

VADLYD MD12 MK4

78 RPM and RIAA Record Preamp



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IMPORTANT SAFETY INSTRUCTIONS

- Set the voltage selector switch on the rear panel to 230 V AC or 115 V AC (50-60 Hz) prior to use.
- Never operate this switch while connected to power mains!!!
- This equipment requires a grounded outlet and a polarized or grounding type IEC power cord suitable for your area.
- Do not defeat the purpose of the polarized or grounding-type plug. This plug is provided for your safety.
- If the polarized or grounding-type plug does not fit into your outlet, consult a qualified electrician for replacement of the outlet.
- Read and follow these instructions carefully.
- Avoid areas where there is extremely high moisture.
- Clean only with dry cloth.
- Allow for proper ventilation. Do not install this equipment in a confined space such as a book case or similar unit. Do not install near any sources that produce heat.
- Protect the power cord from abuse or damage, particularly where it exits the equipment or enters the wall outlet. Never place the power cord where it can be walked on.
- Unplug this equipment during electrical storms and when it is unused for long periods of time.
- Refer all servicing to qualified service personnel.
- Servicing is required when the equipment has been damaged in any way, such as liquid has been spilled or objects have fallen into the equipment, the equipment has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The equipment draws nominal power from the AC outlet with its power switch in the OFF position.

ENVIRONMENT

Danish text for the WEEE:

"Elektrisk og elektronisk udstyr (EEE) indeholder materialer, komponenter og stoffer, der kan være farlige og skadelige for menneskers sundhed og for miljøet, når affaldet af elektrisk og elektronisk udstyr (WEEE) ikke bortskaffes korrekt.

Produkter, der er mærket med nedenstående overkrydsede skraldespand, er elektrisk og elektronisk udstyr. Den krydsede skraldespand symboliserer, at affald af elektrisk og elektronisk udstyr ikke må bortskaffes sammen med usorteret husholdningsaffald, men skal indsamles særskilt.

Til dette formål har alle kommuner etableret indsamlingsordninger, hvor affald af elektrisk og elektronisk udstyr gratis kan afleveres af borgerne på genbrugsstationer eller andre indsamlingssteder eller hentes direkte fra husholdningerne. Nærmere information skal indhentes hos kommunens tekniske forvaltning."



About the environment and disposal of this product (WEEE)

To help conserve resources and protect our health and the environment, we - and your government - use the symbol on the right to remind you that you are obliged to treat electronic equipment separately from regular household waste. For more information on designated disposal/recycling centers, please contact your local government.

This product is manufactured according to EU directives regarding RoHS.

RoHS restricts the use of mercury, lead, hexavalent chromium, cadmium and a range of flame retardants notably polybrominated biphenyls and polybrominated diphenyl ethers.

RoHS stands for the "restriction on the use of certain hazardous substances in electrical and electronic equipment". It is a European directive aiming to restrict the use of certain hazardous substances in the production of new electrical and electronic equipment (EEE). It is closely linked to the WEEE Directive (Waste in Electrical and Electronic Equipment) that controls the disposal and recycling of EEE.

A NOTE FROM THE MANUFACTURER

Recording engineers and serious record collectors know the problem when playing early phonograph records: ordinary RIAA phono equalization does not always match the original recording equalization that was used to make the record.

78rpm records in particular have many different eq settings depending on period, placement, and recording company. Even within the same company, there may be differences depending on which engineer was on job that day.

Because I have not been able to buy a phono preamp which can provide the correct eq settings of 78s and early EP/LPs, I have designed the VADLYD MD12 MK4 in cooperation with Bjarne Jelsborg, B J Elektronik, Denmark.

The VADLYD MD12 MK4 is a product with professional specifications, but it is also useful for record collectors who want the proper playback equalization of early phonograph recordings, particularly 78rpm records.

