

Vinylium DubplateCutter

Usermanual V0.3

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Introduction

The Vinylum Dubplatecutter is a complete stereo cutting system. The mechanics fit on a Technics SL1200/1210 MKII, MKIII turntable.

The System consist of four main parts.

1. The Turntable (Technics SP1200/1210)

the turntable rotates at the desired speed, normally 33 or 45 rpm. The turntable should be flat and strong enough to get a good cut.

2. The Mechanics (Overhead)

the overhead carries the cutterhead from outside of the plate to the center. On the overhead there are 2 highly polished inox bars which let the carriage glide very softly. Also there is a feedscrew which rotates computercontrolled and moves the carriage from outside to center.

3. The Cutterhead

the cutterhead is the "heart" of the whole system. This piece transform the electronic signal into mechanical movement. There are two systems, one for each channe, linked together on a tube of 3mm diameter. On this tube, called the torquetube, the saphire cutting stylus is attached.

The SC99 cutterhead used at the vinylum cutter is a Feedback controlled cutterhead. That means the movement of the stylus is controlled and so you get highest possible quality over the whole frequency range. Cutterheads without Feedback (for example Vestax) have a lack of low and top end and the distortion increases with deeper cuts.

4. The Cuttingelectronics

the vinylcut vc200 cuttingelectronics consist the necessary RIAA signal processing, the poweramplifier, monitor selection and the controlling computer.

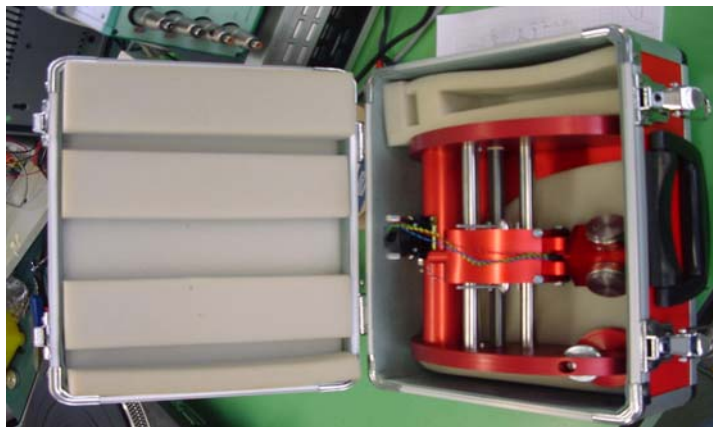
The computer controller analyzes the sound signal and calculate the necessary distance between 2 grooves and control the feedscrew.

unpacking

byou should receive two boxes.
One box contains the electronics



the other box contains a red suitcase with the Cutteroverhead.



If you dont use the cutter. Put theOverhead back into the box. There its best protected against dust and dammage.

In the suitcase there should also be a stylus changing tool and 20mm 0.5 A SB spare fuses.

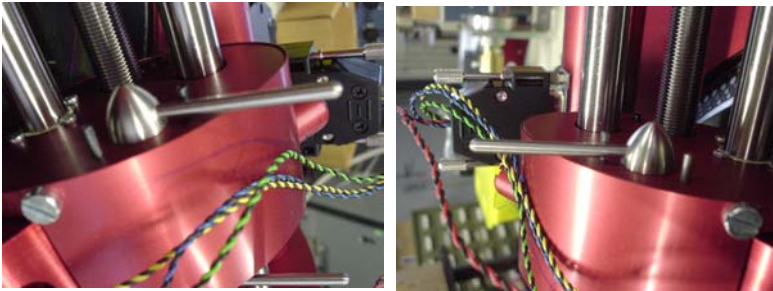
The Overhead

The Overhead moves the cutterhead from outside of the plate to the center. This is done by a feedscrew of high precision which is attached to a computercontrolled dc-motor. The DC-motor moves depending on the amount of low frequency exactly in the right speed to prevent overcuts and not to use too much space. So you will be able to get a maximum recording time per side.

