Definition Of Scanning Properties And Recommendations For Photographing Musical Instruments

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Based on partners’ further practical work in digitising musical instruments and in application of version 2 of this paper (D1.5), feedback, MIMO-born images and practical hints were continuously collected by WP1 lead (GNM) in order to prepare the final version 3 of the standard paper.

An external evaluation conducted by WP5 among members of ICOM-CIMCIM led to improvements in form and content.

The attached document shall be made public as soon as the English wording will be checked by a native speaker and will be delivered as final version of Deliverable D1.8.

Attached document: The MIMO digitization standard. Definition Of Scanning Properties And Recommendations For Photographing Musical Instruments - final Version 3 (draft)
The MIMO Digitisation Standard

Definition of scanning properties
and recommendations for photographing
musical instruments

final version 3
- draft -

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for

MIMO
musical instrument museums online

Nürnberg, 2011
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0. Introduction

This paper is one of the outcomes of the European Community funded digitisation project MIMO – Musical Instrument Museums Online. It is largely based on practical experience of all the members of a consortium of eleven major musical instrument museums and collections in Europe. The authors want to thank all the partners who contributed by images, remarks and sharing of practical hints:

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Content Provider

Associazione "Amici del Museo degli Strumenti Musicali" (AF), Florence, IT
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Università degli Studi di Firenze (UF), Florence, IT
Thesaurus and Classification

This final version was developed over the two years’ lifetime of the project from 1. September 2009 to 31. August 2011 and has undergone permanent evaluation by the consortium as well as by external experts through members of CIMCIM – Comité international des musées et collections d'instruments de musique – a worldwide committee of the International Council of Museums ICOM. The authors are indebted to these specialists having studied the paper’s evaluation version and commented on it.
A special thank goes to Prof. Arnold Myers, University of Edinburgh helping the authors in checking the English wording.
1. General considerations on standards
To better situate this paper in the realm of museum policies, some common definitions on standards are given:

• „A technical standard is an established norm or requirement about technical systems. It is usually a formal document that establishes uniform engineering or technical criteria, methods, processes and practices.“

• „A de facto standard is a custom, convention, product, or system that has achieved a dominant position by public acceptance or market forces.“

• „In social sciences, a voluntary standard that is also a de facto standard, is a typical solution to a coordination problem. The choice of a de facto standard is the better choice for situations in which all parties can realize mutual gains, but only by making mutually consistent decisions.“

A standard in the frame of the MIMO-project is thus an agreement by concerned parties – the project partners – and will be based on as large a number as possible of de facto standards.

2. Scope
This standard text concerns in its photography part overall views of musical instruments, but – except for instruments of the violin family – no images of details. It distinguishes several levels of obligation:

• mandatory
• recommended
• optional

The mandatory and recommended views together describe a sufficient optical representation of a musical instrument according to the customs of experienced specialists like museum curators, however, as stated before, without taking in account images of details.

Mandatory view
The mandatory view describes the image if, for practical reasons, one and only one view can be taken or shown, e.g. the plan view of the front of a violin. In choosing this view, a public as large as possible is taken in account, even if for some specialist purposes this view is of lesser value.

Recommended views describe supplementary views necessary for full first information about the instrument and which mostly can be taken with very few supplementary means once the mandatory view is achieved, e.g. the plan view of the back and of the side of a violin or of a piano with half-closed lid, or the birds-eye view on the piano’s soundboard. Recommended views are regularly given in this standard, if existent as de facto standards or proved useful by other means.

Optional views
Optional views are views which either are made for public relation purposes, e.g. the ¾ view of a violin, or which request important supplementary means once the mandatory view is taken. As optional views touch the realm of artistic purposes as well, they can’t be easily systematised and are thus considered as beyond the scope of this paper.

Technical issues
Detailed advice on lighting, fixing of instruments and other technical issues are not within the scope of this standard, but they are collected as hints to create a pool of practical expertise to make photography more efficient and as safe as possible for the museum objects (see section 36).

This standard applied to all new photographs taken by MIMO consortium members as well as associated project members. This final version is intended to be a recommendation for documentary photography for all musical instrument collections. It does not concern photographs taken for artistic or public relation purposes.

3. Quality control
In digitisation processes, an efficient quality control routine must be implanted. Quality control should happen during or very close to the digitising process in order to repeat processes with a minimum amount of work and time, if necessary. Parameters and procedures of quality control should be clearly determined.

4. Master files, derivatives and digital preservation
A master file is the electronic document which has the best quality and serves for a collection’s documentation. Once it is created, it shall not be altered and is subject to long-time preservation according to actual best practice. An important part of long-time preservation is the proper naming and saving of the file metadata in order to access it at any time.

A derivative is a copy of the master file which is altered to make it suitable for a special pur-
pose, e.g. low-resolution images and cut-down sound files for web-publishing. Camera meta-
data shall be kept within the files, if suitable.

5. Web output formats (formats for derivatives)
Images:
- JPEG
- 24bit colour / 8bit greyscale
- Length of the longest side of the image: 800 pixels
Audio:
- mp3 / AAC / WMA
- bit rate from 128 Kb/s
- preferably stereo
- up to 30 s length (up to ca. +120 s if IPR permit)
- stakeholders have to clear IPR issues according to legislation in their countries
- output level normalized
Video:
- File format for downloading: MPEG-2; AVI; WMV; Quicktime; mp4/H264; bitrate between 300Kb/s and 2Mb/s
- File format for streaming: ASF; WMV; Quicktime; H.264 in mp4/H.264 bitrate between 300Kb/s and 1.2 Mb/s
- Frame rate of 25 frames per second
- 24-bit colour
- PAL colour encoding

6. Parameters for scanning existing images
Slides, b/w-negatives, glass negatives etc. shall be scanned in such a way that the master file format of the scan corresponds roughly to A4 (297x210 mm) or larger in minimum 300 dpi resolution. Prints shall be scanned in a way to obtain a master file which gives a print-out format of the size of the original document at 300 dpi minimum. The colour format is 24 bit (3 x 8bit) for colour images and minimum 8 bit for greyscale images. The recommended file format is uncompressed TIFF. Colour profiles and suitable metadata shall be included.

7. Parameters for digitising analogical audio documents
The master file format of the digitised file should at least correspond to so-called Compact-Disc-Quality with a sampling rate of 44.100 Hz, stereo and 24 bit resolution. For archival use, the output file format must be lossless, i.e. for example WAV or AIFF. If an analogical source is in mono, care should be taken to provide both stereo channels with the signal. For further use it is recommended to digitise the entire analogical audio source at a time and cut short examples for derivatives separately. Samples should be cut in a sensible and aesthetic way, i.e. phrases should be searched which make as much musical sense as possible, and cuts should be made soft, e.g. faded in resp. out.

8. Parameters for digitising analogical video documents
The recommended master file format for short videos and sufficient storage space is RAW AVI (uncompressed). The compressed alternatives to save storage space are MPEG-1(2,4), WMF, ASF, Apple ProRes or DV with a minimum bit rate of 3 Mb/s.

For best preservation in an open software environment, a JPEG 2000 codec in an MXF wrapper should be considered, as soon as this combination is sufficiently established and the data quantities are maniable. Before choosing one of the above mentioned digitising methods, the provider’s entire technical environment must be checked to guarantee storage, further editing and delivery facilities.


These recommendations combine those made by the ATHENA project and JISC.

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5 To avoid confusion: 24bit colour is 8bit red + 8bit green + 8bit blue
6 These recommendations follow those made by the ATHENA project.
9. Photographing

9.1. Technical quality

The quality of the photo master file is 24bit colour at a minimum size of ca. 2,100 pixels for the longer side, corresponding to ca. 17.8 cm at 300 dpi. However, due to technical development, a larger size is recommended. The file format must be lossless, e.g. uncompressed TIFF. The colour profile and suitable metadata should be included.

9.2. Color management

Precautions for a professional colour management shall be taken. To this purpose, a visual colour reference (target) can, but needs not to be included, e.g:

9.3. Lighting, background and mounting

Lighting should be such that no important part of the instrument is blurred by shadows or reflections. The colour and structure of the materials should be rendered as clearly and naturally as possible. In most cases, a diffuse lighting is the best point of depart. Fills, raking light to bring out surface structures, etc. belong commonly to the means of professional photographers. The views of instruments described in the following texts aim to show important organological details as form, proportions and technical details rather than to give a decorative aspect.

