Documentation

Rift S audiostrap GT air

Version 1.0

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Inhaltsverzeichnis

Foreword

The Oculus Rift S is a good and successful VR headset. However I have to struggle with some suffer. The picture is blurred and has some distortions on the edges and corners. In addition I can't find a comfortable and stable fitting with the original halo strap. But for me the worst is the built in audio solution.

So I made my own solution with the Rift S audiostrap GT air! And the name says it:

GT .... (Grand Tourismo) for long VR Sessions:

- New facial interface for better fitting
- Ventilation slots for a cooler face
- Better image quality with fewer distortions
- Hygienic leather pads
- Perfectly balanced weight on the head

air .... for the new air audio solution

- Hovering over the ears
- Phenomenal sound

Important to me was, that you can snap on the Rift S audiostrap GT air! The full guarantee is ensured and you easily build the headset back to its livery stable.

There are many more features to discover. You can adjust the cranial circumference, the headphone arms got a strong snapping raster and the speakers are supported by passive radiators. If you are interested in, you can watch my videos on Youtube:

- GT facemask and strap: https://youtu.be/a4QHpkwNaQQ
- air audio solution: https://youtu.be/ptJTi1SSkw4

Fort the facemask I adopted the form of the Oculus Rift Touch. It is best for my family and fits to me perfectly. This impression is very subjective and largely depends on your faces anatomy. But if you know the Oculus Rift Touch, you can imagine what you will get from the Rift S audiostrap GT air.

Warning notice: The tighter facemask could be unsuitable for wearer of glasses, especially because it narrows the gap between eyes and lenses!

Printerfiles

The printable files are designed to use less material as possible for granting high structural stability. All component parts are save das STL files and can be used on all common 3D printing methods (SLA, SLS and FDM).

Here's a list of all component parts needed. For FDM printing I added an additional column, showing which type of support structure has to be used.

GT facemask		
Files for SLA / SLS	Files for FDM	Support FDM
1x GT_Gasket.stl	1x GT_Gasket_FDM_PS.stl	PS + Slicer
GT strap		
Files for SLA / SLS	Files for FDM	Support FDM
1x GT_Gasket_Adapter_Left_Bottom.stl	1x GT_Gasket_Adapter_Left_Bottom_FDM.stl	Brim
	1x GT_Gasket_Adapter_Center_Left_FDM.stl	Brim
	1x GT_Gasket_Adapter_Hinge_Left_FDM.stl	Brim
1x GT_Gasket_Adapter_Left_Top.stl	1x GT_Gasket_Adapter_Left_Top_FDM.stl	Brim
1x GT_Strap_Left.stl	1x GT_Strap_Left_FDM_PS.stl	PS + Slicer
1x GT_Gasket_Adapter_Right_Bottom.stl	1x GT_Gasket_Adapter_Right_Bottom_FDM.stl	Brim
1x GT_Gasket_Adapter_Right_Top.stl	1x GT_Gasket_Adapter_Right_Top_FDM.stl	Brim
	1x GT_Gasket_Adapter_Center_Right_FDM.stl	Brim
	1x GT_Gasket_Adapter_Hinge_Right_FDM.stl	Brim
1x GT_Strap_Right.stl	1x GT_Strap_Right_FDM_PS.stl	PS + Slicer
air speaker		
Files for SLA / SLS	Files for FDM	Support FDM
1x GT_Air_Base_Left.stl	1x GT_Air_Base_Left_FDM_PS.stl	PS
1x GT_Air_Hinge_Left.stl	1x GT_Air_Hinge_Left_FDM_PS.stl	PS
1x GT_Air_Arm_Left.stl	1x GT_Air_Arm_Left_FDM_PS.stl	PS + Slicer
1x GT_Air_Base_Right.stl	1x GT_Air_Base_Right_FDM_PS.stl	PS
1x GT_Air_Hinge_Right.stl	1x GT_Air_Hinge_Right_FDM_PS.stl	PS
1x GT_Air_Arm_Right.stl	1x GT_Air_Arm_Right_FDM_PS.stl	PS + Slicer
2x GT_Air_Hinge_Axis_Plate.stl	2x GT_Air_Hinge_Axis_Plate_FDM_PS.stl	PS
2x GT_Air_Hinge_Axis.stl	2x GT_Air_Hinge_Axis.stl	PS
2x GT_Air_Hinge_Raster.stl	2x GT_Air_Hinge_Raster.stl	
2x GT_Air_Speaker.stl	2x GT_Air_Speaker.stl	
2x GT_Air_Cover.stl	2x GT_Air_Cover_FDM_PS.stl	PS
2x GT_Air_Cover_Reflex.stl	2x GT_Air_Cover_Reflex.stl	
8x GT_Air_Cover_Clamp.stl	8x GT_Air_Cover_Clamp_FDM_PS.stl	PS
air amplifier		
Files for SLA / SLS	Files for FDM	Support FDM
1x GT_Air_Box_Back.stl	1x GT_Air_Box_Back_FDM_PS.stl	PS
1x GT_Air_Box_Front.stl	1x GT_Air_Box_Front.stl	
1x GT_Air_Box_Logo.stl	1x GT_Air_Box_Logo.stl	