The carriage is the part where the cutterhead is attached. It glides on two high precision stainless steel bars.



The carriage has two handles. One on the left side, the other on the right side.



The right handle is the head lift handle. In position up the head is up, in position down, the head is down, in recording position, that means the stylus touches the plate and cuts into it. Only put the head lift handle down, when the left handle is down and the feedscrew is rotating. Otherwise you will cut into the aluminium after 2-3 turns and your stylus is destroyed.

The left handle is the feedscrew handle. If the feedscrew handle is up you can move the carriage to the desired position. Only move around the carriage when the right handle is up. Otherwise you can destroy the cutterhead.

In the middle of the carriage there is a round bolt. With this bolt you can adjust the groove depth. The bolt adjusts the force of a spring and trough that you cut a deeper or a smaller groove.



Turn to the left handle: thinner groove, head goes up

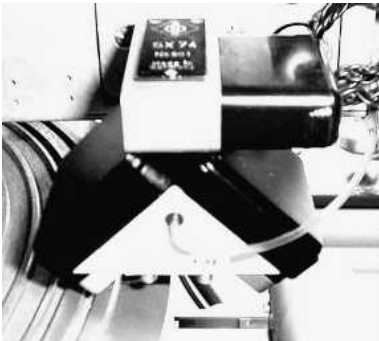
turn to the right handle: deeper groove, head moves down.

The Cutterhead (SC-99)

The Cutterhead is the heart of the whole DubplateCutter. The Head transforms the electrical signal into a mechanical movement. This is done with a drivecoil in a strong manet field, similar to a loudspeaker construction.



The Cutterhead used in your Dubplate Cutter is a Feedback controlled Head. The construction and dimensions are very similar to the State of the Art cutterhead from Georg Neumann , SX-74, which is a standard in professional disc cutting business.



Feedback controll:

To linearize the frequency range, there is a small coil in a second magnet field, which generates a control voltage exactly in the way, the stylus is moving. This control coil is called the Feedback coil.

The head consists of the following components

drive system: 2 systems, each for one channel which transforms the electrical signal to a mechanical movement.

torque tube:where the stylus is mounted. And where the two channels aren linked together

The Cutting Electronics VC-200

the vinylcut vc200 cuttingelectronics consist the necessary RIAA signal processing, the poweramplifier, monitor selection and the controlling computer.

The computer controller analyzes the sound signal and calculate the necessary distance between 2 grooves and control the feedscrew.



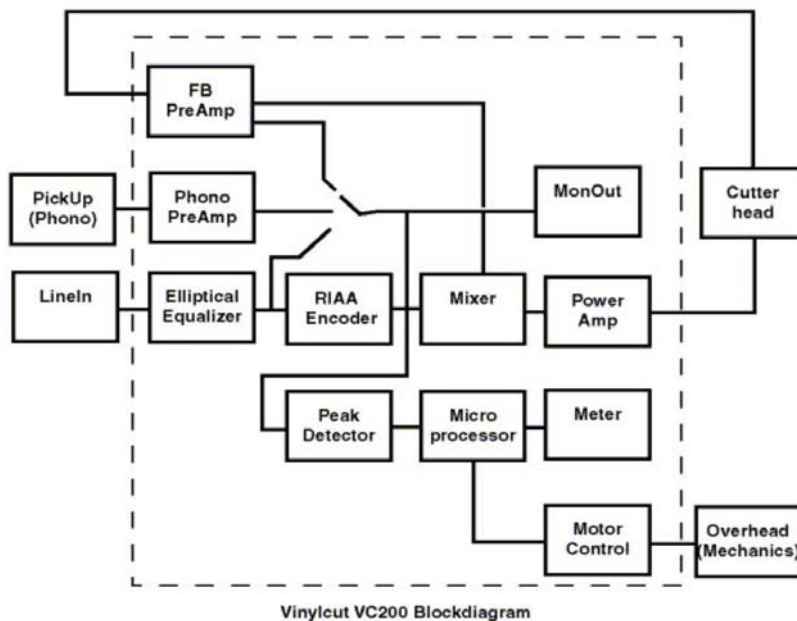
At the front you have a LED stereo peak indicator, 3 mode leds, 5 buttons and 2 potis for the level of both channels.

