

how to setup a caruso cutterhead
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all infos, updates and latest instructions always on : www.vinyllike.com
this documents may contain errors. so double check and use your own brain. we are happy if you can help us to make this document better.

for a working caruso system you need:

1x caruso cutterhead. we sell only fully tested heads,
(every head has cut at least one record in our lab on a AM44 lathe and passed several tests on a neumann SAL74c rack)
2x preamp pcbs built & tested. you can do it yourself and save a lot of money.
1x power supply +/-15V. see details on www.vinyllike.com . for legal reasons. we don't sell power supply.
2x RC network , fuse and cutter switch . you can build yourself
1x cutterhead cable. DB15 connector from head to amp, preamp
1x case to install everything
1x power amp 150-250W at least. most people use the QSC gx-3 which has much more power than you will ever need.
1x professional peak, level meter: i strongly recommend the RTW1206 or NTP177-400. cheap dot led dj meters don't work.
you can also use a true rms meter or a scope.

1x DAW workstation with software. i recommend REAPER . its great and not expensive. but whatever you have will work.

1. prepare the preamps.

simple way:
order prebuilt and tested preamps 2x

do it your self style. read on.

for preamp build you need

-soldering iron.
-a working bipolar (+15V/ -15V Power supply) . if you don't have build that first. if you don't know about bipolar powered configuration. read books about analog electronics and watch some videos about it.
power supply is pretty straight forward. use a linear one. switching power supplies are not very recommended because of the noise that can be picked up by the super sensitive feedback coils.
you need a AC transformer (2x115V, 2x15V, 0.5A torroid is best) , a bridge rectifier
2x 470-1000 uF / 35-50V elkos , LM7815, LM7915, 2x 100nF , 2x220-470nF and 2x 470uF 25-35V elkos.
i recommend self resettable 0.5A polyfuse in line for the +/-15V. that saved already many preamps
or check for prebuilt standard linear power supply online.

-at least a multimeter. a TrueRMS helps and you don't need any other measurement equipment

-an oscilloscope helps. even the cheapest oldest analog one. you can also use DAW software for those tests. but make sure you don't damage any of your DAC equipment during the tests.

how to build

order all parts. everything is very uncritical.

start with the resistors. i use metal film ones.

add the diodes

add the IC sockets

add the caps. start with the 100-220n

select and match caps for C300, C318, C403 , C702 , C703. the absolute value is not super important. more important to have them matched as close as possible for both channels.

add the rest of the parts

check with a multimeter from + to - and to GND. no shortcut (beep)

apply +/-15V power. no smoke no heat should occur. if you have a lab supply that helps. check voltage on the IC sockets Pin4 (-15V) and Pin8 (+15V). use the GND Pin

switch off and put in the chips. double check for correct placement.

power up again. check again for smoke signs or heat.

check input-output path:

feed 1kHz approx 0.5Vpp to Mod In.

measure on Modout. adjust Drive level for unity gain.

if you can switch to 20kHz and close the RIAA jumper now you should see +18dB = 3.97Vpp (7.94 times the input value)

so you know RIAA switch works.

if you have a scope check the output signal. you should see a nice sinus wave. no distortion.

check FBamp to FB mon path.

feed 1kHz (-20db from level before) approx 0.05Vpp = 50mV to Mod In

measure on FBM (Feedback Monitor) .FBM poti fully up clockwise . you should see a nice sinus. approx

set input to 20kHz and 0.05Vpp . if you close the RIAA bridge you should see a drop of 7.94X (-18dB)

