Large scale 3D printed Divers watch desk clock

Fully jointed, rotating uni-directional bezel and working movement

Large scale 3D printed – Divers Watch desk clock

131 individual parts (or thereabouts).

30 hours printing time - approx @ 0.2mm (0.1 recommended).

50 metres of filament @ 3mm dia.

400g weight (approx).

Please note:

This project will require model making skills and lots of patients!

Ideally, all parts should be printed at 0.1 or higher if possible and some fine tuning will be required to make parts fit.

Printed on the MB Rep 2 and Ultimaker 2 using PLA.

The following pages outline printing specification and assembly instructions.

Additional items required:

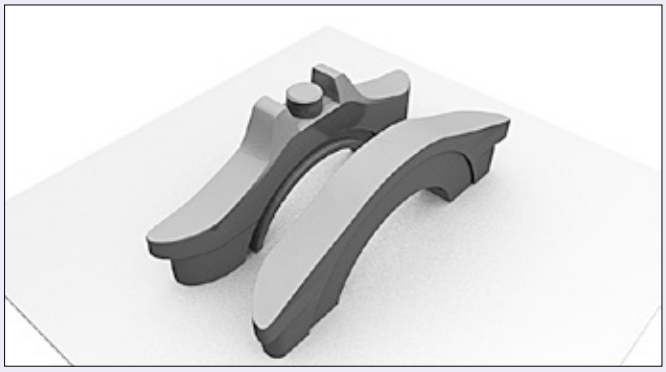
Battery Quartz clock movement – example:
http://www.maplin.co.uk/p/quartz-clock-movement-yu49d?gclid=CJyejrWM9slCFSX3wgodbYAAfA

Perspex/Acrylic 100mm dia disc, 3mm thick – example:
http://www.sheetplastics.co.uk/Acrylic_Disc_Circles/Acrylic_Discs/3mm_clear_Acrylic_Discs_Circles?product_id=3054

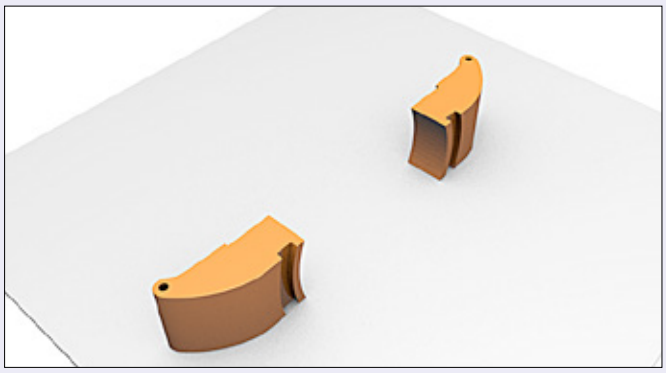
Scalpel, sand paper, smoothing files
Lengths of 3mm filament (or 3mm dowels)
'Super' Glue
3mm drill (to clean hole connections)
Correction fluid (face detail)

Part listing and printing instructions

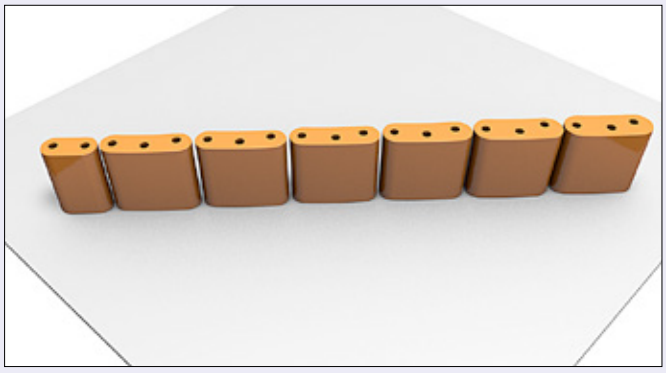
File name:	**Main_body.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	Use your slicer support settings to only support the end overhangs



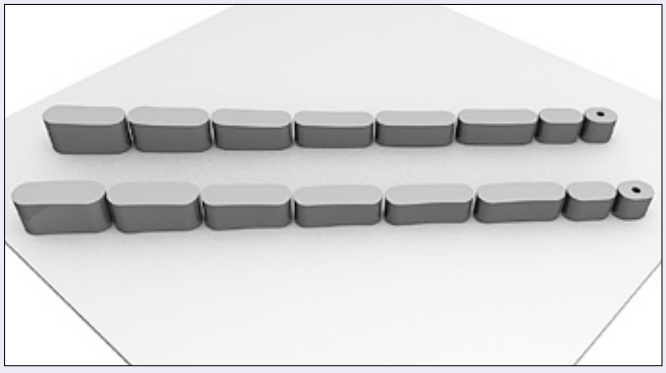
File name:	**Bracelet_watch_links.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Gold filament
Support material:	No



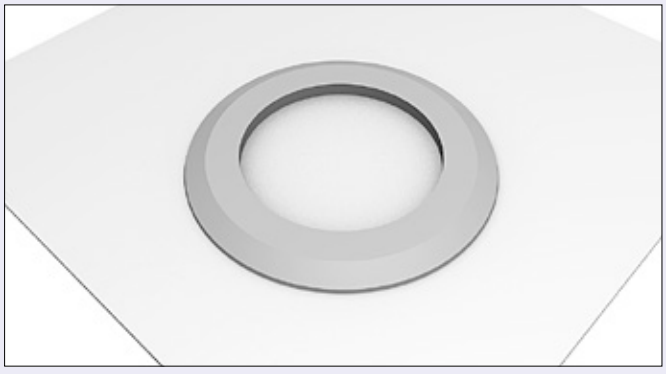
File name:	**Bracelet_inner_links.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Gold filament
Support material:	No **Note:** This file will need to be printed x 2



File name:	**Bracelet_outer_links.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	No **Note:** This file will need to be printed x 2

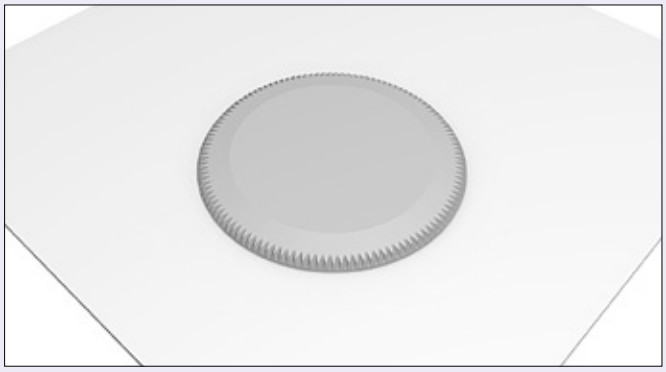


File name:	**Back_outer.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	No



Part listing and printing instructions

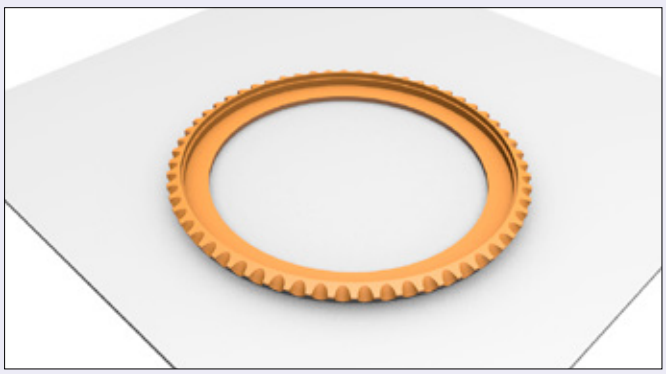
File name:	**Back.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	No



