

Playstation 2 Laseradjustment / replacement

Ver. 3.00.2

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1. Introduction

There are many FAQs regarding the adjustment of PS2 Laserunits (LU), as Sony seems to adjust 'em too careful, so the LU has a greater life expectance, but the PS has difficulties reading some DVDs or gamediscs (backups ?).

Most of the answers give advice to screw a little bit on the laserpots, but that's a real nerve wrecking way of getting your PS to work.

This reworked and rewritten tutorial gives explanation to properly adjusting the LU.

There also seems to be a problem with some batches of PS2 - the LU dies and the PS2 can't read DVDs and/or CDs anymore. Fortunately there are some vendors selling refurbished or new laserunits - the problem is that in most cases you have to replace the unit yourself. The explanations and approaches given in this tutorial are meant as a help performing this task.

2. Tools of the trade

For plain adjustments:

1. Oscilloscope (at least 20 Mhz bandwidth!)
2. 10:1 Scope testprobe with clamp
3. a set of precision screwdrivers (like the ones for repairing clocks)
4. Philips screwdriver (for removing the PS2 cover)
5. your PS2 utility disc (Jap model) / demo disc (Eur model) or any other PS1 gamedisc and a DVD movie
6. knowledge on how to use that stuff ... (esp. the oscilloscope !)

optional:

small piece of thin, isolated wire, solder wick and a solder iron



Fig. 1: Oscilloscope



Fig. 2: probe

For replacing the laserunit:

1. precision height gauge (German: „Schieblehre“ or „Mikrometerschraube“)
2. TORX T06X40 screwdriver
3. precision screwdriver size 1
4. screw securing lacquer (Loctide screwfastener)
5. solder iron and desolder wick or desolder pump

optional:

some insulation tape



Fig. 3: tools for laserreplacement

If you don't have one of the tools above (esp. the scope and probes) ask somebody who can lend it to you (TV repair shops ..), if you lack of [6 knowledge] then ask somebody who's familiar with this (again TV repair shops...) ;)!

3. Disassembling the console (Bringing the console into service position)

Note:

If you disassemble and modify your PS2 you will lose warranty.

The following procedures should only be done by skilled persons with the console unplugged from the mains. If you aren't sure if you can do this ask somebody who's familiar with this kind of work !!!

Furthermore be extremely careful while doing the adjustments as there are no spare parts !!! :(

a) SCPH 10000

1. Remove the bottom and top cover by removing the screws under the small plastic/rubber pads.
2. Remove the metal rfi-shielding at the bottom (pcb) side.
3. Unplug the flat wire band from the drive connector by lifting off the clamping bridge (carefully!!!)
4. Turn the machine around and dismount the drive by removing the two screws holding it.
5. Turn the machine back to the bottom side and plug the wire band back to the connector.
6. Place the drive that you can access the drawer, without bending the flat wire band (I put it on the pcb, isolated with a sheet of paper and „up-side-down“ to get access to the adjustable resistors).

b) SCPH 30004 (V3)

1. Remove the EXPANSION BAY cover and the warranty-void-sticker (don't need it any more ;)



Fig. 4: Expansion Bay

2. Remove the bottom and top cover by removing the screws under the small plastic/rubber pads. (Sorry no pictures, yet)
3. Remove the screws holding the rfi-shield and the metal base plate first, then the shield and plate

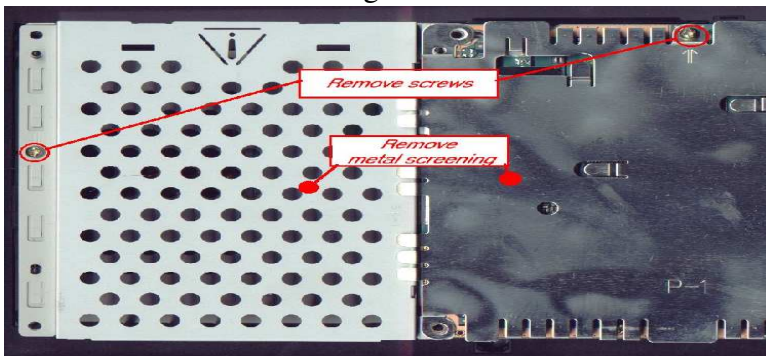


Fig. 5: Cover sheets

4. Unplug the silver ribbon cable (drive unit connector) and the Expansion Bay connector (Be very careful !!!). Lift off the metalsheet on it's left side.

