



## 1973 - 1993: 20 YEARS OF PRECISION FM ACOUSTICS NEWS

Volume 5, Autumn 1993

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### 20 years and in great shape!

We are happy to report this anniversary but will not bore you with a long history or boasting about achievements during these 20 years. The reputation for the world's finest precision audio electronics speaks for itself. Precision for those who only accept the absolute best is what has made our reputation and this is what we will continue to provide. There will be no succumbing to cost or marketing considerations.

While many companies have had to reorganize because of a sluggish economy, FM ACOUSTICS is fortunate to report a turnover increase of 37%. But rather than distributing profits to shareholders and rest on one's laurels, it was decided to continue investments in the company. R & D was intensified even further with the result of rather exciting developments that have just been, or are about to be completed. **Continued on Page 2**



*The brand-new ClassAmp® M-1, an exciting departure from conventional methods in microphone preamplifier design which allows for a full realization of the microphone's potential. Further details on page 2-5.*

**Continued from Page 1:**

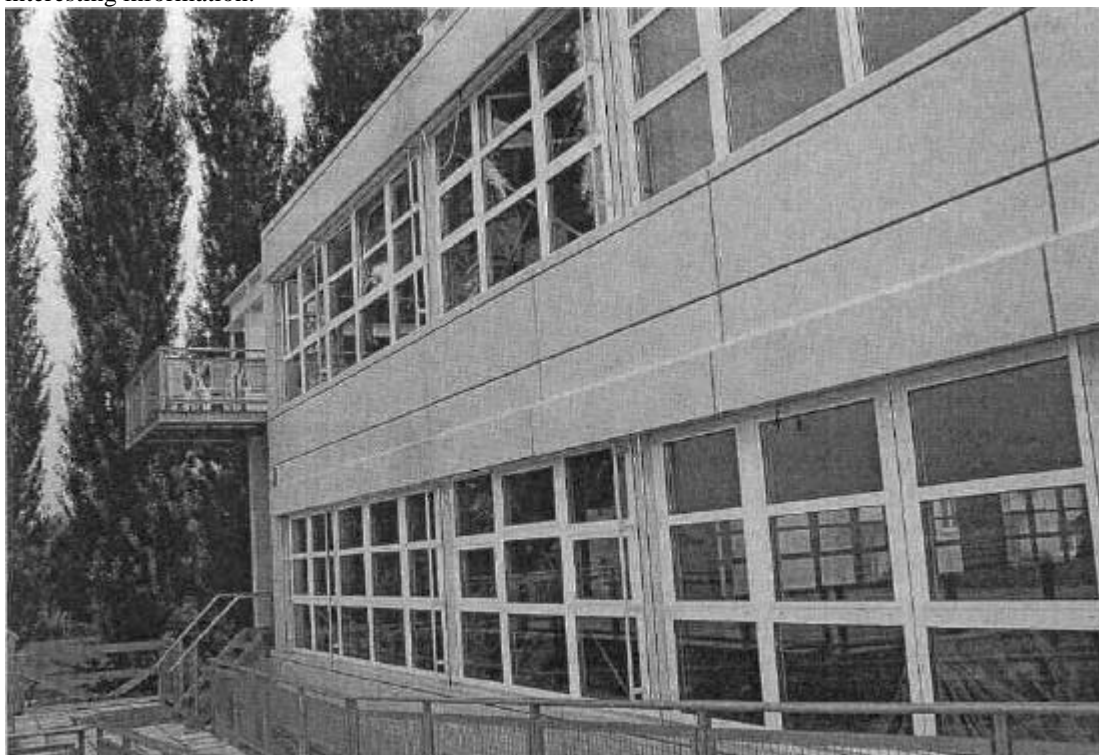
### Professionals

may want to read the information on page 38. The -ClassAmp® M-1 addresses in an innovative and efficient way all problem areas of microphone preamplifier. It provides a naturalness of signal preamplification that is breathtaking.

### Music lovers

may want to turn to page 9. In between there is other interesting information.

As reported in the last FM ACOUSTICS NEWS we have moved to Horgen, only 15 minutes south of Zurich. With the increased activity it was time to move to larger and more convenient premises, as we had clearly outgrown the Wädenswil location. The new purpose designed factory is located in a new building right on the shores of lake Zurich. The peaceful surroundings are optimal for the creativity and accuracy that is expected from the staff of FM ACOUSTICS.



*FM ACOUSTICS' new headquarters on the shores of lake Zurich*

In a time when more and more manufacturing is transferred to countries offering cheap labour (sometimes approaching the level of slave labour...) FM ACOUSTICS is going directly opposite the trend by concentrating all manufacturing in its headquarters in Switzerland. While others are subcontracting most of their assemblies, FM ACOUSTICS is moving in the opposite direction. With the exception of metal parts, for which we have very reliable suppliers that have worked for us for 15 years, all manufacturing is done **in house**. The advantages of in house production are many: absolute integration of selection, production, development, intermediate and final assembly; instant problem recognition and optimal communication.

