

# *ClassAmp*<sup>®</sup> M-1

TOTALLY UNIQUE AMONG MICROPHONE PREAMPLIFIERS  
REVOLUTIONARY IN DESIGN, UNEXCELLED IN PERFORMANCE

An exciting departure from conventional methods in microphone preamplifier design which allows for a full realization of the microphone's potential.

- Greatly improved signal transmission from microphone/transducer to mixer or recorder
- Extracts the optimal characteristics of the microphone/transducer
- Elimination of cable losses between microphone and preamp stages
- Proprietary design utilizing enhanced Class A circuits
- Fully discrete circuitry
- Wide impedance selection guarantees optimal performance with any mic / transducer.
- Switch-selectable gain range between 0 and 72 dB with high resolution "Gain trim" control
- Absolute stability at any gain setting
- Ultra-high linearity guarantees purest preamplification.
- Unmatched symmetrical balancing of signal lines; CMRR (common mode rejection ratio): 100dB(!) over full frequency range
- Entirely crafted with hand-matched and listener-selected semiconductors.
- Superb RF rejection
- Input protection against dangerous transients
- Extremely high headroom (+26dB)
- Ultra wide bandwidth
- Switchable low-cut LF filter
- Special MIL-type RF-shielded case
- Totally transparent. No transformers, IC's, monolithic or discrete op-amp circuitry or hybrid circuits
- *ClassAmp*<sup>®</sup> M-1 stably drives longest cables (hundreds of meters) and highest capacitance.
- Immune to cable loading effects and loading induced by the following stages
- Max. output level capability of more than 27dBu; +26dB output into 600Ω in pure Class A mode!
- 180° polarity inversion switch (perfect phase inversion without any additional circuitry)
- Instant output muting protects against accidental power supply disconnection or mains dropout
- Close mounting direct to microphone stand allows extremely short cables between microphone and *ClassAmp*<sup>®</sup> M-1.
- Separate RF-shielded power supply can power 2 *ClassAmp*<sup>®</sup> M-1's.
- Precision stabilized phantom supply for optimal performance with all microphones; "better phantom supply = better sound"
- Specially shielded power supply cable with separate conductor for phantom voltage
- Switchable phantom voltage (12V / 48V); 12V Tonaderspeisung also possible
- Each *ClassAmp*<sup>®</sup> M-1 undergoes a 100h burn-in test and a 50000 cycle vibration test.

Microphone preamplifiers can be made with one op amp (and sometimes a couple of transistors) costing a few dollars. This is what is found in 99% of the mixing desks and many of the usual outboard microphone preamps. It is far from satisfactory.

The weak link in the microphone chain is the preamplifier. In spite of electronic advances, the microphone preamplifier remains woefully lacking. Almost all of them are made up of an op-amp and a couple of transistors sometimes even with an input transformer. Their quality is far from satisfactory, yet they are found in almost all of today's mixing desks and outboard preamplifiers.

In order to achieve a breakthrough in microphone preamplification, FM ACOUSTICS decided to follow an entirely different approach.

First it was clear that a sophisticated, truly no-compromise circuit was needed. The development of totally discrete, balanced circuits based on FM ACOUSTICS' proprietary enhanced Class A technology took almost four years.

The result is the most natural and accurate sounding pre-amplifier available. Even with the best microphones a clear difference can be heard in clarity, definition and dynamic contrast.

To further develop the concept, it was decided to locate the preamplifier directly adjacent to the microphone rather than in a 19" rack or mixing desk far away. This results in much cleaner high level signal transfer, better RF rejection and elimination of cable loss. By essentially rendering the system immune to interference hum and noise, a dramatic improvement in transparency and definition is achieved.

