tinyMOODS

DSI release 0.99.1

User's Guide

Dipartimento di Sistemi e Informatica
Facoltà di Ingegneria
Università degli studi di Firenze

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Florence, October 15th, 1998 - DSI

1 System overview

The prototype of the computerized system of electronic lecterns/music editors has been implemented by using technologies based on: HPCN, object-oriented paradigm, real-time technique; thus, the name MOODS: Music Object-Oriented Distributed System. The implementation of MOODS prototype involves both hardware and software aspects (see Fig.1.1).

A MOODS system, as reported in Fig.1.1, is comprised of:

- DLIOOs: a set of lecterns (Distributed LIOO, which means Lectern Interactive Object-Oriented).
- PDLOOs: a set of Passive Distributed Lecterns Object-Oriented. A DLIOO not enabled to edit/modify the score visualized. The difference between DLIOOs and PDLOOs is only functional and constrained in the configuration of the software.
- MASE: a MAin Score Editor and lectern used by the director/conductor for managing DLIOOs and PDLOOs lecterns.
- MASAE: a MAin Score Auxiliary Editor which is strictly related to MASE and presents the same user interface. This is a music editor/lectern by means of which the archivist can (i) make even heavy modifications on score during rehearsals or score revision and (ii) beat time indicating the measure under execution, thus correct the time of the automatic turning of pages of all lecterns during performances.
- Theatre Network, TheNET: a network support for connecting lecterns based on 100 BT, TCP/IP and PVM.
- ONCM: the Orchestra/Network Configurator and Manager. It is an application running on the same workstation of MASAE for establishing logical and physical relationships among lecterns and controlling the behavior of the Theatre Network, TheNET.
- Database: a database for storing and retrieving main scores and parts. It is a workstation endowed with a suitable hardware for containing a huge archive of scores and orchestra configurations, etc.

Specific hardware for DLIOOs and MASE has been built by ELSEL using commercial components but considering ergonomic aspect and. MASAE and the Database (provided by Shylock Progetti) use standard hardware.

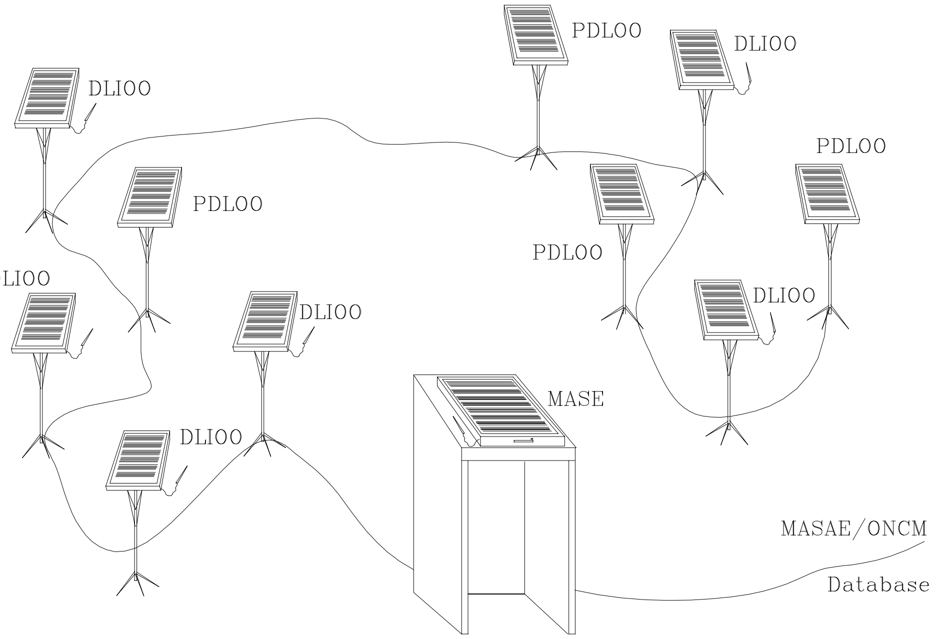


Figure 1.1 -- MOODS, Music Object-Oriented Distributed System of lecterns: DLIOO, PDLOO are lecterns for musicians; MASE, lectern for the conductor; MASAE, auxiliary lectern for the archivist; ONCM, Orchestra/Network Configurator and Manager

Please note that:

- DLIOO software has been obtained by starting from LIOO application of DSI. LIOO is an editor/lectern for score parts working on X-window.
- MASE and MASAE software has been obtained by starting from MSLIOO (Main Score LIOO) application of DSI. MSLIOO is an editor/lectern for main scores working on X-window.
- Network support for TheNET has been obtained by reusing, adapting and optimizing an object-oriented support for PVM of DSI {TheNET96}, see also the preparatory work of DSI.
- Database of main scores and parts has been obtained by customizing the results of SHYLOCK in CANTATE project. This software provides internet connection with other databases.

The adaptation, customization of LIOO, MSLIOO software have been consisted in adding parts (i.e., methods and specialized classes) for distributing lecterns and controlling them on the network. New functionalities due to the possibility of working co-operatively on the same score have been implemented.

Therefore, software support for integrating DLIOOs with MASE/MASAE along the network, configuring the network/orchestra, and monitoring the network behavior (ONCM) has been implemented by using HPCN technology.

1.1 From MOODS to tinyMOODS

The tinyMOODS version differs from many points of view from MOODS, also if it contains the main functionalities of the original product. The main limitation regards the configuration features: tinyMOODS can manage only one archivist, a director and a DLIOO. The machine names can be assigned to parts by the means of environment variables, instead of being dynamically configured with the ONCE tool (see README file in the distribution for setting up details).

ONCE tool is not present in this version and only a resume of the documentation of ONCE is given in this manual. This features, like others implemented, to be implemented, or developed by other partner (i.e. not by DSI) in the MOODS version (database access, full musical justification, professional print, encrypted score formats etc.) are not present in this version of the product.

1.2 Installation

1.2.1 Linux Red Hat 5.1(INTEL)

This distribution of tinyMOODS requires the installation of Linux RedHat 4.2 or higher and the presence in the system of PVM. Please refer to the README file for additional information.

1.2.2 Solaris 2.6.x (SPARC)

Not yet available.

1.2.3 HP-UX

Not available in this distribution.

2 Music notation: a quick tutorial

In this section, a brief overview of 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.), modern and antique music should be separately considered. 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 theaters the music notation is that is published, taught and executed in front of large stalls.

2.1 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 organization 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 6 lines, in the case of 5 lines the staff is also called *pentagram*);
- 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.

Confidentially, the high of a note in the staff represents its sound in a certain context. Please note that the example in Fig. 2.1, 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.

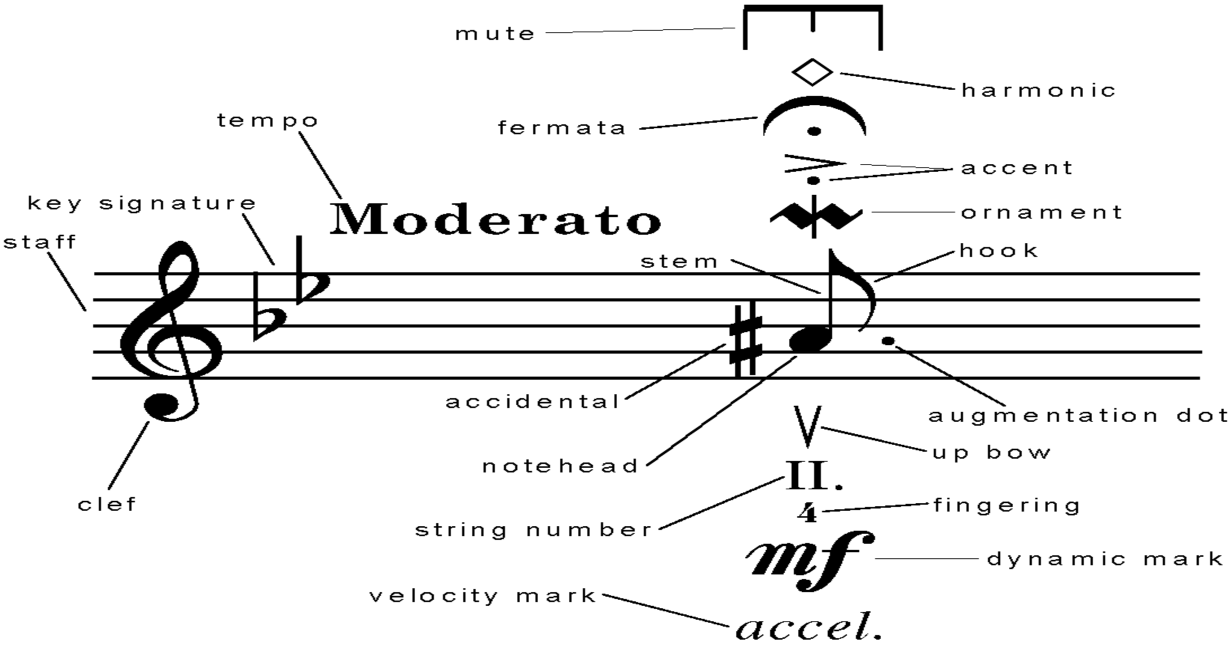


Fig 2.1 - The note, its main components and some related symbols.

The *duration* of a note is conventionally represented by a relative value to 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*.

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 vale 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 realization. These indications are frequently given by means of special graphic symbols -- e.g., an arrow -> or a *wave* for *rall.*

A note may have *ornaments* (abbellimenti) such as: *appoggiatura*, *grace notes*, *mordent*, *trill*, *glissando*, *turn*, *backturn*, *tremolo*. 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 (martello); *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 *ynamics* is a relative concept to specify the loudness of the sound. For example different gradations of, soft: (e.g., *pianississississississimo*) *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*: <>.

2.2 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:

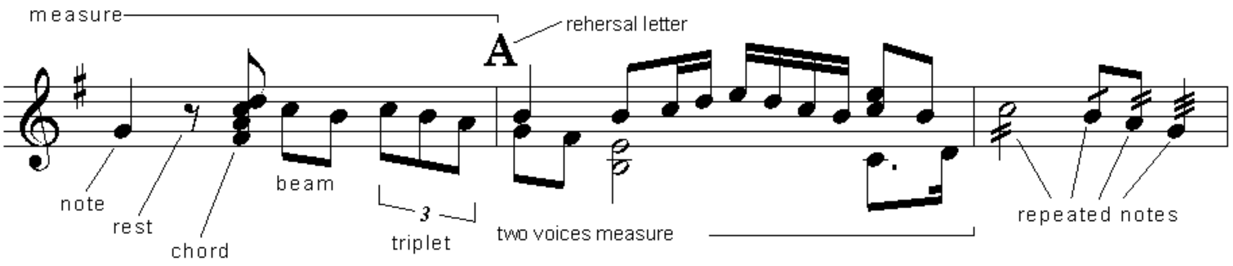


Fig. 2.2

- 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. Chord may present ornaments such as *arpeggiato* from up to down or down to up, depending on the direction of the arrow. In s ome 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 can be considered figures as well. On the other hand, each note in these structures can have all the above mentioned features.

2.3 The Structure of Music Scores

According to the music notation, the figures are organized in measures limited by bars, sometime the bar and measure are used as synonyms. Please see the score reported in the previous figure, 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 exists a score (a part) 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. 2.3.

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.

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) for helping a musician to restart the execution synchronously with the execution of some specific notes of another musician, etc.

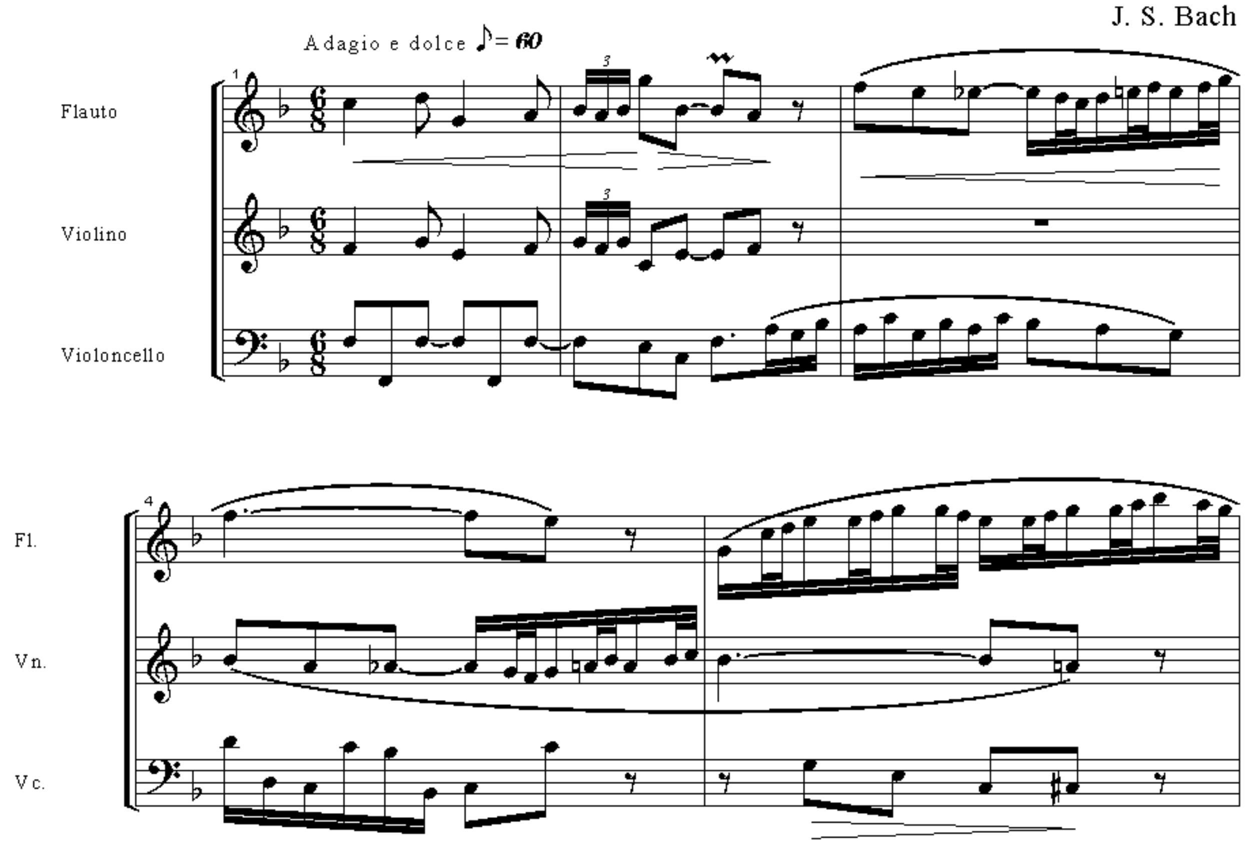


Fig 2.3 - Main score and parts (produced by using Finale).

2.4 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. It is visually specified by using an arc among the note. 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.

Please note that this kind of information is totally asynchronous with respect to the sequence of measures. This can be noted by observing the previous figure and the next one.

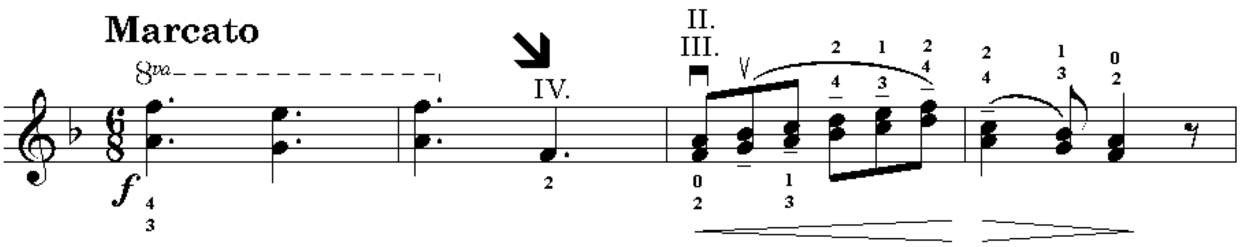


Fig 2.4 - Horizontal and other additional symbols.

2.5 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.

2.6 Discussion

According to the above presentation, it can be stated that the music notation is a visual language witch presents several rules along both horizontal and vertical directions. Several accompanying symbols strictly related to the notes have been discussed. The presence of more than one of these symbols around the figures changes their order, orientation and positions. For instance, the accents have to be placed on the opposite part of the stem (if any). In the case of a slur on the same note, they have to leave the space close to the note at the slur, thus they have to placed more far from the notehead then usually.

Please note that, in general, the position of accompanying symbols with respect to the note assumes a particular relevance since:

- the musicians are used to read the music formatted in a particular way in terms of notation but also considering the relative position of symbols. Particularly precise scores are greatly appreciated since the musicians tend to associate the action to be performed to well-known visual patterns -- e.g., note plus an accents plus etc. Bad, wrong or, even in some extent, different organizations of symbols are totally non-understandable or unsatisfactory for musicians. They do not have enough time to reasoning about the music notation, they are artistically interpreting music;
- some symbols have different meaning depending on the context and the position in which they are placed in the score. In some cases, different meanings are typically associated with symbols on the basis of their positions and dimension. This is an aid for interpreting music but is also an additional complexity for reproducing music in the exact and understandable form. These different semantics aspects are typically delegated to music writer even in computer-based editor for music. This obviously leaves space to errors.
- some visual constructs can be specified even by using different representations. There are many non-written rules to select one representation at the place of another depending on the context.

Moreover, according to the music notation the same meaning can be obtained by using different representations. In the traditional computer-based music editor, the problems have been addressed by considering only the visual representation of music. This means that in most of them every symbol can be place in any position on the score without constraining the organization of the graphical symbols according to the visual syntax of the music notation. Only few automatic mechanisms are established and they present a lot of situation in which the chosen position is unsuitable.

3 DLIOO guide

DLIOO is a display assigned to an orchestral and it shows a score for a specific instrument. DLIOOs will receive from MASAE station all information for visualizing the current score by the means of the network. In DLIOOs the visualization will be performed according to the specific musical part assigned. On each DLIOO, different sets of interpretation symbols will be provided depending on the instrument assigned.
Each DLIOO will work in two different modalities: EXECUTION and EDITOR. Each DLIOO on the Theatre Network switches to EDITOR mode MASAE is in EDITOR mode. A DLIOO in EDITOR mode will be used for modifying classical and interpretation symbols for the instrument to which it has been assigned by using the ONCE and OPD. The modifications performed on DLIOOs in editor mode will be sent in real-time to MASAE editor for visualization and saving.