Overview

- 12 presets enable adjustment to nearly all eq curves: 8 presets for 78s, and 4 presets for 33/45s
- Excellent sound quality (see full specifications on page 12)
- Switches for Stereo, Mono L + R, Mono L or Mono R
- Switch for Vertical Cut records (Pathé/Edison)
- Volume and balance controls, suitable to drive a power amplifier directly
- Multiple LEDs for easy operation
- One set of outputs is balanced with XLR connectors, with a second set providing unbalanced output on RCA phono jacks. This allows for both professional and consumer use.
- The third set of outputs is also balanced with XLR connectors, but it contains a flat output signal. This signal is not affected by the eq settings and is useful for making simultaneous, archival transfers per Paragraph 5.2.6.7 of IASA-TC04, "Guidelines on the Production and Preservation of Digital Audio Objects."
- 19" wide suitable for mounting in one rack (1.75" high) space, or it may be placed on a flat surface close to your turntable
- Two identical inputs, making it possible to have two turntables connected at the same time
- Each input is switchable for moving magnet (MM) or moving coil (MC) phono cartridges. Input impedance for MM cartridge is standard 47 kOhm. MC inputs have 3 switchable load impedances: 50, 100, or 200 Ohm.
- Front panel headphone jack with dedicated volume control.
- Improved back panel grounding screw.
- Internal power supply (no external power supply)

A few words concerning long life of all electronic equipment: most potentiometers can stand severe wear for decades, but dust - and especially smoke - can make them noisy in a very short time. Tobacco smoke is ALMOST as dangerous for a pot as it is for your health!

I wish you good luck with your purchasing of the VADLYD MD12 MK4, and I hope to hear about your experiences with it.

Farum, Denmark, July 18, 2014
Jørgen Vad
VADLYD Mastering & Audio Restoration

ABOUT PHONO PREAMPLIFIERS

When playing phonograph records, you might normally use the phono input provided on your amplifier, often called a RIAA (Recording Industries Association in America) phono input.

The RIAA equalization curve specifies two turnover points (a 'turnover' point is where the level changes $\pm 3\text{dB}$): one at 500Hz, and the other at 2125Hz. The RIAA playback curve has the following theoretical response:

1. +17dB from 20Hz to 50Hz, then falling about 6dB/octave to
2. 0dB from 500Hz to 2125Hz, and then falling again about 6dB/octave to
3. -13.7dB at 10kHz.

You use the RIAA playback curve to compensate for the RIAA equalization that was originally used to make the record.

Normally this works well on single, EP and LP records, issued from 1955 and later. But with earlier LPs (some record companies didn't use RIAA before 1960), this curve is not correct.

The cutting equalizations on all 78 RPMs and LPs before 1955 have been very different. 78rpm records in particular used curves very different from the RIAA curve. For this reason, you should not use the RIAA phono input on your amplifier if you want good quality reproduction of 78rpm records.

I want to thank Roger Wilmut for basic information about reproduction of 78rpm records. For a better understanding of the problems of reproduction of records, read the following articles (with a few edits from my hand) taken with kind permission from Roger Wilmuts home page: "Reproduction of 78rpm records" - www.rfwilmut.clara.net/repro78/repro.html.

EQUALIZATION OF PHONOGRAPH RECORDS

The simplest form of disk cutter consists of an amplifier, similar to that used to drive a loudspeaker, connected to a cutting head having a stylus connected to a coil, which is placed in the field from a strong magnet (or, more usually in later designs, a magnet within a coil). When the signal is applied to the coil, the stylus moves and engraves a groove in the blank disk. (There is of course a lot more to it than that, but we are considering only the basics here.)

However, because the cutter head's movements translate the amplitude swings of the original signal into velocity - the rate at which the stylus moves during its swings - low-frequency signals would be recorded with a much larger swing than high-frequency signals of the same original amplitude. In order to keep the movements of the groove much the same at all frequencies (given equal level signals) it is necessary to use a circuit to introduce - in the theoretical situation - a 6 dB/octave cut as the frequency decreases - i.e., halve the frequency and you halve the voltage.