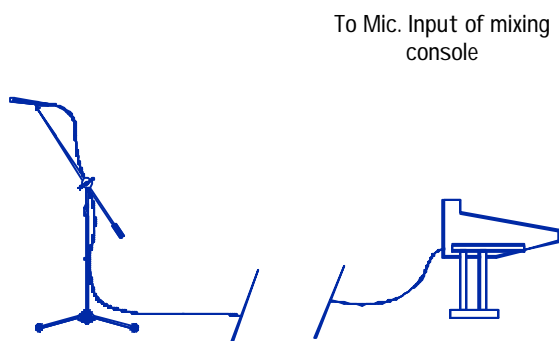
For a product that is made by hand in house production has only one disadvantage: it is costlier. "Lean" and "Just in time" production methods are currently fashionable but they do not lend themselves to crafting truly outstanding products. These production philosophies were developed to minimize capital requirements and to maximize profits. They cannot provide the craftsman with much satisfaction. The consequence is lower motivation and less dedication, not really the basis for the creation of outstanding products. Furthermore, such methods require very short term planning increasing stress which clearly leads to more errors. Neither "Lean" nor "Just in time" production are found with companies known for the excellence of their products.

# NEWS FOR PROFESSIONALS

## The *ClassAmp*<sup>®</sup> M-1

- ◆ Extracts the best characteristics of the microphone/transducer.
- ◆ Clamp mounting to microphone stand allows extremely short cables between microphone and *ClassAmp* M-1 (1-2 feet)
- ◆ Proprietary design utilizing **FM ACOUSTICS** enhanced Class A circuits.
- ◆ Greatly improved signal transmission from microphone/transducer to mixer or recorder
- ◆ Fully discrete circuitry.
- ◆ No transformers, IC's, monolithic or discrete op-amp circuitry nor hybrid circuits.
- ◆ Elimination of cable losses between microphone and preamplification stages.
- ◆ Wide impedance selection guarantees optimal performance with any microphone.
- ◆ Truly ultra low noise: < -131dBv equivalent input noise
- ◆ Gain range between 0dB (stable) and 72dB.
- ◆ Ultra-high linearity guarantees purest pre-amplification.
- ◆ Unmatched symmetrical balancing of signal lines; CMRR = 100dB(!)
- ◆ Entirely crafted with hand-matched and listener-selected semiconductors.
- ◆ Extremely high headroom reserve (+26dB)!
- ◆ Ultra-wide bandwidth, superb reproduction.
- ◆ Totally immune to loading induced by the following stages.
- ◆ *ClassAmp*<sup>®</sup> M-1 perfectly drives extremely long cables (hundreds of meters!).
- ◆ Max. undistorted output level > +27dBu.
- ◆ Instant output muting protection.
- ◆ Heavy-duty MIL-type RF-shielded case.

In spite of today's technological advances, the microphone preamplifier remains the weak link in the microphone chain. Almost all of them are made up of op-amps and a couple of transistors sometimes incorporating an input transformer. Such circuits are far from satisfactory, yet are found in most of today's mixing desks and outboard preamplifiers. The new concept of preamplification addresses for the first time the major limitations inherent in preamplification. Its unique features bypass the basic limitations in microphone and transducer preamplifiers. In order to achieve these breakthrough advances, FM ACOUSTICS decided to follow an entirely different approach. The development of totally discrete, balanced circuits based on FM ACOUSTICS' proprietary enhanced Class A technology took almost four years. The result of this research makes possible the **most natural** sound transfer available in the industry. It really is astounding how important the mic preamplifier really is. Only when comparing to the *ClassAmp*<sup>®</sup> M-1 does one realize how much signal purity, clarity, definition and dynamic contrast is lost in the existing designs. The difference is very audible. To further develop the concept, the *ClassAmp*<sup>®</sup> M-1 can be located directly adjacent to the microphone rather than in a remote 19" rack or mixing a desk. This allows drastically shorter cable length between the microphone (or transducer) and the preamplifier. Results: cleaner high level signal transfer, better RF rejection and elimination of cable loss. By essentially rendering the system immune to cable length, interference, hum and noise, a dramatic improvement in transparency and definition is achieved. The *ClassAmp*<sup>®</sup> M-1 excels in other areas. See Page 4.



Low level signal from microphone is sensitive to cable length, capacitive loading, line disturbances, noise, RF etc.

*Conventional preamplification of microphones*

*ClassAmp*<sup>®</sup> M-1 precision mic preamplifier incorporating high level Class A line driver featuring very high CMRR

Direct to recorder or to line input of mixing console



Balanced and buffered line level signal virtually unaffected by cable length, capacitance, hum, noise, other disturbances or non-audio signals

*Precision microphone preamplification using ClassAmp<sup>®</sup> M-1*

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

✱ Gain selectable in 12 steps from 0 to 66dB with an additional high resolution "gain trim" vernier control allowing fine adjustment between 0 and 6dB gain. Total gain available: 72dB (4000).

✱ The *ClassAmp*<sup>®</sup> M-1 is free from the low frequency noise and PC offset signals which are quite commonly found in preamplifiers. While often not fully appreciated such signals can have a negative influence on performance. The *ClassAmp*<sup>®</sup> M-1 "guarantees phase coherent signal preamplification without the requirement for filtering low frequencies.

