

Resolution Series® 122 MKII

Phono Linearizer/Preamplifier



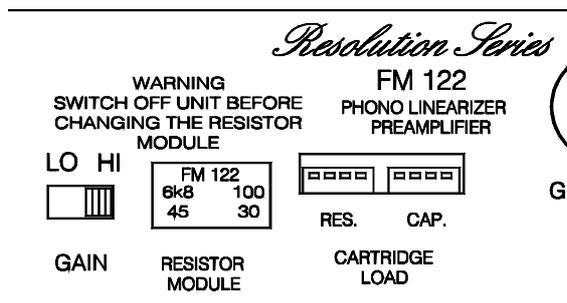
UNIQUE PRECISION IN CARTRIDGE PREAMPLIFICATION AND PHONO LINEARIZATION

- ♪ The FM 122 MKII gives record collections an entirely new life.
- ♪ The ultimate solution in phono pre-amplification.
- ♪ Unique variable "non-RIAA" de-emphasis allows precise linearization of any recording ever made. Continuously variable controls allow precise restitution of any pre-emphasis curve.
- ♪ Freedom from noise and hum.
- ♪ Ultra high accuracy RIAA record compensation circuitry.
- ♪ FM ACOUSTICS phono preamplifiers provide truly accurate reproduction of records.
- ♪ Adjustable resistance and capacitive loading allows fine tuning to any MC or MM cartridge.
- ♪ Large reserves in signal handling capability.
- ♪ Discrete class A circuitry guarantee no more matching problems between cables and electronics.
- ♪ Zero overall feedback or feedforward.
- ♪ Absolutely transparent.
- ♪ Natural micro dynamics are rendered perfectly.
- ♪ Entire unit built of proprietary discrete Class A circuitry.
- ♪ Freedom from usual limitations: no signal degrading IC's, transformers, hybrid circuits or op-amps.
- ♪ Proprietary technology, specialized circuitry, manufacturing and testing methods.
- ♪ Employs special dynamic curve-tracer analyzed semiconductors throughout.
- ♪ Hand-selected, precisely matched components of DIN, IEC & MIL standard guarantee utmost accuracy and long-term stability.
- ♪ Modular construction guarantees no obsolescence.
- ♪ Guaranteed spare parts availability for a minimum of 10 years.
- ♪ The ultimate phono preamplifier for record collectors, libraries and top class audio systems.

When a totally faithful phono reproduction of the original is required - the FM 222 MKII Linearizer/ preamplifier is THE ultimate solution. The FM 122 MKII, however, uses the same technology and has most of the features of the FM 222 MKII but employs unbalanced cartridge interfacing. This allows for considerably lower cost without any compromising.

Quality is not scaled down in the FM 122 MKII. It uses components of identical standard as the FM 222 MKII. Identical selection procedures and manufacturing methods are employed. The savings in cost have been possible because the FM 122 MKII employs the standard cartridge connection and can be made in more realistic quantities.

CARTRIDGE LOADING



In Phono preamplification **all** aspects require careful consideration. Cartridge loading needs addressing, as the variations in the loading have a considerable influence on reproduction.

Negative effects on the performance will occur if there is non-optimal impedance matching between the cartridge and the input stage circuit (the interconnect cables and the connectors are not to be neglected parts of this interface!).

It would be handy if cartridge manufacturers would specify the detailed data required for calculation of the optimal cartridge loading (such as coil resistance, inductance and capacitance over the full frequency range, phase plots with tolerances, area and magnitude of resonances, etc.).

It would then be possible to provide more accurate information on optimal loading for each cartridge model. But as this information is not provided by cartridge manufacturers, it is necessary to empirically find the correct values of cartridge loading. This is best done by listening tests.

It must be realized that often the loading impedance recommended by the cartridge manufacturers is not optimal. With the FM 122 MKII's unique cartridge loading system it is possible to optimally fine tune the performance of any cartridge.

Resistive Loading

The reason for having a load resistance is that electroacoustic transducers must be damped to avoid ringing, overshoot and other negative effects. The loading also influences performance of its input stage circuitry and the preamplifier's noise level.