In the reverse situation, that of a reproduction head, the principal is that of a wire moved in a magnetic field - it is the rate of cutting 'lines of force' that matters. The cutter head works exactly in reverse, like a simple motor, where increased voltage means increased speed. Therefore, the constant amplitude groove theoretically achieved produces a signal where the bass is low and the treble high: so a 6 dB/octave cut with increasing frequency would be called for.

In the real world, losses in the head with increased frequency complicate the issue. Early cutter heads were highly inefficient, and so, while the bass cut described above was used, the treble trailed away, resulting in equal groove modulations (movements) up to mid frequencies, but decreasing above that.

To compensate for this, the playback characteristic boosted the bass below 200 Hz but left it flat above that - effectively providing a 6 dB/octave boost to the higher frequencies (and the surface noise). With the later improvements in cutters, it was possible to pack more treble onto the records, and so new equalizations provided for a 6 dB/octave cut above a turnover frequency which varied between 3.4 and about 6 kHz, depending on the system.

Boosting the treble during recording had the effect of reducing the surface noise during playback. It was also common to flatten out the bass at the very lowest frequencies to reduce the boost of rumble from the turntable.

Similar techniques were applied to microgroove records, and the final standard, RIAA, provides for a bass boost below 500 Hz and a treble cut above the lower frequency of 2,112 kHz - the latter reflecting the considerably increased amount of treble which can be cut onto an LP.

Therefore playing a 78rpm record using RIAA equalization - all that is available to many people - produces far less top end response than is correct, particularly for the earliest electrical records, where the result is akin to turning the treble control down. (Turning the treble up gives an improvement, but it doesn't touch the important mid-range.)

Use of the correct eq curves when reproducing 78rpm records produces a startling improvement in the sound quality (although admittedly the surface noise can increase).

Many of these older recordings are of surprisingly high quality after all!

STYLUS SELECTION

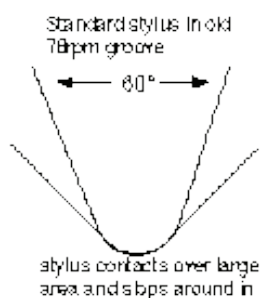
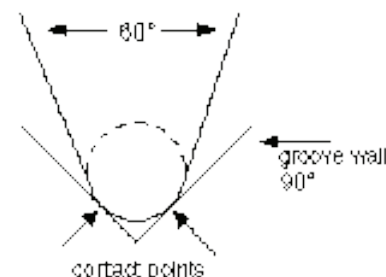
At the time the format disappeared as a popular format, the recommended stylus size was 60μ (0.0025") conical tip. This would be satisfactory for records made in the final few years, but for the great majority of the time since the beginning of 78s in 1896 the grooves were much wider than the 'standard', with the result that a 60μ stylus skates about in the bottom of the groove, seriously increasing the surface noise.

The basic stylus is conical, with a spherical tip; the included angle of the cone is 60 degrees. Most modern styli are elliptical: i.e. they look the same from the front, but from the side they have a much narrower angle. This enables them to track movements in the groove more easily (as the groove moves from side to side it effectively narrows - not across its direct width but across the diameter of the conical tip, at an angle to the direction of travel: consequently a spherical tip will ride up in the groove).

The illustrations below could apply equally to a spherical tip and an elliptical tip seen from the front: in practice I would always recommend elliptical.

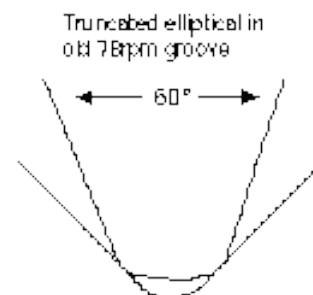
A modern record groove should be a neat 90 degrees, with the stylus making contact at only two points part-way up the groove wall, thus avoiding any debris in the bottom of the groove.