3.1 DLIOO main screen

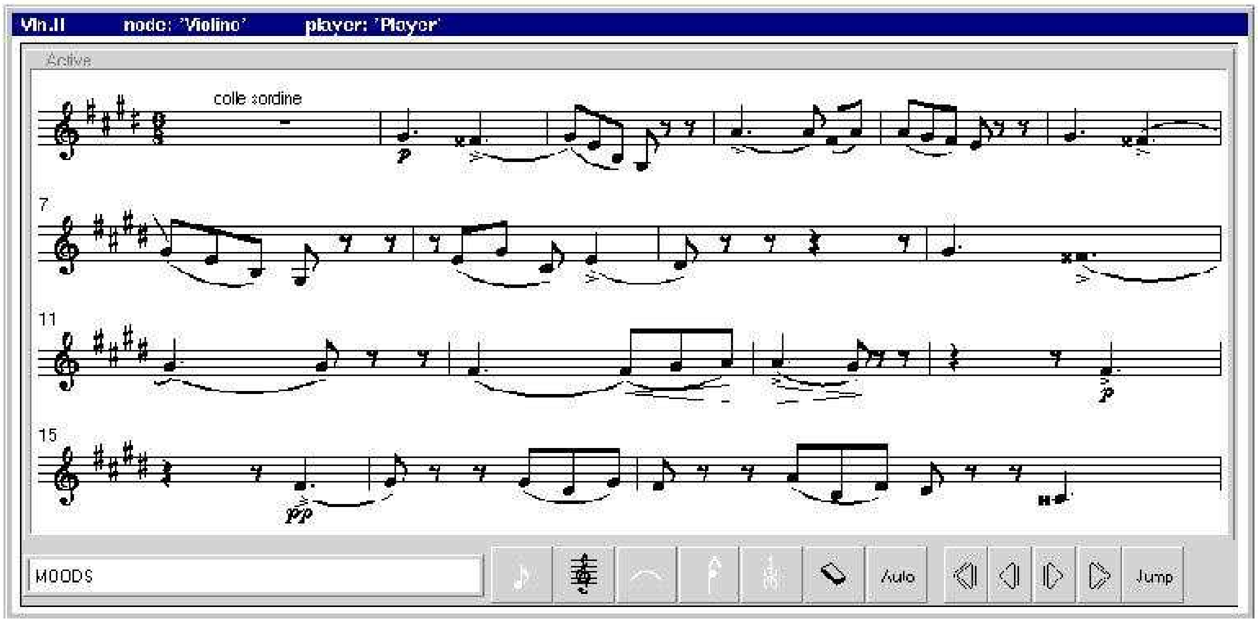


Fig. 3.1 DLIOO main screens.

The screen of the DLIOO is showed in the Figure 3.1. The orchestral can see a number of bars simultaneously like on the normal musical paper.
At the bottom a menu composed by 12 buttons is present. Please note in Fig. 3.1 that some of the DLIOO buttons (the white ones) can be disabled by MASAE (see ONCE and OPD for details). At the bottom on the left side an area for displaying some suggestion exists. It is used when the system is in Editor mode and a button is selected. At the top are displayed the name of the part and player.

3.2 The DLIOO menus

3.2.1 Co-operative editing

The system was created for working in two modalities: Editing and Execution.
The Edit mode allows changing the part if the user has the permissions to do it. A peculiar issue of tinyMOODS is the possibility to change everything in the displayed part. So more users can make change together and the archivist can save all these changes at the end of the Edit session. A change made by the archivist will be sent at the director display and successively to all the affected DLIOOs.

3.2.2 General information about a menu

When the user clicks on the menu area a new menu will appear on the screen. Some menus may have other submenus contained inside or may produce directly an action. The choice to have secondary menus was made because the users can choose to open only the interesting menus. Thus, the display can be personalized and there is a good visibility in Execution mode (only the main window with a little number of button are present).

The first part of the menu is equal for all the menus (see Fig. 3.3) and is used for positioning the window on the screen. The button targeted "1" is used to show the menu horizontally or vertically, the number "2" is for future development and button number "3" closes the menu window.

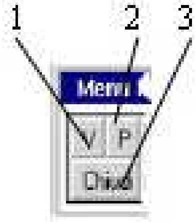


Fig. 3.2 The common part for all menu

There are same buttons with more icons that switch when pressed. In example the menu in Fig. 3.4 allows to insert symbols alone or in chord with a present symbol. If a symbol is inserted in a pentagram with the right icon displayed it will insert spaces in the same bar for the other lectern.

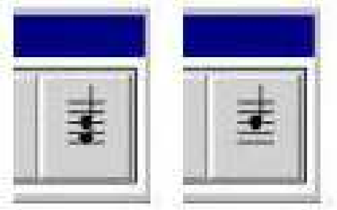


Fig. 3.3 The chord selection button

Another example is the button that allow or not the visualization of spaces (see Fig. 3.5). In Edit mode could be necessary to see spaces, because of manual justification) bat it's not a good idea to let them displayed for the Execution mode. When the button is clicked the label will change from "*Vis.*" to "*Non Vis*" and vice versa.

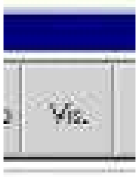


Fig. 3.4 The button for spaces visualization

A very useful symbol that is present in the main menu is the **delete button** (see Fig. 3.5). It can be used to remove any musical symbol and this is the reason for placing it on the main screen. In order to delete a symbol it's necessary to press the "delete" button and than choice the symbol to remove.

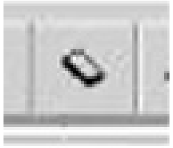
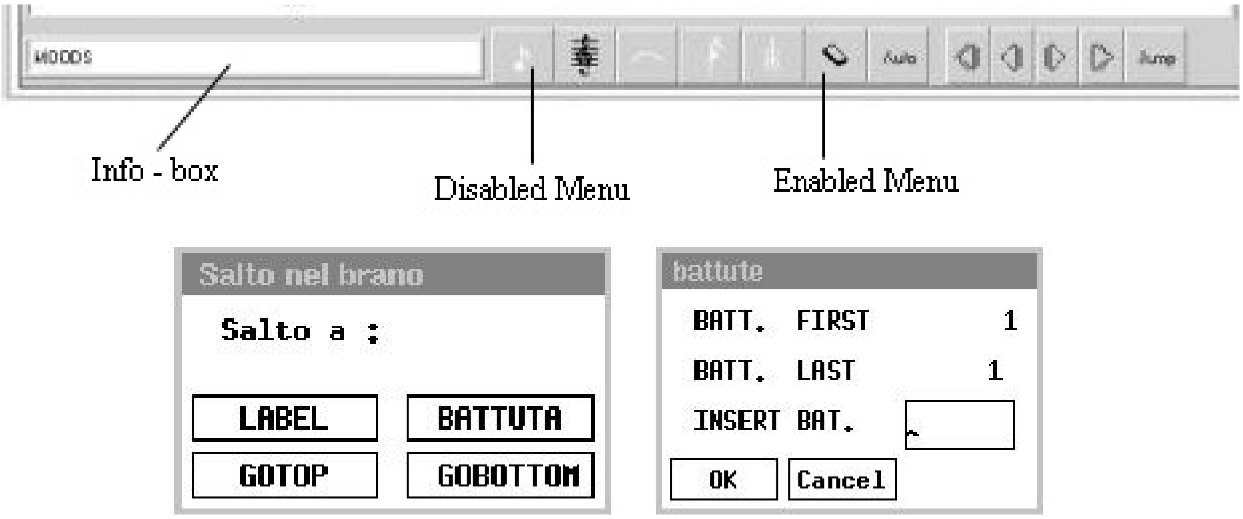


Fig. 3.5 The "delete symbol" button

By pressing the Jump button the window on the bottom-left of Fig.3.6 will appear. Four possibilities are available: (i) jump to a predefined label, (ii) Jump to the start of the score (GOTOP), (iii) jump to the end of the score

(GOBOTTOM), or (iv) jump to a bar (BATTUTA). In case (iv) once BATTUTA button has been pressed the window on the right-bottom part of Fig. 3.6 will appear allowing to insert the bar number to jump to.


MODDS
Auto
Jump
Info - box
Disabled Menu
Enabled Menu
Salto nel brano
Salto a :
LABEL
BATTUTA
GOTOP
GOBOTTOM
battute
OK
Cancel

BATT. FIRST 1
BATT. LAST 1
INSERT BAT.

Fig. 3.6 – The DLIOO (up) main menu with Jump windows (down).

3.2.3 Insert a symbol

Inserting a symbol it's a short and intuitive operation. The user has to select the needed symbol from the menu, verify the information in the left-bottom info box (see Fig 3.6) and than click in the place where the symbol has to be insert. The info-box will show in example something like: "*Select a place for…*".

There are symbols that can be insert only on a note. In this case the info-box will show: "*Select a symbol*".

3.2.4 List of DLIOO menu

How presented in advance there is a tree of menu with primary and secondary window:

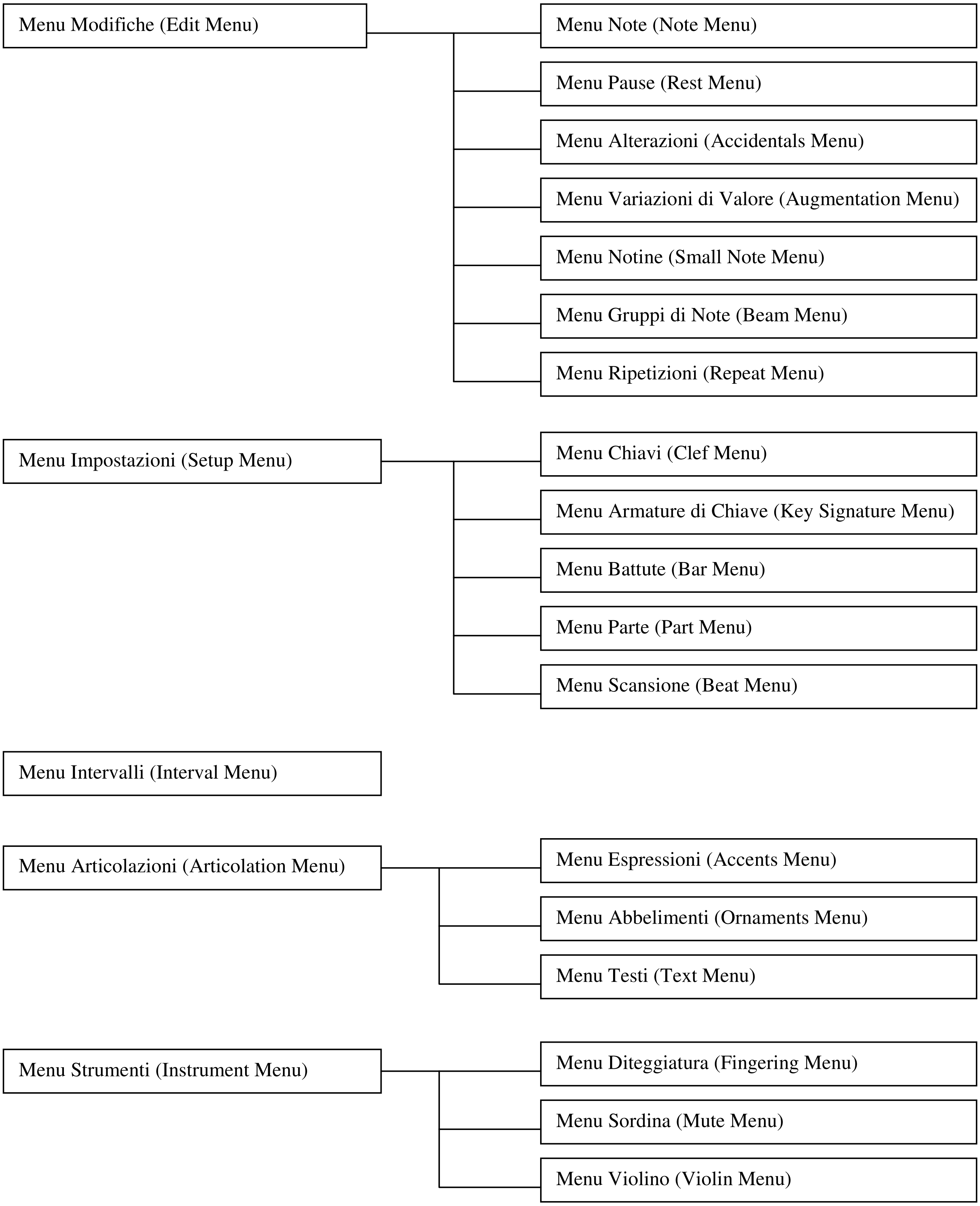

Menu Modifiche (Edit Menu)
Menu Note (Note Menu)
Menu Pause (Rest Menu)
Menu Alterazioni (Accidentals Menu)
Menu Variazioni di Valore (Augmentation Menu)
Menu Notine (Small Note Menu)
Menu Gruppi di Note (Beam Menu)
Menu Ripetizioni (Repeat Menu)
Menu Impostazioni (Setup Menu)
Menu Chiavi (Clef Menu)
Menu Armature di Chiave (Key Signature Menu)
Menu Battute (Bar Menu)
Menu Parte (Part Menu)
Menu Scansione (Beat Menu)
Menu Intervalli (Interval Menu)
Menu Articolazioni (Articolation Menu)
Menu Espressioni (Accents Menu)
Menu Abbelimenti (Ornaments Menu)
Menu Testi (Text Menu)
Menu Strumenti (Instrument Menu)
Menu Diteggiatura (Fingering Menu)
Menu Sordina (Mute Menu)
Menu Violino (Violin Menu)

Fig. 3.7 Menu tree for DLIOO.

3.2.4.1 “Menu Modifiche” (Edit Menu)

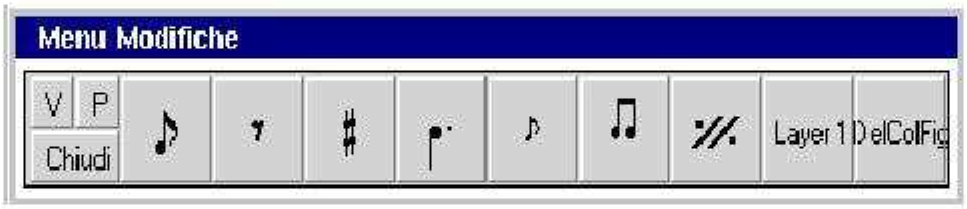


Fig. 3.8 Edit Menu.

The menu in Fig. 3.8 gives the possibility to insert and modify notes, breaks and other musical symbols. From left to right the buttons perform the following operations:

- **Note**: Opens the MenuNote (Note Menu).
- **Rest**: Opens the MenuPause (Rest Menu).
- **Accidentals**: Opens the MenuAlterazioni (Accidentals Menu).
- **Augmentation Dot**: Opens the MenuVariazioniValore (Augmentation Menu).
- **Small Notes (notes with a smaller notehead)**: Opens the MenuNotine (Small Note Menu).
- **Beam Notes**: Opens the MenuGruppiNote (Beam Menu).
- **Repeat**: Opens the MenuRipetizioni (Repeat Menu).
- **Layer**: Selects one of the two musical layers.
- **DelColFig**: Deletes a column of figures.

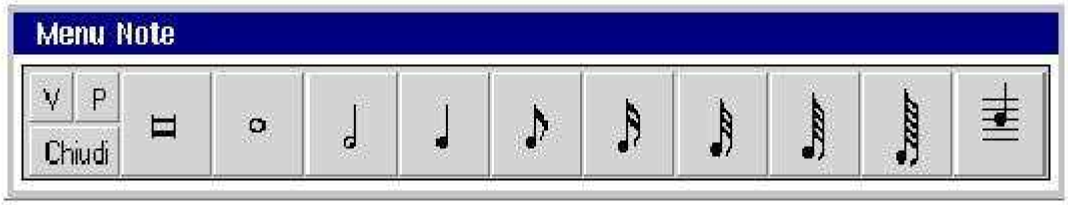


Fig. 3.9 Note Menu.

In Fig. 3.9 the note menu is shown. The using of this menu allows the insertion of all kind of notes, in particular from left to right we have:

- Inserts a **Double whole note;**
- Inserts a **Whole note;**
- Inserts a **Half note;**
- Inserts a **Quarter note;**
- Inserts a **Eight note;**
- Inserts a **Sixteenth note;**
- Inserts a **Thirty-second note;**
- Inserts a **Sixty-fourth note;**
- Inserts a **One hundred twenty-eight note;**
- **Chord Button** (to be selected if a note must be inserted in chord with other figures or not.

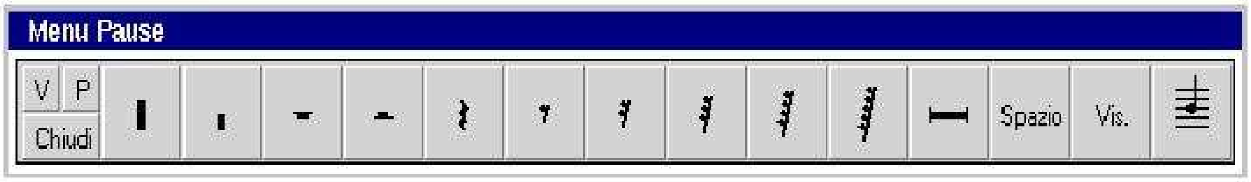


Fig. 3.10 Rest Menu.

In Fig. 3.10 the rest menu is shown. The using of this menu allows the insertion of all kind of rest, and the insertion of spaces, in particular from left to right we have:

- Inserts a **Four measure rest**;
- Inserts a **Two measure rest**;
- Inserts a **Whole rest**;
- Inserts a **Half rest**;
- Inserts a **Quarter rest**;
- Inserts a **Eight rest**;
- Inserts a **Sixteenth rest**;
- Inserts a **Thirty-second rest**;
- Inserts a **Sixty-fourth rest**;
- Inserts a **One hundred twenty-eight rest**;
- Inserts a **Multiple-measure rest**;
- **Spazio**: insert a space;
- **Vis**: Button for selecting if the spaces have to be visualized or not;
- **Chord Button** (to be selected if a note must be inserted in chord with other figures or not.