At the back you have the main power plug, the main switch , thecutterhead protection fuses, and the audio signal inputs and outputs.



This block diagram shows the sinal flow in the electronics.

To understand the VC-200 electronics the best is to study the blockdiagram :



Install

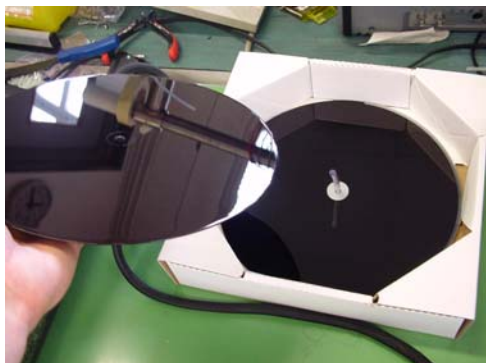
first make sure you have the correct rubberplate for your turntable.

you need a original Sp1200/1210 rubber mat. with a thickness of approx. 5.9 mm thick that means 0.24 inch

on the back of the rubber mat it says technics sftg172-01

the original MK-3 rubber mat is only half thick you cant use this one or use 2 of them.

take a laquer out of the box. Make sure you touch only on edge of the laquer-plate. Laquers are very sensitiv for scratches. Dust, fingerprints and other dirt can destroy the cutting stylus..



put it on the turntable



take the Overhead out of the red suitcase and put it on the turntable. Make sure that both handles are in up position.



Plug in the DB-25 connector on the back of the overhead. Plug in the cutterhead connector (DB15) on top of the overhead.

Move slowly and carefully the carriage and position the carriage so the middle of the Cutterhead is approx 4-5 mm inside the Laquer plate.



Plug in the Audiosource (CD-Player, SoundOutput of computer....) with a stereo chinch cable on the input. The Inputs and Outputs are located at the back of the electronics.

There are three stereo chinch plugs.

Input:

here you plug in the audiosource. For Example CD-Player, Computer the sensitivity is 0.775 shows 0 dB at the LED meters.

Monitor:

here you can attach a ordinary hifi- amplifier. So you can hear the desired monitor signal. On the front of the electronics you can choose the source of monitoring.

In=signal that enters the electronics

FB= FeedbackSignal of the cutterhead. That's exactly what is been cut by the head.

PB= Pickup. The signal from your pickup. so you can immediately play back what you cut.

PB:

here you plug in the cables from the turntable.

Sensitivity is 5mv at 0db (velocity is 5cm/s@ 1000 Hz. = NAB standard).

With a Ortofon Concord Pro you should see a 0 dB when playing back a NAB test record.

first cut

Both handles have to be in up position.

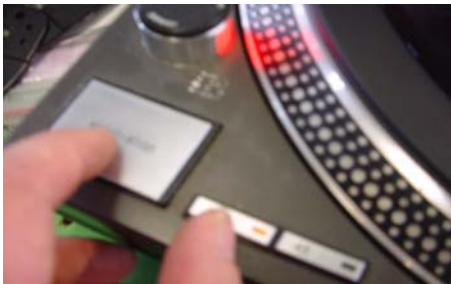
Turn the cutter spring screw and turn from right to left (into direction of the knurled nut), approx. 1 turn. This stretches the spring inside the carriage and moves the cutterhead up. If you lower the right handle the stylus shouldn't touch the plate. put the right handle up.

make sure, the cutterhead at the beginning of the plate. Due to material problems it is recommended to start cutting about 4-5 mm inside the edge of the plate.

If you are at right position put the left handle down. The carriage is now engaged to the feedscrew.