(Some modern microgroove styli have a flat section at the contact point, giving a wider area of contact which reduces wear: however it can also increase noise from worn or damaged groove walls and I would be dubious about its use for 78s).



However older 78s were cut to be used with steel needles, on the assumption that the needle would wear down to fit the groove in the first few seconds: when this wider groove is tracked with a 2.5 thou stylus the result is 'bottoming' as can be seen here.

Here the combination of a larger basic size: 70μ (0.0028") works on the majority of records, although larger sizes may be helpful with very old records - and the truncated tip (which is spherical down to the contact points but truncated below) result in vastly better tracking. Like LPs, Records in good condition, will be better reproduced if the stylus is elliptical. This brings a considerable improvement in distortion and will be with reduced surface noise and greater analysis. With records in poor condition, you often will have a better reproduction with conical styli.



Professional mastering engineers and serious collectors often have a collection of styli sizes, conical truncated as well as elliptical truncated. A good starting point could be:

Records from	Conical truncated	Elliptical truncated
Before 1920:	100μ (0.0040")	$100\mu \times 30\mu$ (0.0040" x 0.0012")
1920 - 1939:	90μ (0.0035")	$90\mu \times 30\mu$ (0.0035" x 0.0012")
1939 - :	70μ (0.0028")	$70\mu \times 25\mu$ (0.0028" x 0.0009")

A good address for buying cartridges and styli, as well as retipping of styli, is
Expert Stylus Company
P.O. Box 3 - Ashted
Surrey KT21 7QD - England
Tel: +44 01372 276604

SPEED SELECTION

Not all 78s were actually recorded at 78 rpm. Even in the late 1920s, English Columbia was still using 80 rpm, and prior to about 1921 speeds were widely variable. Speeds as low as 68 or as high as 84 rpm are not uncommon.

To make matters worse, relatively few 78rpm records state the speed (and when they do it's not always accurate). If the work is a classical piece such as an opera aria, it is possible to check the correct pitch against a score or a modern recording. However, as occasionally singers would transpose, even this isn't completely reliable. My best recommendation is to gradually reduce the speed of a record until it starts to sound sluggish, and then increase it slightly (in my experience the ear is much more sensitive to low speeds than high speeds).

Finding a turntable capable of coping with these speeds is often a challenge. I don't know of any normally available turntable which has more than a tiny variation (usually 2 or 3 %), which is nowhere near enough; but electronically controlled turntables may be modifiable. You need a speed range of 72 to 82 to cover most records.

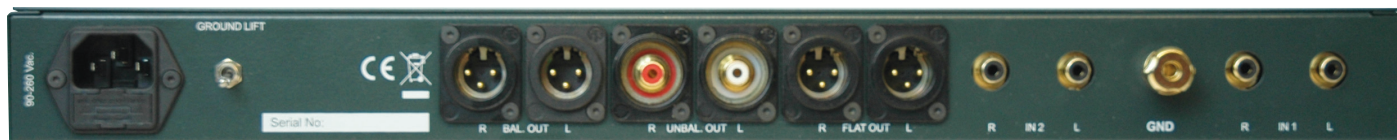
For further information, see Roger Wilmut's web site: <http://www.rfwilmut.clara.net/repro78/repro.html>. This site contains additional information about 78rpm records.