In serial digitisation, care should be taken to use one lighting and mounting scenario for as many objects as possible to be efficient, e.g. for a series of reflecting instruments as brass wind instruments. The object should be photographed using a neutral background, unless the spatial situation doesn’t permit this, e.g. for organs. It is recommended to keep sufficient space around the object that can be cropped in printing. N.B.: In this paper, images are often...
cropped close to the instrument in order to save space. The following specifications give the appearance of the instrument in a two-dimensional image. In some cases, the requested view can be obtained by different mountings, e.g. lying on a flat surface, standing upright or being suspended. In mounting instruments for photographing, conservational concerns are more important than speed or beauty.

9.4. Distortion

Distortion by photo lenses should be minimized. It is strongly recommended to use standard lenses rather than wide angle lenses, if the spatial situation permits.

9.5. Post production

High-quality digital photography needs a certain amount of post-production, such as developing raw data, sharpening or colour control. Other needs for post production come from the special situation in which the instrument is photographed, especially when mounting, securing, or visible light-guiding devices were used. Whichever measure is taken, it has to be kept in mind that the aim of documentary photography is to render images which are as close as possible to the actual perception of the object.

What is common in publicity photography, e.g. correcting shapes and surfaces, isn't in photographing museum objects.

Some considerations for a first orientation:

- Supporting devices as nylon wires or Plexiglas stands need not to be removed in post-production as long as they are clearly distinguishable from the instrument itself. If ever they are removed, retouching normally should be done around the object, not within. If e.g. the removal of a nylon wire causes a “reconstruction” of a structured surface it is better to keep the wire visible.
- Distortion by photo-lenses, especially with large objects, should be corrected to give a natural aspect.
- As long as the structure of a surface is visible, it is a matter of taste and means how much reflection a photo can contain, and sometimes reflections might be made weaker in post production, but the better choice is to have a careful lighting scenario.
- The cleaning of a surface should be done on the object and not on the image.
10. Photographing musical instruments

10.1. Definitions of positions and views

Due to the great variety of instrument morphology and the fact that terms like “front side”, “back side” etc. are not applicable throughout all kinds of instruments, it is often difficult to describe verbally the angle under which a musical instrument should be photographed. Therefore, the description of the three-dimensional orientation of an item on the photo set is replaced by two parameters how it should appear in the two-dimensional photographic representation. From these indications and the example images, it is comfortable to arrange the instrument on the photo-set and place the camera so that the wished result can be obtained.

10.2. The position parameter

The position parameter does not refer to the three-dimensional orientation of the instrument in space, but to the line of its longest axis in the two-dimensional representation. Positions are:

<table>
<thead>
<tr>
<th>Vertical</th>
<th>Oblique</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Vertical Image" /> GNM, MI 968</td>
<td><img src="image2" alt="Oblique Image" /> CM, E.2003.6.1</td>
<td><img src="image3" alt="Horizontal Image" /> UEDIN, EUCHMI 5735</td>
</tr>
</tbody>
</table>

The oblique position doesn’t fix a specific angle. It often goes with a camera position more or less slightly from above. The direction bottom-left to top-right is appropriate for the most instruments and aesthetically more appreciated.

10.3. The view parameter

The view parameter depends on organological conventions and defines which side of an instrument faces the camera lens. Views are:

<table>
<thead>
<tr>
<th>Frontal</th>
<th>Lateral</th>
<th>Dorsal</th>
<th>Half-lateral</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4" alt="Frontal Image" /> GNM, MI 21</td>
<td><img src="image5" alt="Lateral Image" /> CM, E.2003.6.1</td>
<td><img src="image6" alt="Dorsal Image" /></td>
<td><img src="image7" alt="Half-lateral Image" /></td>
</tr>
</tbody>
</table>

The half-lateral view is a camera position anywhere between the frontal and the lateral position at an angle appropriate to the type of instrument. A possible half-lateral view with a camera position between lateral and dorsal is often employed to show e.g. guitars or viola da gambas with ornamented sides and backs. This latter type of view is optional.
In some cases, especially if the instrument’s shape depends mainly from natural forms, the view can be variable, e.g. for shell horns.

Common combinations of these parameters are thus:
- **H** Oblique position and half lateral view
- **V** Oblique position and variable view

The instrument’s longest axis is appearing in the photo in an oblique line from bottom left to top right. According to the details which shall be shown (e.g. keyboards), the view is more or less slightly from above. Typically, the instrument is standing or lying on a flat surface.

- **F** Horizontal position and frontal view
- **L** Horizontal position and lateral view
- **D** Horizontal position and dorsal view

The instrument’s longest axis is appearing in the photo in a horizontal line. The camera faces the side of the instrument which is commonly considered as front side, lateral side, or back side. In most cases, the instrument is lying or standing on a flat surface.

- **V** Vertical position and frontal view
- **HL** Vertical position and half lateral view
- **L** Vertical position and lateral view

The instrument’s longest axis is appearing in the photo in a vertical line. The camera faces the side of the instrument which is commonly considered as front side, lateral side, or back side. The instrument is standing on a flat surface or is suspended. Usually, the photo is taken from a central perspective.

11. Details for instruments and instrument groups

The main goal of the specifications given hereafter is to show the most interesting organological details supposed to be of the most use for a broad bandwidth of interested people. Consequently, the representation described in most cases doesn’t show the playing position of the instrument. This is striking e.g. for violins where the playing position can’t show important information like the shape, the proportions or the grain of the wood. Where the playing position doesn’t infer with an organologically appropriate view, it is taken in account, e.g. for transverse flutes, harps or upright pianos.

In the following, the different instrument types are grouped in a simple, intuitive manner, without trying to establish a new organological system. In the beginning of each chapter, instruments belonging to different groups are recalled (e.g. organs = keyboard instrument and wind instrument).

The position and view parameters are given for the mandatory view.

12. Keyboard instruments

Nyckelharpa, see: String instruments with necks

**Wing-shaped keyboard instruments: Oblique position and half lateral view.**

The instrument’s keyboard appears in an oblique line from top left to bottom right. Lids should be opened to procure a maximum of organological information (mandatory). A half-closed and/or closed lid are recommended views to show the presumed historical playing set-ups (pianofortes) or the furniture aspect e.g. of decorated cases. Further recommended views are a bird’s-eye view and, if applicable, a plans view of a painted lid.9

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9 It might be easier to photograph a detachable lid apart from the instrument, although this would be a detail photograph and not an overall view strictly spoken.
Harpsichord (GNM, MIR 1073)

Grand pianoforte (GNM, MIR 1102)
Bentside spinet (GNM, MiNe 90)

Bentside pianoforte (GNM, MIR 1176)
Regals: Oblique position and half lateral view. Regals are shown with the bellows open which is farer away from the camera, if technically possible. If not, the closed view is sufficient.

Rectangular or polygonal stringed keyboard instruments: Horizontal position and frontal view. The keyboard is facing the camera in a horizontal line with the lid open for the sake of more organological information (mandatory). A half closed lid is recommended to show a possible historical playing setup, a closed lid to show the furniture aspect. An oblique-half lateral view can be added to give a better idea of the depth of the instrument.

- automatic spinets
- clavichords
- double virginals
- eolodicons
- nail pianos
- orphicas
- physharmonicas
- spinets
- square pianos
- terpodions
- virginals
- work box pianos

Clavichord (GNM, MI 442)
Virginal (GNM, MIR 1086)

Square piano (GNM, MIHe 171)
Electric and electronic keyboard instruments: Horizontal position and frontal view. The keyboard or a similar playing device is facing the camera in a horizontal line. For instruments with a stand or larger parts above the keyboard, the image layout can be described as: Vertical position and frontal view.

Upright keyboard instruments: Vertical position and frontal view. The keyboard is facing the camera in a horizontal line. The view with open keyboard flap is mandatory. The view with closed keyboard flap and – for organs closed doors, if existent – is recommended. For stringed instruments, a view with removed front panels to show the construction is recommended.
Giraffe piano (SMV-MTM, M466)

Physharmonika (GNM, MIR 1027)

Reed-organ (SMV-MTM, X5575)

**Accordions resp. hand harmonicas: oblique position and half lateral view / horizontal position and frontal view.**

The instrument should be positioned so that the treble keyboard is visible. An additional view with the bass keyboard visible is recommended. Instruments with large bellows are photographed frontally, the bellow opened in a U-shaped manner, so that both playing sides are visible. Instruments with protruding descant keyboard are photographed frontally.

**bandoneons**

mandatory

**concertinas**

recommended

**aeolas**

 recommended

**hand-aeolines**

mandatory

Accordion (MIM-BE, 4729)

Accordion (MIM-BE, HB160)
Hurdy-gurdies and organ hurdy-gurdies: Oblique position and half lateral view. For hurdy-gurdies, a closed lid is mandatory, an open lid is recommended.