Don't try to move the carriage in this position. You will destroy the halfnut inside the carriage.

press start at your technics turntable



now start your audiosource. Best around its loudest parts.
Check on your vinylcut electronics that the "IN" led is on.
Turn up the volume on both potmeters till the peaks on the meter hit 0 dB.



Go back on the beginning of the track you want to cut. And press pause button.

Now press start on the vinylcut electronics.



The stop button flashes and then the start button lights up. As long as the button flashes, the cutter writes a lead-in groove and during this you move the right handle down. Watch the cutting stylus. It should be around 1 mm above the plate. Now turn the nut from left to right towards the right handle. Do that very slowly. The stylus comes now closer the plate and then starts cutting a groove. Turn till it cuts a nice groove, also watch the strobo at your technics turntable. It shouldn't move or skip. If that's the case, it's maybe already too deep.
If your groove is cut nice press play on your cd player and you will hear the sound in your cutterhead.

Press mode on the vinylcut and the led goes from in to fb. Now you are listening to the cutterhead fb signal. That's the signal your cutterhead produces.

As long as we don't have a good solution for chip suction, use a brush, best will be a carbon fibre record cleaning brush. Use it from the beginning of the cut to move the chip towards the center. Normally it goes to the center and winds around that.



Press stop at the end of your cut and then immediately move the right handle up so your head is moving up. After the stop the feedscrew doesn't turn anymore. That means you would always cut in the same groove. So if your head is still cutting after two turns you cut through the lacquer into the aluminium and your stylus will be damaged.

Then stop the turntable. Remove the overhead and put away.

Remove any chip on the plate.
Now you can listen to your cut.

Tips:

put a 100 watt lamp approx. 60 cm above the overhead. The heat of the lamp heats up the lacquer plate and you will get approx. 5-6 db less surface noise.

never smoke during a cut. the chip cut away during the cut of dubplate is highly flammable.
best to store the chip is to put in a glass jar filled with water.

changing the stylus

this chapter describes how to change the sapphire stylus on your dubplate cutter.

The stylus is the actual tool cutting the sound into the plate. However sapphire or diamond are the hardest existing materials, the stylus doesn't last forever. Normally a sapphire stylus can be used for 15-20 hours of cutting time. They are very hard but the highly polished cutting edges and the tip are very sensitive to break.

a worn out or broken stylus can be detected by

- increasing surface noise
- problems to get a good chip.
- lot of distortion

also if you look over the record, on a plate cut with a proper stylus, the cut looks shiny, and with a rainbow pattern.

if stylus is bad the cut looks grey and the walls are not brilliant.

Stylusgeometrie

The stylus consists of a highly polished sapphire bar approx 1mm diameter. It has a flat, triangular shaped surface, called the cutting surface. Behind the surface the stylus is 45 degree shaped.

The sapphire is glued into an aluminum conical shank. The shank has a squared part where the stylus can be adjusted and handled with a special stylus tool. Always use this tool.

Around the stylus there is a wire wound, called the heater wire. This helps to heat the stylus to get less surface noise. Normally the heat current is 0.5 A with 4-6 volts. Never heat the stylus when you can't remove the chip by vacuum suction. The chip can start burning.

For a better understanding we have a look at the stylus from different sides:



how to change the stylus.

switch off the vinylcut VC200 electronics.

remove the cable coming from the electronics to the overhead mechanics.

make sure that both handles on the carriage are up.

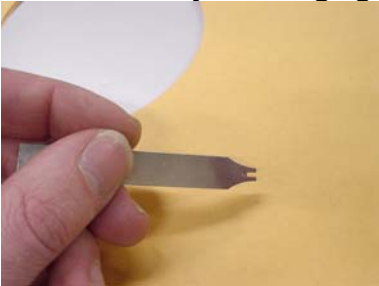
move the carriage in the middle position.

lower the left handle so the carriage doesn't move anymore

take the overhead mechanics and put upside down into your overhead suitcase or put on any other foam.

make sure no magnetic parts lying around the magnets of the cutterhead are extremely strong and they collect any screws or other iron parts around 20 cm.

now take the stylus changing tool.



put the tool from the front of the cutterhead under the squared piece of aluminum of the stylus. then slowly and without force make a quarter turn and lift the old stylus out..



