

MODIFYING THE REGA ARM

Instructions for Origin live arm modification kits



Structural Modification
Rewiring kits for Rega
tonearms

Contents

Introduction

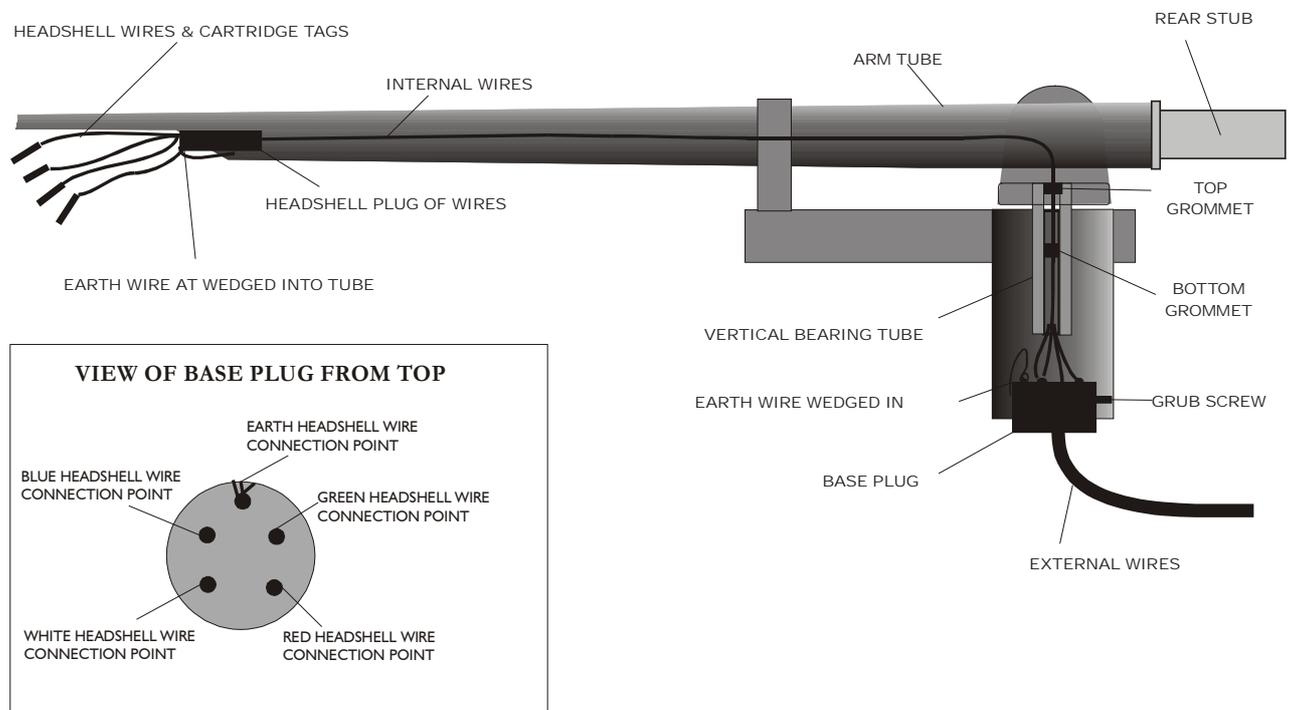
Congratulations on choosing the Origin Live modification(s) to upgrade your Rega arm. You can add the modifications in any order so that you can upgrade at a later date should you wish. If you are carrying out all three modifications at one time then they are most easily carried out in the sequence on the “contents” page.

The structural mod is very straightforward and within the capability of almost everyone. Rewiring the arm demands patience and a little skill in soldering – if you think this is beyond your expertise then you can either return the arm for us to do the job or get a friend to do it.

In terms of effectiveness, the structural mod is the most significant of the modifications but rewiring is also well known to transform the performance of the Rega arm. The wire we use is probably the best available and has been compared with many other high end wires on the market – the search by ourselves and others to find anything better has proved fruitless and literally hundreds of wires have been tried. Most high end interconnect wires are not good performers at carrying the very low levels of the cartridge signal. We would also advise caution before purchasing alternative counterweights to the one we supply – ensure that you get a money back guarantee as experience has shown that they are a backwards step to our own although they undoubtedly improve on the standard Rega counterweights.

When reading the instructions you should refer to the diagram of the Rega arm for part names and clarity. **You need only read the instructions relevant to your particular kit or kits** – the rest are included for information should you wish to know what is involved in other modifications.

DIAGRAM SHOWING INTERNAL WIRING AND REGA PARTS



Internal rewiring kit

PARTS & TOOLS REQUIRED FOR THE INTERNAL REWIRING KIT

PARTS

- One wiring loom
- 22 guage solder
- 400mm draw wire
- Allen key 1.5mm A/F
- Allen key 2mm A/F (not needed for the RB250)
- 2mm rod x 100mm
- New Rega external cable with earth wire (if no Origin Live external upgrade rewire has been ordered).

TOOLS YOU WILL NEED IDEALLY

- Soldering iron
- Sharp blade.
- Continuity tester or resistance meter
- Tweezers
- A pin or needle
- Pliers or molegrips

INSTRUCTIONS FOR THE RB250

This section is not for RB300 / 600 / 900

REMOVE REAR STUB

1. Remove the rear end stub by unscrewing it. You can use either pliers or molegrips to accomplish this. Do not be afraid of damaging the bearings by excessive twist – so long as you do not jerk this action there is no danger – a smooth action is best. **DO NOT REMOVE THE ARMTUBE FROM THE YOKE OF THE RB250 AS THIS IS NOT NECESSARY AND WILL AFFECT BEARING SET UP** (this is not the case for all other Rega arms). Remove the original ground wire clip from inside the rear end of the arm – this is no longer required as the new internal cable is grounded through the headshell.