HOW TO USE THE PREAMPLIFIER



Front Panel (left to right)

- Use the pushbutton on the extreme left to select either Phono Input 1 or Phono Input 2.
- The next two pushbuttons select either MM (moving magnet) or MC (moving coil) cartridges for each input. An LED lights when MC is engaged, in which case load impedances of 50, 100, or 200 Ohms can be selected using the appropriate toggle switch above each pushbutton.
- Equalization curves are selected with the rotary switch, and the currently active curve is indicated by the appropriate LED. Always change equalization curves slowly to minimize pops (the unit was designed to completely eliminate annoying pops by switching slowly).
- Both the 80 Hz Low Cut Filter and the High Cut Filter (which is continuously variable from 1.6 kHz to 12 kHz) are engaged by pressing individual pushbutton switches, which causes the appropriate LED to light. Both filters are first order designs.
- Three pushbuttons allow you to select Vertical Cut, Left or Right channel only, and Mono/Stereo modes.
 1. Pressing only the first button enables you to hear Vertical Cut records played with a stereo cartridge as the mono function is automatically engaged.
 2. Pressing only the second button enables you to hear Left Channel (inner groovewall) alone in both speakers.
 3. Pressing only the third button enables you to hear Right Channel (outer groovewall) alone in both speakers.
 4. Pressing both the second and third buttons together lets you hear both groovewalls in mono.
 5. With neither the second or third buttons pressed, the Vadlyd MD12 Mk2 is working in normal stereo mode.
- Next is the volume control for the XLR flat outputs, the main volume control, the stereo balance control, the headphone volume control, the stereo headphone jack, and the power on/off switch.



Rear Panel (left to right)

- AC power connector with fuse. 90 - 260 V AC.
- Ground lift switch.
- First set of outputs (left to right) are balanced XLRs with pin 1 ground, pin 2 hot, and pin 3 cold. Professional users will be familiar with this. Eq is applied to these outputs.
- Second set of outputs are RCA phono jacks for connecting to consumer equipment. These outputs are unbalanced.
- The third set of outputs are balanced XLR's with a flat only signal. This signal is not affected by the eq settings and is useful for making simultaneous, archival transfers per Paragraph 5.2.6.7 of IASA-TC04, "Guidelines on the Production and Preservation of Digital Audio Objects."
- The preamp is equipped with two identical inputs, which makes it possible to have two turntables connected at the same time. As an example, one turntable might be for LP/EPs and another turntable for 78s. Use only the cables intended for use with your cartridge and turntable, using the length provided. Do not attempt to extend these cables.
- Between the two sets of inputs is the grounding screw. Most turntables must be connected to this ground screw to avoid hum. Proper grounding will reduce hum and noise, and provide the best results.

SETTING THE CORRECT EQUALIZATION USING THE PRESETS

Coarse Groove (78 rpm)

SYSTEM	Treble t/o	Bass t/o	Lower bass t/o	Cut at 10 kHz	Boost at 50 Hz
FLAT	Flat	Flat			
US MID 30	Flat	400 Hz	70 Hz		16 dB
WESTREX	Flat	200 Hz			15 dB
HMW	Flat	250 Hz	50 Hz		12 dB
ffrr 1949	6.36 kHz	250 Hz	40 Hz	5 dB	12 dB
Early DECCA	5.80 kHz	150 Hz		6 dB	11 dB
COLUMBIA	1.60 kHz	300 Hz		16 dB	14 dB
BSI	3.18 kHz	353 Hz	50 Hz	10.5 dB	14 dB

Note that record companies used many different eq settings, and sometimes the same company used different settings depending on which recording engineer was on job.

Generally, there is a difference between American and European 78 rpm recordings: the American records were normally much louder cut with much more bass response and a higher bass turnover frequency. The two American record companies Columbia and Victor had different settings but both used basically the patent from Western Electric.

Since theory and practice are not always the same, always use your ears! This is especially true with records in bad condition, which as a result of wear have often lost much their high frequency response. Unfortunately, many 78s are in bad condition because they have been played many times.

Ideally, use FLAT for old acoustic recordings. Sometimes you will find that you will get a better sound with a little bass lift. Then try one of the other eq settings and use the 80 Hz bass cut filter.

Next eq is US MID 30, which is useful for a lot of American records. Normally you should use it together with the variable low pass filter and find the right settings. Good for American Victor.