File name:	**Back_thread.stl**
Print resolution:	0.1mm
Filament colour:	Silver filament
Support material:	No

File name:	**Inner_ring.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	No

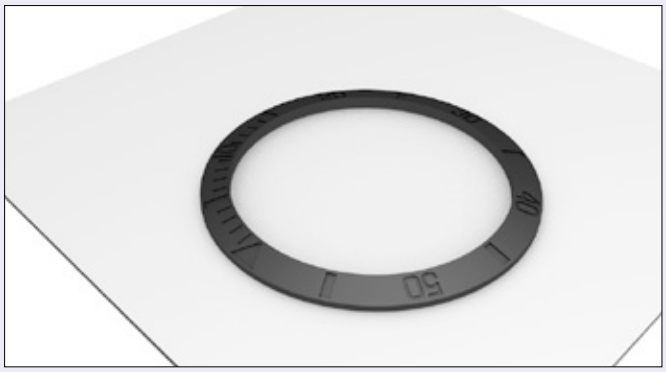
File name:	**Bezel_outer.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Gold filament
Support material:	No



File name:	**Bezel_ratchet.stl**
Print resolution:	0.1mm
Filament colour:	Black filament
Support material:	No

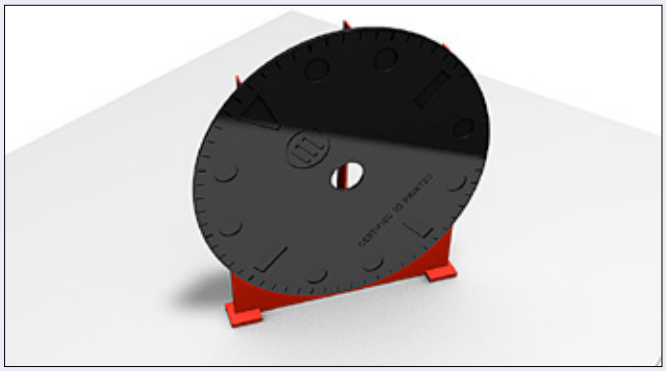
Part listing and printing instructions

File name:	**Bezel_number_face.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Black filament
Support material:	No



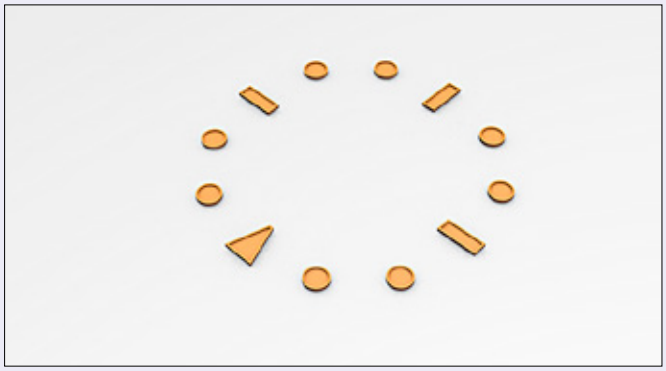
File name:	**Bezel_face_numbers.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Gold filament
Support material:	No

File name:	**Face_dial_MB.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Black filament
Support material:	Model support material to be removed (shown in red)



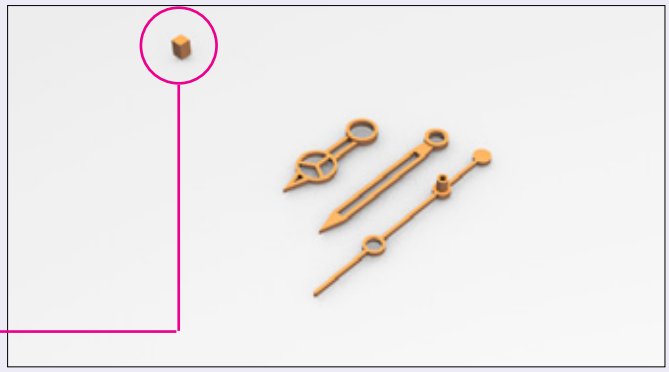
File name:	**Dial_hour_inserts.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	White filament
Support material:	No

File name:	**Dial_hours_outer.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Gold filament
Support material:	No



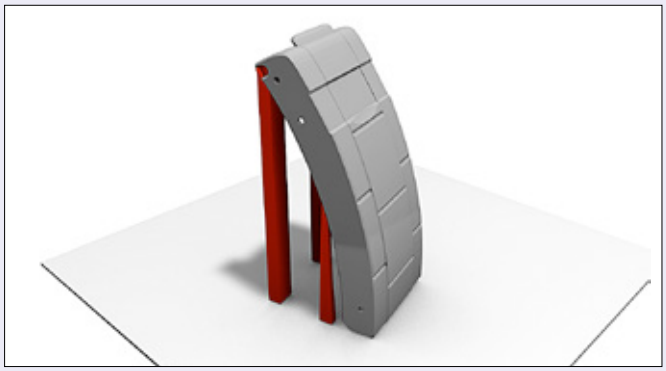
Part listing and printing instructions

File name:	**Hands.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Gold filament
Support material:	No **Note:** 'sacrificial' block to allow nozzle movement for cooling time for Second hand detail

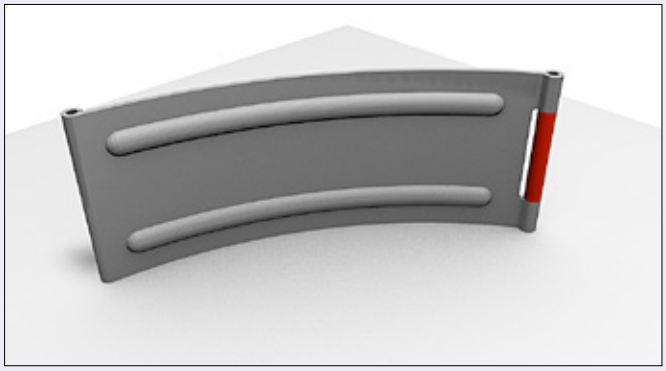


File name:	**Hands_inserts.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	White filament
Support material:	No **Note:** These parts may need trimming for a clean fit into the 'Hands'

