The Resolution Series® 245
Precision Preamplifier

- Proprietary enhanced Class A circuitry performs better than anything else
- Fully discrete circuitry using special curve-tracer analysed and listening-selected semiconductors
- A quality of music reproduction to dream of
- Freedom from hum, noise and interference
- Tremendous headroom & reserves in input signal handling capability (+21dBv!)
- All input & output impedances are perfectly linear over full frequency range
- Sensors in the true balanced outputs automatically optimise performance with balanced, pseudo-balanced or unbalanced loads
- Outputs drive any type of load and long cables (>200m) with perfect reproduction and stability
- Zero overall feedback/feed-forward
- No matching problems with other electronics and cables
- Precision Balance- and Level controls are used; no stepped attenuators, relay-type or inferior sounding optical or digital or optical volume or balance controls
- Built-in stabilised low-impedance power supply
- 3-stage stabilisation plus individual stabilisation inside each module
- Discrete Class A tape send and return circuits guarantee superior recordings and optimal connection to auxiliary equipment like CD-R’s, DVD-R’s, tape machines etc.
- Transformer utilises a special dual shield that prevents stray fields
- Hand-selected and individually matched components of DIN, IEC & MIL standards
- Modular concept guarantees that the FM 245 does not become obsolete
Many requests have been received to combine the advantages of the FM 255 with those of the FM 155 and bridge the gap between the single-ended FM 155 and the true balanced FM 255 - two of FM ACOUSTICS most successful models.

We are happy to be able to announce the FM 245 Precision Preamplifier/Line Stage.

Not unattractively styled in full-width cabinetry it features the unique true balanced line stages of the FM 255 while the inputs are single-ended - as on the FM 155.

This combination is not "wrong" as some might contend. The large majority of so-called "balanced outputs" of source equipment such as converters, CD & DVD players, phono stages etc. are not true balanced. With 95% of these units the unbalanced outputs actually perform better than the balanced outputs. Therefore, it makes good sense to connect the sources to the FM 245 in single-ended mode and then use the unique balancing circuit of the FM 255 for optimal balancing and drive capability.

The true balanced outputs of the FM 245 use sensors that recognize which type of unit is connected and automatically adjust for optimal interfacing to the unit following the FM 245. This guarantees perfect interfacing to whatever type of amplifier or crossover is connected.

- The proprietary balanced output stages of the Resolution Series set an absolute standard. These magnificent circuits allow much higher accuracy of balanced signal transfer than other so-called “balanced” preamplifiers.

- All input impedances are absolutely linear over the full frequency range.

- The FM 245 can drive any load (even high capacitance loads) with perfect reproduction and absolute stability. Even capacitances of 100nF (corresponding to 1000m of quality cable) present no problem!

- The FM 245 works optimally with all types of input and output circuitry. With the FM 245 performance variations and matching problems are a thing of the past.

- The output has a drive capability of up to +29dB! This allows to run much higher signal levels and result in a better signal to noise ratio of the system.

- The truly balanced, supercoupling output have sensor circuits that automatically compensate for the differences between balanced and unbalanced loads. Every interface will be 100% correct. No rewiring or soldering is necessary to achieve correct interfacing, another feature unique to FM ACOUSTICS.

- All outputs are fully short-circuit proof.

- Tremendous reserves in headroom and output capability allow perfect interfacing to all professional, all semi-pro and all consumer equipment.

* True balancing requires much more than just the presence of two signal lines!

What so far has been called "balanced" preamplifiers have been units with simple op amp or op amp style input circuits. In such a configuration the non-inverting and inverting signal paths do not have the same electronics. The paths have different performance which in no way warrants the term "balanced". A balanced circuit must be totally symmetrical (identical electronics) and also be symmetrical in relation to ground and shield.

In the typical so-called "balanced output circuits" an inverting stage is added (a circuit that inverts the output signal of the unbalanced output by 180° and feeds it to a second signal line). As two conductors and a shield are now used to transfer the signal, the layman thinks that his system is now "balanced". This, however, is far from a true balanced signal transfer.

It is not difficult to detect these more primitive pseudo-balanced circuits. One of the tests; if the output impedance of the unbalanced output is lower than that of the balanced output, it is likely that a simple phase inversion circuit is being used. Whenever an output impedance rating reads something like “Balanced 600 Ohm, Unbalanced 300 Ohm”, the product is likely to just have a simple 180° phase inverter at the unbalanced output. This is a high performance symmetrical or "balanced" output and will not give the same performance. A simple phase inverter cannot provide a true balanced stage.
• The FM 245 easily passes the “pro float test”. Practically none of the usual *balanced circuits* used in other line stage/preamplifiers will pass this test, which is the professional real-world test for balanced interfaces.

• In the FM 245 absolutely no overall feedback or feedforward is employed. The Resolution Series® 245 uses FM ACOUSTICS’ ingenious true balanced enhanced Class A stages. Freedom from noise and interference, absolute stability and pristine signal handling are assured.

