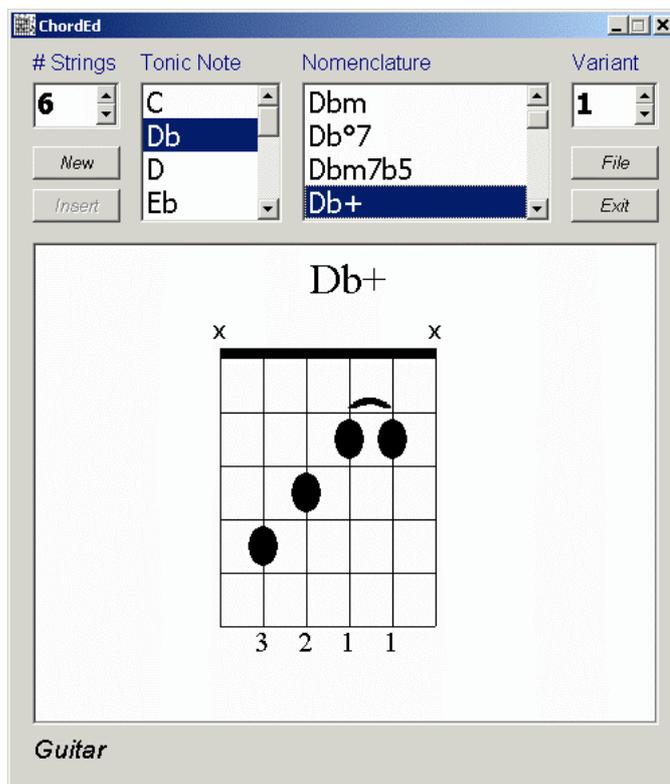
Functionalities are:

Strings: To fix the number of strings in the fretboard. This number can vary from 2 to 9.

Tonic Note: To select the tonics among the listed for the current number of strings. It is possible to select the fundamental note. Fundamental notes are expressed in b-moll to uniform the archive.

Nomenclature: to select the chord on among the possible with the same string and tonic note.

Variant: to select the variant fretboard among those that have the same tonic, string and nomenclature. They are identified increasing the content of this control.



This window visualises the fretboard selected with previous controls and allows editing with the following modality:

- Clicking on the chord name it is possible to modify it.
- Clicking on the fretboard, it is possible to modify finger positions on strings and eventually barré; with the left mouse button user can insert a finger position on a string, move it if it is already present or delete it. To fix a barré the user has to click on the starting and final strings: first click with right mouse button to fix the start position while a second click is needed to impose the final. Barré can be deleted clicking on it.
- Strings which are not pressed can be marked empty with the “o” symbol while mute strings are marked with “x”.
- Strings pressed are marked with the number of fingers (**1,2,3,4,T**) and they are show on bottom. Clicking on them a list box appears then numbers can be modified.
- Key indicators are the **bridge** (a black bold line in top of fretboard that defined the end of keyboard) and the specific key on the side “**key num fr**”; they are mutual exclusive. Clicking on the present indicator arrows appears and user can increase or decrease the star key.

Edit-box Comment

In this box, on the bottom of the window, a comment related to a particular fretboard is visualised and this can be modified.

Button New

A new fretboard with empty strings is prepared and the comment is “*Insert by USER*”. This button is enabled when an archive is loaded.

Button Insert

Add the current fretboard to the current archive. The button is enabled after that fretboard has been modified or the “New” command has been pressed while it is disabled in consultation. The name of new fretboard is controlled in order to respect the request of the archive.

Button File

A Load dialog is opened to load an archive. Default extension of the archive file is *.dat.

Button Exit

Exit and close the application.

The Format for storing fretboards:

This is a simple example of the database file containing the formalisation of the fretboards.

The first field is the tonic, the second the number of strings, the third the version, the fourth to sixth the description of the finger position on the fret, and the last the comment.

```

C;          6;  1;  x32o1o;          0;    732717;          "Guitar"
C;          6;  2;  x3555x;          3500; 713337;          "Guitar"
C;          6;  3;  133211;          1608; 134211;          "Guitar"
C;          6;  4;  xxxo1o;          0;    777717;          "Guitar"
C;          5;  1;  332o1o;          0;    342717;          "Guitar"
Cm;         6;  1;  x3554x;          0;    713427;          "Guitar"
Cm;         6;  2;  133111;          1608; 134111;          "Guitar"
Cm;         6;  3;  x31o1x;          0;    741727;          "Guitar"
Cm;         6;  4;  xxx543;          0;    777321;          "Guitar"
Cm;         6;  5;  x35543;          2600; 713421;          "Guitar"
C?07;      6;  1;  x3424x;          0;    723147;          "Guitar"
C?07;      6;  2;  2x121x;          3507; 271317;          "Guitar"
C?07;      6;  3;  xx4545;          0;    771324;          "Guitar"

```

Chap.23 Lyric Editor (to be translated)

23.1 Introduction

Lyric Editor e' un tool che permette di costruire le linee di lirica. L'aspetto dell'interfaccia è quello di una Window Application standard. Il tool mette a disposizione un insieme di funzioni e regole che permettono di trasformare un testo in una sequenza di sillabe, che successivamente saranno agganciate automaticamente alle note del pentagramma cui si riferirà la lirica.

Le regole di trasformazione sono basate sull'uso di alcuni simboli speciali, di seguito nominati simboli formattatori, che permettono di realizzare i meccanismi di scomposizione sillabica, melismi, vocalizzi, scansioni, prolungamenti. Inoltre è possibile associare fino a 4 linee di lirica, posizionate ad altezze diverse per realizzare ritornelli o linee multilingua.

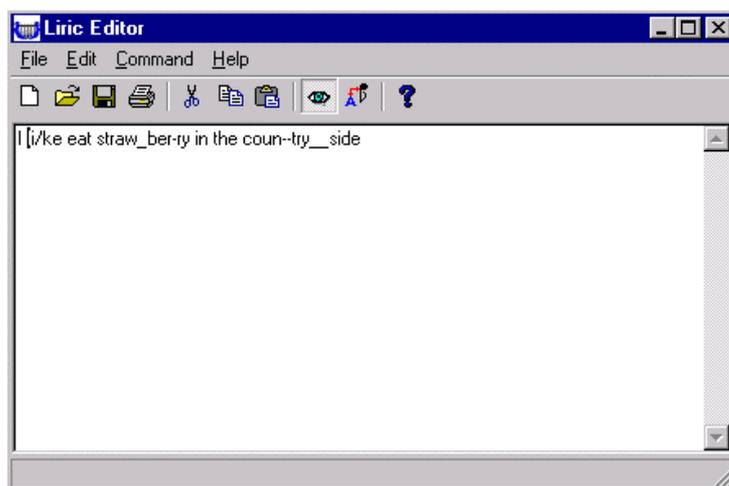


Fig. 23.1 - Dialog Window

Durante la fase di preparazione le strofe nella finestra di Lyric Editor (nella modalità “view” abilitata) sono visualizzate insieme ai simboli formattori, tuttavia, per una agevole lettura del solo testo, è possibile visualizzare le sole strofe senza i simboli (modalità “view” disabilitata).

Il testo della lirica può essere salvato in un File di testo oppure in formato XML, mentre il salvataggio della lirica associata alle note della linea melodica è necessario il salvataggio dal WedelMusic Editor. E’ inoltre possibile importare file di testo (.TXT) o XML.

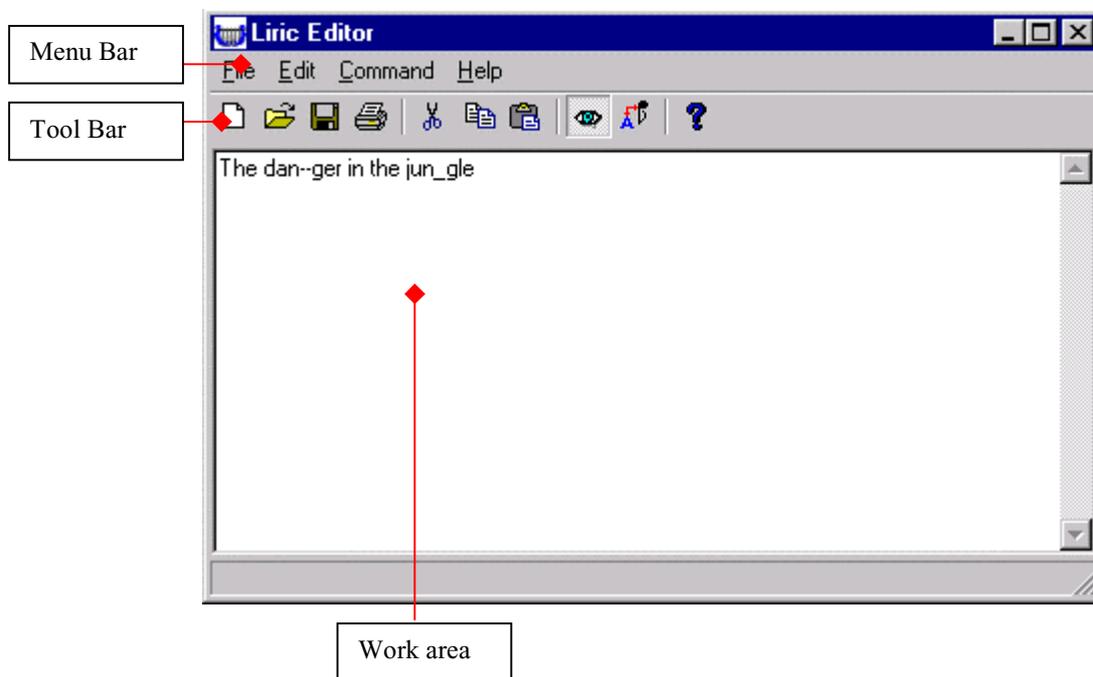
Infine, il tool fornisce alcune delle più comuni funzioni di editing come copia, incolla e taglia.



Fig. 23.2 – Assignment result

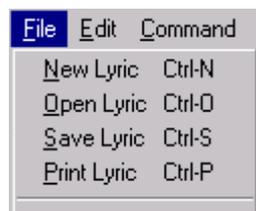
23.2 The Lyric Editor window

In questa sezione viene descritta l’interfaccia grafica del tool Lyric Editor. L’editor presenta tre aree principali: Menu Bar, Tool Bar e Work Area



23.3 Menu Bar

I comandi a disposizione nel menu “File” come mostrato nella figura. Sono:



New Lyric: Crea un nuova area di lavoro.
Open Lyric: Apre un file txt già esistente .

object

Save Lyric: Salva come file txt l'area di lavoro corrente.

Print Lyric: Stampa il contenuto dell'area di lavoro.

Exit : Termina il programma Lyric Editor.

23.4 Menu Edit

I comandi a disposizione nel menu "Edit" come mostrato nella figura sono:



Cut: Rimuove il contenuto dell'area selezionata, memorizzandola per un successivo riposizionamento.

Copy: Memorizza il contenuto dell'area selezionata.

Paste: Inserisce nell'area di lavoro il testo memorizzato dalle due funzioni Cut e Paste.

23.5 Menu Command

I comandi a disposizione nel menu "Command" come mostrato nella figura sono:



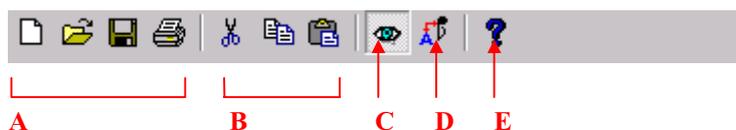
View tokens: Attivo permette la creazione o la modifica di un testo, Disattivo mostra lo stesso testo senza segni grafici senza poterlo modificare.

Add: Comando di Link che converte il testo in una lista di oggetti che saranno collegati alle figure dello spartito.

23.6 Menu Help

Non disponibile.

23.7 The Tool Bar



A: Replica in barra dei comandi presenti sul menu' "File".

B: Replica in barra dei comandi presenti sul menu' "Edit". Questi comandi risultano visibili solo Quando il comando "View" (punto C) Risulta Attivo.

C: "View" replica la voce "View Tokens" del menu' "command". E' un toggle button. Se è Attivo consente di Scrivere e/o modificare il testo da associare al pentagramma . Se è Inattivo non permette la modifica del testo e nasconde i simboli formattatori.

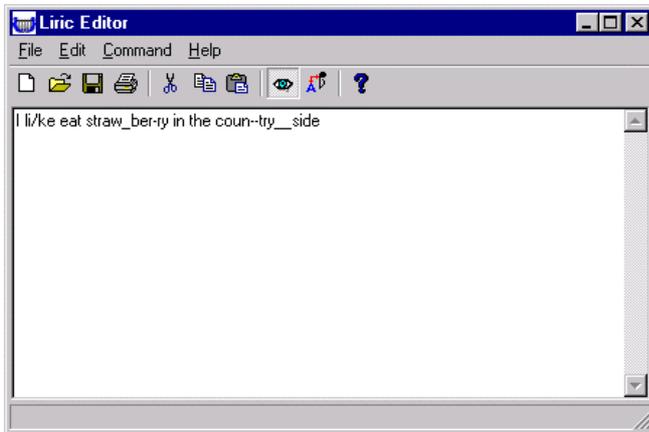
D: Comando "Link"; Consente di avviare l'assegnazione automatica della lirica ad un pentagramma.

E: Replica in barra la chiamata dell' Help nel menu' "Help"

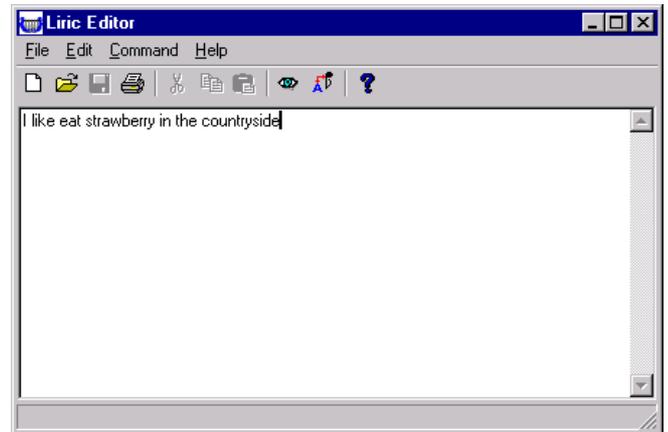
23.8 Work Area

E' l'area della Lyric Editor Window adibita alla scrittura del testo. Durante la fase di preparazione le strofe nella modalità "view" abilitata (a) sono visualizzate insieme ai simboli speciali, tuttavia, per una agevole lettura del solo testo, è possibile visualizzare le sole strofe senza i simboli nella modalità "view" disabilitata

(b). Nella modalità “view” abilitata è consentito l’editing, mentre nella modalità “view” disabilitata è inibita qualunque forma di editing (copy, cut and paste).



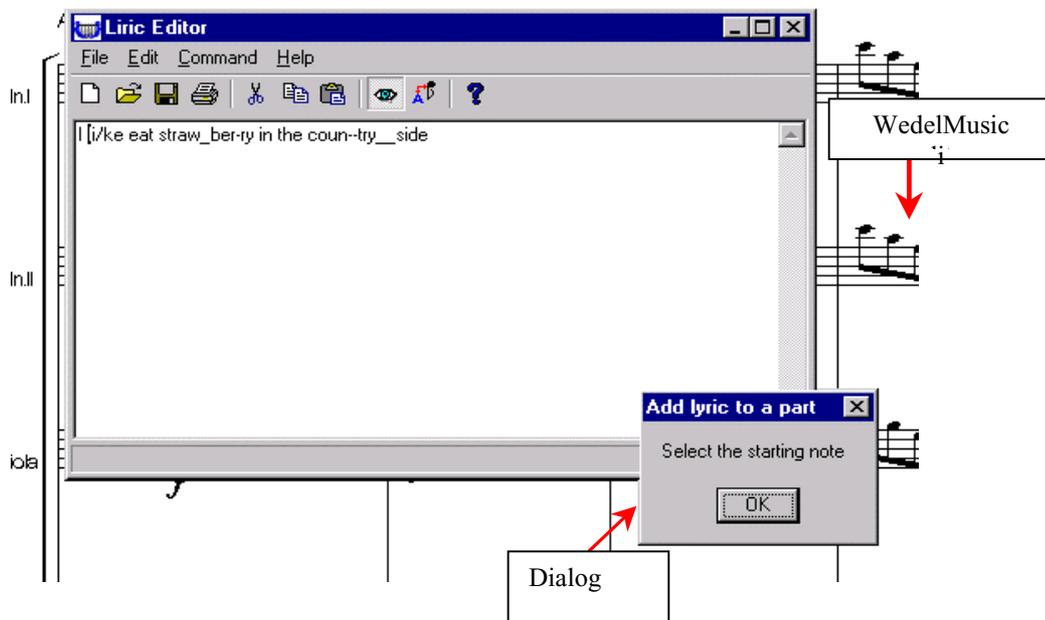
a) Lyric with format symbols – View mode enabled



b) Lyric without format symbols – View mode disabled

23.9 Esempio di inserimento della Lirica

Viene mostrato un esempio di inserimento della lirica all’interno di una parte musicale. Supponiamo di avere preparato la frase per l’assegnazione come mostrato nella figura. Premendo l’icona relativa al **link** viene visualizzata una finestra di dialogo che avverte di selezionare la nota di partenza su un pentagramma dello spartito visualizzato dal WedelMusic Editor. Successivamente WedelMusic Editor viene portato in primo piano e il cursore assume l’aspetto di una croce, l’utente è ora in grado di scegliere la nota di partenza premendo il tasto sinistro del mouse sulla nota stessa. Effettuata la selezione le sillabe vengono associate automaticamente e compariranno sotto il pentagramma come mostrato in Figura.



Risultato dopo il “link”:

adagio (♩ = 80)

li - ke eat straw_ber - - ry in the coun - - try_ side

23.10 Elenco formattatori sillabici

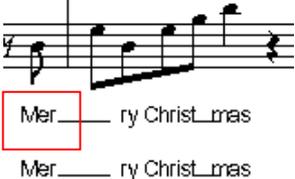
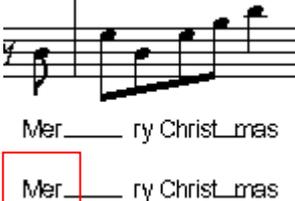
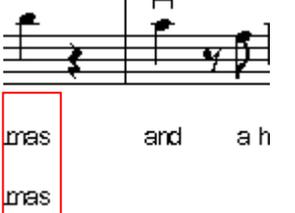
Di seguito sono riportati i Simboli grafici formattatori che possono essere inseriti tra una sillaba e l'altra. Essi consentono di creare le modalità di scrittura e assegnazione alle note cui le sillabe devono riferire.

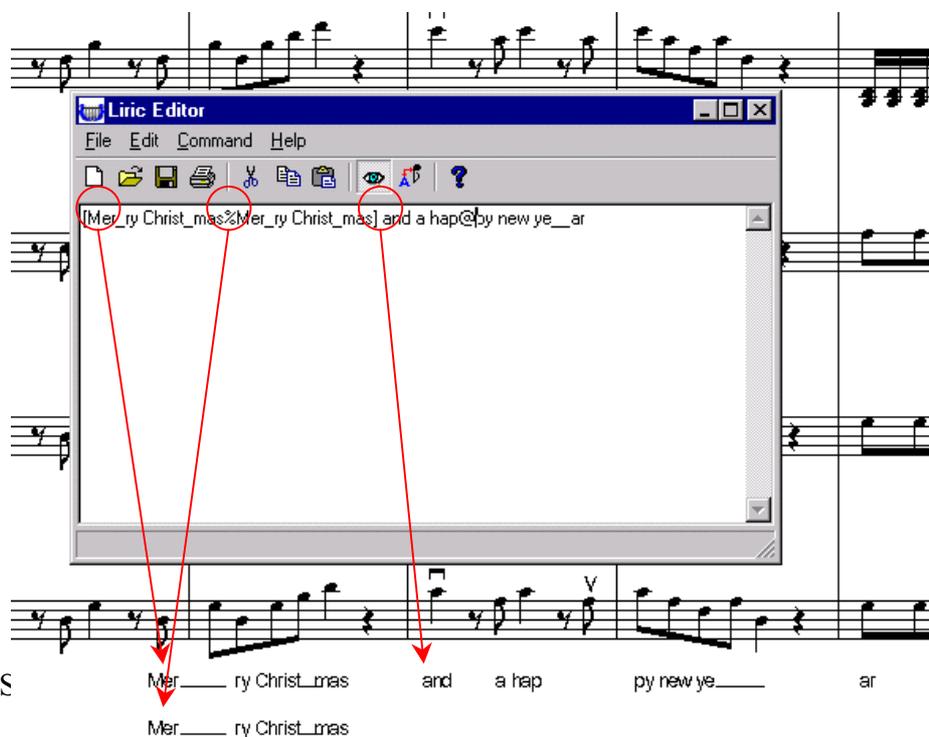
TOKEN(S)	EXAMPLE(S)
<p>/ It is a simple syllable separator. Graphically a short line separates syllables. Es: li/ke</p> <p>, <R> B (=space) and R (=carriage return) are the natural separators between words. Graphically it doesn't produce any line or similar. About space, it can be a sequence of white characters but it's seen as only white character. This is useful to identify and limit a word. In this way other symbols can be considered inside a word and related to a syllable. Es: I li/ke</p>	<p>BACK SLASH</p> <p>li - ke</p> <p>SPACE</p> <p>li -</p>
<p>- (at choice) The minus symbol can be used to fix the number of notes to jump for positioning the next syllable. Graphically syllables are separated by a certain number of dashed. This number depends on the graphic space between notes but at least a short line is guaranteed. Es: 1) straw_ber-ry and 2) coun--try</p>	<p>MINUS</p> <p>_ber - ry</p> <p>MINUS X 2</p> <p>coun - - - - - try_</p>
<p>_ (at choice) Underscore symbol can be used to extend syllables. Graphically continuous line starts from the position of syllable associated and stops after a number of notes equal to the number of underscore used. Line stops under the last note. Es: 1) straw_ber-ry and 2) try__side</p>	<p>UNDERSCORE</p> <p>straw_ber</p> <p>UNDERSCORE X 2</p> <p>-try__ side</p>

<p>@ (at choice) It's like the – symbol but graphically no line is drawn.</p>	
<p>+ It can be used to link two syllables such as the first and the next respectively terminates and starts with vowel. Graphically a slur underscores vowels.</p>	

23.11 Elenco formattori posizionali

Servono per posizionare più linee di lirica ad uno stesso gruppo di figure (funzione ritornello, multilingua).