Hurdy gurdy (GNM, MI 75)

Push up piano players: Oblique position and half lateral view.
A view of the front side (i.e. the side that is not facing the piano) is mandatory. The view should be slightly from above and from the left to give an idea of the instrument's profile. If possible, one program carrier belonging to the player should be inserted (usually a perforated disc or a paper music roll), and if the player features a lid, this should be opened to allow a view on the sound carrier. A view with closed lid and a view of the back side (i.e. the side facing the piano) is recommended.

Push up piano player (ULEI, 4058)
13. Woodwind instruments

- Cornets, see: Brass or other lip-vibrated instruments
- Serpents, see: Brass or other lip-vibrated instruments
- Mouth organs, see: Free reed wind instruments
- Cane (walking stick) flutes, see: Cane (walking stick) instruments
- Cane (walking stick) clarinets, see: Cane (walking stick) instruments

**Transverse flutes.** The main tone holes are facing the camera (mandatory), the mouth-hole is on the left side. A view of a different side is recommended, if there are important organological details:

- Western traversos
- Nose flutes
- Flauts
- Albisifonos
- Didses

**Straight-form woodwind instruments, mainly end-blown: vertical position and frontal view.** “Straight-form” refers to the general extension of the instrument. Thus, bassoons and curtals are classified as “straight-form” for this purpose. The frontal view is mandatory, the dorsal view is recommended, if there are important organological details.

- Algaitas
- Auloi
- Bassoons
- Bone flutes
- Straight bassett horns
- Cane bassett horns
- Cane flutes
- Cane instruments
- Chalumeaus
- Clarinets
- Clarinet d’amore
- Contrabassoons in bassoon-like shape
- Contrabassoons in contrabasso-phones
- Csakans
- Curved cornetos
- Double flageolets
- Dulcians
- Dvojnces
- Straight English horns
- Flageolets
- Giorgi flutes
- Heckelclarinas
- Heckelphones
- Hichirikis
- Mayhorns
- Melodions
- Multiple flageolets
- Multiple flutes
- Musettes
- Mute cornetos
- Nays
- Oboe d’amores
- Oboes
- Panpipes
- Pommers
- Racketts
- Recorders
- Sarrusophones
- Serpents
- Shakuhachis
- Shawms
- Sonas
- Sorduns
- Straight bassett horns
- Tabor-pipes
- Tarogatos
- Walking stick instruments
- Windcap shawms
- Zurnas
Clarinets
(GNM, MI 336)

Oboes
(GNM, MI 428)

Recorders
(GNM, MI 138)

Flageolets
(GNM, MIR 229)

Double flageolet (possibility of supplementary lateral views)
(GNM, MIR 235)
Curved or angular woodwind instruments: Vertical position and half lateral view. The instrument is placed in a way that the mouthpiece is in the top left of the photo, the body directed to the right (mandatory). A half dorsal view is recommended, if there are important organological details to show.

- bass clarinets
- bass oboes
- saxophones
- crumhorns
- contrabassoons with several windings
- pibcorns
- tenor cornettos curved/angular basset horns
- curved/angular cors anglais

Bassoon (GNM, MI 472)
Double bassoon (GNM, MIJ 21)
Saxophone (CM, E.715)
Basset horn (GNM, MIR 466)
Bagpipes: horizontal position and lateral view. The bagpipe is placed in a way, that the bag and, if existing, the bellows are positioned in the middle of the image and the pipes are loosely arranged in front of or beside the bag. If possible, the pipes are in a more or less vertical position with the tone holes visible.

zampognas  dudas  bocks
musettes de cour  cornemuses

Pigeon whistles: Horizontal position and lateral view. The instrument is shown as it is attached on the bird, the latter thought flying to the right side. A view on the top, showing the slits and labia, is recommended

Pigeon whistle (MIM-BE, 2164-11)  Pigeon whistle (MIM-BE, 0710)
14. Brass and other lip-vibrated wind instruments

| Brass wind instruments whose bells are not directed upwards in playing position: Horizontal position and lateral view. For brasswind-instruments, “lateral” means a view on the coil(s) or curves so that their form can be distinguished, independently from what the actual playing position is (e.g. trumpets with perinet valves vs. trumpets with rotating valves). The side facing the camera is the one providing the larger amount of organological information (e.g. valves, triggers). If there is no evidence for such a side, the instrument’s bell is directed to the right side. |
|---|---|---|---|
| aida trumpets | flugel horns | invention horns | natural trumpets |
| Büchels | fog horns | invention trumpets | orchester horns |
| cornets | glass horns | keyed horns | posthorns |
| cornophones | harmonicos | keyed trumpets | Russian horns |
| cupid’s horns | helicons | military bugles | slide trumpets |
| fanfare horns | hunting horns | natural horns | trumpet bugles |

Supplementary crooks belonging to instruments can be shown with the instrument. In this case, they should be oriented as if they were inserted. For instruments with many crooks, i.e. orchestral horns, a supplementary photo showing the crooks only should be considered.

**Trombones: Horizontal position and lateral view.** Assembled with the slide and bell bows at right-angles, the bell facing right; photographed at ca. 45 degrees to both, the camera positioned above a point between the two slide stays.

**Bell over the shoulder instruments: Horizontal position and lateral view.** The bell is directed to the right of the image.
Horns with circular coils except post horns: Horizontal position and lateral view. The blowpipe is on a horizontal line, the side containing the more important organological information is facing the camera: French horns, parforce horns.

French horn (UEDIN, EUCHMI 209)
Parforce horn (UEDIN, EUCHMI 3494)

Posthorns: Horizontal position and lateral view. The coil is oriented downwards, blowpipe and bell pointing symmetrically upwards, the bell oriented to the right. An orientation of the bell to the left is admitted if there are important organological details as finger holes to show.

Posthorn (UEDIN, EUCHMI 3052)
Posthorn with finger hole (UEDIN, EUCHMI 4454)
Brass instruments whose bells are directed upwards in playing position: **Vertical position and lateral view.** The bell-end of the instrument is pointing upwards. The side facing the camera is the one providing the larger amount of organological information (e.g. valves, triggers). If there is not such a side, the instrument’s coil is on the left side:

- tubas
- tenor horns
- ophicleides
- bombardons
- barytons
- bass horns
- saxhorns
- euphoniums
- lurs

Shell horns: **oblique position and variable view.** The instrument appears in an oblique line in the photo, but the view is variable, according to the instrument’s form and special features.

- Shell horn (UEDIN, Euchmi 3172)
- Shell horn (ULEI, 2423)
Lip-vibrated wind instruments with finger holes: Vertical position and frontal view. The finger holes are facing the camera. A view of the backside is recommended, if there are finger holes or interesting details.

<table>
<thead>
<tr>
<th>Treble cornets</th>
<th>Serpents</th>
<th>Straight cornets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mute cornets</td>
<td>Bass cornets</td>
<td>Russian bassoons</td>
</tr>
<tr>
<td>Tenor cornets</td>
<td>Cornettinos</td>
<td></td>
</tr>
</tbody>
</table>

- **Cornett (GNM, MI 119)**
  - mandatory

- **Mute cornett (GNM, MI 121)**
  - recommended

- **Serpent (UEDIN, EUCHMI 4440)**
  - mandatory

- **Russian bassoon (GNM, MIR 49)**
  - mandatory
Curved horns without coils: Horizontal position and lateral view. The camera is at a right angle with the curve. For side-blown horns, the instrument can be inclined in deviating from the right-angle view in order to show the mouthpiece. If there are important organological details as finger holes which can be shown only with the bell to the left, this view is admitted as mandatory.

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphorns</td>
<td>mandatory (bell facing right)</td>
</tr>
<tr>
<td>Hunting horns</td>
<td>(mandatory, if details on the left side)</td>
</tr>
<tr>
<td>Oliphants</td>
<td>mandatory</td>
</tr>
<tr>
<td>Transverse horns</td>
<td></td>
</tr>
<tr>
<td>Crescents</td>
<td></td>
</tr>
<tr>
<td>Shepherd’s horns</td>
<td></td>
</tr>
</tbody>
</table>

Very large curved horns without coils can be photographed upright, the bell facing to the right. If lighting permits, the photograph can be turned by a right-angle in post-processing to match the specification for smaller curved horns.

