

STEP-UP TRANSFORMERS FOR MOVING COIL PHONO CARTRIDGES

INTRODUCTION – ALL ABOUT DAMPING.

Moving coil cartridges like to feed into a high impedance so that the mechanical load on the moving parts is minimised. However the moving parts of the cartridge can resonate at high frequencies. Mechanical load can be provided magnetically via the transformer to damp any resonances by means of a loading resistor across the secondary winding. Generally a load of 10x the cartridge dc resistance works well but the sound can sometimes be a little brighter with more than 10x and more mellow with less than 10x. Depending on the transformer ratio and cartridge resistance the transformer can also exhibit resonance behaviour above 50 kHz, and this may also be improved by damping.

CHOICE OF TRANSFORMER

We always recommend type 9570 as the first choice except for unusual conditions. 9570 is by far the most popular choice because it does not normally exhibit significant self-resonance behaviour. Also it gives a wide range of loading resistor options for the optimum damping load for optimising the sound.

The value of the secondary load is best determined by listening tests but if you are not in a position to experiment, excellent sound performance can almost always be obtained by using a secondary load resistor 10x the cartridge resistance. You do however need to check that your amplifier has enough sensitivity to provide sufficient loudness for the output level of your cartridge when stepped up by the 1:10 voltage ratio. The table at the end of these notes lists the dc resistance and output level for most commonly used cartridges.

OTHER TRANSFORMER CHOICES:

All our cartridge transformers use a 100% Mumetal core for minimal harmonic distortion. They provide a balanced output which can be loaded balanced or unbalanced and ground noise isolation.

Type 9990 is similar to 9570 but has a step-up ratio of 1:20. It is useful if there is insufficient output voltage from the cartridge or gain in the amplifier. It is however, a little more prone to self-resonance. The bandwidth is excellent, although a little less than 9570.

Type 1990 can be configured as a 9990 or a 9570 with identical performance the only disadvantage is the number of wires which have to be accommodated.

Type 1480 uses a larger core and can be the other types and is wound so that it is geometrically balanced. This is popular for customers who want to use balanced (twinax) cables leading to the cartridge. Some customers have found that the larger core results in improved sound.

Type 1090 is designed to be connected to a high impedance moving magnet cartridge. It has a small step-up ratio (1:2) because it is not possible to get a higher ratio and still have good bandwidth with a very high impedance transformer. We have had good reports of the sound improvement provided by this transformer which is probably due to the ground isolation and filtering characteristics of complex transformer impedance.

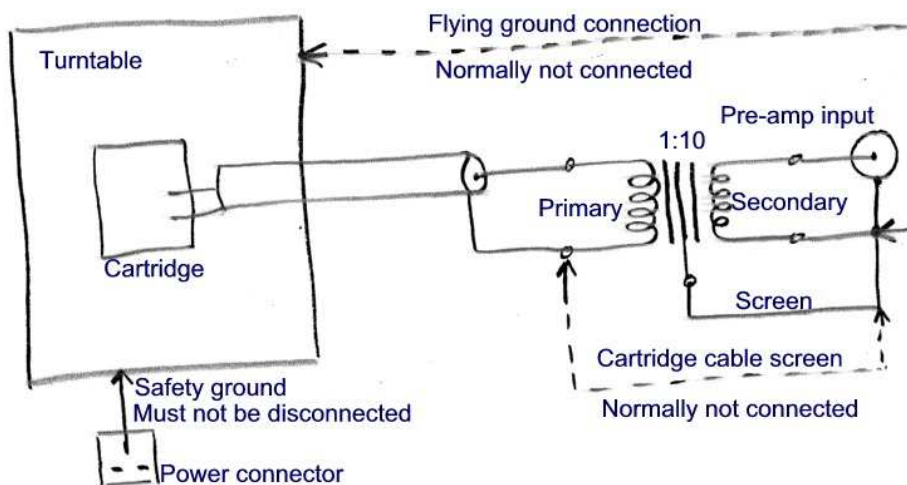
INSTALLATION NOTES

All our cartridge transformers are packaged in a Mumetal screening can and do not need any further screening. Customers have used steel, diecast, plastic or even wood to make a suitable enclosure. If you are building your own amplifier, you can certainly mount the transformers on or under the chassis.



HUM PROBLEMS

Occasionally customers get everything wired up only to find that they get hum or buzz on top of the signal. This can be very frustrating but please be assured that it is always possible to reduce noise to well below an audible level. Below is a diagram showing how to connect the grounds. You may have to experiment with different combinations of grounding depending on your turntable and amplifier.