Many preamplifier's noise performance suffers when the MC loading impedances are set to the relatively low figures that good damping requires. This is a design weakness of the respective preamplifier. Designing for low noise at low impedances is a real challenge and many preamplifier manufacturers take the easy way out by fixing the MC input resistance to a value that is higher than optimal for the cartridge. There are some MC cartridge manufacturers that specify a loading resistance of 47 kOhm (the old "standard" for moving magnet cartridges). While this may give a good theoretical noise specification it does not provide the necessary damping for the MC cartridge. This 47 kOhm input resistance is the "compromise" setting that was accepted for loading of MM (Moving Magnet) cartridges. It is not correct for MC (Moving Coil) cartridges. The optimal loading resistance for most (but not all) MC cartridges is between approximately 10 and 100 Ohm.

Preamplifiers that are missing variable resistance and capacitance loading are unable to extract the full performance from MM or MC cartridges. This is one of the reasons why many preamplifiers work acceptably with one or two cartridges but do not provide satisfactory performance with other cartridges. The listener is at the mercy of the fixed input loading of the preamplifier. Performance cannot be optimized; the cartridge cannot perform optimally.

The FM 122 MKII provides the ultimate solution: it features switches for adjusting loading resistance as well as loading capacitance. Replaceable plug-in modules allow an unlimited number of loading combinations (each module allows setting of four different input resistances). Thanks to the plug-in module concept an unlimited number of loading combinations are possible. One can optimize the loading for any cartridge ever made (or that will ever be made). Thanks to the switchable gain feature the FM 122 MKII provides enough gain for any cartridge available today.

Capacitive Loading

The Capacitive Loading feature can be as important: in the FM 122 MKII switches allow damping of cartridge resonance and help optimize the fine tuning of the upper frequency response. Because it has not been available so far, this feature may not attract much attention initially. However, this feature is of great help in optimizing performance of MC and MM cartridges.

Figs. 1-3 show the effects of cartridge loading with a typical MC cartridge. The magnitude, frequency and effect will obviously vary with different cartridge types. The curves speak for themselves and show how important correct loading is.

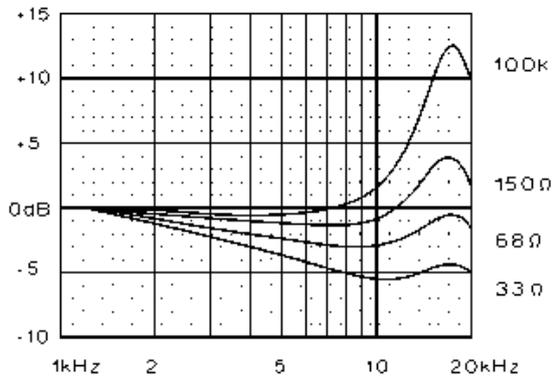


Figure 1 shows the effect of varying the resistive load on a MC cartridge.

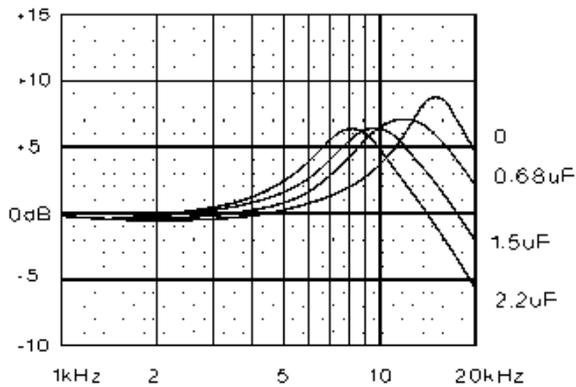


Figure 2 shows the effect of varying the loading capacitance on a MC cartridge.

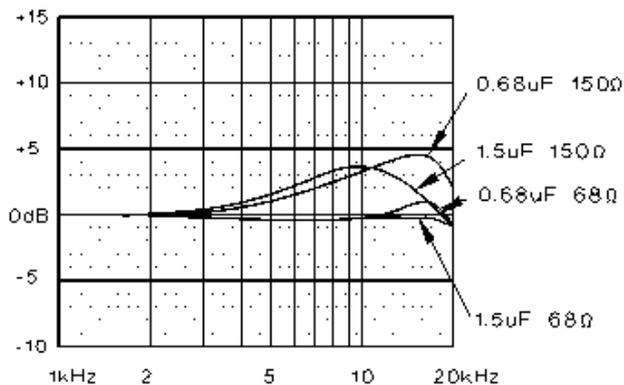


Figure 3 shows various combinations of above.