✱ Ultra accurate, phase coherent discrete Class A circuitry is employed in every single stage of the *Class-Amp*<sup>®</sup> M-1.

✱ All semiconductors are selected by hand and via an exclusive listening-test selection procedure.

✱ The power supply voltages remain absolutely stable even with strongly fluctuating mains voltages. large reserve margins and under- and overvoltage detector circuits guarantee positive safety. There is absolutely no instability or potentially dangerous DC fluctuations.

✱ The *ClassAmp*<sup>®</sup> M-1 excels in its output capability into real world loads: the output can perfectly drive the most extreme loads (even highly capacitive and/or inductive) without change in performance. A capacitance of several 100'000 pF(!) is no problem. This means that neither longest cable runs nor high capacitance cables can have any negative influence on the *ClassAmp*<sup>®</sup> M-1's performance.

✱ With decent finality microphone cable, lengths of many hundred meters can be driven with absolutely superb interference rejection even at "The *ClassAmp*<sup>®</sup> M-1 came out a clear winner. Everybody who used levels of up to +2&dBu! This allows much higher signal levels to be transferred with corresponding improvements in signal-to-noise ratio, better immunity to interference, better balancing, etc. This is a standard of balancing previously unheard of,

✱ To guarantee extremely low hum and noise, the *ClassAmp*<sup>®</sup> M-1 has a shielded heavy duty power supply. A special double shielded cable brings the supply and phantom voltages to the *ClassAmp*<sup>®</sup> M-1. The self-locking 4-pin XLR connector prevents accidental disconnection.

✱ Specially enticing is the use of the *ClassAmp*<sup>®</sup> M-1 for preamplification of musical instruments, such as keyboards, bass, etc. It provides a quality unmatched by any other method of preamplification. It is the optimum for amplifying signals of electroacoustic transducers.

✱ The *ClassAmp*<sup>®</sup> M-1 finds applications in any situation where signals from microphones must be amplified with optimal results. This includes applications in recording studios, remote and film recording, critical live performances, broadcasting, demanding stage preamplification, etc. It is the ideal preamplifier for recording samples for quality workstations/keyboards,

✱ The *ClassAmp*<sup>®</sup> M-1 is THE non-plus-ultra line driver, as it operates stably even at 0dB gain and guarantees an unprecedented headroom of +26dB (most preamplifiers do not operate stably at 0dB gain nor can they guarantee anywhere near such headroom reserves!).

The *ClassAmp*<sup>®</sup> M-1 can also be used in various industrial applications where highest accuracy lowest noise signal preamplification is required. Contact the factory for special requirements.

*Technical excellence is obvious. The difference of its discrete enhanced Class A circuits, however, is most apparent in an actual recording situation.*

Price?

As can be expected the *ClassAmp*<sup>®</sup> M-1 is not "cheap" but considering the extent of improvements in recordings it provides it will have paid for itself after a few recording sessions. Thereafter one is rewarded with constant savings and impeccable recordings.

*"The ClassAmp<sup>®</sup> M-1 came out a clear winner. Everybody who used it agreed. We compared it with well-known tube pre-amps. We compared it with the famous British, American, and Australian mic pre's. It outperformed all in clarity, presence (musicality) and noise floor. It has a nice forward (in the positive sense) and rich sound. It clearly made another famous preamp very thin sounding. The tube stuff was a bit foggy and noisy compared to it. In fact, what people are looking for when they ask for a rich tube sound is exactly how the ClassAmp<sup>®</sup> M-1 sounded, with obviously less noise, distortion and, more importantly, no compression. Dynamic range is impressive, especially on snare or bass drums."*

*Andre Perreault, Hollywood Digital, USA*

## ☛ FREE 3-DAY LOAN!

of a pair of *ClassAmp*<sup>®</sup> M-T for registered professional users? If you would like to hear for yourself what the *ClassAmp*<sup>®</sup> M-1 can do for your recordings contact FM ACOUSTICS for details on the loan conditions. Please understand that there may be some time before you can be accommodated with the *ClassAmp*<sup>®</sup> "loaners" as they are quite heavily booked. If you foresee an interesting project where you would like to try them contact us well in advance.

Acclaimed engineer **Tom Jung** of **DMP**, Stamford, Connecticut, has been making extensive use of the new *ClassAmp*<sup>®</sup> M-1 microphone preamplifier.

With specifications such as equivalent input noise of -131dBv (true RMS 20Hz-20kHz, 150Ω), a headroom of +26dB(!), CMMR of 100dB etc., technical excellence is obvious. The real difference that FM ACOUSTICS' discrete enhanced Class A circuitry makes, however, manifests itself best in actual recording situations. Tom Jung kindly supplied the following information on his choice of microphones in recent productions-

*"Much to my surprise the ClassAmp's<sup>®</sup> have been used on nine DMP recordings to date with the tenth starting next week. The ClassAmp's have been used on many different microphones and in all cases performed better than any preamp I have ever used."*

Tom Jung, DMP, Stamford, Ct. U.S.A.

**JUNKYARD:** David Charles & David Friedman  
ClassAmp<sup>®</sup> M-1 on vocals, vibes and marimba using Sony 800 tube microphone, ClassAmp<sup>®</sup> M-1 on acoustic guitars using a Share SM-80.

