

Remapping with Hand Engine

This guide will provide an overview of how to remap the output of Hand Engine to match the hands of a custom character so you can stream data from Hand Engine directly to that character.

Requirements

- **BEFORE YOU INSTALL BETA4 or ABOVE: Users of Hand Engine Beta3.5 and below must delete their local database so Hand Engine can recreate a new database that supports saving of remapped characters. See below for details.**
- StretchSense Hand Engine: Already installed (see DOC-5009 in Related Documents) with IP address binding configured.
- A calibrated glove (see DOC-5010 in Related Documents)
- An FBX containing your character in a T-Pose in the first frame (see below for details setting up this FBX)
- Hand Engine License Key: Email mcpsupport@stretchsense.com for details
- Operating System: Windows 10 Pro

Related Documents

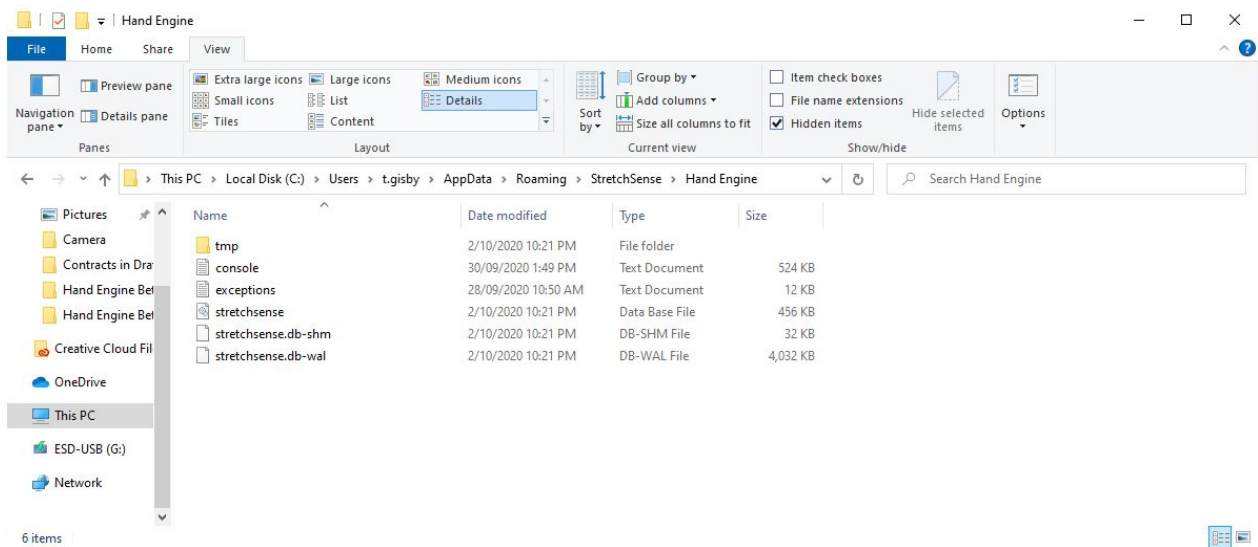
- DOC-5002 - Setting up COM Port for Wired USB Connection
- DOC-5003 - StretchSense USB Dongle Setup Guide
- DOC-5004 - StretchSense MoCap Pro Glove Firmware Update Guide
- DOC-5008 - StretchSense UltraSync One Module Configuration
- DOC-5009 - StretchSense Hand Engine Installation Guide
- DOC-5010 - StretchSense Hand Engine User Guide
- DOC-5011 - Streaming from Hand Engine to Unity
- DOC-5012 - Streaming from Hand Engine to UE4 (Unreal)
- DOC-5014 - Streaming from Hand Engine to MotionBuilder
- DOC-5019 - MoCap Pro Glove Production Ready Checklist
- DOC-5020 - Remapping to a Custom Character Hand in Hand Engine

Deleting Your Hand Engine Beta3.5 or Below Database

If you have previously installed Hand Engine Beta3.5 or below on your PC, in order to be able to save the remapping table connecting the default Hand Engine hand to your character asset you must delete the old local database and restart Hand Engine to reinitialise the database in the required new format. If you wish to preserve Actor calibration profiles from your old database, start at Step 1 below. If you do not wish to preserve any Actor calibration profiles from your old database, simply follow steps 2 and 3.