POSITION TOKEN(S)	EXAMPLE(S)
<p>[Indica che la figura, associata alla sillaba recante questo simbolo, e' quella di inizio per tutte le linee di lirica.</p>	
<p>% Indica che la sillaba alla sua sinistra e' la prima di una nuova linea di lirica. E sara' posizionata sotto la figura a cui e' associata , ad una altezza diversa, la sillaba con "[“.</p>	
<p>] Indica che la sillaba alla destra del token e' l'ultima del ritornello e, quindi, la prossima sillaba sara' associata alla prima linea di strofe.</p>	



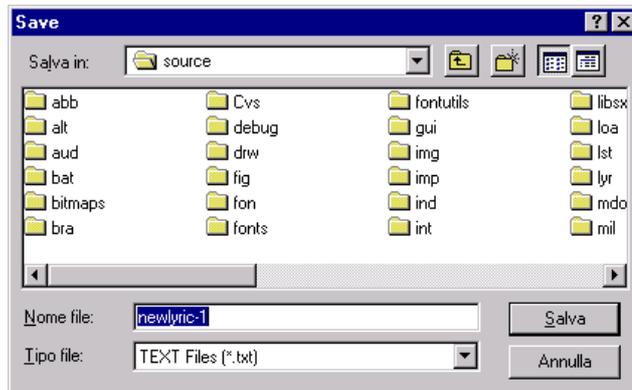
WEDELMUS

Mer ry Christ mas and a hap py new ye ar

Mer ry Christ mas

23.12 Salvataggio della lirica

Per salvare il testo della lirica, dal menù File selezionare Save Lyric. Di seguito, comparirà la finestra di salvataggio con un nome file di default. Il salvataggio consente due modalità:



File text (.txt): E' l'opzione di default, la lirica viene salvata su un file in formato testuale.

File XML: (Da implementare) La lirica viene salvata su un file in formato XML.

23.13 Caricamento file di testo

Per caricare il testo della lirica, dal menù File selezionare Open Lyric. Di seguito, comparirà la finestra di apertura. Possono essere caricati due tipi di file:



File text (.txt): E' l'opzione di default. La lirica viene caricata da un file in formato testuale.

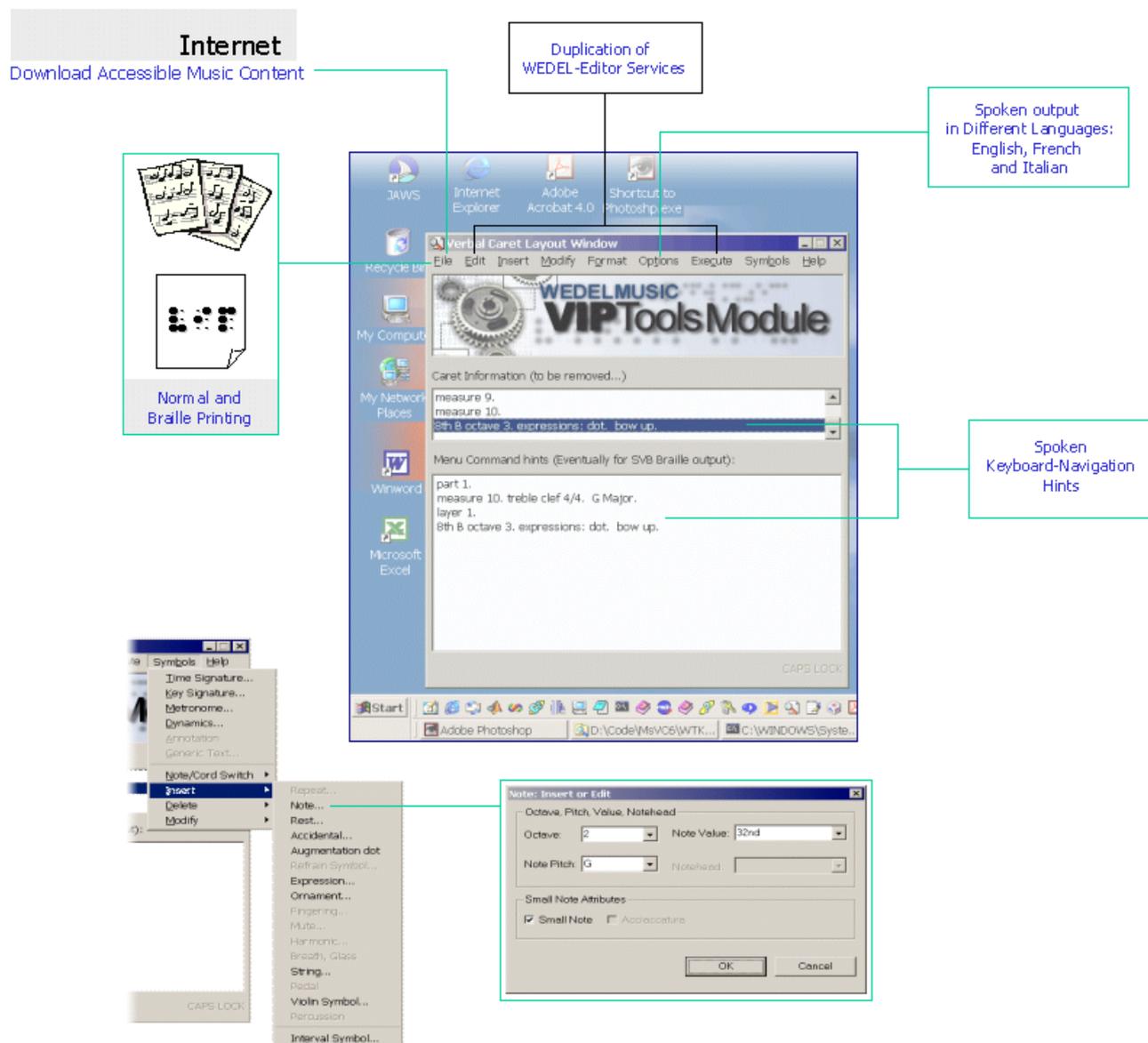
File XML: (Da implementare). La lirica viene caricata da un file in formato XML.

Chap.24 Music Editing for Visually Impaired People

“Tools for Visually Impaired People” is a software module of the WEDELMUSIC system, referring to a collection of tools and methods that render the modalities of the common WEDEL User Interface to a form accessible from the blind people.

- ◆ *Load, Edit and Print* in accessible form, music and text. The visually impaired can *transcribe* music into Braille format, *print* through a Braille printer and *read* the symbolic notation with a Braille bar.
- ◆ *Get audible feedback*. The computer informs the user through *synthetic speech*, about the symbolic content of the music score currently open. They can thereby navigate through parts, measures, layers and notes of the score much as an ordinary user can do with the graphical Interface.
- ◆ *Listen* to the contents of a score – or a selected portion of it – through the *Spoken Music component* of the module.

The “*Tools for Visually Impaired*” or **VIModule**, handles the access to WEDELMUSIC functionality from Visually Impaired Persons (VIs). This is achieved through the duplication of the majority of WEDEL services, as well as the extension of the user interface with modalities appropriate for individuals with sighting disabilities. **VIModule** integrates existing accessible UI technologies into a single service that enables the impaired user to download a music score and associated information remotely, navigate through the content of the music score using the keyboard and get spoken. The **VIModule** represents the WEDELMUSIC System’s extensions for visually impaired persons. However, the module contains tools that need to be accessible from sighted persons as well, such as the Spoken Music Module and the Braille Printing Module. Aside from these tools, the main role of the **VIModule** is to render the WEDELMUSIC Editor’s functionality accessible to VIs. hints of the content.



It makes implicit or explicit use of the following services:

- ♣ **Screen-Reader:** The VIModule does not actually communicate directly with this component, but it certainly relies on its presence to handle focus changes, menu navigation, etc. providing appropriate audible feedback. After all, the WEDELMUSIC VIEditor is a typical Windows application itself and can be treated by the screen-reader the same standard way.
- ♣ **Speech Synthesiser:** In order to provide additional information to the user, when appropriate, a Text to Speech (TtS) converter is required that supports the three project languages. This TtS converter will be explicitly controlled by the system.

The WEDELMUSIC VIModule itself is divided into the following independent modules and components:

- The **WEDELMUSIC VIEditor**. It is a simplified version of the WEDELMUSIC Editor targeted to the visually impaired persons. It contains a set of commands for:
- **Retrieving** information related to the WEDELMUSIC Format header of the file opened for editing, as well as classification, identification, structural, and other information. The VI user will be able to download a music piece in the same way as with the WEDELMUSIC Editor. The VI Module duplicates all the functionality needed for the user authentication and copyright protection of the music piece.
- **Browsing** through a score using a caret-like mechanism. Spoken information is automatically provided relatively to both the current caret location and the symbols in the vicinity of it. The VI user has full navigation capabilities using the computer keyboard. They can move to the preceding or the next part, measure or note relative to the

position of the caret or define where they want the caret to be located within the symbolic representation of the music score.

- **Editing** by means of inserting, deleting, modifying, marking, copying and pasting isolated symbols or entire measures or parts.
- **Reproduction** of any portion of the score. This involves diverse actions such as playback, producing a hardcopy using a Braille printer, or transforming the part of the score to the Spoken Music component.
- **Multilingual TTS**. Spoken messages are involved in all the previously described actions, both to assist the VI users to select the respective commands and to provide feedback on the results of their actions on the currently opened score. All messages related to musical information can be issued in English, French and Italian according to the language selection made by the user.
- **Braille Printing**: This module handles all the details for printing a portion of a score to a Braille printer, e.g. selecting the target printer, setting the printing options, and performing the actual data transmission.
- **Spoken Music**: This is a separate module of the VI Editor that handles all the details for music-to-speech conversion in the language selected by the user. The VI user can direct the system to start “saying” the content of the music piece. The speech output can be saved in an audio file.

Chap.25 WEDELMUSIC Plug-in for Finale

Its purpose is to save in XML WEDELMUSIC format any score file loaded into Finale. This allows sharing music at a wider audience by using the emerging standard of XML. Music Files saved in WEDELMUSIC XML format can be loaded, printed and edited by using the WEDELMUSIC editor and browser.

FINALE is a trademark of CODA Music and NET4MUSIC group.

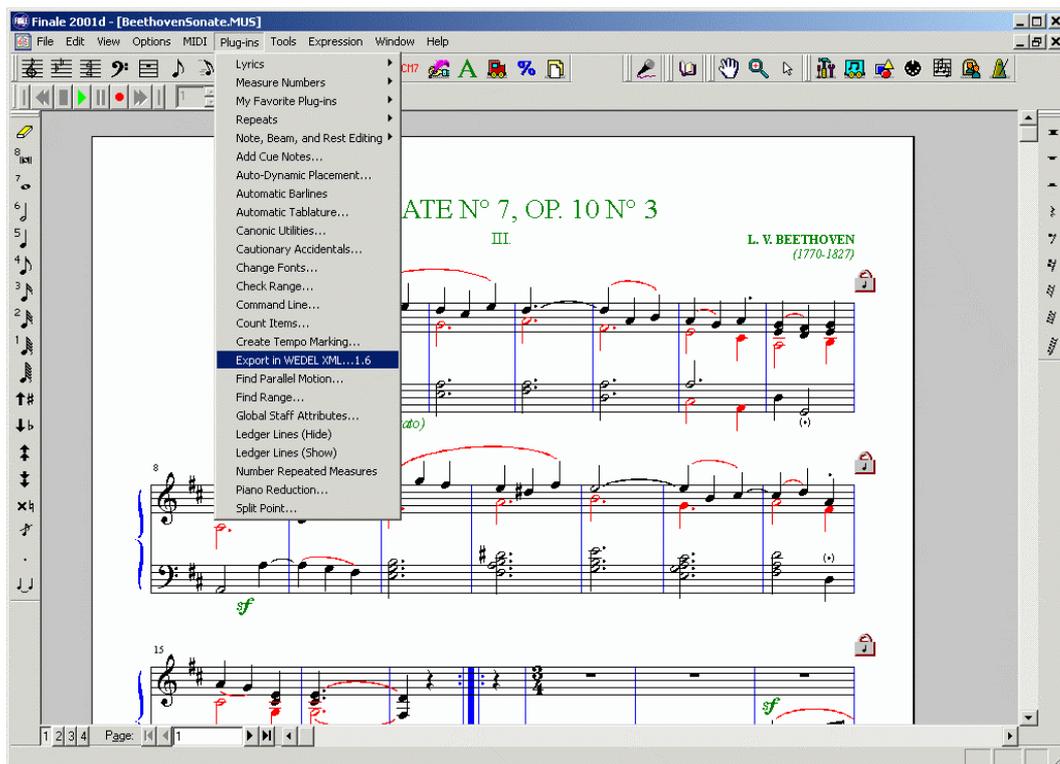
25.1 Installation of WEDELMUSIC Plug-in for Finale

The installation of WEDELMUSIC Plug in is very simple and immediate. It can be done by means of the following phases:

- put the file named WEDEL-v1-x.fxt which is the plug in, in the Plug in directory of Finale 2001 or 2002. It is subdirectory of the Finale directory in your hard disk.
- put the file "exportwedelxml.tab" in the directory indicated by the MDS path of the WEDELMUSIC Editor, please see the Chapter regarding the installation of the WEDELMUSIC Editor.

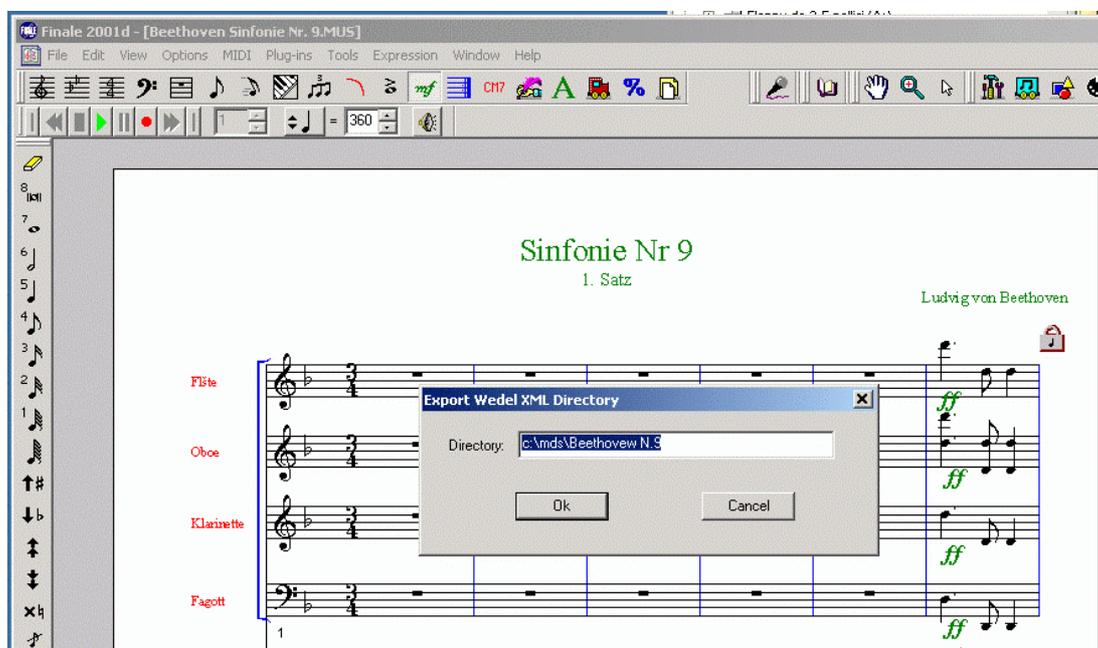
The file "exportwedelxml.tab" is a table of conversion used by the Plug-In and can be adjusted/customised by the users in order to cope with the flexibility of Finale and WEDELMUSIC Editors. The path and file names of the produced file in XML is requested to you at each execution of the Plug-In. The path is stored for your convenience. Please pay attention since it is also stored the file name.

Once the installation is performed it can be verified observing the presence of the Plug in the Finale Editor.



25.2 Exporting Finale Files in WEDELMUSIC Format

According to the previous figure, the export of the Finale file can be easily done by selecting the corresponding item in the Plug ins menu of the Finale editor. Once performed that action a dialog is presented to the user to select the location in which the WEDELMUSIC file has to be saved in its name.



When a file is saved in WEDEL XML format a directory is produced with a name:

<namefile>.wdf

inside the directory you can find the XML files that have the extensions:

WDF: main file of the total WEDEL format object
<nomefile>.SWF: XML main score details
#.<nomefile>.SWF: XML description of the part

In addition, you may find LOG files, one for each part, named in the same manner. In the log files you can find useful information to understand if your conversion has gone in the right manner or something can be improved. This is very important since working a bit on a conversion table you can strongly improved the conversion percentage of your plug in. the 100% of conversion can be easily obtained.

The converter uses a table of conversion which is stored into the file named: exportwedelxml.tab that file has to be located in the directory in which you saved your WDF directories. That path and file names is requested to you at each execution of the Plug-In. The path is stored for you convenience. Please pay attention since it is also stored the file name.

25.3 Export Table File

The table contains 4 areas/sections:

- articulation,
- single char expression,
- shape expressions and
- chords.

For each of them you can write a list of conversion from the number used in Finale to the XML code of WEDELMUSIC. For each section several items can be defined to associate numbers used in Finale with symbols used in WEDELMUSIC.

For each section you can have up to 600 entries. They are numbered from 1 to 600. Over the 400 you can find several examples that have been placed there as examples of what you have to write to generate correct WEDELMUSIC Symbols. In that way, you can make your table selecting what is needed for you, what is needed to convert your Finale Files and symbols into WEDELMUSIC XML files.

The conversion table depends on the style that you have used in Finale, so a prepared table will work for several Finale files, for those produced with the same conventions, finale version, style, etc.

The example reported is only a small part. On the left, the Identification Number used in Finale is reported. For each number the XML code of WEDELMUSIC has to be reported. If a symbol does not has to be translated into the WEDELMUSIC format. The line corresponding to its number can be omitted. For example:

```
1 <marker TYPE="STACCATO" UPDOWN="%s"/>
2 <marker TYPE="ACCENTO" UPDOWN="UP"/>
3 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
14 <marker TYPE="BOWDOWN" UPDOWN="UP"/>
```

25.3.1 Composite symbols to multiple symbols

You can associate to a unique symbol of FINALE even more that one WEDELMUSIC symbols
For example, the case of STACCATO TENUTO:

```
3 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="TENUTO" UPDOWN="UP"/>
```

25.3.2 Up and Down position of Symbols

In the writing of the XML statements above for the table you can write them in parametric manner. This allows you to get from finale the position UP/DOWN of the symbols. In order to leave this flexibility leave the UPDOWN code open with %s:

```
1 <marker TYPE="STACCATO" UPDOWN="%s"/>
```

Please remember that UPDOWN of WEDELXML may accept UP | DOWN | AUTO. AUTO means that the direction is estimated every time the symbol is loaded on the basis of the context by using MILLA inferential engine.

