

Digital Transfer Block Set

Instructions for Use

REF 06-230950





GAMMA
Medizinisch-wissenschaftliche
Fortbildungs-GmbH

Wasserzeile 35
3400 Klosterneuburg
Austria

Phone: +43 2243 34140
Fax: +43 2243 34140 90
E-Mail: office@gammadental.com
Web: www.gammadental.com

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1 Introduction

Transferring the correct condylar relation of intraoral scans into the virtual articulator is a prerequisite for accurate virtual functional analysis. Conventional direct digital workflows either resort to average positioning of upper and lower jaw, thereby resulting in potentially incorrect jaw movement dynamics, or require the use of complex and expensive digital facebow systems.

The GAMMA Digital Transfer Block Set allows the simple yet accurate transfer of the condyle-related upper jaw position directly from the facebow into the virtual articulator, without plaster models. It can be used with both the kinematic and anatomic facebows and practically all intraoral 3D scanners.

1.1 Explanation of used symbols

The following symbols are used on the product and within its documentation:



Caution



Follow operating instructions



Manufacturer



Date of manufacture



Catalogue number



Upper and lower limit for temperature



Upper and lower limit for relative humidity



Upper and lower limit for atmospheric pressure

1.2 Symbols and notations

Special attention will be brought to important aspects using the following symbols:



Warning

Possible sources of error or the danger of a possible operational error.



Attention

Especially important information regarding the topic being described.



Information

Useful tips and tricks.

1.3 Product description

The digital transfer block set comprises three individual digital transfer blocks of different heights, labelled A, B, and C.



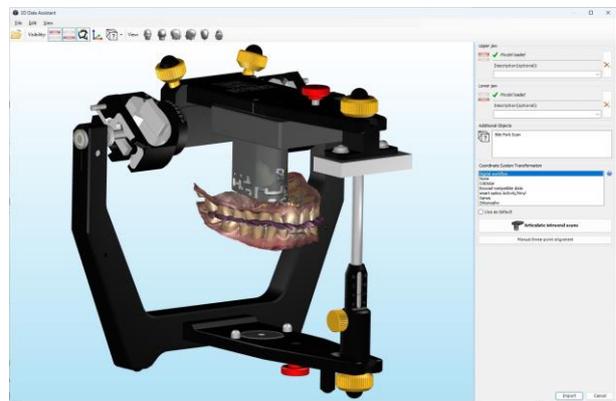
The blocks are made from solid aluminium with a smooth, anti-reflective surface finish. Each block is engraved with a three-dimensional reference pattern that can be scanned by any typical intraoral scanner.



Transferring the upper jaw position from the patient into the articulator or the transfer stand is carried out as usual. There, a digital transfer block is mounted in place of the upper jaw model. The reference pattern of the transfer block is scanned together with the upper jaw impressions of the bite fork using an intraoral scanner.



The 3D scans can subsequently be aligned to one another in GAMMA Dental Software or other CAD/CAM software, therefore bringing the intraoral scans into the correct position in the virtual articulator.



1.4 General safety instructions



The devices are designed for use in the dental practice and laboratory. Make sure to follow these instructions for use during first use and normal operation. Please also ensure that the devices are adequate and applicable for the desired purpose prior to first use, unless it is explicitly stated in the instructions for use.

GAMMA does not assume liability for damages caused by improper usage, incorrect handling, or improper repair. All maintenance and servicing tasks, other than operations mentioned in the instructions for use, should only be performed by authorized specialists. Use genuine GAMMA spare parts only!