1. Open Hand Engine Beta3.5 (or below).
2. Expand **Glove 1/StretchSense Device 1** and in the **Actor** dropdown box, select the first actor that you want to save.
3. Select **File** → **Export Actor** to export a JSON file containing all of that actor's calibration profiles.
4. Repeat Steps 2 and 3 as required.

5. Close the Hand Engine browser tab and the Hand Engine console.
6. Navigate to your Windows Roaming Profile directory, which is typically found at **C:\Users*<User Name>*\AppData\Roaming\StretchSense\Hand Engine**
 - a. **NOTE:** You will need to tick the **Hidden items** option in the **Show/hide** section of the **View** tab of Windows Explorer in order to see the **AppData** folder.



7. Delete all of the files and folders in this directory.
8. Relaunch Hand Engine to reinitialise the database with the required updated structure.
9. Select **File** → **Import Actor** and navigate to the first JSON file you downloaded in Step 3 above.
10. Repeat Step 9 for as many actors as you wish to restore

Setting Up Your Target Character

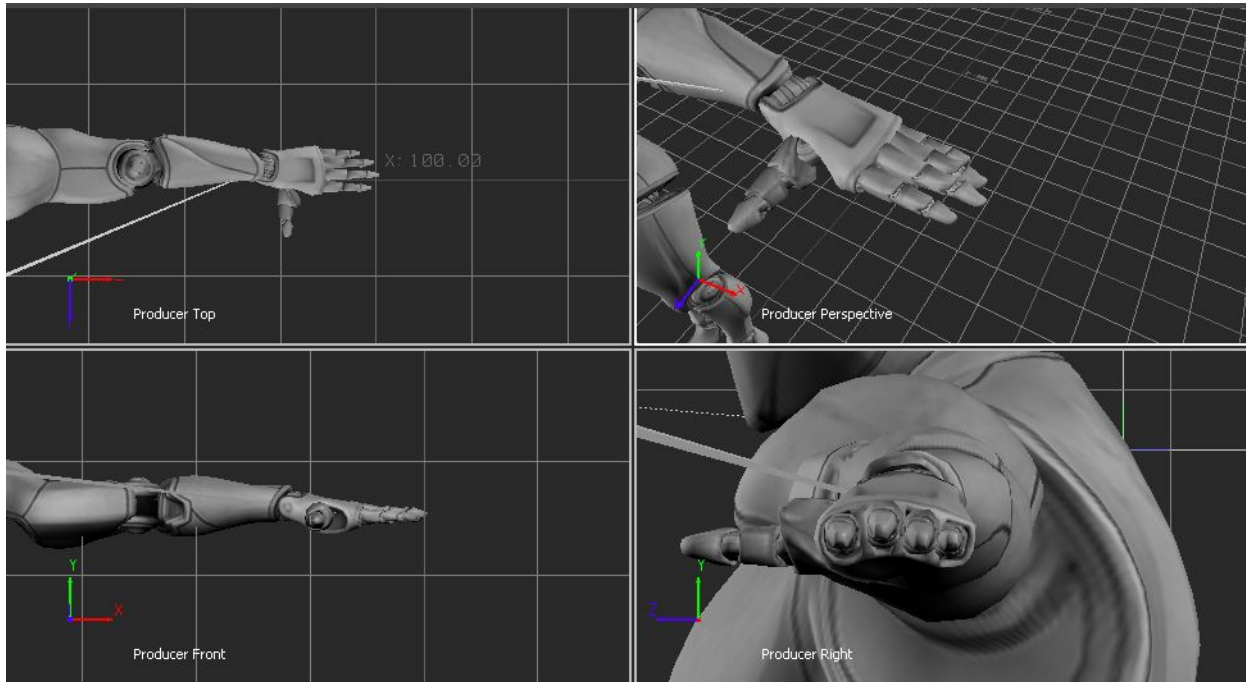
Setting Up Bind Pose

In order to remap the Hand Engine output to your custom character, you must first create an FBX that has just your target character in it and that character is in a full T-Pose that is saved at the first frame in the FBX. The character must be in a full T-pose, with each hand in an L-Pose. The fingers of the character should align with a major axis of the scene/FBX. Please note this FBX is used only for extracting bone hierarchy and rotation order data from your character. Once the remapping process is complete, you will be able to stream data from Hand Engine to any FBX/scene containing that character.