**CHITLINS PARMIGIANA:** Vivino Brothers

*ClassAmp*<sup>®</sup> M-1 with Sony 800 tube mic for trumpet, flugelhorn, soprano and tenor saxophones; Hammond B-3: *ClassAmp*<sup>®</sup> M-1 used with a Neumann U-87.

**DEPARTURE:**

Bob Mintzer Big Band  
5 trumpets, 4 trombones, and 5 saxophones all recorded with a Blumlein pair of Beyer M-380 moving coil microphones driving 2 *ClassAmp*<sup>®</sup> M-1's.

**MEDITERRANEAN:**

Chuck Loeb  
Alto tenor and soprano saxophones, flute, piccolo recorded with *ClassAmp*<sup>®</sup> M-1/Sony 800 tube combination; acoustic guitars: 2 *ClassAmp*<sup>®</sup> M-1's with Share SM-80's; violin & vocals: *ClassAmp*<sup>®</sup> M-1's with custom modified Share SM-81'g.

"The list of instruments and microphones would actually be longer but I only have two Class Amps<sup>®</sup>, and much of what we record is live."

List to be continued in next FM ACOUSTICS NEWS.

*"I compared the classman M-1 directly with the other preamplifiers that we own. Attentive listening shows that in both extremes of the frequency range the signal from the classamp<sup>®</sup> M-1 is much more defined. It also is dynamically clearly more precise especially in the reproduction of difficult musical passages. This stays so from pianissimo to fortissimo. The bass frequencies are very stable and controlled, especially notable when the unit was used as a DI box for musical instruments. This showed the full extent of the improvement in definition without resulting in compression or otherwise negative influence on the signal. I had the chance to try the preamplifier with numerous microphones, and the result was always a more extended less "middy" response. Even with the Schleps microphones, which are putting many mic-pre's in crisis, the ClassAmp<sup>®</sup> M-1 gives the absolute best results."*

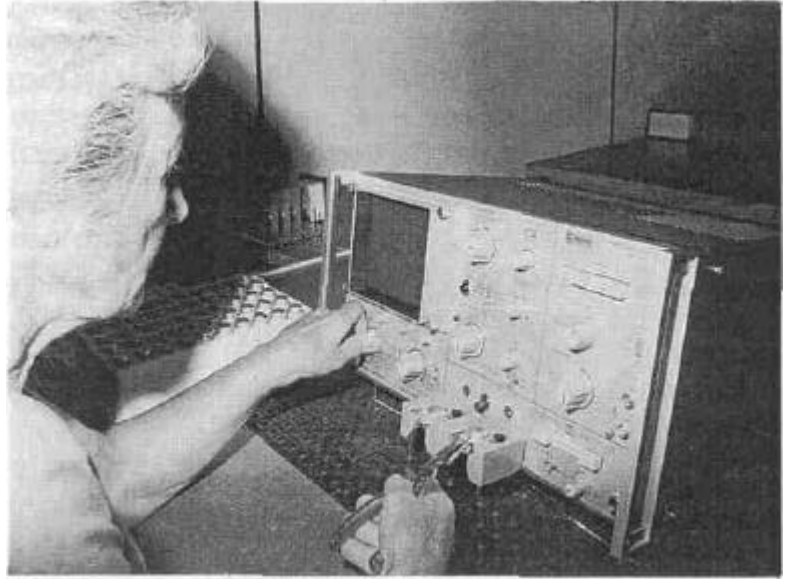
Renato Cantele, Morning Studios, Milan, Italy



Rear panel view of the *ClassAmp*<sup>®</sup> M-1. All imaginable features are incorporated in this unique preamplifier.

## PARTS SELECTION

What makes up a considerable part of the cost of an FM ACOUSTICS unit is **not** the exterior nor the chassis, not the features nor the number of parts used; it is the very time-consuming ultra-accurate selection of hundreds of components. And while these components are not inexpensive (some are very costly, as they are exclusively manufactured for FM ACOUSTICS), it is as much the testing and selection time that accounts for a large part of the cost of an FM ACOUSTICS product. Practically all components conform to IEC or DIN standards and many conform to the extremely tough MIL (military) standards. All are additionally subjected to FM ACOUSTICS' proprietary selection procedures which is of highest importance. Semiconductors are selected by hand on precision high-power testing machines. This individual analysis of each semiconductor is not at all comparable to the simple  $\beta$  measurement that is done by a few other "high-end" manufacturers (the  $\beta$  is a value for the gain of a transistor). What is done by other manufacturers is a simple, quick  $\beta$  test - the number one sometimes finds on the transistor housing. This means that the transistor was only measured at a single current with a single voltage (which then gives a resultant  $\beta$  figure of say "52" or so). This value is only correct at this specific voltage and current. It does **not**



*Individual comprehensive static and dynamic analysis are performed on each and every semiconductor. The majority transistors are rejected.*

indicate at all how the transistor is actually performing, as the transistor will be used at a great many voltages and currents. In contrast to this at FM ACOUSTICS the entire voltage and current range of each individual transistor is analyzed. Once a perfect sample has been found another semiconductor with precisely identical performance is searched, a very time-consuming affair. All this is done in static as well as