1.5 System requirements

The direct digital workflow with the digital transfer block set requires the following items:

- 1) Digital Transfer Block Set
- 2) Intraoral scanner that allows taking full-arch scans and exporting them in an open 3D mesh file format such as PLY, OBJ, or STL (e.g., 3shape TRIOS® 5 or Medit i700)
- 3) Kinematic or anatomic facebow and the corresponding transfer stand or articulator:
 - Condylograph facebow with upper jaw transfer stand,
 - Condylograph comfort facebow with upper jaw transfer stand,
 - Reference AB facebow with Reference articulator, either mounted directly or preferably using transfer stand AB2 (Art.-Nr. 06-231400), or
 - Reference AB junior facebow with Reference articulator and transfer stand AB2 junior (Art.-Nr. 06-231400-J).
- 4) Scannable bite registration material to receive the upper jaw impressions on the bite fork (e.g. Futar® D by Kettenbach Dental)
- 5) Scannable impression material to fill the gap between the bite fork and transfer block (e.g. Optosil® Comfort Putty)
- 6) GAMMA Dental Software version 8.7 or higher, with the CADIAS 3D module activated



Please refer to the manual of GAMMA Dental Software for the requirements regarding the computer system.

1.6 Scope of delivery

The scope of delivery includes three digital transfer blocks of types A, B, and C of different heights.



After taking delivery, please make sure to immediately check the package contents for completeness and faultless condition.

2 Digital workflow

The direct digital workflow using the digital transfer block set comprises the following steps, which will be described in the subsequent chapters:

- 1) Perform a regular intraoral scan of upper and lower jaw as well as of the maxillomandibular relationship with your intraoral scanner (see chapter 2.1).
- 2) Mount the facebow on the patient, take the upper jaw impressions, and transfer the facebow with affixed bite fork into the articulator or transfer stand (see chapter 2.2).
- 3) Take a scan of the upper jaw impressions on the bite fork together with a suitable transfer block in the articulator or transfer stand (see chapter 2.3).
- 4) Load the 3D scan data in GAMMA Dental Software and perform the alignment to position the intraoral scans correctly in the virtual articulator (see chapter 2.4).

2.1 Performing the intraoral scans

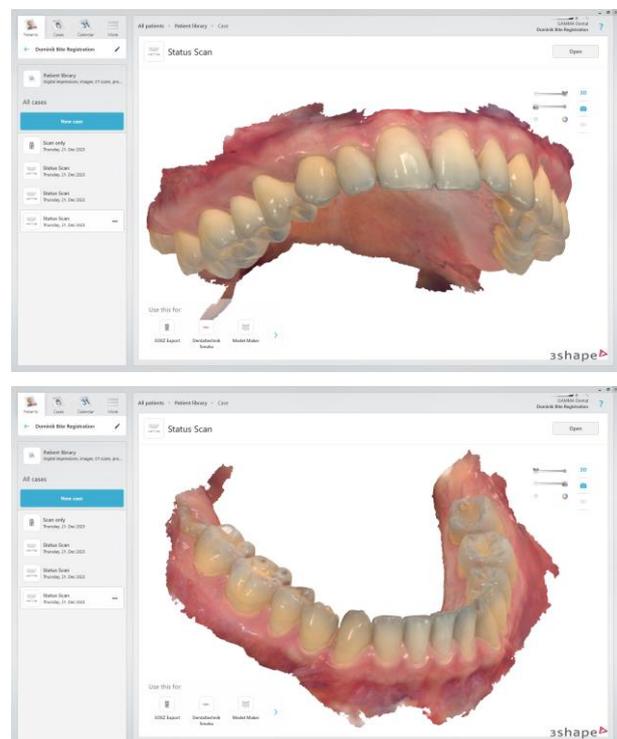
In the first step, the intraoral scans of upper jaw, lower jaw, and their intermaxillary relationship will be performed. For detailed information about how to perform these scans, please refer to the relevant user documentation provided with your intraoral scanner.



The following chapters will illustrate the procedure using the 3shape Unite scanning software. The procedure with other intraoral scanners may differ slightly, although the general order of operations will be similar.

2.1.1 Scanning upper and lower jaw

Perform individual scans of upper and lower jaw using your intraoral scanner. For best results, please follow the scanning strategy recommended by the scanner manufacturer.