The key features for the L-pose for each hand are:

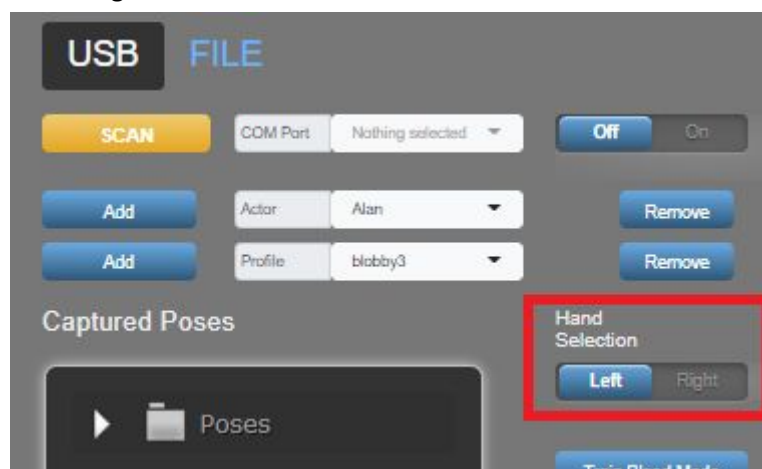
1. The palm is facing down and is parallel to the ground plane
2. The fingers are pointing straight out and are parallel both to each other and to the ground plane, and are aligned with a major axis of the scene/FBX e.g. the X-axis in the screenshots below.
3. The thumb is pointing straight forward and is both perpendicular to the fingers and parallel to the ground plane, and is aligned with one of the other major axes of the scene/FBX, e.g., the Z-axis in the screenshots below. The thumb nail should be facing towards the body, i.e., the opposite direction to which the fingers are pointing.

Example of correct bind pose

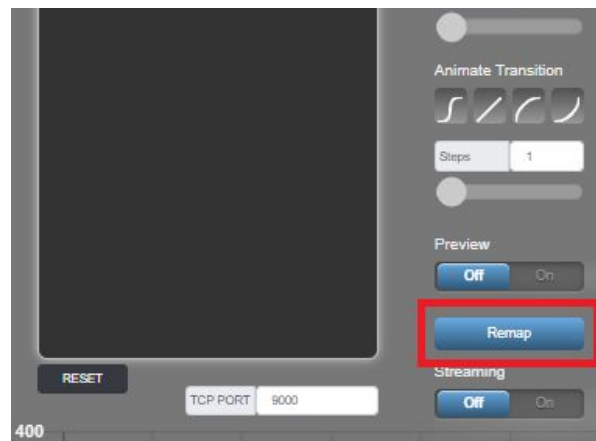


Using Remapping in Hand Engine

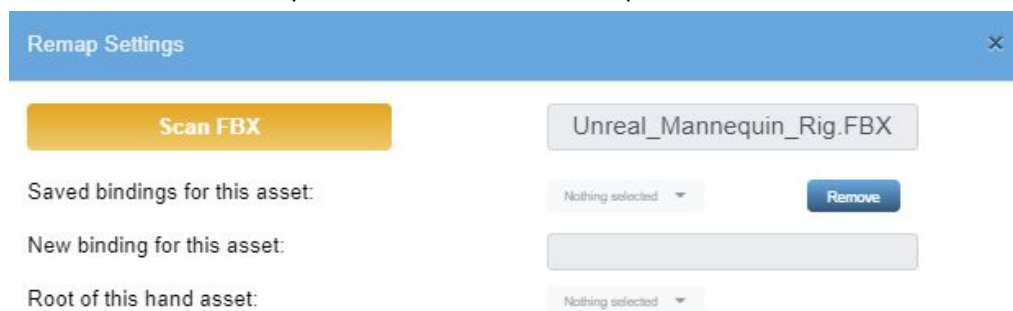
1. Setup and calibrate your glove as per normal (see DOC-5010 - StretchSense Hand Engine User Guide for details).
2. Set the hand you want to retarget to in the Hand Selection