**dynamic** form (for further details on FM ACOUSTICS semiconductor selection see Technical Bulletin No. 2). After this analysis, each of the pre-selected semiconductors is put through a proprietary **listening selection**. In this listening selection every single transistor is warmed up in the circuit and then selected by ear! Each and every semiconductor used in an FM ACOUSTICS component must pass such extremely elaborate tests. All selection processes are proprietary to FM ACOUSTICS. It is understandable that many of them must remain secret, as a tremendous amount of research, experimentation and dedication have gone into their development. No machine can replace these time-consuming selection tests. By-passing such tests would reduce the cost quite dramatically, but performance could not be the same. Those, who have visited our factory and experienced the care that is taken in every little step of the manufacturing process, those who listened themselves to the differences that can exist between technically "identical" transistors have become firm believers.

*Unique: to guarantee non-plus-ultra performance a listening selection is performed on every single transistor!*

When realizing such extreme care and when understanding the production methods it also becomes clear why sometimes longer delivery terms must be accepted. As we try to always keep a rather sizeable stock of every single product it is normally not a major problem but when we encounter unexpected demand for a certain product (currently for instance for the FM 244 series of preamplifiers which are backordered for 24 weeks) patience is required. That our clients are willing to wait for such an extent of time may have to do with the value of the product.

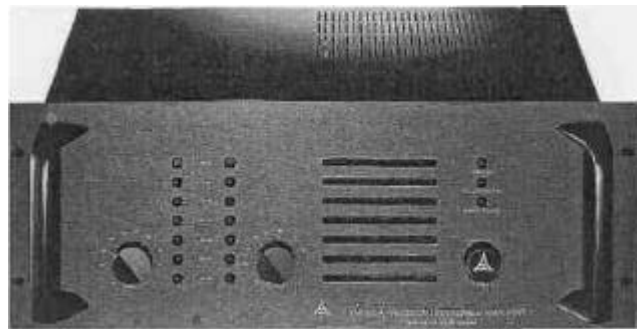
## HOW DO YOU DRIVE

# 8

## OF THESE???



## WITH A SINGLE ONE OF THESE!!!



At BOP Studios a single FM 801A is used to drive no less than 8 (eight!) 15" woofers all of which are connected **in parallel!** Do not try that with a power amplifier of another make...

The FM 801A amplifiers in the 3 studios perform flawlessly providing awesome dynamics and low frequency reproduction. Each of the Hidley/Kinoshita infrasonic woofer cabinets houses four 15" TAD drivers. The reproduction in the room is linear to 12Hz setting a new world standard.

The FM 801a's capability of driving the most extreme loads with absolute fidelity and stability is partly due to its unique protection circuitry which employs no limiting or compression.

## Protection systems that cannot negatively influence sound quality.,

Designers face a dilemma: there must be a short circuit protection for the output stage but the typical fuses, voltage limiting VI, compression, driver or output current limiting and other protection circuits all negatively influence the audio signal. Such circuits are often wrongly triggered by dynamic signals resulting in harsh sound when driving a speaker: sharp limiting, aggressive clipping, even oscillation or extremely fast spikes are not uncommon reactions of the usual protection circuits. These are some of the reasons why other amplifiers sound hard and aggressive and still are unable to provide clean extended high frequency reproduction. In the first moment such amps may seem "louder" as the added distortion of the signal manifests itself as additional mid- and high frequency signal content but very quickly the effect becomes tiring and results in listener fatigue. As these effects do not normally occur with a "dummy-load"

(8,4 or 2 Ohm power resistors used on the typical test benches) their negative effects are not readily apparent on measuring the amp. Only upon careful listening analyses with a large variety of speakers ("real world" loads) are such limitations detected.

Despite claims to the contrary the principal design of the large majority of audio products is still done on the test bench. The time and effort to **thoroughly** analyze a product's behaviour in real-world situations with music signal and with a large variety of different speaker loads is rarely available. If "it works" on a few readily available speakers the designer is satisfied. The large number of amplifiers that only "harmonize" with a couple of speakers while with others they give disappointing results is proof of this. For years extensive studies on these problems were conducted when finally two of our engineers came up with several unorthodox and rather ingenious ideas.

## NEW INSTALLATIONS

An immense amount of time and effort was required to combine these and optimize them in all aspects but this ultimately resulted in amplifiers that can drive any known speaker load (and can even drive light bulbs, electric drills, motors and other "impossible" loads) with absolutely unprecedented performance.

This combination of protection circuits works principally as follows: various parameters of the amplifier are sampled continuously - including the output current (peak and average), the rail voltage, the output voltage, temperatures, bias etc. These data are being compared in on-board circuitry to "real-world" values. If, for example, the amplifier receives a very dynamic signal and must drive a demanding low-impedance load, the output voltage will be high, while the average output current will be reasonable (but the peak current will be large) and the rail voltages remain stable. There is no action of the protection circuitry required and the amplifier supplies as much dynamic current as is required by the load (this of course requires huge reserves in the design of the entire amplifier). The amplifier will reproduce precisely the signal that is supplied to its input.