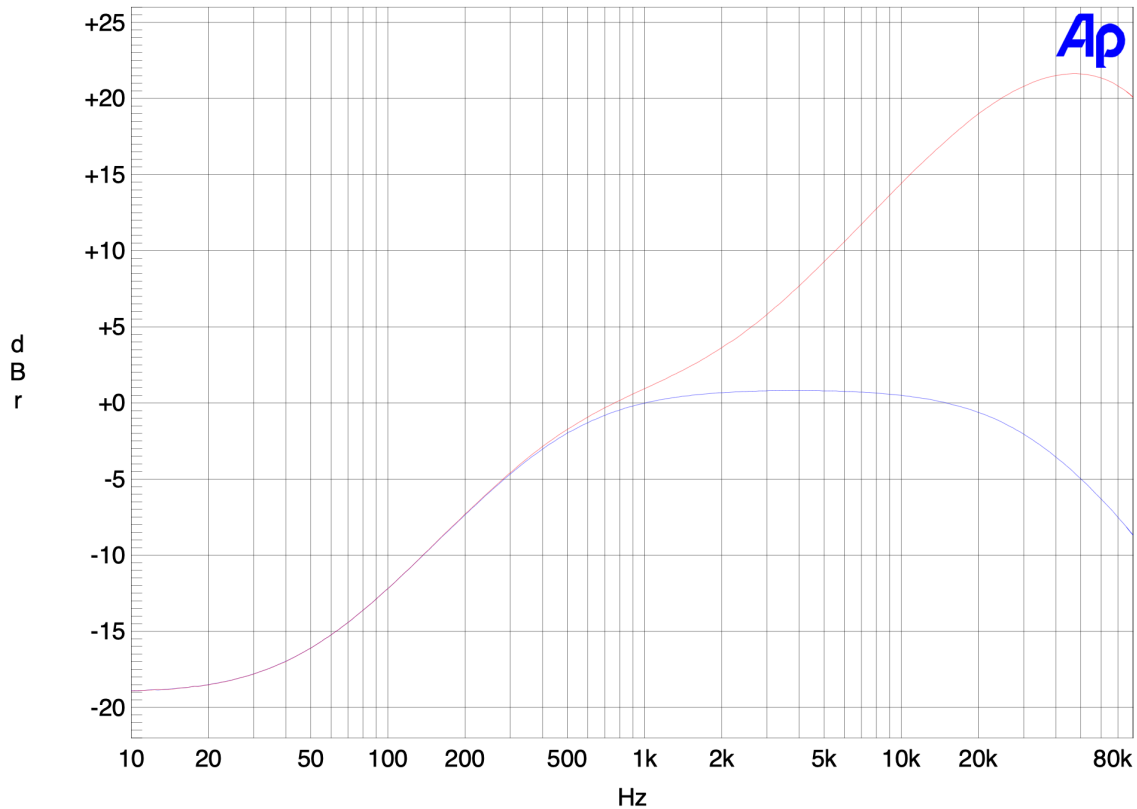
set input to 20 Hz and 0.05Vpp you should see 8x (+18dB) the lower RIAA time constant.

if those tests passed, your preamp should be ok.

to make sure , and if you have the possibilities to run a sweep from 20Hz- 20kHz, from ModIn to Mod out

you can verify the open loop curve including the regulation amp.

that looks like this.



| Sweep | Trace | Color | Line Style | Thick | Data | Axis | Comment |
|-------|-------|-------|------------|-------|-----------|------|---------------------|
| 1 | 1 | Blue | Solid | 1 | Anlr.Ampl | Left | riaa_encoder_ |
| 2 | 1 | Red | Solid | 1 | Anlr.Ampl | Left | riaa_encoder_ _riaa |

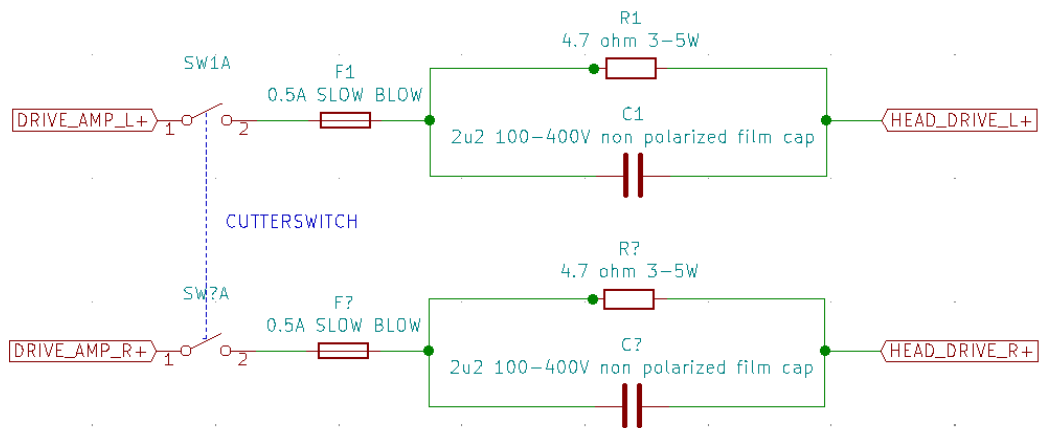
building the Cutterhead Cable and RC network