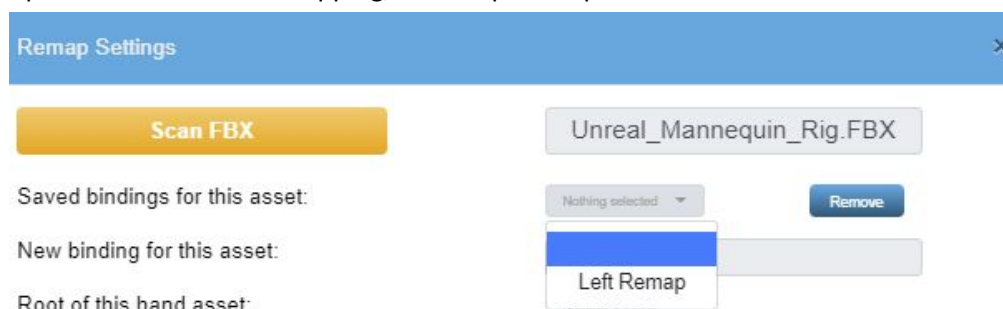
3. Click the **Remap** button.



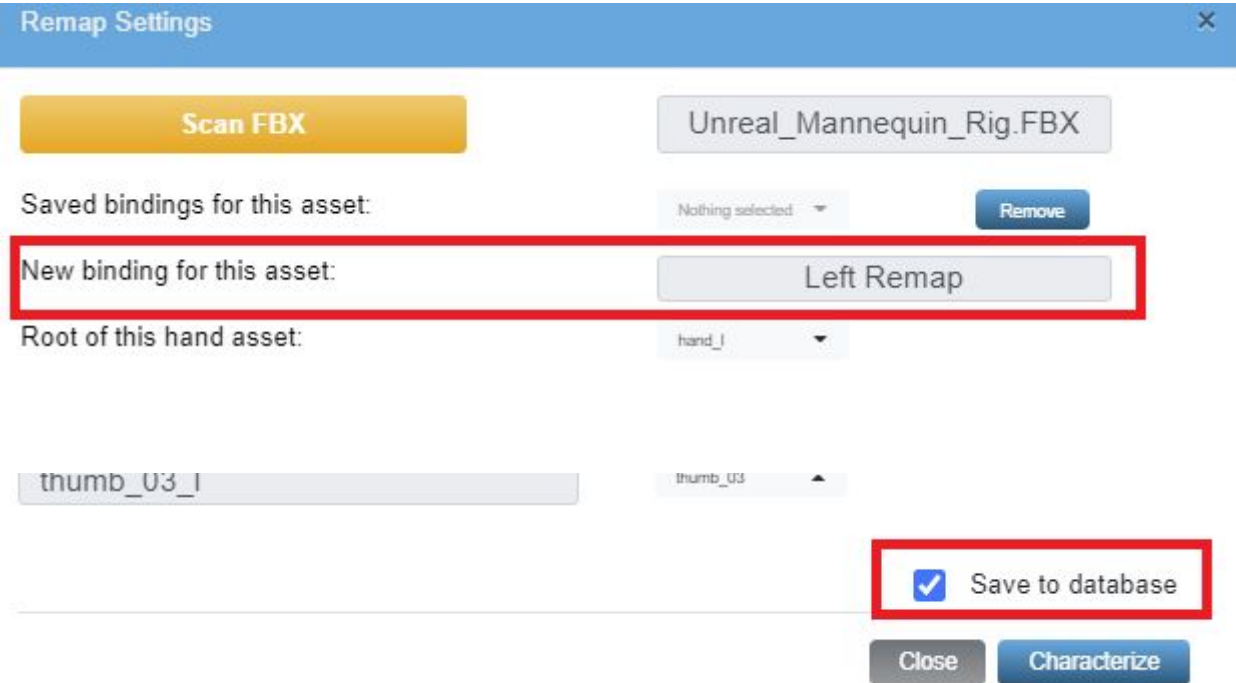
4. In the **Remap Settings** pop up window, select **Scan FBX** and select your target character FBX that in the first frame has your character in a full T-pose with the hands in an L-pose



5. If you have already previously saved a binding for this asset you can select this from the **Saved binings for this asset** dropdown to reload this mapping, then skip to Step 9.