There is no room here to expand further into cartridge loading and its effect on overshoot and ringing, signal-to-noise ratios, etc. Suffice it to know that the FM 122 MKII addresses **all** of these issues and provides the optimum solution for **any** cartridge.

L.F. FILTER

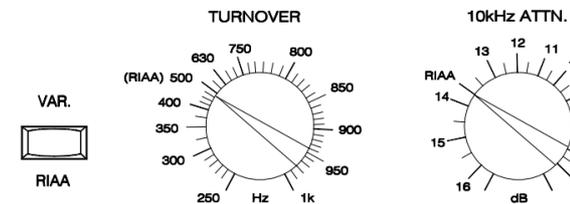


Elimination of sub-audio frequencies is very important. These low frequency signals, usually from pressing faults, record wraps or tonearm resonances can have a deteriorating effect on the audio quality. Furthermore, such sub-audio frequencies consume large amounts of amplifier power that would be needed in the audio range.

To avoid such drain, the FM 122 MKII employs a Linear-Phase filter which attenuates the sub-audio frequencies whilst having no effect on the audio range.

If required the L.F. filter can be factory adjusted to comply with the I.E.C. standard L.F. response (-3 dB at 20 Hz, 6 dB/octave,). However, the 12 dB/octave linear phase filter used in the FM 122 MKII is more effective.

UNIQUE VARIABLE RIAA DE-EMPHASIS



For music lovers the *performance* is every bit as important as the *sound* of a record. Many great performances are only available on LP's. On today's equipment, many of these LP's are replayed wrongly and their sound leaves something to be desired. Quite a few re-issues suffer from similar problems. One of the reasons is that practically all preamplifiers are limited to replay the RIAA de-emphasis curve.

However, one must realize that until 1958 there was no standardized pre-emphasis curve. Different record companies used a wide variety of pre-emphasis "cutting" curves before the RIAA curve was introduced. To inversely match the original recording curves, many different de-emphasis curves are required. Sometimes, even within the same company the pre-emphasis curves changed multiple times!

With the variable RIAA de-emphasis of the FM 122 MKII it is now possible to accurately play back important earlier LP's, 10" and 7", as well as 78's. Accurate de-emphasis combined with Class A amplification stages are used. It is now possible to extract an absolutely astounding amount of information from record grooves.

Fig.4 on next page shows on the top pre-emphasis curves for several typical records, in the centre the error when replayed with the standard RIAA curve and on the bottom the result when the correct de-emphasis response is set on the FM 122 MKII. The corresponding correct knob setting of the "Turnover Frequency" and the "10kHz Attenuation" on the FM 122 MKII is also indicated.

The the variable de-emphasis is not only useful for pre 1958 records! Experimenting with the variable RIAA feature on the FM 122 MKII, records that lack in accuracy will benefit from fine tuning.

The cutting lathes used prior to 1968 were unable to perfectly cut the very high velocities present at frequencies above about 10 kHz*. To circumvent this problem mastering engineers somewhat attenuated the higher part of the frequency spectrum. This often resulted in a slight lack of airiness on upper frequencies. It is amazing how much of the sound made it on record but discs of this area can sometimes lack a bit in high frequency and transparency.

With the continuously variable RIAA de-emphasis of the FM 122 MKII it is now possible to compensate for such effects by individually fine tuning the de-emphasis curve for each recording. By varying the "10kHz attenuation" control on the front panel the attenuation at 10 kHz can be reduced to less (or more) than the standard 13.7 dB of the RIAA curve. In many recordings 1-3 dB will make quite a noticeable difference. This feature will revive some records that previously sounded dull and lifeless, and providing a wonderful musical experience.

The opposite also holds true: In the late 70's and 80's on some records one can find cuts with excessive high frequency levels. By increasing the 10 kHz attenuation these records sound more realistic.