REMOVE INTERNAL WIRING AND RUBBER GROMMETS

1. Unscrew the small allen screw in the base of the arm where the cables exit – use the 1.5mm Allen key supplied for this. Do not remove this screw as you will need it later.
2. Gently withdraw the black plastic plug in the base of the arm using a gentle twisting motion. Once the plug is free, de-solder the internal wires from the plug or just cut them off.
3. Gently prise out the black rubber bung in the headshell end of the arm (the headshell wires exit through this bung). It is unlikely that the internal wires will survive intact so you need not worry too much about destroying this bung should it prove resistant.
4. Prise out the “rubber headshell bung” using a sharp point such as a Stanley blade or thin screw driver. Gently pull the bung to withdraw all the internal wires from the arm tube. If wire breakages

occur remove the remaining wire. Remove the spring clip wedged in the rear threaded portion of the arm along with its black wire.

5. Remove the rubber grommets in the wire duct through the vertical brass pivot tube in the arm housing – see Rega arm diagram. This is best accomplished by using a 2.5mm or 3mm drill to slowly drill out the lower rubber grommet (destroying it in the process). You will need to grip the drill at its very end or there will not be sufficient length to get to the bottom shoulder of this tube. Once you feel the drill hit the brass shoulder and “bottom” on the shoulder then gently withdraw it along with the bits of rubber from the now destroyed first rubber grommet. The rubber grommets are not required and should not be refitted as the Origin Live internal wire uses another method of protection.
6. To remove the “top rubber grommet” - gently poke the grommet up into the arm tube where it can then simply be tipped out - Use the 2mm rod supplied to poke the grommet out through the top of the tube.
7. Lastly prepare the headshell end of the arm by removing the powder coating just inside the arm tube where the cables exit.. This can be carried out using either a blade or using abrasive paper till the aluminium is clear and ready for electrical contact.

The arm is now ready to accept the new internal wiring loom.

INSTALL THE NEW INTERNAL WIRES

1. Tin one end of the thin 400mm draw wire supplied with the kit – the insulation just melts off.
8. Feed the “tinned” end of the “draw wire” into the base of the arm. As the wire enters the arm tube you can see the end of the wire through the rear end of the arm. Using a pair of tweezers or a “hook” made from a paper clip catch the draw wire end and pull it out of the REAR end of the arm tube. Pull through about 250mm of the wire through the rear end of the arm so that you are then free to push the end back through the tube till it exits at the headshell end of the arm tube. You now have a draw wire running from the headshell to the base of the arm.
9. Solder the “tinned” end of the new internal wiring loom to the tinned end of the “draw wire” (at the headshell end). Ensure that this is a *smooth and round* joint that will easily pass through the small arm holes.
10. Pull the draw wire from the base of the arm to lead the new internal wires through the arm tube and out through the base of the arm – it pays to use tweezers through the rear of the arm to “line up” the wire joint as it enters the arm base. This eases any “catching” that can occur at this right angle bend for the wire.
11. Push in the “headshell plug of wires” into the headshell – as you do this, wedge in the strands of the earth wire so that it makes electrical contact with the arm tube. The end result should be approximately 3 mm of headshell bung protruding from the end of the arm tube and the earth wire strands jammed in between the bung and the exposed (earlier abraded) aluminium of the arm tube.
12. Desolder the draw wire and separate the 5 litz wires using a soldering iron along with a needle or spike. Now trim off the ends of the 5 litz wires so that the “tinned” portion of wire is approximately 3mm.
13. The arm is now ready to attach the new Rega external cable or Origin Live external cable kit – so skip the next section and move on to “fitting the new external cable” which is applicable for all external cables .

INSTRUCTIONS FOR THE RB300 / 600 / 900

INTERNAL REWIRING

REMOVE THE REAR STUB

Remove the rear end stub by unscrewing it. You can use either pliers or molegrips to accomplish this. Do not be afraid of damaging the bearings by excessive twist – so long as you do not jerk this action there is no danger – a smooth action is best. Remove the original ground wire clip from inside the rear end of the arm – this is no longer required as the new internal cable is grounded through the headshell.

REMOVE INTERNAL WIRING AND RUBBER GROMMETS

1. Unscrew the small allen screw in the base of the arm where the cables exit – use the 1.5mm Allen key supplied for this. Do not remove this screw as you will need it later.
14. Gently withdraw the black plastic plug in the base of the arm using a gentle twisting motion. Once the plug is free de-solder the internal wires from the plug or just cut them off.
15. Gently prise out the black rubber bung in the headshell end of the arm (the headshell wires exit through this bung). It is unlikely that the internal wires will survive intact so you need not worry too much about destroying this bung should it prove resistant.
16. Set the VTF (Vertical tracking force) dial adjuster to 3 and remove both the steel acorn nuts on both sides of the arm.
17. Remove the 2 button headed allen bolts under the VTF knob using the 2mm Allen key provided. Pull off the spring cover which was held on by these two bolts. You can now remove the arm tube and pull out the wires from the arm base.
18. Prise out the “rubber headshell bung” using a sharp point such as a Stanley blade or thin screw driver. Gently pull the bung to withdraw all the internal wires from the arm tube. If wire breakages occur remove the remaining wire. Remove the spring clip wedged in the rear threaded portion of the arm along with its black wire.
19. Remove the “top and bottom rubber grommets” in the wire duct through the vertical pivot tube in the arm housing – see Rega arm diagram. This is best accomplished using the 2mm rod supplied to poke the grommets out through the top of the tube. The rubber grommets are not required and should not be refitted as the Origin Live internal wire uses another method of protection.
20. Lastly prepare the headshell end of the arm by removing the powder coating inside the arm tube where the cables exit.. This can be carried out using either a blade or using abrasive paper till the aluminium is clear and ready for electrical contact.

The arm is now ready to accept the new internal wiring loom.

