Tools for data recovery experts

Guide for using HddSurgery™ head change tools:

- ***HDDS Sam & Tshb 2.5” Ramp Set***

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1. Introduction

This guide is intended as a short course in handling of our tools for professionals in data recovery. It is assumed that the user is experienced in data recovery and familiar with "traditional" ways of saving data. This manual should not be taken as a guide for training.

Using these tools without adequate software support is not recommended. It is recommended to use some of the proven systems for cloning, such as Ace Lab, Salvation Data, Copy-r and other products.

It is possible to recover data without HddSurgery™ tools. In many cases, the known processes of hard drive head replacement are effective and sufficient. The general idea behind HddSurgery™ tools was to make sure that the process of replacing damaged hard drive heads goes with no errors. The use of HddSurgery™ tools prevents the ferromagnetic read/write heads to come in any kind of contact with the platter i.e. disk surface or other read/write heads. Also, with some basic procedures and short training, it is possible to let junior data recovery technicians handle complex tasks. With the development of these tools, we are trying to eliminate the element of luck that usually accompanies the process of data recovery.

Experienced data recovery technicians or engineers can have great success even without our tools, but they can have absolute security only by using HddSurgery™ tools.

Non-contact head replacement implies that there is no contact between the heads, or between heads and platters in the process of dismounting the donor heads and mounting heads on the patient drive. Traditional techniques of replacing the heads imply contact between the heads and contact of heads with the platters in data area. These problems especially come to light on drives that have suffered some form of physical damage.

This tool doesn't solve the head compatibility problem. It will only assure that the head replacement goes easily. If you have questions about compatibility, you can send them to HddSurgery™ support team on support@hddsurgery.com

HddSurgery™ is not responsible for any eventual damage caused by usage of our tools. HddSurgery™ is not responsible for the data stored on the patient or donor hard drives.

2. HddSurgery™ Sam & Tshb 2.5" Ramp Set head replacement tools

HddSurgery™ **HDDS Sam & Tshb 2.5" Ramp Set** is a set of head replacement tools which can be used to safely and easily replace heads on the most of the modern 2.5" Samsung and Toshiba hard drives which "park heads" on a ramp. Set contains 8 pairs of head replacement tools: **Sam 2.5" Ramp S2**, **Sam 2.5" Ramp S3**, **Sam 2.5" Ramp MP S2**, **Tshb 2.5" Ramp MK T2, Tshb 2.5" Ramp MK T3, Tshb 2.5" Ramp MQ T1, Tshb 2.5" Ramp MQ T2** and **Tshb 2.5" Ramp MQ T3**.

Sam 2.5" Ramp S2

This head replacement tool can be used on 2.5" Samsung hard drive models which have 1 or 2 platter(s), which park their head(s) on a ramp.

Sam 2.5" Ramp S3

This tool is used on Samsung 2.5" hard drives with 3 platters, which park their heads on a ramp.

Sam 2.5" Ramp MP S2

Samsung 2.5" Ramp MP S2 head replacement tool can be used on 2.5" older Samsung hard drive (MP-prefix) models which have 1 or 2 platter(s) and their head(s) parked on a ramp.

Tshb 2.5” Ramp MK T2

Tshb 2.5” Ramp MK T2 head replacement tool can be used on 2.5” (MK-prefix) Toshiba hard drive models which have 1 or 2 platter(s) and their head(s) parked on a ramp.

Tshb 2.5” Ramp MK T3

Tshb 2.5” Ramp MK T3 head replacement tool can be used on 2.5” (MK-prefix) Toshiba hard drive models which have 3 platters and their heads parked on a ramp.

Tshb 2.5” Ramp MQ T1

Tshb 2.5” Ramp MQ T1 head replacement tool can be used on 2.5” (MQ-prefix) Toshiba hard drive models which have 1 platter and their head(s) parked on a ramp.

Tshb 2.5” Ramp MQ T2

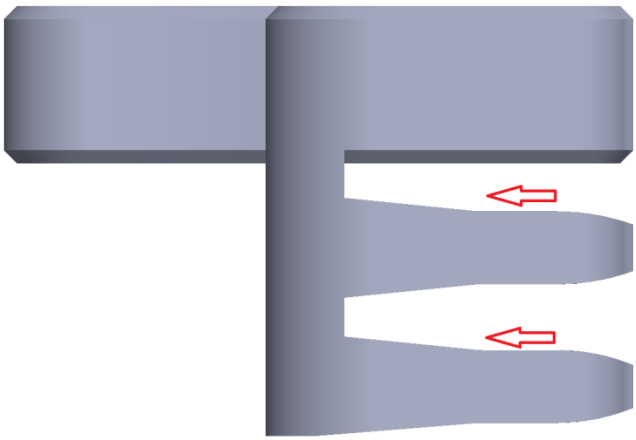
Tshb 2.5” Ramp MQ T2 head replacement tool can be used on 2.5” (MQ-prefix) Toshiba hard drive models which have 2 platters and their heads parked on a ramp.

Tshb 2.5” Ramp MQ T3

Tshb 2.5” Ramp MQ T3 head replacement tool can be used on 2.5” (MQ-prefix) Toshiba hard drive models which have 3 platters and their heads parked on a ramp.

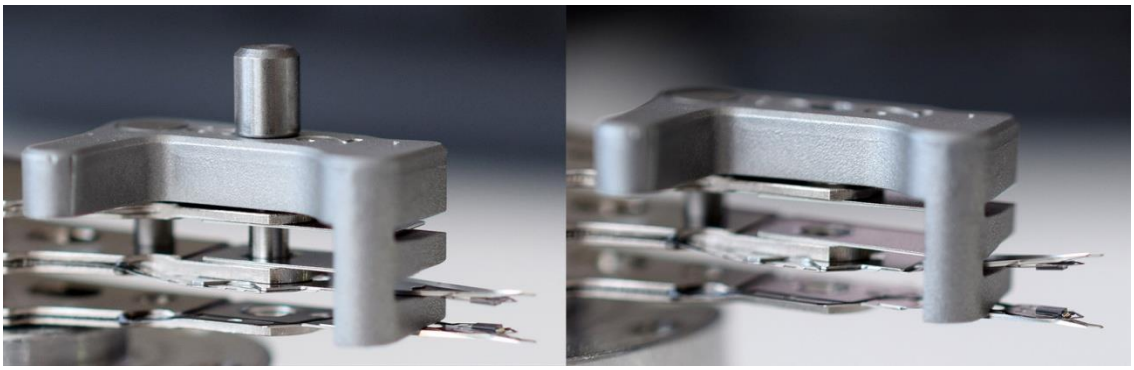
What's new?

HddSurgery pays a lot of attention to the feedback of our customers, and the result of that is an innovation which allows better inspection of the heads and creates more room for safer manipulation.



Picture 2.1 Front view of Sam & Tshb 2.5" S2 tool and the "Peter slope"

Our esteemed customer, colleague and friend Peter Magyar from Adatmentes pointed out that adding a slope to the combs could increase the efficiency of the tool in the ways we mentioned above, and HddSurgery™ acknowledged the benefit of this improvement and named it "Peter Slope" to honor his contribution. Sometimes, that extra space which this slope provides makes the whole difference while inspecting the heads, in other cases, the tool should be used normally.