Even a recording that lacks in "warmth" (not just bass!) can be corrected by moving up the "turnover frequency" knob to a mildly higher setting. This way the entire frequency band above and below the turnover frequency is affected linearly.

It is not just the harmonic content that is reproduced more realistically, the positive effect on depth and width information and transparency can be captivating. While some older LP's indeed have higher surface noise, the FM 122 allows to reduce this. Some of the LP's are recorded superbly, some include stellar performances. There are many treasures to be discovered.

Each record can now be calibrated perfectly. Unlimited variations in turnover frequencies and roll off curves allow most exact compensation for any de-emphasis curve. The following table shows some of the typical settings for important table records. One has to realize that engineers sometimes varied this de-emphasis and that the correct values do not always conform with the curves published by the recording companies. Therefore, experimenting with the two controls will lead to optimal results. The best judge is the trained ear assisted by the information contained in the FM 122 MKII's Instruction Manual (a few typical examples are shown here).

It is amazing how much the sound of records is improved with the FM 122 MKII. Once this has been experienced, it is realized that none of the existing preamplifiers are capable of retrieving the full information which is embedded in the record grooves.

Here are a few examples of some approximate Turnover Frequencies and Rolloff curves of earlier LP's:

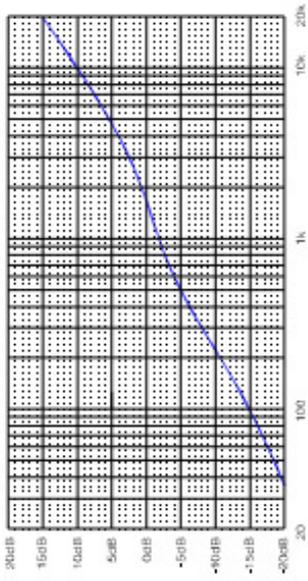
Label	Turnover Frequency	Rolloff at 10kHz in dB	Speed
ANGEL	500	12.0	33
ATLANTIC	500	16.0	33
BLUE NOTE	400	12.0	33
COLUMBIA	750	16.0	33
HMV	300	5.0	78
LONDON	700	10.0	33
MERCURY	300-400	12.0	78
MERCURY	400	12.0	33
VICTOR	800	10.0	33
VOX	750	16.0	33

A list of 85 different emphasis curves is included with every FM 122 MKII. The FM 122 MKII Linearizer/Record preamplifier provides an entirely different dimension in the reproduction of vinyl records. Together with its larger brother (the FM 223), it is clearly the culmination of preamplifier design. With its fine-tuning possibilities, far more information from record grooves can be extracted than ever thought possible.

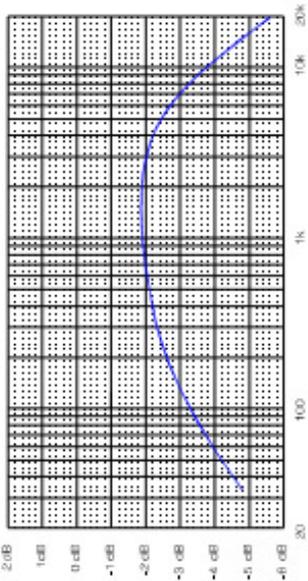
With the FM 122 MKII it is possible for the first time truthfully replay all treasures of vinyl. The proprietary enhanced Class A circuits allow a listening experience that is breathtaking. The FM 122 MKII offers a multitude of other brilliant features and design criteria that have never before been available. With the FM 122 MKII record collections gain an entirely new life and value.

* The first cutting amplifiers that were able to provide reasonably high currents into the cutterhead at high frequencies appeared only in 1968. Until then this was a major obstacle (because of the impedance, the resonances and the non-linearities of the cutterhead which all became too demanding for the then available tube amplifiers above 10 kHz).