INSTALL THE NEW INTERNAL WIRES

1. Tin one end of the thin 400mm draw wire supplied with the kit – the insulation just melts off.
21. Feed the “tinned” end of the “draw wire” into the bottom of the vertical bearing tube in the arm base housing. After the wire has exited through the top of the arm base bearing tube, hold the arm tube in position so that you can push the wire into the small hole underneath the arm. Continue to push the wire through the length of the arm tube until it emerges at the headshell. You now have a draw wire running from the headshell to the base of the arm.
22. Solder the “tinned” end of the new internal wiring loom to the tinned end of the “draw wire” (at the headshell end). Ensure that this is a *smooth and slightly flattened* joint that will pass through the small arm hole on the underside of the arm (this can be tricky as this joint must be free of excessive solder).
23. Pull the draw wire from the small hole in the underside of the arm till the new internal wires emerge and you can pull them through the base of the arm.
24. Reposition the arm tube in it’s original place so that you can thread on the acorn nut on the opposite side of the spring. Tighten this nut to finger tightness and then “nip” tighter by a further 1/12 of a turn or ½ a flat of the nut. As you do this make sure that you hold the spindle in the slotted end to

prevent it rotating as you tighten the nut – if this rotates then the spring settings will be incorrect – the Spring setting must be left at 3 while carrying out this operation.

25. Replace the Spring cover along with it's 2 button headed fastening bolts. These should only be tightened fractionally. The second Acorn nut can then be threaded onto the spindle protruding through the Spring cover – this only requires finger tightness.
26. Push in the “headshell plug of wires” into the headshell – as you do this, wedge in the strands of the earth wire so that it makes electrical contact with the arm tube. The end result should be approximately 3 mm of headshell bung protruding from the end of the arm tube and the earth wire strands jammed in between the bung and the exposed (earlier abraded) aluminium of the arm tube.
27. Desolder the draw wire and separate the 5 litz wires using a soldering iron along with a needle or spike. Now trim off the ends of the 5 litz wires so that the “tinned” portion of wire is approximately 3mm.
28. The arm is now ready to attach the new Rega external cable or Origin Live external cable kit – the next section is applicable to both.

ATTACH THE NEW EXTERNAL CABLE

1. Lay the arm on it's side approx 2" above your working surface height
29. Hold the external wire “base plug” in a position approximately 25mm from the base of the arm i.e. within connection reach of the internal wire ends.
30. Solder the Litz wires to the base plug as per the diagram under the Rega arm diagram – you will need a continuity tester to establish which Litz wire belongs to which cartridge tag colour. The “earth” Litz which attaches to the blue knotted wire should be soldered to a position very close to the blue insulation – take care that solder does not flow onto the stranded portion that wedges between the base plug and the base housing. If you allow this to happen, you will find the fit is too tight when you come to fit the base plug. In this event you can simply solder on a few extra strands of wire to substitute the mistake.
31. Once all the wires are soldered you can insert the plug into the base of the arm (sometimes this requires force) – the earth wire strands should be jammed between inside of the threaded base housing and the plug so that the earth wire makes electrical contact with the housing as well as the headshell tube. Take care when inserting this plug to orientate it so that the earth is no in danger of contacting any of the internal wires.
32. Tighten the small Allen screw on the base of the arm to clamp the base plug in position.
33. Carry out continuity test between all cartridge tags and phono plugs – also check the earth wire at headshell and threaded arm housing. Also check that no short circuits exist between any of the wires.
34. Refit the rear stub or if you have the structural modification kit see the end section “fitting the structural modification.
35. The arm is now ready for your rear stub to be refitted and is then complete – if you are fitting the rear structural modification kit then move on to the section describing this operation.

External rewiring kit

PARTS & TOOLS REQUIRED FOR THE EXTERNAL REWIRING KIT

PARTS

- One set of Origin Live external interconnect wires 1.2m long
- 22 guage solder
- Allen key 1.5mm A/F

TOOLS YOU WILL NEED IDEALLY

- Soldering iron
- Sharp blade.
- Continuity tester or resistance meter
- Tweezers
- Pliers or molegrips

IF YOU HAVE NOT REPLACED THE INTERNAL WIRING

1. If you are not replacing the internal cable then first unscrew the small allen screw in the base of the arm where the cables exit – use the 1.5mm Allen key supplied for this. Do not remove this screw as you will need it later.
36. Gently withdraw the black plastic plug in the base of the arm using a gentle twisting motion. Once the plug is free de-solder the internal wires from the plug.

ATTACH THE NEW EXTERNAL CABLE

37. Lay the arm on it's side approx 2" above your working surface height
38. Hold the external wire "base plug" in a position approximately 25mm from the base of the arm i.e. within connection reach of the internal wire ends.
39. Solder the Litz wires to the base plug as per the diagram under the Rega arm diagram – you will need a continuity tester to establish which Litz wire belongs to which cartridge tag colour. The "earth" Litz which attaches to the blue knotted wire should be soldered to a position very close to the blue insulation – take care that solder does not flow onto the stranded portion that wedges between the base plug and the base housing. If you allow this to happen, you will find the fit is too tight when you come to fit the base plug. In this event you can simply solder on a few extra strands of wire to substitute the mistake.
40. Once all the wires are soldered you can insert the plug into the base of the arm (sometimes this requires force) – the earth wire strands should be jammed between inside of the threaded base housing and the plug so that the earth wire makes electrical contact with the housing as well as the headshell tube. Take care when inserting this plug to orientate it so that the earth is no in danger of contacting any of the internal wires.
41. Tighten the small Allen screw on the base of the arm to clamp the base plug in position.
42. Carry out continuity test between all cartridge tags and phono plugs – also check the earth wire at headshell and threaded arm housing. Also check that no short circuits exist between any of the wires.
43. The arm is now ready for use unless you are fitting the structural modification kit in which case move on to the next section.