Picture 2.2 "Peter Slope"

3. Supported models

HDDS Sam & Tshb 2.5” Ramp Set
Samsung supported models

List of **Samsung** families and models on which process of head replacement could be performed by using the ramp tools from HDDS Sam & Tshb 2.5'' Ramp Set.

Spinpoint M40, MN40	Spinpoint M40S	Spinpoint M60P, M40SG, MN40S	Spinpoint M80P, M80S	Spinpoint M5S
MP0302H MP0402H MP0603H MP0804H	HM020GI HM20GIJ HM040HI HM060II HM080JI	HM040HC HM080II HM041HI HM100JC HM060HC HM100JI HM060HI HM120JC HM080IC HM120JI	HM080HC HM080HI HM120IC HM120II HM160JC HM160JI	HM080GC HM121HC HM160HC
Spinpoint MPS1, MPS2	**Spinpoint M6**	**Spinpoint M7**	**Spinpoint M7E**	**Spinpoint M7E (Seagate models)**
HM080GI HM160HI HM250JI	HM061GI HM080GI HM121HI HM161HI HM251JI HM320JI	HM120GI HM250HI HM320II HM500JI	HM161GI HM251HI HM321HI HM501II HM641JI	ST160LM000 ST250LM000 ST320LM000 ST500LM011 ST640LM000
Spinpoint M8	**Spinpoint M8 (Seagate models)**	**Spinpoint M8E**	**Spinpoint M8E (Seagate models)**	**Spinpoint MT2**
HN-M160MBB HN-M250MBB HN-M320MBB HN-M500MBB HN-M640MBB HN-M750MBB HN-M101MBB	ST250LM004 ST320LM001 ST500LM012 ST640LM001 ST750LM022 ST1000LM024	HN-M101XBB HN-M500XBB HN-M101ABB HN-M500ABB	ST1000LM026 ST500LM016 ST1000LM025 ST500LM014	HM100UI

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HDDS Sam & Tshb 2.5” Ramp Set
Toshiba supported models

List of the **Toshiba** families and models on which process of head replacement could be performed by using ramp tools from HDDS Sam & Tshb 2.5'' Ramp Set.

59GSM MK7559GSM MK1059GSM	**65GSY** MK1665GSY MK2561GSY MK3265GSY MK5065GSY MK6465GSY	**MQ01ABD** MQ01ABD025 MQ01ABD032 MQ01ABD050 MQ01ABD064 MQ01ABD075 MQ01ABD100	**MQ01ABU** MQ01ABU032BW MQ01ABU032W MQ01ABU050BW MQ01ABU050W
59GSX(P) MK3259GSX MK5059GSX MK6459GSX MK7559GSX	**65GSX** MK1665GSX MK2565GSX MK3265GSX MK5065GSX MK6465GSX	**MQ01AAD** MQ01AAD010C MQ01AAD020C MQ01AAD032C	**MQ01ACF** MQ01ACF050 MQ01ACF032
61GSY MK1661GSY MK2561GSY MK3261GSY MK5061GSY MK6461GSY	**75GSX** MK3275GSX MK5075GSX MK6475GSX MK7575GSX	**MQ01ABC** MQ01ABC100 MQ01ABC150	**MQ01ABD-VS** MQ01ABD025VS MQ01ABD050VS MQ01ABD100VS
63GSX MK3263GSX	**76GSX** MK3276GSX MK5076GSX MK6476GSX	**MQ01ABF** MQ01ABF025 MQ01ABF032 MQ01ABF050	**MQ01ABD-H** **MQ01ABF-H** MQ01ABF050H MQ01ABD075H MQ01ABD100H

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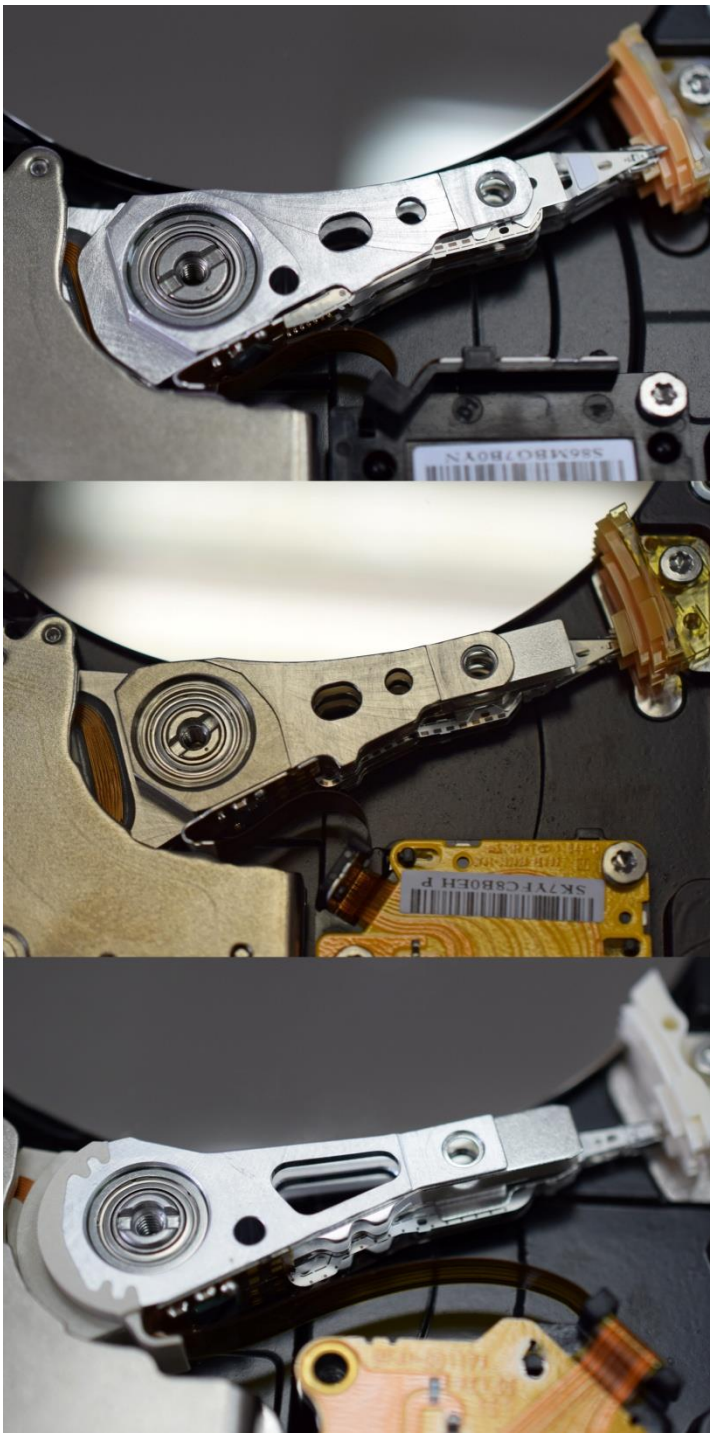
4. Specificities of Samsung and Toshiba 2.5'' hard drives and features of HDDS Sam & Tshb 2.5'' ramp tools

Samsung

4.1 Hole used for mounting Samsung 2.5'' ramp tools

There are many different models (and mechanics) of modern Samsung 2.5'' hard drives. Actuator arms of these various mechanics are mutually different in terms of shape, dimensions and number of holes on them.