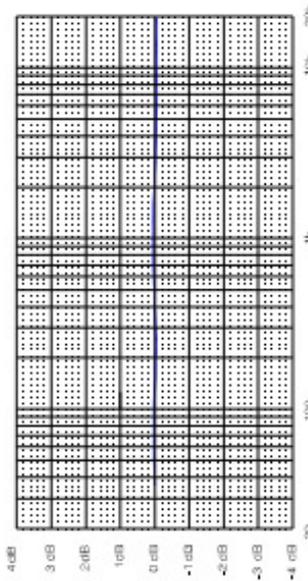
LONDON



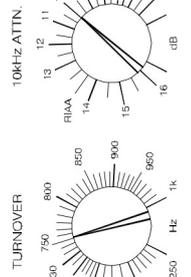
Recording Characteristic



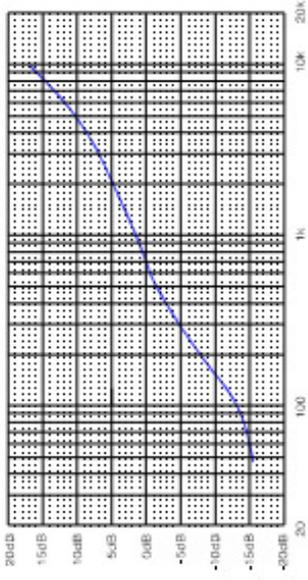
Frequency Response with RIAA Filter



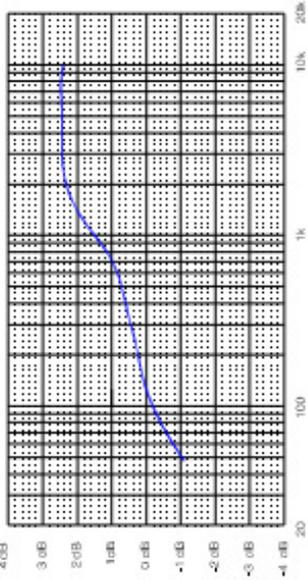
Frequency Response with FM 123 Linearization



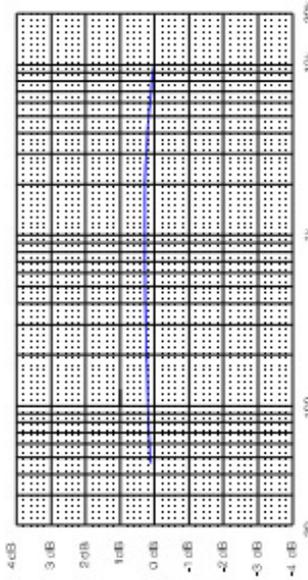
RCA ORTHOACOUSTIC



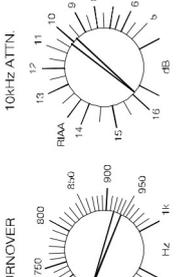
Recording Characteristic



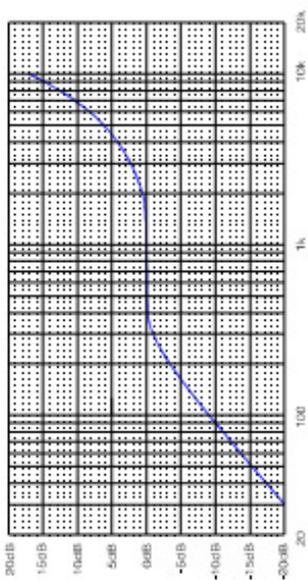
Frequency Response with RIAA Filter



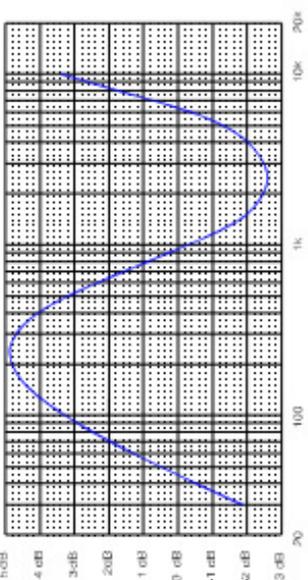
Frequency Response with FM 123 Linearization