Arm Structural Modification

PARTS

- Rear stub & Counterweight
- Threaded insert, Allen bolt
- Fitting bolt with “locked nuts”, 3mm Allen key, serrated washer
- 2 large spacing washers for VTA adjustment if needed

TOOLS YOU WILL NEED IDEALLY

- Pliers or molegrips

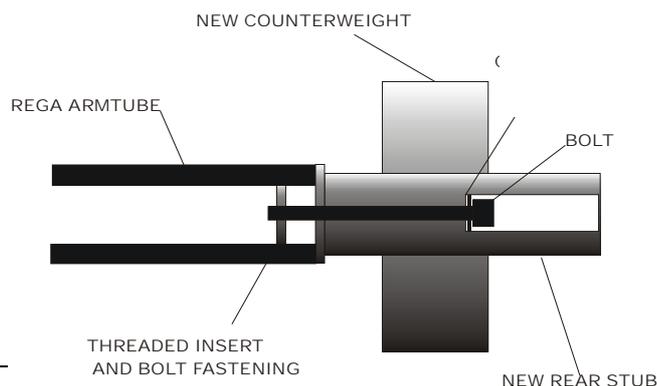
INSTRUCTIONS FOR THE RB250/300/600/900

STRUCTURAL MODIFICATION

Please find parts enclosed. They do not represent time in machining, but countless hours of development, testing, and listening. The best ideas are always simple and what started off as a highly laborious and expensive job of inserting a bicycle spoke down the entire length of RB250's has now been gradually refined. So, now onto the procedure that will transform your arm.

1. Remove the rear stub by gripping it with a pair of molegrips (or similar) and GENTLY unscrewing it.
44. Screw in the small threaded insert into the end of the arm till it is approx. 1.5mm inside the end face of the arm tube. This can be accomplished with the bolt and nuts supplied. Now comes the tricky part (sometimes) - you need to withdraw the bolt leaving the threaded insert in the same position. The trick is to lever the bolt sideways as you unscrew it. This has the effect of jamming the threaded insert against the outer threads while allowing the 4mm bolt to be withdrawn. If this procedure doesn't work first time, try again ensuring that the bolt hasn't become too tightened onto the threaded insert.
45. Now tighten the rear stub onto the rear end of the arm tube as the diagram below shows. The correct torque is achieved by tightening to hard using the short end of the Allen key in your fingers (not the long one or torque will be too high). High torque is not beneficial! It will prove most rewarding to listen to various torque settings till it sounds just right. So there it is - not too difficult we trust.

DIAGRAM OF THE ORIGIN LIVE STRUCTURAL MODIFICATION



Installation and Set up of Rega & Origin Live tonearms

INSTALLING THE ARM

INTRODUCTION

Rega arms and Origin Live arms require mounting dimensions such that the centre of the platter to the centre of arm hole is approx 223mm plus or minus 2mm tolerance and the hole diameter for the arm is 24mm to 25 mm.

Please note that for the Origin Live Silver 250 tonearms - do not adjust bearing tightness - this is carefully set at factory - it may seem that there is slight “play” in the bearings - this is deliberate and must be left alone or degradation will result - it is not actually play in the bearings but carefully designed clearance tolerances of other components.

VTA (VERTICAL TRACKING ADJUSTMENT)

To allow the cartridge needle to track at the correct angle it is important that the base of the arm is at the correct height in relation to the platter. Usually the optimum setting is such that the TOP edge of the arm is parallel with the surface of a FLAT record – you can use a piece of card with parallel lines drawn on it to check this once the cartridge is fitted.

Most cartridges have a height of 17mm and if this is the case, then the base of the arm should rest approximately 31mm below the top of the platter surface. If your cartridge height is different you can work out where the base of the arm should be from the preceding figures.

IF YOU DO NOT HAVE A VTA ADJUSTER

- If you do not have a VTA adjuster then use the 2 large spacing washers supplied to set the arm base to the correct height according to the above figures
- It is recommended to place the large serrated washer (supplied by Origin Live) under the large base nut as shown in the diagram “Rear end view of counterweight”. For decks with metal arm-boards (e.g the Gyrodeck) it sounds best NOT to fit the serrated washer - if in doubt listen to the difference. The washer does not always fit on the Rega 3 deck - if this is the case leave it off.
- Bolt the arm to the armboard or plinth - you only need tighten the large bolt to finger tightness or very slightly tighter (“nipped tight 1/16 turn”). It is best to experiment by listening to music. This may seem laborious but you will be richly rewarded as this adjustment is CRITICAL for performance. The mistake is often made of over tightening this nut with the result that the music is deadened.

IF YOU HAVE THE ORIGIN LIVE THREADED VTA ADJUSTER (WHICH FITS ALL DECKS)

Thread the adjuster onto the arm. Ensure that the threaded metal sleeve is the right way up with the recess on the top side. This ensures that the arm goes all the way down into the sleeve. If you find your arm is too high with fitted then you should remove it as it adds 1.5mm to the height of the arm. As a starting point set up the arm such that it is parallel with a FLAT record, if not rotate the VTA adjuster at the arm base to get the level right.

It is recommended to place the large serrated washer (supplied by Origin Live) under the large base nut as shown below. For decks with metal armboards (eg the Gyrodeck) it sounds best NOT to fit the serrated washer - if in doubt listen to the difference. The washer does not always fit on the Rega 3 deck - if this is the case leave it off.

Bolt the arm to the armboard or plinth - you only need tighten the large bolt to finger tightness or very slightly tighter (“nipped tight 1/16 turn”). It is best to experiment by listening to music. This may seem laborious but you will be richly rewarded as this adjustment is CRITICAL for performance. The mistake is often made of over tightening this nut with the result that the music is deadened.