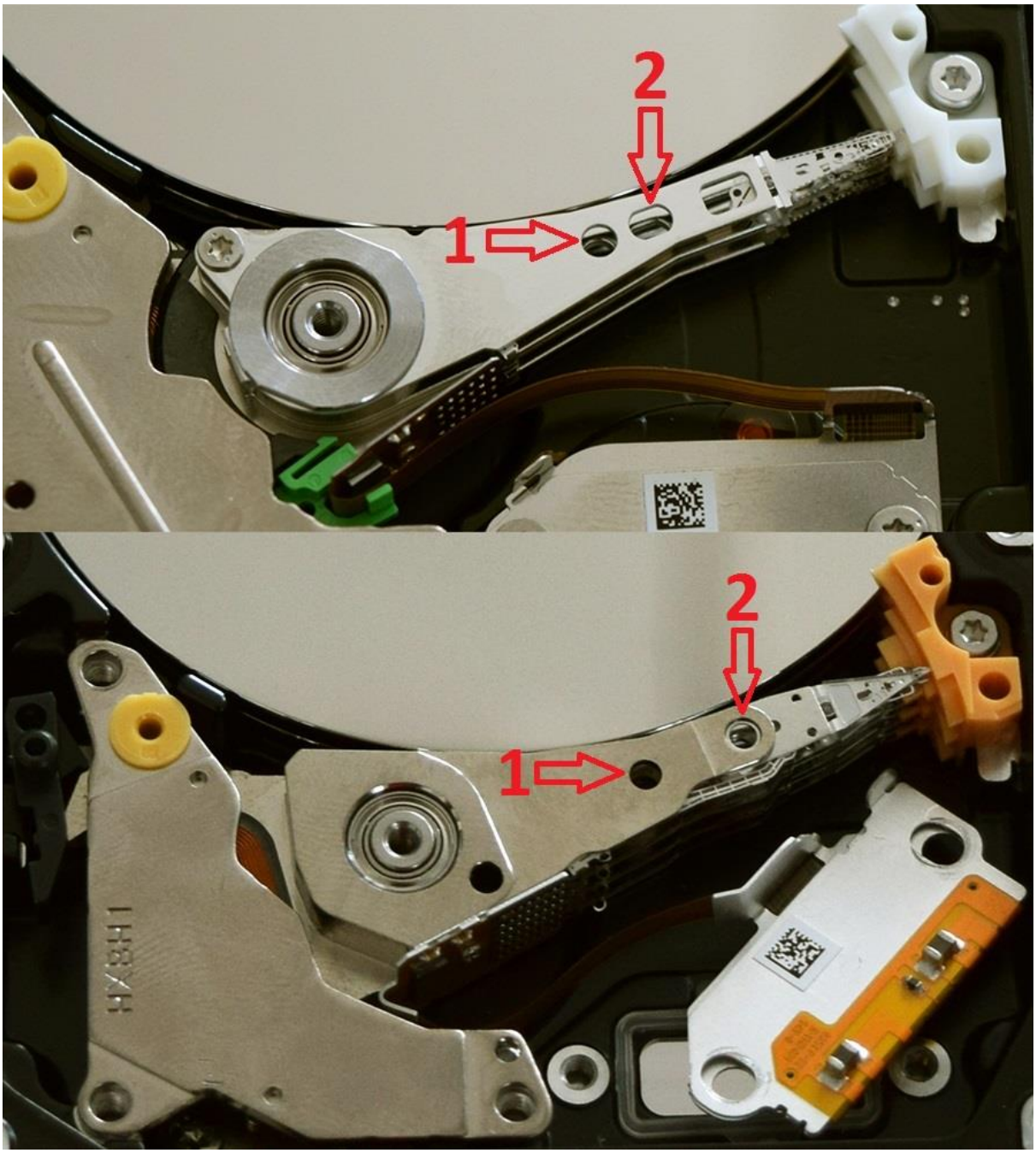
On most of the models there is a hole (second closes to the heads) on the actuator arm which is used for mounting of the HddSurgery Samsung 2.5'' ramp tools (S2 and S3 tools) and another hole used for mounting of the safety pin.



Picture 4.1 Hole on the actuator arms of two different Samsung 2.5'' hard drives

Toshiba

4.2 Hole used for mounting Toshiba 2.5'' ramp tools



Picture 4.2 Holes on the actuator arms of two different Samsung 2.5'' hard drives (1 marks the whole for the tool's axel, and 2 marks the hole for the pin)

5. Handling the tools

When not in use, the tools should always be kept in a wooden box delivered with the tools. This way of keeping the tools prevents any possible damage which could appear when not handled properly.

While taking the tool out of the box, always hold it for the shank. Never hold the tool in the part where the head lifting snouts are.

Due to the sensitivity of hard drive platters to dust and any kind of contamination, be sure to clean the tools before their use. Tools can be cleaned with a piece of cotton wool and alcohol. When cleaning the head lifting snouts, be extremely gentle.

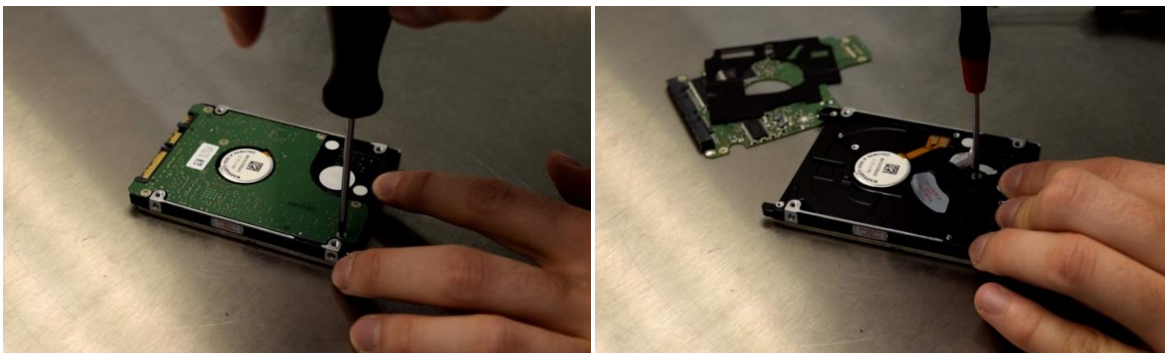
Picture 5.1. (HDDS Sam & Tshb 2.5'' Ramp Set)

6. Head replacement process on Samsung hard drives

Step 1 – Preparing the hard drive for head replacement

To prepare the hard drive for head replacement process it is needed to dismount the PCB (circuit board on the bottom side) and to take off the lid from the top of the hard drive.

