Resolution Series® 122 MKII
Phono Linearizer/Preamplifier

The FM 122 MKII gives record collections an entirely new life.
The ultimate solution in phono preamplification.
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 are only able to 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 driver circuitry guarantee no more matching problems between cables and electronics.
Zero overall feedback or feedforward.
Entire unit built of proprietary discrete Class A circuitry.
Absolutely transparent.
Natural micro dynamics are rendered perfectly.
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**

<table>
<thead>
<tr>
<th>Resolution Series</th>
</tr>
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<tbody>
<tr>
<td>WARNING</td>
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<tr>
<td>SWITCH OFF UNIT BEFORE CHANGING THE RESISTOR MODULE</td>
</tr>
<tr>
<td>LO HI</td>
</tr>
<tr>
<td>FM 122</td>
</tr>
<tr>
<td>PHONIC LINEARIZA PREAMP</td>
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<tr>
<td>RES. CAP.</td>
</tr>
<tr>
<td>RES. RES. RES. RES.</td>
</tr>
<tr>
<td>GAIN</td>
</tr>
<tr>
<td>RESISTOR MODULE</td>
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<tr>
<td>CARTRIDGE LOAD</td>
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<td>GI</td>
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</tbody>
</table>

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 of the preamplifier 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. Unfortunately, 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, even for those with extremely low output.

**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 and its use is not yet established, 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

In the process of high quality sound reproduction elimination of sub-audio frequencies can be 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 is needed in the audio range.

To avoid such drain, the FM 122 MKII employs a 12 dB/octave 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, in our opinion the 12 dB / octave linear phase filter used as standard in the FM 122 MKII is preferable.

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 before 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 finally agreed to. This is a problem unsolved by today's preamplifiers, whose de-emphasis curve are fixed to the standard RIAA curve. However, 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 equalization combined with Class A amplification stages are used. It is now possible to extract an absolutely astounding amount of information from record grooves.

But 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 high surface noise by far not all of them do. Some of them are recorded superbly, some include stellar performances. There are many treasures to be discovered.

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. But the variable de-emphasis is not only useful for pre 1958 records! However, 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 RIAA 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 (of course with decreased 10kHz attenuation the noise may increase very slightly, this is less objectionable than having attenuated, somewhat muted upper frequencies). This feature will revive some records that previously sounded dull and lifeless, suddenly providing a wonderful musical experience.

And 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.

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

<table>
<thead>
<tr>
<th>Label</th>
<th>Turnover Frequency</th>
<th>Rolloff at 10kHz in dB</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGEL</td>
<td>500</td>
<td>12.0</td>
<td>33</td>
</tr>
<tr>
<td>ATLANTIC</td>
<td>500</td>
<td>16.0</td>
<td>33</td>
</tr>
<tr>
<td>BLUE NOTE</td>
<td>400</td>
<td>12.0</td>
<td>33</td>
</tr>
<tr>
<td>COLUMBIA</td>
<td>750</td>
<td>16.0</td>
<td>33</td>
</tr>
<tr>
<td>HMV</td>
<td>300</td>
<td>5.0</td>
<td>78</td>
</tr>
<tr>
<td>LONDON</td>
<td>700</td>
<td>10.0</td>
<td>33</td>
</tr>
<tr>
<td>MERCURY</td>
<td>300-400</td>
<td>12.0</td>
<td>78</td>
</tr>
<tr>
<td>MERCURY</td>
<td>400</td>
<td>12.0</td>
<td>33</td>
</tr>
<tr>
<td>VICTOR</td>
<td>800</td>
<td>10.0</td>
<td>33</td>
</tr>
<tr>
<td>VOX</td>
<td>750</td>
<td>16.0</td>
<td>33</td>
</tr>
</tbody>
</table>

* 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).
A list of 85 different emphasis curves is included in the instruction manual. The FM 122 MKII Linearizer/Record preamplifier provides an entirely new dimension in the reproduction standard 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.