If your armboard is less than 10mm thick you will need to fit an arm “packing washer” between the armboard and the large bolt or it will not “clamp” on the 4mm thick armboard.

IF YOU HAVE THE ORIGIN LIVE VTA SLIDING ADJUSTER

Do not fit a threaded VTA adjuster. Ensure that the Aluminium sleeve is the right way up with the recess on the top side. This ensures that the arm goes all the way down into the sleeve. Place the arm in the aluminium sleeve and then clamp it in position via the set screw in the side of the VTA housing (i.e. the sleeve is forced in to grip the arm's threaded base). You do not need the Rega nut on the base of the arm. Only tighten the set screw sufficiently to clamp the arm firmly in position – over-tightening can make the arm sound bright. Fit the arm cable clip.

Fasten the arm cable - this should be supported by a cable clip screwed into position underneath the plinth - leave a slight droop on it so that it isn't "tight". This again is helpful to "earth" vibration in the cable. (Please note that the occasional rewired arm can make a slight "rustling" noise through the speakers when it is lifted across the record. This should not be a cause for concern as it is only caused by microphony of the internal litz cable - under normal playing conditions this is inaudible. The earth lead should be connected to the earth of your pre-amplifier or amplifier. This earth lead is best separated slightly from the arm signal leads so do not wind it around them for best performance. Avoid pulling the external wires at the base of the Silver arms as they are not indestructible and can become detached if excessive force is used to manipulate them.

ARM & CARTRIDGE SET UP

FIT THE CARTRIDGE (IF NOT FITTED ALREADY)

Fit the cartridge to the arm using an alignment gauge and ensure the headshell wires are bent so that they are clear of the record surface. If you are not familiar with fitting cartridges then please read the section "Hi-Fi Cartridges – Setting up procedures".

SET TRACKING FORCE & SIDE FORCE BIAS

Ensure that the bias adjustment slider is set to zero. Set the tracking force to the manufacturer's recommendations using a stylus force gauge (stylus balance). When tightening the counterweight, set it so that the Allen bolt is at the side of the arm (not at the top) see figure "Rear end view of counterweight" and tighten firmly - check tracking force is still correct after tightening.

Once the tracking force has been set you can set the sliding control for tracking bias – For Rega arms and arms with a similar bias adjustment you should set the value of approximately 1 or less due to the fact that the bias adjustments on Rega arms and similar arms tend to under-read the true value of side force produced. The settings you read on the Rega, OL1 or Silver arms are not always dead accurate so it may be worthwhile to fine tune the setting using the following method. Find a test record or a record with approx 10mm of blank vinyl between the end of the lead out groove and the record label. Place the stylus needle on the blank uncut vinyl and see whether the needle skates inwards towards the centre of the record or outwards. You are aiming to achieve a situation where the needle drifts *slowly* towards the centre of the record so adjust the side bias until this state is reached.

USE OF STYLUS FORCE GAUGE

Most stylus force gauges work on the same principle as a set of scales or balances. For example with the Ortofon Stylus Force Gauge, first place the stylus on the inscribed or graduated portion of the scales. Then try the stylus at different points until you find the point where the beam "balances" freely in a roughly level position. You then read the force that is being exerted – (1gram = 10 mN if the scale is in mN). From this number you can assess whether you need to increase the tracking force or vica-versa. Move the tonearm counterweight accordingly and re-measure the tracking force. Repeat this procedure until the correct tracking force is obtained. The Shure stylus force gauge works slightly differently so follow the instructions that come with the gauge.

SET THE VTA (VERTICAL TRACKING ADJUSTMENT)

To allow the cartridge needle to track at the correct angle it is necessary that the base of the arm is at the correct height in relation to the platter. Usually the optimum setting is such that the TOP edge of the arm is parallel with the surface of a FLAT record – you can use a piece of card with parallel lines drawn on it to check this. Place the cartridge on the record with the deck switched off. Hold the card edge onto the record in a position alongside the arm and see whether the top edge of the arm is parallel. Raise or lower the base of the arm till you achieve parallel position. Most cartridges have a height of 17mm. If this is the case, the base of the arm should rest approximately 31mm below the top of the platter surface – see diagram "cross-section of sub-chassis".

It is worth experimenting with VTA adjustment. Slightly raise or lower the arm and then listen - if the sound is relatively bright then the arm is too high, if it is relatively dull and bass heavy then the arm is too low.

- **If you have no VTA adjuster** Raise and lower the arm by fitting spacing washers under the arm. Alternatively you can raise or lower the height of the platter – this is easily accomplished by removing the platter & sub-platter to re-set the height of the threaded bearing house (see “diagram showing threaded bearing house arrangement”).
- **If you have the threaded VTA adjuster** Raise and lower the arm by rotating the VTA adjuster. If you find your arm is too high in relation to the platter with the VTA adjuster set to give the arm it’s lowest position then you need to raise the height of the platter a few millimetres – this is easily accomplished by removing the platter & sub-platter to re-set the height of the threaded bearing house (see “diagram showing threaded bearing house arrangement”).
- **If you have the Origin Live VTA sliding adjuster** – Raise and lower the arm in the aluminium sleeve and then clamp it in position via the set screw in the side of the VTA housing (i.e the sleeve is forced in to grip the arm’s threaded base). You do not need the Rega nut on the base of the arm. Only tighten the set screw just sufficiently to clamp the arm in position – over-tightening can make the arm sound relatively bright.

SET THE ARM FASTENING TIGHTNESS

It is best to experiment with the tightness of the large Rega base nut (if fitted) by listening to music. This may seem laborious but you will be richly rewarded as this adjustment is CRITICAL for performance. The mistake is often made of over tightening this nut with the result that the music is deadened.