do build this cable exactly as described. its a very important part of the system and you might damage or destroy the head if not done properly !

the Caruso Head needs a RC network for impedance matching. the goal is to keep the the impedance constant from 20Hz 20kHz.

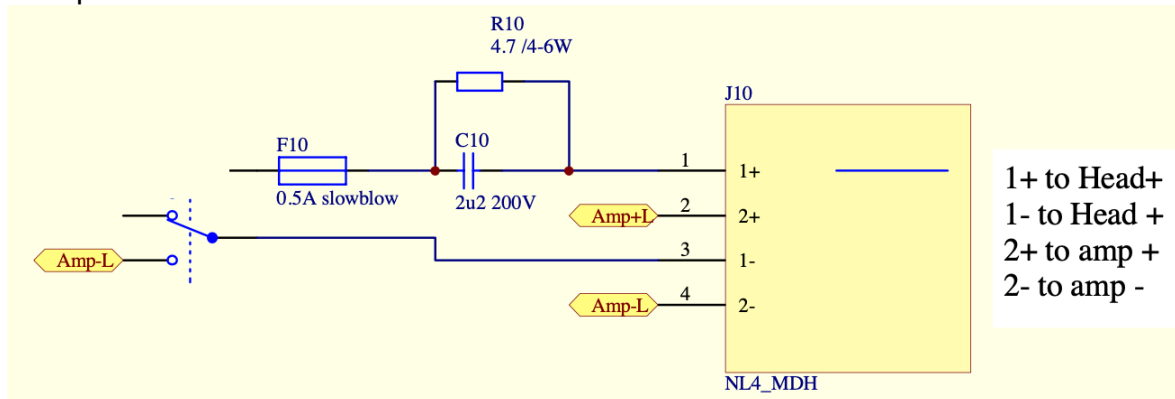
this is done by a RC network consisting a 2.2uF / 200V foil cap and a 4.7 ohm 5-10W resistor. for example KEMET 80-R60MR42205040J or any non polarized caps. use a switch to physically disconnect the head if you are not cutting.