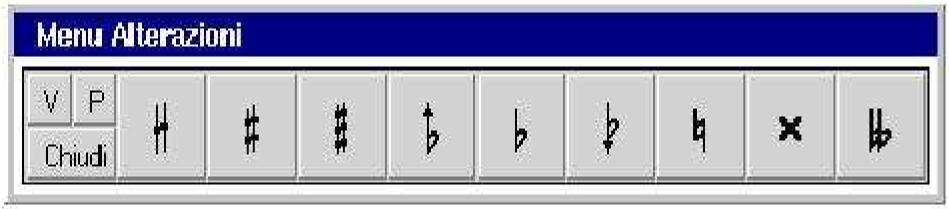


Fig. 3.11 Accidentals Menu.

In Fig. 3.11 the accidentals menu is shown. 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.

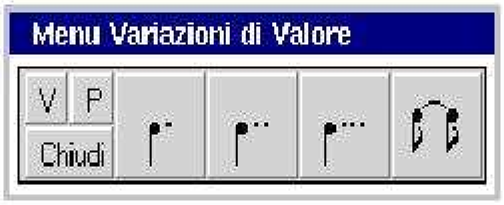


Fig. 3.12 Augmentation Menu.

In Fig. 3.12 the augmentation menu is shown. The using of this menu allows the insertion of augmentation dots and ties, in particular from left to right we have:

- **Augmentation Dot**: inserts a single augmentation dot;
- **Augmentation Dot**: inserts a double augmentation dot;
- **Augmentation Dot**: inserts a triple augmentation dot;
- Inserts a **Tie**.

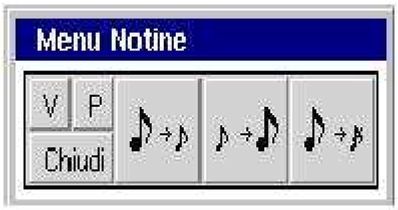


Fig. 3.13 Small Note Menu.

In Fig. 3.13 the Small Note menu is shown. The using of this menu allows to change a normal note in a little one and vice versa, in particular from left to right we have:

- From normal note to little;
- From Small Note to normal;
- From normal note to grace note.

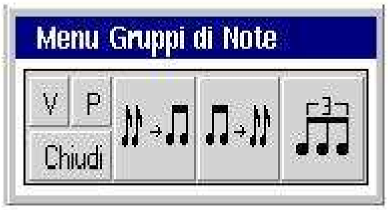


Fig. 3.14 Beam Menu.

In Fig. 3.14 the beam menu is shown. The using of this menu allows to change a normal notes to a note beam, and to insert tuplets, in particular from left to right we have:

- Converts some notes to beam;
- Converts a beam to separated notes;
- Create a tuplet from separated notes.

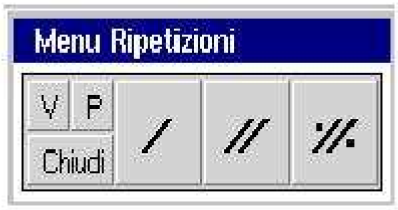


Fig. 3.15 Repeat Menu.

In Fig. 3.15 the Repeat menu is shown. The using of this menu allows to insert repeats, in particular from left to right we have:

- Beat repeat
- Half measure repeat
- Measure repeat

3.2.4.2 Menu Impostazioni (Setup Menu)

The menu in Fig. 3.16 manages the structural changes (new part, new staff, new bar, new musical clef).

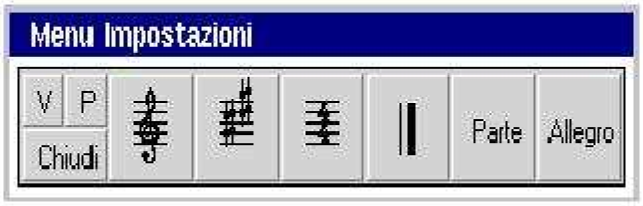

Menu Impostazioni
V
P
Chiudi
Parte
Allegro

Fig. 3.16 Setup Menu.

The buttons from left to right perform the following operations:

- **Clef:** open the MenuChiavi (Clef Menu)
- **Key Signature:** open the MenuArmatureChiavi (Key Signature Menu)
- **Tempo**: allows the insertion of a new time indication. Please note that the time indication can be inserted in several ways. After the insertion it's necessary to indicate the bar that use the time, since the command has effect only for the selected bar.
  - By inserting the "c" letter means a time of four quarters
  - By inserting the "C" letter means a time of two half
  - By inserting a string in format time/time (4/4 = "c", 2/2 ="C")
- **Bar:** opens the MenuBattute (Bar Menu)
- **Parte:** opens the MenuParte (Part Menu)
- **Allegro:** – open the MenuScansione (Beat Menu)

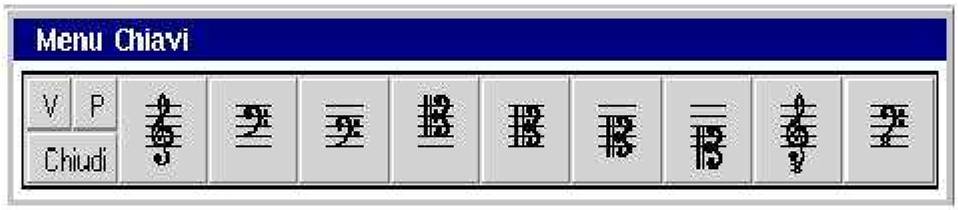

Menu Chiavi
V
P
Chiudi

Fig. 3.17 Clef Menu.

In Fig. 3.17 the Clef menu is shown. The using of this menu allows inserting and modifying clefs, in particular from left to right we have:

- Inserts a **G clef, Treble**;
- Inserts a **F clef, Bass**;
- Inserts a **Baritone clef**;
- Inserts a **Tenor clef**;
- Inserts an **Alto clef**;
- Inserts a **Mezzo-soprano clef**;
- Inserts a **Soprano clef**;
- Inserts an **Octave G clef, Tenorized Treble**;
- Inserts an **Octave F clef**;

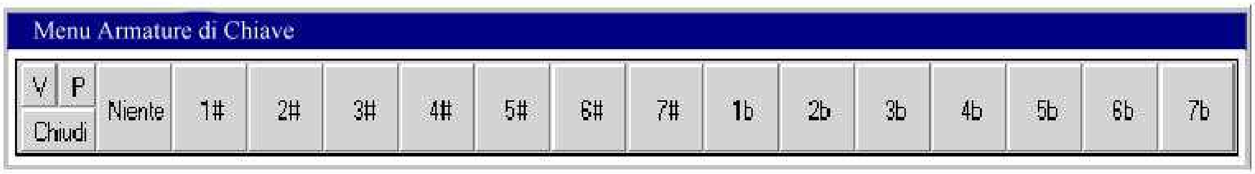

Menu Armature di Chiave
V
P
Chiudi
Niente
1#
2#
3#
4#
5#
6#
7#
1b
2b
3b
4b
5b
6b
7b

Fig. 3.18 Key Signature Menu.

In Fig. 3.18 the Key Signature menu is shown. The using of this menu allows inserting and modifying key signatures, in particular from left to right we have:

- **Niente:** Inserts a C Major
- **1#:** inserts a G Major key signature;
- **2#:** inserts a D Major key signature;
- **3#:** inserts an A Major key signature;
- **4#:** inserts a E Major key signature;
- **5#:** inserts a B Major key signature;
- **6#:** inserts a F Sharp Major key signature;
- **7#:** inserts a C Sharp Major key signature;
- **1b:** inserts a F Major key signature;
- **2b:** inserts a B Flat Major key signature;
- **3b:** inserts an E Flat Major key signature;
- **4b:** inserts an A Flat Major key signature;
- **5b:** inserts a D Flat Major key signature;
- **6b:** inserts a G Flat Major key signature;
- **7b:** inserts a C Flat Major key signature.

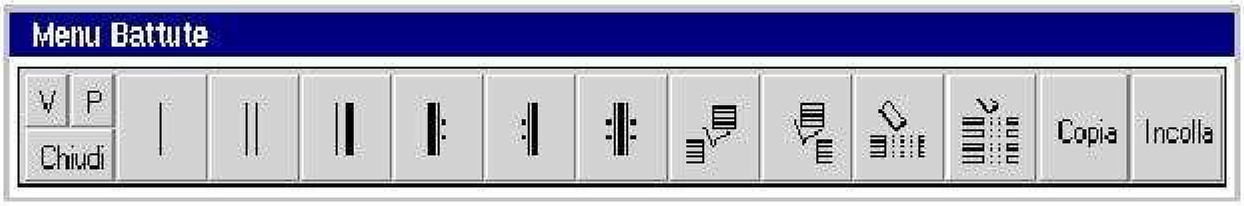


Fig. 3.19 Bar Menu.

In Fig. 3.19 the bar menu is shown. The using of this menu allows inserting and modifying bars, inserting, deleting bars and deleting an entire column of bars; additionally this menu will allow the Copy and Paste of bars, in particular from left to right we have:

- Inserts a **Barline;**
- Inserts a **Double barline;**
- Inserts a **Heavy double barline;**
- Inserts a **Left repeat barline;**
- Inserts a **Right repeat barline;**
- Inserts a **Double repeat barline;**
- **Insert** a bar **after** the current;
- **Insert** a bar **before** the current;
- **Delete** a **bar**;
- **Delete** a **column** of **bar;**
- **Copia**: Copy a bar;
- **Incolla**: Paste a bar.

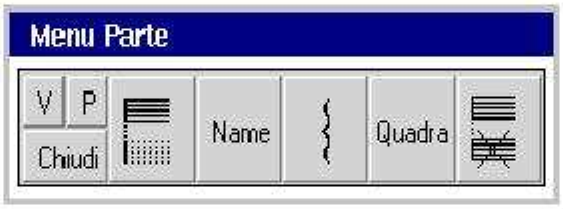


Fig. 3.20 Part Menu.

In Fig. 3.20 the part menu is shown. The using of this menu allows inserting new part, changing the name of the part, inserting brackets and delete parts, in particular from left to right we have:

- **Insert** a **part**;
- **Assign** or change the **part name**;
- **Brace**: inserts a brace bracket used for grouping parts;
- **Quadra**: inserts a square bracket used for grouping parts.
- **Delete** a **part.**

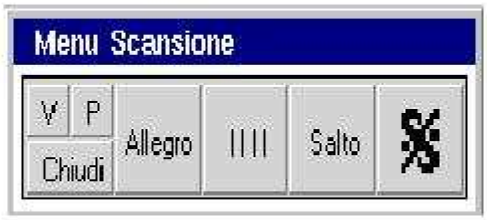


Fig. 3.21 Beat Menu.

In Fig. 3.21 the beat menu is shown. It allows the inserting of symbols related to measures or bars, in particular from left to right we have:

- **Allegro**: inserts tempo indication.
- **||||:** allows to specify in which beats has to be considered a given measure.
- **Salto**: This allow to define a textual Label on which the user can jump during editing or execution.
- This last button is a marker for measures
- MenuIntervalli (Horizontal Symbols Menu)
- This menu allows the inserting of the Horizontal symbols like slur, crescendo, diminuendo and others symbols that involve a group of symbols.

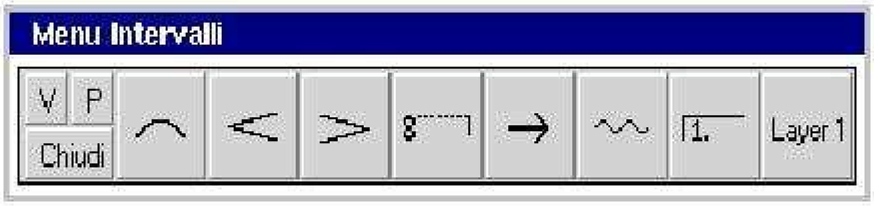


Fig. 3.22 Horizontal symbol Menu.

It contains from left to right the buttons performing the following operations:

- **Slur**: inserts a slur between notes;
- **Crescendo**: inserts a crescendo symbol among a group of notes;
- **Diminuendo**: inserts a diminuendo symbol among a group of notes;
- **Octave change**: insert an octave change symbol among a group of notes;
- **Arrow**: inserts an arrow symbol among a group of notes;
- **Wave**: inserts a wave symbol among a group of notes;
- **Refrain Change**: insert a refrain change symbol among a group of notes;
- **Layer** – select the active layer.

For the slur, crescendo, diminuendo, wave and refrain two selection points must be selected with pointing device because these symbols need a start and an end point.

3.2.4.3 Menu Articolazioni (Articulation Menu)

This menu manages the musical interpretation symbols.

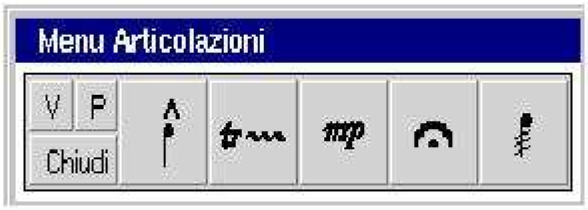


Fig. 3.23 Horizontal symbol Menu.

It contain, from left to right, the following buttons:

- **Accent**: opens the MenuEspressioni (Accent Menu);
- **Trill**: opens the MenuAbbelimenti (Ornaments Menu);
- **Dinamic Marking**: opens the MenuTesti (Texts Menu);
- **Fermata**: inserts the fermata symbol;
- **Beam like** – insert the beam like symbol for a note.

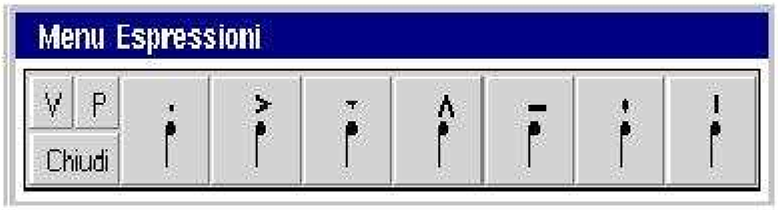


Fig. 3.24 Accents Menu.

In Fig. 3.24 the Accents menu is shown. The using of this menu allows inserting accents on notes, in particular from left to right we have:

- **Staccato** dot symbol;
- **Accent** symbol;
- **Martellato** (**heavy wedge**) symbol;
- **Wedge** symbol;
- **Tenuto** symbol;
- **Light wedge** symbol;
- **Long dot** symbol.

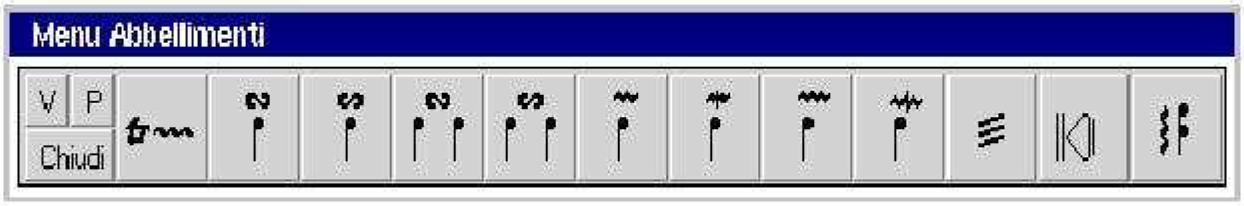


Fig. 3.25 Ornament Menu.

In Fig. 3.25 the Ornaments menu is shown. The using of this menu allows inserting ornaments on notes, in particular from left to right we have:

- **Trill**: inserts a trill symbol with an user defined number of waves;
- **Turn**: inserts a turn symbol on a note;
- **Backturn**: inserts a backturn on a note;
- **Turn**: inserts a turn symbol between notes;
- **Backturn**: inserts a turn symbol between notes;

- **Superior Mordent**: inserts a superior mordent symbol on a note;
- **Inferior Mordent**: inserts an inferior mordent symbol on a note;
- **Double Superior Mordent**: inserts a double superior mordent symbol on a note;
- **Double Inferior Mordent**: inserts a double superior mordent symbol on a note;
- **Tremolo**: inserts a tremolo symbol on a note;
- **Glissando**: inserts a glissando symbol on a note;
- **Arpeggiato**: inserts an arpeggiato symbol on a chord;

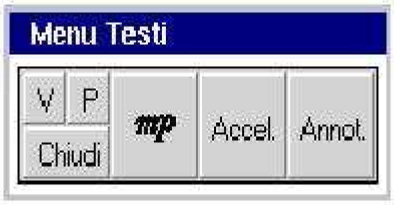


Fig. 3.26 Texts Menu.

In Fig. 3.26 the texts menu is shown. The using of this menu allows inserting various kind of texts, like abbreviated dynamic marking, agogic text, conductors annotations, in particular from left to right we have:

- **Abbreviated dynamic marking**: inserts dynamic marking like *mp, mf, fff*, etc;
- **Accel.:** inserts agogic texts like Accel. etc;
- **Annot.**: inserts a conductor’s textual annotation.
- Menu Strumenti (Instrument Menu)

This menu, depicted in Fig. 3.27, manages the instrumental indication symbols.

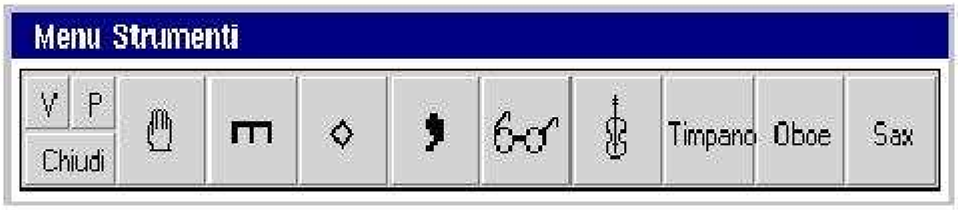


Fig. 3.27 Instruments Menu.

Instruments menu provides buttons that open submenus, for the several instrument categories or insert some particular symbols, like take breath and glasses. In particular from left to right we find:

- **Fingering**: opens the MenuDiteggiatura (Fingering Menu);
- **Mute**: opens the MenuSordina (Mute menu);
- **Armonics**: opens the MenuArmonici (Harmonics Menu);
- **Take breath**: inserts the take breath symbol. Please note that this symbol can be inserted only in chord with a space;
- **Glasses:** inserts the glasses symbol;
- **Violin:** opens the MenuViolini(Violin Menu);
- **Timpano:** will inserts a textual symbol for Timpani (not implemented yet); menu percussions
- **Oboe:** will opens the MenuOboe (Oboe Menu) (not implemented yet);
- **Sax:** will opens the MenuSax (Sax Menu) (not implemented yet).