Hints for SLA

The strap hinge is constructed to be printed directly in one process. So you should keep the rotating parts in mind when you are planning support structures. Furthermore you have to clean the hinge accurate from uncured resin.

Hints for FDM

For myself I printed in FDM on my Ultimaker 2+ withe a layer hight of 0,2 mm and 30% Infill. I used PLA as material.
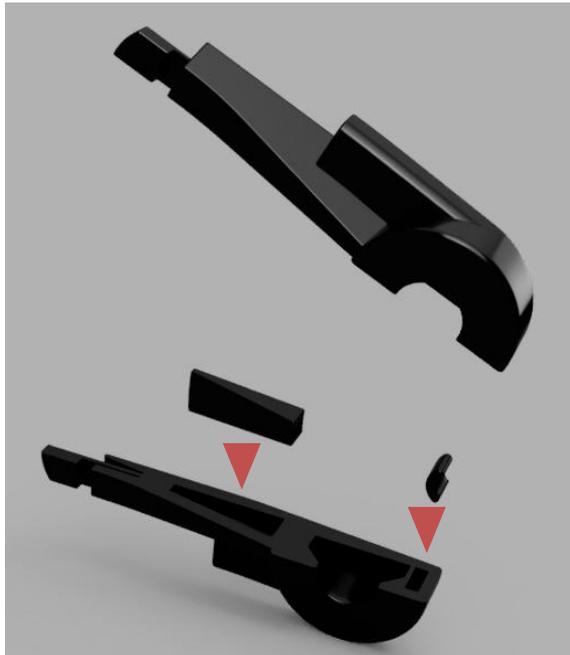
I devided the strap adapter clamp into some more parts, in order to get it better printable. These files are named with the suffix "_FDM".

The separated clamp curve (GT_Gasket_Adapter_Hinge_Left_FDM.stl) and cotter pin (GT_Gasket_Adapter_Center_Left_FDM.stl) have to be glued into one side of the strap adapter clamp (GT_Gasket_Adapter_Left_Bottom_FDM.stl).

I suggest to print the facemask standing upright to provide best stability for the locking bracket at the bottom of the gasket. So that you don't have to print support onto the inner side of the model, I have constricted a plateau on which the support can be laid down.

The facemask should be printed with 100% infill and slightly increased extrusion multiplier. This is especially for the weakest part between end of the cable duct and the fixed link to the headset. A good layer adhesion in this section is very important! (The housing has to be thin here in order to get the eyes closer to the lenses.)

Hints for planned supports (PS)

For some parts I have constructed planned supports (PS). This support needs less material and is easy to remove. These files are named with the suffix "_FDM_PS".

Despite of planned support some components need more additional support. This additional support is easier set in your slicer. You can find an advice in the chart, when have to plan own support in your slicer.

In order to identify the planed support to remove it more easily, I highlighted them in green on the following pictures.

GT_Gasket_FDM_PS [part 1]	GT_Gasket_FDM_PS [part 2]
GT_Air_Base_Left_FDM_PS	Air_Base_Right_FDM_PS
GT_Air_Arm_Left(Right)_FDM_PS	Strap_Left(Right)_FDM_PS
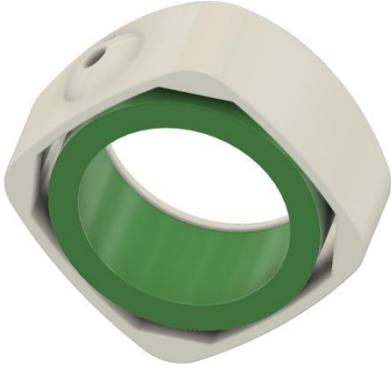
GT_Air_Cover_FDM_PS	GT_Air_Cover_Clamp_FDM_PS

GT_Air_Hinge_Left(Right)_FDM_PS	GT_Air_Hinge_Axis_Plate_FDM_PS

GT_Air_Box_Back_FDM_PS

Purchased parts

In addition to the printed components some parts have to be purchased.
(Weblinks are exemplarily, they should help you to find the right parts.)