15. Free reed wind instruments

<table>
<thead>
<tr>
<th>Harmoniums</th>
<th>Harmonicas</th>
</tr>
</thead>
<tbody>
<tr>
<td>See: keyboard instruements</td>
<td>Oblique position and half-lateral view</td>
</tr>
<tr>
<td>Accordions</td>
<td></td>
</tr>
<tr>
<td>See: keyboard instruements</td>
<td></td>
</tr>
</tbody>
</table>

Mouth organs: Vertical position and lateral view. The calabash is oriented to the bottom, the pipes to the top. The side containing the organological information is facing the camera. If there is no such a side, the mouthpiece is directed to the right: Shengs etc.

Harmonicas: Oblique position and half-lateral view. The instrument is shown in a way that the blowing apertures and the lid are visible.
16. Cane (walking-stick) instruments

Cane resp. walking-stick instruments: horizontal position and frontal view. This is independent of the mode of sound production and applies to flutes, clarinets, trumpets, violins or other. A view of the back or lateral side is recommended, if there are interesting organological details, and depending on the type of instrument.

Cane violin (GNM, MIR 770)
Cane clarinet/flute (GNM, MIR 484)
Cane trumpet (GNM, MIR 123)

17. String instruments with necks, bowed or plucked

Bowed zither, see: box-shaped string instruments
Bridge harps, see: harps
Vinas as tube zithers, see: tube zithers

Lute- and violin-like instruments: Vertical position and frontal view. A suspension of the particular object might be necessary, if the shape of the body doesn’t allow a different fixing device (see Practical hints section). For examples see below.

accord guitars  bassoon violins  chitarrones  domras
angelicas  bent neck lutes  citterns  double neck guitars
arpeggiones  bipanchi vinas  cobzas  er hus
balalaikas  biwas  colasciontinos  esrars
bandolons  bowed mandolas  concert guitars  feles
bandurrias  bracs  contrabasses  flamenco guitars
banjos  bumbasses  contraltos  gitterns
bass citterns  cane violins  crwths  descant lutes
bass guitars  celsos  flamenco guitars

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Instruments of the violin family: Vertical position and frontal view. For the lateral view, the soundboard is directed to the left side. Care should be taken in lighting so that as less reflections as possible are visible on the top and the back, showing grain and wood colour as well as possible. To avoid distortion, the camera lens should be positioned at a height symmetrically between upper and lower corners. If possible in the workflow, the camera should be raised at the height of the scroll to take extra shots of this part without distortion.

Violin (GNM, MI 21)
Lute instruments: Vertical position and frontal view. The frontal view is mandatory, lateral and dorsal views are recommended. In lateral view, the orientation of the strings depends on the orientation of the pegs, i.e. the lateral pegs should be visible, if their order is asymmetrical.

Setar (SPK, IC 15351)  Bipanchi vina (CM, E.796)

Lute instruments with several peg-boxes: Vertical position and frontal view. In lateral view, the strings are usually oriented to the right to show details of the peg-boxes.

Bass Cittern (GNM, MI 65)
Lute instruments with supplementary gourd resonators: Vertical position and frontal view. To show the overall volumes of the instrument, a photo in oblique position and half lateral view is recommended, the instrument resting on its two resonators.

Sitar (MIM-BE, 4028)

Spike fiddles: Vertical position and frontal view.

Nyckelharpas: Vertical position and frontal view. The plan view on the instrument’s strings, the peg-box oriented to the bottom of the image, is mandatory.

Spike tube fiddle Endingidi (MIM-BE, 3606)

Nyckelharpa (SMV-MTM, X5662)
Compound bow (pluriarc) instruments: Vertical position and half lateral view. The oblique frontal view is mandatory, the half dorsal view is recommended.

Bow lute lukombe (MIM-BE, 1927)

Stick zithers: Horizontal position and lateral view. The calabash can be on either side or in the middle.

Stick zither (RMCA, MO.0.0.36808)
18. **Box-shaped string instruments, plucked, struck or bowed**

See also: keyboard instruments
See also: harps
Open harps, see: harps
Angular harps, see: harps

**Non trapezoid zither instruments: Oblique position and half lateral view resp. horizontal position and lateral view.** The oblique angle is only slight to show volumes and a tuning device. A supplementary bird’s eye view is recommended.

| aliquodiums | harp zithers | raft zithers |
| arpanetti | horn zithers | resonance zithers |
| autoharps | kanteles | Salzburg zithers |
| bowed melodions | keyed monochords | santurs |
| bowed zithers | kotos | struck zithers |
| Concert zithers | kratzzithers | transverse zithers |
| descant zithers | Mittenwald zithers | triple zithers |
| double zithers | monochords | vinas |
| double psalmodicons | pedal dulcimers | zithers without fingerboards |
| non-symmetrical dulcimers | psalmodicons | |
| epinettes des Vosges | qanuns | |

- Schlagzither (ULEI, 442)
- Accord zither (ULEI, 4056)
- Box zither Scheitholt (GNM, MIR 660)
- Raft zither (GNM, MINe 10)
Symmetrical dulcimers, hammered or plucked: Horizontal position and frontal view. A bird’s eye view is recommended.

Aeolian harps conceived for upright position: Vertical position and frontal view. Depending on the type of instrument, other views, e.g. lateral or dorsal, can be added as recommended views.

Aeolian harps conceived for horizontal position: Horizontal position and frontal view. Depending on the type of instrument, other views, e.g. lateral or dorsal, with or without lid, if present, can be added as recommended views.

Hammered dulcimer (GNM, MI 249)

Horizontal aeolian harp (GNM, MIR 734)
19. Tube zithers

Kacchapi vina, Kinnari vina, Bipanchi vina, and all other lute-like vinas, see: string instruments with necks

Vinas: Oblique position and half lateral view. The instrument is resting on its gourds. Vertical positions with frontal, lateral and dorsal views are recommended.

<table>
<thead>
<tr>
<th>mandatory</th>
<th>recommended</th>
<th>recommended</th>
<th>recommended</th>
</tr>
</thead>
</table>

Vina (MIM-BE, 0083)

Whole tube zithers as valihas: Horizontal position and lateral view. The mandatory view is showing the most important organological details. For more details, the instrument can be photographed from four sides in executing quarter turns.

<table>
<thead>
<tr>
<th>mandatory</th>
<th>recommended</th>
</tr>
</thead>
</table>

Whole tube zither Valiha (MIM-BE, 3799)

20. Harps

Aeolian harp, see: box-shaped string instruments
Autoharp, see: string instruments with necks
Nyckelharpa, see: string instruments with necks

Frame harps: Vertical position and half-lateral view. The base of the harp pillar is in the bottom left and the top end of the sound box is in the upper right of the photo. A lateral view to show the proportions is recommended.

hook harps  pedal harps  diatonic harps  chromatic harps.
**Bridge harps: Vertical position and frontal view.** The neck being (almost) in a same plane with the soundboard, the instrument is photographed like a lute-like instrument.
Open harps: Oblique position and half-lateral view. A supplementary lateral view showing the angle of the neck is recommended.

Arched harp Kundi (MIM-BE, Inv.no 3556)

21. Box-shaped mechanical instruments

| mechanical pianos, see: keyboard instruments |
| piano players, see: keyboard instruments |

Small, mostly rectangular programme music instruments: Oblique position and half-lateral view. If there is no side with very important organological information, the front-line of the instrument should be in the direction bottom-left to top-right.

| bird organs | organ clocks | barrel organs |
| music boxes | organettes | serinettes |

Serinette (MIM-BE, 2001.010)

Music box (MIM-BE, 1946)
22. Drums

Drums in anthropomorphic or zoomorphic shape, see: instruments in anthropomorphic or zoomorphic shape

Slit drums in non-anthropomorphic shape: Oblique position and half-lateral view.

Shallow frame drums: vertical position and half-lateral view. The view is obliquely on the membrane, showing at the same time the frame. A view from the backside is recommended, if there are important details.

- Tambourines
- Riqs
- Tars
- Bendirs

Slit drum (MIM-BE, 1984.003)  Riq (SPK, VII b 146)

Drum instruments conceived for horizontal playing position: Oblique position and half-lateral view. One membrane is visible. A photo on the other membrane is recommended.

- Mandatory
- Recommended

Drum played sideward (SPK, VII c 83)

All hour-glass shaped drums, with or without variable tension: Oblique position and half-lateral view. A lateral view, showing the profile shape, is recommended.

- Mandatory
- Recommended

Hour-glass shaped drum (MIM-BE, 692)
Drums not played horizontally and friction drums: Vertical position and lateral view. The drum is standing upright on one of the two membranes resp. the bottom of the body. The camera position is obliquely from above in a way to distort the body proportions as a less as possible, but give an idea of the membrane.