However, the *ClassAmp*® M-1 excels in other areas. Read on:



## *Producer's Set:*

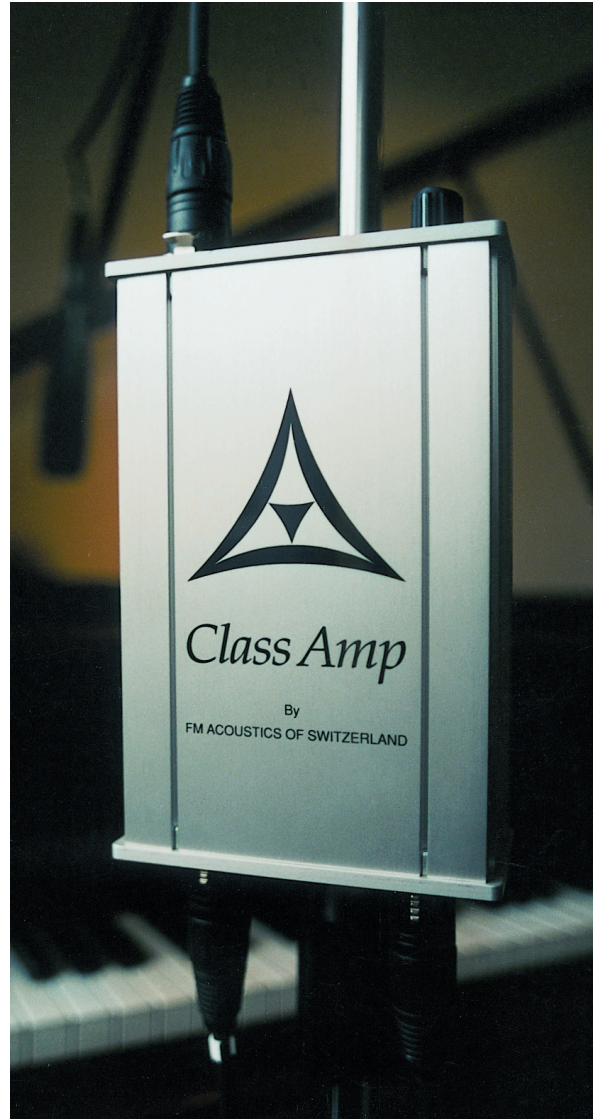
Consists of two *ClassAmp*® M-1, one double power supply, one additional power supply cable in flight case.

# Characteristics of the *ClassAmp*<sup>®</sup> M-1

- Ultra low noise with a balanced noise distribution results in quiet, ultra-linear pre-amplification with superior signal-to-noise performance (all semiconductors are selected via a FM ACOUSTICS' exclusive listening-test selection).
- The *ClassAmp*<sup>®</sup> M-1 is free from the low frequency noise and DC offset which are present in other preamplifiers. This allows wideband phase-coherent signal pre-amplification without requirement for filtering low frequencies.
- Selectable gain in 12 steps from 0 to 66 dB with an additional "gain trim" vernier control allowing fine adjustment between 0 and 6dB gain.
- Ultra fast, discrete enhanced Class A circuitry in every stage of the *ClassAmp*<sup>®</sup> M-1.
- XLR input connector allows connection of balanced as well as unbalanced microphones and transducers. Unbalanced sources are automatically balanced right at the input.
- The *ClassAmp*<sup>®</sup> M-1 has a switchable LF filter. At 10 Hz the attenuation reaches -26 dB. If required, this filter can be modified internally to other frequencies or slopes. (see Fig. 3)
- The *ClassAmp*<sup>®</sup> M-1 excels in the capabilities of its output capability into real world loads; the output can perfectly drive loads (even highly capacitive and/or inductive loads) without change in performance! In practice this means that neither longest cable runs nor high capacitance cables can have a negative influence on the *ClassAmp*<sup>®</sup> M-1's performance.

With decent microphone cable, lengths of hundred meters are no problem and this with absolutely superb interference rejection, and at levels of up to +28 dB of undistorted signal output! This allows higher signal levels to be transferred down the cables, with corresponding massive improvements in signal-to-noise ratio, immunity to interference, better balancing, etc. This is a standard of balancing previously unheard of.