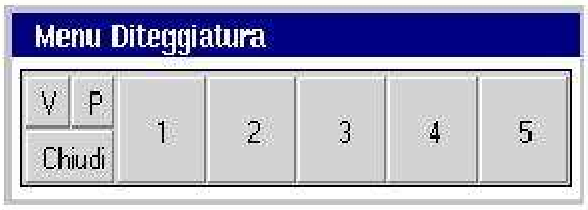

Menu Diteggiatura
V
P
Chiudi
1
2
3
4
5

Fig. 3.28 Fingering Menu.

Fingering menu provides buttons for inserting fingering number.

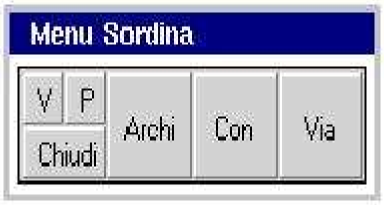

Menu Sordina
V
P
Chiudi
Archi
Con
Via

Fig. 3.29 Mute 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**: insert the symbol (selected with **Archi** button) that specifies to put the mute on.
- **Via**: insert 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.*

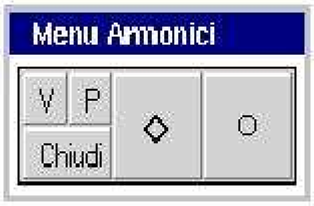

Menu Armonici
V
P
Chiudi
◇
O

Fig. 3.30 Harmonics Menu.

Harmonics menu has two buttons for inserting harmonics symbols. In particular from left to right we find:

- Harmonic symbol for strings;
- Harmonic symbol for flutes.

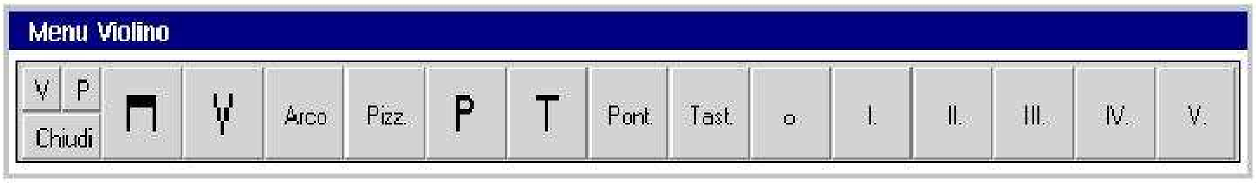

Menu Violino
V
P
Chiudi
Arco
Pizz.
P
T
Pont.
Tast.
o
I.
II.
III.
IV.
V.

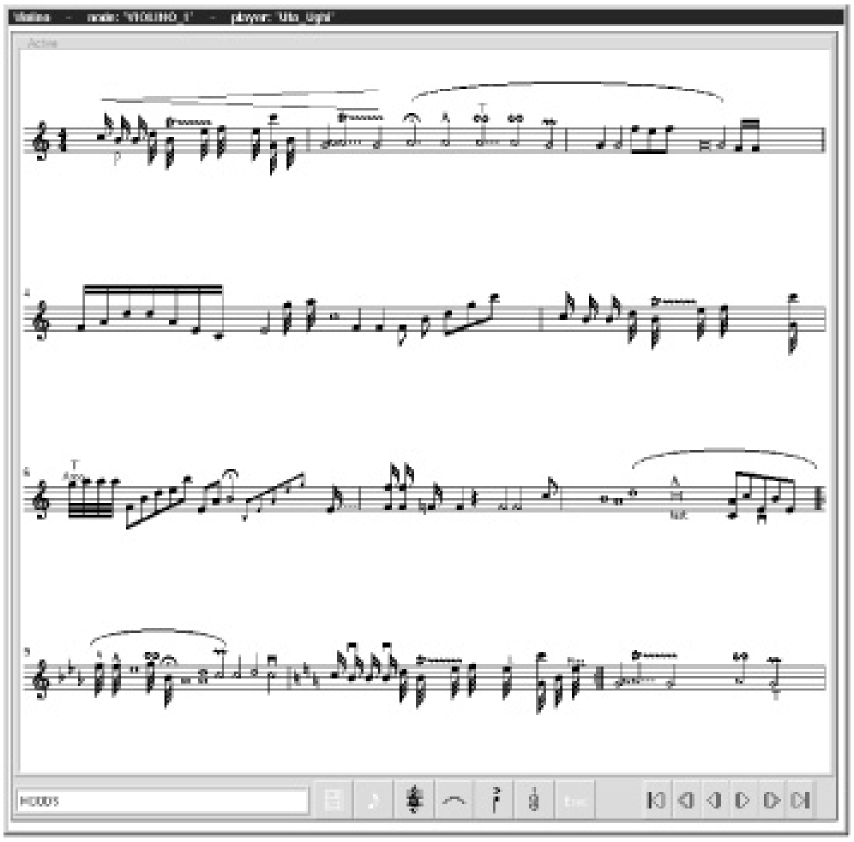
Fig. 3.31 Violin Menu.

Violin menu provides buttons for arcs interpretation symbols. In particular from left to right we find:

- **Bow up**;
- **Bow down**;
- **Arco**: the note must be played with arc;
- **Pizz**.: play in Pizzicato way;
- Use **Bow Point**;
- Use **Bow Hell**;
- **Pont**: the note must be played on bridge;
- **Tast**: the note must be played on fingerboard;
- **0**: empty string;
- **I,II,III,IV,V**: note to be played with the marked string number.

3.3 Scrolling

One of the many advantages of tinyMOODS using, is the automatic scrolling and page turning, during the execution. Because the relative position of the pentagrams and the different display resolutions are different among MASE, MASAE and DLIOO the scrolling must be different too. The next figures (Fig. 3.32) present three scrolling step on the DLIOO display. Like the figures show, the page that is about to be played appears from up to down, slowly replacing the bars already played.



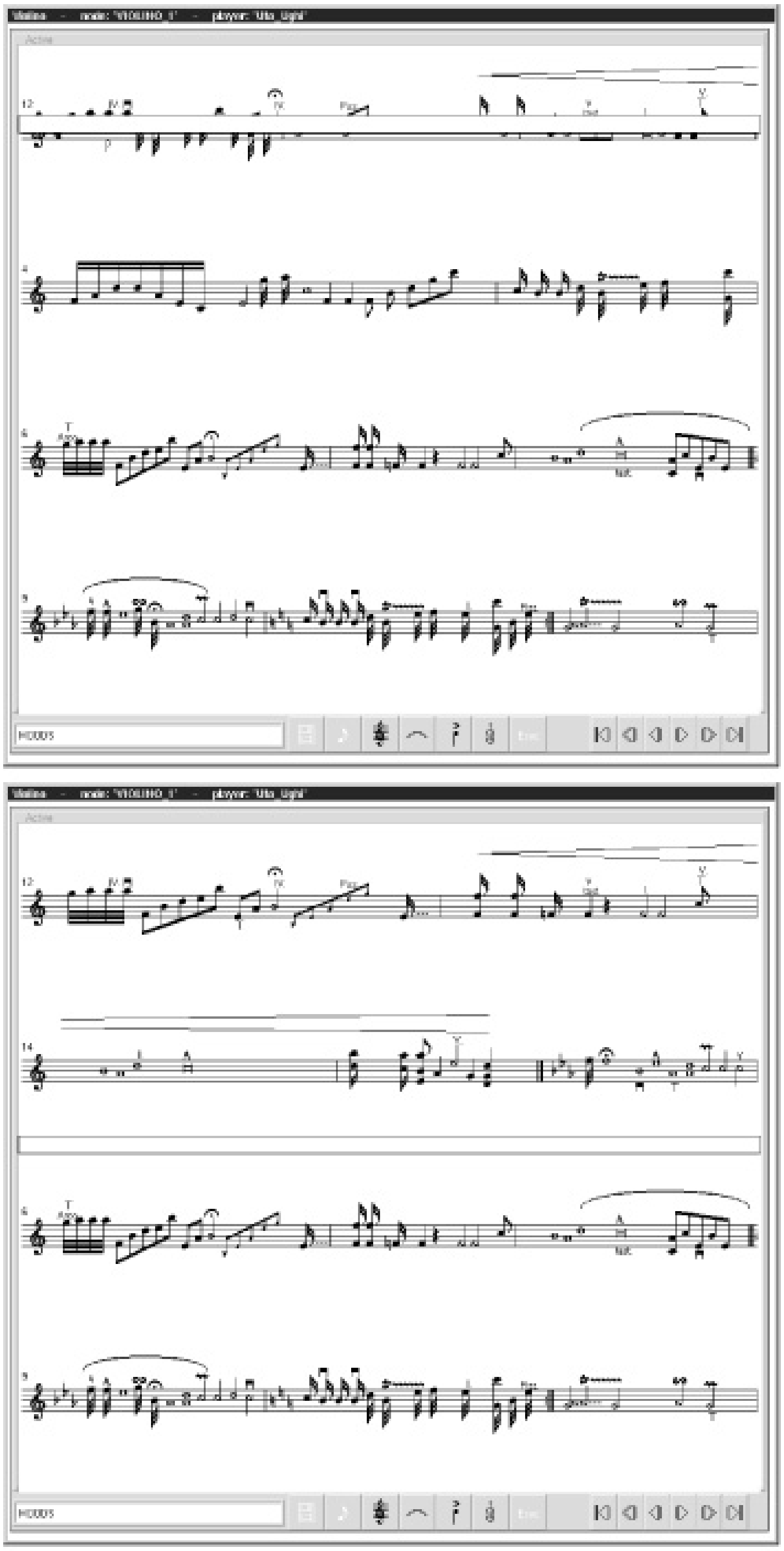
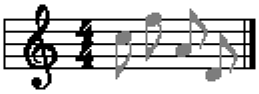

'Violino' - mode: 'VIOLINO_I' - player: 'Uto_Ughi'
Active
12
4
6
9
14
Pizz.
Nut.

Fig. 3.32 An example of DLIOO scrolling.

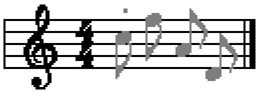
3.4 Some examples of music editing.

In this chapter an example of music symbol insertion with the result obtained on the screen is presented. Obviously the reported example has no musical meaning, but it is only an example of symbol insertion.

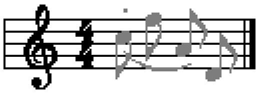
In an empty part we can insert some note by using the submenu note of edit menu. Once the button of the selected note have been pushed, we have to click on th epentagram in order to select the note (A, G, F, etc.)



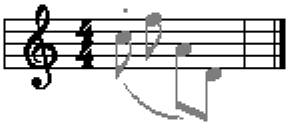
By using the accent menu a staccato dot can be inserted on the 1st note of the bar.



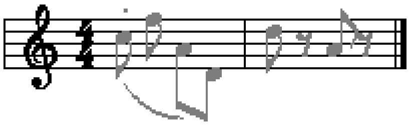
A slur can be easily inserted by selecting the slur button in the horizontal symbol menu and by clicking on the starting and ending slur symbol. In our example the slur has been inserted between the 1st and 3rd note of the bar.



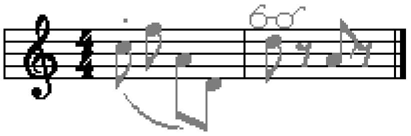
In order to create a beam it necessary to select the “From notes to beam” button in the beam menu and draw with mouse pointer a rectangul shape around the notes we want to beam. Please note that the slur automatically modify its shape. Once the 1st bar has been completed another bar can be inserted by using the appropriate button in the bar menu and clicking on the part to which the bar has to be added.



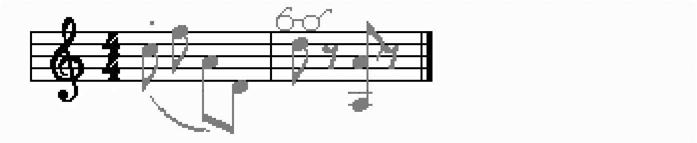
As previously described some rests and notes can be inserted in the 2nd bar.



A very useful symbol is the glasses symbol that advertises about a difficult bar or measure to be played. This symbol can be inserted by selecting the glasses button in the instrument menu and clicking on the note to which we want to pay attention.



By selecting the chord button in the note menu on the chord modality, chords can be easily created by selecting the note button and clicking on the part above or up with respect to the note that is already present on the bar.



This example doesn’t cover the entire symbols that can be inserted with MOODS, but wants only to explain some of the basic operations that can be performed using MOODS.

Please note that a not very skilled user of tinyMOODS program has created this example in no more than five minutes.

4 MASE/MASAE guide

MASAE will be capable of selecting a main score and parts from a temporary archive to distribute them to DLIOOs and MASEs on the basis of a current Orchestra/Network Configuration.
Each modification performed on the current score by using MASE/MASAE is sent in real-time to the corresponding DLIOOs/PDLOOs, according to the association of each pentagram of the main score to the corresponding physical lecterns connected through the network (using the ONCM). Modifications on the main score can involve all classical symbols of music and all the interpretation symbols. From the MASAE it is also possible to build new main scores and modifying old scores without loading the scores on DLIOOs (off-line modifications).
When tinyMOODS is in EXECUTION mode, MASAE can be used for tracking the measure under execution by pushing a STEP KEY, and thus beating time. This time trend causes the automatic turning of pages on all DLIOOs and on MASE. When this operation leads to change page, this action is automatically performed on all involved lecterns, (DLIOOs and/or MASE). In effect, MASE/MASAE editors/lecterns will not implement the page turning by scrolling the screen (strongly unacceptable) or with a complete redraw of score on the screen. MASE/MASAE will change the page by using a new idea: the next page will be gradually prepared from the left as soon as the measures from left of the current page will be already executed. This means that the measures corresponding to the next page will replace those of the current page as soon as the latter are executed. This also leads to have on the screen two areas one presenting the current page which is reducing in size loosing measures from left, and the other presenting the next page with an increasing number of visible measures. This process is made continuously. This mechanism does not change the habit of musicians to read pages of paper-based lecterns. After a certain number of pressing actions on STEP KEYs the velocity of execution can be supposed as already learned and the MASAE will continue at that rate. A pressing action on STEP KEY will cause an adjusting to the current velocity, and the blinking of a marker will help the MASAE user. In this modality, the fast jumps defined for refrains are automatically executed.
MASE related hardware, MASE-HW, will be built up by considering usability in terms of ergonomicity, functionality, and learnability. As DLIOO-HW, also MASE-HW will be implemented by using commercial macro-components.

4.1 MASE main screen

There are no difference between MASE and MASAE except the File Menu present only on the MASAE and the possibility to disable some menu on the MASE display.
At the bottom a menu composed by 12 buttons (for MASE) and 15 buttons for MASAE is present. Please note in Fig.4.1 that some of the MASE buttons (the white ones) can be disabled by MASAE (see ONCE and OPD for details).
At the bottom on the left side an area for displaying some suggestion exists. It is used when the system is in Editor mode and a button is selected. At the top are displayed the name of the part and player.

4.2 The MASAE menus

4.2.1 General information about a menu

When the user clicks on the menu area a new menu will appear on the screen. Some menus may have other submenus contained inside or may produce directly an action. The choice to have secondary menus was made because the users can choose to open only the interesting menus. Thus, the display can be personalized and there is a good visibility in Execution mode (only the main window with a little number of button are present).

The first part of the menu is equal for all the menus (see Fig.4.3) and is used for positioning the window on the screen. The button targeted “1” is used to show the menu horizontally or vertically, the number “2” is for future development and button number “3” closes the menu window.

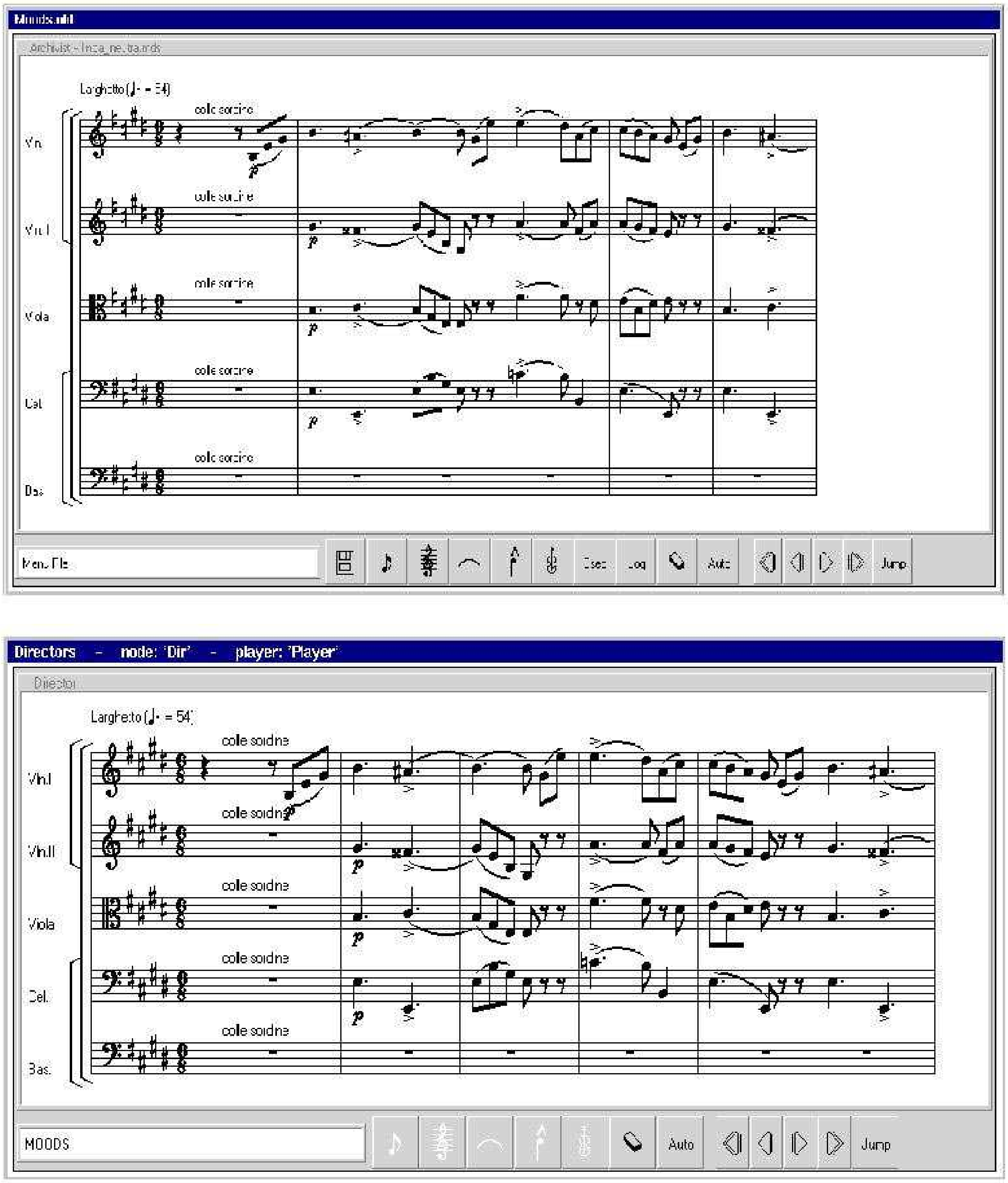

Archivist
Larghetto (♩. = 54)
colle sordine
Vln.I
Vln.II
Viola
Cel.
Bas.
Menu File
Exec
Log
Auto
Jump
Directors - node: 'Dir' - player: 'Player'
Director
MOODS

Fig.4.1 MASAE (up) and MASE (down) main screens.