- barrel drums
- conical drums
- cup-shaped drums
- cylindric drums
- daikos
- foot drums
- friction drums
- kettledrums
- lansquenet drums
- rommelpots
- side drums
- tablas
- tsuzumis
- vessel drums

Long African and Asian drums (> 1,5 m): Horizontal position and lateral view. The perspective showing a membrane is mandatory. A profile view showing the shape is recommended.

- mandatory
  - Drum (ULEI, 1944)
- mandatory
  - Drum (RMCA, MO.0.0.30974)
- mandatory
  - Drum (RMCA, MO.1997.21.2)

23. Rattles

Strung rattles and rattles without handles: Oblique position and half lateral view. Strung rattles are typically spread out on a flat surface and photographed obliquely from above. If there is a part of the string without fixed shells or with a device for fixing etc., this part is oriented to the top or top right of the photo. Rattles without any of these characteristics are shown obliquely in view showing their volume and function as well as possible.
Vessel rattles with handles: Vertical position and lateral view. They appear vertically with the handle oriented to the bottom of the image.
24. Concussion idiophones (clappers, cymbals etc.)

Concussion idiophones as clappers, cymbals etc.: Horizontal position and lateral view. The camera sees the objects from above at an almost right angle, showing the more important side resp. sides. For a pair of cymbals, one element can show the hollow side, the other the dome. A lateral view to show the profile is recommended.

Cymbals (SPK, IC 23801)

Cymbals (SPK, IC 30113 a,b)

Cymbals (MIM-BE, 1979.009-05)

Cymbals (MIM-BE, AR0019)

Castanets: Horizontal position and lateral view. The cord, if still preserved, is at the top of the photo. Both shells are overlapping in an appropriate manner to show the cavity. The photo is taken from a bird’s eye perspective. With a pair of castanets, one pair of shells can be entirely open.

Castanets (SPK, VII a 6)

Castanets (MIM-BE, 2010.047)
25. Bowed resp. friction idiophones

**Nail violins:** Horizontal position and lateral view. The side giving the most organological information is facing the camera. The photo is taken slightly from above to show the soundboard.

**Glass harmonicas:** Horizontal position and frontal view. The photo is taken slightly from above to show the glass shells.

**Musical saws:** Vertical position and lateral view. The cutting edge is directed to the right side of the image.

26. Plucked idiophones

**Sansas:** Oblique position and half-lateral view. The tongues are appearing in an ascending line.

27. Mallet idiophones

**Mallet instruments,** played sideward: Oblique position and half-lateral view. The view is slightly from above. In choosing the camera angle, attention should be made to show important organological details, e.g. bars and resona-
tors. The side from which the instrument is played is facing the camera. If this side cannot be determinate, either side can be chosen, and it is recommended to take images of both sides in order to make a possible later choice based on further research.

<table>
<thead>
<tr>
<th>xylophones</th>
<th>metalophones</th>
<th>marimbas</th>
<th>slentos</th>
</tr>
</thead>
<tbody>
<tr>
<td>lithophones</td>
<td>vibraphones</td>
<td>gambangs</td>
<td></td>
</tr>
</tbody>
</table>

Mallet instruments, played from the bass end: Vertical position and frontal view. The bars are appearing in horizontal lines, seen from above, the lowest pitched bar to the bottom of the image.

- Xylophone gambang (CM, E.1116)
- Metalophone slento (CM, E.1117)
- Xylophone (MIM-BE, 3854)
- Xylophone (RMCA, MO.0.0.31354-15)
- Glockenspiel (GNM, MIR 561)
- Straw fiddle (GNM, MIR 514)

Special care should be taken for instruments whose different pitches are obtained more by differing thickness than by lengths of the lamellas. The oblique angle should be slight, and a horizontal view is accepted.
28. Struck upright or hanging idiophones

Struck upright or hanging idiophones: Vertical position and frontal view. Appropriate side and back views are recommended.

<table>
<thead>
<tr>
<th>bells</th>
<th>tam-tams</th>
<th>tubular bells</th>
</tr>
</thead>
<tbody>
<tr>
<td>gongs</td>
<td>triangles</td>
<td>Turkish crescents</td>
</tr>
</tbody>
</table>

Gong (CM, E.2000.11.1)

29. Trumps

Trumps, also called “jew’s harps”: Horizontal position and dorsal view. The end where the tongue is plucked is located on the right side of the image. The view is obliquely from above. Finger activated trumps, string activated trumps.

30. Musical bows

Musical bows held upright: Vertical position and lateral view. The curve of the bow is directed to the right side of the image. The instrument can be slightly turned (half-lateral) to show the cavity of a calabash: Berimbau etc.

Mouth-bows held horizontally or obliquely: Horizontal position and lateral view. The curved side is oriented to the bottom of the image.

31. Instruments in anthropomorphic or zoomorphic shape

Slit drums in anthropomorphic shape: Vertical position and frontal view. A view on the slits is mandatory. A view from a different side showing the sculptural quality of the object is recommended.

Other Instruments in anthropomorphic or zoomorphic shape: Variable positions and views. For the mandatory photo, position and view should be chosen so that the sculptural character of the instrument is stressed, if possible, also showing organological features. Recommended photos can show the playing position (if different) or organological details. A representation showing the sculptural quality and, if possible, organological details is mandatory. A supplementary view showing the playing position and/or important organological details is recommended.
32. Sets of musical instruments

Consistent sets of instruments: Horizontal position and frontal view. They disposed in playing setup, photographed from an audience (mandatory) or player’s (recommended) view:
Gamelans, drum sets etc.

Drum set (CM, E.996.4.1)

33. Parts of musical instruments

An exception to the focus of this paper on entire musical instrument views are some important parts being crucial for playing, but which can’t always be attributed to a certain instrument.

String instrument bows: Horizontal position and lateral view. The frog resp. the holding is directed to the right, the stick to the top, the hair to the bottom. For bows of violins and the like an extra photo of the frog and the tip is recommended.

Violin bow (MIM-BE, 238)
Mouthpieces of brass wind instruments: Vertical position and lateral view. A view slightly from above on the cup is recommended.

Beaters for percussion and hammered string instruments: Horizontal position and lateral view. The handle end is directed to the right, the head to the left.

34. Instruments in bad condition

Many objects in bad condition or with partial losses are nevertheless important sources for information about the development and variety of musical instruments. If the instrument is broken in several parts, the parts in the photo should be arranged in a way that the image gives an idea of its original shape and construction. As for this group of instruments and for technical reasons, it is not always possible to apply the definitions of view and positions in this document, these definitions may in this case be suspended.
35. Miscellaneous

Vessel flutes and animal voice imitating devices, Cuckoos, duck pipes etc., vessel flutes, such as ocarinas. The position of the particular instrument as well as the view on it depends both on form characteristics of the object and on details which should be shown. In most cases, an oblique position and a half lateral view is appropriate.

Different idiophones: Shaken idiophones, scraped idiophones. The position of the instrument is depending on form characteristics and special details of the object: Stamping sticks, scrape vessels, bull-roarers, ratchets.
36. Practical hints for serial digitisation

Based on the practical work with digitising, all partners of the MIMO project would like to share their experience to make photographing processes more efficient and more reliable in accordance with conservational aspects. In applying some of these hints, it should be checked which of them are useful for a particular scenario.

Responsibility, care and security

The responsible person for the musical instruments to be photographed, normally the collection’s curator should supervise the entire photographing process and should ideally be present to answer questions or take decisions. A conservator should equally be present to allow a secure handling of the instruments and to prevent them from risky operations. Instruments should only be handled by trained staff and under generally accepted museum standards. Operations like dusting, suspending, fixing instruments and the use of adhesive or any other potentially harmful materials and procedures should only be executed by trained personnel and in the case of doubt, a conservator’s advice should be asked. In photography environments, care should also be taken to avoid harmful exposure to heat, UV-rays and other environmental influences as undue climatic conditions.

Make sure that transporting and storing ways and devices comply to common law in order to avoid accidents and legal pursuit.

Organisation

As musical instruments present a great variety of shapes, sizes, materials, weights and surface structures, photographing them on a high-quality level in a serial process in an efficient procedure in compliance with conservational needs is a challenge. The procedure has thus to be thoroughly organised.

If the particular budget allows enough staff, each of them should be responsible for definite assignments in order to work efficiently together: taking minutes, positioning and returning musical instruments, fetching not yet photographed items, naming and checking images etc.