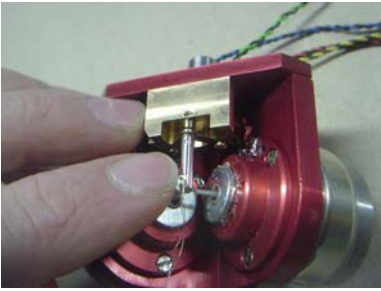
never use any force!!!

take out the stylus of the box. only hold the stylus at its heating wires. never touch the stylus with your fingers. you can destroy the polished surface and the sharp edges.

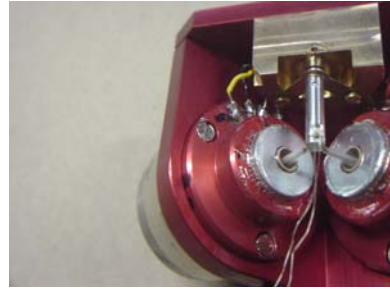


the heating wires should look towards you. on the opposite direction of the stylus there is the cutting surface. this one should look away from you.

bring the stylus to the conical hole of the cutterhead. use your fingernail to press in the stylus with nearly no force. but dont touch the safire. just press on the aluminum square.



then take the changing tool and hold it from the opposite and press with a slight rotation the stylus into the hole. but just with very low pression. if you use too much pression you can destroy the cutterhead or the conical hole.



make sure the front of the squared part of the stylus is parallel to the torque tube.

For the cutterheads shipped from december 2002 on, there are M3 bolts on the two front screws. so you can clamp the wires under the bolt.



If you dont have the bolts maybe you can organise them in any hardware store. They are metric M3.

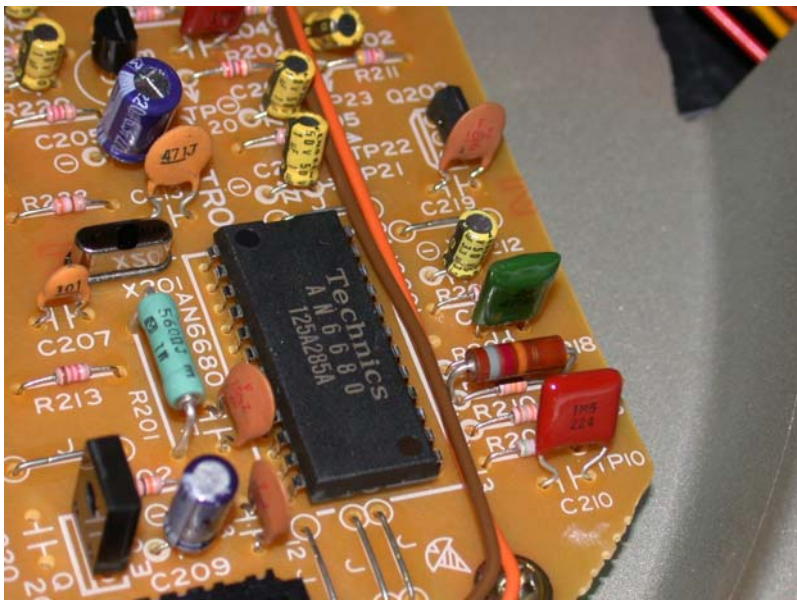
how to upgrade the technics turntable

all changes are made of own risk. we dont take any responsibility of damaged electronics or other troubles.

only approved for Technics Sp1200/1210 original version. may not work with mark III version.

how to process:

1. unplug the turntable. take the main power plug and put it onto the turntable to be sure you have unplugged the technics turntable
2. remove the rubber plate on the turntable
3. remove the turntable. see original manual for more details
4. remove the plastic cover by removing 4 screws.
5. solder a 150 kohms (brown blue orange) resistor in parallel with the original 330 k ohms (orange orange yellow) resistor of R209. near this resistor it says TT17. you should reach 100k ohms in total.