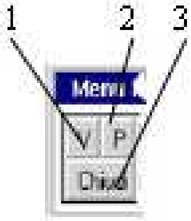

1
2
3
Menu
V
P
Chiudi

Fig.4.2 The common part for all menu

There are same buttons with more icons that switch when pressed. In example the menu in Fig.4.4 allows to insert symbols alone or in chord with a present symbol. If a symbol is inserted in a pentagram with the right icon displayed it will insert spaces in the same bar for the other lectern.

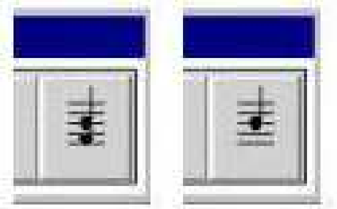


Fig.4.3 The chord selection button

Another example is the button that allow or not the visualization of spaces (see Fig.4.5). In Edit mode could be necessary to see spaces, because of manual justification) bat it's not a good idea to let them displayed for the Execution mode. When the button is clicked the label will change from "*Vis.*" to "*Non Vis*" and vice versa.

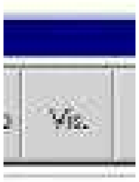


Fig.4.4 The button for spaces visualization

A very useful symbol that is present in the main menu is the **delete button** (see Fig.4.5). It can be used to remove any musical symbol and this is the reason for placing it on the main screen. In order to delete a symbol it's necessary to press the "delete" button and than choice the symbol to remove.

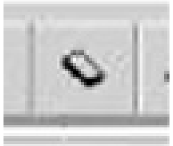
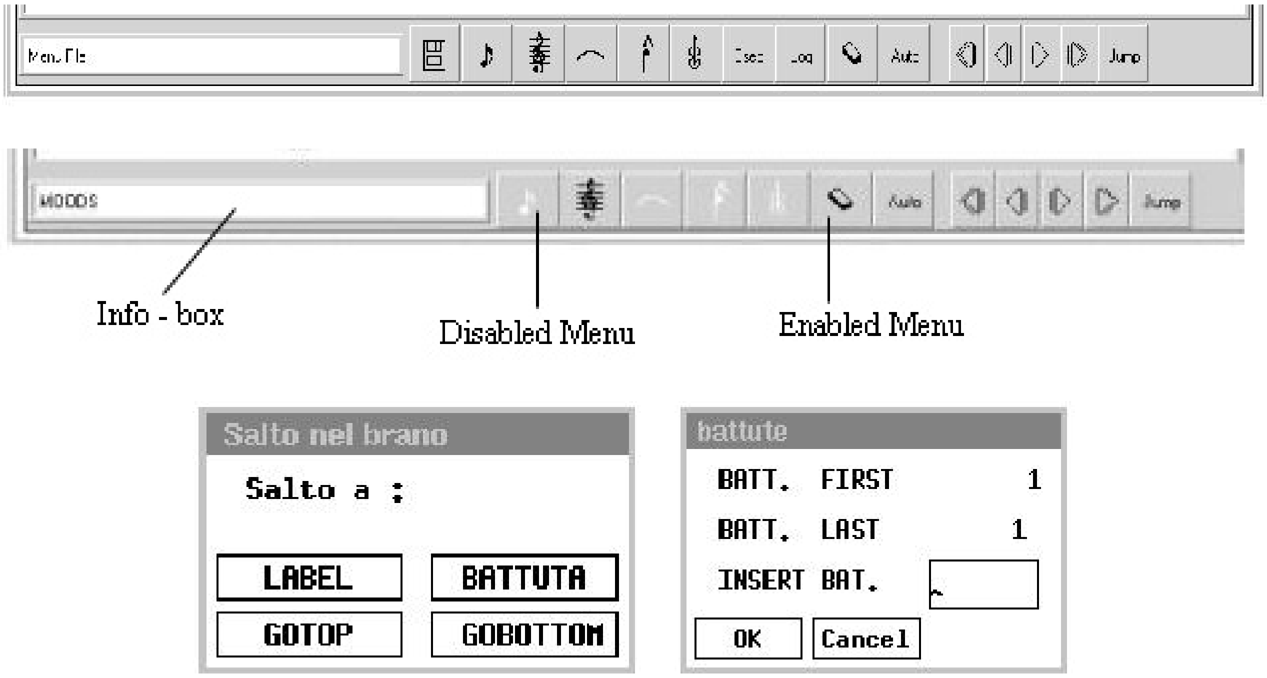


Fig.4.5 The "delete symbol" button

By pressing the Jump button the window on the bottom-left of Fig.3.6 will appear. Four possibilities are available: (i) jump to a predefined label, (ii) Jump to the start of the score (GOTOP), (iii) jump to the end of the score (GOBOTTOM), or (iv) jump to a bar (BATTUTA). In case (iv) once BATTUTA button has been pressed the window on the right-bottom part of Fig.4.6 will appear allowing to insert the bar number to jump to.


Menu File
Auto
Jump
MOODS
Auto
Jump
Info - box
Disabled Menu
Enabled Menu
Salto nel brano
Salto a :
LABEL
BATTUTA
GOTOP
GOBOTTOM
battute
OK
Cancel

BATT. FIRST 1
BATT. LAST 1
INSERT BAT.

Fig.4.6 – The MASAE (up) and MASE (middle) main menu with Jump windows (down).

4.2.2 Insert a symbol

Inserting a symbol it's a short and intuitive operation. The user has to select the needed symbol from the menu, verify the information in the left-bottom info box (see Fig 3.6) and than click in the place where the symbol has to be insert. The info-box will show in example something like: "*Select a place for…*" There are symbols that can be insert only on a note. In this case the info-box will show: "*Select a symbol*".

4.2.3

4.2.4 List of MASAE menu

How presented in advance a menu tree exists with primary and secondary menus; first level menu (are opened from main window) and second level menu (opened from first level menu window)

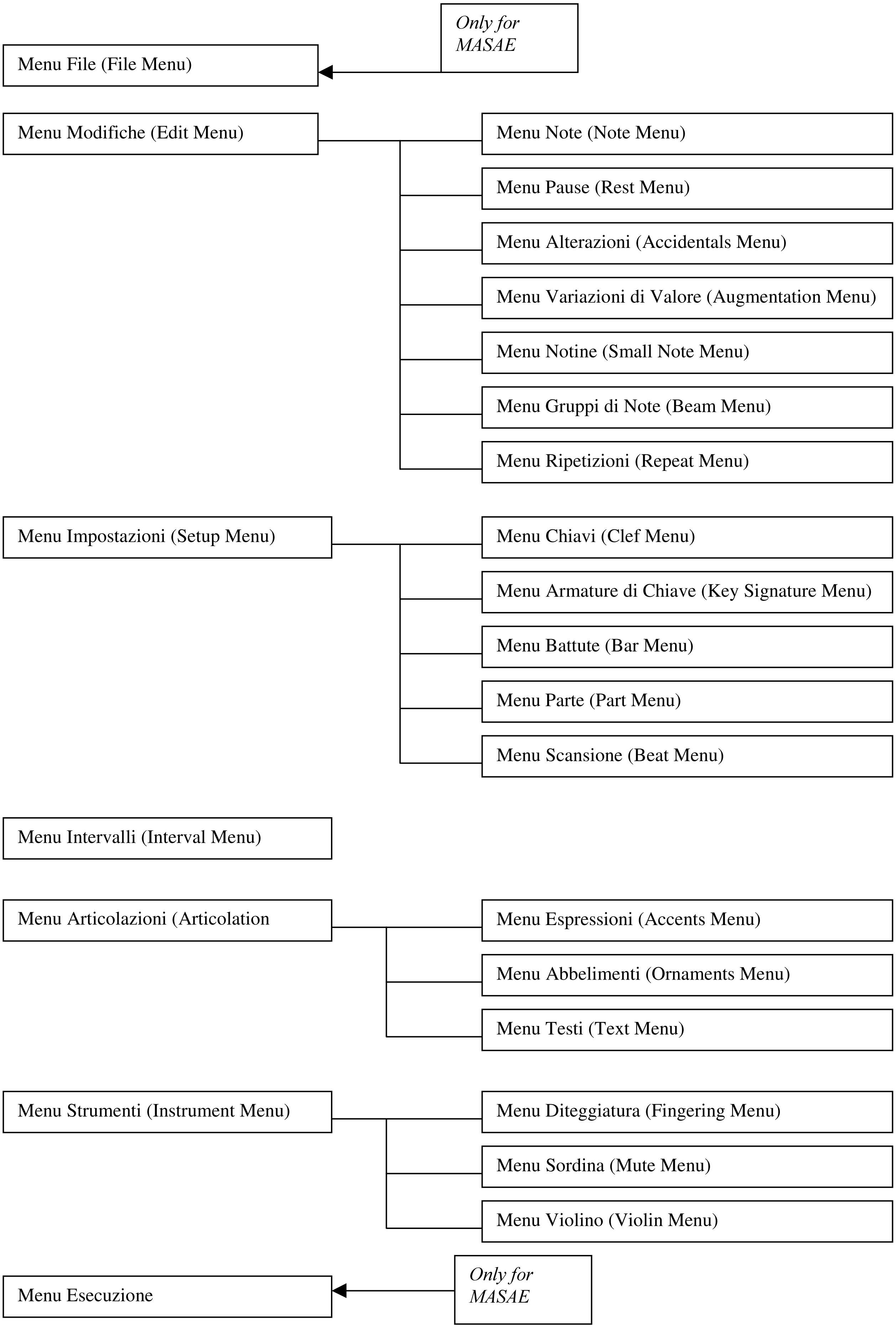

Only for MASAE
Menu File (File Menu)
Menu Modifiche (Edit Menu)
Menu Note (Note Menu)
Menu Pause (Rest Menu)
Menu Alterazioni (Accidentals Menu)
Menu Variazioni di Valore (Augmentation Menu)
Menu Notine (Small Note Menu)
Menu Gruppi di Note (Beam Menu)
Menu Ripetizioni (Repeat Menu)
Menu Impostazioni (Setup Menu)
Menu Chiavi (Clef Menu)
Menu Armature di Chiave (Key Signature Menu)
Menu Battute (Bar Menu)
Menu Parte (Part Menu)
Menu Scansione (Beat Menu)
Menu Intervalli (Interval Menu)
Menu Articolazioni (Articolation
Menu Espressioni (Accents Menu)
Menu Abbelimenti (Ornaments Menu)
Menu Testi (Text Menu)
Menu Strumenti (Instrument Menu)
Menu Diteggiatura (Fingering Menu)
Menu Sordina (Mute Menu)
Menu Violino (Violin Menu)
Menu Esecuzione
Only for MASAE

Fig. 3.7 Menu tree for MASAE and MASE.

4.2.4.1 Menu File

This menu is present only on the MASAE main menu and allows to load, save, save as, delete a changed score version. It allows also to exit from MOODS.

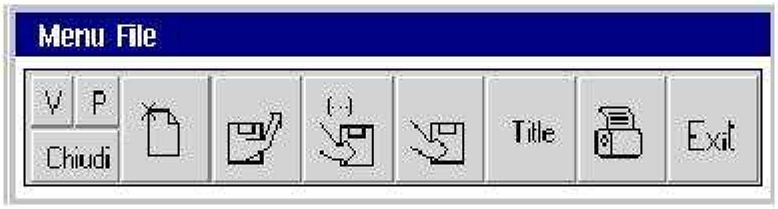
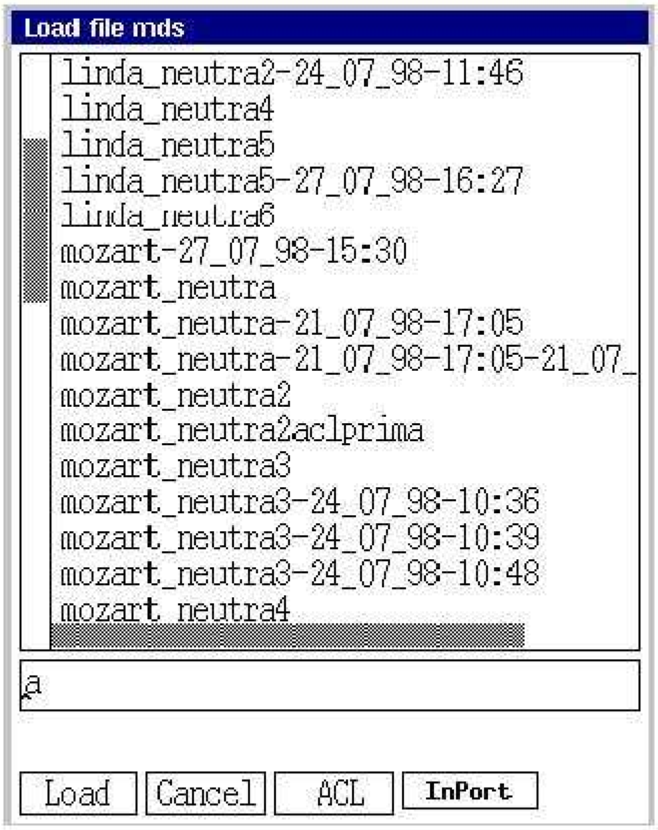


Fig.4.8 Menu File (File Menu)

The button present from left to right are:

- **New**: open a new score (the old one will be loosed if not saved before);
- **Open**: Open a score;
- **Save As** button;
- **Save** file (the old version will be removed);
- **Title**: Change the name;
- **Print**: it will be used when an internal printer output will be developed;
- **Exit** – will close all the tinyMOODS windows, DLIOO included.



linda_neutra2-24_07_98-11:46
linda_neutra4
linda_neutra5
linda_neutra5-27_07_98-16:27
linda_neutra6
mozart-27_07_98-15:30
mozart_neutra
mozart_neutra-21_07_98-17:05
mozart_neutra-21_07_98-17:05-21_07_
mozart_neutra2
mozart_neutra2aclprima
mozart_neutra3
mozart_neutra3-24_07_98-10:36
mozart_neutra3-24_07_98-10:39
mozart_neutra3-24_07_98-10:48
mozart_neutra4

a

Fig.4.9 Load button will open this window.

Please note in Fig.4.9 the presence of the **Import** button that allows the loading of a main score and parts from the database. In the save window an export button exists, for saving scores in the database.

4.2.4.2 “Menu Modifiche ” (Edit Menu)

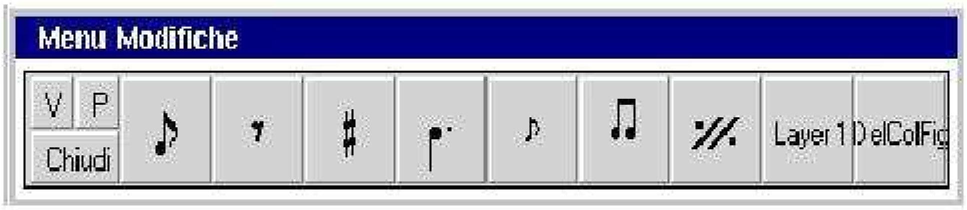


Fig.4.10 Edit Menu.

This menu gives the possibility to insert and modify notes, breaks and other musical symbols.

From left to right the buttons perform the following operations:

- **Note**: Opens the MenuNote (Note Menu).
- **Rest**: Opens the MenuPause (Rest Menu).
- **Accidentals**: Opens the MenuAlterazioni (Accidentals Menu).
- **Augmentation Dot**: Opens the MenuVariazioniValore (Augmentation Menu).
- **Small Note**: Opens the MenuNotine (Small Note Menu).
- **Beam Notes**: Opens the MenuGruppiNote (Beam Menu).
- **Repeat**: Opens the MenuRipetizioni (Repeat Menu).
- **Layer**: Selects one of the two musical layers.
- **DelColFig**: Deletes a column of figures.

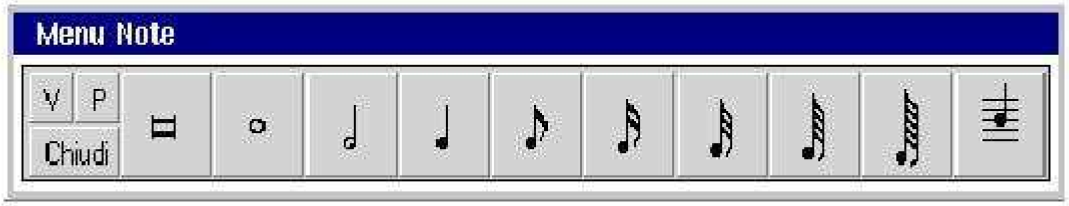


Fig.4.11 Note Menu.

In Fig.4.11 the note menu is shown. The using of this menu allows the insertion of all kind of notes, in particular from left to right we have:

- Inserts a **Double whole note;**
- Inserts a **Whole note;**
- Inserts a **Half note;**
- Inserts a **Quarter note;**
- Inserts a **Eight note;**
- Inserts a **Sixteenth note;**
- Inserts a **Thirty-second note;**
- Inserts a **Sixty-fourth note;**
- Inserts a **One hundred twenty-eight note;**
- **Chord Button** (to be selected if a note must be inserted in chord with other figures or not.