25.3.3 An example of the Export table

In the following, an example of the Export Table for Finale export in WEDELMUSIC format:

```

articulations
1 <marker TYPE="STACCATO" UPDOWN="%s"/>
2 <marker TYPE="ACCENTO" UPDOWN="UP"/>
3 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
14 <marker TYPE="BOWDOWN" UPDOWN="UP"/>
15 <ornament TYPE="TURNBACK" UPDOWN="UP"/>
16 <piano TYPE="PEDALDOWN" UPDOWN="DOWN"/>
17 <piano TYPE="PEDALUP" UPDOWN="DOWN"/>
180 <arpeggio DIRECTION="NONE"/>
19 <text UPDOWN="DOWN">ERROR</text>
22 <harmonic UPDOWN="UP" TYPE="STRINGS"/>
23 <mute UPDOWN="DOWN" TYPE="PLUS"/>
24 <text UPDOWN="DOWN">ERROR</text>
27 <ornament TYPE="TREMOLO" NUMBER="3" UPDOWN="UP"/>
28 <text UPDOWN="DOWN">ERROR</text>
29 <text UPDOWN="DOWN">ERROR</text>
30 <marker TYPE="SFORZATO" UPDOWN="UP"/>
31 <marker TYPE="SFORZATO" UPDOWN="UP"/><marker TYPE="STACCATO" UPDOWN="%s"/>
32 <marker TYPE="TENUTO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
33 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
48 <text UPDOWN="DOWN">ERROR</text>
49 <ornament TYPE="TREMOLO" NUMBER="3" UPDOWN="UP"/>
50 <text UPDOWN="DOWN">ERROR</text>
51 <marker TYPE="ACCENTO" UPDOWN="UP"/>
52 <text UPDOWN="DOWN">ERROR</text>

single-char-expressions
1 <dynamictext DYNAMIC="F" UPDOWN="DOWN"/>
2 <dynamictext DYNAMIC="MF" UPDOWN="DOWN"/>
3 <dynamictext DYNAMIC="FF" UPDOWN="DOWN"/>
11 <dynamictext DYNAMIC="SFZ" UPDOWN="DOWN"/>
12 <dynamictext DYNAMIC="SFFZ" UPDOWN="DOWN"/>
17 <text UPDOWN="UP">8va</text>
18 <text UPDOWN="DOWN">8ba</text>
153 <dynamictext DYNAMIC="SFZ" UPDOWN="DOWN"/>

shape-expressions
1 <text UPDOWN="DOWN">ERROR</text>
2 <marker TYPE="GENERIC" UPDOWN="DOWN" NAME="smear"/>

chords
A <fretboard UPDOWN="UP" NUMBER="6" NAME="A" FRETS="x0222o" FINGERS="771237"
  BARRE="00" HEAD="0"/>
B <fretboard UPDOWN="UP" NUMBER="6" NAME="B" FRETS="x2444x" FINGERS="713337"
  BARRE="35" HEAD="0"/>
C <fretboard UPDOWN="UP" NUMBER="6" NAME="C" FRETS="x32o1o" FINGERS="732717"
  BARRE="00" HEAD="0"/>
D <fretboard UPDOWN="UP" NUMBER="6" NAME="D" FRETS="xxx331" FINGERS="777341"
  BARRE="00" HEAD="5"/>

```

Each of the above areas may contain at most 600 entries which is a huge number with respect to what it is typically needed, with respect to the number of different shapes, chords, articulations, etc which are used in a Finale file.

25.4 Aligning WEDEL Export Table with Finale Settings

In the general cases, the prepared table is strong enough to work with your files. If you want to have a good conversion it is better to verify in finale if the table corresponds to the correct set of articulations, single char expressions, and shape expressions.

To do that, you have to go in Finale and open the articulation, expression and shape expression tables from which in finale it is possible to select and insert those symbols. They are in the same order of the above tables. The number reported in the table above and in the table inside finale has to correspond to the right XML code for WEDELMUSIC in this table.

25.4.1 Examples of Finale Articulations into WEDELMUSIC

Finale Articulations are typically drawn in red in the music. They are translated into several classes of symbols in WEDELMUSIC. Articulations are symbols that are associated with notes and thus are placed up or down with respect to the notehead.

For example, in the table we have associated to Finale articulations some: markers, fermata, text, ornaments, piano pedals, arpeggio symbol, harmonics, etc.

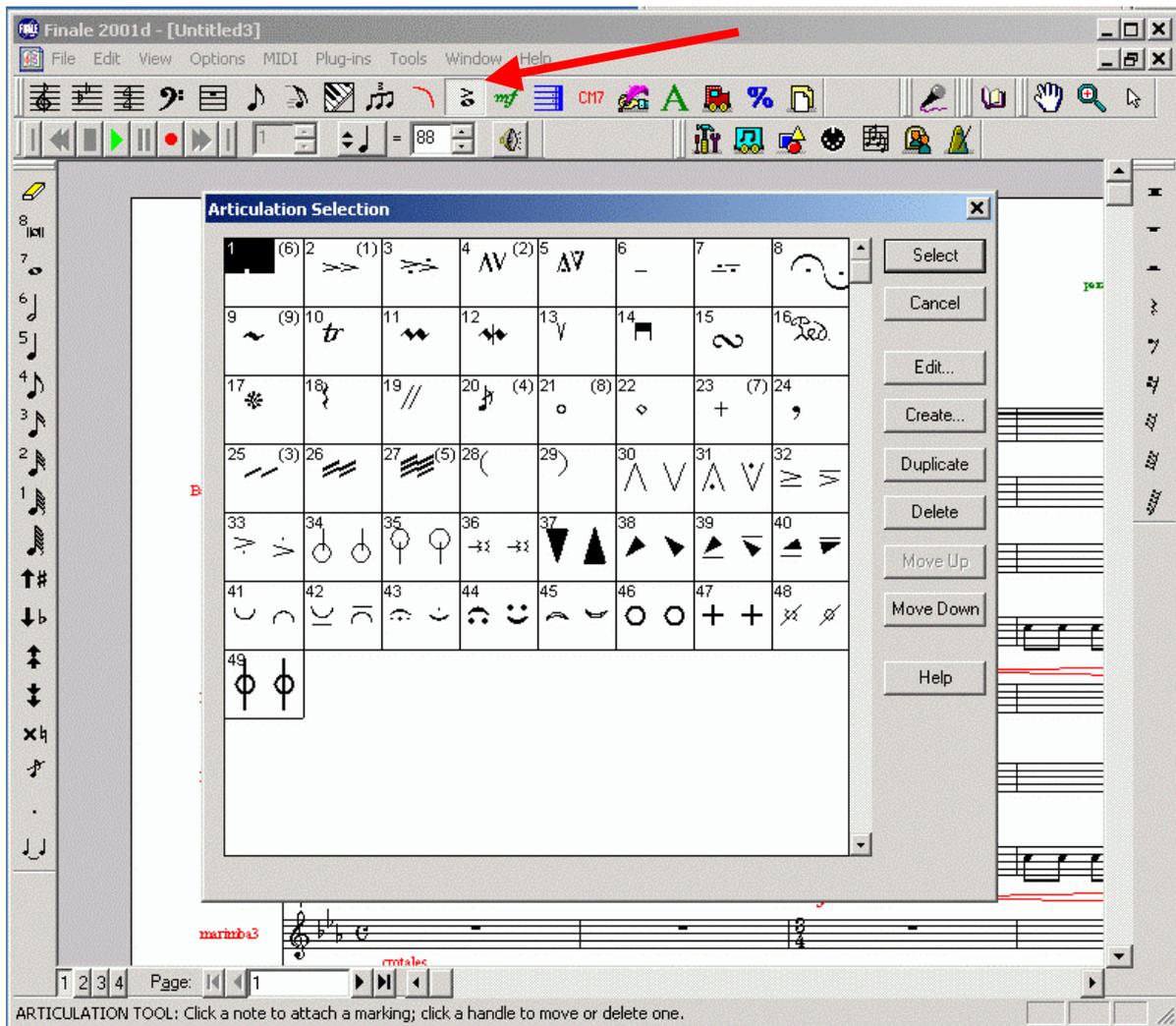
To access at the list of the Finale articulations it is needed to: (i) select the articulation button in the Finale window toolbar as depicted in the next figure, (ii) select a notehead, and thus with that selection the Articulation Selection dialog box is visualised.

When a symbol which is present into the Articulation list is not present in the list of symbols of WEDELMUSIC a generic symbol can be created. For the realisation of a new symbol in WEDELMUSIC please read the specific section of Fonts and that for the definition of New Symbols. The user defined symbols in WEDELMUSIC are called Generic Expressions.

When a symbol is not replicated into the WEDELMUSIC and you would not like to replicate it with a Generic Expression, it suggested to produce in the converted music score with a marker that highlights the presence of miss-conversion. This can be done associating with that symbol a text reporting the type of error:

```
<text UPDOWN="DOWN">ERROR xxxx</text>
```

In the section regarding articulations, after the position numbered 400, several examples are reported. That examples, together with those reported for the other sections: single char expressions, shape expressions and chords can be used for converting any type of symbols are identified in the four groups of Finale. The division in four groups has been performed since it is present in Finale, while in WEDELMUSIC the symbols are classified in several other groups: markers, text, annotation, ornaments, fingering, piano, arpeggio, mute, etc. See for details the Chapter regarding the Fonts in which the list of symbol is presented.



According to the above example, the first 33 symbols are correctly associated with WEDELMUSIC symbols. In some cases, a single symbol in Finale is translated with more symbols of WEDELMUSIC, see for example the symbols numbered 31, 32 and 33.

articulations

```

1 <marker TYPE="STACCATO" UPDOWN="%s"/>
2 <marker TYPE="ACCENTO" UPDOWN="UP"/>
3 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
4 <marker TYPE="SFORZATO" UPDOWN="UP"/>
5 <marker TYPE="SFORZATO" UPDOWN="UP"/><marker TYPE="STACCATO" UPDOWN="%s"/>
6 <marker TYPE="TENUTO" UPDOWN="UP"/>
7 <marker TYPE="TENUTO" UPDOWN="UP"/><marker TYPE="STACCATO" UPDOWN="%s"/>
8 <fermata UPDOWN="%s" TYPE="MEDIUM"/>
9 <text UPDOWN="DOWN">ERROR</text>
10 <ornament TYPE="TRILLO" UPDOWN="UP"/>
11 <ornament TYPE="MORDENTSUP" UPDOWN="UP"/>
12 <ornament TYPE="MORDENT" UPDOWN="UP"/>
13 <marker TYPE="BOWUP" UPDOWN="UP"/>
14 <marker TYPE="BOWDOWN" UPDOWN="UP"/>
15 <ornament TYPE="TURNBACK" UPDOWN="UP"/>
16 <piano TYPE="PEDALDOWN" UPDOWN="DOWN"/>
17 <piano TYPE="PEDALUP" UPDOWN="DOWN"/>
180 <arpeggio DIRECTION="NONE"/>
19 <text UPDOWN="DOWN">ERROR</text>
20 <text UPDOWN="DOWN">ERROR</text>
21 <harmonic UPDOWN="UP" TYPE="FLUTES"/>
22 <harmonic UPDOWN="UP" TYPE="STRINGS"/>
23 <mute UPDOWN="DOWN" TYPE="PLUS"/>
24 <text UPDOWN="DOWN">ERROR</text>

```

```

25 <ornament TYPE="TREMOLO" NUMBER="1" UPDOWN="UP"/>
26 <ornament TYPE="TREMOLO" NUMBER="2" UPDOWN="UP"/>
27 <ornament TYPE="TREMOLO" NUMBER="3" UPDOWN="UP"/>
28 <text UPDOWN="DOWN">ERROR</text>
29 <text UPDOWN="DOWN">ERROR</text>
30 <marker TYPE="SFORZATO" UPDOWN="UP"/>
31 <marker TYPE="SFORZATO" UPDOWN="UP"/><marker TYPE="STACCATO" UPDOWN="%s"/>
32 <marker TYPE="TENUTO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
33 <marker TYPE="STACCATO" UPDOWN="UP"/><marker TYPE="ACCENTO" UPDOWN="UP"/>
34 <text UPDOWN="DOWN">ERROR</text>
35 <text UPDOWN="DOWN">ERROR</text>
36 <text UPDOWN="DOWN">ERROR</text>
37 <text UPDOWN="DOWN">ERROR</text>
38 <text UPDOWN="DOWN">ERROR</text>
39 <text UPDOWN="DOWN">ERROR</text>
40 <text UPDOWN="DOWN">ERROR</text>
41 <text UPDOWN="DOWN">ERROR</text>
42 <text UPDOWN="DOWN">ERROR</text>
43 <text UPDOWN="DOWN">ERROR</text>
44 <text UPDOWN="DOWN">ERROR</text>
45 <text UPDOWN="DOWN">ERROR</text>
46 <text UPDOWN="DOWN">ERROR</text>
47 <text UPDOWN="DOWN">ERROR</text>
48 <text UPDOWN="DOWN">ERROR</text>
49 <ornament TYPE="TREMOLO" NUMBER="3" UPDOWN="UP"/>
50 <text UPDOWN="DOWN">ERROR</text>
51 <marker TYPE="ACCENTO" UPDOWN="UP"/>
52 <text UPDOWN="DOWN">ERROR</text>
53 <text UPDOWN="DOWN">ERROR</text>
54 <text UPDOWN="DOWN">ERROR</text>

400 <marker TYPE="STACCATO" UPDOWN="DOWN"/>
401 <marker TYPE="ACCENTO" UPDOWN="UP"/>
402 <marker TYPE="MARTELLATO" UPDOWN="UP"/>
403 <marker TYPE="SFORZATO" UPDOWN="UP"/>
404 <marker TYPE="TENUTO" UPDOWN="UP"/>
405 <marker TYPE="MARTDOLCE" UPDOWN="UP"/>
406 <marker TYPE="PUNTOALLUNGATO" UPDOWN="UP"/>
407 <marker TYPE="BOWDOWN" UPDOWN="UP"/>
408 <marker TYPE="BOWUP" UPDOWN="UP"/>
409 <marker TYPE="ARCO" UPDOWN="UP"/>
410 <marker TYPE="PIZZ" UPDOWN="UP"/>
411 <marker TYPE="PUNTA" UPDOWN="DOWN"/>
412 <marker TYPE="TALLONE" UPDOWN="DOWN"/>
413 <marker TYPE="PONTICELLO" UPDOWN="DOWN"/>
414 <marker TYPE="TASTIERA" UPDOWN="DOWN"/>
414 <ornament TYPE="TRILLO" UPDOWN="UP"/>
415 <ornament TYPE="TURNBACK" UPDOWN="UP"/>
416 <ornament TYPE="TURN" UPDOWN="UP"/>
417 <ornament TYPE="TURNSLASH" UPDOWN="UP"/>
418 <ornament TYPE="TURNUP" UPDOWN="UP"/>
419 <ornament TYPE="MORDENTSUP" UPDOWN="UP"/>
420 <ornament TYPE="MORDENT" UPDOWN="UP"/>
430 <ornament TYPE="DMORDENTSUP" UPDOWN="UP"/>
431 <ornament TYPE="DMORDENT" UPDOWN="UP"/>
432 <ornament TYPE="TREMOLO" NUMBER="1" UPDOWN="UP"/>
433 <ornament TYPE="TREMOLO" NUMBER="2" UPDOWN="UP"/>
434 <ornament TYPE="TREMOLO" NUMBER="3" UPDOWN="UP"/>
435 <ornament TYPE="TREMOLO" NUMBER="4" UPDOWN="UP"/>
436 <ornament TYPE="TREMOLO" NUMBER="5" UPDOWN="UP"/>
437 <ornament TYPE="TREMOLO" NUMBER="6" UPDOWN="UP"/>
438 <ornament TYPE="STEMTREMOLO" NUMBER="1"/>
439 <ornament TYPE="STEMTREMOLO" NUMBER="2"/>
440 <ornament TYPE="STEMTREMOLO" NUMBER="3"/>
441 <ornament TYPE="STEMTREMOLO" NUMBER="4"/>
442 <ornament TYPE="STEMTREMOLO" NUMBER="5"/>
443 <ornament TYPE="STEMTREMOLO" NUMBER="6"/>
444 <ornament TYPE="STEMTREMOLO" NUMBER="6"/>
445 <ornament TYPE="GLISSLINE" UPDOWN="UP"/>

```

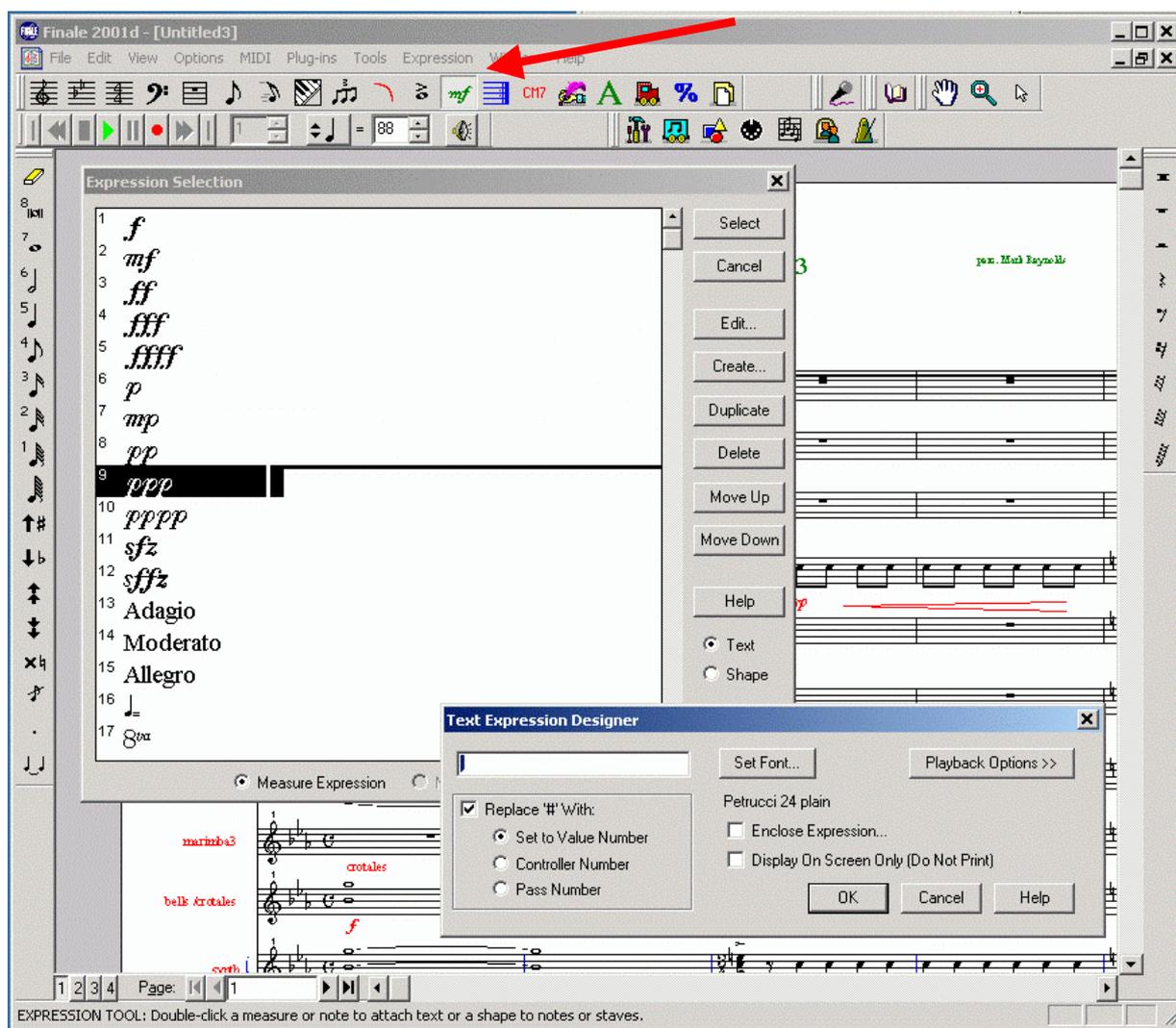
```

446 <ornament TYPE="GLISSWAVE" UPDOWN="UP"/>
447 <piano TYPE="PEDALDOWN" UPDOWN="DOWN"/>
448 <piano TYPE="PEDALUP" UPDOWN="DOWN"/>
449 <breath/> solo on the anchorage
450 <marker TYPE="GENERIC" UPDOWN="DOWN" NAME="smear"/>
451 <marker TYPE="GENERIC" UPDOWN="UP" NAME="smear"/>
452 <mute UPDOWN="DOWN" TYPE="ON"/>
453 <mute UPDOWN="DOWN" TYPE="OFF"/>
454 <mute UPDOWN="DOWN" TYPE="PLUS"/>
455 <mute UPDOWN="DOWN" TYPE="MINUS"/>
456 <mute UPDOWN="DOWN" TYPE="IN"/>
457 <mute UPDOWN="DOWN" TYPE="VIA"/>
458 <annotation UPDOWN="DOWN">la violetta la va la va</annotation>
459 <text UPDOWN="DOWN">write here any text</text>
460 <harmonic UPDOWN="UP" TYPE="STRINGS"/>
461 <harmonic UPDOWN="UP" TYPE="FLUTES"/>
462 <arpeggio DIRECTION="NONE"/>
463 <arpeggio DIRECTION="UP"/>
464 <arpeggio DIRECTION="DOWN"/>

```

25.4.2 Examples of XML single char expression for WEDELMUSIC

Finale expressions are symbols that can be associated with measures or with notes. They are typically drawn in green. Their activation is performed by selecting the "mf" button in the toolbar of the Finale Window as depicted in the following figure.