6. put plastic motor cover back. dont forget to tighten all the screws
7. put turntable back
8. put rubber plate back
9. plug in the turntable
10. test on 33 in locked pitch position. should be still locked
11. test on 45 in locked pitch position. should be still locked

congratulation. your technics has now much more torque without jumping from one strobopoint to the other.... it still does but at a much higher torque....if it still happens during your cut, it is asign of too deep cutting.

Laquers

there are several laquer types available for disc cutting
3 qualities exist

-masters

-reference (yellows)

-dubs

for your cutter you only need dubplate quality. the other ones are for cutting masters
and the only difference for you would be the price.

at the moment the price for a 10 inch dub would be around 7-15 us\$

and for a 12 inch dub around 12-20\$

just buy 10 inch or 12 inch laquers any other sizes wont fit on your cutter.

important: if you receive your laquers, open the box and let them dry for a couple of days. the
laquers contain
solvents that will evaporate. if the laquers are too new, you will have troubles to remove the chip.

recommended laquers:

apollo: 10 inch dubs, 12 inch dubs

transco: 10 inch dubs, 12 inch dubs

cutting stylus

you need a kmh-74 stylus.same one as for neumann sx74, sx68 cutting head.

there are different tips available. buy at least 3 mil tip radius or bigger

recommended stylus:

apollo: Adamant NSH 2

transco:model 320

laquers can be purchased at the following places:

usa:

Apollo Masters

apollo-masters.com

101 West Lincoln Street

92220 Banning CA

USA

(001) 909 849 8831

Fax: 909-849-1374

Transco;

<http://www.transcousa.com/lds.html>

PO BOX 1025; 609 W. Elizabeth Ave; Linden NJ 07036-4239

PH: 800.876.0039; FAX: 800.354.4669; E-Mail: info@transcousa.com

europe:

england:

preco (apollo)

transco england

vinylum

Installing and adjusting the cutterhead

this chapter describes how to install the cutterhead after a repair or if you prefer to remove the head for stylus change.

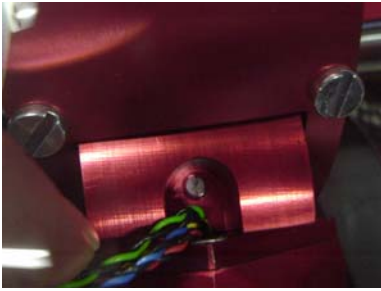
The cutterhead has to be adjusted after each installation.

You need a flat screwdriver number 1 for this installation.

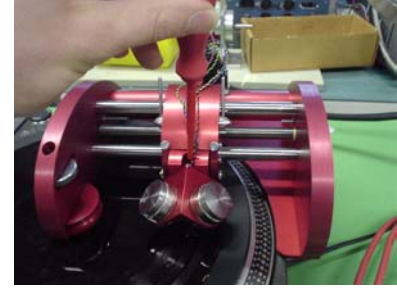
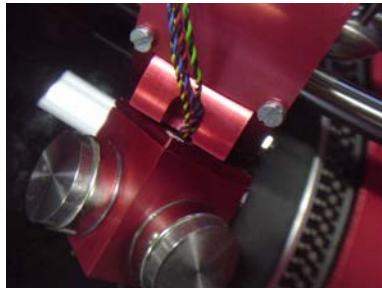
Make sure you do the installation only when the cutting electronics VC200 and the technics turntable are switched off.

Both handles have to be up and best is to be in middle position of the overhead.

First loose the screw enough on the cuterhead suspension. Its the small screw in the middle.



then take carefully the head and insert the round stick at the back of the head into the suspension.



Then tighten the screw with the screwdriver. Make sure the middle of the angle is in the middle of the gap where the cables are...thes a good starting point.

To be sure that the stylus is exactly vertical to the laquer there are two different possibilities.