- The *ClassAmp*<sup>®</sup> M-1 uses FM ACOUSTICS' proprietary enhanced Class A output buffer stage.



- A 180° polarity inversion switch allows for a quick remedy of polarity problems, without the need for any additional circuitry. Unlike typical "pseudo balanced" designs both in-phase and out-of-phase signals pass precisely the same electronic circuitry. Performance variations are impossible.

- Typical electronically balanced inputs are not truly balanced, with the inverting and non-inverting paths not having identical impedances and not employing exactly the same electronics.\* The *ClassAmp*® M-1's unique circuitry avoids the disadvantages of transformer-coupled equipment (phase errors, distortion, bandwidth limitation, saturation, see Fig. 1)
- To guarantee extremely low hum and noise, the *ClassAmp*® M-1 has a shielded, heavy duty out-board power supply. A special cable leads the various supply and phantom voltages to the *ClassAmp*® M-1. The self-locking connector prevents accidental disconnection.
- The power supply's output voltages remain absolutely stable even with varying mains voltages. Large reserve margins guarantee absolute safety with both under- and overvoltage (no instability or potentially dangerous DC fluctuations).
- "Better phantom supply = better sound".\*\* The phantom supply, switchable between 12V and 48V, uses individual stabilizers and allows the most demanding microphones to be supplied with plenty of reserve. Thanks to this, optimal microphone performance is guaranteed.
- Only one power supply is required to power two *ClassAmp*® M-1's and to supply the respective phantom power for the microphones.
- The *ClassAmp*® M-1 can also supply 12V "Tonaderspeisung".
- A "PHANTOM" LED is located on the frontpanel.
- A fast acting "PEAK" LED with precision peak and hold detector circuitry is located on the frontpanel.
- The *ClassAmp*® M-1 finds applications in any situation where signals from microphones or transducers must be pristinely amplified with guaranteed results. This includes applications in recording studios, remote recording, film recording, critical live performances, broadcasting, stage pre-amplification, etc. It is ideal to record highest quality samples for use in sampling keyboards and workstations. It pristinely amplifies signals of electro-acoustic transducers.
- Specially enticing is the use of the *ClassAmp*® M-1 for highest quality preamplification of musical instruments, such as keyboards, bass, etc. It provides a quality unmatched by any other method of preamplification.
- The *ClassAmp*® M-1 is the ultimate precision line driver, as it operates stably even at 0dB gain and guarantees an unprecedented headroom of +26dB.
- Adding a *ClassAmp*® M-1 at the output of an existing mixer, a keyboard or other units that typically have mediocre drive stages guarantees proper balancing and perfect signal transfer over long distances. The resulting improvements are amazing.
- The *ClassAmp*® M-1 can also be used in various industrial applications where highest-accuracy lowest noise signal pre-amplification is required.