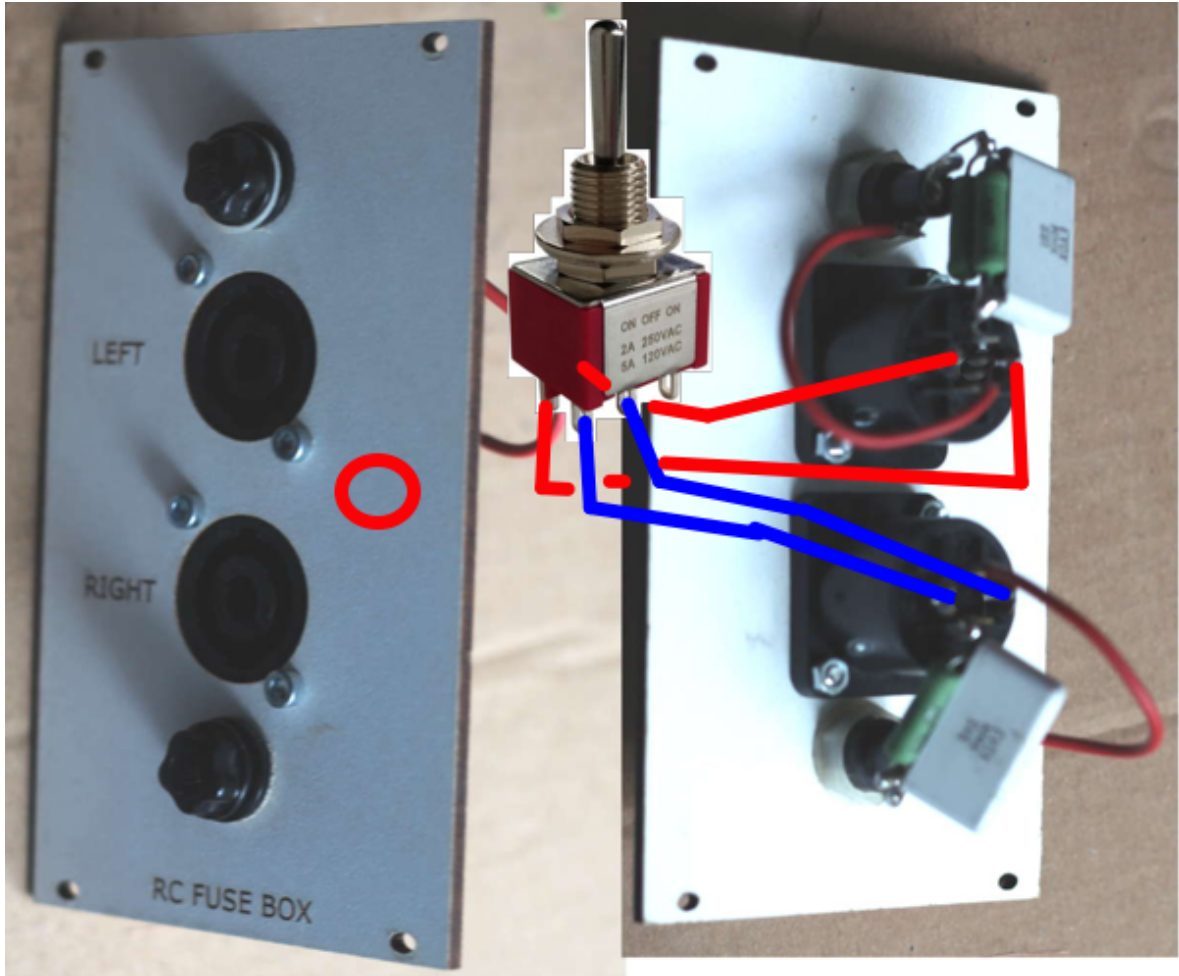
Especially when firing up the amps. A 0.5A slow blow fuse will protect the drive coil from excessive power.



add the RC network in the + Line of the cutterhead drive cable.
 add a 0.5A slow blow Fuse in line . use a fuse holder in front of the preamp.
 add a 2x on-off toggle switch switch for cutter off if you don't cut. you can also use a Relay that you can command by a little microswitch on the lathe
 so the head is always disconnected if head is up.

i personally use always 2x 4pole speakon plug and a double switch and 2 Fuse Holders to build everything in a simple laser cut front plate.





Cutterhead Cable to preamp and to QSC GX3 amp.

for other amps similar. but make sure you check polarity first. either you change polarity on drive or Feedback.

if you raise Feedback the level should drop. otherwise you will have heavy oscillation and destruction of head, worst case.

double/tripple check always with a dummy head first.

- PIN1 FB LEFT +
- PIN2 FB LEFT
- PIN3 DRIVE L+
- PIN4 HEATER +
- PIN5 HEATER -
- PIN6 DRIVE R+
- PIN7 FB R SH
- PIN8 FB R +
- PIN9 FB LEFT -
- PIN10
- PIN11 DRIVE L-
- PIN12
- PIN13 DRIVE R-
- PIN14
- PIN15 FB RIGHT

left channel:

FB cable 6.3mm stereo jack goes to CarusoPre FBin :

Tip: —> Pin 9 on DB15 female connector FB-

Ring: —> Pin 1 on DB15 female connector FB+

shield: —> Pin 2 on DB15 female connector

Drive Cable 6.3mm mono jack goes to GX3:

Tip: —> Pin 3 on DB15 female connector GND: —> Pin 11 on DB15 female connector

right channel

FB cable 6.3mm stereo jack goes to CarusoPre FBin :

