5120
DVA TUNING DATA FOR POPULAR CARTRIDGES

The table (page 2) lists many of the phono pickup cartridges on the world market, with reference data for tuning the DVA (dynamic vibration absorber) in the flexible NAD tonearm. This table will be updated periodically as more information is obtained for existing cartridge models, and as manufactures introduce new pickup cartridges.

For each cartridge the table provides suggested settings of the resonance frequency (Fr) and the damping (Q) of the dynamic vibration absorber. These have been computed using the nominal values of pickup body weight (Mp) and stylus compliance (Cs) listed in the table.

If your cartridge is listed in the table, the suggested DVA settings will provide very nearly optimum performance with the unique flexible NAD tonearm.It is not necessary to be very exacting when making the adjustments; a variation of ±2 Hz in resonance frequency (Fr) or ±1 in the damping value (Q) will yield only a small difference in system performance.

The suggested values in the table are only approximate, because various samples of the same cartridge model may differ slightly in compliance. For this reason the resonance frequency may vary by one or two Hz from sample to sample. If you wish to obtain exactly optimum DVA tuning for your particular cartridge, you may use the NAD test record to determine the resonance frequency by direct experiment, as described in Appendix B of the instruction manual for the NAD 5120 turntable.

If your cartridge is not listed in the table, you may try any of the following approaches for tuning the DVA:

(1) Adopt median settings (Fr=10 Hz and Q=2). Even if these are not optimum, they will provide better performance than a tonearm that lacks the DVA feature.

(2) Contact your NAD dealer to discover whether there may be an updated version of this table that contains suggested DVA settings for your cartridge.

(3) Use the graphs below to determine approximate settings of the resonance frequency and damping.

(4) Obtain the NAD test record and determine the optimum DVA settings by direct experiment.

USING THE GRAPHS

If the cartridge weight (Mp) and the stylus compliance (Cs) are known, the resonant frequency (Fr) can be computed. This relationship is shown in the first graph. To use the graph, first locate the net weight of the cartridge body on the horizontal axis. From that point draw a vertical line upward until it intersects the curve that represents the compliance (Cs) of the stylus assembly. From there, draw a horizontal line to the left until it intersects the resonance frequency (Fr) scale along the left edge of the graph. The graph illustrates this process for a cartridge having a weight of 5.7 grams and a compliance of 20; the resulting resonance frequency is 9.5 Hz.

You need to know Mp and Cs in order to use this graph. The weight of the cartridge body usually is included among the specifications of the pickup cartridge, or it can be measured directly. The dynamic compliance usually is not specified. (If it is specified, it may have been measured at mid-frequencies; the compliance at infrasonic frequencies may only be two-thirds of the specified value.) The low-frequency compliance is sometimes given in test reports, notably in "Hi-Fi Choice" (England) and "Hi-Fi Stereophonie" (Germany).

In any case, the VTF provides an approximate guide to the compliance. If the optimum VTF is over 2 grams, the compliance is likely to be relatively low (around 12). If the correct VTF is approximately 1.6 grams, the cartridge probably has a medium compliance (around 20). If the VTF is only 1.2 grams, the compliance is high (above 30). Using these estimates you can use the graph to compute Fr. Though only approximate, the result will be accurate enough (within +2Hz) to obtain most of the benefit of the DVA.

Damping. The second graph provides a means of estimating the optimum setting of the damping rod. To use it, first note your cartridge weight. Subtract the VTF that you are using, and locate the resulting number on the horizontal axis of the graph. Draw a vertical line upward from there until it intersects the curve that represents the resonance frequency that you have tuned the DVA to. From that point, draw a horizontal line to the left until it intersects the damping scale along the left edge of the graph.

The graph illustrates the process for a cartridge that weighs 5.7 grams and is used with a VTF of 2.0 grams. The vertical line is drawn at 3.7 grams. The resonance frequency was determined (in the first graph, or by direct measurement using the NAD test record) to be 9.5 Hz, so we draw the line up to the 10 Hz curve in the graph. Looking to the left, this corresponds to a damping value (Q) of 3.

As mentioned earlier, the calculated value of Q is the total damping desired for the entire vibrating system. Some damping may be provided in the cartridge, so you will often find that the best setting of Q on the DVA is about one grade lower than the computed value.

CONTENTS OF THE TABLE

MODEL Listed in alphabetical order by manufacturer.

TYPE MM = moving magnet (and related types, such as induced magnet, moving iron, or variable reluctance).
MCH = moving coil with high output, intended for connection to a conventional MM phono input.
MCL = moving coil with low output voltage, to be used with a step-up transformer, pre-preamp, or high-gain MC phono input.
ELEC = electret.