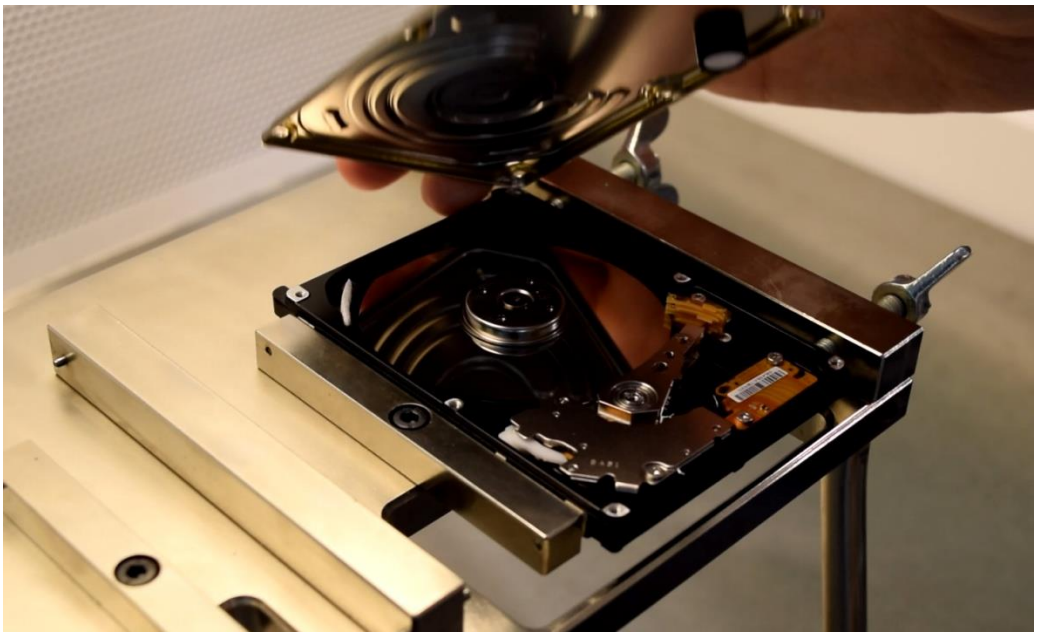
Loosen and remove all the screws on the PCB and dismount the circuit board. Loosen the screw, which is holding the head assembly from the bottom, just a little bit and then tighten it again. This is needed in order to avoid problems of loosening the mentioned screw later in the process.



Picture 6.1 Dismounting the PCB and loosening and tightening of the screw which is holding the head assembly from the bottom

Loosen and remove all the screws from the hard drive lid and open the hard drive casing.

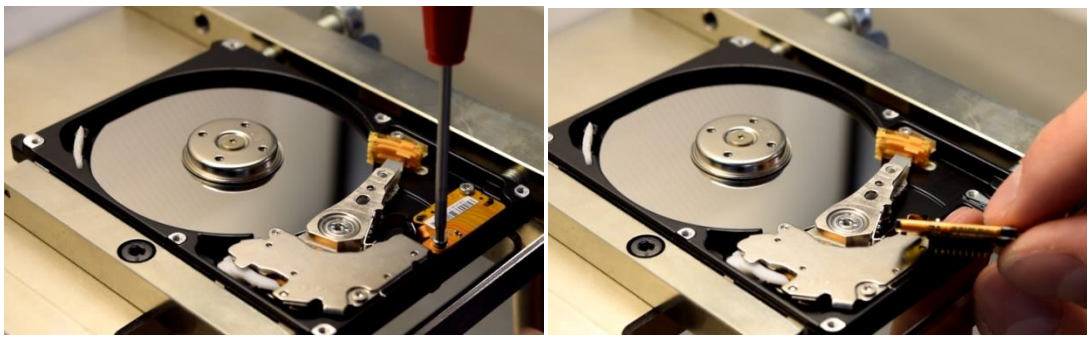
Picture 6.2 Unscrewing the lid



Picture 6.3 Opening the casing

Step 2 – Releasing the flat cable connector

Remove the two screws that are holding the flat cable connector and push the connector from the bottom upwards to release it. Pressure from below may cause the connector to pop out and possibly damage the platters. Because of this, hold the top of connector with another hand while pushing it from the bottom. Before applying pressure, remove the screws from their holes.



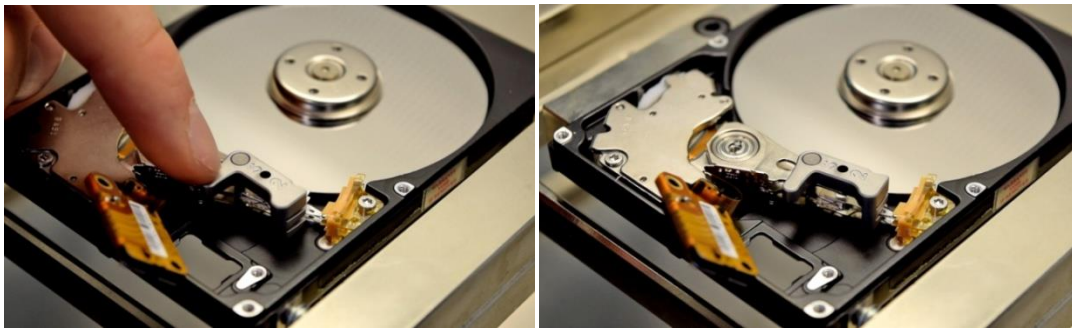
Picture 6.4 Dismounting the flat cable connector

Step 3 – Mounting the tool on the donor drive actuator arm

Carefully center the axle of the tool over the hole which is the **second closest** to the top of the head arm (near the heads themselves). Take care that the snouts stand away from the heads, and put the axle of the tool through hole in the actuator arm. Axle of the tool should go easily through this hole.

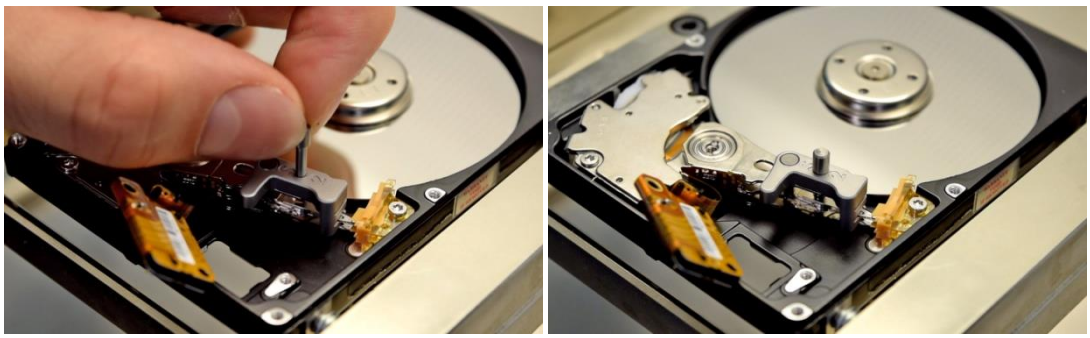
Picture 6.5 Mounting the tool on the actuator arm

Push the tool so the snouts go between the heads. These snouts will keep the distance between the heads and assure that the heads don't touch each other after sliding them off the ramp. Before pushing the snouts check if the tool is lying straight and steady on the actuator arm and make sure it achieves a steady and straight position before pushing the snouts.



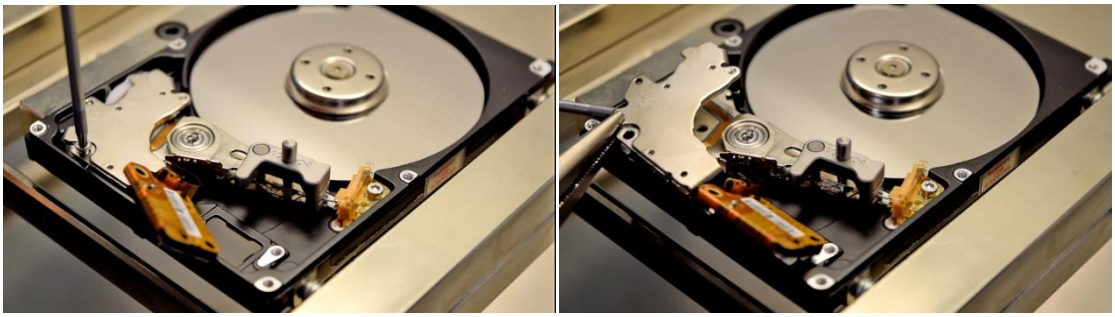
Picture 6.6 Rotating the tool - snouts are positioned between the heads

Secure the head's position on the tool by inserting the safety pin. The pin should go through the hole easily.