• A unique biasing system guarantees that the Resolution Series® 245 does not have any form of distortion or changing tonal characteristics when warming up. It reaches its operating temperature very quickly; there is no hour long warm-up required as is the case with other electronics.

• The phase inversion switch on the front panel performs precise 180° phase inversion of the main outputs. This is done without any additional circuitry. The signal does not enter an additional 180° phase inversion stage. “In-phase” and “out-of-phase” signal lines are absolutely identical. With this, every source signal can be reproduced in correct phase.

• There is not a single signal carrying wire in the FM 245. There are no unit to unit variations.

• Tape monitoring loop:

Most preamplifiers that have a tape loop have only a passive switching arrangement. This is not satisfactory because of the fact that tape machines CD-R’s, DVD-R’s and other equipment that use the tape monitoring loop differ largely in their input and output impedances and in the characteristics of their input and output circuits. This difference in loading results in inconsistent sound quality and gives a non-predictable reproduction.

To avoid such errors the Resolution Series® 245 uses discrete Class A buffer circuits that isolate the high level outputs from the following load. With this, consistent and pristine signal transfer is guaranteed whatever the load and whatever the source. Frequency non-linearities, distortion, compression, limiting and similar errors that occur in the usual tape monitoring arrangements are a thing of the past.

• Thanks to the built-in precision power supply, the FM 245 achieves exemplary noise and distortion performance that surpasses even that of today’s best professional equipment.

• The FM 245’s mechanically damped chassis effectively isolates sensitive electronic components from induced resonances. The chassis, side panels, cover, bottom, transformer mounting etc., are all damped and supported by special suspensions.

• The output level and balance controls are specially made for FM ACOUSTICS. They are precision laser trimmed and then additionally hand-selected on specially-built machines at FM ACOUSTICS. Ultra low-noise performance and superb tracking accuracy are the result.**

• The precision Output-Level and highest resolution "spread" Balance controls - another FM ACOUSTICS exclusive - are carefully isolated by proprietary Class A circuitry. This is not normally done and results in different characteristics of sound at different Volume or Balance settings.

• The super-wide balance control features a unique centering system. When the knob is turned ±45° from the center, the level adjustment range is within 1 dB. This way the rather phenomenal resolution of 0.02 dB in the center area is obtained! Thanks to this, any audio signal can be centered much more accurately than with the usual balance controls. At full turn, the level of the corresponding channel is fully attenuated. This is ideal for tests and checking purposes.

** Rather than switched (stepped) attenuators, VCA circuits, optical encoders or relay matrix, FM ACOUSTICS employs hand-selected precision potentiometers in the FM 245. With stepped attenuators the limit of resolution is determined by the individual steps. Music levels, however, do not come in steps but rather must be finely tunable to achieve realistic reproduction, especially so in high - accuracy equipment. Therefore, level and balance control’s must be continuously variable.

VCA (voltage controlled amplifiers) and the circuitry of optical encoders are well known to be detrimental to audio quality and therefore must be avoided. Multiple switched relays have the same limitations as stepped attenuators, in addition to having poorer long-term reliability (partly due to a massive additional electro-mechanical component count).

While not “fancy”, fine tuned precision potentiometers as used in the FM 245 give better results all around. They are the optimal choice.
Furthermore, the total gain of the FM 245 can also be adjusted inside the unit allowing an optimal range of Volume Level whatever the gain structure of the sources and load.

The Resolution Series® 245 employs proprietary control and protection circuitry that performs various tasks:

- Of course delayed switch on is incorporated. During switch on outputs are disengaged and the preamplifier checks itself. If everything is found to be perfect, the control circuitry frees the outputs. Within ten seconds of switch-on the preamplifier is fully operational.

- Another protection circuit safeguards the preamplifier against extreme over- and under-voltages. The FM 245 has superior reserves in overvoltage (140%), but a separate sensor also protects the unit and the equipment connected to it from extreme undervoltage that could result in non-optimal performance, transients or DC fluctuation.

The Resolution Series® 245 is the ultimate precision preamplification centre. It provides 4 unbalanced high-level inputs with a precision Class A tape monitoring loop and FM ACOUSTICS true balanced output.

The Resolution Series® 245 achieves a superb level of performance far ahead of its rivals. The techniques and the ingenious circuitry are proprietary to FM ACOUSTICS.

The FM 245 will not be subject to obsolescence. Thanks to its modular construction any future breakthrough can be readily incorporated. By simply replacing the corresponding module (a 20 minutes affair), it will be possible to keep the FM 245 at the forefront of technology and performance.

For applications where ultra-precise vinyl and shellac reproduction is required, the world renown Resolution Series 122 and 222 Phono Linearizers complement the FM 245. They come as separate, totally shielded units that are connected directly to the FM 245.

- Phenomenal signal to noise ratio, freedom of hum, noise and other non-audio signals are achieved. The FM 245 betters existing designs by 10 - 20 dB (that is up to 10 times better noise performance!). The phenomenal part is that this is achieved with an internal power supply.