GT Gesichtsmaske	
	1x Face foam Basis-Set für Gesichtsschnittstelle und Schaumersatz für Oculus™ Rift ASIN: B073TTMW9M https://www.amazon.de/VR-Cover-Basis-Ersatzset-Interface-Schaumstoffpolster/dp/B073TTMW9M/ref=sr_1_3?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=vr+cover+rift&qid=1615631009&sr=8-3 The leather face foam is the only part needed. But I only found it as set from VR cover. But its thin and of high quality.
	1x Velcro strip Klebeshop24 KLETTBAND SELBSTKLEBEND ASIN: B01MUGJ447 https://www.amazon.de/dp/B01MUGJ447/ref=sspa_dk_detail_1?pd_rd_i=B01MUGJ447&pd_rd_w=zEKSv&pf_rd_p=8ba6da41-0794-4ffc-80e6-91844af04175&pd_rd_wg=5oZia&pf_rd_r=9A53VWH062BZXGQEZS0T&pd_rd_r=4d180264-7dca-482b-8e9e-b600b130ab19&spLa=ZW5jcnlwdGVkUXVhbGlmaWVyPUEyWUNRNzA4WFpUUjdYJmVuY3J5cHRlZElkPUEwNzEzMTEwMTdQWUVZTlBVSzZNUyZlbmNyeXB0ZWRBZElkPUExMDQwMDIzM0pKMUlLQks5WVZZNSZiZ3aWRnZXROYW1lPXNwX2RldGFpbF90aGVtYXRpY19hcF9tb2JpbGVfd2ViJmFjdGlvbj1jbGlja1JlZGlyZWN0JmRvTm90TG9nQ2xpY2s9dHJ1ZWU&th=1 Only the rough side is needed. It is stuck to the inner side of the interface.

GT Strap

	1x	**Welding strap**
		NON-ORIGINAL Miller Generation II Headgear 256174 Welding helmet Parts Headband
		https://www.zaversone.com/index.php?main_page=product_info&products_id=136990
		or
		https://parts.weldinghelmet.biz/jinslu-non-original-miller-generation-ii-headgear-256174.html?product_id=qKZIi30gZBcspw
		Alternative you should be able to use any other welding strap from MILLER. (They should be compatible but I haven't tested it.)
	2x	**Headband**
		kwmobile Bose Quietcomfort Bügelpolster - Kunstleder Kopfbügel Polster für Bose Quietcomfort Kopfhörer
		ASIN: B07BW9MQBW
		https://www.amazon.de/kwmobile-Kopfb%C3%BCgelpolster-f%C3%BCr-Bose-Quietcomfort-Schwarz/dp/B07BW9MQBW/ref=sr_1_7?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=kopfh%C3%B6rer%2Bb%C3%BCgelpolster%2Buniversal&qid=1590334059&sr=8-7&th=1
		or
		https://www.amazon.de/WEWOM-Ersatz-B%C3%BCgelpolster-Passend-Kopfh%C3%B6rer-Schwarz/dp/B07FGDX1KH/ref=sr_1_24?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&crid=1K8RA4CPFDH7T&dchild=1&keywords=kopfh%C3%B6rer+b%C3%BCgelpolster&qid=1590326626&sprefix=Kopfh%C3%B6rer+b%C3%BCgelpol%2Caps%2C176&sr=8-24

air speaker		
	2x	**Speaker** Visaton BF 37 1.5 Zoll 3.7 cm Breitbänder 5 W 4 Ω EAN: 4007540022604 https://www.conrad.de/de/p/visaton-bf-37-1-5-zoll-3-7-cm-breitbaender-5-w-4-2141393.html
	1x pair	**Passive radiator** SimpleLife 40mm Lautsprecher Vibration Membran-Passiv Radiator Subwoofer Bass Gummi Woofers ASIN: B07JGWXCVS https://www.amazon.de/SimpleLife-Lautsprecher-Vibration-Membran-Passiv-Subwoofer/dp/B07JGWXCVS/ref=sr_1_2?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=bass+radiator+40mm&qid=1597141498&sr=8-2 From SimpleLife I always got pairs. Thats why I counted 1 pair. Some other vendors only sell 1 piece. Then it would be 2 pieces.
	10x	**Tapping screw** Linsenkopf Blechschraube PH-Antrieb Ø 3,5 mm x 9,5 mm Schwarz https://www.obi.de/spanplattenschrauben-universalschrauben/lux-linsenkopf-blechschraube-ph-antrieb-3-5-mm-x-9-5-mm-schwarz-verz-12-st-/p/4888012?wt_mc=gs.pla.Technik.EisenwarenBeschlaege.Schrauben&wt_cc1=664779265&wt_cc4=c&wt_cc9=35461689564&gclid=CjwKCAiA4rGCBhAQEiwAeIVtiyXZxafm2hZMy4zxSzfhIDnej3VWlYwZOl9mR8tVR_A7EqPE77wAwxoC8YkQAvD_BwE I had similar screws (3mm x 9mm) at home. Srews with 12 mm length and countersunk should also work fine.
	1x	**Audio cable 25 cm** 25 cm cable 2 strand with outer diameter about 3mm
	1x	**Audio cable 50 cm** 50 cm cable 2 strand with outer diameter about 3mm for example: Sommer Cable 200-0401 Audiokabel 2 x 0.22 mm² EAN: 2050001138286 https://www.conrad.de/de/p/sommer-cable-200-0401-audiokabel-2-x-0-22-mm-schwarz-meterware-609440.html