After that selection, the activation of the Expression Selection dialog is performed by selecting the position or the noted in which you would like to insert the symbol. In that dialog, the list of Expressions is reported. These can be single char or strings. When they are strings, such as those numbered 13, 14, and 15, (adagio, moderato, etc.) they are automatically translated into WEDELMUSIC format. In order to understand which of them are coded into Finale with single characters in a graphic font of symbols or with strings it is need t o edit the Expression. This can be done by selecting the button "Edit.." of the dialog. In that case, the Text Expression Designer dialog is opened. From that dialog is immediately evident if the Selected Expression (number 9 in the figure) is implemented as a Single Char Expression or as a string. When It is implemented as a Single Char Expression, a single character is present in the text box of that dialog, such as in the case presented in the example.

In the following, the translation table used f or the Single Char Expression is reported.

```
single-char-expressions
1 <dynamictext DYNAMIC="F" UPDOWN="DOWN"/>
2 <dynamictext DYNAMIC="MF" UPDOWN="DOWN"/>
3 <dynamictext DYNAMIC="FF" UPDOWN="DOWN"/>
4 <dynamictext DYNAMIC="FFF" UPDOWN="DOWN"/>
5 <dynamictext DYNAMIC="FFFF" UPDOWN="DOWN"/>
6 <dynamictext DYNAMIC="P" UPDOWN="DOWN"/>
7 <dynamictext DYNAMIC="MP" UPDOWN="DOWN"/>
8 <dynamictext DYNAMIC="PP" UPDOWN="DOWN"/>
9 <dynamictext DYNAMIC="PPP" UPDOWN="DOWN"/>
10 <dynamictext DYNAMIC="PPPP" UPDOWN="DOWN"/>
11 <dynamictext DYNAMIC="SFZ" UPDOWN="DOWN"/>
12 <dynamictext DYNAMIC="SFFZ" UPDOWN="DOWN"/>
17 <text UPDOWN="UP">8va</text>
18 <text UPDOWN="DOWN">8ba</text>
153 <dynamictext DYNAMIC="SFZ" UPDOWN="DOWN"/>

401 <dynamictext DYNAMIC="FFFF" UPDOWN="DOWN"/>
402 <dynamictext DYNAMIC="FFF" UPDOWN="DOWN"/>
403 <dynamictext DYNAMIC="FF" UPDOWN="DOWN"/>
404 <dynamictext DYNAMIC="F" UPDOWN="DOWN"/>
405 <dynamictext DYNAMIC="P" UPDOWN="DOWN"/>
406 <dynamictext DYNAMIC="PP" UPDOWN="DOWN"/>
407 <dynamictext DYNAMIC="PPP" UPDOWN="DOWN"/>
408 <dynamictext DYNAMIC="PPPP" UPDOWN="DOWN"/>
409 <dynamictext DYNAMIC="PPPPP" UPDOWN="DOWN"/>
410 <dynamictext DYNAMIC="PPPPPP" UPDOWN="DOWN"/>
411 <dynamictext DYNAMIC="MP" UPDOWN="DOWN"/>
412 <dynamictext DYNAMIC="MF" UPDOWN="DOWN"/>
413 <dynamictext DYNAMIC="FFFFFF" UPDOWN="DOWN"/>
414 <dynamictext DYNAMIC="FFFFFFF" UPDOWN="DOWN"/>
415 <dynamictext DYNAMIC="FPP" UPDOWN="DOWN"/>
416 <dynamictext DYNAMIC="FFP" UPDOWN="DOWN"/>
417 <dynamictext DYNAMIC="FFPP" UPDOWN="DOWN"/>
418 <dynamictext DYNAMIC="SP" UPDOWN="DOWN"/>
419 <dynamictext DYNAMIC="SF" UPDOWN="DOWN"/>
420 <dynamictext DYNAMIC="SFF" UPDOWN="DOWN"/>
421 <dynamictext DYNAMIC="SFFF" UPDOWN="DOWN"/>
422 <dynamictext DYNAMIC="SFFP" UPDOWN="DOWN"/>
423 <dynamictext DYNAMIC="SFFZ" UPDOWN="DOWN"/>
424 <dynamictext DYNAMIC="SFP" UPDOWN="DOWN"/>
425 <dynamictext DYNAMIC="SFPP" UPDOWN="DOWN"/>
426 <dynamictext DYNAMIC="SFZ" UPDOWN="DOWN"/>
427 <dynamictext DYNAMIC="FZ" UPDOWN="DOWN"/>
428 <dynamictext DYNAMIC="FP" UPDOWN="DOWN"/>
429 <dynamictext DYNAMIC="RF" UPDOWN="DOWN"/>
430 <dynamictext DYNAMIC="RFZ" UPDOWN="DOWN"/>
431 <marker TYPE="STACCATO" UPDOWN="UP"/>
432 <marker TYPE="ACCENTO" UPDOWN="UP"/>
433 <marker TYPE="TENUITO" UPDOWN="UP"/>
434 <marker TYPE="MARTDOLCE" UPDOWN="UP"/>
435 <marker TYPE="PUNTOALLUNGATO" UPDOWN="UP"/>
436 <marker TYPE="MARTELLATO" UPDOWN="UP"/>
437 <marker TYPE="SFORZATO" UPDOWN="UP"/>
438 <fermata UPDOWN="UP" TYPE="LONG"/>
```

```

439 <fermata UPDOWN="UP" TYPE="MEDIUM"/>
440 <fermata UPDOWN="UP" TYPE="SHORT"/>
441 <fermata UPDOWN="DOWN" TYPE="LONG"/>
442 <fermata UPDOWN="DOWN" TYPE="MEDIUM"/>
443 <fermata UPDOWN="DOWN" TYPE="SHORT"/>
444 <glasses UPDOWN="UP"/>
445 <fingering FINGER="0" UPDOWN="UP" TYPE="NORMAL"/>
446 <fingering FINGER="1" UPDOWN="UP" TYPE="NORMAL"/>
447 <fingering FINGER="2" UPDOWN="UP" TYPE="NORMAL"/>
448 <fingering FINGER="3" UPDOWN="UP" TYPE="NORMAL"/>
449 <fingering FINGER="4" UPDOWN="UP" TYPE="NORMAL"/>
450 <fingering FINGER="5" UPDOWN="UP" TYPE="NORMAL"/>
451 <fingering FINGER="0" UPDOWN="UP" TYPE="CIRCLED1"/>
452 <fingering FINGER="1" UPDOWN="UP" TYPE="CIRCLED1"/>
453 <fingering FINGER="2" UPDOWN="UP" TYPE="CIRCLED1"/>
454 <fingering FINGER="3" UPDOWN="UP" TYPE="CIRCLED1"/>
455 <fingering FINGER="4" UPDOWN="UP" TYPE="CIRCLED1"/>
456 <fingering FINGER="5" UPDOWN="UP" TYPE="CIRCLED1"/>
457 <fingering FINGER="0" UPDOWN="UP" TYPE="CIRCLED2"/>
458 <fingering FINGER="1" UPDOWN="UP" TYPE="CIRCLED2"/>
459 <fingering FINGER="2" UPDOWN="UP" TYPE="CIRCLED2"/>
460 <fingering FINGER="3" UPDOWN="UP" TYPE="CIRCLED2"/>
461 <fingering FINGER="4" UPDOWN="UP" TYPE="CIRCLED2"/>
462 <fingering FINGER="5" UPDOWN="UP" TYPE="CIRCLED2"/>
463 <fretboard UPDOWN="UP" NUMBER="6" NAME="Cm7" FRETS="x35343" FINGERS="713121"
  BARRE="26" HEAD="0"/>
464 <fretboard UPDOWN="UP" NUMBER="6" NAME="E6" FRETS="x3221x" FINGERS="742317"
  BARRE="00" HEAD="5"/>
465 <strings STRING="0" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
466 <strings STRING="1" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
467 <strings STRING="2" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
468 <strings STRING="3" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
469 <strings STRING="4" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
470 <strings STRING="5" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
471 <strings STRING="6" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
472 <strings STRING="7" UPDOWN="UP" ROMAN="TRUE" TYPE="NORMAL"/>
473 <strings STRING="0" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
474 <strings STRING="1" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
475 <strings STRING="2" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
476 <strings STRING="3" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
477 <strings STRING="4" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
478 <strings STRING="5" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
479 <strings STRING="6" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
480 <strings STRING="7" UPDOWN="UP" ROMAN="FALSE" TYPE="NORMAL"/>
481 <strings STRING="0" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
482 <strings STRING="1" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
483 <strings STRING="2" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
484 <strings STRING="3" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
485 <strings STRING="4" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
486 <strings STRING="5" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
487 <strings STRING="6" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
488 <strings STRING="7" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED1"/>
489 <strings STRING="0" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
490 <strings STRING="1" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
491 <strings STRING="2" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
492 <strings STRING="3" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
493 <strings STRING="4" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
494 <strings STRING="5" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
495 <strings STRING="6" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
496 <strings STRING="7" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED1"/>
497 <strings STRING="0" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
498 <strings STRING="1" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
499 <strings STRING="2" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
500 <strings STRING="3" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
501 <strings STRING="4" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
502 <strings STRING="5" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
503 <strings STRING="6" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
504 <strings STRING="7" UPDOWN="DOWN" ROMAN="TRUE" TYPE="BRACKETS"/>
505 <strings STRING="0" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS"/>

```

```

506 <strings STRING="1" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
507 <strings STRING="2" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
508 <strings STRING="3" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
509 <strings STRING="4" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
510 <strings STRING="5" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
511 <strings STRING="6" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
512 <strings STRING="7" UPDOWN="DOWN" ROMAN="FALSE" TYPE="BRACKETS" />
513 <strings STRING="0" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
514 <strings STRING="1" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
515 <strings STRING="2" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
516 <strings STRING="3" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
517 <strings STRING="4" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
518 <strings STRING="5" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
519 <strings STRING="6" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
520 <strings STRING="7" UPDOWN="UP" ROMAN="TRUE" TYPE="CIRCLED2" />
521 <strings STRING="0" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
522 <strings STRING="1" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
523 <strings STRING="2" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
524 <strings STRING="3" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
525 <strings STRING="4" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
526 <strings STRING="5" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
527 <strings STRING="6" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />
528 <strings STRING="7" UPDOWN="UP" ROMAN="FALSE" TYPE="CIRCLED2" />

```

25.4.3 Examples of XML shape expressions for WEDELMUSIC

Shape expressions are the "Smart Shapes" of Finale. They are typically slurs, crescendo, decrescendo, trill, octave, quindicesime, bend, glissando, etc. More or less the Horizontal symbols of that are used in the WEDELMUSIC editor.

Differently from the horizontal symbols of WEDELMUSIC smart shapes can be associated to only one symbol. They can be horizontal of simple symbols such as ornaments, markers, strings, clef, dynamic text, mute, harmonics, etc.

In Finale editor, the menu of Smart Shapes is activated by selecting the red arc on the toolbar as depicted in the figure on the right.

After that selection the, the menu Smart Shape appears among the main menus of the Finale window.



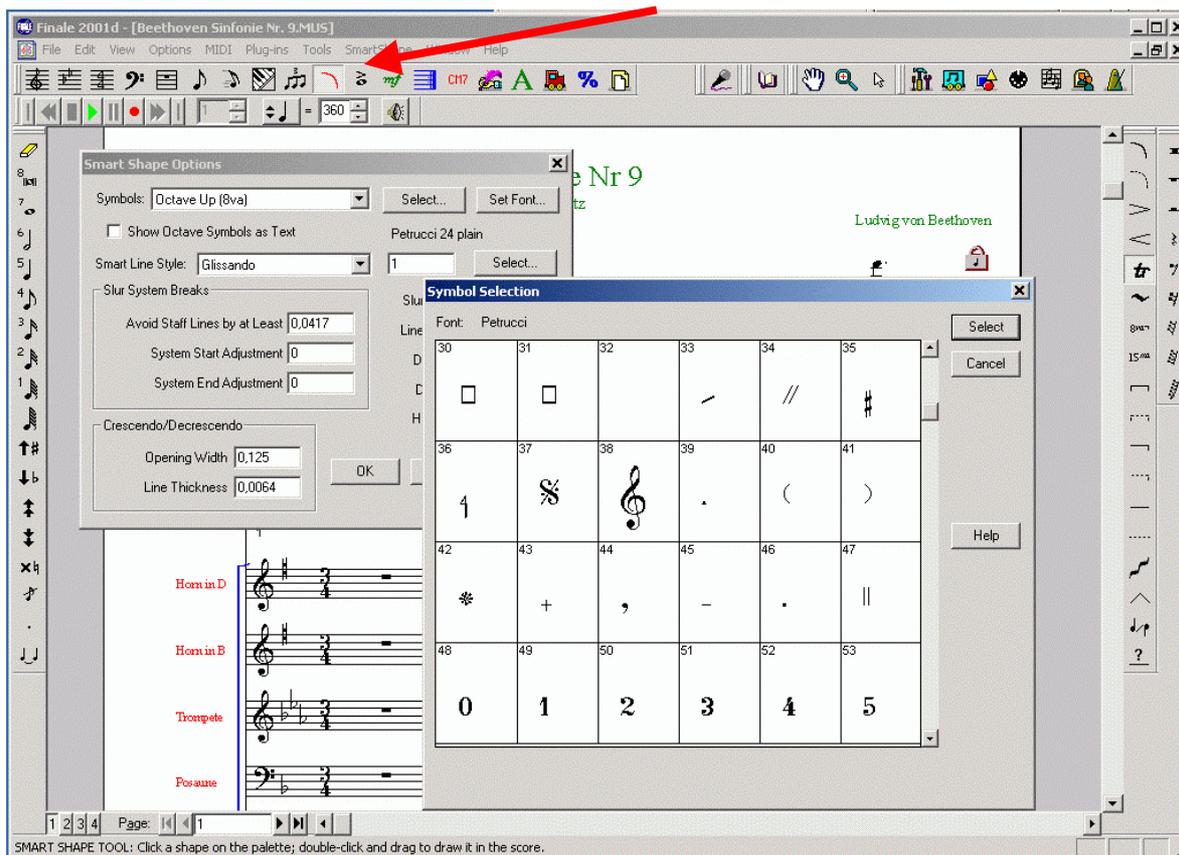
The Smart Shape Menu is used to define the parameters of that symbols. The dialog in which the list of smart shape (shape expression symbols) are reported can be found selecting the item "Smart Shape Options" in that menu.



As a result the dialog regarding the smart shape option expression is presented. The list of them with their corresponding preview as depicted in the next figure can be visualised by pushing the button "Select" close to the text box with the name of the Symbol.

In the figure, it is evident that according to Finale model the smart shapes can be horizontal of simple symbols such as ornaments, markers, strings, clef, dynamic text, mute, harmonics, etc.

Symbol number 40 is the round square, 43 is a plus.



The whole definition of the example reported in the table is:

shape-expressions

```
1 <text UPDOWN="DOWN">ERROR</text>
2 <text UPDOWN="DOWN">ERROR</text>
3 <text UPDOWN="DOWN">ERROR</text>
4 <text UPDOWN="DOWN">ERROR</text>
5 <text UPDOWN="DOWN">ERROR</text>
6 <text UPDOWN="DOWN">ERROR</text>
```

25.4.4 Examples of XML chords for WEDELMUSIC

Chords in Finale are written in several manners. Fretboards are typically produced in automatic manner from a textual description which is quite concise. The structure of the conversion table for that symbols present the in the first column the name of the Chord and in the second column the XML WEDELMUSIC description of the fretboard. For details regarding the meaning of that detail you read the Chapter of the Fret Board Editor in this Manual.

chords

```
A <fretboard UPDOWN="UP" NUMBER="6" NAME="A" FRETS="xo222o" FINGERS="771237" BARRE="00" HEAD="0"/>
B <fretboard UPDOWN="UP" NUMBER="6" NAME="B" FRETS="x2444x" FINGERS="713337" BARRE="35" HEAD="0"/>
C <fretboard UPDOWN="UP" NUMBER="6" NAME="C" FRETS="x32o1o" FINGERS="732717" BARRE="00" HEAD="0"/>
D <fretboard UPDOWN="UP" NUMBER="6" NAME="D" FRETS="xxx331" FINGERS="777341" BARRE="00" HEAD="5"/>
E <fretboard UPDOWN="UP" NUMBER="6" NAME="E" FRETS="o221oo" FINGERS="723177" BARRE="00" HEAD="0"/>
F <fretboard UPDOWN="UP" NUMBER="6" NAME="F" FRETS="133211" FINGERS="134211" BARRE="16" HEAD="0"/>
G <fretboard UPDOWN="UP" NUMBER="6" NAME="G" FRETS="32oo03" FINGERS="217773" BARRE="00" HEAD="0"/>
Ab <fretboard UPDOWN="UP" NUMBER="6" NAME="Ab" FRETS="133211" FINGERS="134211" BARRE="16" HEAD="4"/>
```

```

Bb <fretboard UPDOWN="UP" NUMBER="6" NAME="Bb" FRETS="x1333x" FINGERS="713337" BARRE="35"
    HEAD="0"/>
Eb <fretboard UPDOWN="UP" NUMBER="6" NAME="Eb" FRETS="x1333x" FINGERS="713337" BARRE="35"
    HEAD="6"/>
Db <fretboard UPDOWN="UP" NUMBER="6" NAME="Db" FRETS="x4312x" FINGERS="743127" BARRE="00"
    HEAD="0"/>
Gb <fretboard UPDOWN="UP" NUMBER="6" NAME="Gb" FRETS="244322" FINGERS="134211" BARRE="16"
    HEAD="0"/>
Am <fretboard UPDOWN="UP" NUMBER="6" NAME="Am" FRETS="xo221o" FINGERS="772317" BARRE="00"
    HEAD="0"/>
Bm <fretboard UPDOWN="UP" NUMBER="6" NAME="Bm" FRETS="x2443x" FINGERS="713427" BARRE="00"
    HEAD="0"/>
Cm <fretboard UPDOWN="UP" NUMBER="6" NAME="Cm" FRETS="x3554x" FINGERS="713427" BARRE="00"
    HEAD="0"/>
Dm <fretboard UPDOWN="UP" NUMBER="6" NAME="Dm" FRETS="x1332x" FINGERS="713427" BARRE="00"
    HEAD="5"/>
Em <fretboard UPDOWN="UP" NUMBER="6" NAME="Em" FRETS="o22o0o" FINGERS="712777" BARRE="00"
    HEAD="0"/>
Fm <fretboard UPDOWN="UP" NUMBER="6" NAME="Fm" FRETS="133111" FINGERS="134111" BARRE="16"
    HEAD="0"/>
Gm <fretboard UPDOWN="UP" NUMBER="6" NAME="Gm" FRETS="355333" FINGERS="134111" BARRE="16"
    HEAD="0"/>
Amin <fretboard UPDOWN="UP" NUMBER="6" NAME="Am" FRETS="xo221o" FINGERS="772317"
    BARRE="00" HEAD="0"/>
Bmin <fretboard UPDOWN="UP" NUMBER="6" NAME="Bm" FRETS="x2443x" FINGERS="713427"
    BARRE="00" HEAD="0"/>
Cmin <fretboard UPDOWN="UP" NUMBER="6" NAME="Cm" FRETS="x3554x" FINGERS="713427"
    BARRE="00" HEAD="0"/>
Dmin <fretboard UPDOWN="UP" NUMBER="6" NAME="Dm" FRETS="x1332x" FINGERS="713427"
    BARRE="00" HEAD="5"/>
Emin <fretboard UPDOWN="UP" NUMBER="6" NAME="Em" FRETS="o22o0o" FINGERS="712777"
    BARRE="00" HEAD="0"/>
Fmin <fretboard UPDOWN="UP" NUMBER="6" NAME="Fm" FRETS="133111" FINGERS="134111"
    BARRE="16" HEAD="0"/>
Gmin <fretboard UPDOWN="UP" NUMBER="6" NAME="Gm" FRETS="355333" FINGERS="134111"
    BARRE="16" HEAD="0"/>
A+ <fretboard UPDOWN="UP" NUMBER="6" NAME="A+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="10"/>
B+ <fretboard UPDOWN="UP" NUMBER="6" NAME="B+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="8"/>
c+ <fretboard UPDOWN="UP" NUMBER="6" NAME="C+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="0"/>
D+ <fretboard UPDOWN="UP" NUMBER="6" NAME="D+" FRETS="x5433x" FINGERS="732117" BARRE="45"
    HEAD="0"/>
E+ <fretboard UPDOWN="UP" NUMBER="6" NAME="E+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="5"/>
F+ <fretboard UPDOWN="UP" NUMBER="6" NAME="F+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="6"/>
G+ <fretboard UPDOWN="UP" NUMBER="6" NAME="G+" FRETS="x3211x" FINGERS="732117" BARRE="45"
    HEAD="8"/>
A7 <fretboard UPDOWN="UP" NUMBER="6" NAME="A7" FRETS="131211" FINGERS="131211" BARRE="16"
    HEAD="5"/>
B7 <fretboard UPDOWN="UP" NUMBER="6" NAME="B7" FRETS="x212o2" FINGERS="721374" BARRE="00"
    HEAD="0"/>
C7 <fretboard UPDOWN="UP" NUMBER="6" NAME="C7" FRETS="x3231x" FINGERS="732417" BARRE="00"
    HEAD="0"/>
D7 <fretboard UPDOWN="UP" NUMBER="6" NAME="D7" FRETS="131211" FINGERS="131211" BARRE="16"
    HEAD="10"/>
E7 <fretboard UPDOWN="UP" NUMBER="6" NAME="E7" FRETS="o2o1o0" FINGERS="727177" BARRE="00"
    HEAD="0"/>
F7 <fretboard UPDOWN="UP" NUMBER="6" NAME="F7" FRETS="131211" FINGERS="131211" BARRE="16"
    HEAD="0"/>
G7 <fretboard UPDOWN="UP" NUMBER="6" NAME="G7" FRETS="32o0o1" FINGERS="327771" BARRE="00"
    HEAD="0"/>

```

25.4.5 Generic Symbols and WEDELMUSIC

As previously stated if a symbol which is present in a Finale file is missing in WEDELMUSIC standard font do not worry, you can build a specific symbol into the Generic font files and you can associate one of these generic symbols to the Finale symbols in the Conversion table, in any group you like, articulation, single char expressions, shape expressions or chords.