RECOMMENDED TRANSFORMERS BY CARTRIDGE			
Manufacturer	Model	Z(Ohms)	Output uV)
Audio Technica	AT-OC9ML/II	(2)?	500
Benz Micro	Ref 2 Silver	8.5	300
Benz Micro	Glider L2	12	300
Benz Micro	L2	13	300
Benz Micro	MC Gold	20	400
Benz Micro	Glider M2	24	800
Benz Micro	M2	24	800
Benz Micro	LP Ebony	38	280
Benz Micro	Ruby 2	45	450
Benz Micro	Ruby 3	40	340
Benz Micro	Ruby H	85	800
Benz Micro	Glider H2	90	2500
Benz Micro	H2	90	2500
Benz Micro	MC20E	110	2200
Benz Micro	MC Silver	120	2000
Benz Micro	Ace L	12	400
Bloom H	R50	8	480
Cardas	Heart	40	300
Cardas	Myrtle	45	380
Clear Audio	Victory-Gold	9	200
Clear Audio	Accurate	50	600
Clear Audio	Discovery	50	500
Clear Audio	Gamma	50	500
Clear Audio	Insider Gold	50	600
Clear Audio	Insider Reference Wood	50	700
Clear Audio	Sigma Wood	50	600
Clear Audio	Signature	50	500
Clear Audio	Victory H	50	600
Denon	DL-103	40	300
Denon	DL-103R	14	300
Denon	DL-301 Mk2	33	400
Denon	DL-304	40	180
Denon	DL-110	160	1600

Denon	DL-S1	40	150
Denon	DL-160	160	1600
Dynavector	DV XX-1L	3	250
Dynavector	Te Kaitori	4	250
Dynavector	DV17D2 MkII Karat	38	230
Dynavector	DV23RS MkII	10	150
Fuji	ZYX R-100	4	250
Goldring	Elite	8	500
Grado	Master	2	500
Grado	Platinum	2	500
Grado	Reference	2	500
Grado	Sonata	2	500
Immutable Music	Transfiguration Spirit	10	400
Koetsu	Platinum	5	250
Koetsu	Black	5	400
Koetsu	Rosewood	5	600
Lynn	Troika	5	200
Lyra	Titan i	5.5	500
Lyra	Parnassus	2	250
Lyra	Helikon Mono	3	250
Lyra	Lydian Beta	4	500
Miyabi	Alnico	4	250
Ortofon	SPU Meister A	1.5	300
Ortofon	SPU Meister GM	1.5	300
Ortofon	SPU Meister Silver A	1.5	300
Ortofon	SPU Meister Silver GM	1.5	300
Ortofon	SPU Classic A	2	100
Ortofon	SPU Classic A E	2	200
Ortofon	SPU Classic GM	2	200
Ortofon	SPU Classic GM E	2	200
Ortofon	SPU Reference A	3	200
Ortofon	SPU Reference GM	3	200
Ortofon	SPU 90 Anniversary	2	300
Ortofon	Kontrapunkt a	5	470
Ortofon	Kontrapunkt b	5	450

Ortofon	MC 10 Super MkII	5	200
Ortofon	MC 10 Supreme	5	500
Ortofon	MC 20 Super MkII	5	200
Ortofon	MC 20 Supreme	5	500
Ortofon	MC 2000 MkII	5	125
Ortofon	MC 30 Super MkII	5	200
Ortofon	MC 30 Supreme	5	500
Ortofon	MC 3000 MkII	5	125
Ortofon	MC Jubilee	5	340
Ortofon	MC 10 Super	6	300
Ortofon	MC 25 E	6	500
Ortofon	MC 25 E	6	500
Ortofon	MC 25 FL	6	500
Ortofon	MC 25 FL	6	500
Ortofon	MC 5000	6	140
Ortofon	MC 7500	6	130
Ortofon	MC Rohmann	6	250
Ortofon	Rohmann	6	250
Ortofon	SPU Royal A	6	200
Ortofon	Rondo Red	6	500
Ortofon	SPU Royal GM	6	200
Ortofon	SPU Royal N	6	200
Ortofon	MC 15 Super MkII	7	340
Ortofon	Tango	10	500
Ortofon	Samba	6	300
Ortofon	Salsa	7	380
Pickering	XLZ-7500-S-mk2	5?	330
Shelter	901	5	1400
Shelter	501 II	10	400
Sumiko	Pearl	MM	?
Sure	V15VxMR	MM	3000
Van den Hul	Black Beauty a	16	500
Van den Hul	Black Beauty b	41	?
Van den Hul	Black Beauty c	96	?
Yamaha	MC11	0	350