WARRANTY

We guarantee arms supplied by ourselves to be free from fault for 2 years and will undertake to correct any faults providing the arm has not been modified by any party other than ourselves and has not received maltreatment of any kind. Our OEM arms and modifications are not guaranteed by Rega so in the event of a warranty claim you should contact ourselves rather than Rega.

NOTES

A detailed description of Cartridge set up and care is included in the end sections of this manual..

Please note that the occasional rewired arm can make a slight “rustling” noise through the speakers when it is lifted across the record. This should not be a cause for concern as it is only caused by microphony of the internal litz cable - under normal playing conditions this is inaudible.

The sound of the arm will improve significantly over the first 2 weeks or so as items “bed in” and the arm wires burn in.

The earth lead should be connected to the earth of your pre-amplifier or amplifier. This earth lead is best separated slightly from the arm signal leads so do not wind it around them for best performance.

Now that all the hard work is over you can settle back and hear the results - we wish you many hours of enjoyable music and rediscovering your record collection. Fit the cartridge to the arm using an alignment gauge and ensure the headshell wires are bent so that they are clear of the record surface. Ensure that the bias adjustment slider is set to zero. Set the tracking force to the manufacturer’s recommendations using a stylus force gauge (stylus balance). When tightening the counterweight, set it so that the Allen bolt is at the side of the arm (not at the top) see figure below and tighten firmly - check tracking force is still correct after tightening.

Set the sliding control for tracking bias - This should be set to be approximately equal to the tracking weight value. You can then fine tune the setting by ear using the centre track of a record as the calibration is not always dead accurate.

It is worth experimenting with VTA adjustment if you can. Slightly raise and lower the arm and then listen - if the sound is bright then the arm is too high, if it is dull and bass heavy then the arm is too low.

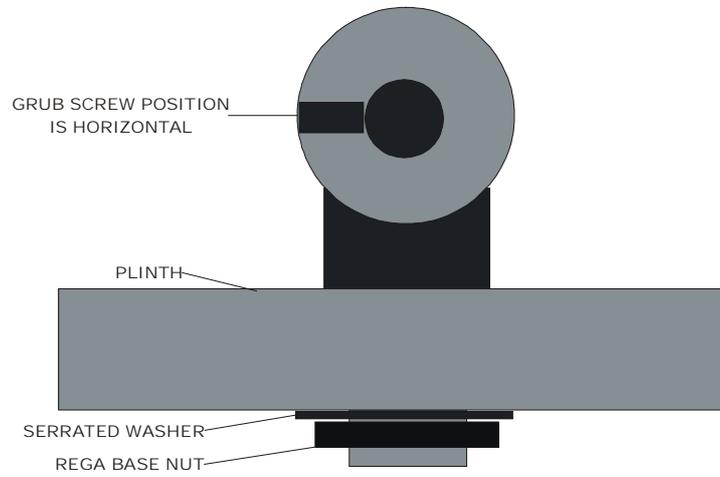
We guarantee arms to be free from fault for 2 years and will undertake to correct any faults providing the arm has not been modified by any party other than ourselves and has not received maltreatment of any kind.

NOTE: The Ortofon stylus force gauge works on the same principle as a set of scales or balances. First, place the stylus on the inscribed line on the white portion of the scales. Then try the stylus at different points along the line until you find the point where the white plastic beam “balances” freely in a roughly level position. You then read the force that is being exerted - 1gram = 10 mN on the numbered scale. From this number you can assess whether you

need to increase the tracking force or vica-versa. Move the tonearm counterweight accordingly and re-measure the tracking force. Repeat this procedure until the correct tracking force is obtained.

A detailed description of Cartridge set up and care is included in the end sections of this manual.

REAR END VIEW OF COUNTERWEIGHT



Hi-Fi cartridges - setting up procedures

INTRODUCTION

GENERAL NOTES

As we supply most makes of hi-fi cartridge we get asked questions from time to time about various issues regarding set up and care. To help newcomers to this area we have published the following notes. These guidelines are of a general nature - we publish them only to be of help and although widely accepted they are not formally authoritative - we cannot accept liability if you choose to use them and neither do we encourage the time consuming occupation of answering queries surrounding the procedures outlined - these are best referred to the manufacturer of your specific hi-fi cartridge.

For those new or inexperienced to fitting hi-fi cartridges we would state that this is NOT difficult and much of the detail and perfectionism outlined below is for those who like to experiment. We ourselves do not normally check azimuth, or vary tracking forces from the manufacturers recommendations - neither would we worry if the arm was up to 3mm away from the recommended distance from the spindle - although all these details are audible they are generally of a relatively low order, although tracking force and VTA are worth trying should you feel anything is lacking. If things seem complicated we would encourage you not to be put off as it all becomes clear once you get started.

Before fine tuning the set up as described below you should allow the cartridge to "run in" properly - at least 40 hours for some cartridges.

IMPORTANCE OF OVERALL SET UP

Hi-Fi cartridges travel like a bobsleigh through the grooves of a record only a few thousandths of an inch wide. You hear groove displacements of the order of a few millionths. (That's like splitting a hair into one thousand pieces.) Every bit of motion or vibration allowed at this level can be heard enormously amplified through your speakers. For this reason it is good to set up the turntable and arm correctly so that the audio cartridge can do it's job properly. For instance a turntable out of level can produce side forces on the pickup cartridge tip that will wear it more on one side than the other as well as have a slightly degrading effect on the wear of your records.

LEVELNESS

When a turntable goes out of level, the platter bearing performance and the arm's dynamics, specifically anti-skate, are negatively affected. So be sure your turntable platter and tonearm mounting board are level - use a spirit level. If the platter is out of level, first adjust the surface that the deck stands on. The suspension (in the case of a suspended sub-chassis design) may also need levelling if it has subsided over time. If the arm board is not level (which means the arm pivot is not vertical), either return it to your dealer for repair or re-level it yourself by shimming between the mounting board and it's support.