For proceeding fast, it is essential to group beforehand instruments with similar characteristics, as determined by photographic needs. Some of the respective parameters might thus not correspond to common organological practice, where others do:

- size (e.g. group square pianos in descending length)
- type (e.g. instruments of the violin family)
- suspension type (instruments standing alone, as most clarinets vs. instruments needing a security fixing, as bassoons)
- surface reflectance (polished brass instruments vs. terra cotta darabukkas)
- place on the photoset (on the floor vs. on a table)
- colour (ebony and lighter background vs. ivory and darker background)

Every change of one of these parameters may necessitate a time-consuming change of the lighting, lenses, camera position or the presentation environment of the instruments.

Precise checklists with instruments per photo session are an efficient means to know what has to be fetched and what has already been photographed. Photographed items should be registered and can be marked us such, e.g. by loosely tying a cotton thread around them or add a paper label. For being sure about marking methods, a conservator’s advice should be asked.

To avoid confusion in putting back instruments in showcases and storing facilities, it is useful to take a snapshot of the particular situation.

Instruments should be prepared in advance by checking their condition or dusting them before going to the photoset. The transport ways between collection resp. reserve and photoset
should be as short as possible to save time and to minimize transporting risks and harsh climatic changes. If space permits, makeshift studios can be set up in the reserves.

Photographing instruments in a publicly accessible space in a museum can be a good publicity action. But before doing this, make sure to work in the most professional and secure environment to give a positive example on how to document and handle musical instruments.

Photographing

As said in the introduction, no technical advice shall be given here to professional photographers, seen that they know their profession. However, some organizational hints might be useful to facilitate museum management in serial digitization.

File naming for images on the photo set should imperatively use the object’s inventory number as most reliable identifier, adding, if necessary, suffixes etc. if different views of an instrument are taken. It goes without saying that the technical metadata should always be preserved during saving, naming, post-processing etc.

A quality check of the images is indispensible; best is to do it immediately after the image is taken, this might slightly slow down a particular photo session, but keeps from having to fetch and prepare an item a second time. Checking should not be left to the photographer alone, but should be executed by trained museum staff in taking in using the photographer’s technical expertise.

The object should not fill the entire image surface. Space should be let around for cropping, and rulers, inventory numbers, logos, color charts possibly taken and their respective shadows should not disturb this space.

Presenting instruments on the photo set

Please note: In the following, all advices concerning the presentation of instruments on the photo set should be checked before using them and applied by trained and reliable staff. If a method seems too risky, it is better to search for a different means to obtain a similar result. Neither the authors nor the members of the MIMO project having procured these advices can take any responsibility for damages occurred elsewhere in applying them.

To secure e.g. wind instruments photographed standing upright, a flexible wire covered by a smooth material can be passed through the photo table. An appropriate squeezing device makes the length adjustable. Another way is to have holes of different diameters drilled in a plank between photo table and background paper, in which smoothed wooden rods of different lengths and diameters can be inserted. Whatever method is used, the wire or rod should be black to be less apparent in the finger holes. Inserting something in a woodwind instrument’s bore should always be done with extreme caution and only if necessary.

Security suspensions, e.g. for bassoons standing upright, can be fixed and adjusted in a quick flexible manner in fixing nylon wires to a transversal suspending bar by winding these wires two to three times around a portion of the bar equipped with double adhesive tape. Touching the adhesive surface with gloves should be avoided, and the adhesive force of the tape should be checked frequently to replace it in time. A surplus length of the wire can be attached to another portion of double adhesive tape fixed at a different point of the bar.

A quick and secure suspension method for stringed instruments with necks and pegs (lutes, violins etc.) consists in fixing a sling of nylon-wire to a bar. Fixing several wires in different
lengths prepares for instruments in different sizes. Instruments are suspended in the wire by their pegs, what works for frontal, dorsal and lateral views. Before suspending an instrument, double-check if the pegs are well fixed and solid enough and if the geometry of the instrument permits it. A wire running in front of a non-ornamental peg can in general easily be retouched.

The fixing device for lateral views for frontal/dorsal views all photos and drawing GNM

To fix small objects on a surface or to prevent them from rolling away, photographers often use a flexible adhesive paste which contains grease and lets residues on the instruments’ surfaces, as Hama Haftpast (TM). A better solution is to use natural rubber paste as Groom Stick (TM) as it is used in paper conservation for cleaning or clean bees wax. It needs a little bit of practice to hold the instrument with one hand wearing a glove and applying the paste with the other bare hand. Applying any adhesive to worn or textile surface might be harmful. Before applying any adhesive, a conservator’s advice should be asked.

A quick solution for photographing mouthpieces, necessitating post-production: First, the mouth-piece is photographed using a supporting arm, if wished, in different positions, then the arm is put away in post-processing.

Another quick solution for photographing mouthpieces, mostly avoiding post-production, is to put them on a square Plexiglas rod which is scarcely visible in the photo.

To avoid shadows on the background, objects can be placed on a clear Plexiglas sheet at a sufficient distance from the background. It is important to give the background an even lighting in order to keep it uniform. A careful lighting on the object itself and the use of a polarizing filter helps avoiding the object’s reflecting contour on the Plexiglas.
To position violins and other such instruments, which don’t stand upright for photographing on their own, set them in a Plexiglas ring, in a water glass or in a double-T-form Plexiglas stand with smoothed edges.
### 37. Index

Position and view parameters are given in short form, e.g.: “Oblique / half lateral” = “Oblique position and half lateral view”.

#### A
- Abanangbweli: vertical / frontal
- Accordion: oblique / half lateral
- Accordzither: oblique / half lateral
- Adufe: oblique / half lateral
- Adungu: oblique / half lateral
- Aeolian harp, played horizontally: horizontal / frontal
- Aeolian harp, played vertically: vertical / frontal
- Aeolian organ: vertical / frontal
- Agogo: oblique / half lateral
- Alboka: horizontal / lateral
- Algaita: vertical / frontal
- Algoja: vertical / frontal
- Alphorn: horizontal / lateral
- Althorn: horizontal / lateral
- Alto bugle: horizontal / lateral
- Alto clarinet: vertical / half lateral
- Alto crumhorn: vertical / half lateral
- Alto dulcian: vertical / frontal
- Alto flugelhorn: vertical / half lateral
- Alto flute: vertical / half lateral
- Alto horn: vertical / lateral
- Alto keyed bugle: horizontal / lateral
- Alto ophicleide: vertical / lateral
- Alto rothophone: vertical / half lateral
- Alto saxhorn: vertical / lateral
- Alto saxophone: vertical / half lateral
- Alto saxotromba: vertical / lateral
- Alto shawm: vertical / frontal
- Alto trombone: horizontal / lateral
- Amakondere: horizontal / lateral
- Ambassa: vertical / frontal
- Anata: vertical / frontal
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- Angklung: vertical / lateral
- Antiphonel: vertical / half lateral
- Anzona: vertical / frontal
- Aporo: vertical / frontal
- Appalchian dulcimer: oblique / half lateral
- Arch harp-lute: vertical / frontal
- Arched harp: oblique / half lateral
- Archicistre: vertical / frontal
- Archlute: vertical / frontal
- Archlute: vertical / frontal
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- Armandine: oblique / half lateral
- Arpanetta: vertical / half lateral
- Arpeggione: vertical / frontal
- Arpi Guitare: vertical / frontal
- Arpicordo: oblique / half lateral
- Assa muta chati: oblique / half lateral
- Atamo: vertical / frontal
- Aulos: vertical / frontal
- Autoharp: oblique / half lateral
- Automatic piano: horizontal / frontal
- Azibwazi: horizontal / frontal

#### B
- Bagili: vertical / lateral
- Baglama: vertical / frontal
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Bell: vertical / frontal
Bell harp: vertical / half lateral
Bendir: vertical / half lateral
Bengala: vertical / frontal
Bergman: horizontal / frontal
Bianzhong: vertical / frontal
Bilangdao: vertical / frontal
Bimbonifono: vertical / lateral
Bin: oblique / half lateral
Binou: vertical / half lateral
Bird instrument: oblique / half lateral
Bissex: vertical / frontal
Biwa: vertical / frontal
Bladder pipe: vertical / half lateral
Bo: horizontal / lateral
Board zither: oblique / half lateral
Boatswain's call: horizontal / lateral
Bodhran: vertical / half lateral
Bokongo: vertical / lateral
Bolange: oblique / half lateral
Bouhe: vertical / half lateral
Bouzouki: vertical / frontal
Bowel: horizontal / lateral
Bowed zither: oblique / half lateral
Bowel lyre: vertical / frontal
Bozhong: vertical / frontal
Buche des Flandres: oblique / half lateral
Buchla: horizontal / frontal
Buchn: vertical / frontal
Bucha: horizontal / frontal
Bucium: horizontal / lateral
Buhai: vertical / frontal
Bullroarer: oblique / half lateral
Bumbass: vertical / frontal
Burus: horizontal / lateral
Buzuq: vertical / frontal