Manufacturer	Model	Z(Ohms)	Min Load (ohms)	Output (uV)
Audio Technica	AT-OC9ML/II	(2)?	20	500
Benz Micro	Ref 2 Silver	8.5	100	300
Benz Micro	Glider L2	12	120	300
Benz Micro	L2	13	100	300
Benz Micro	MC Gold	20	200	400
Benz Micro	Glider M2	24	200	800
Benz Micro	M2	24	200	800
Benz Micro	LP Ebony	38	500	280
Benz Micro	Ruby 2	45	400	450
Benz Micro	Ruby 3	40	400	340
Benz Micro	Ruby H	85	1000	800
Benz Micro	Glider H2	90	1000	2500
Benz Micro	H2	90	1000	2500
Benz Micro	MC20E	110	47000	2200
Benz Micro	MC Silver	120	1000	2000
Benz Micro	Ace L	12	200	400
Bloom H	R50	8	100	480
Cardas	Heart	40	400	300
Cardas	Myrtle	45	500	380
Clear Audio	Victory-Gold	9	90	200
Clear Audio	Accurate	50	500	600
Clear Audio	Discovery	50	500	500
Clear Audio	Gamma	50	500	500
Clear Audio	Insider Gold	50	500	600
Clear Audio	Insider Reference Wood	50	500	700
Clear Audio	Sigma Wood	50	500	600
Clear Audio	Signature	50	500	500
Clear Audio	Victory H	50	500	600
Denon	DL-103	40	100	300
Denon	DL-103R	14	100	300
Denon	DL-301 Mk2	33	330	400
Denon	DL-304	40	100	180
Denon	DL-110	160	47000	1600
Denon	DL-S1	40	100	150
Denon	DL-160	160	47000	1600
Dynavector	DV XX-1L	3	30	250
Dynavector	Te Kaitori	4	100	250
Dynavector	DV17D2 MkII Karat	38	100	230
Dynavector	DV23RS MkII	10	100	150
Fuji	ZYX R-100	4	100	250
Goldring	Elite	8	100	500
Grado	Master	2	20	500
Grado	Platinum	2	20	500

Grado	Reference	2	20	500	
Ortofon	SPU Reference A	3	10		
Ortofon	SPU Reference GM	3	10		
Ortofon	SPU 90 Anniversary	2	Oct-50		
Ortofon	Kontrapunkt a	5	50		
Ortofon	Kontrapunkt b	5	50		
Ortofon	MC 10 Super MkII	5	10		
Ortofon	MC 10 Supreme	5	20		
Ortofon	MC 20 Super MkII	5	10		
Ortofon	MC 20 Supreme	5	20		
Ortofon	MC 2000 MkII	5	20		
Ortofon	MC 30 Super MkII	5	10		
Ortofon	MC 30 Supreme	5	20		
Ortofon	MC 3000 MkII	5	10		
Ortofon	MC Jubilee	5	10		
Ortofon	MC 10 Super	6	10		
Ortofon	MC 25 E	6	20		
Ortofon	MC 25 E	6	20		
Ortofon	MC 25 FL	6	20		
Ortofon	MC 25 FL	6	20		
Ortofon	MC 5000	6	20		
Ortofon	MC 7500	6	70		
Ortofon	MC Rohmann	6	10		
Ortofon	Rohmann	6	100		
Ortofon	SPU Royal A	6	100		
Ortofon	Rondo Red	6	100		
Ortofon	SPU Royal GM	6	100		
Ortofon	SPU Royal N	6	100		
Ortofon	MC 15 Super MkII	7	20		
Ortofon	Tango	10	>20		
Ortofon	Samba	6	>10		
Ortofon	Salsa	7	>20		
Pickering	XLZ-7500-S-mk2	5 ?	50 to 250		
Shelter	901		100		
Shelter	501 II		100		