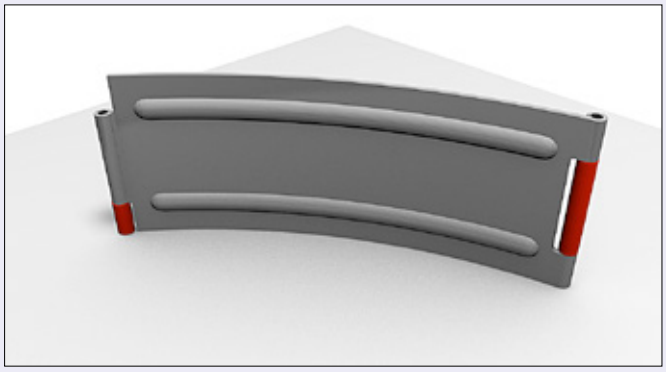
File name:	**Main_clasp.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	Model support material to be removed (shown in red)



File name:	**Clasp_hinge_latch.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	Model support material to be removed (shown in red)



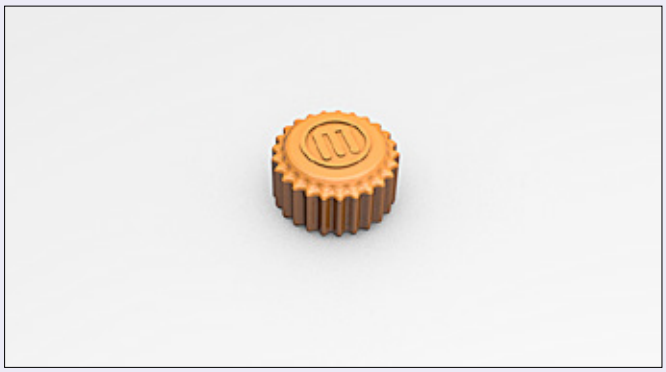
File name:	**Clasp_hinge_clasp.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	Model support material to be removed (shown in red)



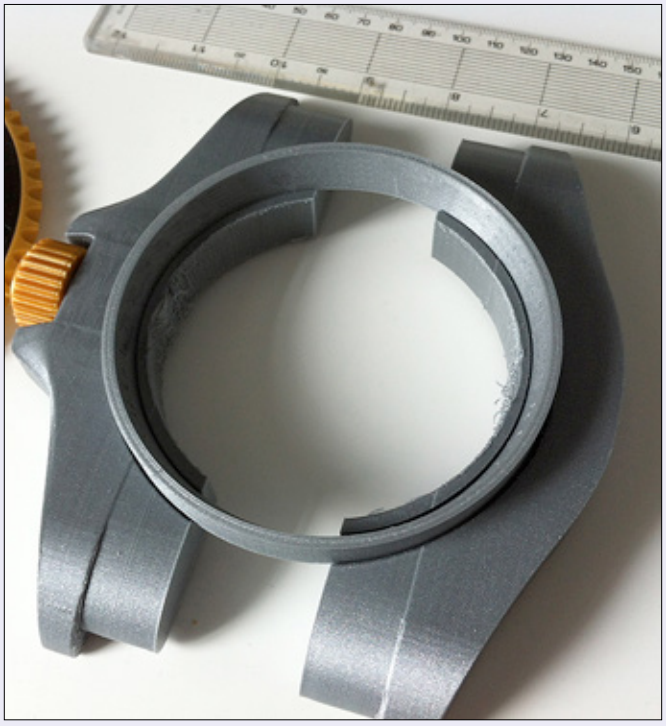
Part listing and printing instructions

File name:	**Small_clasp.stl**
Print resolution:	0.2mm (optimum 0.1)
Filament colour:	Silver filament
Support material:	No

File name:	**Winder_MB.stl**
Print resolution:	0.1mm (or higher)
Filament colour:	Gold filament
Support material:	No