2.1.2 Scanning the bite relation or reference position

Perform an occlusal scan, or bite scan, of upper and lower jaw in relationship. Typically, this scan is performed in intercuspation (ICP).



You may also perform the scan in reference position (RP), using a previously created wax plate as a centric registrate.



When performing the bite scan in RP, please make sure that the patient is able to hold this position stably. Applying too much pressure to the centric registrate may cause it to deform and thus distort the model interrelation.



Your scanning software may support scanning the intermaxillary relationship in both ICP and RP positions. If not, you may choose to duplicate the case file and re-do the bite scan in the second position.

2.2 Capturing the upper jaw position

For correctly positioning of the upper jaw scan in the virtual articulator, it is necessary to capture the position of the upper jaw relative to the condylar hinge axis. For this purpose, you may use either a kinematic facebow (Condylograph or Condylograph comfort) or an anatomic facebow (Reference AB or Reference AB junior). The upper jaw impressions are taken using a bite fork, which is attached to the facebow while on the patient and subsequently transferred to the articulator or transfer stand using the hinge axis determined using the facebow.

2.2.1 Preparing the bite fork



To allow for the most accurate alignment of the 3D scans in the subsequent steps, it is necessary to take an impression of the entire upper dental arch. Scanning and aligning partial impressions may lead to inaccurate results.

Apply a generous amount of bite registration material to the top side of the bite fork (e.g. Futar® D by Kettenbach Dental).

Make sure to proceed quickly in order to prevent the material from hardening outside the patient's mouth.



For better adhesion of the bite registration material to the bite fork, you may apply additional material on the bottom side.



Firmly press the bite fork with the bite registration material applied against the teeth of the patient's upper jaw. Wait for the material to harden while holding this position.



Put the bite fork with the impression of the upper jaw aside.



2.2.2 Transferring the upper jaw position using a kinematic facebow

Using the kinematic facebows Condylograph and Condylograph comfort, the upper jaw position can be transferred in relation to the exact kinematic hinge axis from the patient to the upper jaw transfer stand and subsequently to the articulator.

For this purpose, the hinge axis localization is performed either mechanically on writing paper or electronically using a CADIAX device while the facebow is mounted on the patient. At this stage, you may also perform condylography as required.

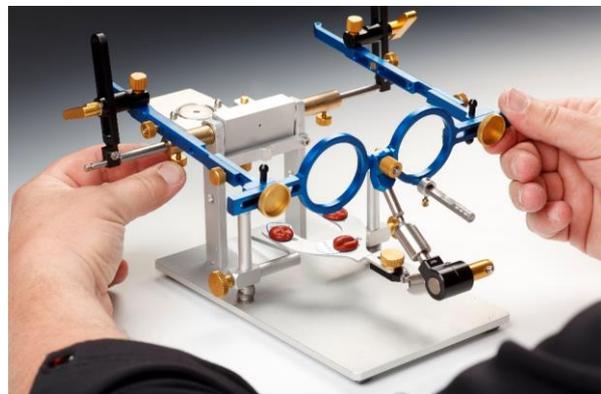


The prepared bite fork is subsequently pressed against the upper jaw and affixed to the upper facebow using the 3D joint support.



Finally, the facebow with the bite fork still attached is removed from the patient's head and mounted in the upper jaw transfer stand.

The bite fork is thus correctly positioned relative to the exact hinge axis, and you may proceed with the digital workflow.



Please refer to the instructions for use of the kinematic facebow for a comprehensive description of this procedure.

2.2.3 Transferring the upper jaw position using an anatomic facebow

Using the anatomic facebows Reference AB and Reference AB junior, the upper jaw position can be transferred in relation to the anatomic hinge axis from the patient to the articulator.

While the anatomic facebow is mounted on the patient's head, the prepared bite fork is pressed against the upper jaw and affixed to the upper facebow using the 3D joint support.