P The axial distance from the stylus tip to the mounting screws, in millimeters. If no value is listed, you may measure it yourself. If P is equal to 9.5mm, the cartridge should be mounted with the screws located midway in the slots (as indicated by the white dots).

VTF Vertical Tracking Force, in grams. (For milliNewtons, multiply by 10; 1.5 g = 15mN.) A nominal, or median, setting of the VTF is given; a slightly higher value may be required for secure tracking of the highest modulation levels in recordings.

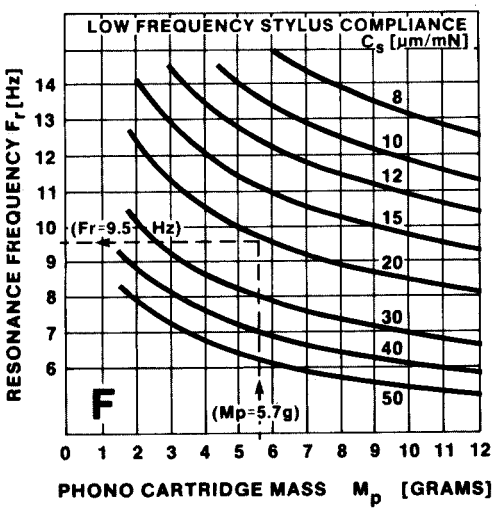
Mp The mass, or net weight, of the cartridge, in grams.

Cs The dynamic compliance of the stylus assembly, measured at infrasonic frequencies (around 10 Hz).

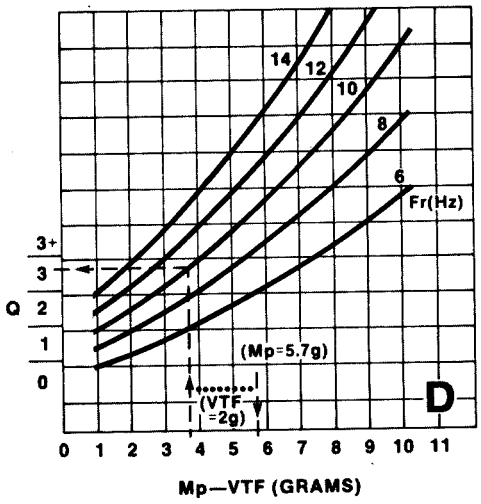
Fr The resonant frequency of the arm/cartridge system, computed from the listed values of Mp and Cs. If the value is lower than 7 Hz you may remove the white tuning screw entirely.

Q The damping grade, on a scale from 0 (no viscous damping)to 3+ (maximum damping, with the damping rod inserted fully into the fluid). The listed value is the recommended total damping for the vibrating system, including any damping provided within the cartridge. Many cartridges have some internal cantilever damping (and Shure models are equipped with a damping brush), so you may find that optimum performance is obtained by using a lower value of Q than that listed.

RESONANCE FREQUENCY (Fr)

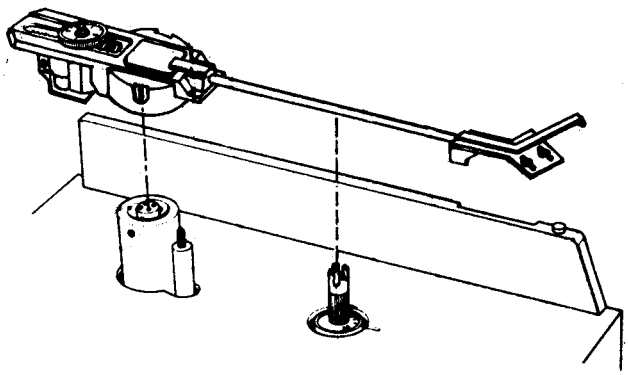


DAMPING (Q)