- If this is a new binding and you plan to save the binding for later recall, enter a name for the new binding in **New binding for this asset**, then check the **Save to database** checkbox at the bottom of the **Remap Settings** pop up.



Remap Settings

Scan FBX

Unreal_Mannequin_Rig.FBX

Saved bindings for this asset: Nothing selected Remove

New binding for this asset: Left Remap

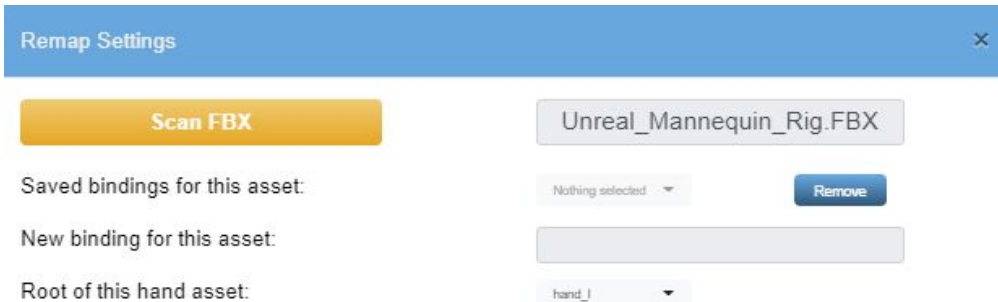
Root of this hand asset: hand_I

thumb_U3_I thumb_U3

Save to database

Close Characterize

- Select the root of the hand on the target character from the **Root of this hand asset** dropdown box. This is the point where the fingers branch out from and the label name may start with hand/wrist/palm etc.



Remap Settings

Scan FBX

Unreal_Mannequin_Rig.FBX

Saved bindings for this asset: Nothing selected Remove

New binding for this asset:

Root of this hand asset: hand_I

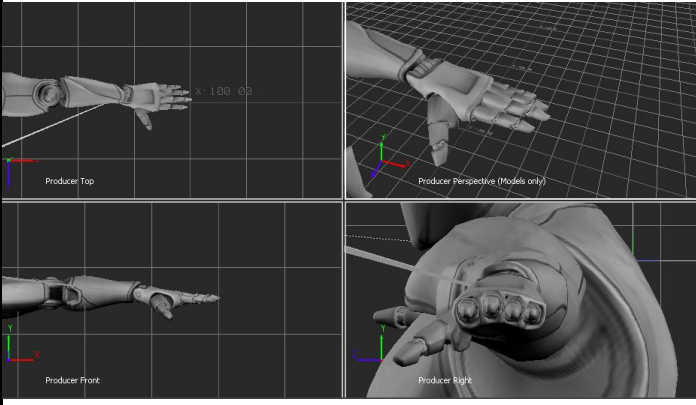
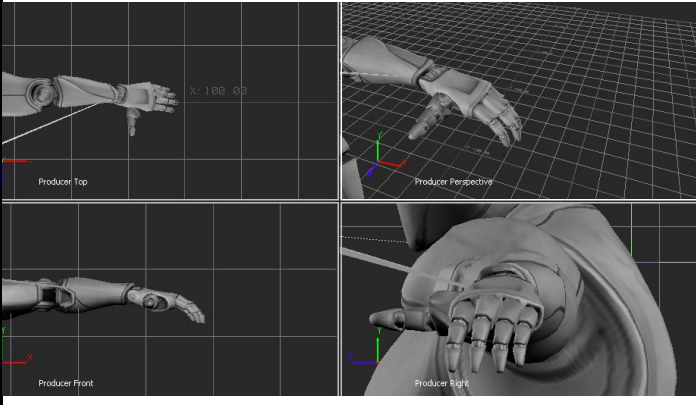
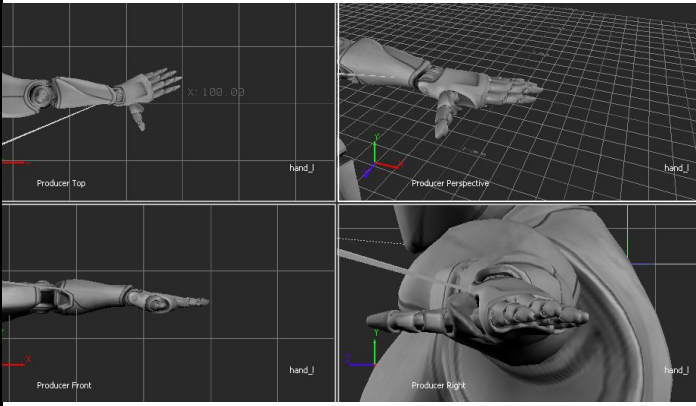
thumb_U3_I