### 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 short circuiting RCA/Phono connectors that guarantee no thumps or transients when the cables are connected.
- The FM 122 MKII’s mechanical grounding effectively isolates all 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. Cables with special connectors (such as Fischer/Camac, etc.) are available on special order.
- Swiss made hermetically sealed ultra high-performance relays are used. Four specially coated contacts provide perfect operation, even after tens of 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’s precision output.
- 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. Delayed switch-on is incorporated. 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 totally modular technology. Major advantages are:
  
  a) Updates or changes can be performed in a matter of minutes. 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.
  
  b) If servicing should ever be necessary, a faulty module can be replaced within minutes. 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 unique features.

The FM 122 MKII is transparent. It will leave unaltered the qualities and characteristics of the associated equipment. Tube affectionados will still have the “tube sound”, solid state “fans” will still get the unparalleled bass and dynamics of good solid state unit while at the same time benefiting from the performance improvements of the FM 122 MKII. The same applies for all other equipment of decent quality.

**ACCESSORIES**

<table>
<thead>
<tr>
<th>Order Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACC 22014</td>
<td>Resistor Module 122 MKII MC: 6.8k / 1k / 500 / 350 Ohm</td>
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<tr>
<td>ACC 22015</td>
<td>Resistor Module 122 MKII MC: Standard: 6.8k / 100 / 45 / 30 Ohm</td>
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<tr>
<td>ACC 22019</td>
<td>Resistor Module 122 MKII MC: 6.8k / 3k / 1 k / 850 Ohm</td>
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<tr>
<td>ACC 22020</td>
<td>Resistor Module 122 MKII MC: 6.8k / 5k / 4k / 3.3k Ohm</td>
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<tr>
<td>ACC 22016</td>
<td>Resistor Module 122 MKII MM: Standard: 100k / 47k / 33k / 24k Ohm</td>
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<tr>
<td>ACC 22027</td>
<td>Labels FM122 MKII: for record coding; set of 240 pieces</td>
</tr>
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</table>

**Phono Interconnect Cables by Precision Interface Technology®**

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<thead>
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<th>Description</th>
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<tbody>
<tr>
<td>CA 25171</td>
<td>5-P DIN - Phono M 0.6m Ultra flexible phono interconnect angled DIN</td>
</tr>
<tr>
<td>CA 25172</td>
<td>5-P DIN - Phono M 1.2m Ultra flexible phono interconnect angled DIN</td>
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<tr>
<td>CA 25173</td>
<td>5-P DIN - Phono M 3.0m Ultra flexible phono interconnect angled DIN</td>
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<tr>
<td>CA 25181</td>
<td>5-P DIN - Phono M 0.6m Ultra flexible phono interconnect straight DIN</td>
</tr>
<tr>
<td>CA 25182</td>
<td>5-P DIN - Phono M 1.2m Ultra flexible phono interconnect straight DIN</td>
</tr>
<tr>
<td>CA 25183</td>
<td>5-P DIN - Phono M 3.0m Ultra flexible phono interconnect straight DIN</td>
</tr>
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### 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

<table>
<thead>
<tr>
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<tr>
<td>FL-20064:</td>
<td>FM 122 MKII: Standard Moving Coil (MC) version</td>
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<tr>
<td>FL-20061:</td>
<td>FM 122 MKIIIB: Standard Moving Magnet (MM) version</td>
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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 contact the factory.

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
12 dB/octave Linear-Phase Filter.
No negative influence on audio signals.

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

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

Output drive capability
+ 20 dBu (8Vrms) into 5KOhm 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 supply/transformer delivered with FM 122 MKII.

Mains voltage
Either 115V or 230V; adjustable inside FM 102 power supply: 50-60Hz

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

SPECIFICATIONS FM 122 MKII
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 45921-107
- IEC 68: 2-6 DIN 44061
- 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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Due to continuous research, FM ACOUSTICS LTD. reserves the right to change specifications without further notice.