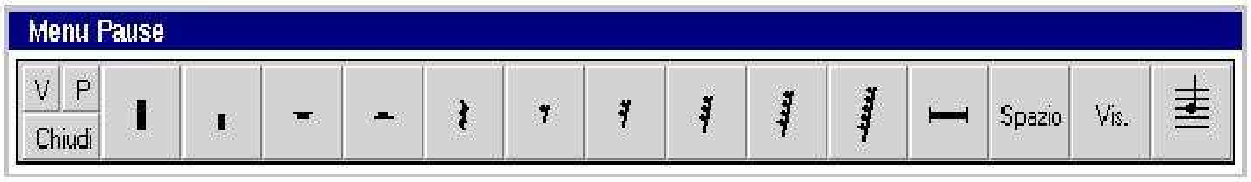


Fig.4.12 Rest Menu.

In Fig.4.12 the rest menu is shown. The using of this menu allows the insertion of all kind of rest, and the insertion of spaces, in particular from left to right we have:

- Inserts a **Four measure rest**;
- Inserts a **Two measure rest**;
- Inserts a **Whole rest**;
- Inserts a **Half rest**;
- Inserts a **Quarter rest**;
- Inserts a **Eight rest**;
- Inserts a **Sixteenth rest**;
- Inserts a **Thirty-second rest**;
- Inserts a **Sixty-fourth rest**;
- Inserts a **One hundred twenty-eight rest**;
- Inserts a **Multiple-measure rest**;
- **Spazio**: insert a space;
- **Vis**: Button for selecting if the spaces have to be visualized or not;
- **Chord Button** (to be selected if a note must be inserted in chord with other figures or not.

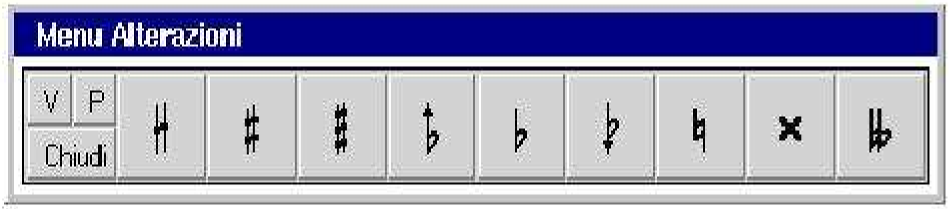


Fig.4.13 Accidentals Menu.

In Fig.4.13 the accidentals menu is shown. 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.

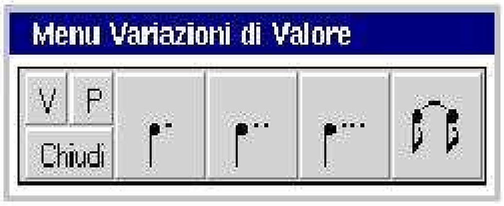


Fig.4.14 Augmentation Menu.

In Fig.4.14 the augmentation menu is shown. The using of this menu allows the insertion of augmentation dots and ties, in particular from left to right we have:

- **Augmentation Dot**: inserts a single augmentation dot;
- **Augmentation Dot**: inserts a double augmentation dot;
- **Augmentation Dot**: inserts a triple augmentation dot;
- Inserts a **Tie**.

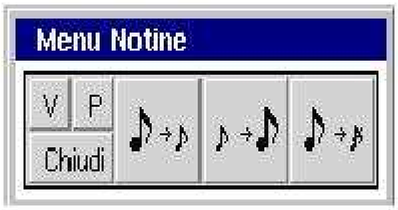


Fig.4.15 Small Note Menu.

In Fig.4.15 the Small Note menu is shown. The using of this menu allows to change a normal note in a little one and vice versa, in particular from left to right we have:

- From normal note to little;
- From Small Note to normal;
- From normal note to grace note.

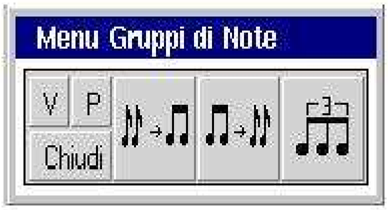


Fig.4.16 Beam Menu.

In Fig.4.16 the beam menu is shown. The using of this menu allows to change a normal notes to a note beam, and to insert tuplets, in particular from left to right we have:

- Converts some notes to beam;
- Converts a beam to separated notes;
- Create a tuplet from separated notes.

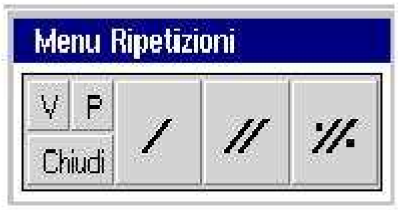


Fig.4.17 Repeat Menu.

In Fig.4.17 the Repeat menu is shown. The using of this menu allows to insert repeats, in particular from left to right we have:

- Beat repeat
- Half measure repeat
- Measure repeat
- Menu Impostazioni (Setup Menu)

The menu in Fig.4.18 manages the structural changes (new part, new staff, new bar, new musical clef).

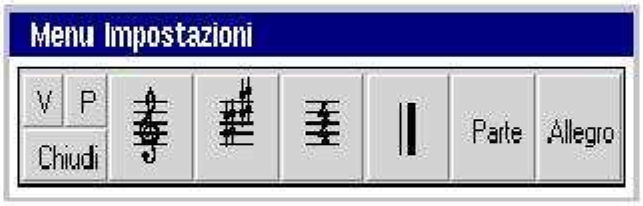


Fig.4.18 Setup Menu.

The buttons from left to right perform the following operations:

- **Clef:** open the MenuChiavi (Clef Menu)
- **Key Signature:** open the MenuArmatureChiavi (Key Signature Menu)
- **Tempo**: allows the insertion of a new time indication. Please note that the time indication can be inserted in several ways. After the insertion it's necessary to indicate the bar that use the time, since the command has effect only for the selected bar.
- By inserting the "c" letter means a time of four quarters
- By inserting the "C" letter means a time of two half
- By inserting a string in format time/time (4/4 = "c", 2/2 =”C")
- **Bar:** opens the MenuBattute (Bar Menu)
- **Parte:** opens the MenuParte (Part Menu)
- **Allegro:** – open the MenuScansione (Beat Menu)

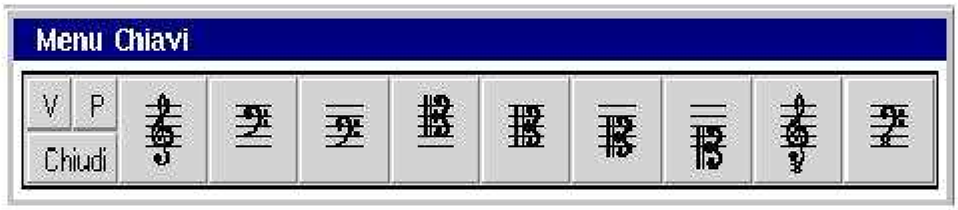


Fig.4.19 Clef Menu.

In Fig.4.19 the Clef menu is shown. The using of this menu allows inserting and modifying clefs, in particular from left to right we have:

- Inserts a **G clef, Treble**;
- Inserts a **F clef, Bass**;
- Inserts a **Baritone clef**;
- Inserts a **Tenor clef**;
- Inserts an **Alto clef**;
- Inserts a **Mezzo-soprano clef**;
- Inserts a **Soprano clef**;
- Inserts an **Octave G clef, Tenorized Treble**;
- Inserts an **Octave F clef**.

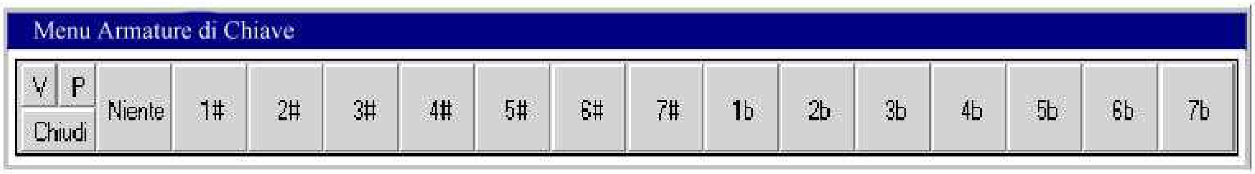


Fig.4.20 Key Signature Menu.

In Fig.4.20 the Key Signature menu is shown. The using of this menu allows inserting and modifying key signatures, in particular from left to right we have:

- **Niente:** Inserts a C Major
- **1#:** inserts a G Major key signature;
- **2#:** inserts a D Major key signature;
- **3#:** inserts an A Major key signature;
- **4#:** inserts a E Major key signature;
- **5#:** inserts a B Major key signature;
- **6#:** inserts a F Sharp Major key signature;
- **7#:** inserts a C Sharp Major key signature;
- **1b:** inserts a F Major key signature;
- **2b:** inserts a B Flat Major key signature;
- **3b:** inserts an E Flat Major key signature;
- **4b:** inserts an A Flat Major key signature;
- **5b:** inserts a D Flat Major key signature;
- **6b:** inserts a G Flat Major key signature;
- **7b:** inserts a C Flat Major key signature.

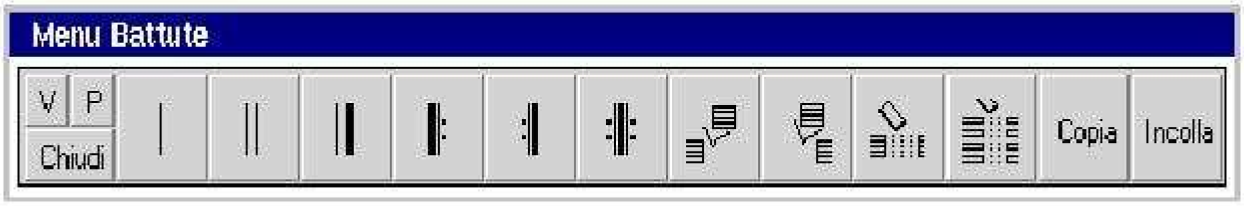

Menu Battute
V
P
Chiudi
Copia
Incolla

Fig.4.21 Bar Menu.

In Fig.4.21 the bar menu is shown. The using of this menu allows inserting and modifying bars, inserting, deleting bars and deleting an entire column of bars; additionally this menu will allow the Copy and Paste of bars, in particular from left to right we have:

- Inserts a **Barline;**
- Inserts a **Double barline;**
- Inserts a **Heavy double barline;**
- Inserts a **Left repeat barline;**
- Inserts a **Right repeat barline;**
- Inserts a **Double repeat barline;**
- **Insert** a bar **after** the current;
- **Insert** a bar **before** the current;
- **Delete** a **bar**;
- **Delete** a **column** of **bar;**
- **Copia**: Copy a bar;
- **Incolla**: Paste a bar.

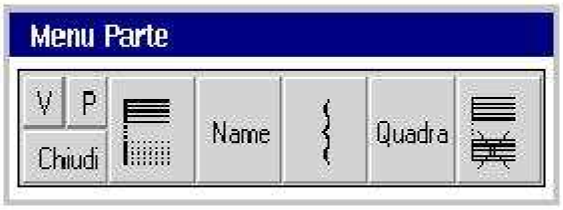

Menu Parte
V
P
Chiudi
Name
Quadra

Fig.4.22 Part Menu.

In Fig.4.22 the part menu is shown. The using of this menu allows inserting new part, changing the name of the part, inserting brackets and delete parts, in particular from left to right we have:

- **Insert** a **part**;
- **Assign** or change the **part name**;
- **Brace**: inserts a brace bracket used for grouping parts;
- **Quadra**: inserts a square bracket used for grouping parts.
- **Delete** a **part.**

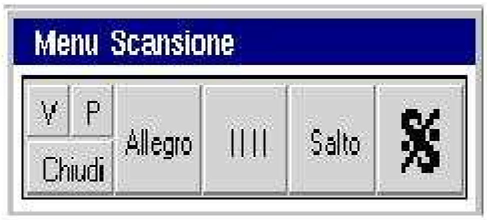

Menu Scansione
V
P
Chiudi
Allegro
Salto

Fig.4.23 Beat Menu.

In Fig.4.23 the beat menu is shown. It allows the inserting of symbols related to measures or bars, in particular from left to right we have:

- **Allegro**: inserts tempo indication.
- ||||: allows to specify in which beats has to be considered a given measure.
- **Salto**: This allow to define a textual Label on which the user can jump during editing or execution.
- This last button is a marker for measures

4.2.4.3 MenuIntervalli (Horizontal symbol menu)

This menu allows inserting of the Horizontal symbols like slur, crescendo, diminuendo and others symbols that involve a group of symbols.

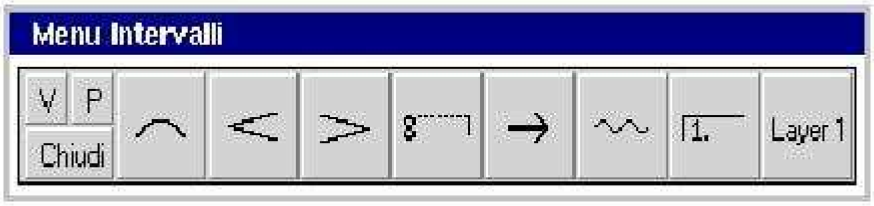


Fig.4.24 Horizontal symbol Menu.

It contains from left to right the buttons performing the following operations:

- **Slur**: inserts a slur between notes;
- **Crescendo**: inserts a crescendo symbol among a group of notes;
- **Diminuendo**: inserts a diminuendo symbol among a group of notes;
- **Octave change**: insert an octave change symbol among a group of notes;
- **Arrow**: inserts an arrow symbol among a group of notes;
- **Wave**: inserts a wave symbol among a group of notes;
- **Refrain Change**: insert a refrain change symbol among a group of notes;
- **Layer** – select the active layer.

For the slur, crescendo, diminuendo, wave and refrain two selection points must be selected with pointing device because these symbols need a start and an end point.

4.2.4.4 Menu Articolazioni (Articolation Menu)

This menu manages the musical interpretation symbols.

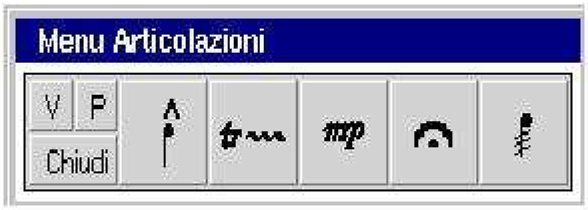


Fig.4.25 Horizontal symbol Menu.

It contain, from left to right, the following buttons:

- **Accent**: opens the MenuEspressioni (Accent Menu);

- **Trill**: opens the MenuAbbelimenti (Ornaments Menu);
- **Dinamic Marking**: opens the MenuTesti (Texts Menu);
- **Fermata**: inserts the fermata symbol;
- **Beam like** – insert the beam like symbol for a note.

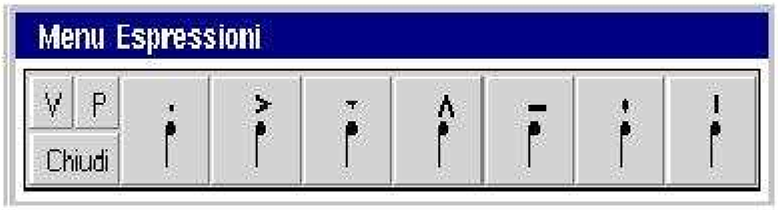


Fig.4.26 Accents Menu.

In Fig.4.26 the Accents menu is shown. The using of this menu allows inserting accents on notes, in particular from left to right we have:

- **Staccato** dot symbol;
- **Accent** symbol;
- **Martellato** (**heavy wedge**) symbol;
- **Wedge** symbol;
- **Tenuto** symbol;
- **Light wedge** symbol;
- **Long dot** symbol.

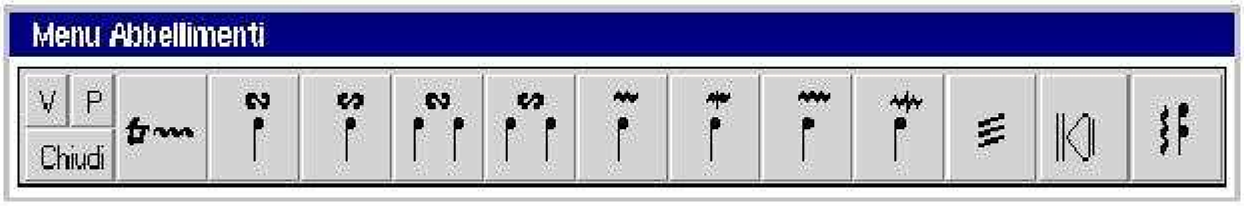


Fig.4.27 Ornament Menu.

In Fig.4.27 the Ornaments menu is shown. The using of this menu allows inserting ornaments on notes, in particular from left to right we have:

- **Trill**: inserts a trill symbol with an user defined number of waves;
- **Turn**: inserts a turn symbol on a note;
- **Backturn**: inserts a backturn on a note;
- **Turn**: inserts a turn symbol between notes;
- **Backturn**: inserts a turn symbol between notes;
- **Superior Mordent**: inserts a superior mordent symbol on a note;
- **Inferior Mordent**: inserts an inferior mordent symbol on a note;
- **Double Superior Mordent**: inserts a double superior mordent symbol on a note;
- **Double Inferior Mordent**: inserts a double superior mordent symbol on a note;
- **Tremolo**: inserts a tremolo symbol on a note;
- **Glissando**: inserts a glissando symbol on a note;
- **Arpeggiato**: inserts an arpeggiato symbol on a chord;

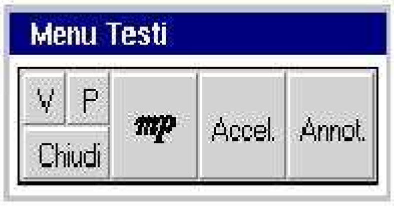


Fig.4.28 Texts Menu.

In Fig.4.28 the texts menu is shown. The using of this menu allows inserting various kind of texts, like abbreviated dynamic marking, agogic text, conductors annotations, in particular from left to right we have:

- **Abbreviated dynamic marking**: inserts dynamic marking like *mp, mf, fff*, etc;
- **Accel.:** inserts agogic texts like Accel. etc;
- **Annot.**: inserts a conductor’s note.

4.2.4.5 Menu Strumenti (Instrument Menu)

This menu, depicted in Fig.4.29, manages the instrumental indication symbols.