Picture 6.7 Securing the heads with the tool

Step 4 – Dismounting the upper magnet

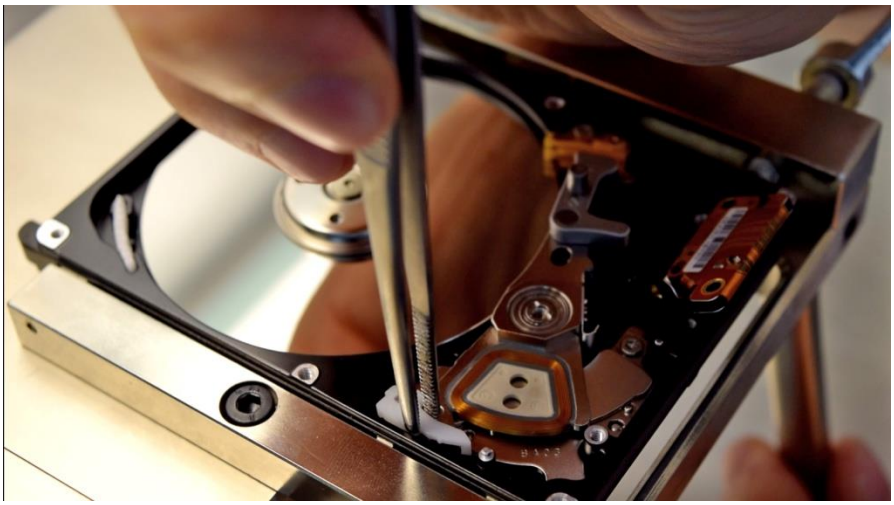


Picture 6.8 Removing the screws connecting upper magnet to the HDD casing (left); Removing the upper magnet with the needle-nose pliers (right);

Remove the magnet carefully using the needle-nose pliers (use the HDD casing as a lever).

Step 5 – Removing the security brake

Carefully remove the security brake, placed in the area behind the magnets. Use the tweezers in the process.



Picture 6.9 Removing the security brake

Firstly, loosen and remove the screw which connects the upper magnet to the HDD casing. Then, remove the upper magnet by using needle-nose pliers.

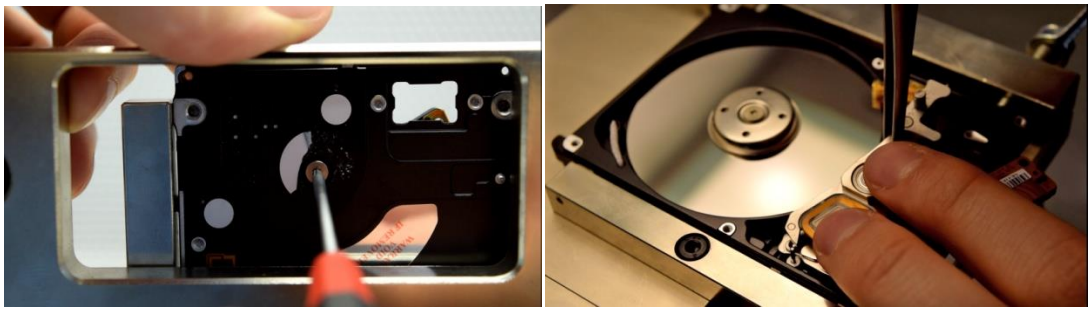
Step 6 – Sliding the heads off the donor drive ramp

Slide the heads off the donor drive ramp by pushing the voice coil of the actuator arm.

Picture 6.10 Sliding the heads off the donor drive ramp

When the heads are off the ramp, the tool will prevent the heads from touching each other and the head assembly can be safely and easily transferred to another drive.

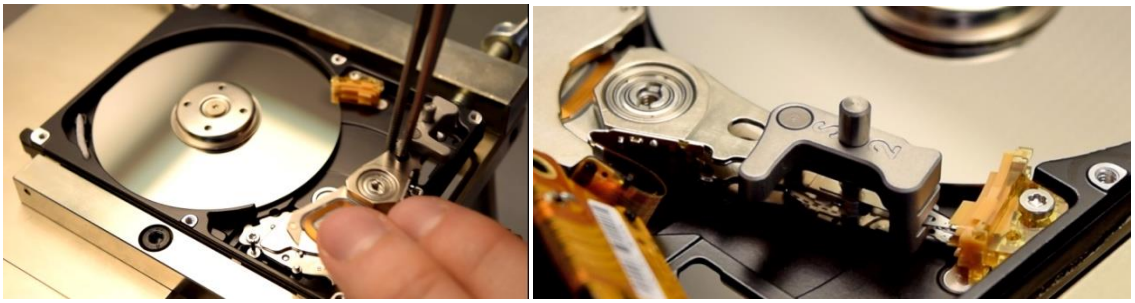
Step 7 – Removing the screw that holds the head arm and dismounting the heads



Picture 6.11 Removing the screw that holds the head arm assembly and head dismounting

Loosen and remove the bottom screw that's holding the head assembly connected to the donor drive casing. While loosening the screw support the head assembly with your other hand. After the screw is removed, use the tweezers to dismount the heads.

Step 8 – Mounting the heads in the patient drive and moving the heads to the ramp



Picture 6.12 Mounting the heads on the patient drive and moving them to the ramp

Place the head assembly to its place in a patient hard drive using the tweezers. Assist the process with your other hand. When the head arm is in its place, screw the head arm from the bottom. Be sure to tighten this screw to assure good connection between the head arm and the hard drive casing.

Push the heads over the ramp. While holding the heads on the ramp, return the security brake to its place.

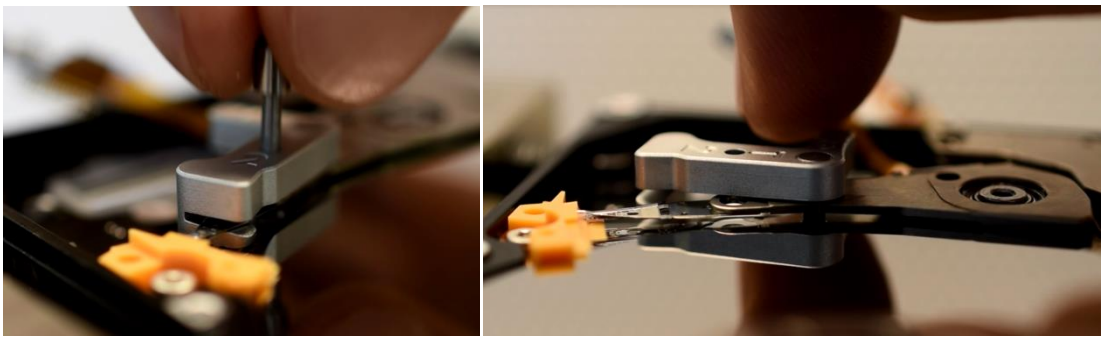
Step 9 – Mounting the upper magnet back on

Picture 6.13 Putting the magnet back to its position

After the heads are safely parked on the ramp and the security brake is properly positioned, it is time to put the upper magnet back to its place. Using the needle-nose pliers, carefully place the magnet to its original position.