Assembly instructions to follow



Assembly instructions – bracelet

1. Layout the printed parts as shown below from the files:

Bracelet_watch_links.stl

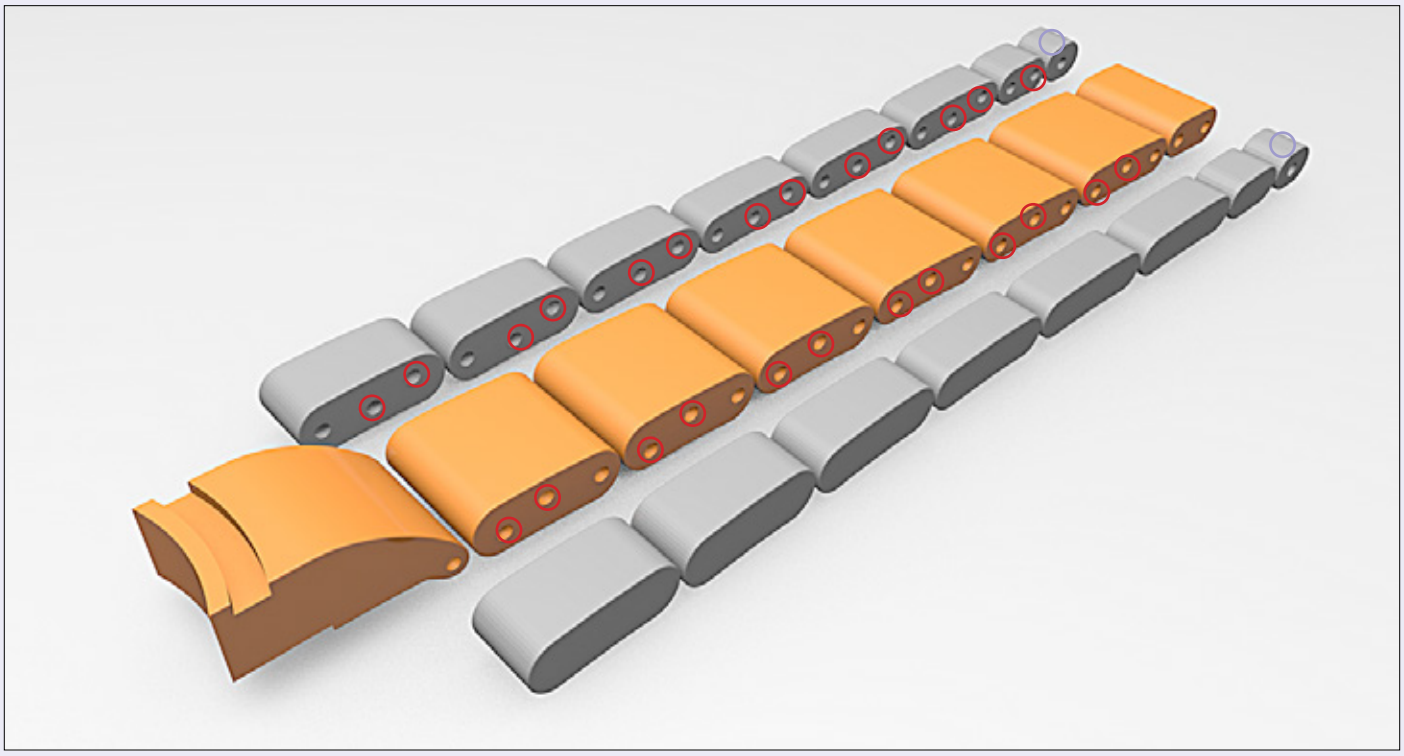
Bracelet_inner_links.stl

Bracelet_outer_links.stl

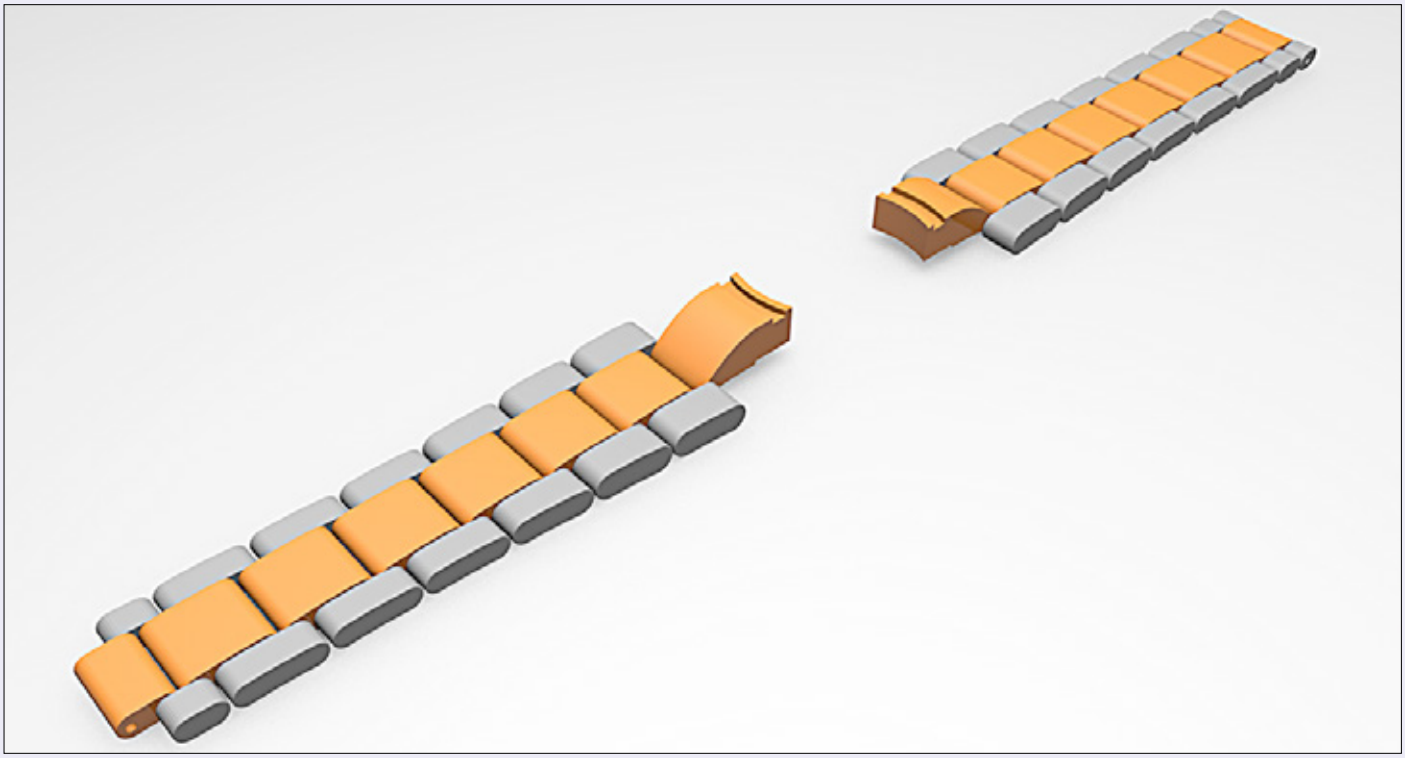
Note: The 'curve' of all links should face up.

2. Connect each link set with a short length of 3mm filament or dowel. Only glue the connections marked red ○ (both sides of link).

3. Repeat this construction for both sides, but remove the two final small silver links for the second bracelet ○



Completed bracelet



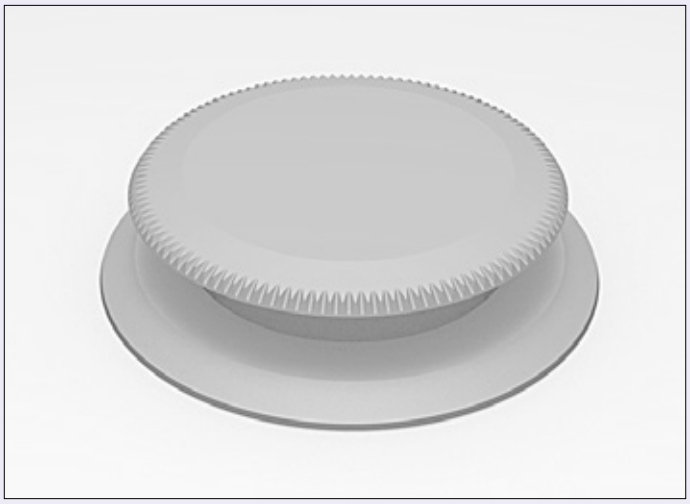
Assembly instructions – clock back and main body

1. Position and glue together printed parts as shown below from the files:

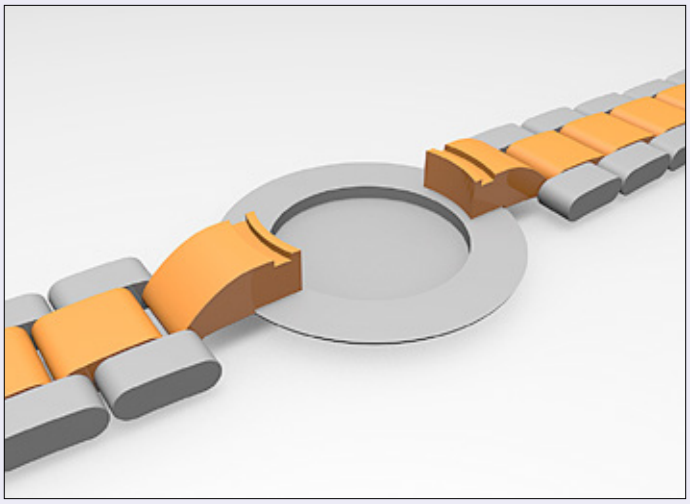
Back_outer.stl

Back.stl

Note: These two files can be joined and printed as one piece if preferred.