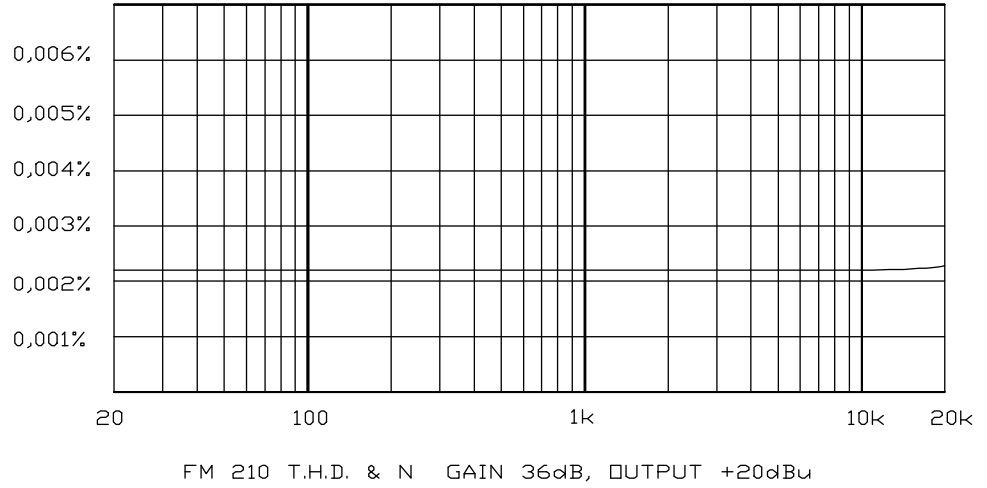
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\*One must appreciate the fact that the typical so called "balanced" outputs are not truly balanced at all. All that is done in so-called "balanced" output circuits is that an inverting stage is added (a circuit that inverts the output signal by 180° and feeds it to a second signal line). It is actually not so difficult to detect these pseudo-balancing circuits. If the output impedance of the unbalanced output is lower than that of the balanced output, it is likely that a primitive phase inversion circuit is being used. Whenever an output impedance rating reads something like "Balanced 600 Ohms, Unbalanced 300 Ohms", the product likely just has a simple 180° phase inverter added to the unbalanced output. This is not a high performance symmetrical or "balanced" output and will not give the same performance. In order to attain a truly balanced stage, much better balancing than a primitive phase inverter can provide is required.

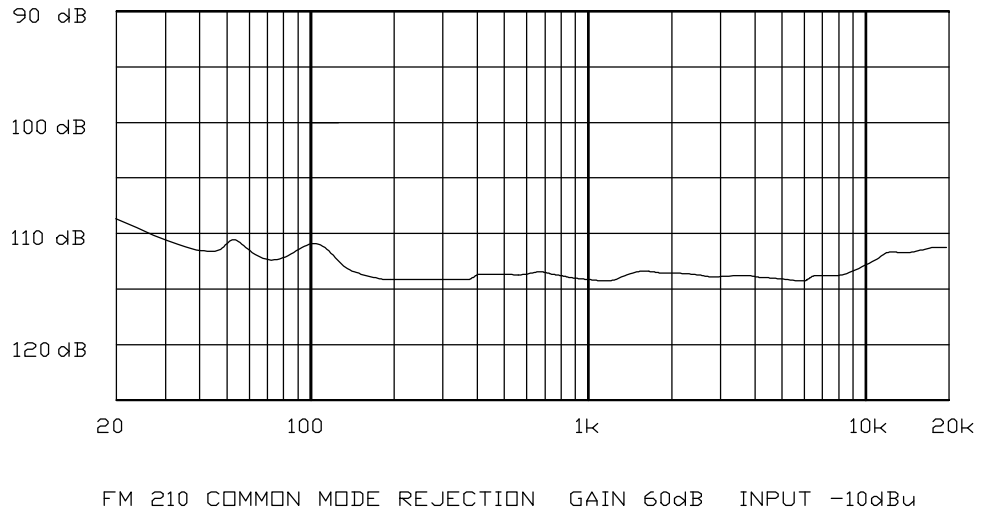
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\*\*Because of the general simplicity of the principle, it is very often assumed that all phantom powering is the same. It is not. The way the microphone is supplied with phantom voltage, the maximum continuous and peak current capability of the phantom line, the smoothing capability and the stability of the phantom voltage with varying mains voltages are all factors that are of high importance to the performance of microphones. In the *ClassAmp*® M-1 the phantom supply is optimized in every detail so all microphones are operating optimally.