Step 10 – Dismounting the tool

Remove the security pin from the tool. Scroll the tool away from the heads. While holding the head arm in its place with one hand, pull the axis of the tool out of the hole to dismount the tool.



Picture 6.14 Pin removal and tool dismounting

Put the lid back to close the disk. Put the PCB back and clone the drive.

Samsung MP S2 additional notes

In order to mount the tool properly, we must first remove the magnet and the brake, then carefully slide the heads off the ramp.

Picture 6.15 Pin removal and tool dismounting MP S2

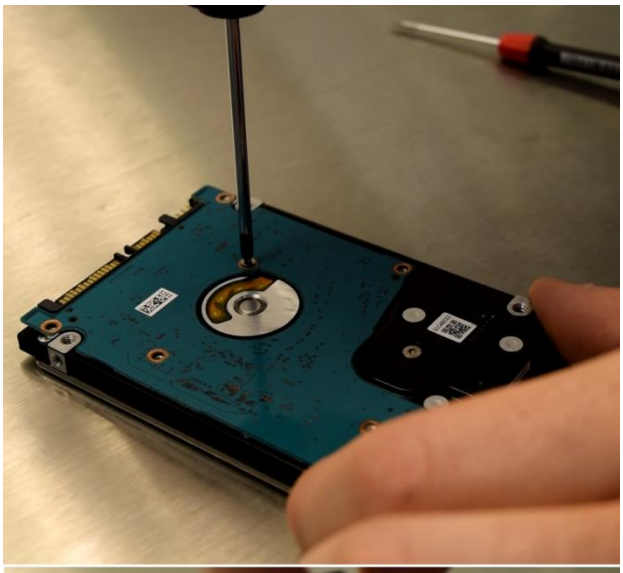
Based on the results of testing, HddSurgery team has decided to remove the pin on this tool in the future tool sets, as we determined that it was unnecessary for the remainder of the process.

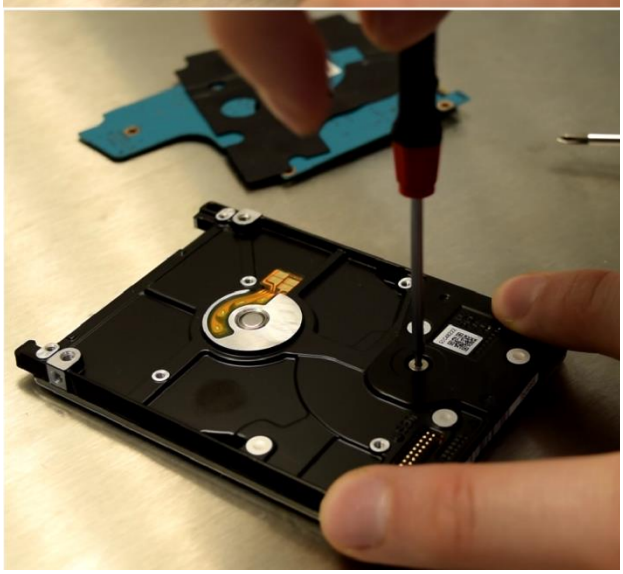
7. Head replacement process on Toshiba hard drives

Step 1 – Preparing the hard drive for head replacement

To prepare the hard drive for head replacement process it is needed to dismount the PCB (circuit board on the bottom side) and to take off the lid from the top of the hard drive.

Loosen and remove all the screws on the PCB and dismount the circuit board. Loosen the screw, which is holding the head assembly from the bottom, just a little bit and then tighten it again. This is needed in order to avoid problems of loosening the mentioned screw later in the process.





Picture 7.1 Dismounting the PCB and loosening and tightening of the screw which is holding the head assembly from the bottom

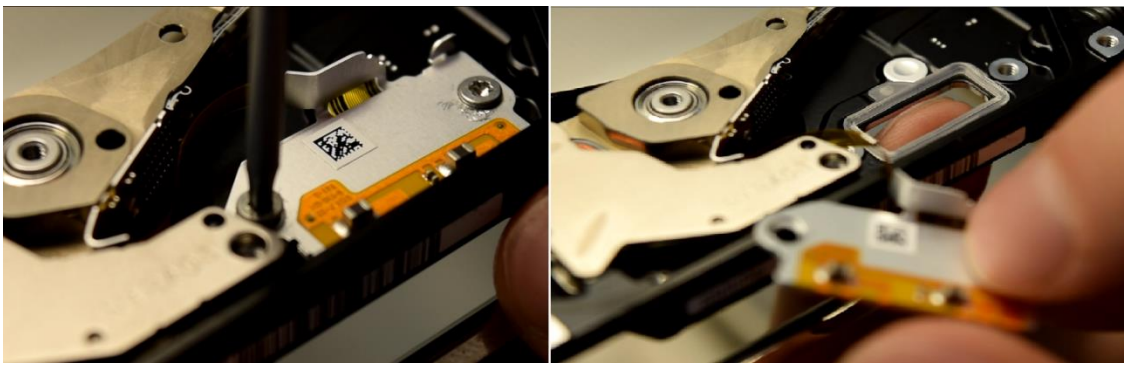
Loosen and remove all the screws from the hard drive lid and open the hard drive casing.

Picture 7.2 Unscrewing the lid

Picture 7.3 Opening the casing

Step 2 – Releasing the flat cable connector

Remove the two screws that are holding the flat cable connector and push the connector from the bottom upwards to release it. Pressure from below may cause the connector to pop out and possibly damage the platters. Because of this, hold the top of connector with another hand while pushing it from the bottom. Before applying pressure, remove the screws from their holes.

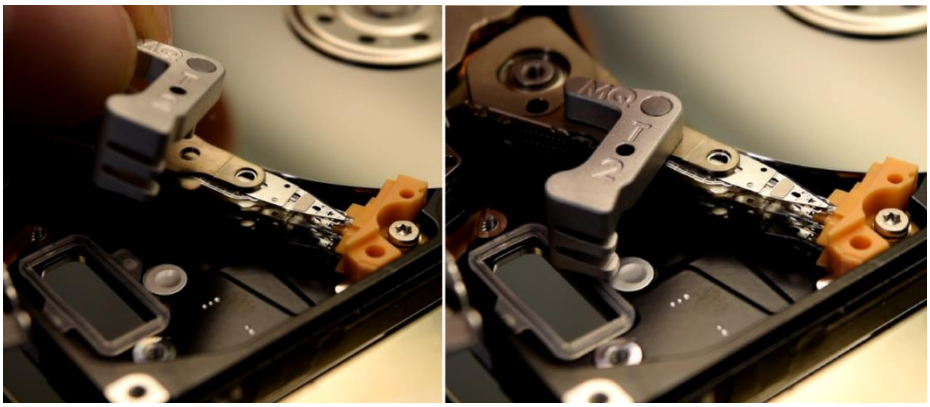


Picture 7.4 Dismounting the flat cable connector

Step 3 – Mounting the tool on the donor drive actuator arm

Carefully center the axle of the tool over the hole which is the **second closest** to the top of the head arm (near the heads themselves). There are different mechanics of Toshiba 2.5'' hard drives, with prefixes MK and MQ in their models (check Toshiba hard drive specifics for detailed explanation). MK-prefix models have opening of the rectangular shape which is covered from bellow and it's clear that it cannot be used for tool mounting or safety pin placement. Behind this hole, on same models, there is an elliptical hole and a circular hole respectively. Since the mentioned rectangular opening cannot be considered as a hole, since it's covered from bellow, the circle hole remains **the second closest** to the heads and it is used for the tool mounting (check the picture 4.2 on page 11).