2. When the back is complete, turn the clock back over and position both completed bracelets as shown below.



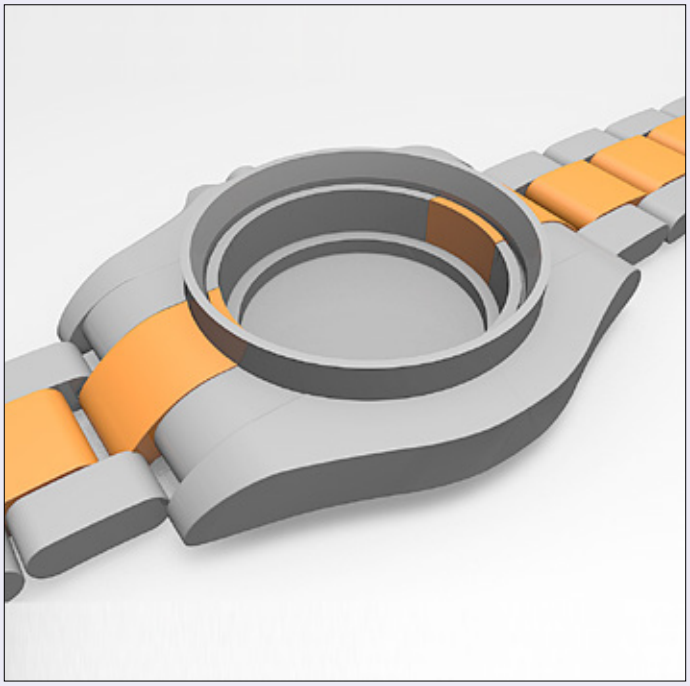
3. Position and glue together the additional printed parts as shown below from the files:

Main_body.stl

Inner_ring.stl

4. Glue the printed file: Winder_MB.stl onto the main body.

Note: The clock back is only used to position all parts - do not glue clock back onto main body.



Assembly instructions – uni-directional bezel

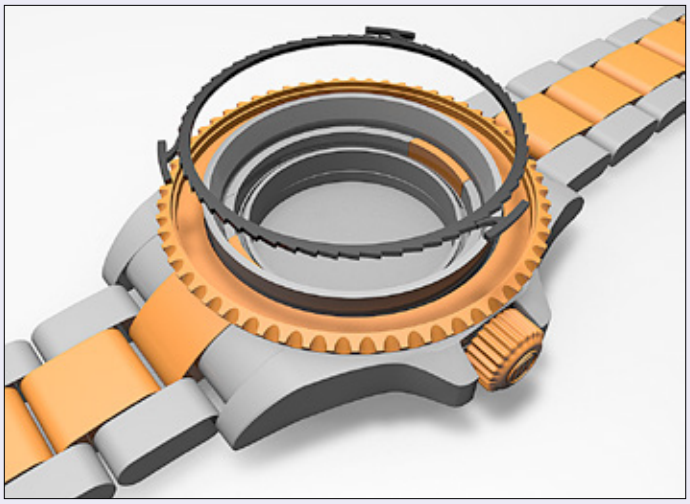
1. Position the printed parts as shown below from the files:

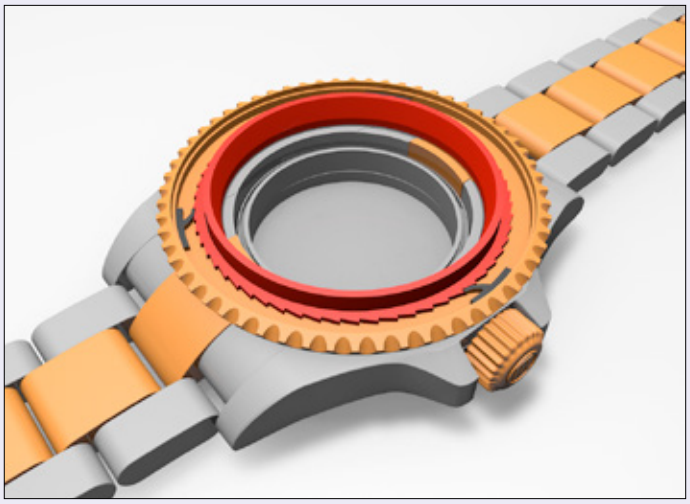
Bezel_outer.stl

Bezel_ratchet.stl

2. Glue the ratchet ring onto the ‘Inner ring’ (two parts shown in red below)

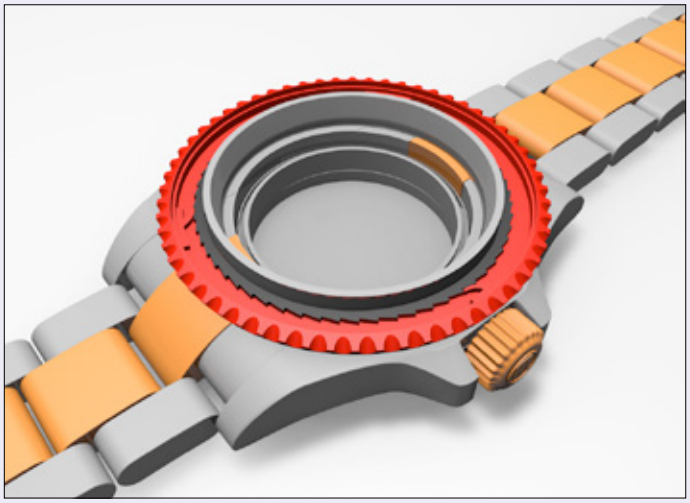
Note: Make sure to leave the ‘bezel outer’ free to rotate.

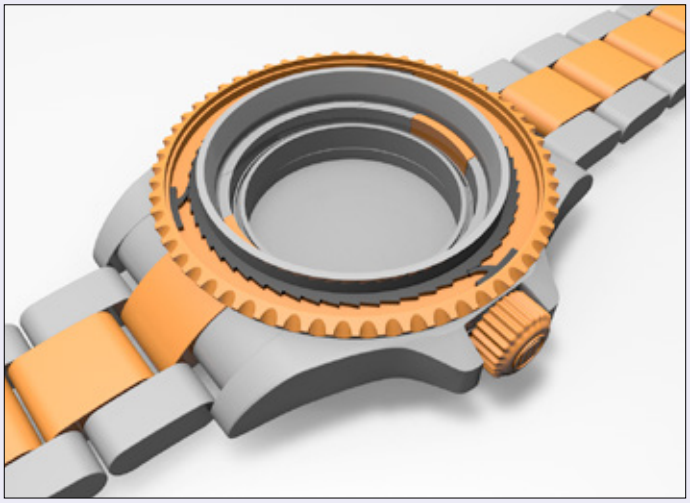




3. Position the three ratchet pegs as shown below and glue onto the ‘bezel outer’ as shown in red.

Note: Make sure the ratchet pegs are orientated to only allow the ‘bezel outer’ to rotate anti clockwise.