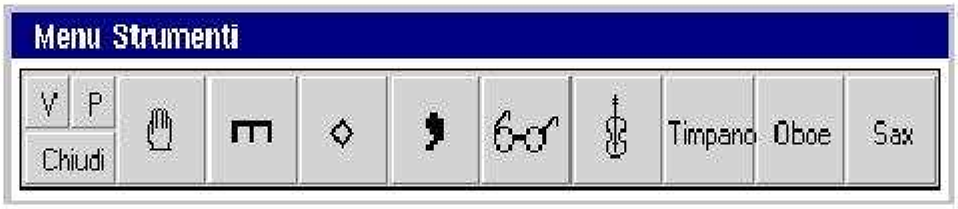


Fig.4.29 Instruments Menu.

Instruments menu provides buttons that open submenus, for the several instrument categories or insert some particular symbols, like take breath and glasses. In particular from left to right we find:

- **Fingering**: opens the MenuDiteggiatura (Fingering Menu);
- **Mute**: opens the MenuSordina (Mute menu);
- **Harmonics**: opens the MenuArmonici (Harmonics Menu);
- **Take breath**: inserts the take breath symbol. Please note that this symbol can be inserted only in chord with a space;
- **Glasses** - inserts the glasses symbol;
- **Violin** – opens the MenuViolini(Violin Menu);
- **Timpano:** inserts a textual symbol for Timpani (not implemented yet);
- **Oboe** – opens the MenuOboe (Oboe Menu) (not implemented yet);
- **Sax** – opens the MenuSax (Sax Menu) (not implemented yet).

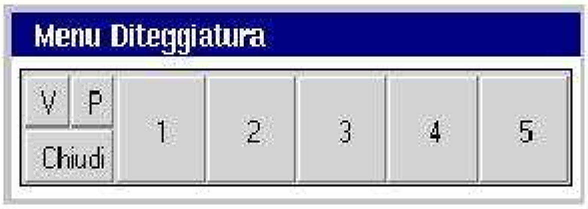


Fig.4.30 Fingering Menu.

Fingering menu provides buttons for inserting fingering number.

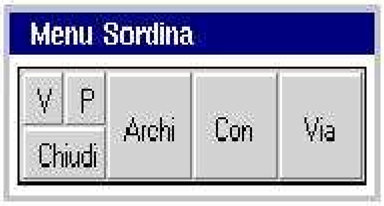


Fig.4.31 Mute Menu.

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**: insert the symbol (selected with Archi button) that specifies to put the mute on.
- **Via**: insert 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.*

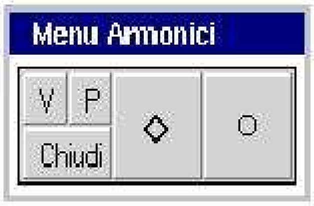


Fig.4.32 Harmonics Menu.

Harmonics menu has two buttons for inserting harmonics symbols. In particular from left to right we find:

- Harmonic symbol for strings;
- Harmonic symbol for flutes.

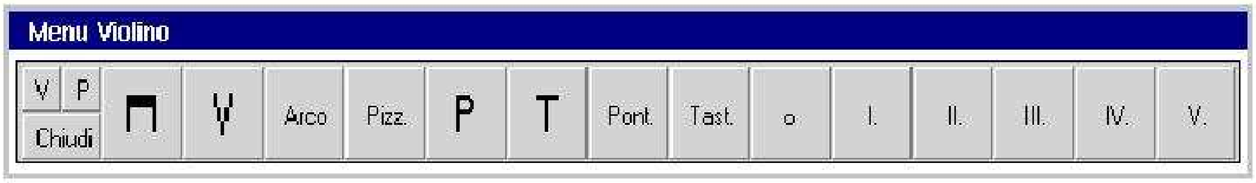


Fig.4.33 Violin Menu.

Violin menu provides buttons for arcs interpretation symbols. In particular from left to right we find:

- Bow up;
- Bow down;
- Arco: the note must be played with arc;
- Pizz.: play in Pizzicato way;
- Use Bow Point;
- Use Bow Hell;
- Pont: the note must be played on bridge;
- Tast: the note must be played on fingerboard;
- 0: empty string;
- I,II,III,IV,V: note to be played with the marked string number.

4.2.4.6 Execution Menu:

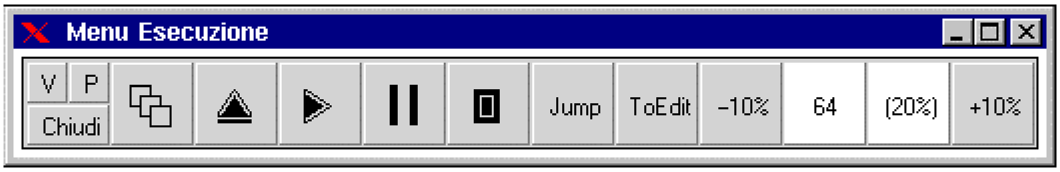


Fig.4.34 Execution Menu.

Execution menu provides buttons for all the operations linked to the tinyMOODS execution phase, like compilation, start or stop execution, jump and buttons for the execution speed modification. In particular from left to right we find:

- Compilation button: allows the compilation of score on all lecterns in order to provide automatic scrolling for all the lecterns in the network.
- Initialization button: is used for loading the recorded execution time trend in order to obtain a synchronous page turning and a correct scrolling;
- Start button: starts the execution of the already loaded score;
- Fermata button: allows to suspend the scrolling until the director decides to continue the execution;
- Stop: stops the current execution, for a reload or for a new starting point.
- Jump: allows the archivist to jump to a predefined point on the score;
- ToEdit: Once the tinyMOODS is in Execution mode no changes can be made on the parts. This button allows to go back to the editing mode;
- -10%: Decrease the time trend of 10% with respect to the actual – e.g. if we have 60 beat per minutes, it will became 66.
- The white window between the percentage buttons reports in real-time both the actual number of beat for minute under execution and the percentage of correction.
- +10%: Increase the time trend of 10% with respect to the actual – e.g. if we have 60 beat per minutes, it will became 54.

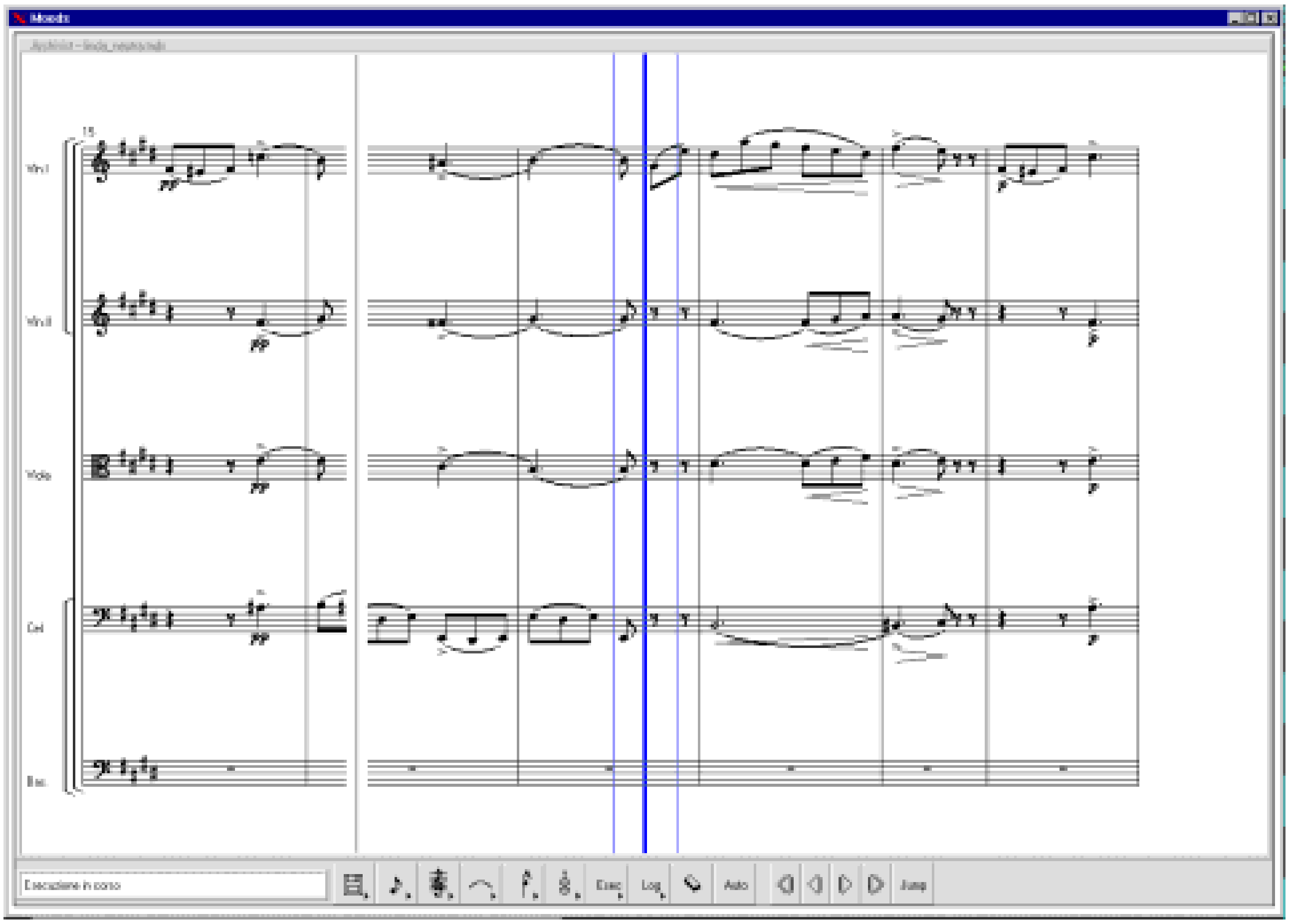
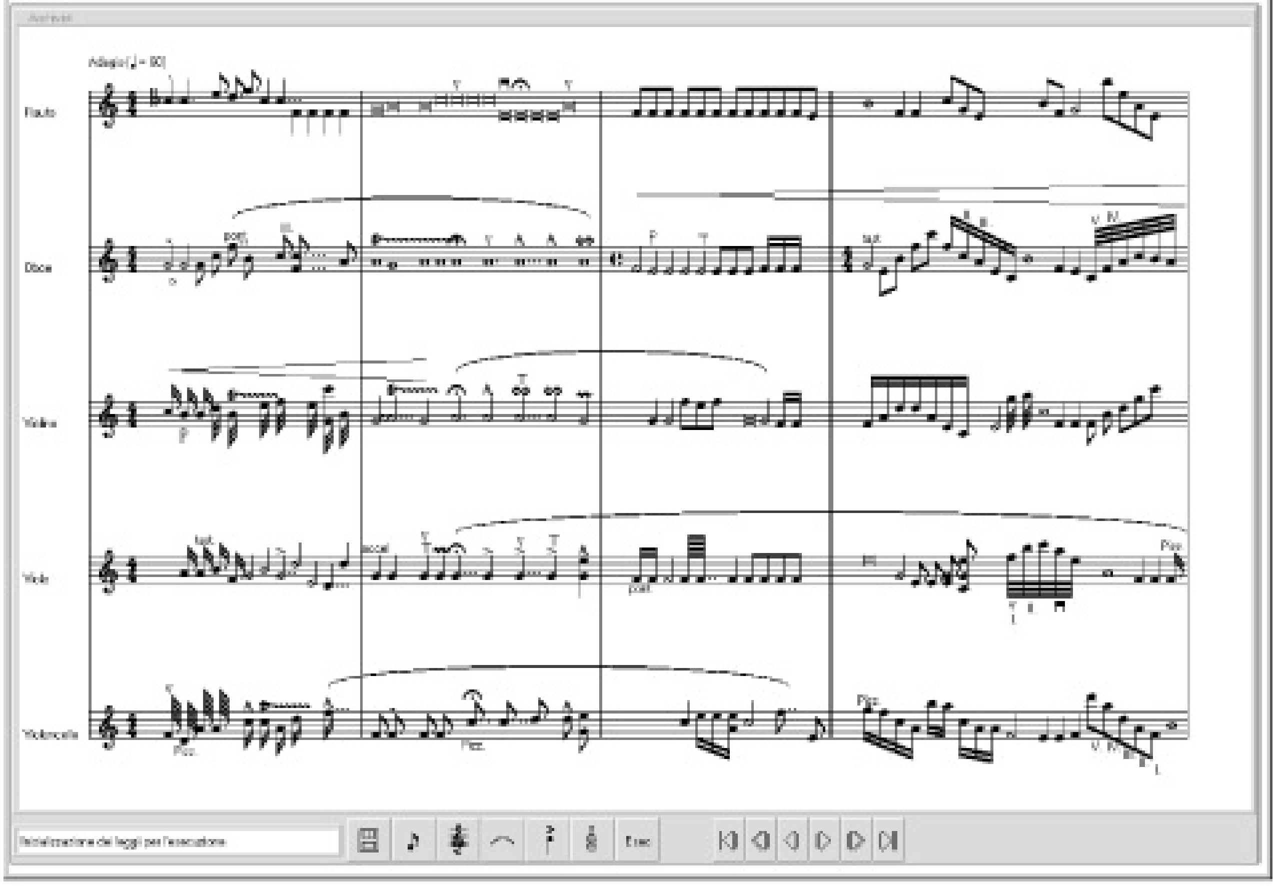


Fig.4.35 MASAE window during execution.

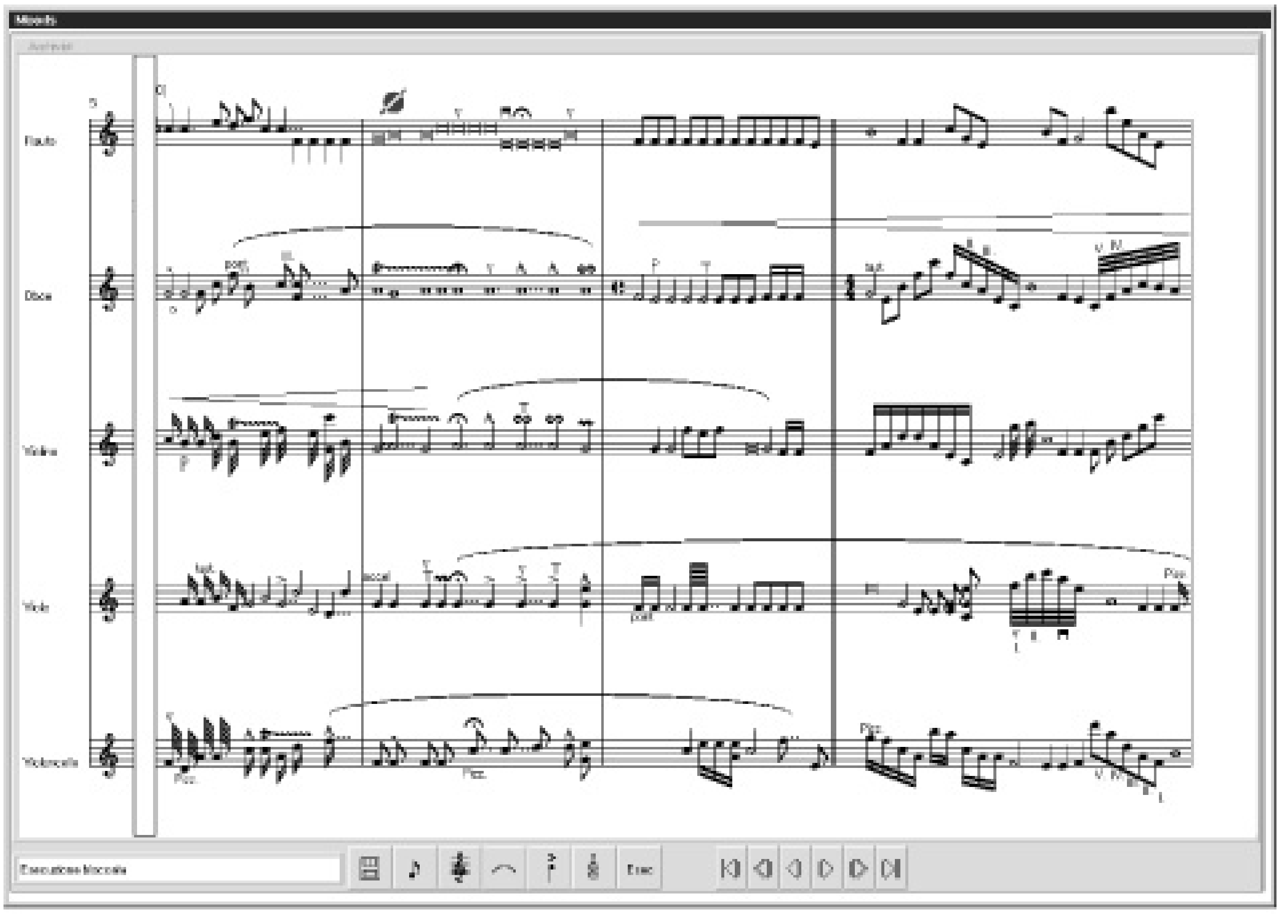
Fig.4.35 shows the MASAE window during execution. On the left part of the window a gray vertical line indicates the bar under execution according to the recorded execution time trend. The three blue line in the center part help the archivist to follow the musical trend imposed by the director; the tiny lines indicates where the thick bar will move with an increment or a decrement of 10% made by the button in the execution menu.

4.3 Scrolling

One of the many advantages of tinyMOODS using is the automatic scroll and page turning, during the execution. Because the relative position of the pentagrams and the different display resolutions are different among MASE, MASAE and DLIOO the scrolling must be different too. The next figures (Fig. 3.36) present three scrolling step on the MASE display. Like the figures show, the page that is about to be played appears from left to right, slowly replacing the bars already played.