The upper facebow with the bite fork still attached can then be removed from the patient's head and mounted directly in the articulator.



However, to provide more space for the subsequent scanning procedure, consider using transfer stand AB2 instead. It can be mounted in the articulator and receives the 3D joint support with attached bite fork from the facebow. When using the Reference AB junior facebow, the transfer stand AB2 junior must be used instead.

The bite fork is thus correctly positioned relative to the anatomic hinge axis, and you may proceed with the digital workflow.



Please refer to the instructions for use of the anatomic facebow for a comprehensive description of this procedure.

2.3 Scanning the bite fork with a transfer block

Having mounted the facebow in the transfer stand or articulator, the bite fork with the upper jaw impressions is now correctly positioned in the articulator coordinate system. A digital transfer block of the appropriate height is selected and mounted in place of the upper jaw model. The intraoral scanner is then used to scan the upper jaw impressions together with the reference pattern of the digital transfer block. This will subsequently allow the intraoral scans to be brought into the articulator coordinate system as well.

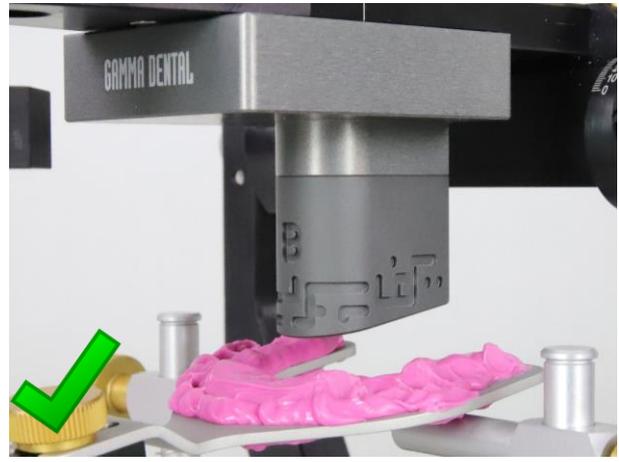


Please note that the following sections will illustrate the procedure for using the anatomic facebow and when performing the bite fork scan in the articulator using transfer stand AB2. When using the kinematic facebow, the scanning procedure in the upper jaw transfer stand is identical.

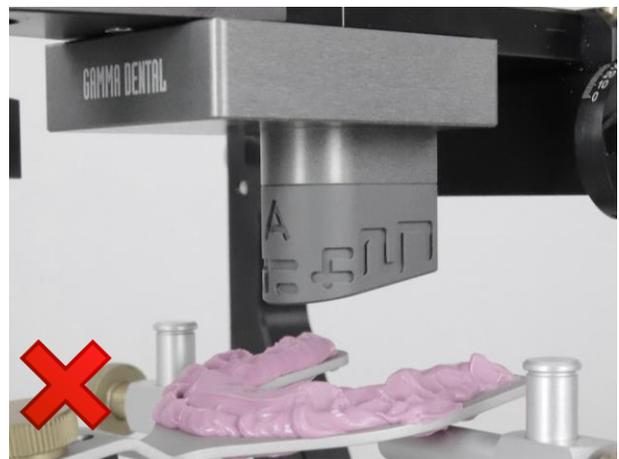
2.3.1 Selecting a suitable transfer block

Depending on the anatomy of the particular patient case, the bite fork with the upper jaw impressions may be positioned higher or lower in the articulator or transfer stand. The digital transfer block set therefore provides blocks of different heights to fit the individual situation.

OK: When mounted, the suitable transfer block should have a gap of roughly 1-2 centimeters to the impressions in the bite fork.



Not OK: If the gap is too big, an excessive amount of putty material needs to be used to fill it. This can negatively impact the quality of the scan.



Not OK: If the gap is too small, it may not be possible to scan the reference pattern of the digital transfer block completely.