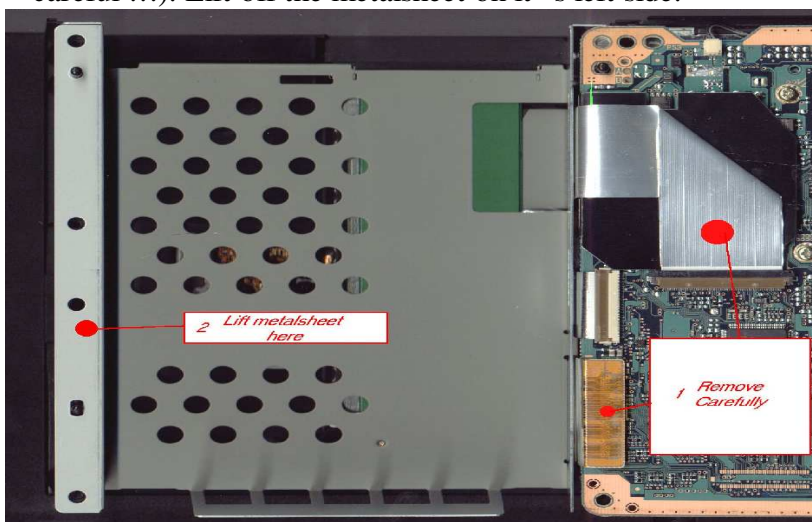


Fig. 6: disconnecting the drive

5. Turn the machine around (to top side) and dismount the drive by removing the two screws holding it. Get the drive unit out of the console (make sure you´ve disconnected it in step 4 !!!)

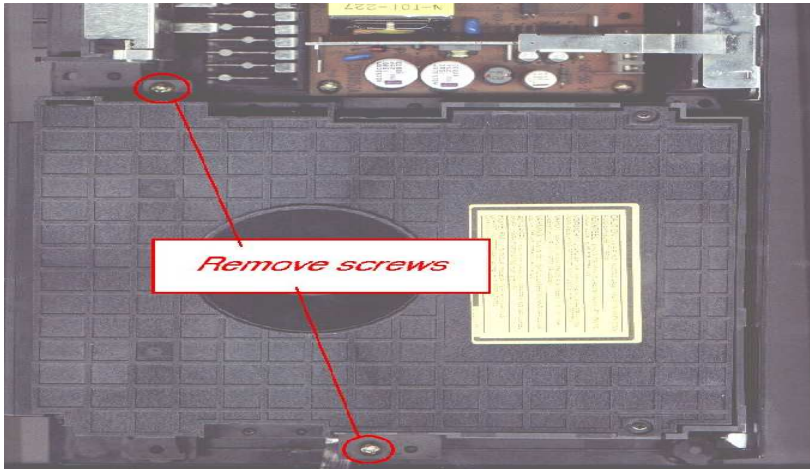


Fig. 7: cd/dvd drive top side

6. Turn the console again upside down. Lock the black isolation sheet in position with a small strip of power-strip (Tesa) - this is important as the silver ribbon cable is conductive on its surface! Place the drive upsidedown on the Expansion Bay spacers and the mainboard´s left side. Reconnect the silver ribbon cable.