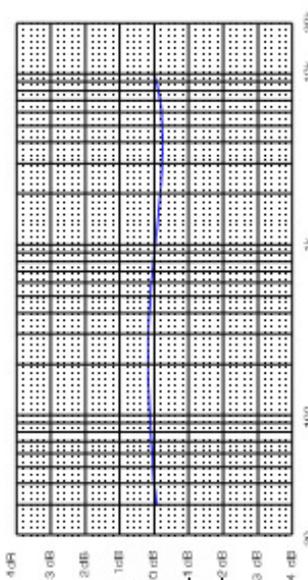
VERTICAL RECORDINGS 1953



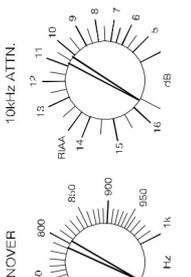
Recording Characteristic



Frequency Response with RIAA Filter



Frequency Response with FM 123 Linearization



ADDITIONAL FEATURES

- The FM 122 MKII is transparent. It does not add any characteristic sound of its own.
 - The FM 122 MKII interfaces optimally with all types of circuitry. With the FM 122 MKII matching problems are a thing of the past.
 - The FM 122 MKII's circuits employ no overall feedback or feedforward. The entire FM 122 MKII is built with FM ACOUSTICS' proprietary Class A stages. Freedom from hum, noise and interference is guaranteed. Stability and signal accuracy are unparalleled and surpass anything that has ever been available.
 - All inputs and outputs use special RCA/Phono connectors that guarantee no thumps or transients when the cables are connected.
 - The FM 122 MKII's mechanical grounding effectively isolates sensitive electronic components from induced resonances.
 - Ultra-linear circuitry guarantees that the FM 122 MKII can drive longest cable with absolutely pristine performance.
 - A variety of Interconnect cables made by *Precision Interface Technology* are available.
 - Swiss made hermetically sealed relays are used. Four special contacts provide perfect operation, even after millions of switching cycles. Hermetic sealing guarantees that environmental factors cannot have any negative effect on the precision plated contacts and therefore, on performance.
 - The FM 122 MKII allows connection to any balanced or unbalanced equipment. Every load - be it true balanced, pseudo balanced or unbalanced, whether it has high or low impedance - is perfectly driven by the FM 122 MKII.
 - Tremendous reserves in output drive capability are engineered into the FM 122 MKII.
 - There is no signal carrying wire in the FM 122 MKII. Unit to unit consistency is assured.
 - It's outstanding signal-to-noise ratio betters all existing designs.
 - Precision on-board stabilisation avoids hum, noise or electronic interference (provided the proper interconnect cables are used).
 - Proprietary control circuitry perform various tasks. During switch-on outputs are disengaged and the FM 122 MKII checks itself. If everything is perfect, the control circuitry frees the outputs within ten seconds.
 - Overvoltage protection guarantees that no dangerous LF signals or DC instability can harm speakers, preamplifier, and other equipment.
 - A special biasing system guarantees that the FM 122 MKII does not have any form of distortion or changing tonal characteristics when warming up. It reaches its optimal operating temperature within minutes; there is no hour long warm-up required.
 - To assure that the *Resolution Series 122 MKII* will not become obsolete, it uses modular technology. Major advantages are updates or changes can be performed quickly. This comes with the guarantee of 100% correct performance, as parameters are fine tuned inside the respective module. This way the FM 122 MKII can be kept at the forefront of technology and performance should new technologies become available.
- Every repair will be 100% accurate, as the modules have been precisely calibrated, burnt-in, and double-tested at the factory.

Words can by no means describe the experience of listening through the FM 122 MKII. It literally revives record reproduction. Entirely new insights in performances can be gained thanks to the FM 122 MKII's proprietary circuitry and features.

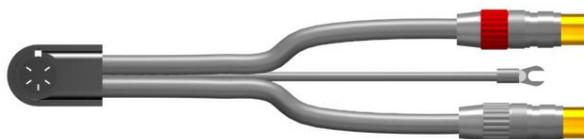
The FM 122 MKII is transparent. It will leave unaltered the qualities and characteristics of the associated equipment. Tube aficionados will still have the "tube sound", solid state "fans" will still get the unparalleled bass and dynamics of good solid state units while at the same time benefiting from the performance improvements of the FM 122 MKII.