Generic Expression of WEDELMUSIC can be single fonts characters generated with Fontographer. One the font is generated according to the details deported in the Chapter related to the creation of new symbols it is possible to use it into the conversion table.

To associate the Generic Expression, also called Generic Markers please use:

```
<marker TYPE="GENERIC" UPDOWN="DOWN" NAME="smear"/>
```

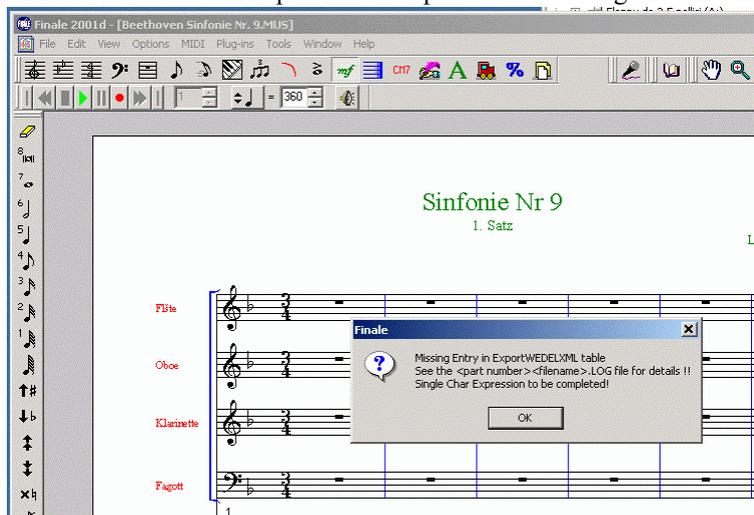
They are included into the WEDELMUSIC Editor by using MILLA file. This file can be associated to a specific WEDELMUSIC object or taken from the FONT directory of the WEDELMUSIC editor.

25.4.6 Error Detection During Conversion and Log File

During the export of the Finale File into WEDELMUSIC format the process is capable of detecting the missing definitions. For example if a certain Shape expression, articulation, expression, etc. has not its counterpart in the conversion table a message is presented to the user.

That message is reported only once for each category of symbols even if multiple codes are missing. At the conclusion of the process a report dialog is present in which you can see the number of symbols that have been missed.

To solve the problems related to the missing symbols, it is possible to use a LOG file that is produced into the directory in which the exported WEDELMUSIC file is produced. It iss generated a LOG file for each part of the Music converted. In the Log file you can find a textual description of the conversion performed. Several details are present only in the LOG file: for example the lyric that in the current version is not traduced into the WEDELMUSIC format. For each missing symbols a WARNING is reported into the LOG file.

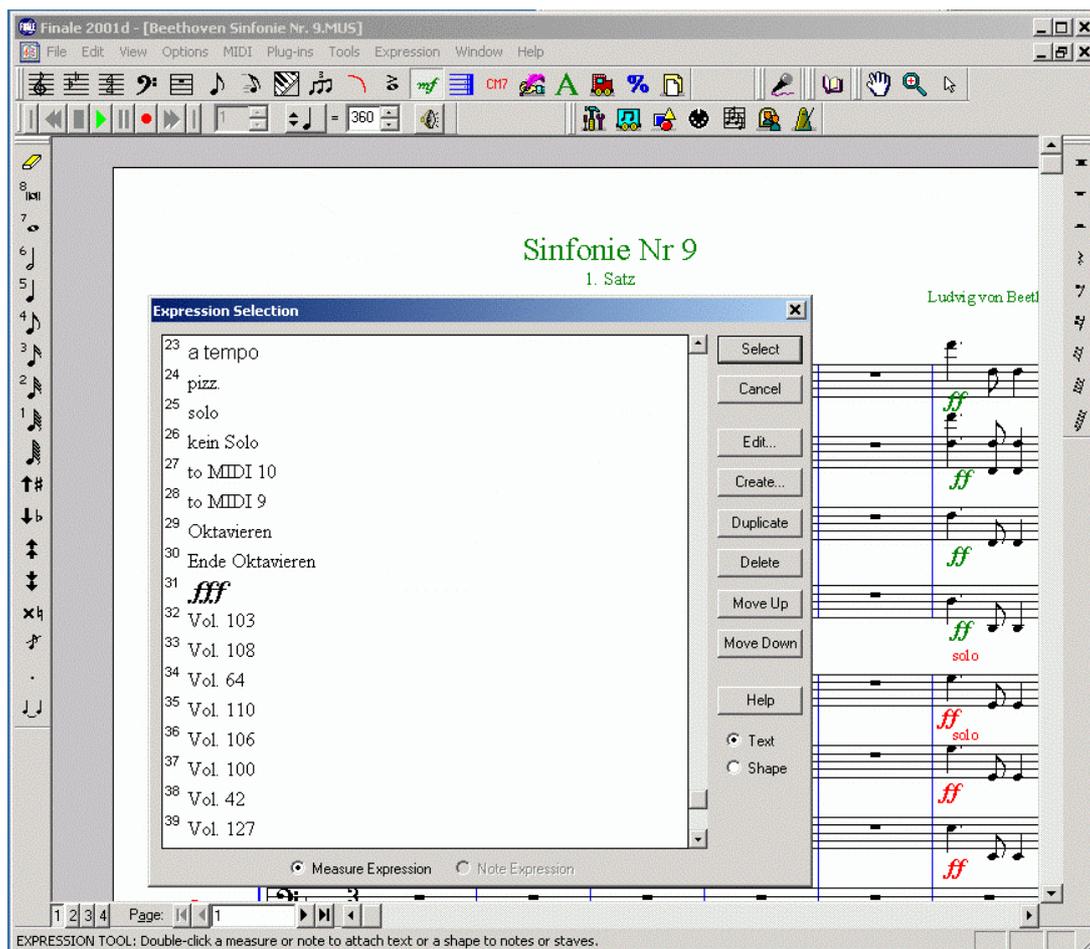


For example in the Conversion of symphony number 9 of Beethoven Warning have been detected in Parts number 4, 9 and 14.

WARNING: Single char expression number 31 not defined in table

In this case, it is possible to see the symbol that has not been converted by browsing the conversion table and the List of Expressions in Finale. In particular, a symbol of dynamic 'fff' was missing. This was due to the non perfect alignment between the Finale tables and the conversion table.

This problem can be solved with 5 second of work on the conversion table. In general, before a conversion, it should be needed to verify the alignment of the conversion table with the tables used into the Finale.



Unfortunately, Finale files are not created all with the same table for articulation, expression and shapes. On the other hand, files that are professionally produced typically present the same tables.

During the conversion, and thus into the LOG file can be found other WARNING errors. They can be useful for detecting some imprecision or for getting suggestions such as:

WARNING: Too low note accidentals may be incorrect

In this case, the needs of a transposition is evidenced and any message is presented to the user during conversion.

Please remember that, we suggest you to assign at missing elements, or elements that you have decided to manage in a different manner with WEDELMUSIC editor the following line. In that way you can see in your converted score inside the WEDELMUSIC editor where the symbols has been lost.

50 <text UPDOWN="DOWN">ERROR</text>

25.5 Imported Music Reformatting

In the WEDELEEDITOR several utilities for make the music in the good format are present:

- automatic justification
- automatic beaming
- automatic definition of stem direction,
- automatic positioning of symbols (up/down) and along the score
- etc.

For these reasons, do not worry about the music formatting, it is the WEDELMUSIC Editor's job!

In WEDELMUSIC editor you can also verify the time consistency of the imported music with respect to the time duration of the measure. It is quite frequent that the composer in finale leave some measure inconsistent when the part presents more voices.

In WEDELMUSIC, you can change the color of a layer and work on it to compensate the time duration. You can insert rests, they can be sed visible and invisible according to your needs. See the WEDELMUSIC Help for details about this.

Please note that some music scores produced in Finale present symbols not associated with notes but at Measures or at the page. In those cases, the symbols are replicated into the WEDELMUSIC format as associated to anchorages or in few cases they are lost. This implies that they are not considered into the reformatting process. Therefore, an high quality Finale Score is typically converted in a high quality WEDELMUSIC score.

25.6 Export Statistics

The converter presents at the end of the conversion also a statistic report. It allows you to understand what has not been converter in the proper manner and to assess the time needed to adjust the MUSIC Score in WEDELMUSIC editor. For instance, in the example of Beethoven only a note expression and two page texts have been lost in the conversion.

The screenshot shows the WEDELMUSIC interface with a 'WEDEL Format Statistic Report' dialog box open. The report contains the following data:

Category	Original	Converted	Category	Original	Converted
Measure:	1526	1526	Page Text:	2	0
Notes:	2892	2892	Key Changes:	0	0
Grace Notes:	0	0	Time Sig. Changes:	1526	1526
Rests:	636	636	Clef Changes:	0	0
Tuplets:	0	0	Repeats:	14	14
Note Expressions:	19	18	Text Repeats:	0	0
Measure Expressions:	14	14	Measure Numbers:	1526	1526
Articulations:	0	0	Chord Symbols:	0	0
Lyrics:	0	0	Measure Graphics:	0	0
Measure Text:	0	0	Page Graphics:	0	0
Staff Systems:	14	14	Smart Shapes:	0	0
Total Number of Symbols		8169	Number of saved symbols		8166
Percentage of saved		100			

The background shows a musical score for 'Sinfonie Nr 9' by Ludwig von Beethoven, with staves for Flute, Oboe, Clarinet, Bassoon, Horn in D, Horn in B, and Trombone. The score includes dynamic markings like *ff* and *solo*.

Other interesting details are also reported. In the example, 1526 measures have been converted, with 8166 symbols of 8169 symbols have been converted, 636 rests, 1892 notes, 14 parts, 1526 time signatures 14 repeat symbols. The total estimation is of 100% of conversion since the lost 3 symbols is neglectable on 8169.

From our analysis, When the score does not presents too much smart shapes such in classical or didactical music the conversion is typically close to 100% as in the above example.

In modern music, it can be at least greater than 70% without working on shape expressions.

If you work on that, preparing symbols and using the GENERIC markers of WEDELMUSIC you can strongly increase the conversion rate/percentage.

25.7 Tricks and tips of WEDELMUSIC Finale Plug-In

The manual has been referred to Plug-in version 1.6. In that plug in the following problems are still present.

- DIRECTION of tie is imposed by WEDEL since this information is not recoverable from Finale interface;
- slur and smart shape of finale are not fully recognised for the lack of information inside the plug-in and Finale tool;
- position of expressions and articulations is imposed by the statement written into the conversion table;
- text associated with single measures are not well associated;
- brackets grouping staves are not recognised in this version;
- title, composer, etc. as page text imposed from the dialog is not available. In several cases this text can be get in the LOG file;
- lyric text can be recovered from log files;
- some few textual annotations that are not transcribed into WEDEL file can be recovered in the log file
- some repeat symbols: ./, ./., are not recognised. On the other hand, frequently they are only a representation in Finale, in this case the real music is converted in WEDELMUSIC format;
- some confusion in getting SLURS;
- no detection on Octave and 15me, crescendo, decrescendo;
- no detection of changes of clef and key signature in the middle of the measure;
- the start of the refrain barline is got in the wrong place "|:" ;
- crescendo and decrescendo are converted if they are fonts, not if they are implemented as smart shapes;
- no arpeggio on chords, it has to be detected as symbol, see the above table.

For any problem, send to WEDELMUSIC@dsi.unifi.it, the original Finale File and the obtained WDF files together with a description of the detected problems. We will do the possible to solve it in short time. If you have some examples with symbols that are not recognised please send the example to us and the description of the missing symbol recognition.

It is very important for us to receive from you the FINALE FILES THAT GET VERY LOW conversion rates, especially when important symbols are not recognised, thanks!

Chap.26 Music Score Printing

Print Manager allows user to perform several actions in order to personalise the printed page setting. Some of the user options are listed before.

- Printing symbolic music, main score and parts
- Printing symbolic music, main score and parts with watermark and fingerprint
- Printing image score music, main score and parts (to be completed)
- Printing the cover page of the main score and parts
- Setting the default parameters for printing music scores
- Editing printing parameters for the main score and parts
- Cover page settings of the main score and parts
- Printing preview
- Definition of the printing parameters for the ready to print parts of the WDF object
- Print empty score pages

When the user decides to print something he can modify the page shape setting if the permission allow him to do that. For the whole part the available parameters are:

- Left, right, top and bottom margin
- Page format
- Magnification
- Number of systems to print in one page
- Distance between the staves
- Insert or not the title (a text field) in the top of any page
- Insert or not the page number in the top of any page

For the single part the available parameters are:

- Left, right, top and bottom margin
- Page format
- Magnification
- Number of staves to print in one page
- Distance between the staves

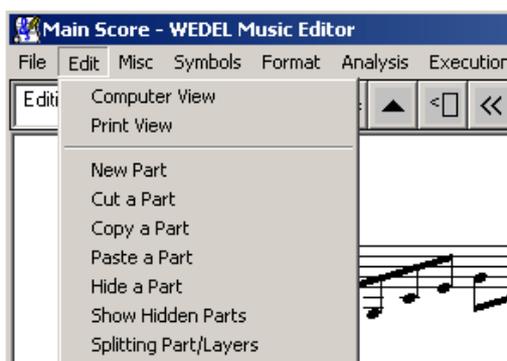
- Insert or not the title (a text field) in the top of any page
- Insert or not the page number in the top of any page

If print empty page was selected the user may set:

- Left, right, top and bottom margin
- Page format
- Magnification
- Number of staves to print in one page (for single part)
- Number of systems (for main score)
- Distance between the staves
- Insert or not the title (a text field) in the top of any page
- Insert or not the page number in the top of any page
- Number of pages to be printed

26.1 Preparing the Music Score Page

In order to print a music score the user has to perform a set of actions, which guarantee the needed results. WEDELMUSIC gives the possibility to see a Print Preview in order to evaluate the results – the command is placed into the “Edit” menu (see next figure).

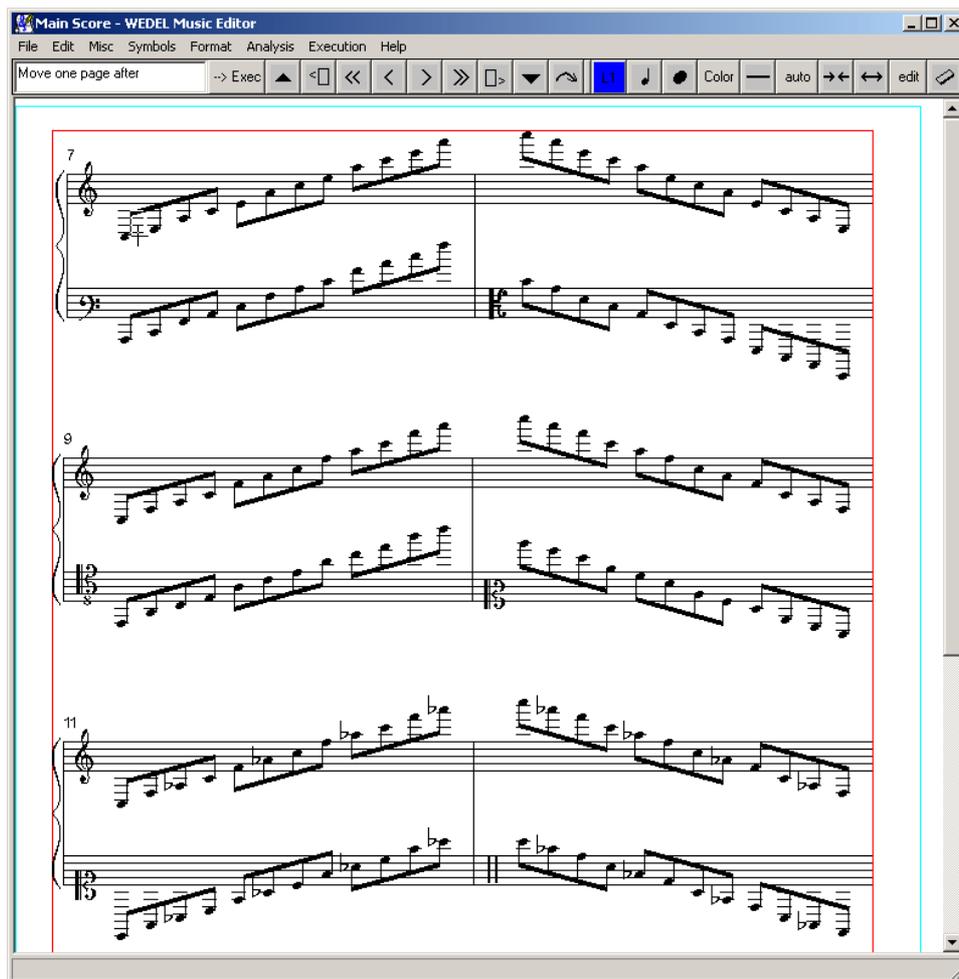


Menu Edit – Print View command

The “Print View” command changes the display of the active window from Computer View to Print View (see next figure). The light blue lines indicates the page margins and the red line indicates the user margins.

Please note:

- The first page has different settings with respect with the next pages. The user has to set both parameters in order to obtain the wanted results.
- The main score page in print view has different setting than parts
- Each part has its settings

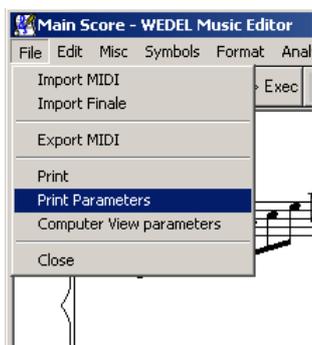


Print View display

In the print view, all the buttons used to move forward/backward in the music score by a measure or a set of measures changes their effect and will display the next/previous page.

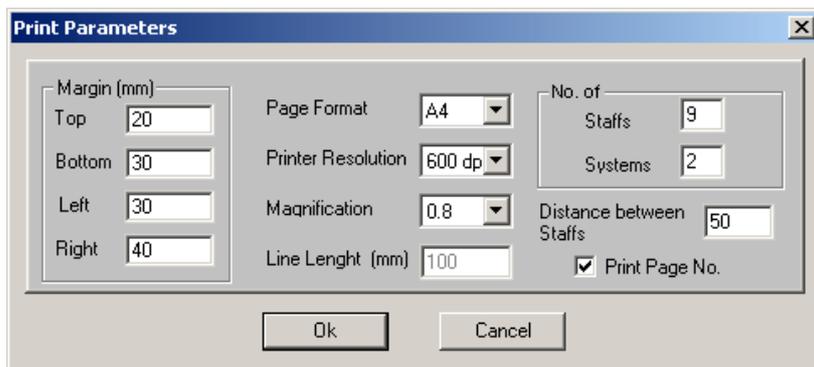
26.1.1 Print View Parameters

By using the Print View Parameters command from the “File” menu (see next figure) the user can personalise the page settings. By activating this command the display is automatically changed from Computer View to Print View.