Moods
Adagio (♩ = 80)
Flauto
Oboe
Violino
Viola
Violoncello
Pizz.
Exec

Inizializzazione dei leggii per l'esecuzione


Moods
Flauto
Oboe
Violino
Viola
Violoncello
Pizz.
Exec

Esecuzione bloccata

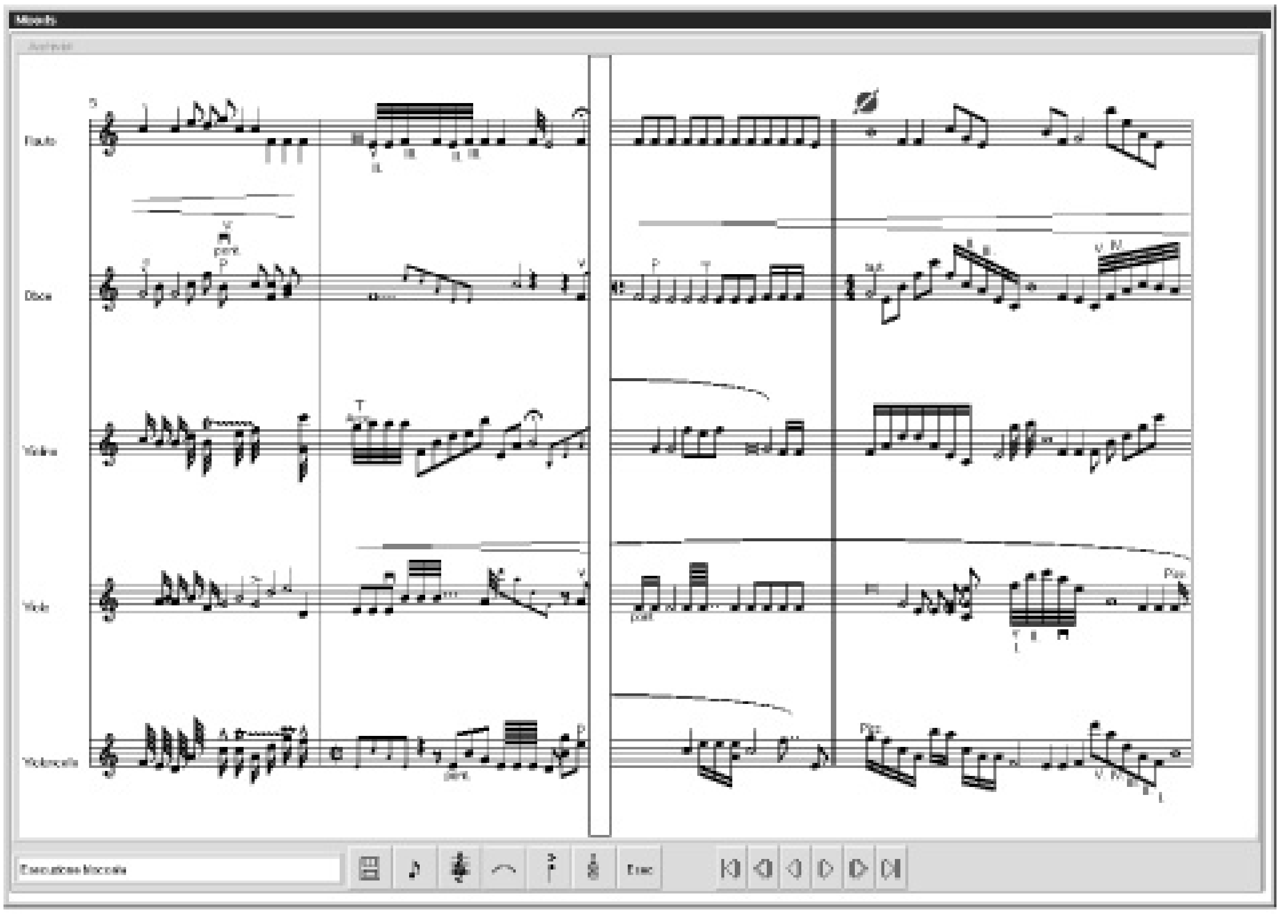

Flauto
Oboe
Violino
Viola
Violoncello
Esecuzione bloccata
Esec

Fig. 4.37 A sequence taken during execution in order to show the MASE/MASAE scrolling.

4.4 An example of a MASAE display

In Fig 4.38 the MASAE window with all menus opened is showed. This is not the unique modality to open menus that can be positioned according to user needs. The visible portion of the score can be enlarged if not all the menus are necessary at the same time or increasing the screen resolution. A minimum requirement for MASAE usage with all menus screen is the resolution of 1280x1024, but when possible a resolution of 1600x1200 in more suitable especially when music has to be written and not simply reviewed or corrected.

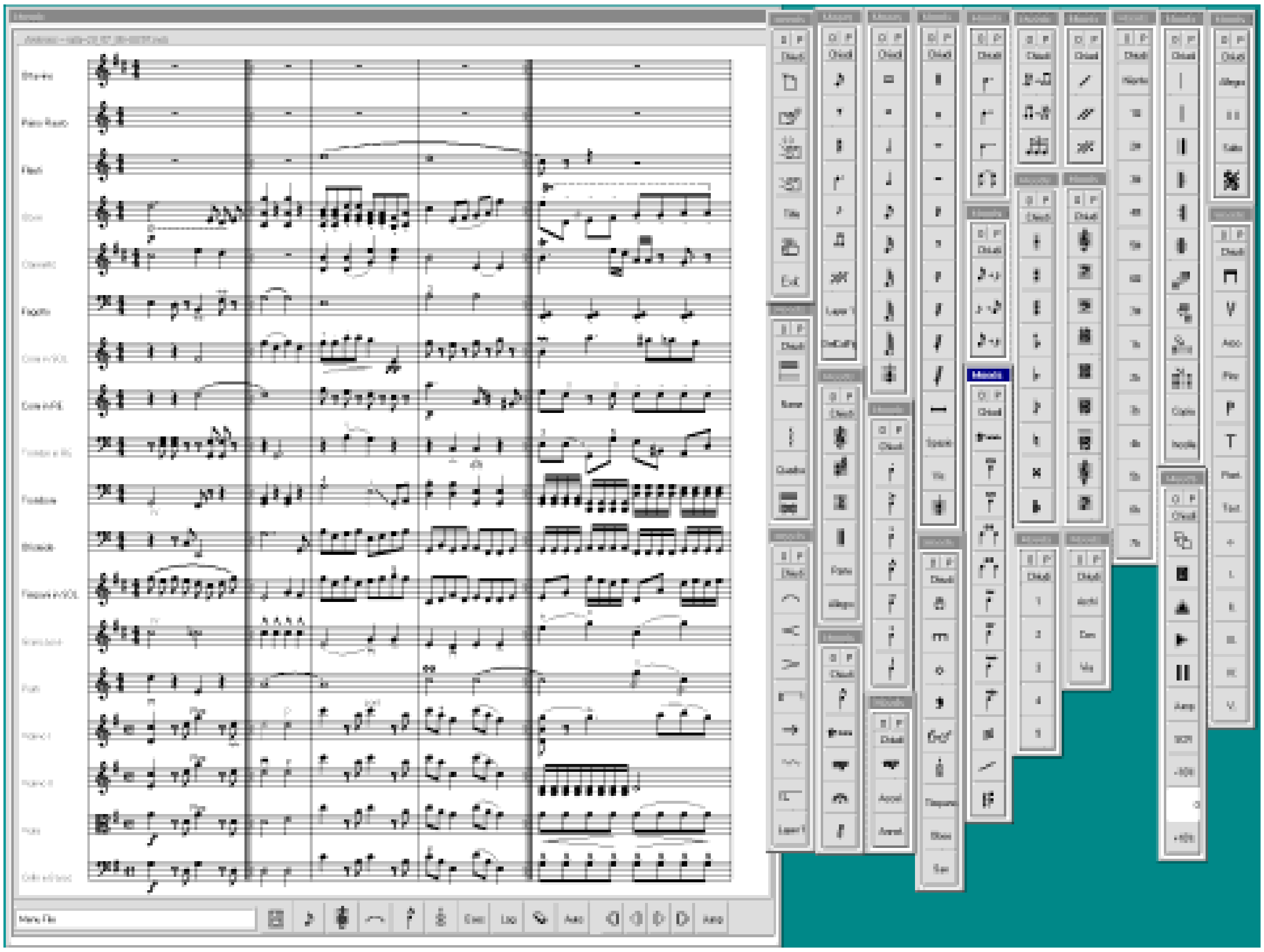
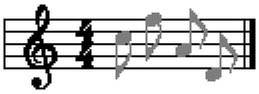


Fig. 4.38 Layout of MASE with all menus opened.

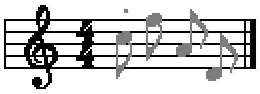
4.5 Some example of music editing.

In this chapter an example of music symbol insertion with the result obtained on the screen is presented. Obviously the reported example has no musical meaning, but it is only an example of symbol insertion.

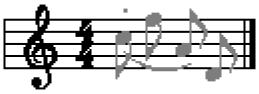
In an empty part we can insert some note by using the submenu note of edit menu. Once the button of the selected note have been pushed, we have to click on th epentagram in order to select the note (A, G, F, etc.)



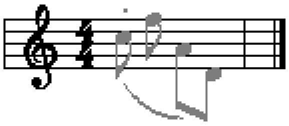
By using the accent menu a staccato dot can be inserted on the 1st note of the bar.



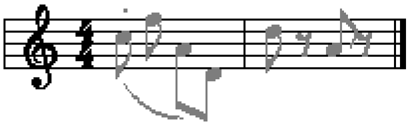
A slur can be easily inserted by selecting the slur button in the horizontal symbol menu and by clicking on the starting and ending slur symbol. In our example the slur has been inserted between the 1st and 3rd note of the bar.



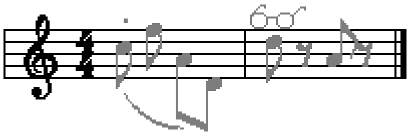
In order to create a beam it necessary to select the “From notes to beam” button in the beam menu and draw with mouse pointer a rectangul shape around the notes we want to beam. Please note that the slur automatically modify its shape. Once the 1st bar has been completed another bar can be inserted by using the appropriate button in the bar menu and clicking on the part to which the bar has to be added.



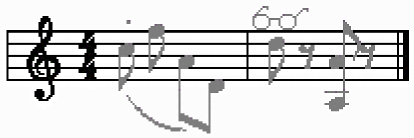
As previously described some rests and notes can be inserted in the 2nd bar.



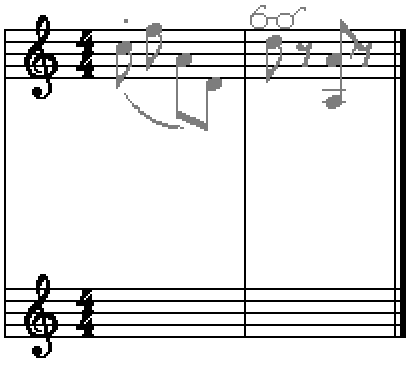
A very useful symbol is the glasses symbol that advertises about a difficult bar or measure to be played. This symbol can be inserted by selecting the glasses button in the instrument menu and clicking on the note to which we want to pay attention.



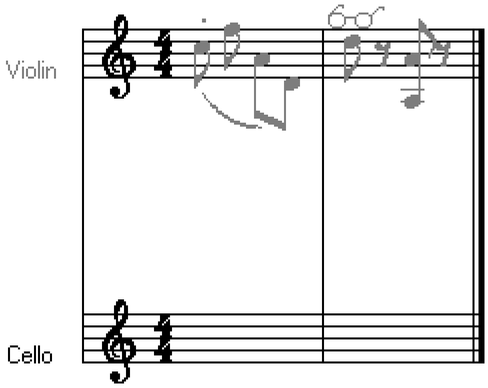
By selecting the chord button in the note menu on the chord modality, chords can be easily created by selecting the note button and clicking on the part above or up with respect to the note that is already present on the bar.



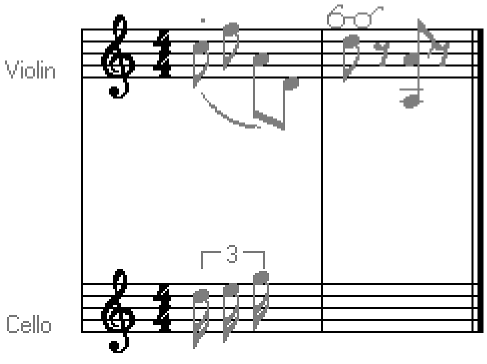
When we want to create a multi-part piece of music (because more than one instrument is present) we can add a part by using the 1st button of the part menu and clicking on the MASE/MASAE window.



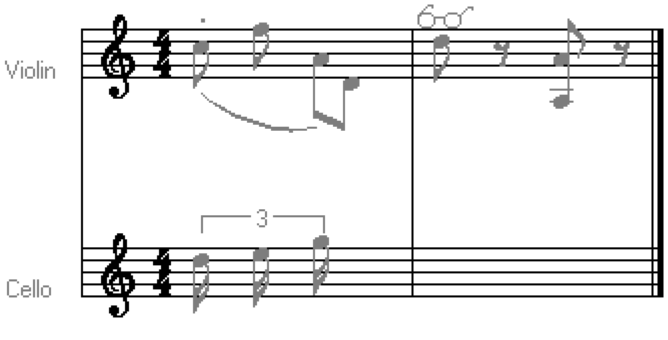
When more than one instrument is present, it is necessary to assign the part name. This operation can be easily performed by using the name button on the part menu, writing in the appeared window the name and selecting the part to which assignthe written name.



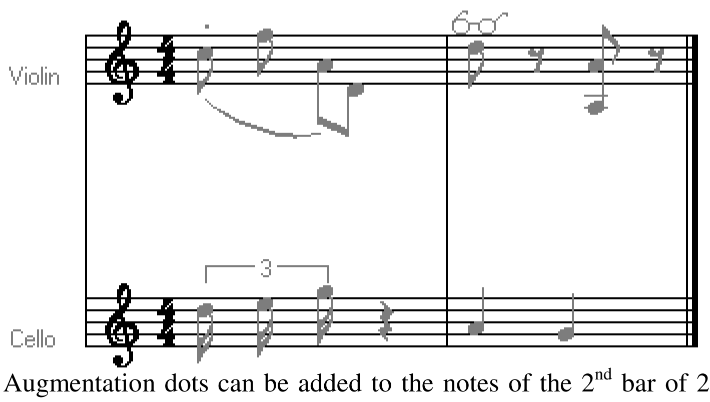
In order to insert a tuplet it is necessary to insert the notes and then press the tuplet button on the beam menu. The system will ask to the user the number of notes that compose the tuplet. Once the number has been inserted we have to select the starting and ending note of the tuplet to draw the horizontal square bracket over the group of notes.



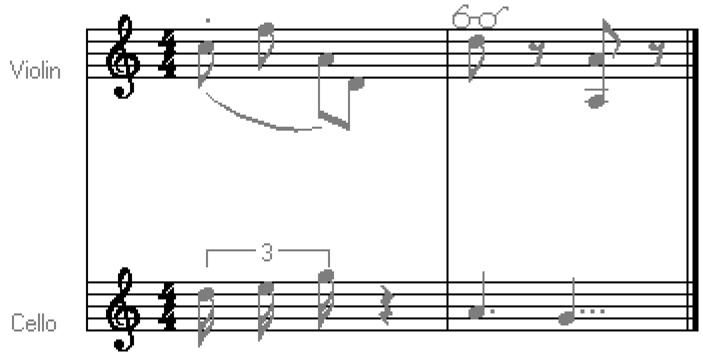
If the justification is not completely satisfactory spaces can be added by the use of the space button in the rest menu.



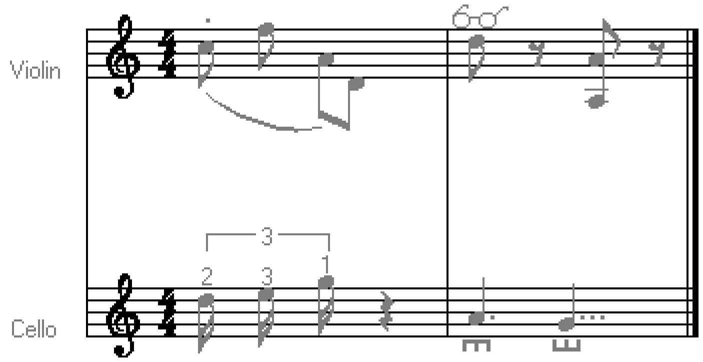
If we want to add some notes on the 1st and 2nd bar of the 2nd part without adding additional spaces also in the corresponding bar of the 1st part the chord modality must be selected in the note menu before inserting the notes. The new note will be "in chord" with existing spaces.



Augmentation dots can be added to the notes of the 2nd bar of 2nd part by the use of the augmentation buttons of the augmentation menu and by selecting the note we want to modify.



In the last figure some fingering information has been added to the notes of the 1st basr of the 2nd part, and a mute symbol (on, and then off) on the notes of the 2nd bar of the second part.



This example doesn't cover all the symbol that can be inserted with MOODS, but wants only to explain some of the basic operations that can be performed using MOODS.

Please note that this example has been created in no more than five minutes, by a not very skilled user of tinyMOODS program.

5 ONCE overview[1]

The purpose of ONCE (Orchestra Network Configuration Editor) is to help the user to configure the orchestra network from the logical point of view. This task is easier if a graphic interface is used, in this way the possibilities of configuration and visualisation are made available without having to edit various kind of files with a precise grammar that have to be respected. It is evident that even little errors could compromise the program behaviour and these errors are sometimes difficult to find for an inexperienced user. With the user interface proposed in the following many of these problems are avoided because the program checks the data inserted by the user.

However, the configuration of the orchestra is saved in files in a readable form so that if the program hangs the user could modify manually the configuration data to continue the work.

The network is viewed as a set of hosts, which are owned by the theatre, and every orchestra will use a subset of these hosts to execute their piece. Every orchestral uses a host to read his/her part and since a part could be executed by more than one orchestral these are joined in groups and every orchestral plays only one part every group is disjoint. An exception is the director/directors of orchestra that has/have to view all the parts of the score.

The parts are strictly related to the instruments and there is a standard sequence of name of parts and every orchestra uses a subset of these standard parts. Also the order in which the parts are presented is standardised.

Every orchestral has his/her own version of the part that can be eventually modified to correct errors or to add new symbols/notes to help the execution of the part. The archivist have to control the access to the parts granting to orchestrals specific access capabilities such as the ability to add or delete some types of symbols or to add/delete new measures, etc.

In every group has to be present one and only one orchestral identified as a *master* whose modification to the score may be reflected (if possible) to all the other members of the group (*slaves*). This characteristic is needed to avoid that every orchestral of the group to do the same variation to the score due to an error on the score.

In the following is presented a detailed report of the main characteristics and properties of the entities present in the system.

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[1] ONCE is not present in this version of the product.