The first one is to use a new plate. If you have a adjustable light adjust it that you see the stylus mirrored in the plate. The stylus and its mirror picture should be in one line. If its badly adjustet you will have a small angle into one or the other direction.

The other way to adjust is to use the stylus changing tool and an old plate. This is the better method but it needs some experiennce and you can destroy the stylus if you dont take care.

Make sure the right handle is up. Then take the stylus tool and put it under the head..but be sure you don't touch the stylus.



The tool acts as a parallel bar. You can lower theright handle a bit so both sides of the cutterhead edges touch the stylus tool. Press with nearly no force to the cutterhead that both sides touch. Then tighten the screw. The head is now absolutely parallel to the plate.

problems, frequently asked questions

- **my acetates wear out very fast**

use only good non abrasive pickups (shure m44-6,m42, stanton 680) with reasonable weight. if you

use ortofon concord, especially the elliptic ones your acetates wont play more than 30-40 times. with a

carefull handlyng and a good pickup you can play them more than 100 times.

can i scratch with acetates?

not really. if you want to scratch with acetates, use at least a non abrasive pickup (shure m42)

- i want to cut harder records than acetate for scratching.(cutting vinyllike,hardmodisk)

the original turntable is not strong enough to cut harder material with your cutter.

harddiscs can be cut but with very thin grooves only. there is also a electrostatic problem with the chip. because of

electrostatic charge the chip doesnt move away...

we work hard on a solution and hopefully within next half year we can present you a good solution to cut

the vinyliums "vinyllike" records, which are identical to regular records.

- **i turned the left channel totally down, the right channel is turned on. Why do i have a signal on the left channel?**

The stereo signal passes a elliptical equalizer which makes the signal mono under 700 Hz. This is because you can not cut a out of phase low frequency signal. To avoid this problem, we integrated this necessary vinylmastering tool into the cutting electronics.

So if one channel is turned off you always hear the signals under 700 hz coming from the other channel.

- **i start record and i hear a slight steady tone without applying music**

there is a steady tone in the high frequency area, typically 5-10 khz if you press record.

this is caused by a loose feedback coil. turn of electronics and remove cutterhead and send in for repAIR. SEE CHAPTER REMOVING CUTTERHEADS AND SEND FOR REPAIR.

- **i have strong distortion on my cut**

strong distortion are caused of mainly 2 problems

first problem is a disadjustment of the cutting stylus. that means that the cutting surface of the stylus is not 100% tangetial to the laquer. so especially high frequency are distorted.

also weared out or mechanically damaged styluses are often responsible for distortion.

replace stylus and make sure allignement is properly done.

second problem is a defect of the cutterhead itself. disconnect the electronics, unscrew the cutterhead and send it well packed to

vinylum for fixing.SEE CHAPTER REMOVING CUTTERHEADS AND SEND FOR REPAIR.

- **lost of one or both channels**

cutterhead fuse is gone replace with 0.5 slowblow fuses (20mm)

or 0.63 A fast acting fuses

never use higher fuses.otherwise you will destroy the cutterhead.

each channel is protected by a 0.5 a slow blow fuse. there are 10 spare fuses in your cutteroverhead box.

spares can be ordered at following distributors or any better radio shack, electronics store

www.farnell.com

order number:

www.rse.com

cutting level exceeded.

electronic protection. if the over leds on the vinylcut electronics are on for more than 2 seconds, the electronics mute the power amps to protect head and amps from destruction. this protection helps for excessive levels in bass, and mid frequency region. on higher frequencies the head is just protected by the 0.5 amp fuses.

* Mini Kingston Manual *

Powerup

After switching on the saved values from the eeprom are read into memory.

the display shows a moving dot animation.

at the end of the powerup sequence the display shows the saved presetting for the selected turntable speed (33 or 45rpm).

after two more seconds the display returns to the normal peak meter.