Assembly instructions – uni-directional bezel face

1. Position and glue the printed part as shown below from the files:

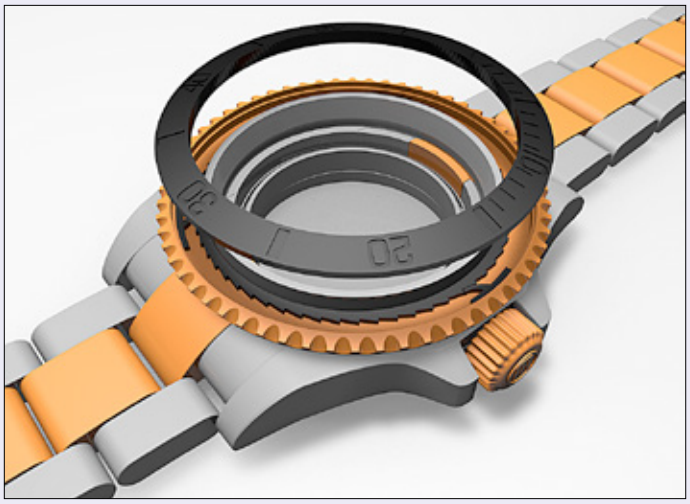
Bezel_number_face.stl

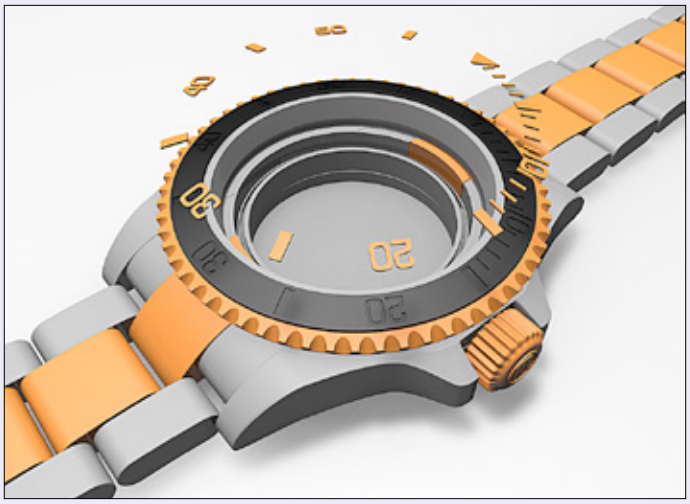
Note: Only apply glue between the ‘Bezel number face’ and the ‘Bezel outer ring’

2. Glue the **Bezel_face_numbers.stl** printed parts into the recesses onto the ‘Bezel number face’.

Note: The fit of these parts will depend on the print quality and resolution of your printer - this is a real test!

Some trimming will be required.





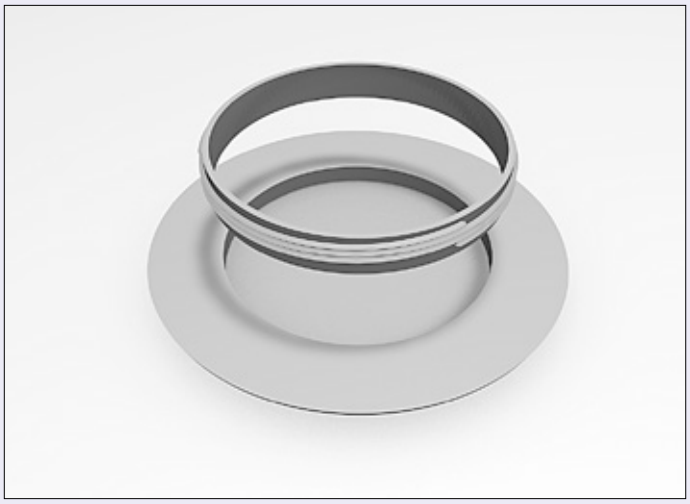
Note: The fit of these parts will depend on the print quality and resolution of your printer - this is a real test!

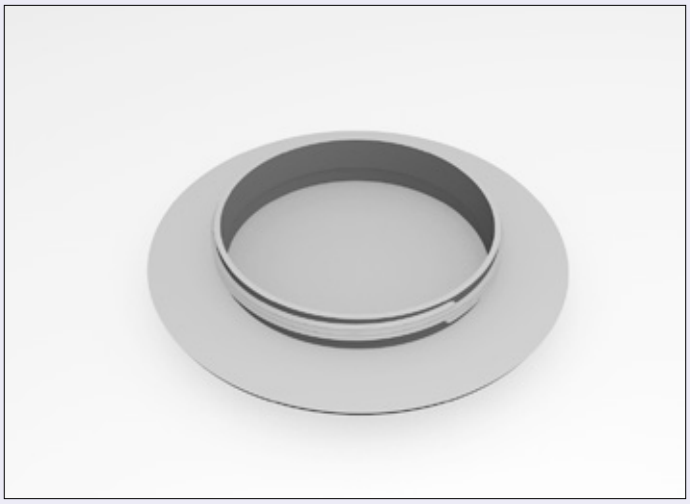
The number inserts have been given a -0.2mm tolerance to fit into the recessed areas. However, some trimming may be required for a fit as below.

Assembly instructions – clock back

1. Position and glue the printed part as shown below from the file onto the completed clock back:
Back_thread.stl

Note: Ensure the inner threaded collar is precisely centred on the back.