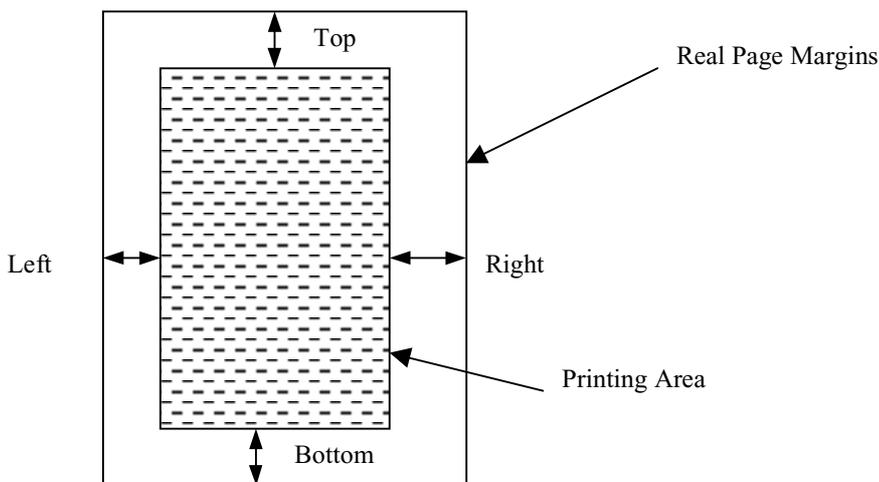
The Print Parameters command in the “File” menu

The dialog window opened after the activation of the Print Parameters command allows the user to personalise the page settings (see next figure).



Print Parameters dialog window

The set of parameters: **Top, Bottom, Left, Right**, changes the user margins. The printing area is that shown in red in the print view.



Print Parameters Margin meanings

Page Format switches from A4 to A3, the **Printer Resolution** can define the effective resolution used for the PostScript file generation (it has no sense for printing music since the symbols are generated in vectorial manner, thus the resolution is formally that of the printed).

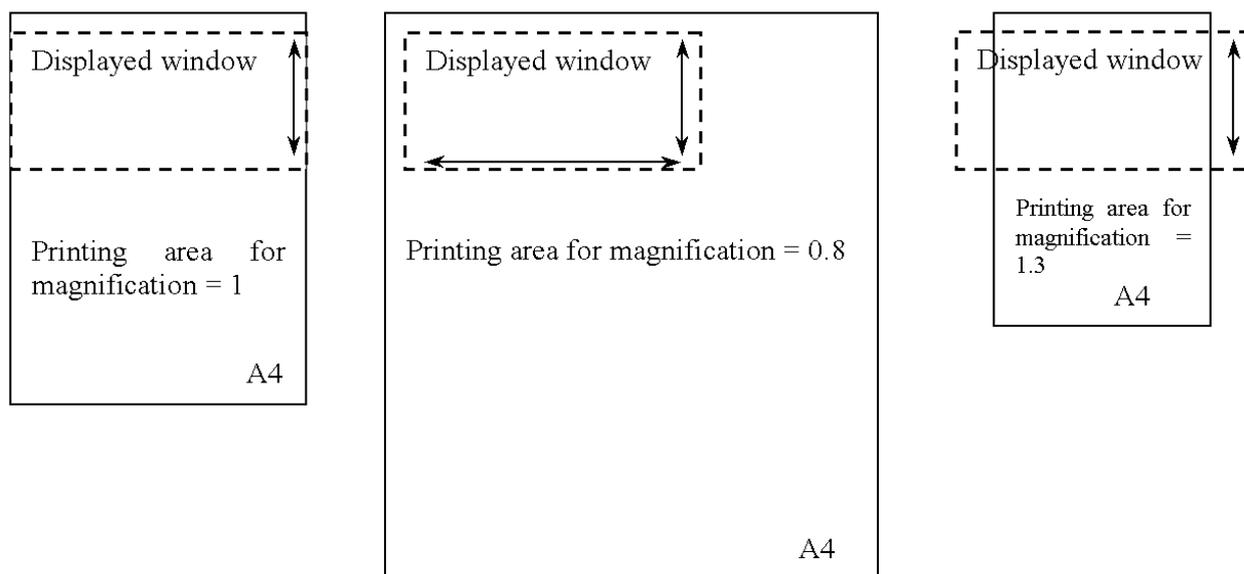
Line Length option has effect only for the Braille printing.

Music Score **Magnification** (see next figure) allows the user to set the scale. By using a low value (as 0.6) the page will contains more symbols since the font will be smaller in printing page. A big value for this parameter allow to print big font – it should be used in case the player is placed at distance from the paper.

The **No. of Staves** option has effect for the Single Part printing. It allows choosing the number of staves to be printed on each page.

The **No. of Systems** options give the possibility to choose the number of systems to be printed on each page in case of Main Score printing.

Both parameters (number of staves and number of systems) have to be used in concordance with the **distance between the staves**. A high value for the distance should place out of page the last staves; a low value should left empty the bottom part of the page.



Print View Magnification

The **Print Page No.** check box activates the printing of the pages numbers. The page number is printed on the right of the page.

26.1.1.1 First page settings

On the first page of a music sheet the titles, images or logos are typically included. WEDELMUSIC allows the user to separately set the first page parameters in order to better arrange the music sheet.

The Print Parameters has to be set separately for the first page and the successive. The management of the titles or images on the first page is described in the section below.

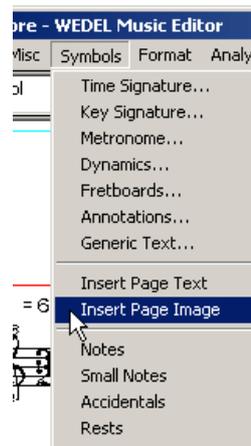
26.1.2 Inserting, Editing and Moving Images on the first Page

For inserting an image on the first page the next steps have to be followed. An image may include logos, special written text, etc. If the WEDELMUSIC object has to produce high quality music scores, the included image has to be included at high resolution, for instance 300, 600 dpi or higher.

Step 1 - Set the display on Print View

Step 2 - From the Symbols menu choose the Insert page Image command.

Step 3 - Using the mouse, select a rectangular area where the image has to be placed (see next figure)



Insert Page Image command

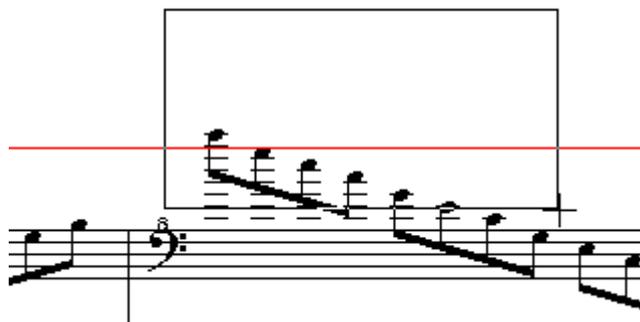


Image position and dimensions selection

Step 4 – When the mouse button is released the dialog window showed in the next figure is presented. By using the Path the user could insert the image name or browse for it on the hard disks by selecting the button [...] on the left of the Image Path. The image dimension and position can be successively changed by using the same dialog box in editing.

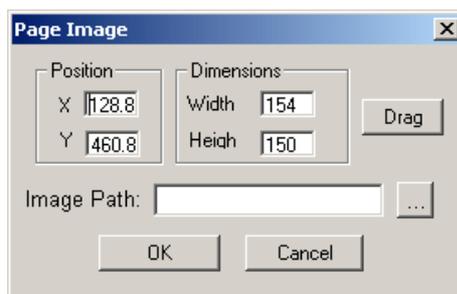


Image insertion dialog window

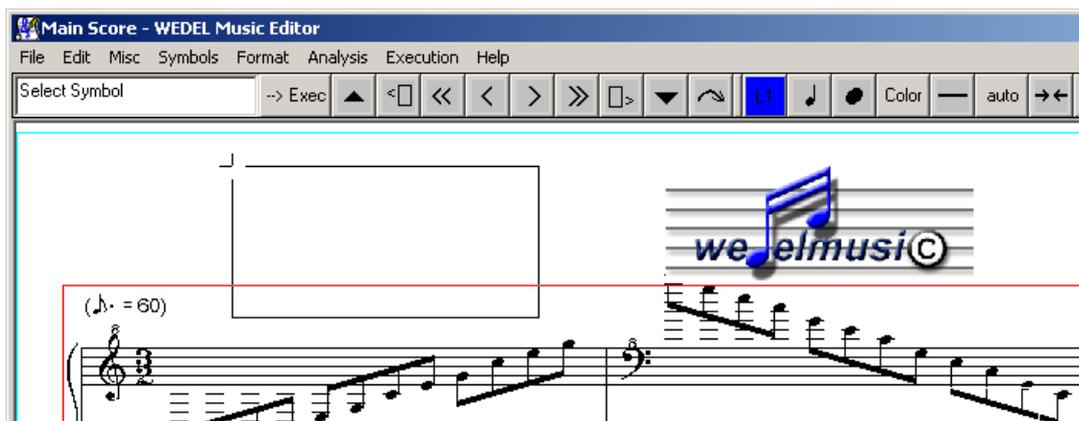
Step 5 – Push the OK button. The image will be displayed on the selected position.

Step 6 – Change the image position/dimensions (if necessary). By using the edit button on the main menus of the editor window the Page Image dialog box is displayed again.



Edit button

For changing the image position or dimension the user can change the size and positions showed in the dialog. For moving the image the drag capabilities are also allowed. Just push the “Drag” button on the Page Image dialog window and place the mouse in the new position.



Dragging an image

To delete an image click on the Delete button on the editor main menu and click on the image. The method is identical to that used for deleting any other WEDELMUSIC symbol.

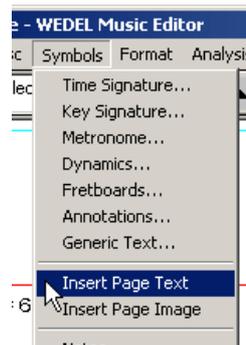
26.1.3 Inserting, Editing and Moving Text of the Page

For inserting text on the music score first page a set of steps quite similar with the image insertion have to be performed.

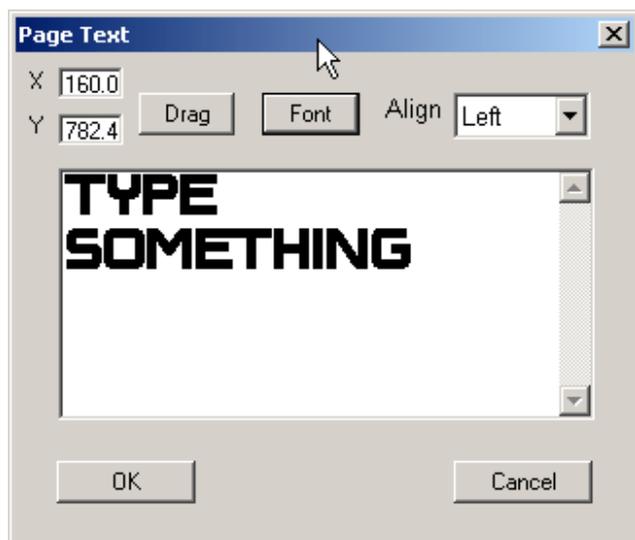
Step 1 – Choose the Insert Page Text command from the “Symbols” menu.

Step 2 – Click on the first page in the position where the text has to be placed in the page.

Step 3 – Write the text, from the Page Text dialog window select the font.



Insert Page Text command



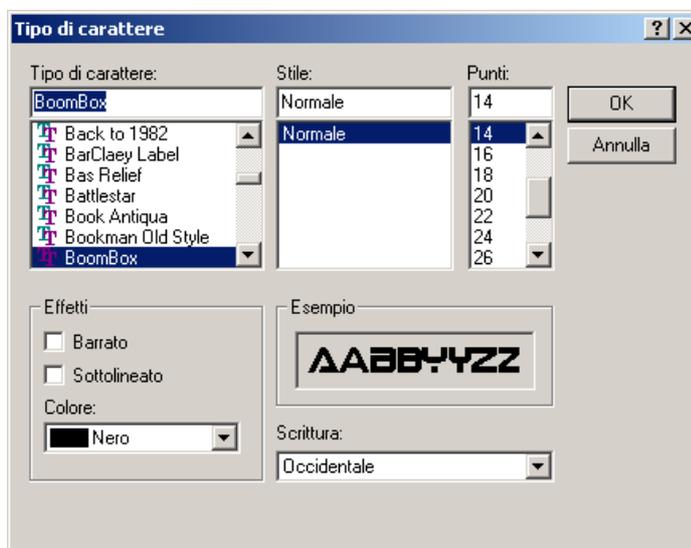
Page text dialog window



Text inserted into the first page

Step 4 – Push the OK button. The text will be shown on the print view display.

Please note the black rectangle on the top-left side of the text. It represents the reference point of placement and the reference to be selected when the text has to be modified (after activate the edit button on the editor main menu) or deleted. Also this rectangle has to be used when the text is dragged.



Font selection dialog window

26.1.4 Different Setting for Different Views: main Score and parts

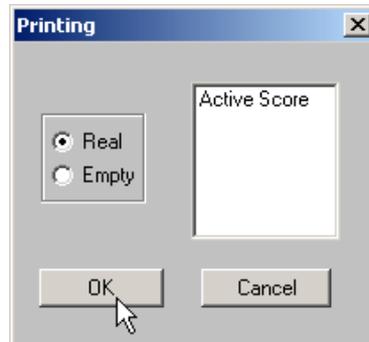
Please note that the setting are saved in relation with the music displayed on the screen. The main score and the single part may have different print parameters. The user has to set them before printing the score. All the parameters have default values loaded when the part is firstly edited.

26.2 PostScript Page Generation from Symbolic Music Score

To generate a PostScript file the Print command from the “File” menu has to be used. The opened dialog window shows the score to be printed. Please be sure that the “Real” option is selected. The “Empty” option will generate a PostScript file with empty staves.



Print command in “File” menu



The dialog window opened after the print command activation

After press the OK button a dialog window for deciding the insertion or not of the watermark is opened. It allows the user to print with or without watermark.

After pushing the OK button the PostScript file is generated. The file is named “moods.ps” and is overwritten after each new printing. Moods.ps file is placed into MDS directory. The printing of music score generates the activation of the default Program for viewing PostScript files.

For viewing the results commercial PostScript visualisers can be used. For example the Ghostview program.

By using the GSview print command the file can be printed on any printer device.

Next figure shows the music score (main part) as viewed in GSview. In figure after the next a single part example is reported.



Insert Watermark dialog window



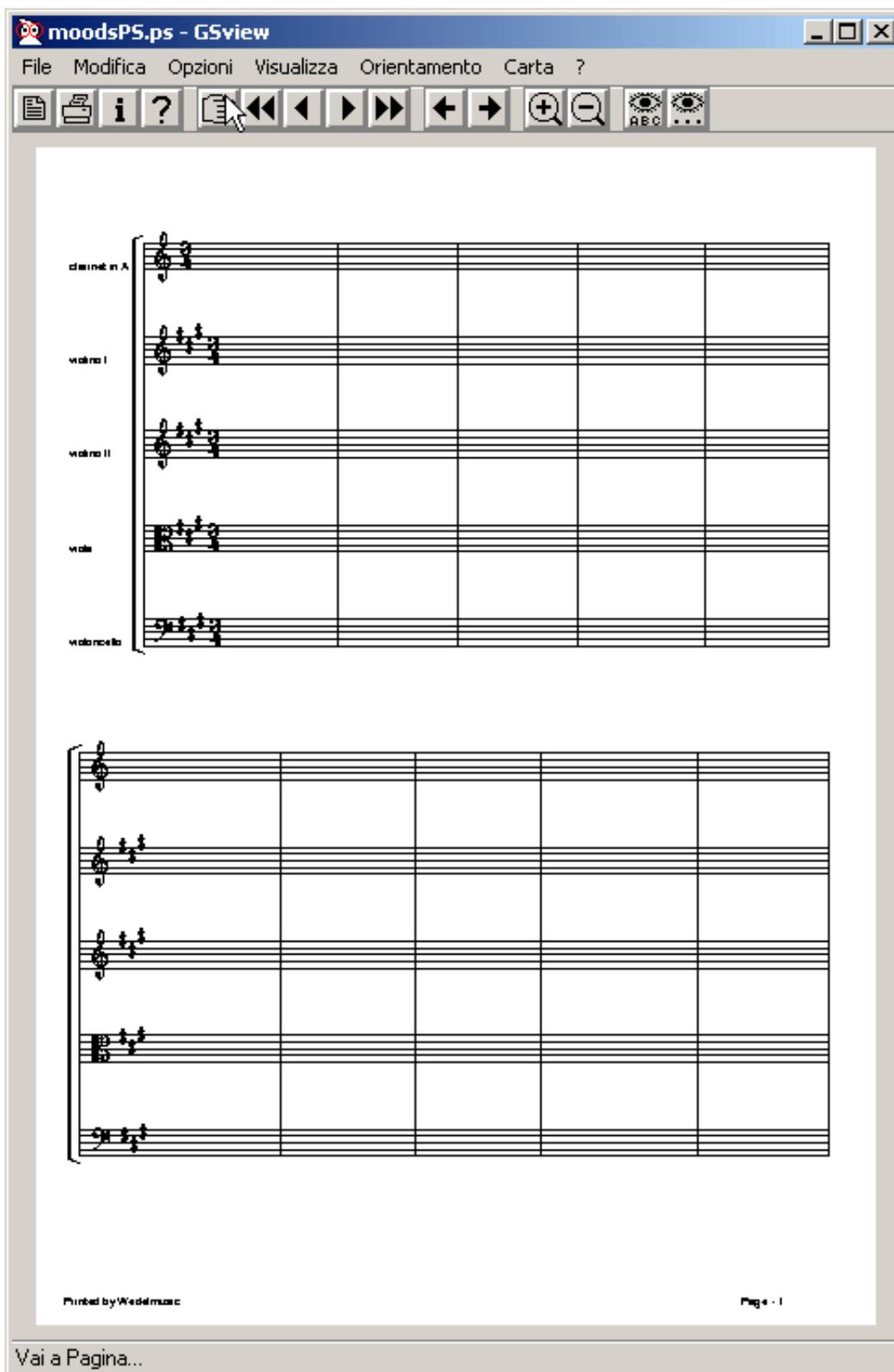
The PostScript file viewed with Gsview (main score)



The PostScript file viewed with Gsview (single part)

26.3 Printing Empty Pages

As described before the WEDELMUSIC printing system give to the user the possibility to print empty staves. It is sufficient to load a main score or a single part, justify it, set the printing parameters and activate the “print” command from the “File” menu. In the “Printing” dialog window activate the “Empty” option. The resulted PostScript file will contains all the staves with the clefs and the bar lines (see the next figure). The music can be hand-written by the user.



The PostScript file obtained after choosing the “Empty” option

In the next pages some printing results are shown. They have been produced by using different Print Parameters.

Larghetto (♩ = 40)

This musical score block contains the first four measures of a piece for a string ensemble. The tempo is marked 'Larghetto' with a quarter note equal to 40 beats. The key signature is three sharps (F#, C#, G#) and the time signature is 6/8. The instruments are Violin I, Violin II, Viola, Cello, and Bass. Measure 1 shows the Violin I part starting with a quarter rest followed by a quarter note G4, a quarter note A4, and a quarter note B4, all marked with a piano (*p*) dynamic. Measures 2-4 show the other instruments (Violin II, Viola, Cello) entering with various rhythmic patterns, also marked with a piano (*p*) dynamic. The Bass part remains silent throughout these measures.

5

This musical score block contains measures 5 through 8 of the piece. The key signature and time signature remain the same. Measure 5 shows the Violin I part with a quarter note G4, a quarter note A4, and a quarter note B4. Measures 6-8 show the other instruments (Violin II, Viola, Cello) continuing their parts with various rhythmic patterns. The Bass part remains silent throughout these measures.

10

19

26

32

37

44

53

58

62

69

Printed by Wedelmusic II Soli p Page - 1

The image displays a musical score for a single melodic line in 6/8 time, spanning 60 measures. The key signature is three sharps (F#, C#, G#). The score includes various dynamics such as *p* (piano) and *f* (forte), and articulation marks like accents (*v*) and slurs. Technical markings include triplets and slurs. The score is divided into systems, with measure numbers 7, 13, 19, 24, 28, 32, 35, 39, 45, 52, and 56 indicated. There are several instances of the word "ERROR" placed below the staff, likely indicating printing or editing issues. The score concludes with a final *f* dynamic marking.

Durata: min.10

CONCERTO in Mi maggiore

per Violino, Archi e organo (o Cembalo)

La Primavera

Da "Il Cimento dell'armonia e dell'invenzione"

Op. VIII n.1 - F. I n.22



Nelle pubbliche esecuzioni
è obbligatorio inserire nei
programmi il nome del revisore

Revisione e realizzazione del basso continuo di

Gian Francesco Malipiero

Antonio Vivaldi
(1678 - 1741)

Allegro (♩ = 80)

Vin.Princ

Vin.I

Vin.II

Viola

Cel.

Bas.