MODEL	TYPE	MTG. DIST.	VTF	MASS	COM—PLI—ANCE	RES. FREQ.	DAMP—ING
		p (mm.)	VTF (grams)	Mp (grams)	Cs	Fr (Hz)	Q
ADC							
QLM 34 III	MM	9.5	2.2	5.8	9	14.3	3+
QLM 36 III imp.	MM	9.5	1.4	5.7	38	7.0	2
VLM III imp.	MM	9.5	1.4	5.7	35	7.3	2
XLM III imp.	MM	9.5	1.3	5.7	25	8.6	3
ZLM imp.	MM	9.5	1.2	5.7	30	7.9	3
Phase II	MM		2.0	5.7	14	11.5	3+
Phase IV	MM		1.3	5.7	24	8.8	3
Astrion	MM		1.3	5.7	27	8.3	3
MC 1.5	MC-L		1.6	5.0	33	7.7	2
ADCOM							
HCE	MC—H		1.8	4.7	30	8.2	2
A & R							
P77	MM		1.8	6.0	23	8.9	3
AUDIO—TECHNICA							
AT 30E	MC—L	9.5	1.8	5.0	17	10.7	3
AT 31E	MC—L	9.5	1.6	5.0	22	9.4	2
AT 33E	MC—L	9.5	1.9	6.8	19	9.5	3+
AT 155LC	MM	9.5	1.4	8.3	34	6.8	3+
AT 24, AT 22	MM	9.5	1.3	8.5	28	7.4	3+
AUREX							
E 400	ELEC		1.8	6.0	14	11.4	3+
BANG & OLUFSEN							
MMC 20E	MM		1.5	5.5	18	10.2	3
MMC 20EN	MM		1.2	5.5	26	8.5	3
MMC 20CL	MM		1.0	5.5	23	9.1	3
CORAL							
777 EX	MC—L		2.2	5.5	17	10.5	3
MC 81	MC—L		2.0	5.0	17	10.7	3
MC 88E	MC—L		2.0	5.0	29	8.2	2
DENON							
103C	MC-L		2.5	8.5	13	10.9	3+
300	MC-L		1.9	4.2	15	11.8	2
301	MC-L		1.5	4.7	27	8.6	2
303	MC-L		1.3	5.8	44	6.5	2
305	MC-L		1.3	5.8	33	7.5	2
DYNAVECTOR							
10X	MC—L		1.8	9.5	45	5.7	3
DV 50A	MC—L		1.6	4.5	26	8.9	2
20A II	MC—L		1.8	5.3	27	8.4	2
DV 100R Karat	MC—L		1.8	5.3	26	8.6	2
DV 23R Ruby	MC—L		1.6	5.3	19	10.0	3
DV 17D Diamond	MC—L		1.4	5.3	34	7.5	2
EAGLE							
P 750X	MM		1.7	5.2	25	8.8	2
ELITE							
EEI 700	MM		1.8	6.0	19	9.8	3
MCP 555	MC—L		2.0	6.5	12	12.1	3+
EMPIRE							
200E	MM		2.5	5.3	10	13.8	3+
LENTEK							
Entre 1	MC—L		1.8	5.8	22	9.2	3
FIDELITY RESEARCH							
FR 101SE	MM		1.8	6.0	22	9.1	3
FR 1 Mk.IIIF	MC—L		2.0	10.0	27	7.2	3+
MC 201	MC—L		1.8	7.5	22	8.6	3+
MC 202	MC—L		1.8	7.5	20	9.1	3+
GLANZ							
MFG 31E	MM		1.5	5.5	24	8.9	3
MFG 31L	MM		1.5	5.5	35	7.3	2
MFG 61	MM		1.6	5.3	27	8.4	2
MFG 71E	MM		1.2	5.5	35	7.3	2
GOLDRING							
G 900E	MM	9.5	1.8	4.0	30	8.4	1
G 900SE	MM	9.5	1.3	4.0	35	7.8	1
G 900IGC	MM	9.5	1.2	4.0	42	7.1	1
G 910IGC	MM	9.5	1.8	4.3	23	9.5	2
G 920IGC	MM	9.5	2.0	4.3	24	9.3	1
GRADO							
FTE + 1	MM	10.3	2.0	4.5	18	10.6	2
GT Super	MM		1.8	5.3	20	9.8	3
GF-3 Super	MM		1.8	5.3	22	9.3	2
JVC							
Z—2E	MM		1.8	5.5	25	8.7	2
X—2	MM		1.6	7.5	23	8.5	3+
MC 1	MC—L		1.6	8.7	22	8.3	3+
MC 2E	MC—L		1.7	8.7	17	9.5	3+
KOETSU							
Black	MC—L		2.0	9.5	14	10.2	3+
Rosewood	MC—L		2.0	12.0	9	11.9	3+
LINN							
Basik			1.8	5.0	24	9.0	3
Asak DC 2100K	MC—L		2.0	6.0	14	11.4	3+
Asak (new)	MC—L		2.0	6.0	10	13.5	3+
MAYWARE							
MC 3L	MC—L		2.0	6.9	23	8.6	3
MISSION							
773	MC—L		1.8	5.2	45	6.6	1
773HC	MC—L		1.8	6.0	24	8.7	3
NAD							
9000	MC—H	9.5	1.8	6.0	50	6.0	1
9001	MC—H	11.0	1.9	4.4	30	8.3	2
9200	MM	9.5	1.4	5.7	28	8.1	3
9300	MM	9.5	1.3	5.7	15	11.1	3+