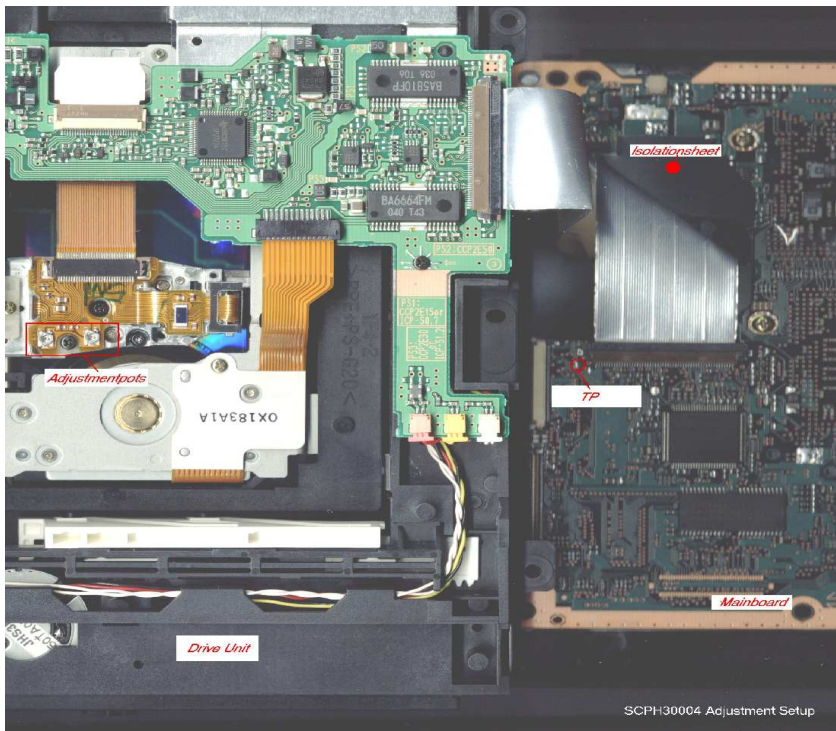


Fig. 8: service mode setup

4. Adjustment

Adjustment's basically the same for all model types, only the testpoints differ.

Connect your probe to the TP and GND. I soldered a small piece of wire to the pad and connected the probe via the clamp, this is safe and replaces the „third hand“ you would need to hold the probe while adjusting the laser and holding the drive. Set your oscilloscope to 20mV/Sect. and 0.2us/Sect.

SCPH 10000

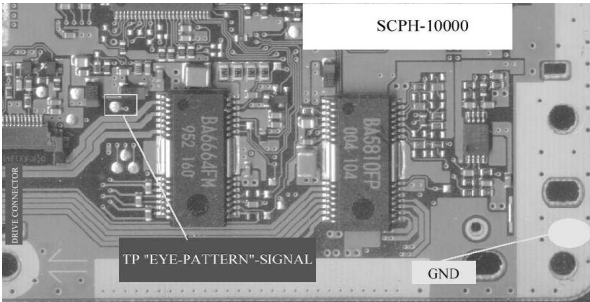


Fig. 9: SCPH-10000 (Jap) test pin

SCPH 30004 (Euro / US)