HI-FI CARTRIDGES ALIGNMENT

Alignment for hi-fi cartridges needs to be optimised in three different planes. However, it cannot be perfect in all three planes, so it must be optimised for an overall best balance or compromise. The final authority should always be your ears and preferably over an extended period of listening time. Bear in mind that each record is cut slightly differently. Here again, optimise for an overall balance of good sound over a wide range of records. The three alignment planes are as follows. (Please note that it is the stylus, not the cartridge that is being aligned.)

- **Lateral tracking angle**

Viewed from above, the hi-fi cartridges arcing movement across the record must maintain the stylus in the same relation to the groove as that of the cutting stylus's straight-line tracking; this is Lateral Tracking Angle, or Tangency. Apart from linear tracking arms this is always a matter of the best compromise.

- **Azimuth**

Viewed from head on, the stylus must be perpendicular in the groove so as not to favour one groove wall, and therefore one channel, over the other wall/channel; this is Azimuth.

- **Vertical tracking angle (VTA)**

Viewed from the side, the stylus must sit correctly in the groove, at the same angle as the original cutter; this is Vertical Tracking/Stylus Rake Angle. (VTA, however, varies from record to record. Therefore, this alignment must be set by ear, even more than is the case with the other adjustments.) Also check that the distance from the centre of the arm pillar (the upright post) to the spindle (usually fixed by the arm mounting board) is correct as this will affect the ability to achieve the tangency adjustments. This "L dimension varies with every pivoted arm — check your manual or with the manufacturer (in the case of Rega arms this measurement is 222mm).

HI-FI CARTRIDGE ALIGNING TOOLS

Tools required are an alignment gauge, a tracking force gauge, a FLAT record, a screwdriver or Allen keys of the right size (usually 2mm), a good light may also be helpful. Small needle-nose pliers and a magnifying glass all help. It also helps to have the hi-fi news test record. Treat the arm with care as some parts are fragile. To this end ensure that tightening of any bolts is carried out gently and without causing undue strain. Do not adjust bearing tightness - this is carefully set at factory - it may seem that there is slight "play" in the bearings - this is deliberate and must be left alone or degradation will result - it is not actually play in the bearings but carefully designed clearance tolerances of other components. Check hi-fi cartridge clip connections and mounting

Tonearm wiring uses a standard color code for channel and polarity ID: White = L Hot, Blue = L Ground, Red = R Hot, and Green = R Ground. If the cartridge pins aren't color-coded the same way, they will have letter identifications next to them. Make sure that the arm's wires, wire clips, and solder joints are in very good condition. At minimum, clean the contact between cartridge pins and wire clips by removing and replacing each clip. Holding the clips with needle-nose pliers can make this easier, but be careful that you don't strain the wires where they join the clip. Check the clips for a proper fit on the cartridge pins, and adjust them if necessary. "Proper" means snug but not tight. To check clip size, hold the cartridge tail-up close to the head wires, grasp a clip firmly right behind its tubular part with the tweezers, line it up with the cartridge pin, and press. If it does not slide on with moderate force, the clip needs opening-up. If it slides on easily but flops around when attached, it needs tightening. Sizing is the operation most likely to detach a clip. The trick is to avoid bending the wire at its attachment point or putting too much tension on it. To avoid either, always hold the clip with its wire slightly slack-looped behind it while adjusting. For opening a clip, hold it firmly with the tweezers or needle-noses, right behind its tubular section, and press the tip of the jeweler's screwdriver into the open end of its longitudinal slot until you see this widen very slightly. (Here's where you'll probably need the headband magnifier or reading glasses.) You're dealing with thousandths of an inch here, so a barely visible spreading may be all that's needed. Try it for fit, and repeat until it does. For tightening a clip, press a toothpick inside it as far as it will go, then use the needle-nose pliers to gently squeeze together the sides of the clip near its free end, while watching the slot for any change. (Attempting to squeeze a clip without the toothpick inside it will flatten its sides.) Try it for size, and resqueeze if necessary until the fit is correct. When it is, close up the middle section of the tube to match the end

Cartridge mounting screws (usually 2.5mm allen bolts) should be tight. Steel allen bolts are the best for mounting hi-fi cartridges - aluminum or brass are OK but difficult to tighten.

FITTING THE HI-FI CARTRIDGE

MOUNTING

Mount the hi-fi cartridge in the headshell if this is not done already. This is best done with the hi-fi cartridge stylus guard in place but it may be necessary to remove it during at least one phase of the installation. If you do, replace it as soon as possible. Be especially careful when the stylus guard is off, as many MC cartridges have a strong magnetic field at the base of the cantilever. If this attracts the tip of a steel-bladed screwdriver, it can destroy the stylus - there is no hope of resisting it. The best precaution is to keep the screwdriver well away from the cantilever, use a nonferrous screwdriver, or keep the stylus guard on when you're using the screwdriver near it. The headshell screws should be finger-tightened just enough that the cartridge cannot fall off but is still loose enough that the cartridge is easily moved around. Work whenever possible with the stylus's safety cap in place. Set tracking force at nominal, then do the tangency alignment procedures, then the azimuth. Do not deviate from this sequence as each step affects the subsequent one — change the order and the setup will be wrong.

TRACKING FORCE

This adjustment is carried out on the counterbalance weight of the tonearm or spring dial if one is in place. At this point, use your tracking force gauge and setting tracking force according to your cartridge instructions — final adjustment will be done later by ear. If you do not have a tracking force gauge, but the arm does have a calibrated counterweight, defeat the arm's anti-skate mechanism or set it to zero. Set the counterweight so the arm is level and balanced. Be very careful of the unprotected stylus — you cannot do this with its safety cap in place. Once the arm is

balanced, lock it in its cradle and, using the calibrated counterweight, set the tracking force according to your cartridge's recommended weight.