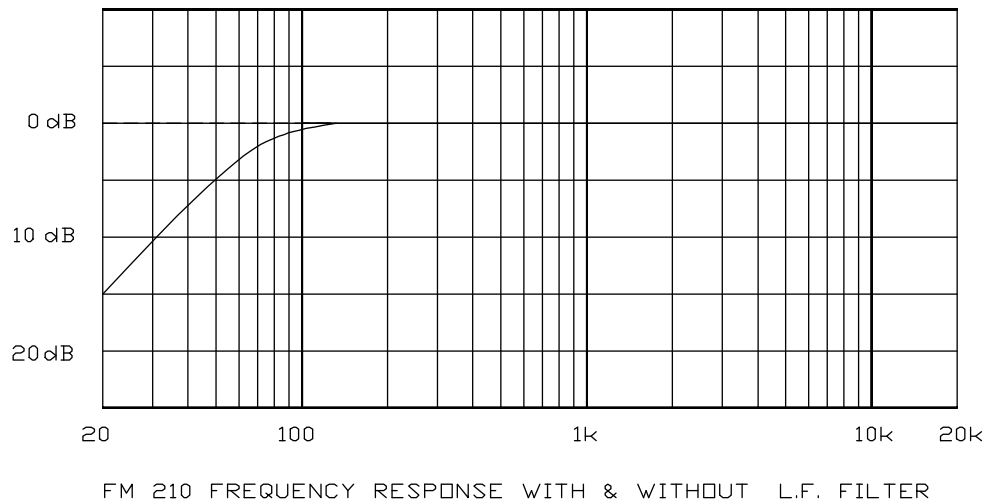
**Fig. 1:**  
Total harmonic distortion  
at +20 dB out



**Fig. 2:**  
Input CMRR  
(Common Mode Rejection)



**Fig. 3:**  
Frequency response  
with LF-Filter in



# Specifications *ClassAmp*<sup>®</sup> M-1

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 most carefully controlled listening tests, will show the differences and permit you to make the correct choice.

The **guaranteed** specifications below indicate the absolutely unique standard of this preamplifier and show those performance aspects that can be measured. Words cannot describe the truly breathtaking difference in musical accuracy between the *ClassAmp*<sup>®</sup> M-1 and other microphone preamplifiers. Only a controlled audition using the absolutely best associated equipment will reveal these facts. All specifications are guaranteed minimum figures for every single *ClassAmp*<sup>®</sup> M-1 that leaves the factory.

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<b>Circuitry:</b>	Proprietary, highest purity, discrete, enhanced Class A circuitry using hand-selected, super-speed semi-conductors. These are individually analysed, selected and then subjected to FM ACOUSTICS' unique listening selection process.	<b>Rise &amp; fall time:</b>	0,5 uSec.
<b>Input features:</b>	Symmetrical, electronically balanced discrete Class A circuitry, non-polarized, non-inverting or inverting connection possible; gives perfect results with any balanced or unbalanced source. Unbalanced sources are automatically balanced right at the input.	<b>Equivalent Input Noise:</b>	better than -137dBV, true RMS, 22Hz - 22kHz (Input shorted) better than -131dBV, true RMS, (Input loaded with 150Ohm)
<b>CMRR Input common mode rejection:</b>	10 Hz - 20 kHz: (see Fig. 2) better than 90 dB	<b>Output:</b>	Electronically symmetrical, balanced, discrete Class A, ultra stable circuitry. Can drive any load even if connected with hundreds of meters of quality cable.
<b>Input impedance:</b>	Continuously variable between 500ohm and 1kOhm; absolutely linear over full frequency band.	<b>Maximum Output Level:</b>	+28 dBu (19.5V <sup>RMS</sup> into 4,7kW) balanced load  +26 dBm (15.5V <sup>RMS</sup> into 600W) in pure Class A operation
<b>Headroom:</b>	+26 dBu (15.5V <sup>rms</sup> ) at 0 dB gain	<b>Distortion:</b>	At +22 dBu, 30 dB gain: 0.003% At +22 dBu, 60 dB gain: 0.006% Up to clipping level no high order harmonics at all
<b>Gain:</b>	Switchable in 6 dB steps from 0 to 66dB. Gain trim potmeter allows fine tuning of gain between the 6dB steps. Max. gain is 72dB. <i>ClassAmp</i> <sup>®</sup> M-1 remains absolutely stable at any gain setting.	<b>Phantom Power:</b>	Switchable, 48V or 12V, Tonaderspeisung also possible
<b>Bandwidth:</b>	1Hz-200kHz, 20Hz-20kHz± 0.04dB	<b>Low Cut Filter:</b>	factory set to -3dB at 55 Hz -15,5 dB attenuation at 20 Hz -26dB attenuation at 10 Hz; other filter characteristics and frequencies available on special order
<b>Phase accuracy:</b>	at 20 Hz: <1°, at 20 kHz: <4°	<b>Peak Indicator:</b>	Full wave rectified, factory set at +22 dBu attack time: 0,5 mSec.
<b>Step response:</b>	Perfect with no overshoot or ringing (see Fig. 4)	<b>Mains Voltage:</b>	Switchable on separate power supply=115V/230V, 50-60 Hz
<b>Overshoot:</b>	None (see Fig. 4)	<b>Mains Overvoltage:</b>	Max. short-term: 150% V <sup>nominal</sup> Max. long-term: 130% V <sup>nominal</sup>