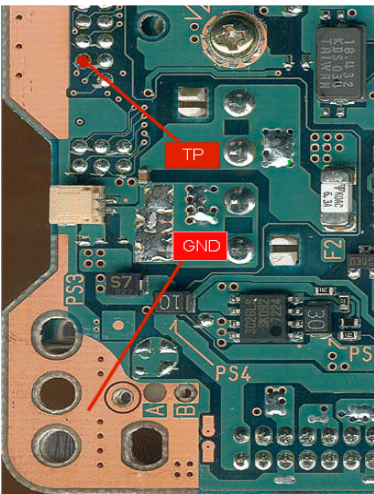


Fig. 10: SCPH-30004 V3

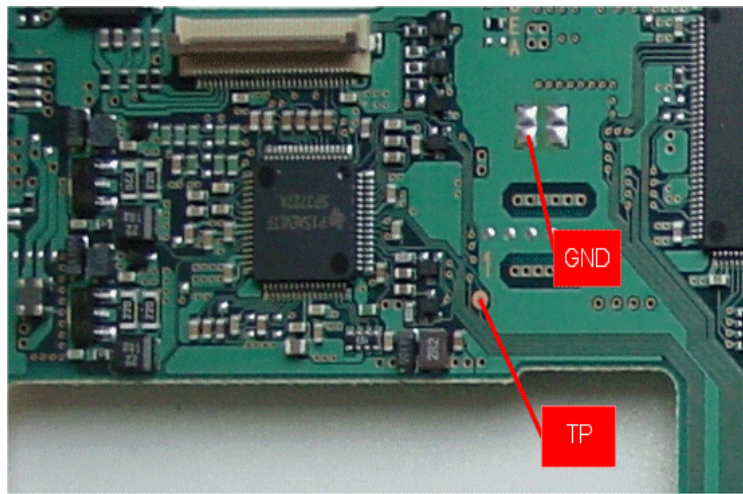


Fig. 11: SCPH-30004 V4

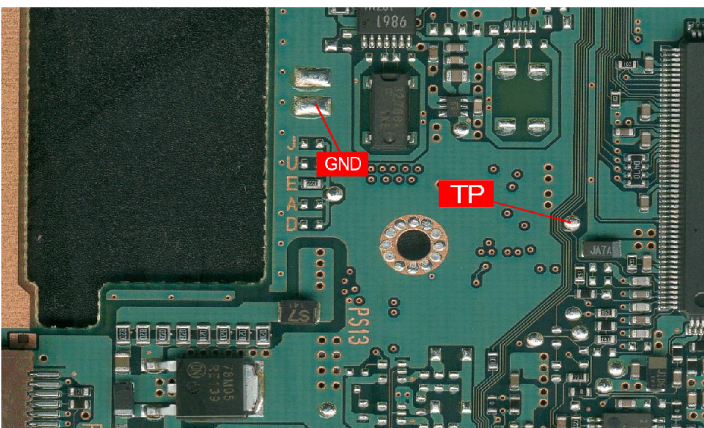


Fig. 12: SCPH-30004 V5

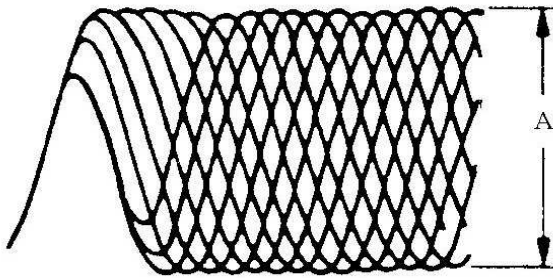
Performing the adjustments

Power up the PS2 and insert the PS2 utility disc.

You should now see the „eye-pattern“ signal (as below) on your scope. Wait until the disc is completely booted to get a stable picture on your scope.

Turn the resistor marked `CD` clockwise until you get the maximum undistorted „eye-pattern“ (if you want more safety and a longer life of your laser then turn back a bit so the laser doesn't run at full power).

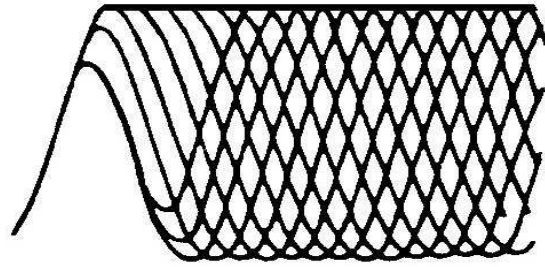
"EYE-PATTERN" SIGNAL



Scope settings : 20 mV/Sec 0.2 us/Sec

Fig. 14: "Good" Signal

Distorted (overdriven) "EYE-PATTERN" Signal



Scope settings : 20 mV/Sec 0.2 us/Sec

Fig. 13: "Bad" Signal

SCPH 10000

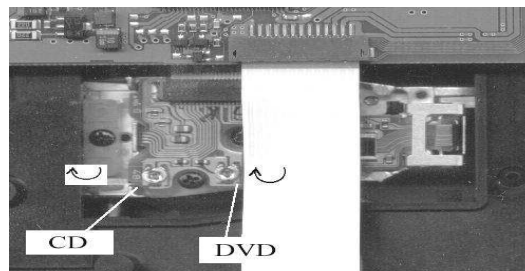


Fig. 15: SCPH-10000 LU

SCPH 30004

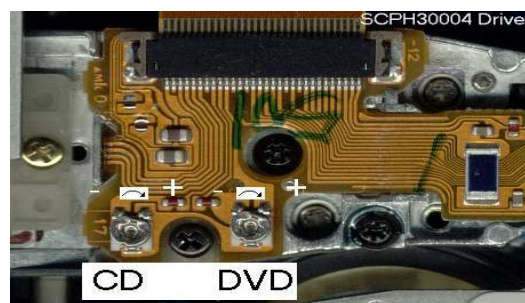


Fig. 16: SCPH-30004 LU

If you get a distorted signal just turn back a bit until it becomes stable and clear !