How is the amplifier then protected against short-circuits? When the output is short-circuited the peak and average currents rush towards infinity, the output voltage drops to zero, the rail voltage starts to drop etc. In such a situation an FM ACOUSTICS amplifier will not limit, compress or have any similar negative action as is the case with the usual circuitry that in one way or another limits the output current with resulting distortion. An FM ACOUSTICS isolates itself and the load, flashes the mains indicator and in addition displays a corresponding error message. At the same time another circuitry is activated. As soon as the short-circuit is removed the amplifier resets automatically. So, either the amplifier works perfectly or it switches off and indicates the type of error via the front panel error indicators.

The computerized protection system further employs a multitude of sensors that continually check various performance parameters. Faults like transients on the mains line, HF oscillation of preceding equipment, presence of strong RF signals, short circuits, DC offset, non-satisfactory earthing/grounding arrangements etc. do not harm the amplifier. It always recognizes the fault, protects itself and the speaker and displays the error message on the frontpanel. This is a far better way of protecting the load and the amplifier than the usual output or line fuses, electronic limiting or signal compression and similar methods which all create distortion (or, as is the case in some "audiophile" amplifiers: no protection at all!). With this proprietary system there is no negative influence on the audio signal possible as the protection systems are totally separate from the audio circuitry.

FM ACOUSTICS has recently supplied a complete state of the art amplification system in continental Europe for an extensive listening and presentation complex. The name is confidential as the client itself is a well-known manufacturer of audio electronics! The staff had strict orders to use only their own brand in the entire complex. After consultants heard the system they however recommended a trial using an entire electronics chain of FM ACOUSTICS equipment. The difference was so dramatic that it was decided to make an exception to the rule for the audio system. An entire FM ACOUSTICS system comprising of the following products was chosen:

- 1 **FM 801A** Precision High Power Amplifier to drive the 3-way full range cabinets
- 1 **FM 600A** Prof/ULI High Power Stereo Amplifier to drive the dual 15" subwoofer cabinets
- 1 **FM 236-X100 MK II** Linear Phase Electronic Crossover that optimally segregates the frequency range in true linear-phase mode with its unique 36dB/octave filters and full attenuation to -90dB .
- 1 **FM 300A** to drive the dynamic surround speakers
- 1 **FM 244C** control preamplifier to drive all of the above.
- 2 **FM 214** Line Drivers are utilised to assure no loss of signal purity from the source equipment (which employs output stages that did not quite satisfy the engineers).

To guarantee superior dynamic damping the system is using **FORCELINES** speaker cables.

All interconnect cables were from *Precision Interface Technology*®.

The system is practically invisible as it is elegantly hidden on the sides and in the wall. In this system the expressed goal was to achieve accurate and uncoloured reproduction throughout the entire audible range while reproducing the dynamics at their original levels. The reactions have been unanimous. Running day-in day-out the system continuous to impress experienced engineers and consultants. One comment reflects this best:

*"I did not know that such finesse and realism is really possible while at the same time reproducing the original dynamics. It is simply amazing".*



# NEWS FOR MUSIC LOVERS

*"If there is one singular expression which best describes the experience of listening to **the Resolution Series™**, it is **realism**. There is a simply arresting quality of realism with a concomitant phenomenal reproduction of emotional content which suddenly appears after connecting these units."*

comments one of the world's most experienced reviewers. What is the secret behind the singular performance accuracy of the *Resolution Series™*?

*"We utilize numerous proprietary technologies and production methods, details of which cannot be fully disclosed, but there is no single characteristic which alone explains such reproduction accuracy. A vast number of crucial details, several of them unique to FM ACOUSTICS products, receive the most careful attention. When combined they result in this quantum leap forward in performance".*

explains Manuel Huber, director of the Swiss company. Below you will find some explanations and descriptions of specific techniques used in the *Resolution Series™*. While some of the technology is unorthodox it is always based on the proven laws of physics and practical experiences in the field. One cannot simply throw overboard all - more or less - established design criteria as is sometimes done in "audiophile" equipment. The true laws of physics do not change. However, remaining open-minded one realizes that some of the existing theories and assumptions are simplistic and antiquated. There can be little doubt that much too many products that are practically indistinguishable from each other, products that really do not provide any innovation and fail to create musical involvement have appeared (and often disappeared shortly thereafter).

The *Resolution Series™* is the ultimate range of audio electronics. Designed over the last 8 years without constraints on time, resources or finances our engineering team was able to leave the beaten path of audio electronics design, try different ways to resolve common problems/optimize these new technologies and test them thoroughly before even thinking of starting to go into "production". The result is not just another pretentious unit encased in a huge steel chassis with monstrous cooling fins taking up more footprint than a speaker system. Instead optimization of many little details has led to a reasonable sized and

not too overweight range of products executed in a way unlike any other. Of course, there will always be those who need to impress their friends with a stark visual impact and they will go for the "designer" styles or the "battleship" appearance of other makes. Such units may be fine as status symbols but in reality audio systems should first satisfy the ears...