8. The bones of the character in the scanned FBX will now populate all children joints from the root node selected in the **Bones of this asset column**. In the **Bones of HE asset** column, select the corresponding bone you wish to map to using the dropdown boxes.
 - a. **NOTE:** In the example below the naming convention between the target character and the HE asset match almost exactly, but there is no requirement for any similarity in the bone names.

Bones of this asset:	Bones of HE asset:
hand_l	hand ▼
middle_01_l	middle_01 ▼
middle_02_l	middle_02 ▼
middle_03_l	middle_03 ▼
pinky_01_l	pinky_01 ▼
pinky_02_l	pinky_02 ▼
pinky_03_l	pinky_03 ▼
index_01_l	index_01 ▲
index_02_l	index_02 ▲
index_03_l	index_03 ▲

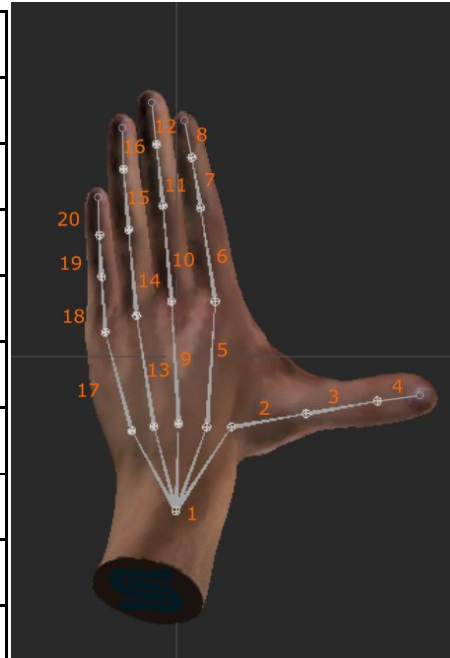
9. Click **Characterize** to save the binding and start streaming the remapped hand data from Hand Engine.

Common Mistakes

	<p>Thumb is in a relaxed position.</p> <p>This will cause the thumb to be tucked in too close to the hand</p>
	<p>Fingers are curled/in a relaxed position.</p> <p>This will cause the fingers to be over rotated then creating a fist</p>
	<p>Fingers and thumb are correctly set, but the hand/arm is rotated relative to the major axis of the global scene.</p> <p>This will cause off-axis rotations of the fingers/thumb when curling them.</p>

Hand Engine Bone Naming Convention

#	Label	Description
1	Hand	Wrist
2	Thumb_01	Thumb Metacarpal
3	Thumb_02	Thumb Proximal
4	Thumb_03	Thumb Distal
5	Index_00	Index Metacarpal
6	Index_01	Index Proximal
7	Index_02	Index Intermediate
8	Index_03	Index Distal
9	Middle_00	Middle Metacarpal
10	Middle_01	Middle Proximal
11	Middle_02	Middle Intermediate
12	Middle_03	Middle Distal
13	Ring_00	Ring Metacarpal
14	Ring_01	Ring Proximal
15	Ring_02	Ring Intermediate
16	Ring_03	Ring Distal
17	Pinky_00	Pinky Metacarpal
18	Pinky_01	Pinky Proximal
19	Pinky_02	Pinky Intermediate
20	Pinky_03	Pinky Distal



DOC-5020 - Remapping to a Custom Character Hand in Hand Engine

Created: 20200924

Last Updated: 20201002

Last Updated By: TG

Authors: AD, TG

Revision: 2



Revision Summary

Revision	Date	Notes
2	2020.10.02	Updated with database reset instructions
1	2020.09.24	Initial version