ACCESSORIES

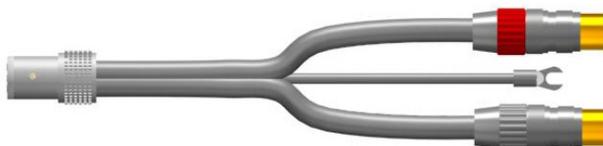
OrderNumber Description

ACC 22014	Resistor Module 122 MKII MC:	6.8k / 1k / 500 / 350 Ohm
ACC 22015	Resistor Module 122 MKII MC:	Standard: 6.8k / 100 / 45 / 30 Ohm
ACC 22019	Resistor Module 122 MKII MC:	6.8k / 3k / 1 k / 850 Ohm
ACC 22020	Resistor Module 122 MKII MC:	6.8k / 5k / 4k / 3.3k Ohm
ACC 22016	Resistor Module 122 MKIIB MM:	Standard: 100k / 47k / 33k / 24k Ohm
ACC 22027	Labels FM122 MKII:	for record coding; set of 240 pieces

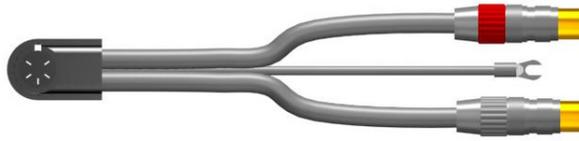
Phono Interconnect Cables by *Precision Interface Technology*®



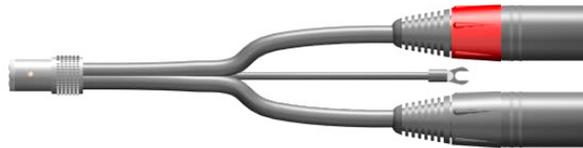
CA 25171	5-P DIN - Phono M 0.6m	Ultra flexible phono interconnect angled DIN
CA 25172	5-P DIN - Phono M 1.2m	Ultra flexible phono interconnect angled DIN
CA 25173	5-P DIN - Phono M 3.0m	Ultra flexible phono interconnect angled DIN



CA 25181	5-P DIN - Phono M 0.6m	Ultra flexible phono interconnect straight DIN
CA 25182	5-P DIN - Phono M 1.2m	Ultra flexible phono interconnect straight DIN
CA 25183	5-P DIN - Phono M 3.0m	Ultra flexible phono interconnect straight DIN



CA 25191	5-P DIN - Phono M 0.6m	Ultra flexible phono interconnect angled DIN
CA 25192	5-P DIN - Phono M 1.2m	Ultra flexible phono interconnect angled DIN
CA 25193	5-P DIN - Phono M 3.0m	Ultra flexible phono interconnect angled DIN



CA 25201	5-P DIN - Phono M 0.6m	Ultra flexible phono interconnect straight DIN
CA 25202	5-P DIN - Phono M 1.2m	Ultra flexible phono interconnect straight DIN
CA 25203	5-P DIN - Phono M 3.0m	Ultra flexible phono interconnect straight DIN



CA 25211	Phono M - Phono M	0.6m Phono interconnect for MC
CA 25212	Phono M - Phono M	1.2m Phono interconnect for MC
CA 25213	Phono M - Phono M	3.0m Phono interconnect for MC



CA 25221	Phono M - Phono M	0.6m Phono interconnect for MM
CA 25222	Phono M - Phono M	1.2m Phono interconnect for MM
CA 25223	Phono M - Phono M	3.0m Phono interconnect for MM

ORDERING INFORMATION

Order Number	Description
FL -20064:	FM 122 MKII: Standard Moving Coil (MC) version
FL -20061:	FM 122 MKIIB: Standard Moving Magnet (MM) version

SPECIFICATIONS FM 122 MKII

Specifications are often misused, misunderstood, or utilized only to sell a product instead of indicating its actual performance capabilities. "Typical" specifications will not tell you much about the true value of a certain component. Only guaranteed minimum specifications as indicated below, together with carefully controlled listening tests, will provide accurate and useful information. Please observe these distinctions if you make comparisons with other products' specification sheets. All specifications are guaranteed minimum figures for every single FM 122 MKII produced by FM ACOUSTICS.

Circuitry

Proprietary, highest purity discrete, Class A circuitry using hand-selected super-speed semiconductors. These are individually analysed, selected and are then subjected to FM ACOUSTICS' exclusive listening selection process. Entire unit is built with FM ACOUSTICS' hand calibrated precision Class A Modules.