DEMO example

6

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IMPRIMÉ EN ITALIE

WEDELMUSIC Editor

Example of Symbols

Nov. 2001



The musical score example displays various symbols and notations across several staves:

- Staff 1:** Time signature, notes, rests, trills (tr), Roman numerals (IV), and Sord. (Sordano).
- Staff 2:** Roman numerals (III, VI, VII, VII 3), triplets (3), and a 2-measure rest.
- Staff 3:** Accidentals, Roman numerals (4, 5), and fretboard diagrams for Gmaj7 (1 3 4 2), A+ (3 2 1 1), and Bb7sus4 (1 3 1 4 1 1).
- Staff 4:** Dynamics (ppp, mp, f, sp, sfz), articulation (15ma), and Fretboards.
- Staff 5:** Small notes, Augmentations and slurs.
- Staff 6:** Repeats, Barlines, and Roman numerals (2, #).

WEDELMUSIC Editor

Example of Symbols

Nov. 2001



21

Musical staff 21: Treble clef, key signature of two sharps (F# and C#), 2/4 time signature. The staff contains a sequence of notes and rests, including a measure with a 4/4 time signature and a common time signature (C) in a box, and another measure with a B time signature in a box. There are also some special symbols like a question mark and a circled X.

27

Clefs

Musical staff 27: Multiple clefs including bass, alto, and tenor clefs, along with various time signatures (3/8, 3/4, 3/8, 3/4, 3/8, 3/4, 3/8, 3/4, 3/8, 3/4, 3/8, 3/4). The staff ends with a TAB symbol.

40

Horizontals

tr ~ *Sva*

Refrains

5.

Red.

Musical staff 40: Treble clef, key signature of one sharp (F#), 2/4 time signature. It features a wavy line above the staff, a bracketed section labeled "Horizontals", a trill symbol "tr ~" followed by "Sva", and a section labeled "Refrains" with a "5." above it. A "Red." symbol is at the bottom.

47

1

A

Expressions

Ornaments

Musical staff 47: Treble clef, key signature of one sharp (F#), 2/4 time signature. It starts with a "1" above the staff, followed by a section labeled "A" with a triangle symbol. There are "Expressions" and "Ornaments" labels with various symbols like a triangle and a squiggle.

53

Fingering and strings

2 4 1

V

Pizz.

P T

pont. tast.

Musical staff 53: Treble clef, key signature of one sharp (F#), 2/4 time signature. It includes fingering numbers "2", "4", "1" above notes, a "V" symbol, "Pizz." (pizzicato), "P T" (pizzicato and tenuto), and "pont. tast." (ponticello and tastatura).

58

Otoni + - +

Red.

H H R C

s

ψ

s

z

H

Musical staff 58: Treble clef, key signature of one sharp (F#), 2/4 time signature. It includes "Otoni + - +" above notes, a "Red." symbol, "H H R C" above notes, "s" above notes, a "ψ" symbol, another "s" above notes, "z" above notes, and "H" above notes.

Chap.27 WEDELMUSIC XML format

The problems of music notation modelling have been addressed in computer systems several times. Among the several possible computer-based applications of music, the notation editing for professional publishing and visualisation is one of the more complex for the intrinsic complexity of music notation. Music publishing requires the production of high quality music scores in terms of the number of symbols and their precise placement. In commercial editors used to prepare music scores for publishing, the number of elementary symbols is close to 300 while in MIDI is close to 40. Commercial music editors for publishing are mainly oriented towards placing music symbols on the score page rather than modelling relationships among symbols.

Recently, new needs for new computer-based applications of music have been identified: (i) cooperative music editing in orchestras and music schools, such as in project MOODS (Music Object-Oriented Distributed System) ESPRIT; (ii) music score distribution via Internet, such as in the many WWW sites distributing music scores or MIDI files; (iii) integration of multimedia aspects of music for educational applications; (iv) distribution of interactive music via Internet, music that can be manipulated by the end users in the respect of the owner rights.

In all these new applications, the mechanisms of automatic formatting of music are becoming important since the visualisation area is typically different with respect to that in which the music score is generated.

27.1 Music distribution and interchange formats

Music can be distributed via Internet by using images, audio and symbolic files. Presently, the distribution of music is limited to images of music scores (PDF or GIF) or simple symbolic files (Finale, Sibelius, MIDI), while the distribution of audio files (such as mp3) is widely diffused. The music received from Internet can be *interactive or not*. For interactive music we intend symbolic music that can be manipulated in a certain measure: addition/deletion of symbols, transposition, reformatting, etc. Images of music sheets do not allow the music manipulation, while the MIDI model is interactive and too coarse for satisfying needs of professionals, since MIDI provides a reduced set of music notation symbols. MIDI is the most frequently used format for music interchange.

In the past years, NIFF has been developed with the aim of defining an interchange format for music notation among music notation editing/publishing and scanning programs. NIFF format includes in a unique model integrating both

visual and logical aspects. This makes hard the delivering of music independently of the visualisation details as needed for Internet distribution. Relationships among symbols are defined via specific links.

Internet is presently dominated by the distribution of documents by using the so-called mark-up languages derived from SGML, HyTime, XML, etc. A mark-up language consists of a set of constructs to express how text has to be processed with the main aim of text visualisation. With generalised mark-up languages it is specified only what you have, rather than how it has to be visualised. The visual aspects are specified by using standard tags for stating the typographic features: spacing, font change, etc. For example, by using XSL a formatting styles can be defined. This means that a clear distinction has to be performed between the content and formatting aspects. Mark-up languages have been created for formatting textual documents and not for defining relationships among document symbols. This is one of the main problems to adopt mark-up languages for modelling music.

SMDL (Standard Music Description Language) has been the first mark-up language for music and was built on SGML and HyTime standards -- ISO 10743. The aim was the definition of an interchange abstract model. SMDL model includes the following aspects: logical (symbolic), gestural, visual and analytical. The logical aspect includes the music content (pitches, rhythms, dynamics, articulations, etc.). In SMDL, the visual domain describes the musical typographic details of scores (the symbol, placing, fonts etc.). SMDL cannot be used as a standard interchange format for the visual aspect but only for the logical aspects of music. The main problem of SMDL remains the lack of a formal model for the visual aspects and thus of tools for editing and printing music in SMDL. SMDL was also analysed in CANTATE and MOODS projects obtaining the same results.

Recently, several other XML compliant mark-up languages for music modelling have been proposed, among them: MNML ([Musical Notation Markup Language](#)), MusicML, MML (Music Markup Language), MusiXML, etc. [The MNML](#) is a simplified version of SMDL. In MNML, it is possible to fully describe the basic melody and lyrics of a music piece. It is incomplete in describing all the needed details of real music scores (annotations, publishing aspects, etc.). MusicML can only represent notes and rests. Even staccato points and slurs are missing. MusiXML is quite unstructured and several relationships among music notation symbols are not established. None of the reviewed XML formats for music is completely satisfactory in modelling real music notation aspects. The adoption of symbolic model totally separate by the visualisation issues makes the distribution of interactive music a very complex task. In MOODS project, a co-operative editor of music has been proposed. It was based on a non-XML-based format. The solution was the definition of a specific language called MILLA (Music Intelligent Formatting Language) for defining rules for a formatting engine and leaving the possibility of forcing exceptional conditions.

WEDELMUSIC model and language can be considered the XML evolution of MOODS format. With WEDELMUSIC several early problems of MOODS for music modelling have been solved, in addition WEDELMUSIC is a multimedia model. We do not claim to have solved all problems related to music notation modelling, but only to provide an effective framework that includes most music symbols and their relationships, and on the basis of which several new and innovative applications can be built and where some exceptions and several modelling problems highlighted in can be formalised. In this paper, a short overview of the advantages in adopting WEDELMUSIC model and language is given. WEDELMUSIC format presents multimedia capabilities and includes identification, classification, symbolic, visual, versioning, printing, protection, image score, image, document, performance, video, lyric, aspects. It keeps separate visual/formatting and symbolic aspects. WEDELMUSIC format can be profitably used for new applications and as a format for interchanging symbolic description of music scores.

27.2 Music Notation Problems vs new Applications

This section reviews the most important modelling problems in the view of the emerging applications of music notation. As stated by several authors in the past, the modelling of music notation presents several problems: (i) the intrinsic complexity of formalising *music notation and relationships* among music symbols; (ii) the needs of providing different visualisations/views of the same music in the main score and parts; (iii) the complexity of automatic organising music symbols; (iv) the needs of adding new symbols for expanding the music notation model towards modern music and users' needs; (v) the needs of presenting new functionalities for multimedia applications.

27.2.1 Music Notation Relationships

The modelling of all relationships among notation symbols is a complex task. As the number of symbols grows, the number of relationships among them grows more than proportionally. The syntax and semantics of music are strictly related and cannot simply be modelled by using only *non-visual* (relationships among symbols) or *visual* aspects of music (positions with respect to the staff). The modelling of music symbol **relationships** is not enough to describe the music notation: for example, a *diminuendo* starting between two notes (and ending on the second) depicts the instant in which it has to be applied. The description of music as a collection of **graphical symbols** on the page disregarding their relationships is too much dependent on the visualisation device (automatic reformatting is really complex). In most of the commercial music editors, the music notation symbols are simply managed as graphical symbols that can be placed on the screen. When the music has to be distributed along the network for its visualisation on different devices,

structural description of symbol relationships and visualisation rules have to follow separate mechanisms and formalisations such as in MOODS.

27.2.2 Main Score and Parts, Different Visualisations

The automatic generation of the main score from the separate parts and the extraction of parts from a main score are complex tasks for real music, since the conductor's main score is typically formatted in different manner from the musicians' scores.

Parts are printed by using compressed versions of music notation symbols. Parts usually present also several *instrumental, personal symbols*, which are typically excluded from the main score. The main score may present some specific textual notes or symbols for the conductor. The main score may show more than one part on a unique staff, in this case, they are treated as distinct voices/layers. In parts, other indications are added to facilitate co-ordination among musicians; for instance, the so-called grace/cue notes. The main score and parts present typically different justifications, line breaking and page breaking. In some music editors, even the insertion of measure in a part provokes a huge manual work of reformatting for the replication of performed changes on the main score, or vice versa. In order to solve these problems, a unified model for main score and parts has to be defined. A similar solution has been adopted in MOODS and in WEDELMUSIC for maintaining a unified model for the main score and parts.

27.2.3 Music Notation Visualisation/Formatting

The positioning of music elements on the score presents many critical conditions. A music editor should help the users to produce well-formatted music scores. In most of the music editors, this task is addressed by considering only the visual representation of music symbols and not their relationships. Very few music editors (Finale, MusicEase, Score, Lime, Sibelius, etc.) address problems of (i) automatic placement of symbols and/or (ii) music justification. Some of these are capable of correctly arranging a limited number of symbols.

As above highlighted, some visual aspects of music scores cannot be formalised in terms of symbol relationships. For this reason, the visual arrangement of music notation symbols completes the description of the music scores. Music can be considered a visual language with its own rules . For this reason, the modelling of the visual rules for formatting music is needed for completing the model.

27.2.4 Definition of New Symbols

Typically, there is the need of adding new symbols for stating specific instrument aspects, and/or expanding the music notation model towards modern music. The addition of new symbols means to add font, relationships among the other symbols, execution rules and formatting rules. For example, the addition of a symbol modelling a special figure (such as a cloud of notes) implies a deep changes in the music notation model; while the addition of a new marker for notes can be performed by adding positioning rules and font since the relationship with the note is already established.

27.2.5 Multimedia applications

At a first glance, the new applications related to Internet distribution of music scores seem not much different from the music editors that are currently on the market. The applications of the next years will be mainly based on: (i) co-operative work on music, (ii) interactivity of music, (iii) the availability of different integrated information associated to the music piece, (iv) music as support for tuition systems. In all these cases, music has to be independently presented on the visualisation support features, formatting and resolution. Then, the following functionalities have to be available.

- ♣ a clear distinction between the music notation model and the visualisation rules: reformatting in automatic manner on the basis of the user's needs, etc.
- ♣ music notation model has to be abstract enough to allow the interactivity with music at symbolic level: adding and deleting symbols, changing symbols features, etc.
- ♣ Music model has to integrate the several aspects: audio, symbolic music notation, images of music score, documents, video, etc.
- ♣ Mechanisms for distributing music by using shops, libraries, conservatories, etc., as Local Distributors.
- ♣ A refined protection model for Digital Right Management.

The first two problems may be covered by formal models supported by a separate engine for the automatic formatting of music on the basis of rules. Ideally, this work is infeasible, but good compromises can be obtained.

The new multimedia applications are bringing music in a new era. Simple audio files or music sheets are losing their nature to be included in more complex multimedia objects. In this view, WEDELMUSIC format allows the modeling of westerns music, plus tablatures and the exploitation of several new functionalities.

27.3 XML FORMAT

XML is becoming the leading technology for the WWW. XML is also suitable for structured data representation and data exchange among different systems and/or platforms. Due to the complexity of the WEDEL object structure, the formalisation has been divided in several DTDs, among them:

- Header: modelling the WEDEL object structure as depicted and managed by the WEDEL Editor, including identification, classification, protection, printing, and references to the other DTDs.
- SWF: modelling symbolic music notation (main score and parts) and the related cataloguing information for music score.
- IWF: modelling a score section that include a collection of images of music scores and the related cataloguing information; both main score and parts.
- AWF: modelling each instance of the audio section that are audio files and related cataloguing information.

Due to the limited space only some segments of the whole set of DTDs and/or related examples can be presented. Since the most interesting aspects are related to cataloguing (identification, classification) and music notation modelling; then, the following examples are concentrated on these aspects.

27.3.1 Cataloguing: identification and classification

In the following, an example of the identification section is reported. An identification section can be associated with the whole WEDEL object as well as to each component, such a part, the set of images of the main score, the video, the lyric in Italian language, a document in a specific language, etc. The following example reports only the main fields of the identification section. Please note the presence of the WDFID (identification of the whole WEDEL object), and of the Local Distributor ID.

```
<Identification>
  <WDFID>wdfid of the document</WDFID>
  <ISxx TYPE="ISBN" CODE="412-3432-141"/>
  <ISxx TYPE="ISMN" CODE="546246256256546"/>
  <Publisher PUBLISHING_STATUS="PUBLISHED"
    PUBLISHING_LOCATION="Florence"> P. Nesi</Publisher>
  <Preparation_date MAJOR_VER="0" MINOR_VER="1"> 20000601</Preparation_date>
  <Music_Geographic_Area>Italy</Music_Geographic_Area>
  <Catalog_ID>Z4567</Catalog_ID>
  <Second_publisher>PubXFT</Second_publisher>
  <LocalDistributor>
    <LD_ID>10g540</LD_ID>
    <LD_NAME>Universita di Firenze</LD_NAME>
  </LocalDistributor>
  <URI>http://www.wedelmusic.org</URI>
  <Responsible_Name>K. Lemon</Responsible_Name>
  <Quality_Level>36</Quality_Level>
</Identification>
```

The next example reports a classification section. A classification can be associated with the whole WEDEL object as well as to each component -- such as: a part, the set of images of the main score, the video, the lyric in Italian language, a document in a specific language, etc. The classification can be present in more than one language. The following example reports only the main fields of a classification section.

```
<Classification xml:lang="ITA">
  <Criticalreview REVIEWER="P. Bellini" DATE="20003105">
    <Review_Description>Rev.1 Bocchi Piero
  </Review_Description>
  </Criticalreview>
  <Textual_description>La mia opera prima</Textual_description>
  <Instrument TONALITY="A Major">Violino</Instrument>
  <Piece_tonality>B Minor</Piece_tonality>
  <Author>Nicola Mitolo</Author>
  <Unique_Short_Name>Trio</Unique_Short_Name>
  <Title>Trio per archi</Title>
  <Act>Primo</Act>
  <Movement>Secondo</Movement>
  <Genre>Hip Hop</Genre>
  <Style>new Hip</Style>
  <Purpose>demo</Purpose>
```

```

<Extracted_from>Album X534</Extracted_from>
<Sequence_Number>18638363</Sequence_Number>
<Alphanumeric_number>7hdy47erhgfdj</Alphanumeric_number>
<Original_language>Italiano</Original_language>
<Duration>12307</Duration>
<Composition_date>2000421</Composition_date>
<Epoque>
  <Start_year>1980</Start_year>
  <End_year>2000</End_year>
</Epoque>
<Composition_location>Firenze</Composition_location>
<Nationality>Italiana</Nationality>
<Dedicated_to>none</Dedicated_to>
<Commitment>none</Commitment>
<First_execution>ieri</First_execution>
</Classification>

```

27.3.2 Structure of the Symbolic: Music Notation Section

The main idea of WEDELMUSIC format for modelling music notation is to keep separate the single parts and to produce the main score composing the descriptions of single parts. This approach is similar to what has been used in MUSE, MOODS and in other formats. To this end, the XML formalisation of music notation is divided in two groups.

The first includes the header and the information for the main score. This part includes (i) the specific identification and classification aspects for the main score, (ii) the information to reconstruct the bracketing among parts on the main score, and (iii) independent textual annotations for the main score.

The second group is the set of files, one for each part, containing the header and the description of symbolic music notation for the part.

In WEDELMUSIC format, a music part is seen as comprised of one or more staves (simple, piano, organ, and harp parts).

The annotations of the main score are assigned to the music score elements after that the music parts are used to build the main score. This is possible thanks to the adoption of the *Symbolic Addressing* of music notation symbols that will be shown in the following for horizontal symbols.

27.4 Part Music Notation Section

A part is seen as a sequence of measures with their signature. Each measure has one or more layers/voices distributed on one or more staves. This means that in order to represent non-measured music invisible barlines have been used. Each voice/layer may pass from one staff to the others of the same part. In this way, symbols of the same layer may across different staves of the same part (for example, beams and slurs). This means that each figure (note, rests, beam, chord, etc.) knows its position in terms of staff number. Each figure may have several minor symbols associated with it: alterations, accents, expressions, ornaments, augmenting dots, etc. After the description of each measure with its layers and figures the list of horizontal symbols is reported.

Horizontal symbols are slurs, crescendo, decrescendo, octave, bends, tuples, etc. Tuples are a special case of horizontal symbols. They are associated with notes, rests or hidden anchorages for their starting and ending points. Anchorages are used for defining intermediate positions in which some symbols have to be anchored. The modelling of anchorage is an abstraction to avoid the needs of associating graphics co-ordinates with the position of symbols. For example, a note may present a crescendo for 2/3 of its duration and then a decrescendo until its conclusion. In this case, it is needed to have a intermediate point in which the end of the crescendo and the start of the decrescendo have to be referred. An anchorage states the distance ration between the duration of the previous note and its insertion position, and can be visible only under request.

In WEDELMUSIC format, the main music notation elements such as notes, rests, anchorages, changing clefs, changes of key signature, etc., are univocally identified according to a set of numbers assigned at their insertion: part, measure, layer, beam or chord and symbol number. The sequence of numbers that allows the identification of each music notation symbol is called *Symbolic Address*.

For these reasons, the only numerical details which are present in a WEDELMUSIC description of a symbolic part are those related to (i) the symbolic addressing of each music notation symbols, and (ii) the justification parameters to format the music.

Justification parameters can be different for (i) main score on computer screen, (ii) part on computer screen, (iii) printing music main score, (iv) printing music part. To this reason, 4 different justification parameters are present for each measure. The justification can be linear or logarithmic and a number identifies the scale. Each figure also includes positive and negative microspaces. When the formatting engine has produced non satisfactory results, the user can add

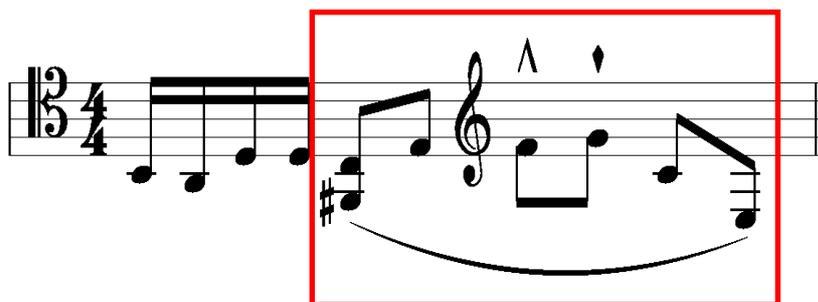
microspaces at the music notation symbols (notes, rests, changes of key signature, changes of clef, etc.) to reach a very high quality format for the music score. This is performed independently on the graphics aspects since microspaces are relative spacing associated to previous symbols.

The music formatting (at level of main score and for single parts) is completely demanded to MILLA engine and thus other graphic details inside the XML formalisation of symbolic music are not needed to formatting music. According to the classical music notation rules, several symbols associated with notes, rests and anchorages may be placed above or below the staff according to the context and to the publisher style. MILLA formatting engine is capable to take decisions in any context when the loaded symbol has the attribute AUTO for the automatic positioning of the symbol (for example when symbolic music is imported). When the relative position of the symbol with respect to the staff has been fixed an UP or DOWN constraints is present. In MILLA can be also specified the symbol category that do not have to be visualized when the symbolic data is used to produce the main score.