Tip: —> Pin 15 on DB15 female connector FB-

Ring: —> Pin 8 on DB15 female connector FB+

shield: —> Pin 7 on DB15 female connector

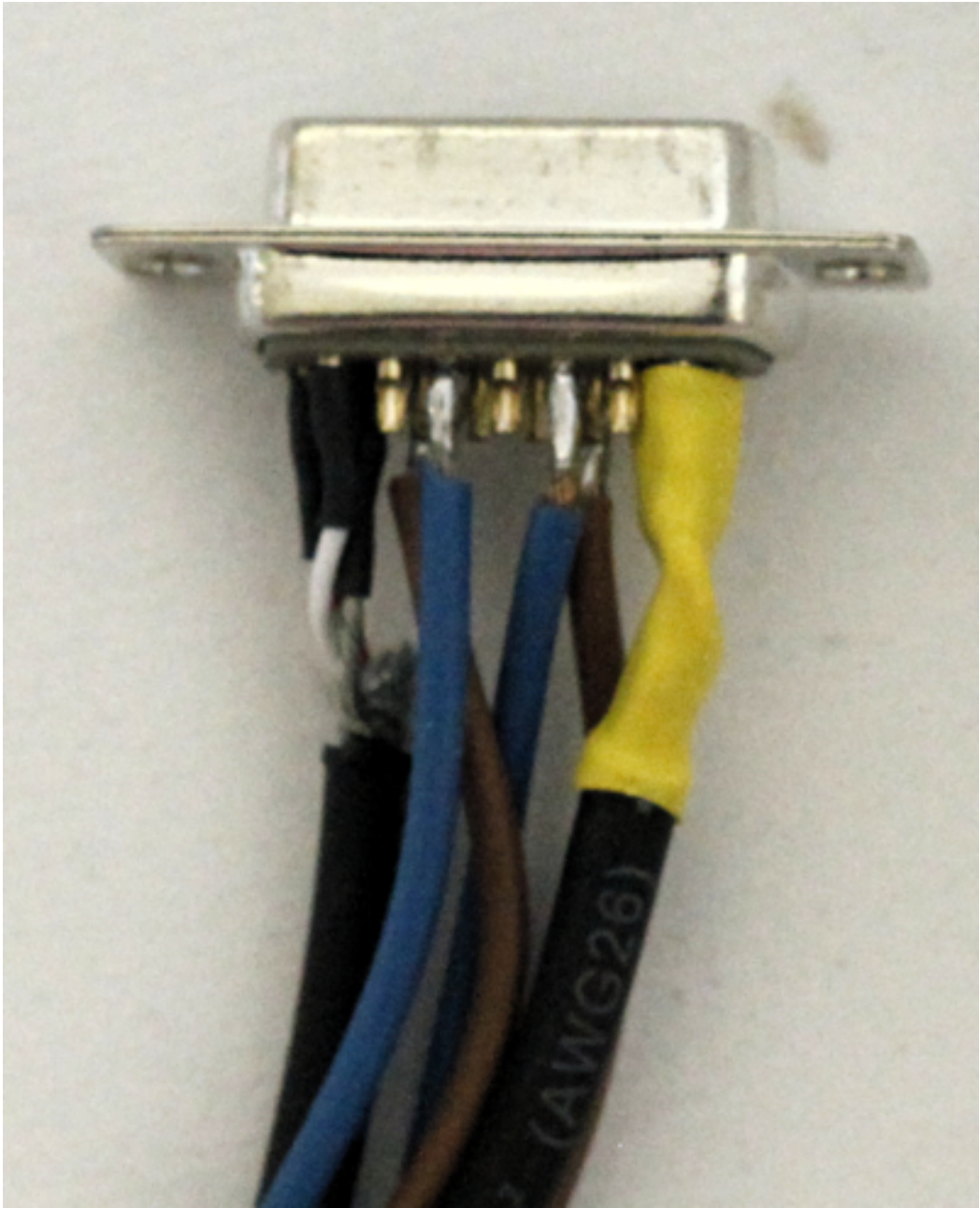
Drive Cable 6.3mm mono jack goes to GX3:

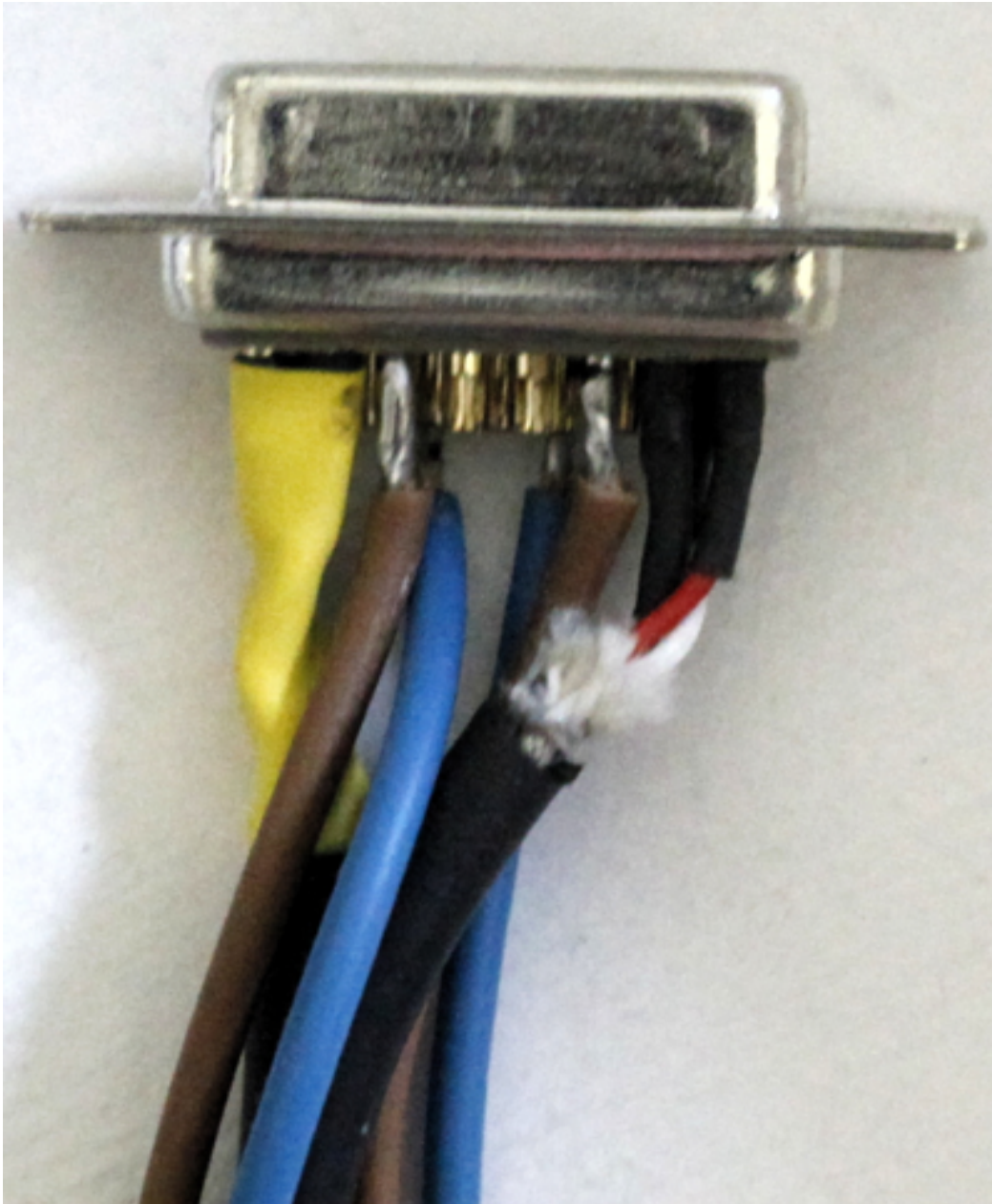
Tip: —> Pin 6 on DB15 female connector via Fuse and $2\mu 2//4.7\text{ohm}$ RC Network