Ok, now the CD section is adjusted so replace the utility/demo CD with the DVD and reset the console. Now do the same adjustments as above but use the variable resistor marked `DVD` this time.

Safe values (tested on Jap model only!) :

<i>Mode</i>	<i>DVD</i>	<i>CD</i>
Oscilloscope setting	20mV / 0.2us per Section	20mV / 0.2us per Section
„Eye-Pattern“ signals´ amplitude (A) set to	800mV Vpp	640 mV Vpp

5. Replacing the Laserunit

1. Disassemble the PS2 as described above.
2. Disconnect the silver ribbon cable from the drive (at the mainboard's connector), dismount the driveunit by removing the 2 screws holding it
3. Remove the cover of the drive (4 screws) using the precision screwdriver
4. Turn the drive-unit upside-down
5. Disconnect the laser-unit connector (be careful - the ribbon cable is very sensitive !!)

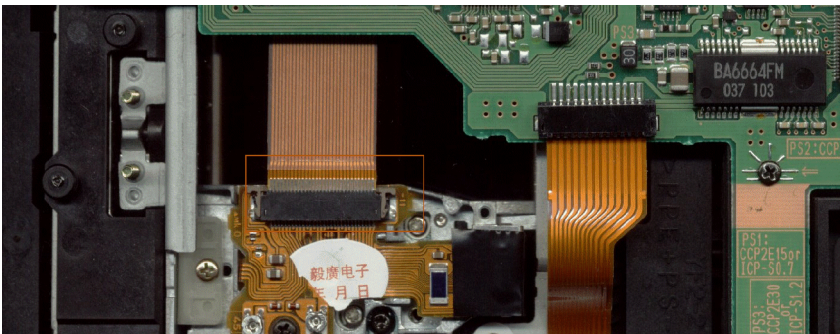


Fig. 17: laserunit connectors

6. Push the white slider to the left in order to release the drawer

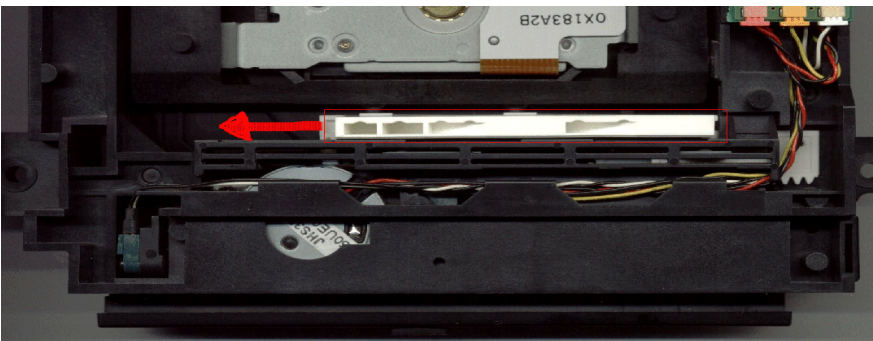


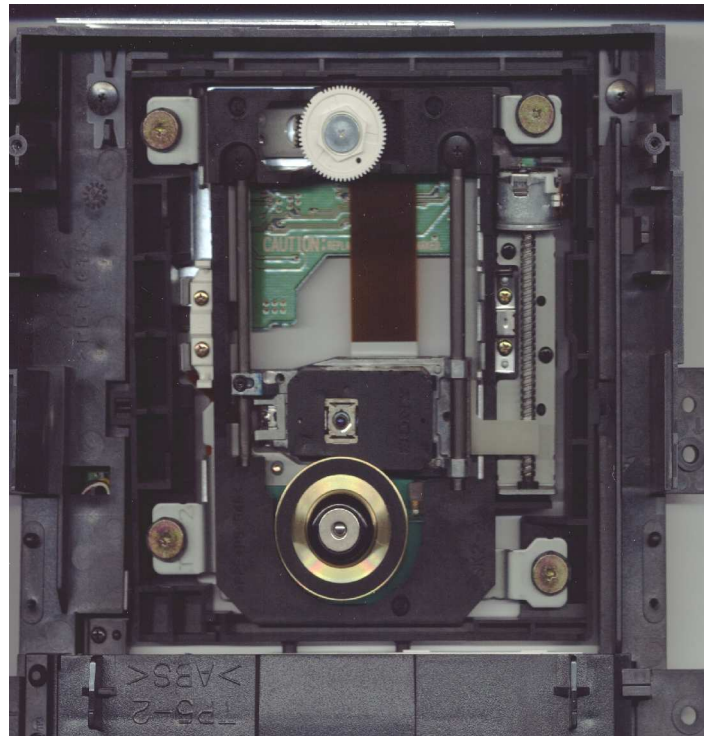
Fig. 18: tray lock/unlock slider

7. Pull out the drawer / tray completely



Fig. 19: drawer / tray bottom side

8. Turn around the drive again



9. Now´s the tricky part:

Measure the height of the laserunit at the marked point using the precision height gauge. Write down the measured value, this will be important later on !!!

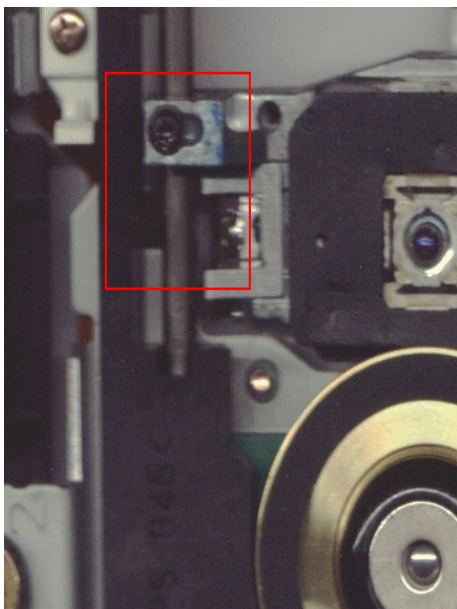


Fig. 21: height adjustment screw

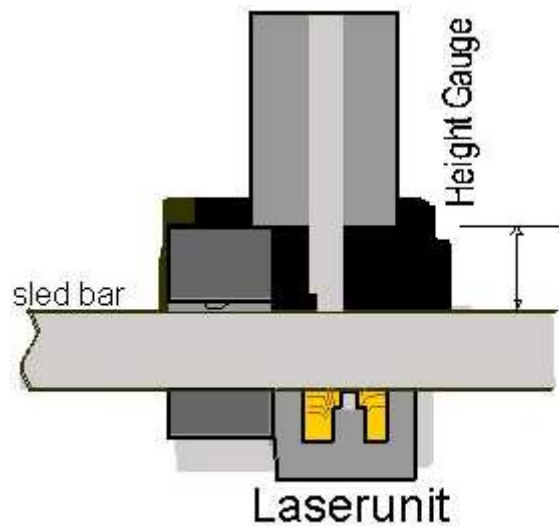
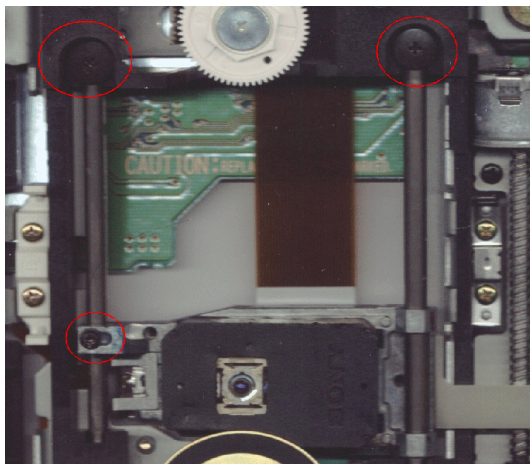
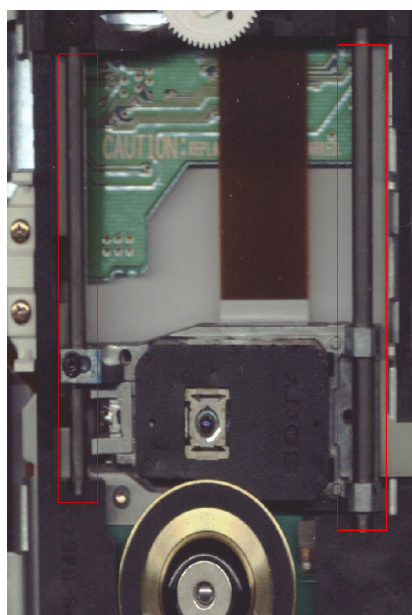