air amplifier

	1x	**Amplifier**
		Audio Verstärkerplatine, Droking PAM8406 Digitale Endstufe 5W + 5W Immersion Gold Stereo Amp 2.0 Zweikanal Mini Klasse D DC5V Verstärker DIY Schaltung Modul für Bücherregal Boden Lautsprecher ASIN: B07J6GX2YN
		https://www.amazon.de/dp/B07J6GX2YN/ref=cm_sw_em_r_mt_dp_z5tmFbZP30231
	1x	**5m USB extension cable**
		5m USB 2.0 High Speed Kabel Verlängerungskabel ASIN: B00OPXLPJI
		https://www.amazon.de/Verl%C3%A4ngerungskabel-Stecker-Buchse-Anschlusskabel-Steckverbindung/dp/B00OPXLPJI/ref=sr_1_16?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&crid=3IAGL9G3XFUMW&dchild=1&keywords=5m+usb+kabel+verl%C3%A4ngerung&qid=1615642021&sprefix=5m+usb+kabel%2Caps%2C172&sr=8-16
		The USB extension cable is only needed to provide power to the amplifier. So you can get a really cheap one. The female connector will be cut off.
	1x	**Headphone cable**
		Premium-Audio-Kabel. 20cm kurz. 3,5-mm-Klinke. AUX. Stecker gewinkelt 90° + gerade. Case/Bumper-kompatibel. 0,2m ASIN: B00JV0HF0I
		https://www.amazon.de/ams-Tipp-2015-Premium-Audio-Kabel-5-mm-Klinke-Bumper-kompatibel/dp/B00JV0HF0I/ref=sr_1_293?__mk_de_DE=%C3%85M%C3%85%C5%BD%C3%95%C3%91&dchild=1&keywords=kabel+klinke+3+5+auf+3+5+10cm&qid=1597144005&sr=8-293

Assembling air speaker

Search for all printed and purchased
parts for the air speaker.


Start with the assembly of the speaker
cover.

Put the passive radiator into the speaker
cover (GT_Air_Cover). The painted side
should be oriented outside. The rubber
must lay flat on the cylindrical cutout.

Insert the mounting ring
(GT_Air_Cover_Reflex) into the cylindrical
cutout of the cover.

Stick one mounting clamp
(GT_Air_Cover_Clamp) into a corner of the
cover. You have to see the screw hole.

Repeat with with the three remaining
mounting clamps.
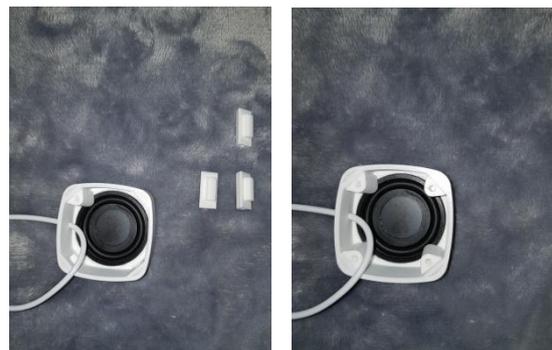
Solder the audio cable to the Visaton BF 37. The red positive terminal goes to the right connecting link.

Run in the audio cable through the speaker arm (GT_Air_Arm_Left(Right)) and the cable hole in the speaker cover (GT_Air_Cover).
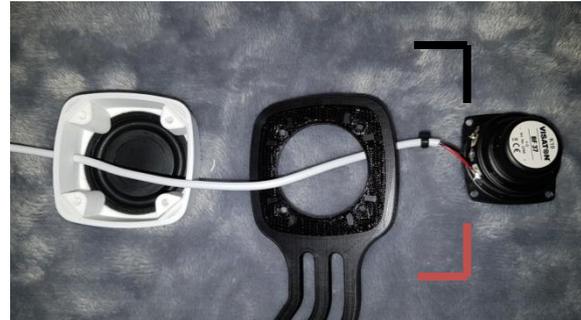
Put the speaker arm onto the cover.