C
Cabinet pianoforte: vertical / frontal
Cabrette: vertical / half lateral
Cajon: vertical / half lateral
Caledonica: vertical / frontal
Cane flute: vertical / frontal
Cane oboe: vertical / frontal
Cane violin: vertical / frontal
Canh: vertical / frontal
Cap ke: vertical / frontal
Carillon: vertical / frontal
Carminx: vertical / half lateral
Castanets: horizontal / lateral
Cavaquinho: vertical / frontal
Celeste: horizontal / frontal
Celestina: vertical / frontal
Cencerro: vertical / frontal
Ceterone: vertical / frontal

Chabara: horizontal / lateral
Chalmei: vertical / half lateral
Chalumeau: vertical / frontal
Chalumeau double: vertical / frontal
Chamber organ: vertical / frontal
Changgo: vertical / frontal
Chapter: horizontal / lateral
Charango: vertical / frontal
Chekker: horizontal / frontal
Chi: horizontal / frontal
Chiboni: vertical / half lateral
Chime bar: horizontal / frontal
Ching: vertical / frontal
Chipendani: vertical / lateral
Chirawatta: vertical / frontal
Chirimia: vertical / frontal
Chitarra battente: vertical / frontal
Chitende: vertical / lateral
Chizeze: vertical / frontal
Chow: vertical / frontal
Choke cymbal: horizontal / lateral
Chromatic harp: vertical / half lateral
Chum choe: horizontal / lateral
Chwago: vertical / frontal
Cikara: vertical / frontal
Clairbass: vertical / lateral
Clitole: vertical / frontal
Clittern: vertical / frontal
Clappers: oblique / half lateral
Claquebois: horizontal / frontal
Claquoir: vertical / half lateral
Clarinet: vertical / frontal
Clarinette d'amour: vertical / frontal
Clarsach: vertical / half lateral
Clavecin brisé: oblique / half lateral
Clavecin oculaire: oblique / half lateral
Claves: oblique / half lateral
Clavichord: horizontal / frontal
Clavio: horizontal / lateral
Clavicytherium: vertical / frontal
Clavichord: horizontal / frontal
Clavi-harp: vertical / frontal
Clavi-lame: horizontal / frontal
Clavioline: horizontal / frontal
Claviorgan: vertical / frontal
Coach horn: horizontal / lateral
Cobza: vertical / frontal
Colascione: vertical / frontal
Componium: vertical / frontal
Concertina: vertical / half lateral
Conch-shell trumpet: oblique / half lateral
Cong: vertical / frontal
Congo: vertical / frontal
Conical drum: vertical / frontal
Console piano: horizontal / frontal
Contrabass bugle: horizontal / lateral
Contrabass ophicleide: vertical / lateral
Contrabass saxhorn: vertical / lateral
Contrabass sordun: vertical / frontal
Contrabass tuba: vertical / frontal
Contralto saxhorn: vertical / lateral
Contrebasse à anche: vertical / lateral
Cornamusa: vertical / frontal
Cornet: horizontal / lateral
Cornett: vertical / frontal
Cornettino: vertical / frontal
Cornopean: horizontal / lateral
Cornophone: vertical / lateral
Corom: vertical / lateral
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<td>Irregular violin</td>
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G: Fanfare trumpet / horizontal / lateral

H: Hajhuj / vertical / frontal

I: Ifambu / horizontal / frontal
J
Jaltarang: vertical / frontal
Jarana: vertical / frontal
Jengglong: vertical / frontal
Jew's harp: horizontal / dorsal
Jinghu: vertical / frontal
Jingle: oblique / half lateral

K
Ka: vertical / frontal
Kabaro: vertical / frontal
Kaburu: vertical / frontal
Kacapi: oblique / half lateral
Kacchapi vina: vertical / frontal
Kagurabue: horizontal / frontal
Kahala: horizontal / lateral
Kakko: oblique / half lateral
Kalangu: vertical / frontal
Kalimba: oblique / half lateral
Kamaica: vertical / frontal
Kamanche: vertical / frontal
Kambre: vertical / frontal
Kani: vertical / frontal
Kanjira: vertical / half lateral
Kantele: oblique / half lateral
Kara: vertical / frontal
Karna: vertical / frontal
Kas: horizontal / lateral
Kasat: horizontal / lateral
Kasso: vertical / frontal
Kaval: vertical / frontal
Kayagum: oblique / half lateral
Kazo: horizontal / lateral
Kementses: vertical / frontal
Kempul: vertical / frontal
Ken: vertical / frontal
Ken bau: vertical / frontal
Ken be: vertical / lateral
Ken doi: vertical / frontal
Ken meo: horizontal / lateral
Ken mot: vertical / frontal
Kena: vertical / frontal
Kendang: oblique / half lateral
Kenong: vertical / frontal
Kenyen: oblique / half lateral
Kettledrum: vertical / frontal
Ketuk: vertical / frontal
Keyed bugle: horizontal / lateral
Keyed trumpet: horizontal / lateral
Khaen: vertical / lateral
Khalam: vertical / frontal
Khanjari: vertical / half lateral
Khartal: horizontal / lateral
Khlu: vertical / frontal
Khuy: vertical / frontal
Khol: oblique / half lateral
Khong mong: vertical / frontal
Khuur: vertical / frontal
Ki: vertical / frontal
Kidi: vertical / frontal
Kili: vertical / frontal
Kin: oblique / half lateral
Kinanda: oblique / half lateral
Kinnari vina: vertical / frontal
Kiringi: oblique / half lateral
Kisaanj: oblique / half lateral
Kiftejes citera: oblique / half lateral
Kissar: vertical / frontal
Kit: vertical / frontal
Kkwaenggwari: vertical / frontal
Kokyu: vertical / frontal
Komabue: horizontal / frontal
Komu'go: horizontal / frontal
Komuz: vertical / frontal
Kopuz: vertical / frontal
Kot: vertical / frontal
Koto: oblique / half lateral
Kotsuzumi: vertical / frontal
Krajappi: vertical / frontal
Krar: vertical / frontal
Kudu: vertical / frontal
Kundi: oblique / half lateral
Kundye: vertical / frontal
Kyi-waing: vertical / frontal
Kyi-zi: vertical / frontal

L
Labo: horizontal / lateral
Lamellaphone: oblique / half lateral
Labeddddas: vertical / frontal
Legwegwe: vertical / frontal
Ligombo: oblique / half lateral
Likembe: oblique / half lateral
Limonaire: vertical / frontal
Lira: vertical / frontal
Lira da braccio: vertical / frontal
Lira organizzata: oblique / half lateral
Lirone: vertical / frontal
Lithophone: vertical / frontal
Lituius: vertical / lateral
Longdi: horizontal / frontal
Lu: vertical / frontal
Ludaya: horizontal / frontal
Lukombe: oblique / half lateral
Luo: vertical / frontal
Luqu: vertical / half lateral
Lur: vertical / lateral
Lutar: vertical / frontal
Lute: vertical / frontal
Lute-guitar: vertical / frontal
Lute-harpischord: oblique / half lateral
Lutheal: oblique / half lateral
Lyra: vertical / frontal
Lyra glockenspiel: vertical / frontal
Lyre: vertical / frontal
Lyre guitar: vertical / frontal
Lyre piano: vertical / frontal
Lyre-banduria: vertical / frontal