Input Impedance / Cartridge Loading

Variable unlimited combinations. Impedance and capacitance load are set by rear panel DIP switches. Replaceable resistance module allows infinite combinations. Standard module:
MC cartridge: 6800 /100 /45 / 30 Ohm
For other resistance values see page 7.

Gain

Standard: 56 dB
Switchable to: 46 dB

Input Sensitivity

at 1 kHz: 120uV for 100mV output

Bandwidth

less than 1 Hz to 400 kHz.

Hum and Noise

Equivalent input noise
22Hz - 22kHz: -135 dBu
Below 0 dBV = Better than 81 dB weighted

LF Filter

Linear-Phase Filter.
No negative influence on audio signals.

RIAA accuracy

In RIAA setting better than
+/- 0.09 dB over full frequency range.

Outputs

Precision Class A outputs. Can drive any balanced or unbalanced load and very long cables.

Output drive capability

+ 20 dBu ($8V_{RMS}$) into 5 KOhm load

Recommended load impedance

>600 Ohm

Stereo separation

Better than 70 dB

Distortion

At 1V (+1.2dBu) out: 0.07%
No higher order harmonics at all (up to clipping level)

Power

Supplied from external FM 102 power transformer delivered with FM 122 MKII.

Mains voltage

Either 115V or 230V

Mains overvoltage

Maximum short-term: 150% V nominal
Maximum long-term: 120% V nominal

Maximum undervoltage

Stable operation within a mains voltage range of:
95 V to 130 V (115 V setting)
190 V to 260 V (230 V setting)

Power consumption

5 W continuous

Operating temperature

-20 to +40°C

Operating humidity

Long-term: 0 - 85%
Short-term: 0 - 95%
Continuous high humidity may shorten lifetime of certain components somewhat

Burn-in time at factory

500 thermal cycles, minimum 100 hours

Vibration test at factory

50'000 vibration cycles, minimum 60 minutes

Average Life expectancy

34 years (at 25°C ambient, 10 hours per day, 365 days per year)

Front panel

5mm laser cut, brushed and then hand-polished aluminium, letters anodized so they can never wear off. Precision, self-cleaning long-life switches, Hand-selected, sealed specially made close tolerance controls. Power on" indicator.

Back panel

Same as frontpanel but with 4mm brushed and handpolished aluminium, lettering anodized so it can never wear off. All inputs and outputs are precision RCA Phono receptables with automatic short circuit upon connection and disconnection. "Groundlift" switch.

Spare parts availability

Minimum 10 years;
guaranteed availability of 99.8% of all parts ex stock.

Dimensions

245 mm wide / 62 mm high / 290 mm deep

Weight

FM 122 MKII:	2.2 kg net
FM 102 power supply:	1 kg net
Packed:	5.5 kg

Applications

Reference phono Linearizer/preamplifier for restoring work, libraries, mastering studios, true audiophile systems, record collectors, recording studios, laboratory, institutional and a variety of other professional applications.

IEC, DIN and MIL (military) standards of components used:

IEC 68 = 55/155/56	DIN 384-4
IEC 68 = 55/085/2	DIN 40040
IEC 144/IP 65	DIN 40046
IEC 40/100/56	DIN 40050 P 54
IEC 115-1	DIN 41332 TYPE IIA
IEC 384-9	DIN 44112
IEC 384-8 IB	DIN 44356
IEC 384-2	DIN 45910 PART 1201
IEC 68: 55/085/56	DIN 45921-107
IEC 68: 55/200/56	DIN 44061
IEC 68: 2-6	

MIL-R-STD 202 method 101, 103, 106, 213, 301
MIL-R-11804/2B/G
MIL-R-22097
MIL-R-10509
MIL-R-55182
MIL-R-22684
MIL-R-45204 TYPE 2
MIL-R-23285
MIL-C-19978 B
MIL-VG-95-295
MIL-S-23190 R.I.N.A.Nr. 5/206/85

"You've never heard it so good"

S.E.&O. excepted
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FM ACOUSTICS LTD.
CH-8132 Egg b. Zurich
Switzerland
www.fmacoustics.com

Due to continuous research, FM ACOUSTICS LTD. reserves the right to change specifications without further notice.