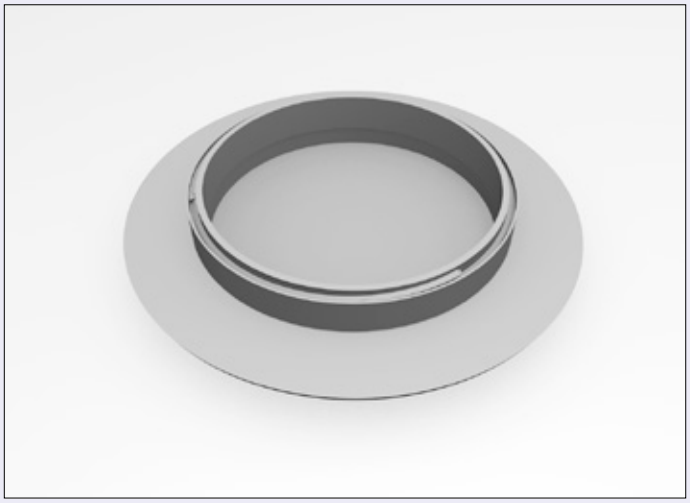


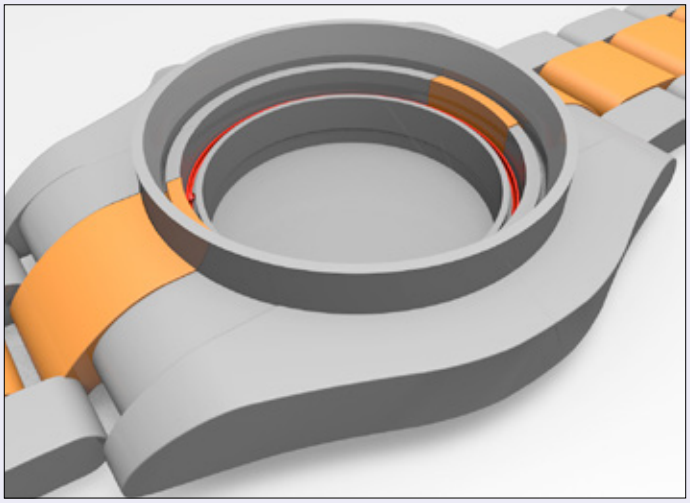


2. Screw the outer part onto the back thread collar and position the back into the main body.

3. Once the back is positioned correctly into the main body recess, glue the outer threaded collar (shown red below) onto the main body.

Ensure the threads are free to rotate and the back seats squarely.





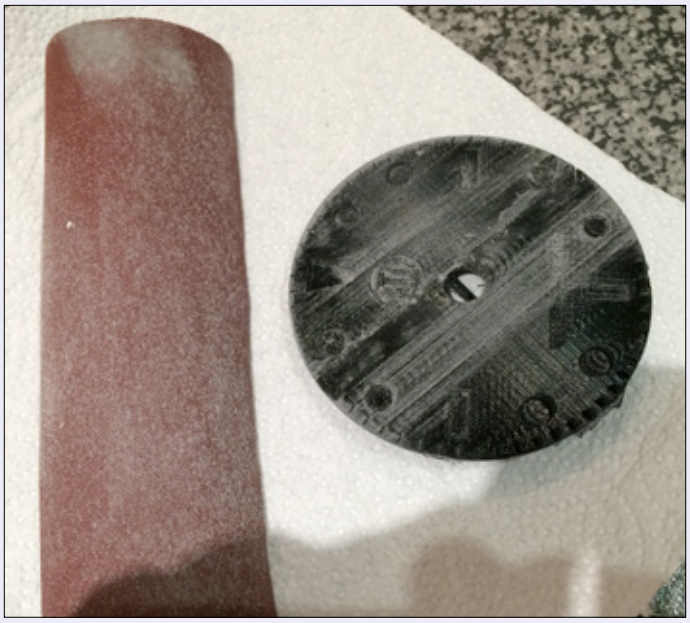
Finishing and assembly instructions – clock dial face

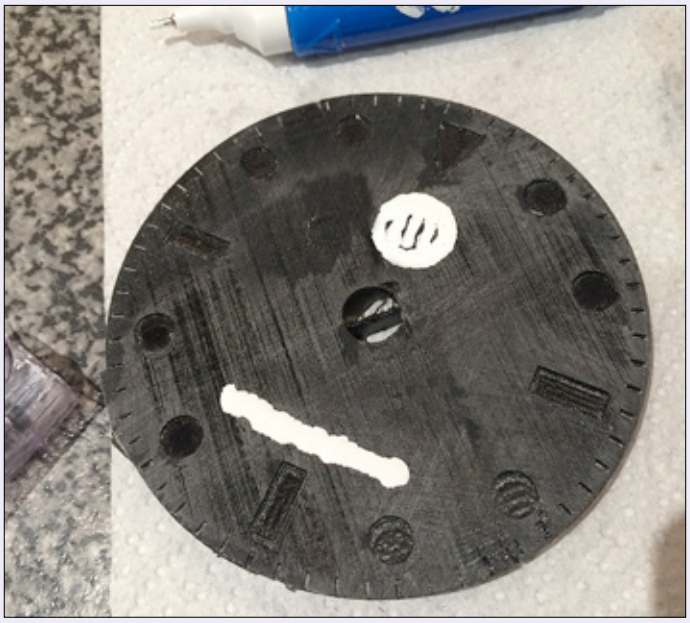
1. Remove the base supports but leave the three back supports on the printed file (grip these to help sanding) : **Face_dial_MB.stl**

Depending on the quality of the printed piece, some sanding may be required to smooth the surface.

2. Sand the surface to remove any pronounced z-axis layering to achieve as smooth a surface as possible.

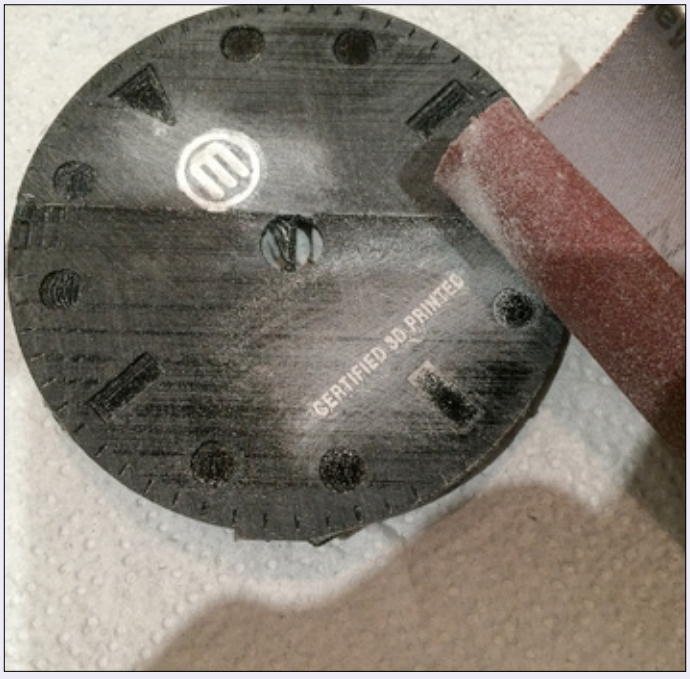
Use a Stationery correction fluid pen to 'flood' the de-bossed MB logo, wording and outer 'minute' markers.





3. When the Correction fluid is dry, surface sand away the over painted areas to reveal only the de-bossed features.

4. Repeat this process until all details are crisp and the surface is smooth. If the surface dries to a powdery finish, an application of a light oil (Baby Oil) will help darken the finish.