MODEL	TYPE	MTG. DIST.	VTF	MASS	COM—PLI ANCE	RES. FREQ.	DAMP—ING
		p (mm.)	VTF (grams)	Mp (grams)	Cs	Fr (Hz)	Q
NAGAOKA							
MP 11		9.5	2.0	6.8	23	8.7	3
MP 20		9.5	1.8	7.8	26	7.9	3+
MP 30		9.5	1.6	9.0	20	8.7	3+
MP 50		9.5	1.4	9.0	34	6.6	3+
ORTOFON							
FF 15E II	MM	9.5	1.6	5.0	25	8.9	2
VMS 20E II	MM	9.5	1.3	5.0	28	8.4	2
M 20FL	MM	9.5	1.6	5.0	20	9.9	3
VMS 30 II	MM	9.5	1.5	5.0	34	7.6	2
LM 10	MM	9.5	2.0	2.6	12	14.2	2
FF 15E II	MM	9.5	1.6	5.0	25	8.9	2
VMS 20E II	MM	9.5	1.3	5.0	28	8.4	2
M 20FL	MM	9.5	1.6	5.0	20	9.9	3
VMS 30 II	MM	9.5	1.5	5.0	34	7.6	2
LM 10	MM	9.5	2.0	2.6	12	14.2	2
LM 20	MM	9.5	1.1	2.6	22	10.5	2
LM 20H	MM	9.5	1.1	2.6	33	8.5	1
LM 30H	MM	9.5	1.3	2.6	30	9.0	1
MC 10	MC-L	9.5	2.0	7.0	14	11.0	3+
MC 10 II	MC-L	9.5	16.0	7.0	16	10.3	3+
MC 20 II	MC-L	9.5	1.8	7.0	18	9.7	3+
OSAWA							
Mirage OS 60L	MC-L		2.0	6.8	15	10.7	3+
PHILIPS							
GP 401 II	MM	9.5	1.7	6.0	27	8.2	3
PICKERING							
XV 15/625E	MM		1.4	6.0	15	11.0	3+
XSV	MM		1.2	5.5	20	9.7	3
REFERENCE							
Spectre	MC—L		1.8	8.5	26	7.7	3+
SATIN							
M 117S	MC—L		1.8	9.2	10	12.2	3+
SHURE							
M 97EJ	MM	9.5	2.0	6.4	28	8.0	3
M 97HE	MM	9.5	1.3	6.4	35	7.1	3
V-15 III-HE	MM	9.5	1.2	6.0	53	5.9	2
V-15 IV	MM	9.5	1.1	6.4	32	7.4	3
V-15 V	MM	9.5	1.1	6.5	27	8.1	3
SIGNET							
TK 3E	MM		1.5	6.8	23	8.7	3+
TK 5E	MM		1.5	6.8	32	7.3	3
TK 9E	MM		1.3	8.5	28	7.4	3+
Mk IIIE	MC—L		1.8	4.8	28	8.4	2
SONUS							
Gold Blue	MM		1.3	5.5	35	7.3	2
SONY							
XL 44	MC—L		1.6	6.2	30	7.7	3
XL 45			1.6	5.5	25	8.7	3
XL 55	MC—L		1.8	10.0	19	8.6	3+
XL 70			1.5	4.2	33	8.0	1
XL 88	MC—L		1.6	6.8	25	8.3	3
STANTON							
881S	MM	8.5	1.3	5.7	18	10.2	3+
981 LZS	MM		1.4	5.5	30	7.9	3
SUPEX							
SD 900 Super	MC-L		2.0	9.0	11	11.7	3+
SD 901S	MC-L		2.2	9.5	12	11.0	3+
TECHNICS							
EPC 205 III—L	MM		1.2	6.5	23	8.7	3+
EPC 305 MC	MC—L		1.6	6.7	20	9.3	3+
TENOREL							
TMC 10	MC—L		1.8	6.5	20	9.4	3+
YAMAHA							
MC 1S	MC-L		1.8	7.5	24	8.3	3+
ZENN							
MCZ 7	MC—L		1.9	4.8	15	11.5	3



NAD INTERNATIONAL
LONDON/BOSTON