Use WESTREX (English Western Electric) for HMV 78s with a triangle matrix code and English Columbias with a "W" Matrix code.

HMV eq is used for HMVs with a square matrix code, and English Columbia with a "C" matrix code, or in both cases with no code (post 1945 up to about 1953).

ffrr 1949 is used by Decca and EMI.

Early Decca are Decca eq setting from 30s.

Columbia is an American Columbia setting used by Columbia since around 1930. But note: this setting is an ideal setting and only useful for records in absolute good condition

BSI 78 useful for all post 1953 78s. It can also be useful for some earlier American 78s.

Microgroove (LPs and 45 rpm)

SYSTEM	Treble t/o	Bass t/o	Lower bass t/o	Cut at 10 kHz	Boost at 50 Hz
ffrr LP 1953	3 .00kHz	450 Hz	100 Hz	11 dB	12.5 dB
CCIR	3.18 kHz	500 Hz	50 Hz	10.5 dB	17 dB
NAB	1.60 kHz	500 Hz		16 dB	16 dB
RIAA	2.125 kHz	500 Hz	50 Hz	13.6 dB	17 dB

Use ffr LP 1953 for early Decca LPs and for pre 1955 HMV and English Columbia LPs.

CCIR is used by European labels for early LPs and EPs

Use NAB (NARTB) for some early American LPs. Use NAB together with the first order 80 Hz bass cut filter for American Columbia LPs.

RIAA is the universal standard (in theory) of all EP/LPs after 1955

REPRODUCTION OF PATHÉ AND EDISON VERTICAL CUT RECORDS

Normally mono recordings are lateral, which means "side to side" in the groove wall. But some of the first recordings were vertically cut, also named as "hill and dale" recordings. Because of that, a mono cartridge is not able to reproduce a vertical groove signal. But a stereo record is a combination of a lateral cut and a vertical cut record. That's why you can use a stereo cartridge. You will get the best result with a special costum made stylus for this purpose.

Ask your "Cartridge Man" for purchasing the right stylus.

For reproduction of Pathé and Edison vertically cut records, activate the "VERTICAL" switch.

Further references

* International Association of Sound and Audiovisual Archives

<http://www.iasa-web.org/>

* Audio Engineering Society

<http://www.aes.org/>

* Association for Recorded Sound Collections

<http://www.arsc-audio.org/>

* European Broadcast Union

<http://www.ebu.ch/en/index.php>

* Society of American Archivists

<http://www.archivists.org/>

* Grammy Foundation Grants

http://www2.grammy.com/GRAMMY_Foundation/Grants/

SPECIFICATIONS

Power requirements: 90 - 260 V AC

Frequency response: 18 Hz to 54 kHz (-1 dB)

Input impedance: 47 kOhm/47 pF (MM), 50/100/200 Ohm (MC)

Gain @ 1KHz: 50dB (MM), 75dB (MC)

Max out: +24 dBu

Output impedance (normal out) 50 Ohm

Load impedance (normal out): > 600 Ohm

Deviation from RIAA-curve: max. 0.5 dB

Distortion @ +10dBu out (20Hz-20KHz): 0.03%

Noise: -70dBA below 2.5mV in (MM), -70dBA below 1mV in (MC)

Channel separation @ 10KHz: > 55dB

0 dBu = 0.775 V

Balanced XLR's: Pin 1 = ground, pin 2 = hot, pin 3 = cold.

Limited Warranty

VADLYD MD12 MK4 is warranted for two years from date of purchase to be free of defects in materials and workmanship. In event of such defect, VADLYD MD12 MK4 will be repaired promptly without charge. This warranty excludes defects due to normal wear, abuse, shipping damage, or failure to use product in accordance with instructions. This warranty is void in the event of unauthorized repair or modification, or removal or defacing of the product labelling. For return approval and shipping information, contact:

VADLYD

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DK-3520 Farum, Denmark

or by email: md12@vadlyd.dk.