TANGENCY ALIGNMENT (LATERAL TRACKING ANGLE)

Follow the manufacturer's literature and the dictates of your alignment gauge — different gauges use slightly different methods. As you square up the hi-fi cartridge body with the gauge's markings, be sure that the cartridge sides are square or your alignment will be wrong. When all adjustments are correct, carefully tighten down the hi-fi cartridge mounting screws. Keeping a firm grip on hi-fi cartridge and headshell together so nothing shifts, delicately tighten each screw down a turn or so, then repeat until tight. Tightening down one screw all the way before tightening the others is almost certain to twist the cartridge out of alignment. However careful you've been, always check the alignment again after tightening.

VERTICAL TRACKING ANGLE (VTA)

Unless your tonearm has a special VTA adjuster, adjusting arm height is usually carried out with the use of spacing washers (as with Rega arms). In arms with a pillar / collar type vta adjuster it helps to put pencil or pen marks on the pillar to keep track of various heights. See your tonearm manual for its recommendations on adjusting arm pillar height. The best approach is to tune-in VTA gradually by listening to music. You know the arm needs to be lowered at the arm pillar when the overall sound is hard and bright, with thin bass or no deep bass, edgy highs, and harsh midrange (of course, this could also be tracking force which is too light). Distortion obscures low level details between the musical; notes so dynamic range is reduced. Transient attacks may be too sharp. Raise the arm when the sound is dull and damped, the highs rolled off, the lows muddy and lacking definition, and transient attacks are dull. Mind you, this sounds an awful lot like the effects of changes in tracking force (too light is edgy, too heavy is heavy and dull). They are different sounding but hard to explain. Start with the arm a little low and very gradually raise it, first to where it is parallel to the record, and then so the back of the cartridge is tilting up. Keep track of your settings so you can return to the one you like best where everything snaps into focus. The range of adjustments can be quite broad, as much as 3/4" or even more (at the arm pivot). Play with the full range so you know what it sounds like and don't be diffident.

ANTISKATE FORCE (PIVOTING ARMS ONLY)

This applies an opposing, balancing force to the natural inward drag of a pivoting arm while playing. Left uncontrolled, the stylus would push up against the inner groove wall, causing distortion both from mistracking and a cantilever skewed in relation to the cartridge generator. To set, lower the stylus down near the label of a record with a wide run-out to it. Increase antiskate until the arm starts to slowly drift inwards, towards the label. Again, this should be finalized by ear as you listen to music. If image placement is a little off-center, or if things don't seem to be locked in solidly, experiment with antiskate. Also, watch the stylus when you set it into a groove. Does it move to the right or left relative to the cartridge body? This indicates too much or too little antiskating.

FINE TUNING

You now have three adjustments approximated. Tracking force, VTA, and azimuth. It's a matter of reiteration to optimize the sound. The change in sound with each of these individual adjustments can be similar. It's therefore necessary, in optimizing all three, to experimentally move from one type of adjustments to the next, then to the next, in order to balance the optimization for all three. It's helpful to listen to female vocals as you proceed. Firstly try deviating from the cartridge's recommended tracking force by small increments - about 0.2 of a gram deviation above and below the manufacturer's basic recommendations. Don't worry about record damage from heavy tracking as most record damage is actually caused by mistracking in the middle-to-high frequencies with too little tracking force rather than with too heavy. If you're getting mistracking at the low (lightest) end of the range and yet the low range is generally sounding the best (and on moderate signals, not heavy passages), then chances are you have either a dirty stylus, a bad record, an accumulation of crud in your cartridge, or a cartridge that's getting old. Changes in tracking force can change how you want VTA and azimuth adjusted. If azimuth was initially adjusted by ear, experiment with it.

Proper care and maintenance of Hi-Fi cartridges & records

CARE OF HI-FI CARTRIDGES

Replace your cartridge when due - hi-fi cartridges have a lifespan for their cantilever suspensions and stylus needles. This will vary from manufacturer and type of cartridge as well as other factors like the cleanliness of your record and the care you take of the cartridge. It is wise to enquire on the expected life of your cartridge to the manufacturer so that when the time comes it is replaced accordingly - most importantly this will preserve your records as well as enable you to enjoy the best performance.

If there is a build-up of dust and dirt where the needle enters the cartridge body you should use a small soft brush to brush the debris out. Always brush from the direction of the cantilever to the stylus or you may do damage.

Care of stylus - One well known method of cleaning stylus is the Linn green stuff which is a very fine abrasive paper - this may just be OK on some cartridges which do not have fine stylus tips and fragile cantilever mechanisms. However there is a danger of causing fractures or chips on your diamond stylus on certain fineline tips. This method can also strain the cantilever mechanism.

There are a number of fluids on the market that increase stylus life and help to clean gunge from the needle - a word of caution though - some of these can loosen the stylus glue on the cantilever over time - some fluids can also attack the cantilever or coil material itself or harden the suspension - consult your cartridge manufacturer over this. One key factor is to use the liquid very sparingly on a cotton bud such that it is just damp (not running with fluid) - this minimises the fluid which can run up inside the cartridge.

RECORD CARE AND CLEANING

The stylus itself does a pretty good job of cleaning the grooves and should itself therefore be kept clean. The proprietary brushes etc. for cleaning records will often do little more than brush dirt deeper into the record grooves and are best avoided if possible. Also keep records in high quality non-scratch record sleeves - preferably good ones.

A record cleaning machine is really the only answer for cleaning records properly as they suck out the debris and dust in the record grooves using a powerful vacuum. Tests using a microscope prove that this does the job with 100% success. The performance improvement is also very noticeable when it comes to even new records being played. We supply and highly recommend the Moth record cleaning machine as this is very effective from personal experience and comes with many glowing endorsements – see our web site for details and reviews.

Word/ instructions/turntable and arms/rega modification kits

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