The cable hole should be oriented along the arm.

Insert the Visaton BF 37 into the socket of the speaker arm.

Insert the speaker frame (GT_Air_Speaker) into the socket of the speaker arm.

Screw the speaker frame to the arm (four screws).

All parts will be tightened automatically.

Insert the hinge axis (GT_Air_Hinge_Axis) from underneath into the speaker arm.

The three posts must fit into the holes of the speaker arm.

Put the hinge raster (GT_Air_Hinge_Raster) from the upper side onto the hinge axis.

The cylindrical ending must face towards the speaker arm.

Put the hinge arrester (GT_Air_Hinge_Left(Right)) into the hinge raster.

The three posts must fit into the holes of the speaker arm.

Attach the base adapter (1x GT_Air_Base_Left(Right)).

The hinge raster must fit into the pattern of the speaker arm.

Put in the axis endplate
(GT_Air_Hinge_Axis_Plate).

Because of the hexagonal fitting pattern,
the endplate rotates together with the
axis. This prevents the screw to become
loose when adjusting the speaker arm.

Put a screw into the center of the axis.

Assembling air amplifier

Run in the two audio cable and the USB power cable through the cable hole in the back plate (GT_Air_Box_Back) of the amplifier box.

Connect the right 50 cm audio cable to the left upper socket of the Droking PAM8406 amplifier.

Connect the left 25 cm audio cable to the left bottom socket.

Connect the 5 m USB power cable to the right socket.
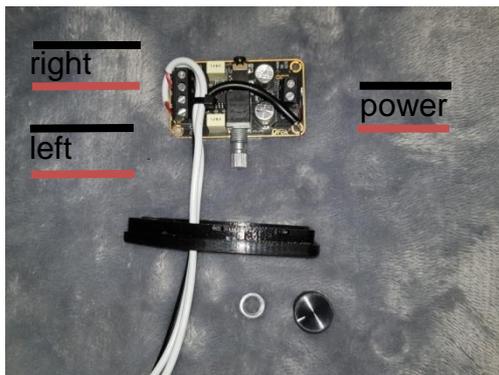
Push the Droking PAM8406 amplifier into the mounting of the back plate.

Fasten the amplifier with the screw nut.

Put on the rotary knob of the amplifier.
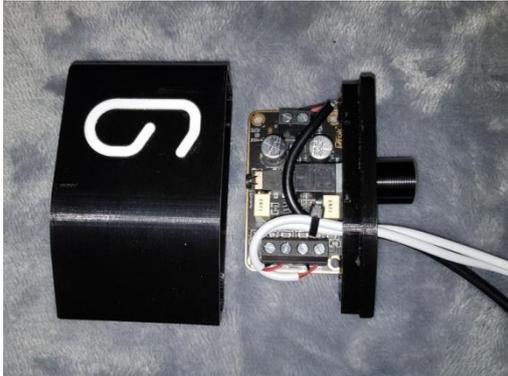
Glue the GT logo (GT_Air_Box_Logo) into the recess on the front box (GT_Air_Box_Front).

Put the amplifier into the front box (GT_Air_Box_Front).
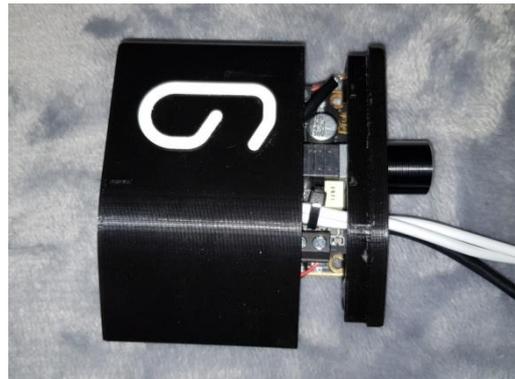
Push the back plate (GT_Air_Box_Back) into the front box (GT_Air_Box_Front), till it snaps in.

Here's a picture of the fully assembled air audio solution:

If you can hear a permanent supply noise (buzz), it depends on feedback from the USB power supply. Here it would help to change the USB port or you can use an external USB power adapter.

Assembly of the Rift S audiostrap GT air

For the assembly of the Rift S audiostrap GT air, I refer to my YouTube videos. They show detailed step by step guidance.

- GT facemask and strap: https://youtu.be/a4QHpkwNaQQ
- air audio solution: https://youtu.be/ptJTi1SSkw4