- The transformer housing employs an additional super shield. Any kind of hum, noise, magnetic or electronic interference is properly rejected and eliminated by direct conduction to earth as the FM 245 demonstrates in an unparalleled manner.

- The huge advantage of internal power supplies is that there are much shorter distances between the power supply and the amplification stages. The corresponding impedances are lower than when power supplies in separate housings are used. Lower Impedance = higher accuracy & faster response.

- With usual arrangements, hum, interference, noise and stray fields can enter the audio path through the relays, the switches, the potentiometers etc. Not so in the FM 245. Special shielding techniques are used to avoid these problems.

- The FM 245 allows connection to any balanced or unbalanced equipment. All of the required interconnect cables and connectors such as RCA/Phono’s or XLR’s are available in the Precision Interface Technology® line. Cables with other types of connectors (such as Fischer/Camac, etc.) are available on special order basis.

- The Swiss-made, quad-contact, ultra high performance relays are hermetically sealed. Four specially coated contacts guarantee perfect operation, even after millions of switching cycles. Hermetrical sealing guarantees that environmental factors cannot have a negative effect on the contacts and therefore there is no degradation of sound quality or performance over time.

- Two of the inputs of the Resolution Series® 245 feature switchable additional 6 dB/10 dB attenuation. This is a nice feature when the level of preceding equipment is too excessive. This way the different output levels of source equipment can be adjusted so that the system provides optimal gain.
When choosing a product do not simply compare specifications sheets! Specifications are often misused, misunderstood, or utilised 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 show the differences and will permit to make the correct choice.

The guaranteed specifications indicate the absolutely unique standard of the FM 245 and show those performance aspects that can be measured. But words cannot describe the truly breathtaking difference between the FM 245 and the other preamplifiers. Only a controlled audition using the absolutely best associated equipment will reveal the facts.

All specifications are **guaranteed minimum figures** for every single FM 245 that leaves the factory.

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**Circuitry:**
Proprietary discrete, enhanced Class A circuitry using hand-selected super-speed semiconductors. These are individually analysed, selected and are then subjected to FM ACOUSTICS’ unique listening selection process. The FM 245 uses hand-calibrated enhanced Class A modules.

**Inputs:**
- 4 unbalanced HIGH LEVEL inputs.
- 1 precision Class A TAPE/ACCESSORIES loop.

**Input features:**
- High level, earth-free unbalanced discrete Class A circuitry.

**Input impedance:**
50 kOhm, linear over full frequency range

**Input Headroom:**
+21 dBv (9V RMS)

**Input Sensitivity:**
100 mV for 100 mV out at tape output

**Max. Gain:**
- Any Input to Tape output: 0 dB.
- Any Input to Main output: 20 dB.

**Frequency response:**
20 Hz - 20 kHz +/- 0.03 db

**Bandwidth:**
- Without RF filter: 1 Hz - 2 MHz
- With internal RF filter: 1 Hz - 100 kHz
The actual frequency response of the preamplifier, however, is intentionally attenuated above 100 kHz with a linear-phase anti-RF circuit. For special application this can be bypassed.

**Step response:**
Perfect without any overshoot or ringing

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**Phase accuracy:**
Without RF filter: better than -0° / +1° over full frequency range from 20 Hz - 20 kHz

**Resolution of Output Level Control:**
Better than 0.02 dB

**Center Resolution of Balance Control:**
Better than 0.02 dB

** Rise time:**
300 nanoseconds = 0,3 uSec.
(capability of electronics, measured without RF filter)

**Fall time:**
300 nanoseconds = 0,3 uSec.
(capability of electronics, measured without RF filter)

**Hum and Noise:**
- Below full output: >120 dB, 20 Hz - 20 kHz
- Below 0 dBv: > 95 dBV

**Output:**
Fully symmetrical, true balanced, discrete Class A circuitry. Drives any balanced or unbalanced load. Sensors automatically adjust output to optimal performance whatever type the connected equipment.
Short-circuit proof, the unit perfectly passes the true balanced "pro float test".

**Maximum output level:**
+28 dBv (19,5 V RMS) into 4,7 kOhm balanced load

**Recommended load Impedance:**
600 Ohm

**Stereo separation:**
Better than 85 dB

**Channel separation:**
Better than 95 dB
Harmonic Distortion:
Over full frequency range 0.003% at 3V out. No higher order harmonics at all (up to clipping level).

Connectors:
Inputs: precision RCA-Phono recetables
Outputs: balanced male XLR 3-pin or unbalanced, automatically optimizing connection
Pin 1: ground
Pin 2: (return) cold
Pin 3: (signal) hot

Spare parts availability:
Min. 10 years; Guaranteed ex stock availability of 99.8% of all parts.

Dimensions:
446 mm wide / 44 mm high / 280 mm deep

Weight:
6 kg net / 8 kg packed

Applications:
Reference preamplifier/control center for recording studios, mastering studios, highest Class home audio systems, laboratory, institutional and a variety of other professional applications.

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

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"You've never heard it so good"

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