Take care that the snouts stand away from the heads, and put the axle of the tool through hole in the actuator arm. Axle of the tool should go easily through this hole.



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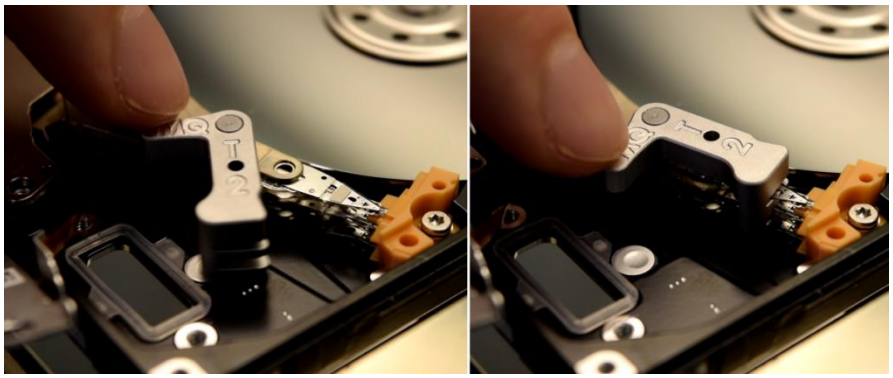
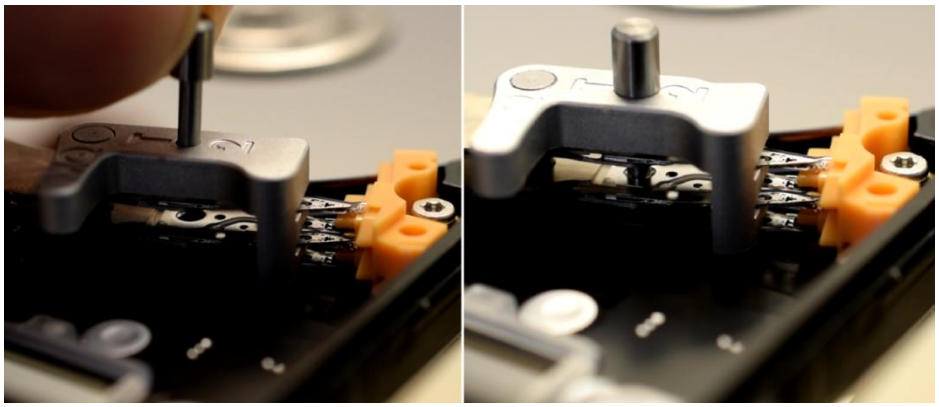


Picture 7.6 Rotating the tool - snouts are positioned between the heads

Secure the head's position on the tool by inserting the safety pin. The pin should go through the hole easily.



Picture 7.7 Securing the heads with the tool

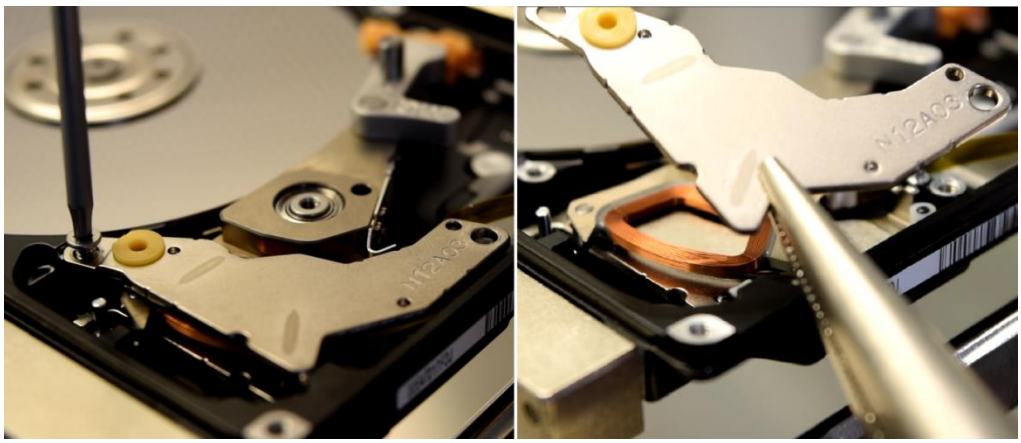
Step 4 – Removing the security brake

Carefully remove the security brake, placed in the area behind the magnets. Use the tweezers in the process.

Picture 7.8 Removing the security brake

Firstly, loosen and remove the two screws which connect the upper magnet to the HDD casing. Then, remove the upper magnet by using needle-nose pliers. Yellow head stop (brake) which prevents sliding the heads off the ramp is an integral part of the upper magnet. After the upper magnet removal, nothing else prevents the heads to slide off the ramp.

Step 5 – Dismounting the upper magnet

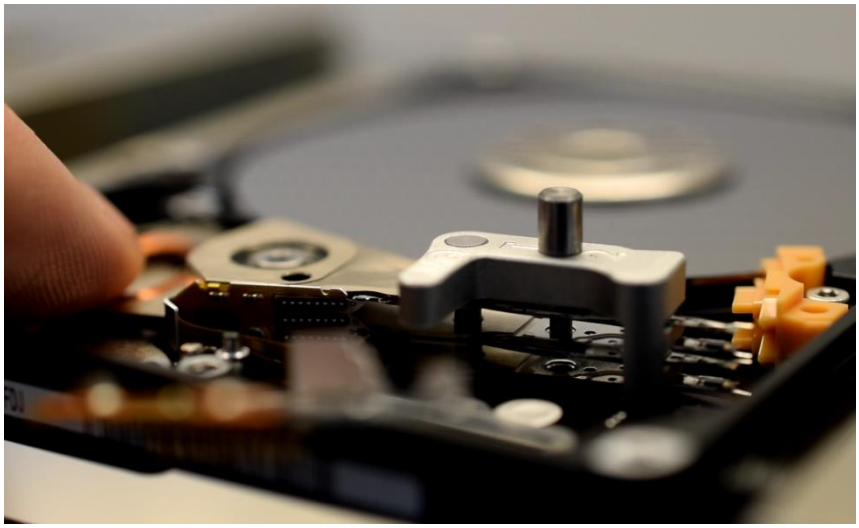


Picture 7.9 Removing two screws connecting upper magnet to HDD casing (left); Removing the upper magnet with needle-nose pliers (right);

Remove the magnet carefully using the needle-nose pliers (use the HDD casing as a lever).