GND: —> Pin 13 on DB15 female connector

Heater

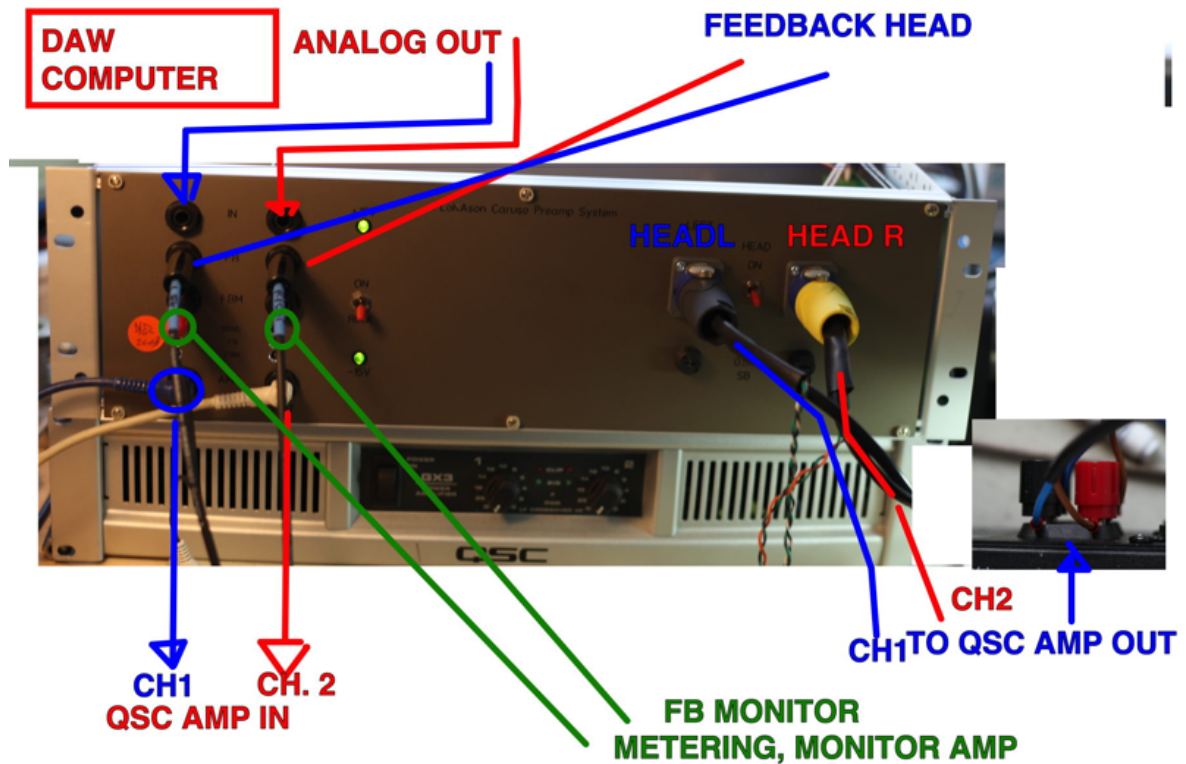
H+: —> Pin 4 on DB15 female connector H- : —> Pin 5 on DB15 female connector





wiring up the preamp. amp and rest.

all connectors are unbalanced except the feedback cables
make sure you checked polarity.
check one channel after the other by using the gain poti.
first test with RIAA off and gain only half up.



cutterhead cable to use on flokason AM44 or Neumann standard 6pin suspension box

DRIVE

| | | |
|-------|---------|---------|
| DR_L+ | DB15_03 | DIN6M_3 |
| DR_L- | DB15_11 | DIN6M_4 |
| DR_R+ | DB15_06 | DIN6M_1 |
| DR_R- | DB15_13 | DIN6M_2 |

Feedback

| | | |
|--------|---------|---------|
| FB_L+ | DB15_01 | DIN6F_3 |
| FB_L- | DB15_09 | DIN6F_4 |
| FB_SHL | DB15_02 | |
| FB_R+ | DB15_08 | DIN6F_1 |
| FB_R- | DB15_15 | DIN6F_2 |
| FB_SHR | DB15_07 | DIN6F_6 |

HEAT

| | | |
|----|---------|---------|
| H+ | DB15_04 | DIN6M_6 |
| H- | DB15_05 | DIN6M_5 |