In the XML formalization the description of fretboards, harp pedals, piano pedals, etc., are described by using simple strings coding the position of pedals -- e.g., HHLH|LHH for harp.

27.5 Some Examples of WEDELMUSIC XML

The following example has been chosen to show the formalisation of chords, beams, beam with chords, expressions, clef change, alterations, and slurs. In the specification, the direction of the stems has been imposed during insertion.



XML coding in WEDELMUSIC

After the formalization of the music piece, the specification of the horizontal symbol is reported. In that case, a slur is present, and the symbolic addressing is used to identify the starting point (a specific note in a chord of a layer of a measure) and the ending note (a note in a beam). Please note that the horizontal symbols could be defined between symbols that are placed even on different layers. In the XML examples of this paper, two arrows highlight the relationships defined by using the symbolic addressing between the slur definition (on the bottom) and the notes used for starting and ending the slur.

```
<measure.....>
<layer .....>
<figure NUMERICCODE="17">
  <beam>
```

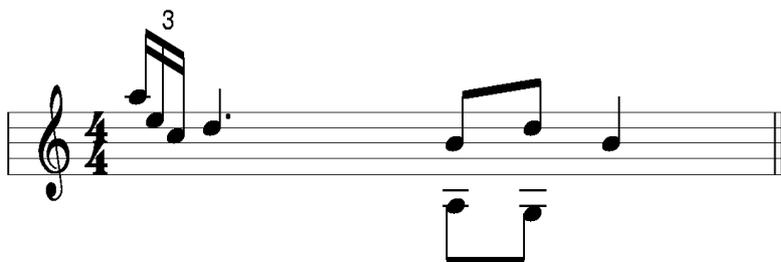
```

<beamnote ID="5">
  <figure NUMERICCODE="5">
    .....
    <chord NOTETYPE="CROMA" STEM="UP">
      <chordnote ID="5" HEIGHT="-5">
        <alteration TYPE="DIESIS"/>
      </chordnote>
      <chordnote ID="16" HEIGHT="-1"></chordnote>
    </chord>
  </figure>
</beamnote>
<beamnote ID="10">
  <note TYPE="CROMA" STEM="UP" HEIGHT="1" >
  </note>
</beamnote>
</beam>
</figure>
.....
.....
<figure NUMERICCODE="14">
  <beam>
    <beamnote ID="7">
      <note TYPE="CROMA" STEM="UP" HEIGHT="-2">
      .....
      </note>
    </beamnote>
    <beamnote ID="6">
      <note TYPE="CROMA" STEM="UP" HEIGHT="-7">
      .....
      </note>
    </beamnote>
  </beam>
</figure>
.....
</measure>
.....
<horizontal ID="1" TYPE="SLUR" UPDOWN="DOWN">
  <address MEASURE="1" LAYER="1" FIGURE="17" CHORD.OR.BEAM="5" CHORD.IN.BEAM="5"/>
  <address MEASURE="1" LAYER="1" FIGURE="14" CHORD.OR.BEAM="6" CHORD.IN.BEAM="0"/>
</horizontal >
<measure .....

```

In the example, it is show how is possible to produce music piece in which two layers are present. In one of the two layers the measure duration is inconsistent, in the sense that some rests are missing since they are implicitly intended. This can be produced in WEDELMUSIC format by using the concept of invisible rests. This means that the user has to insert in the second layer rests and notes in order to make the measure time consistent, thus the measure can be justified considering simultaneities among layers/parts. On the other hand, if the musicians prefer to hide/see the rests they can be made invisible/visible.

In the first part of the example, a tuple has been included. The tuples are managed in WEDELMUSIC as a special case of horizontal symbols. For this reason the specification of the tuple is at the end of the part description.



Second Example XML coding

```

<measure.justification>.....

```

```

</measure.justification>
<intestazione>
<key TYPE="TREBLE" .....
.....
<layer NUMBER="1">
  <figure NUMERICCODE="32">
    <beam>
      <beamnote ID="1">
        <note TYPE="SEMICROMA" HEAD="CLASSIC" STEM="UP" HEIGHT="10" ></note>
      </beamnote>
      <beamnote ID="2">
        <note TYPE="SEMICROMA" HEAD="CLASSIC" STEM="UP" HEIGHT="7" ></note>
      </beamnote>
      <beamnote ID="31">
        <note TYPE="SEMICROMA" HEAD="CLASSIC" STEM="UP" HEIGHT="5" ></note>
      </beamnote>
    </beam>
  </figure>
.....
</layer>
<layer NUMBER="2">
.....
</layer>
</measure>

<horizontal ID="4" TYPE="TUPLE" UPDOWN="UP"
  TUPLENUMBER="3" TUPLELINE="FALSE">
  <address MEASURE="1" LAYER="1" FIGURE="32" CHORD.OR.BEAM="1" CHORD.IN.BEAM="0"/>
  <address MEASURE="1" LAYER="1" FIGURE="32" CHORD.OR.BEAM="31" CHORD.IN.BEAM="0"/>
</horizontal >

```

For other details regarding the XML format you can download the DTD of the symbolic part of the XML WEDELMUSIC format from the WWW site of WEDELMUSIC. For complete details please consult the Deliverables regarding the WEDELMUSIC format.

Chap.28 WEDELMUSIC Editor Adoption Agreement

Please note that in the following two page the registration form and adoption agreement for:

- the tools produced by WEDELMUSIC tool kit;
- the WEDELMUSIC Editor;
- the WEDELMUSIC Editor for Visually Impaired People;
- the WEDELMUSIC Editor integrating also the Music Analyser (in this case also the analyser has to be registered also at the IRCAM);
- and all the WEDELMUSIC compliant tools produced with the WEDELMUSIC Tool Kit.

See for the registration details the Chapter of Installation.

Other tools such as the Server and the Local Distributors present different and separate registrations and agreements.

WEDELMUSIC Editor or Compliant Tools Ver. 6.xx, 2002 REGISTRATION FORM WEDELMUSIC Agreement

Version:3.0 -- January/2002

Wedelmusic@dsi.unifi.it

Fax: +39-055-4796363 (Prof. P. Nesi)

The sending of this registration form and agreement implies that the installing person and its institution or company certifies to respect the following rules. The agreement is between the owner of WEDELMUSIC editor (DSI) and the company/person/institution identified by the details reported at the end of this agreement and called in the rest of the document the receiving party.

1. All the information and tools provided by DSI and WEDELMUSIC, and by officers or representatives of its members, will be held confidential and used exclusively according to the restriction of this agreement.
2. All the information and tools provided by the DSI or WEDELMUSIC cannot be distributed from the receiving party to other parties without the written permission of DSI. In affirmative case the new party will have to sign another copy of this agreement if they intend to use DSI tools or WEDELMUSIC compliant tools developed and distributed by other parties.
3. Information shall mean all information and documents obtained by the receiving party from or disclosed by DSI, which relates to the WEDELMUSIC project past, present and future research, development and business activities and the results from such work, except such information as is previously known to the receiving party or is publicly disclosed without breach of an obligation to DSI and WEDELMUSIC, either prior or subsequent to the receiving party's receipt of such information.
4. For tools we intend all the provided software tools comprised of executable programs, documentation, help files, font files, tables, symbol database, source examples, etc., that are delivered from DSI to the receiving party for demonstration, explanation or for development. For tools we also intend the WEDELMUSIC compliant applications developed by third parties. These may also be available via DSI or others.
5. The receiving party shall not disclose by publication or otherwise to any person any such confidential information nor use it for its own benefit. Any publication based on WEDELMUSIC compliant tools and or development has to be sent to the WEDELMUSIC to get the authorisation. This means that DSI verifies if private information is included and if WEDELMUSIC has been properly mentioned. Providing that these conditions are respected the authorisation cannot be refused. If the receiving party does not receive any email message after 15 days of the reception of the publication request from the DSI and WEDELMUSIC, the authorisation can be considered granted.
6. The registration has an expiration time. This can be requested by the receiving party according to its needs with this registration form. If a demo version is requested only 60 days of adoption are provided and the tools present some limitations.
7. DSI declines any responsibility about eventual loss/damages to people or to objects due to the adoption of the provided tools or information.
8. The receiving party may use the DSI WEDELMUSIC tools for no-profit research purpose without any restriction for limited time duration imposed during the registration.
9. The receiving party may use the DSI WEDELMUSIC tools for profit research purpose by recognising to DSI a registration fee on the basis of the project considered. In these cases, the registration of DSI WEDELMUSIC tools has a fixed but small costs for each computer.

10. The WEDELMUSIC compliant tools include a serial number that cannot be modified, these tools cannot be copied and each registration allows to install only one DSI WEDELMUSIC tool set.
11. The registration process of each DSI WEDELMUSIC tool, including DSI WEDELMUSIC Compliant applications, called in this paragraph tool, is as follows:
 - The tool is delivered to the receiving party with a serial number.
 - The tool at the first execution, after the installation, provides a code that has to be communicated to DSI via fax +39-055-4796363 with this filled and signed registration form.
 - DSI will send via email the habitation code (registration key) for the assigned period of adoption.
 - The code allows the installation of tools only on the computer in which it has been installed the first times.

All matters arising out of or in connection with the interpretation, implementation, termination or cancellation of this agreement shall be governed in accordance with the laws in force in Italy and Europe from time to time, and the laws of the Italian Govern shall be deemed for all purposes to be the proper law of this agreement.

If one or more of the above rules will be non respected a specific legal action will be performed by DSI to recover the economical damage performed by the infraction.

Contact Person: _____

Company: _____

Place of business: _____

Address: _____

Country _____

Email _____

WWW _____

Project _____

Deadline of Usage _____

Your Serial Number _____

The Code provided during registration

Place: _____ **Date:** _____

Signatures: _____ / _____

Chap.29 WEDELMUSIC Tool Kit, Adoption Agreement

Please note that in the following two pages the registration form and adoption agreement for the WEDEL tool kit is reported.

See for the registration details the Chapter of Installation.

Other tools such as the Server and the Local Distributors present different and separate registrations and adoption agreements.

WEDELMUSIC WEDEL Tool Kit

ver.6.xx

Adoption AGREEMENT

Version:3.0 -- January/2002

Wedelmusic@dsi.unifi.it

Fax: +39-055-4796363 (Prof. P. Nesi)

This WEDELMUSIC WEDEL Tool Kit adoption agreement is between the DSI of WEDELMUSIC consortium and the company/person/institution identified by the details reported at the end of this agreement and called in the rest of the document the receiving party.

This WEDELMUSIC WEDEL Tool Kit, WTK, agreement includes a list of duties and rules that have to be respected by the receiving party of the WTK. This agreement has to be signed for receiving and using the current version of the WTK. The WTK can be used for building WEDELMUSIC compliant applications. A simpler agreement called Registration Form -- WEDELMUSIC Agreement is available for those that intend to use only tools such as the WEDEL Editor, The WEDELMUSIC Editor, all the applications produced with the WTK, etc., and for registering the WTK. That agreement includes the use of WEDEL Editor, WEDEL Music Editors, WEDEL Fret Editor, WEDEL Audio Player. Both the agreements have to be renovated every year to receive each new version of the WTK/tools that will include more functionalities. The adoption of tools such as WEDELMUSIC Server, WEDELMUSIC Local Distributor, Music Analyser, Music Editor for VIP is not included in this agreement. Specific registration forms and agreements have to be requested for that tools.

With this agreement the receiving party certifies that:

1. All the information and tools provided by the WEDELMUSIC consortium, and by officers or representatives of its members, hereinafter called WEDELMUSIC, will be held confidential and used exclusively according to the restriction of this agreement.
2. All the information and tools provided by the WEDELMUSIC cannot be distributed from the receiving party to other parties without the written permission of WEDELMUSIC. In affirmative case the new party will have to sign an agreement similar to this or the simpler version called WEDELMUSIC agreement if they intend only to use WEDELMUSIC tools or WEDELMUSIC compliant tools developed and distributed by the receiving party. The signing of the WEDELMUSIC agreement for WEDELMUSIC tools or derived tools is mandatory and included in the WEDELMUSIC registration process described in the rest of this document
3. For Information we intend all information and documents obtained by the receiving party from or disclosed by WEDELMUSIC, which relates to the WEDELMUSIC project past, present and future research, development and business activities and the results from such work, except such information as is previously known to the receiving party or is publicly disclosed without breach of an obligation to WEDELMUSIC, either prior or subsequent to the receiving party's receipt of such information.
4. For tools we intend all the provided software tools comprised of executable programs, WTK, documentation, help files, font files, tables, symbol database, source examples, etc., that are delivered from WEDELMUSIC to the receiving party for demonstration, explanation or for development. For tools we also intend the WEDELMUSIC compliant applications that can be built from the receiving party by using the WTK. These may also be available via WEDELMUSIC.
5. The receiving party shall not disclose by publication or otherwise to any person any such confidential information nor use it for its own benefit. Any publication based on WEDELMUSIC compliant tools and or development has to be sent to the WEDELMUSIC to get the authorisation. This means that WEDELMUSIC verifies if private information is included and if WEDELMUSIC has been properly mentioned. Providing that these conditions are respected the authorisation cannot be refused. If the receiving party does not receive any email message

after 15 days of the reception of the publication request from the WEDELMUSIC, the authorisation can be considered granted.

6. At any time upon request of WEDELMUSIC, the receiving party shall return to WEDELMUSIC all written or descriptive matter including, but not limited to drawings, blueprints, descriptions or other papers or documents which contain any such confidential information of WEDELMUSIC together with all copies thereof. This can be contracted/amended with WEDELMUSIC on the basis points 8 of 9.
7. DSI and WEDELMUSIC declines any responsibility about eventual loss/damages to people or to objects due to the adoption of the provided tools or information.
8. The receiving party may use the WEDELMUSIC tools for no-profit research purpose without any restriction for limited time duration imposed during the registration.
9. The receiving party may use the tools provided by DSI and WEDELMUSIC and the WTK in profit based projects. In this case, the receiving party has to recognise to DSI a corresponding registration fee for compensating the Information Property Right, IPR. The fee is fixed for each installation of the WTK and for each installation of the DSI WEDELMUSIC compliant applications produced. These applications has a fixed but small costs for each computer.
10. Possible extensions to WTK can be requested and committed to DSI. Their costs, if any, and delivering time has to be contracted with DSI.
11. The involvement of DSI and/or WEDELMUSIC in specific projects in which specific WEDELMUSIC compliant applications are built is possible and has to be contracted with DSI and WEDELMUSIC.
12. The registration fee can be paid in terms of contributions to the DSI. This means that interesting contributions delivered free of IPR to DSI can be used to acquire free registrations. Typical contributions are loader from different formats and savers to other formats.
13. The registration of WTK as well of each tool has a limited time of exploitation. This can be requested by the receiving party according to its needs with this agreement. If a demo version is requested only 60 days of adoption are provided and the tools present some limitations.
14. The core of the WTK is delivered in OBJ or DLL code. The code cannot be unassembled.
15. The WTK includes a serial number and has to be registered such as all WEDELMUSIC tools. The serial number cannot be modified. The installation is fixed to a unique computer and cannot be moved. The receiving party can require more registrations.
16. The delivered WTK can be used only by personnel employed by the receiving party that has signed the agreement.
17. The WTK can be used for implementing WEDELMUSIC compliant applications. Each installation of the application has to be registered to WEDELMUSIC consortium. Non registered applications are not authorised and can be legally persecuted. They will be not capable of loading music in protected format. During the registration the DSI WEDELMUSIC provides a key to enable to cope with protected objects.
18. The adoption of the WTK to build applications that are capable of reading protected files and producing files containing description of music features coming from the WEDELMUSIC Object Oriented model of music. The production of ASCII, Binary or Encrypted files by using WTK code is not allowed when the read files are protected. For the same reasons the generation of temporary or hidden or in RAMDISK files from data contained in protected file is not allowed.
19. The protection mechanisms enforced into the WTK takes into account the protection aspects of the loaded WEDELMUSIC object have to be respected, no violation is permitted.
20. The receiving party that intends to use the WTK for implementing a saver into a different format has to communicate the intention to DSI organisation. This will be possible according to the permission manager and thus according to the rules for respecting prices and habilitations enforced by the publishers into each specific WEDELMUSIC object according to the WEDELMUSIC general format and transaction model.
21. The registration process of WTK and of each WEDELMUSIC tool, including WEDELMUSIC Compliant applications, simply called in this paragraph tool, is as follows:
 - The tool is delivered to the receiving party with a serial number.
 - The tool at the first execution, after the installation, provides a code that has to be communicated to DSI via fax +39-055-4796363 with this filled and signed registration form.

- DSI will send via email the habitation code (registration key) for the assigned period of adoption.
- The code allows the installation of tools only on the computer in which it has been installed the first times.
- This means that a receiving party that has signed this agreement to receive the WTK has in any case to make the registration of its WTK on a specific computer.

All matters arising out of or in connection with the interpretation, implementation, termination or cancellation of this agreement shall be governed in accordance with the laws in force in Italy and Europe from time to time, and the laws of the Italian Govern shall be deemed for all purposes to be the proper law of this agreement.

If one or more of the above rules will be non-respected a specific legal action will be performed by DSI and/or WEDELMUSIC or by it partners to recover the economical damage performed by the infraction.

Contact Person: _____

Company: _____

Place of business: _____

Address: _____

Country _____

Email _____

WWW _____

Project _____

Deadline of Usage _____

Your Serial Number _____

The Code provided during registration

Place: _____

Date: _____

Signatures: _____

/ _____

Chap.30 Glossary

- DAM: Digital Asset Management;
- DRM: Digital Right Management;
- LD: Local Distributor;
- MIDI: format for coding music files;
- MILLA: Music Intelligent Language for the automatic formatting of music notation;
- PPQN: Pulse Per Quarter Note;
- SDMI: Secure Digital Music Initiative;
- WAVE: format for coding audio files;
- WDF: extension given to WEDELMUSIC objects and directories;
- WDFCID: identification code of each component of WEDELMUSIC objects;
- WDFID: identification code of the WEDELMUSIC object;
- WEDELMUSIC: Web Delivering of Music;

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Chap.31 File Extensions

- AVI: Audio Video file
- AWF: Audio WEDELMUSIC header
- BMP: Bitmap format for images
- BWF: Bitmap WEDELMUSIC header
- CWF: additional command list file
- DAT: file containing database of the fretboard
- DOC: file MS-Word
- DWF: file describing the content and the classification of each document included. Each document should have a DWF file for allowing the search and the identification.
- EPS: Encapsulated PostScript File
- ETF: Enugman format of FINALE
- ETT: execution time trend of MOODS, a file containing how the measures of a symbolic music score are consumed during the execution. It is used for the paging mechanism of execution;
- EWF: execution file containing the synchronisation among an audio file and a symbolic or an audio and an image score, a sort of the ETT of MOODS.
- FOG: Fontographer files, file of font
- FON: files containing fonts for visualisation of symbols and user interface
- FXT: the Finale Plug in, for example the WEDELMUSIC plug-in for finale
- GIF: image format
- HTML, HTM: file html for internet browser
- HWF: Header WEDELMUSIC format
- IWF: file containing the list of images belonging to a main score or a part for and image score music sheet
- JPG: image format
- LOG: Log file generated by the WEDELMUSIC Plug-In fro FINALE
- LWF: file containing its classification, identification and text corresponding to a lyric for a music part. The file contains also the reference in terms of WDFCID to the music part to which is assigned and any references to the singles notes.
- MDS: File generated in MOODS format
- MID: MIDI file

- MP3: format for coding audio files;
- MPG: video format
- MUS: format file containing symbolic music, it can be a Finale, SCORE or other file produced by other music editors.
- PCX: image format
- PDA: file containing fonts for printing music scores
- PDF: Acrobat File
- PNG: image compressed format
- PPT: power point file
- PS: PostScript File
- SIB: format file containing symbolic music in SIBELIUS format
- SWF: symbolic music file
- TAB: table containing:
- TBL: table for visualising and printing music scores
 - the position and the size of font elements
 - the transcoding definitions for the WEDELMUSIC plug-in for FINALE
- TIF: image compressed format
- TXT: file in standard ASCII
- WAV: audio file non compressed
- WDF: wedelmusic object at whole
- XLS: excel file
- XWF: WEDELMUSIC header for other symbolic socores

Chap.32 **Font Tables**

See external file..

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Chap.33 Index

Chap.34 References

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See also the deliverables of the following Projects

CANTATE: <http://www.FNB.nl/project/cantate/cantate.htm>
HARMONICA: <http://www.FNB.nl/project/harmonica/harmonica.htm>
IMEASY: <http://www.dsi.unifi.it/hpcn/wwwimeasy/wwwpag.html>
MIRACLE: <http://www.FNB.nl/project/Miracle/miracle.htm>
MOODS: <http://www.dsi.unifi.it/moods>
MUSTUTOR: <http://www.ilsp.gr/mustutor/MusTutor.htm>
WEDELMUSIC: www.wedelmusic.org