Always make sure that the transfer block does not touch the bite fork or the bite registration material. This may disturb the position of the bite fork and thus lead to an incorrect positioning of the scans in the virtual articulator.

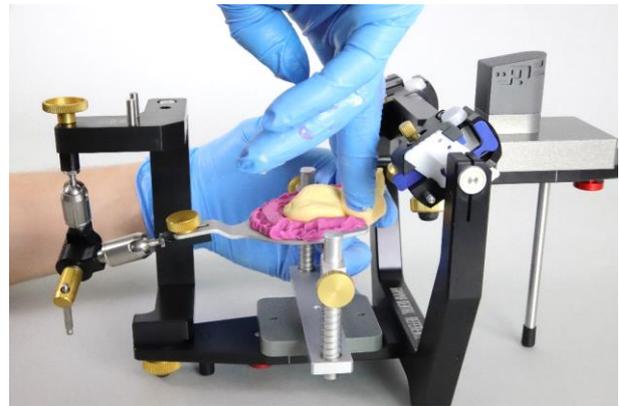
2.3.2 Filling the gap between bite fork and transfer block

As the measurement area of typical intraoral scanners is relatively small, a large gap between the bite fork and the transfer block may result in the scanner failing to connect the two surfaces into one continuous scan. It is therefore recommended to fill this gap with soft and malleable bite registration material (e.g. Optosil® Comfort Putty) or modelling compound prior to scanning.



Using a two-component putty that hardens when mixed with an activator is preferable as it will ensure that the material will retain its shape during scanning. When doing so, make sure to proceed quickly as closing the mounted transfer block onto an already hardened putty material may distort the position of the bite fork.

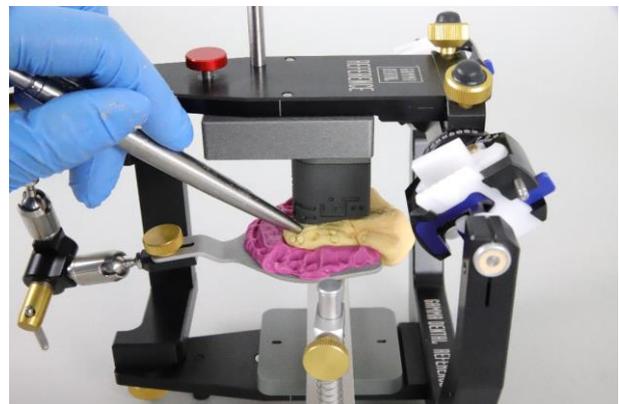
First, open the transfer stand or articulator. Use an adequate, roughly palm-sized amount of putty material, add the activator and knead the material thoroughly to mix the components. Form it into an appropriate shape and place it within the dental arch of the bite fork. Make sure not to fill in any of the upper jaw impressions.



Close the transfer stand or articulator. Support the putty material from below to ensure that it adheres to the underside of the transfer block. Make sure that no material enters the reference pattern of the block.



Depending on the width of the gap being filled, you may use a pen or another pointy tool to add indentations in the putty material around the entire dental arch. This will provide additional surface structure during the scanning process and should result in better-quality scans.



2.3.3 Performing the bite fork scan

Once the putty material is hardened, you can perform a scan of the upper jaw impressions together with the reference pattern of the transfer block using your intraoral scanner. Depending on the type of scanner being used, you may be able to create an additional scan item in the scanning software or perform this scan as an additional lower or upper jaw scan in the same case file.

Start the scan at the posterior teeth on one side and continuously move it up and down to capture the upper jaw impressions as well as the reference pattern of the transfer block. While doing so, slowly move along the dental arch until you reach the opposite side. If necessary, you may pause the scanning procedure briefly to reposition the scanner and continue where you left off.