STOP MODE

MODE key

- pressed short selects the input monitor source (IN [Line], FB [Feedback], PU [Pick Up])

- depressed for about a second enters changing parameters:

key functions during parameters changing:

- MODE cycle through parameters: main - land - width - mark pitch - mark time

- START Save setting to eeprom

- STOP Return to normal peak meter

- FAST Decrease value (-)

- MARK Increase value (+)

parameters:

main: select the turntable speed (33 or 45) and enable/disable peak hold function

land: select the land (space between the grooves) value (4um to 120um)

width: set to the actual cutting width, double of the depth (50um to 120um)

mark pitch: set the leadin/mark pitch (400um to 1100um, nominal 800um)

mark time: set the duration of the track mark spacing (0.3s to 1.5s, nominal 1sec)

START key

- Starts recording:

before you start a recording prepare your master that it can be started immediately by ONE button press (normally play or pause on your cd-player, mini-disc, computer, tape-machine.

put on a blank and start the turntable at the appropriate speed, use quartz lock position of the pitch fader. be sure to have selected the same speed in the cutter settings of your vinyl recorder, see changing parameters chapter.

set the cutter at the desired position either by manually moving or using the FAST key. be sure to have the feedscrew engaged before starting to record.

recording doesn't start before the START button is released. after releasing the key you can release the head with the headlift handle. now the stylus starts cutting a safety groove.

after about a second the pitch controller writes a short leadin (about 1 turntable revolution). after

the leadin has finished (the MARK key light extinguishes) you press start (or pause) on your master playback unit. recording is now in progress. have a look that the chip (the part of the groove that's cutted) gets off from the stylus.

FAST key

- moves the cutter manually
first the cutter is moved slowly and then going faster as long as depressed.

MARK key

- moves the cutter for about one track mark. used if you stopped a recording and you want to have a small space (about 1mm) before the next track starts.

RECORDING MODE

MODE key

- pressed short changes the monitor channel you are listening to. LINE - FEEDBACK - PICKUP
- pressed about a second: allows you to change the LAND and the TRACK MARK TIME setting.
after about 3 seconds the display returns to normal peak meter readings.

START key

- no effect

STOP key

- stops any foregoing recording by writing a lockgroove. do not lift the head before the START key light goes off, but don't leave the head down too long after the START key light went out or otherwise the stylus can get damaged (especially on laquer dubplates, because after several revoulutions the stylus cuts deeper and deeper and will reach the aluminium surface).

FAST key

- once pressed the cutter starts to write a leadout until you press STOP or the END of the recording area is reached. you can also press MARK to return to normal recording if you want.
- in LAND and TRACK MARK TIME changing mode lets you decrease the selected parameter.

MARK key

- writes a TRACK MARK for the selected MARK TIME. used to distinguish several tracks on the record if you do recording of several tracks in one go.
- in LAND and TRACK MARK TIME changing mode lets you increase the selected parameter.

INPUT LEVEL GAIN

adjust here your recording level. the peak meter shows the level relative to the american standard reference level. the louder you cut the more space you need (less recording time available on disc)

and the more distortion on high frequency will be the result. if you cut too low level the more noise (less dynamic) you will hear if played back.

Vinyl Blanks versus Dubplates

Vinyl blanks allow you two have a more durable recording and you even can scratch or backqueing without destroying the sound. But you will always have more background noise than on dubplates. Vinyl blanks also need a different cutting stylus (diamond) to be mounted on the cutterhead than you for cutting dubplates (where you use standard Neumann compatible saphire stylus).

The Chip

The part of the groove which is cutted away from the disc is called "chip".

33 1/3 versus 45 RPM

On lower turntable speed you have more recording time available than on 45rpm. but the high frequency response (especially if you cut loud) is better if you use 45 rpm, namely for smaller recording diameters.

Quartz Lock Stability

Because the quartz lock control loop (pll) of the technics turntable is not really good (its ok for normal pickup playback) you need to install the accompaning "power plugin" in your technics mk II. This is one time and easy to do job. If you have a good new stylus and you cut only on dubplates you probably don't need it, but for the vinyl blanks it's absolutely necessary.