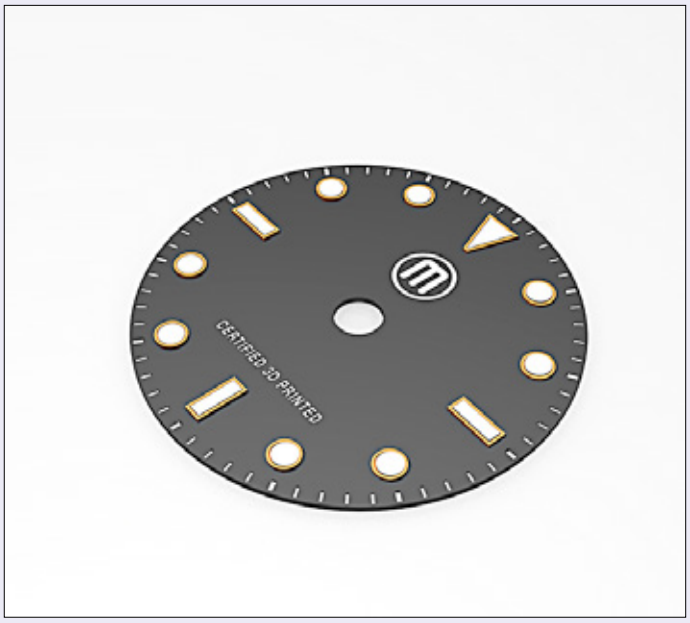
Assembly instructions – clock dial face, cont.

1. Remove all support material from the dial face and position as shown below from the files:

Dial_hour_inserts.stl

Dial_hours_outer.stl

2. Glue the ‘outers’ and ‘insert’ onto the dial face.



3. Ensure the face dial is positioned correctly.

4. Glue the Dial face onto the main body piece.

Assembly instructions – clock hands

1. Remove all support material from the printed pieces and position as shown below:

Hands.stl

Hands_inserts.stl

2. Glue the 'insert' onto the hands.

Note: The fit of these parts will depend on the print quality and resolution of your printer - this is a real test!

Some trimming will be required.

3. Obtain a standard battery Quartz clock movement (short shafts version) - http://www.maplin.co.uk/p/quartz-clock-movement-yu49d?gclid=CJyejrWM9slCFSX3wgodbYAAfA

4. Remove the movement 'hanging hook' and fix the movement through the face and connect the hands.

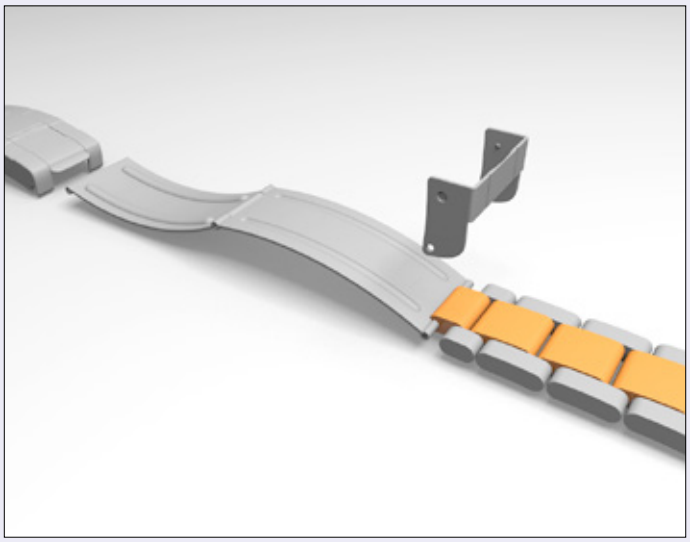
Note: The fit of the hands on the shafts will depend on the print quality and resolution of your printer - this is a real test! Some trimming may be required to secure the hands onto each shaft and allow free rotation.

Lightly glue the Acrylic disc http://www.sheetplastics.co.uk/Acrylic_Disc_Circles/Acrylic_Discs/3mm_clear_Acrylic_Discs_Circles?product_id=3054 onto the main body ring.

Assembly instructions – main clasp

1. Remove all support material from the printed pieces and position as shown below:

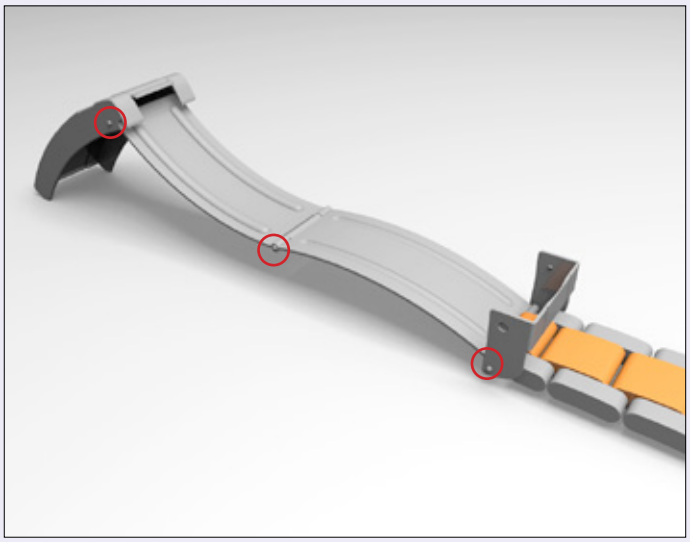
Main_clasp.stl
Clasp_hinge_latch.stl
Clasp_hinge_clasp.stl
Small_clasp.stl



2. Using 3mm filament or dowel, connect all links together.

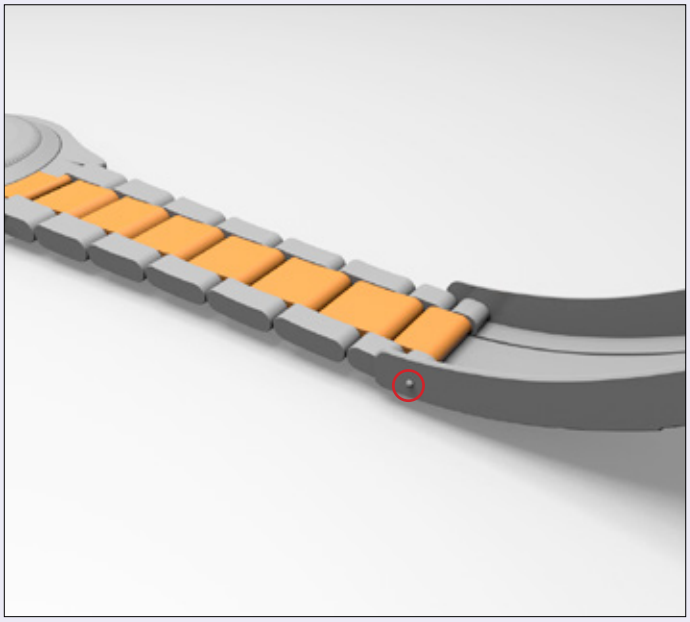
A 3mm drill may be needed to clean link connections.

The ‘pins’ connecting the links will require glueing only to the outer faces ◯.



3. Finally, connect the main clasp to the other bracelet. Glue the outer connection ◯.

Ensure all links, clasps and hinges ‘fold’ correctly and freely.



Completed clock… Enjoy!