Fig. 20: height adjustment with height gauge

10. Remove the marked screws, use the TORX screwdriver for the small screw adjusting the laser unit's height



11. Remove the laser unit by (carefully) pulling out the slider bars



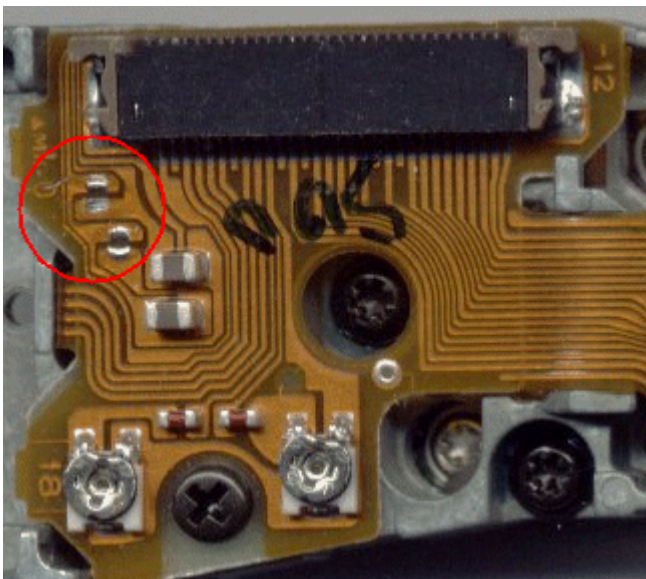
12. Mount the white, plastic steering plate and the TORX screw to your new laser unit (sorry no picture, yet!)

13. Reassemble the drive the reverse way.

14. Adjust the height of the laser unit to the drive you measured in (9)

15. Desolder the anti-statics protection pins (just remove the solder) on the laser unit's PCB.

Attention : This is a MUST !!! If you don't do this the drive's electronics may get damaged !!



16. Remount the drive unit and reconnect it to the mainboard.

17. Adjust the laserunit electrically according to the adjustments-section

18. Reassemble your PS2 and have fun !!!

6. Document History

<i>Version</i>	<i>Content /Changes</i>
1.00.0	First Tutorial; Description for Jap SCPH 10000 only
2.00.1	Eur SCPH 30004 (V3) added, disassembly added
3.00.1	Laserunit replacement tutorial added (beta, no 100% solution for adjusting the height of the laserunit), some nice pictures added, some facelifting done (finally colored pictures *g
3.00.2	V3 (revised), V4 and V5 testpoints added, facelifting, better compression

Any comments, remarks, bug reports ? Feel free to contact me : mrbdna@gmx.net

If you need further assistance please visit the www.gamefreax.de forum (both english and german) or the www.ps2.nu ps2repair forum. Also check out the Gamefreax shop if you live in Germany and need anything regarding consoles, games, repair (many spare parts), modification.

If you want to spread this document feel free to do so as long as you keep it unmodified. Check at www.gamefreax.de / community / tools / playstation 2 for the latest version of this document.

Greetings / Credits go out to :

Mike of www.gamefreax.de for great support

Hansi of www.ps2.nu for inspiration regarding testpoints and running an inspiring forum ;)

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