Step 6 – Sliding the heads off the donor drive ramp

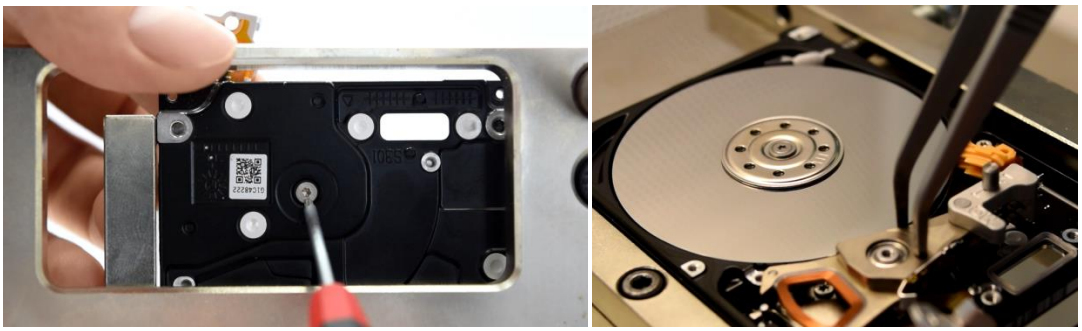
Slide the heads off the donor drive ramp by pushing the voice coil of the actuator arm.



Picture 7.10 Sliding the heads off the donor drive ramp

While the heads are off the ramp, the tool will prevent the heads from touching each other and the head assembly can be safely and easily transferred to another drive.

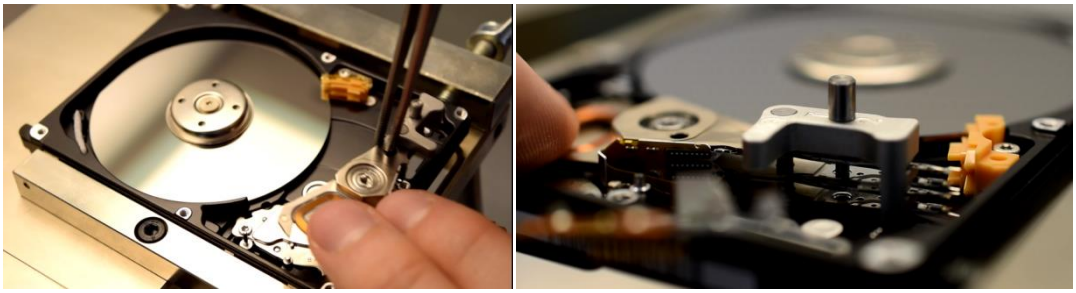
Step 7 – Removing the screw that holds the head arm and dismounting the heads



Picture 7.11 Removing the screw that holds the head arm assembly and head dismounting

Loosen and remove the bottom screw that's holding the head assembly connected to the donor drive casing. While loosening the screw support the head assembly with your other hand. After the screw is removed, use the tweezers to dismount the heads.

Step 8 – Mounting the heads in the patient drive and moving the heads to the ramp

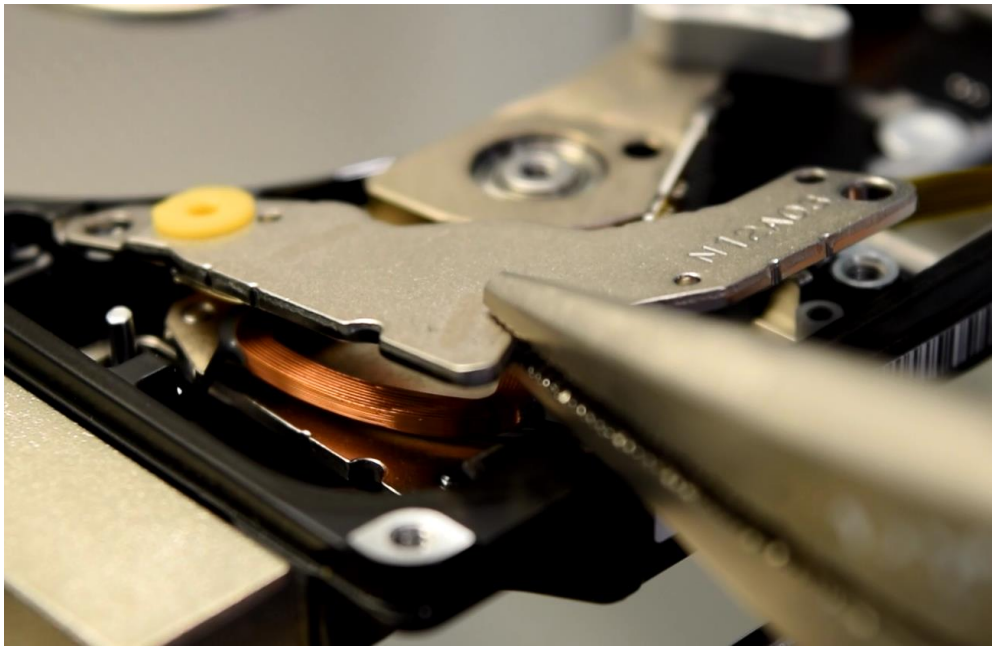


Picture 7.12 Mounting the heads on the patient drive and moving them to the ramp

Place the head assembly to its place in a patient hard drive using the tweezers. Assist the process with your other hand. When the head arm is in its place, screw the head arm from the bottom. Be sure to tighten this screw to assure good connection between the head arm and the hard drive casing.

Push the heads over the ramp. While holding the heads on the ramp, return the security brake to its place.

Step 9 – Mounting the upper magnet back on

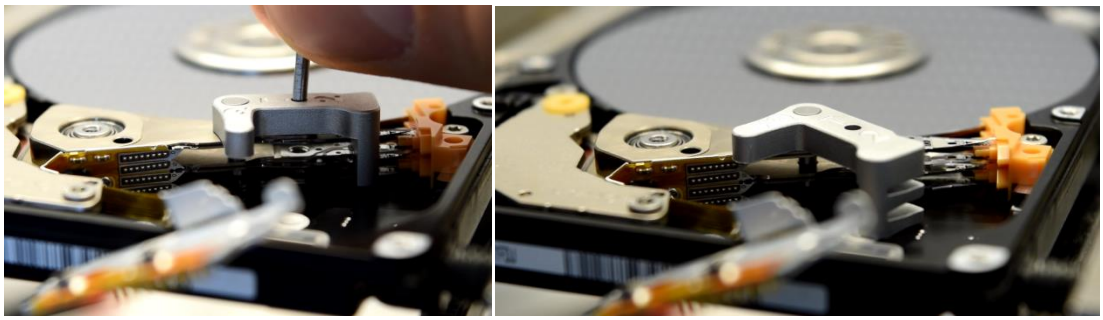


Picture 7.13 Putting the magnet back to its position

After the heads are safely parked on the ramp and the security brake is properly positioned, it is time to put the upper magnet back to its place. Using the needle-nose pliers, carefully place the magnet to its original position. Put the screws that connect the upper magnet and the casing back in.

Step 10 – Dismounting the tool

Remove the security pin from the tool. Scroll the tool away from the heads. While holding the head arm in its place with one hand, pull the axis of the tool out of the hole to dismount the tool.



Picture 7.14 Pin removal and tool dismounting

Put the lid back to close the disk. Put the PCB back and clone the drive.

8. Conclusion

This guide was written by HDDSurgery™ team and it is based on our experience acquired during the process of development, design and testing.

HddSurgery™ is not responsible for any possible consequential damage, including the loss or recovery of data or any other damage made by using or working with HddSurgery™ tools.

You can find more information about these tools and many other tools used for data recovery on our website:

http://www.hddsurgery.com/

Also you can watch the videos that show how these tool work on our YouTube channel:

http://www.youtube.com/user/HddSurgery

If you have any doubts or questions regarding use of HDDS HGST 3.5'' Ramp Set, you can contact our support team any time:

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