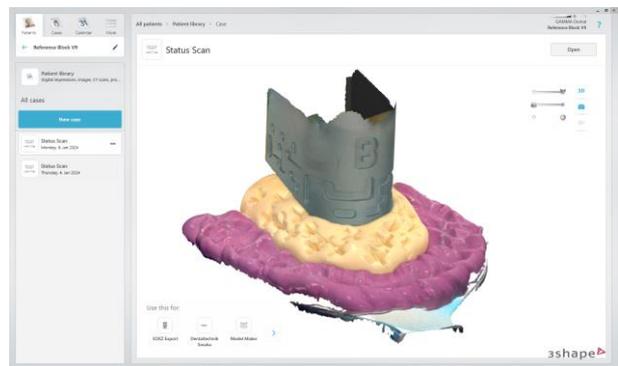




After scanning, make sure to review the scanned data and make sure to rescan low-quality areas or holes in the upper jaw impressions and the reference pattern of the transfer block. Surfaces that were not scanned completely may be closed automatically by the scanning software, which could introduce distortions or artifacts in the scan data.

Once the scan is finished, you can dismount the transfer block and the facebow from the transfer stand or articulator.

Proceed with exporting the scan data from your scan software in an open file format such as PLY, OBJ, or STL. Please refer to the instructions for use of your intraoral scanner for more information.

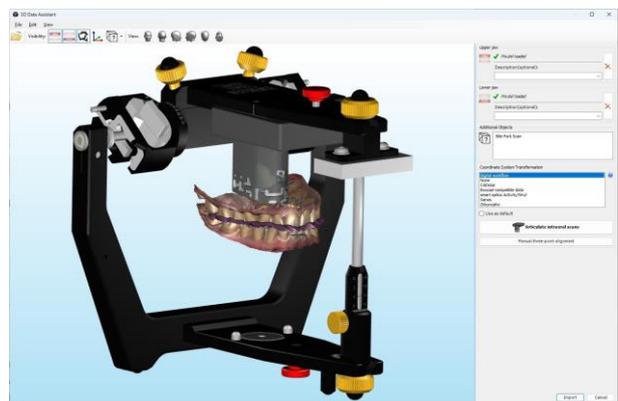


2.4 Aligning the scan data in CADIAS 3D

By exporting the scan data, you should have obtained at least three files, which are the upper and lower jaw in interrelation, as well as the scan of the bite fork together with the transfer block.

When importing these files in CADIAS 3D, the software provides you with a step-by-step assistant for articulating the intraoral scans. By aligning the individual scans together, they can be positioned correctly in the virtual articulator and used for virtual functional analysis.

The digital workflow is thus completed. Please refer to the instructions for use of GAMMA Dental Software for additional information.



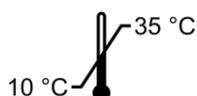
3 Specifications

3.1 Maintenance and cleaning

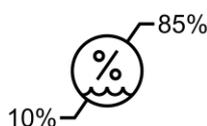
Cleaning should be carried out gently and without the use of solvents. Disinfection or sterilization is not required as the devices are not intended to come into contact with the patient. For the correct function of moving parts, no lubricants are required.

3.2 Operating conditions

The devices are intended exclusively for operation in dry indoor areas. The following operating conditions apply:



Temperature from 10 °C to 35 °C.

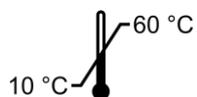


Relative humidity from 10% to 85%, non-condensing.

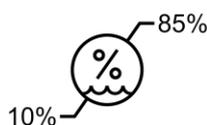
In case of a drastic change in temperature, wait until the devices have reached room temperature before beginning operation.

3.3 Storage and transport conditions

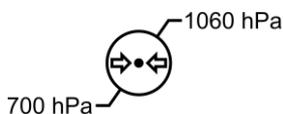
If the devices are to be transported over long distances, pack them in their original packaging. For storage and transport, make sure to comply with the following environmental conditions:



Temperature from 10 °C to 60 °C.



Relative humidity from 10% to 85%. Store in a dry place!



Atmospheric pressure from 700 hPa to 1060 hPa.



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