Sumiko	Pearl	MM	MM	
Sure	V15VxMR	MM	MM	3 mV
Van den Hul	Black Beauty a	16	>500	
Van den Hul	Black Beauty b	41	47k	
Van den Hul	Black Beauty c	96	47k	
Yamaha	MC11	30	300	
RECOMMENDED TRANSFORMERS BY CARTRIDGE				
Manufacturer	Model	Z(Ohms)	Min Load (Ohms)	C
1480	9570	9990	1990	
Audio Technica	AT-OC9ML/II	(2)?	20	
Benz Micro	Ref 2 Silver	8.5	100	
Benz Micro	Glider L2	12	120	
Benz Micro	L2	13	100	
Benz Micro	MC Gold	20	200	
Benz Micro	Glider M2	24	200	
Benz Micro	M2	24	200	
Benz Micro	LP Ebony	38	500	
Benz Micro	Ruby 2	45	400	
Benz Micro	Ruby 3	40	400	
Benz Micro	Ruby H	85	1000	
Benz Micro	Glider H2	90	1000	
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Cardas	Myrtle	45	500	
Clear Audio	Victory-Gold	9	90	
Clear Audio	Accurate	50	500	
Clear Audio	Discovery	50	500	
Clear Audio	Gamma	50	500	
Clear Audio	Insider Gold	50	500	

Clear Audio	Insider Wood	50	500	
Clear Audio	Sigma Wood	50	500	
Clear Audio	Signature	50	500	
Clear Audio	Victory H	50	500	
Denon	DL-103	40	100	
Denon	DL-103R	14	100	
Denon	DL-301 Mk2	33	330	
Denon	DL-304	40	100	
Denon	DL-110	160	47000	
Denon	DL-S1	40	100	
Denon	DL-160	160	47000	
Dynavector	DV XX-1L	3	30	
Dynavector	Te Kaitori	4	100	
Dynavector	DV17D2 MkII Karat	38	100	
Dynavector	DV23RS MkII	10	100	
Fuji	ZYX R-100	4	100	
Goldring	Elite	8	100	
Grado	Master	2	20	
Grado	Platinum	2	20	
Grado	Reference	2	20	
Grado	Sonata	2	20	
Immutable Music	Transfiguration Spirit	10	100	
Koetsu	Platinum	5	50	
Koetsu	Black	5	30	
Koetsu	Rosewood	5	100	
Lynn	Troika	5	100-470	
Lyra	Titan i	5.5	100	
Lyra	Parnassus	2	100	
Lyra	Helikon Mono	3	100	
Lyra	Lydian Beta	4	100	
Miyabi	Alnico	4	40	
Ortofon	SPU Meister A	1.5	10	
Ortofon	SPU Meister GM	1.5	10	
Ortofon	SPU Meister Silver A	1.5	10	

	SPU Meister Silver GM	1.5	10	
Ortofon	SPU Classic A	2	10	
Ortofon	SPU Classic A E	2	10	
Ortofon	SPU Classic GM	2	10	
Ortofon	SPU Classic GM E	2	10	
Ortofon	SPU Reference A	3	10	
Ortofon	SPU Reference GM	3	10	
Ortofon	SPU 90 Anniversary	2	Oct-50	
Ortofon	Kontrapunkt a	5	50	
Ortofon	Kontrapunkt b	5	50	
Ortofon	MC 10 Super MkII	5	10	
Ortofon	MC 10 Supreme	5	20	
Ortofon	MC 20 Super MkII	5	10	
Ortofon	MC 20 Supreme	5	20	
Ortofon	MC 2000 MkII	5	20	
Ortofon	MC 30 Super MkII	5	10	
Ortofon	MC 30 Supreme	5	20	
Ortofon	MC 3000 MkII	5	10	
Ortofon	MC Jubilee	5	10	
Ortofon	MC 10 Super	6	10	
Ortofon	MC 25 E	6	20	
Ortofon	MC 25 E	6	20	
Ortofon	MC 25 FL	6	20	
Ortofon	MC 25 FL	6	20	
Ortofon	MC 5000	6	20	
Ortofon	MC 7500	6	70	
Ortofon	MC Rohmann	6	10	
Ortofon	Rohmann	6	100	
Ortofon	SPU Royal A	6	100	
Ortofon	Rondo Red	6	100	
Ortofon	SPU Royal GM	6	100	
Ortofon	SPU Royal N	6	100	
Ortofon	MC 15 Super MkII	7	20	
Ortofon	Tango	10	>20	

	Samba	6	>10	
Ortofon	Salsa	7	>20	
Pickering	XLZ-7500-S-mk2	unknown	load 50 to 250	
Shelter	901	5	100	
Shelter	501 II	10	100	
Sumiko	Pearl	MM	MM	
Sure	V15VxMR	MM	MM	
Van den Hul	Black Beauty a	16	>500	
Van den Hul	Black Beauty b	41	47k	
Van den Hul	Black Beauty c	96	47k	
Yamaha	MC11	30	300	