Throughout the world true connoisseurs appreciate precision audio technology. These are the individuals that realize the tremendous efforts that go into an FM ACOUSTICS product and are able and willing to experience something out of the ordinary.

*"I'm the owner of an FM ACOUSTICS 244A preamplifier and 611 power amplifier and would like to thank you for these real musical works of art. It's really wonderful to see that there is at last one product maker who can make a musical product (neutral; adds nothing, doesn't change nothing and music sounds just like what's on the recording); an amplifier which looks like art and is also an A-Class amplifier which doesn't need such an insane warm-up time as for example some American products. I hope that more people will open their eyes and especially their ears to see and hear the value that FM ACOUSTICS products bring to music reproduction; the absolute sound. So, a big thank you to you all at FM ACOUSTICS. Marko Myller, Finland*

The *Resolution Series™* is the final result of the tremendous creative efforts of a deeply dedicated staff and is based on an incomparable approach that combines a wealth of knowledge, innovation, finesse, and exemplary craftsmanship.

The world's experts agree that what has been achieved with the *Resolution Series™* is unparalleled. Built for an exacting elite this well matured and reliable range creates an absolutely neutral image (reproduction) of the original musical event allowing even the smallest details in a performance to come alive. Unprecedented neutrality and total freedom of colorations however euphonic they may be is one of the characteristics that has made the Resolution Series famous. An accurate rendering of the finest musical emotions is another trademark. With these products - crafted to stand the test of time - an entirely new horizon in reproduction accuracy is established.

Continuing from FM Acoustics Newsletter No. 4:

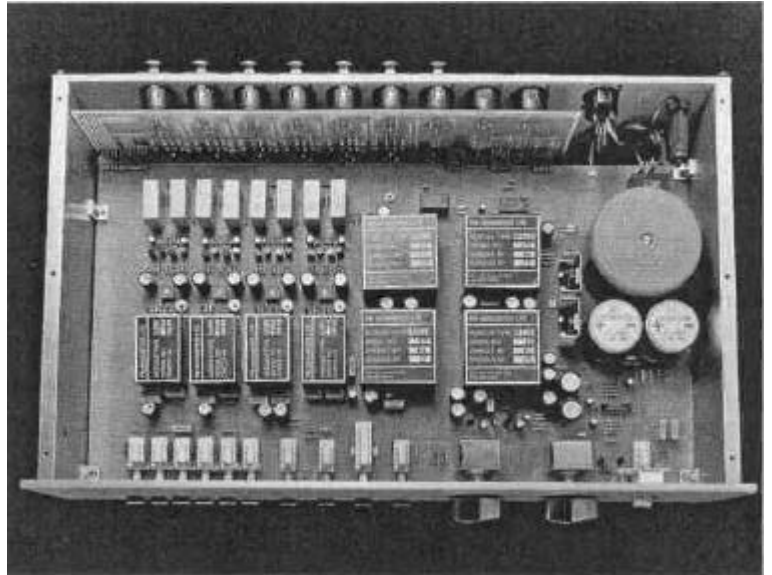
below you will find further information on the world's only true-balanced line stage/preamplifier, the

## *Resolution Series™ 266*

True balancing requires more than just the presence of a pair of signal carrying lines and XLR connectors!

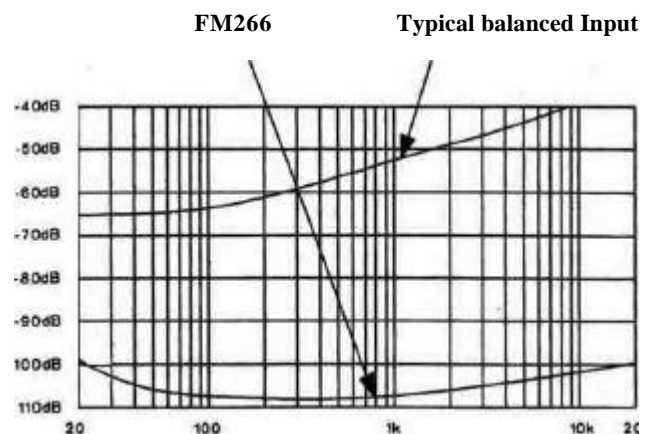
The FM 266 is the only line stage preamplifier available that is capable of **truly** symmetrical signal handling thanks to its proprietary balanced input and output circuits. After an intensive research program that extended over 8 years and is continuing, and after dozens of rejected circuit topologies, a combination of several ingenious ideas brought the final breakthrough. The proprietary, truly symmetrical balanced input and super-coupled output stages of the *Resolution Series™* 266 set an absolutely new standard:

- In the FM **266** outstanding CMRR performance is achieved with finely tuned, totally discrete enhanced Class A circuitry (no op-amps or IC's nor op-amp circuitry), resulting in absolutely singular performance.
- All input impedances are identical and are absolutely linear over the full frequency range.
- Unbalanced signals are automatically balanced right at the input.
- The FM 266 can drive any load (even highest capacitance) with perfect reproduction and absolute stability. Even a capacitance of 100nF (corresponding to 1000m of good quality cable...) present no problem!
- The truly balanced, super-coupling outputs have a sensor circuit that automatically compensates for the differences between balanced and unbalanced loads.
- The output has a drive capability of +29dB! This allows to run higher signal levels and therefore achieve a better signal to noise ratio of the system.
- In the FM 266 absolutely no overall feedback **or** feed-forward is employed. It uses FM ACOUSTICS' proprietary new "balanced enhanced Class A" stages. Freedom from noise and interference, absolute stability and pristine signal handling surpass anything that has ever been available.
- The *Resolution Series 266* works optimally with all types of input and output circuitry. Performance variations and matching problems are a thing of the past.