**Mains Undervoltage:** 80%  $V^{nom}$  before output muting protection circuitry activates. Stable operation within a voltage range of:  
95 V - 140 V (in 115 V setting)  
190 V - 280 V (in 230 V setting)

**Power consumption:** 12 W continuous

**Operating temperature:** -20°C to +40°C

**Operating humidity:** Long term:0-85% non condensing  
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** 38 years (at 25°C ambient, 10h per day, 365 days per year)

**Frontpanel:** 4mm, brushed and hand-polished aluminium, letters anodized so they can never wear off, precision input resistance loading control. Precision, self-cleaning, long-life gain switch; "Gain trim" control. "Power on" indicator, "Peak" indicator, "Phantom power" indicator XLR input connector.

**Backpanel:** 4mm, brushed and hand-polished aluminium, lettering anodized so it can never wear off. Polarity switch, L.F. filter switch, Phantom on-off/ 12V/48V switch.

Power supply input and signal output connectors are precision, XLR connectors. To avoid ground-loops earth is lifted from chassis.

**Connectors:**

**INPUT:** female XLR 3-pin

Pin 1: ground  
Pin 2: signal  
Pin 3: signal

**OUTPUT:** male XLR 3-pin

Pin1: ground  
Pin2: signal  
Pin3: signal

**Spare parts availability:** Minimum 10 years; guaranteed availability of 99% of all parts ex stock.

**Dimensions:** *ClassAmp*<sup>®</sup> M-1= 170x105x50mm  
Power Supply = 125x105x50mm

**Weight:** *ClassAmp*<sup>®</sup> M-1 = 0.8 kg  
Power Supply = 1.3 kg

**Power supply cables:** Various lengths of power supply cables are available:  
ACC-22083 (2 m)  
ACC-22084 (5 m)  
ACC-22085 (10 m)  
Any other lengths can be manufactured on order.

**Applications:** For recording studios, remote and film recording, laboratory, live performances, broadcasting, stage pre-amplification and precision microphone amplification for samplers and musical instruments; for institutional and a variety of other professional and industrial applications.

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

IEC 68 = 55/155/56	DIN384-4	MIL-R-STD 202
IEC 68 = 55/085/21	DIN 40040	method 101, 103,
IEC 144/IP 65	DIN 40046	106, 204, 213, 301
IEC 40/100/56	DIN 40050 P 54	MIL-R-11804/2B/G
IEC 115-1	DIN 41332 Type II	MIL-R-22684
IEC 384-4	DIN 44061	MIL-R-22097
IEC 384-9	DIN 44112	MIL-R-45204 Type 2
IEC 384-8 IB	DIN 44356	MIL-R-10509
IEC 68: 2-6	DIN 45910 Part 1201	MIL-R-23285
IEC 68: 55/085/56	DIN 45921-107	MIL-R-55182
IEC 68: 55/200/56		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"*



**FM ACOUSTICS LTD.**  
CH-8132 Egg  
Switzerland  
[www.fm-acoustics.com](http://www.fm-acoustics.com)