M
Machete: vertical / frontal
Madaku: oblique / half lateral
Madimba: oblique / half lateral
Madiumba: oblique / half lateral
Malakat: horizontal / lateral
Mamokhorong: vertical / frontal
Mandole: vertical / frontal
Mandolin: vertical / frontal
Mandolione: vertical / frontal
Mandolongello: vertical / frontal
Mandolin: vertical / frontal
Mandore: vertical / frontal
Manjira: horizontal / frontal
Manza: horizontal / lateral
Maracas: vertical / frontal
Marimba: oblique / half lateral
Marimba: horizontal / frontal
Masenqo: vertical / frontal
Masul: vertical / frontal
Mattauphone: oblique / half lateral
Mazhar: vertical / half lateral
Mbejn: vertical / frontal
Mbila: oblique / half lateral
Mbira: oblique / half lateral
Mbombu: vertical / frontal
Mechanical clock: vertical / frontal
Mechanical harpsichord: oblique / half lateral
Mechanical organ: vertical / frontal
Mechanical piano forte: oblique / half lateral
Mellotron: horizontal / lateral
Melotron: horizontal / frontal
Melodeon: oblique / half lateral
Melodica: vertical / frontal
Melodica: oblique / half lateral
Mendi: vertical / half lateral
Metalophone: oblique / half lateral
Midi instrument: horizontal / frontal
Miyaw: oblique / half lateral
Mijwiz: vertical / frontal
Milanese mandolin: vertical / frontal
Mirliton: oblique / half lateral
Musette: vertical / frontal
Mrdanga: oblique / half lateral
Mukhavina: vertical / frontal
Mukupiela: vertical / frontal
Murali: horizontal / frontal
Mouth bow: vertical / lateral
Mouth organ: vertical / lateral
Mukhavina: vertical / frontal
Mukupiela: vertical / frontal
Murali: horizontal / frontal
Murchang: horizontal / dorsal
Musette: vertical / frontal
Musette: vertical / half lateral
Musical bow: vertical / lateral
Musical bowl: vertical / frontal
Musical box: vertical / half lateral
Musical glass: horizontal / frontal
Musical saw: vertical / lateral
Mute cornett: vertical / frontal
Myo: oblique / half lateral
Myo: horizontal / lateral
N
Nafir: horizontal / lateral
Nagara: vertical / frontal
Nagavaram: 9.3.5 vertical / frontal
Nail violin: horizontal / frontal
Nakers: vertical / frontal
Naqara: vertical / frontal
Narsiga: horizontal / lateral
Natural cornet: horizontal / lateral
Natural trumpet: horizontal / lateral
Naturhorn: horizontal / lateral
Nay: vertical / frontal
Ndere: vertical / frontal
Ndingidi: vertical / frontal
Ndjembo: oblique / half lateral
Ndjongo: vertical / frontal
Neapolitan mandolin: vertical / frontal
Nedemu: oblique / half lateral
Nembro: horizontal / lateral
Neocor: vertical / lateral
Ney-e anban: vertical / half lateral
Ngoma: vertical / frontal
Ngombi: oblique / half lateral
Ngongo: vertical / frontal
Nguru: vertical / frontal
Nkoko: vertical / frontal
Nkoni: vertical / frontal
Nkan: horizontal / frontal
Nonga: vertical / frontal
Northumbrian pipe: vertical / half lateral
Nose flute: horizontal / frontal
Notched flute: vertical / frontal
Nupur: vertical / frontal
Nyastaranga: vertical / frontal
Nyckelharp: vertical / frontal
Nyo: vertical / frontal

O
Oboe: vertical / frontal
Oboe da caccia: vertical / half lateral
Oboe d'amore: vertical / frontal
Ocarina: horizontal / lateral
Octavina: vertical / half lateral
Octobass: vertical / frontal
Odaiko: oblique / half lateral
Ophir: oblique / horizontal / lateral
Ommis: oblique / half lateral
Ondes Martenot: horizontal / frontal
Ondioline: horizontal / frontal
One-string fiddle: vertical / frontal
Opiecleide: vertical / lateral
Ophimionude: vertical / lateral
Orchestra: vertical / frontal
Organ: vertical / frontal
Organistrum: oblique / half lateral
Orpharion: vertical / frontal
Orpharion: vertical / frontal
Orpheon: oblique / half lateral
Orphica: horizontal / frontal
Otsuzumi: oblique / half lateral
O-zi: vertical / frontal

P
Paiban: vertical / frontal
Paixiao: vertical / frontal
Pakhavaj: oblique / half lateral
Pandeiro: vertical / half lateral
Panduri: vertical / frontal
Pangi: horizontal / lateral
Panpipe: vertical / frontal
Para: oblique / half lateral
Penny whistle: vertical / frontal
Penorcon: vertical / frontal
Percussion stick: horizontal / lateral
Percussion tubes: vertical / frontal
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Shabbaba: vertical / frontal
Shagu: vertical / frontal
Shakuhachi: vertical / frontal
Shamisen: vertical / frontal
Shawn: vertical / frontal
Sheng: vertical / lateral
Sheypur: horizontal / lateral
Shiilla-shilla: vertical / frontal
Shinobue: horizontal / frontal
Shkashek: horizontal / frontal
Sho: vertical / lateral
Shofar: horizontal / lateral
Shou: vertical / frontal
Shuangqing: vertical / frontal
Shuiniao: vertical / frontal
Side drum: vertical / frontal
Sigu nihu: vertical / frontal
Sihu: vertical / frontal
Sil-snyan: horizontal / lateral
Simbing: oblique / half lateral
Sinh tien: oblique / half lateral
Sistrum: vertical / frontal
Sitar: vertical / frontal
Sitari: horizontal / frontal
Sixian: vertical / frontal
Sizzle cymbal: horizontal / lateral
Sleigh bell, mounted: vertical / frontal
Slentem: oblique / lateral
Small pipe: vertical / half lateral
So duang: vertical / frontal
So se: vertical / frontal
Sock cymbal: vertical / frontal
Sodina: vertical / frontal
Sogo: vertical / frontal
Solovox: horizontal / frontal
Sonorophone: vertical / lateral
Sopilka: vertical / frontal
Soprano recorder: vertical / frontal
Soprano bugle: horizontal / lateral
Soprano crumhorn: vertical / half lateral
Soprano flugelhorn: horizontal / lateral
Soprano saxhorn: vertical / lateral
Soprano saxophone: vertical / frontal
Soprano trombone: horizontal / lateral
Sordin: vertical / frontal
Sousaphone: vertical / lateral
Spinet: oblique / half lateral
Square pianoforte: horizontal / frontal
Sralai: vertical / frontal
Sruti-box: oblique / half lateral
Steel drum: vertical / frontal
Still shawm: vertical / frontal
Straight cornett: vertical / frontal
String drum: vertical / frontal
Sudrophone: vertical / lateral
Suffara: vertical / frontal
Suling: vertical / frontal
Sultana: vertical / frontal
Suona: vertical / frontal
Surbahar: vertical / frontal
Surmandal: oblique / half lateral
Surnay: vertical / frontal
Surune: vertical / frontal

Suzu: vertical / frontal
Swirel: vertical / frontal
Swanee whistle: vertical / frontal
Swanee-sax: vertical / half lateral
Swanga: vertical / frontal
Symphonium: oblique / half lateral
Synclavier: horizontal / frontal
Synthesizer: horizontal / frontal
Synyx: vertical / frontal

T
Tabl: oblique / lateral
Tabla: vertical / frontal
Tablak: vertical / frontal
Taegum: horizontal / frontal
Taga: vertical / frontal
Taiko: vertical / frontal
Talempong: horizontal / frontal
Tam am la: vertical / frontal
Tama: vertical / frontal
Tambora: oblique / half lateral
Tambourin de Provence: vertical / frontal
Tambourine: vertical / half lateral
Tambura: vertical / frontal
Tamdam: vertical / frontal
Tanbur: vertical / frontal
Tanggu: vertical / frontal
Taba: oblique / half lateral
Taba: vertical / half lateral
Tango: vertical / half lateral
Tar: vertical / frontal
Tar: vertical / half lateral
Tarogato: vertical / frontal
Tarol: horizontal / frontal
Tarompet: horizontal / lateral
Tasa: vertical / frontal
Tbel: oblique / half lateral
Tebashul: vertical / frontal
Telharmonium: horizontal / frontal
Temple block: oblique / half lateral
Tenor bugle: horizontal / lateral
Tenor cor: horizontal / lateral
Tenor crumhorn: vertical / half lateral
Tenor drum: vertical / frontal
Tenor dulcian: vertical / frontal
Tenor new violin: vertical / frontal
Tenor oboe: vertical / frontal
Tenor recorder: vertical / frontal
Tenor rothophone: vertical / half lateral
Tenor saxophone: vertical / half lateral
Tenor shawm: vertical / frontal
Tenor trombone: horizontal / lateral
Tenor violin: vertical / frontal
Tenora: vertical / frontal
Tenoroon: vertical / frontal
Thali: horizontal / frontal
Thanh la: vertical / frontal
Theorbo: vertical / frontal
Theremin: vertical / frontal
Third flute: horizontal / frontal
Thon: vertical / frontal
Tibia: vertical / frontal
Tikara: vertical / frontal
Tilinca: vertical / frontal
Timbrh: oblique / half lateral
Timila: vertical / frontal
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<tr>
<th>Instrument</th>
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<tr>
<td>Ting-ting-shags</td>
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<td>Transverse flute</td>
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<td>Ud</td>
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<td>Uganda drum</td>
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