- *Inside view of the Resolution Series 266 displays a work of art*

- Phenomenal signal to noise ratio as well as total freedom of hum and other non-audio signals are achieved. The FM 266 betters the best existing designs by no less than 10 - 20 dB (that is 10 times better noise performance!). The phenomenal part is that this is achieved with an internal power supply. No wonder that experts call its performance sensational.
- The FM 266 makes intelligent use of proprietary input stages. The CMRR (which describes the accuracy of balancing) achieves an incredibly >100 dB over the full frequency range (see Fig.1).



*Fig. 1: FM 266 Common mode rejection vs. frequency compared with a usual balanced circuit*

## THE AUDIO CIRCUITRY

All FM ACOUSTICS equipment employs proprietary, fully discrete Class A designs. The circuits have no overall feedback. Of course the gain of the stages has to be set, but feedback is only allowed locally. Other manufacturers claim "no feedback at all" which is quite unrealistic as the total gain would be far removed from the requirements; others are advertising "low feedback" but then "low" is a relative term. What some consider "low" others consider "high". However, feedback per se is not necessarily evil, nor can the performance of a unit simply be ascribed to the type and amount of feedback used.

To really conquer the problems one has to create an entirely distortion-free stage, and this means the use of transistors that perform absolutely identical. Transistors and semiconductors in general have huge variations; variations of 200-300% are absolutely common! When the transistors in the amplifier have even slightest differences, this automatically results in non-linearities. These non-linearities manifest themselves in different ways, one of them is distortion (either intermodulation, static or dynamic distortion or a combination thereof). The end-result is always inaccuracy (non-linearity).

The only way to achieve a symmetrical and truly clean distortion-free stage is by selecting transistors until perfectly identical pairs are found, a tiresome task. These transistors must be identical not just at one or two voltage and current levels but must be so over the entire voltage range and at all currents. This can be extremely tedious and sometimes - depending on the tolerance of the batch of transistors received - be even impossible. Good suppliers that can regularly deliver quality over years are rare.

To be continued in FM ACOUSTICS NEWS No. 6

## SPECIFICATIONS

Specification most often represent typical data. When actual units supplied do not quite conform to the advertised specification the user is not helped when the manufacturer can claim that the specifications are "typical". In some cases one dB more or less will not reduce the value of the product to the customer. However, there has been gross misuses of "typical" specifications. It would be the duty of an independent (and useful) press to report on manufacturers who unethically distribute specification sheets that are not representative of actual production units.

As long as only a few press members are willing to actively support such ethical standards (which would benefit the entire industry!) the end user must carefully check the products before purchase with whatever ability and help he has. Therefore when choosing a product do not simply compare specifications sheets! Specifications are often misused, misunderstood, or utilized only to sell a product instead of indicating the product's actual performance capabilities.

"Typical" specifications will not tell you much about the true value of a certain component. Only **guaranteed minimum specifications**, together with carefully controlled listening tests, will show the differences and permit you to make the correct choice. In addition inspect the units closely and last but not least insist on a carefully controlled **listening** test. Also remember that specifications indicate only those performance aspects that can be measured. There are many aspects for which no measuring instrument or measuring method exists. Therefore always insist on a controlled audition which will reveal some of the actual differences observable in the field.

All specifications published by FM ACOUSTICS are **guaranteed minimum** figures for every single unit that leaves the factory. Detailed test reports on each individual unit are included in the instruction manuals.

*Dear FM ACOUSTICS,*

*I would like to thank you wholeheartedly for the incredible musical experience. I really didn't want to send your system back. This was the first time ever that I had problems parting with something "materialistic". Yes, that is the problem: it was like a separation and goodbye from a beloved one. It really felt as if I had lost something very personal. This all indicates that your audio electronics have something magical that extends far beyond the sheer performance aspects of the unit.*

*It was pretty disappointing when I had to go back to my own amplifier. Not only was depth missing, but the naturalness was not there. The fundamentals of the bass had disappeared and the highs seemed missing - and when they finally came through they were much too hard.*

*Of course you already know all of this. The beautiful thing about your amplifiers is, however, that one really misses them when they are no longer present. It was as if I had lost a good friend.*

*Well, thank you again for giving me the chance to listen.*

*With best regards*

*Christian Bernhard, Bern, Switzerland*

## AVOID BEING USED AS A GUINEA PIG

With an FM ACOUSTICS there are no half-yearly "updates", "improvements" or "modifications" every few months or year, something which is too common with other audio products. With some makes such updates often follow soon after the purchase and then come quite regular. It simply means that the client is being required to participate in the trial-and-error "field-testing" and development of the product as an unwilling and - at least initially - unknowing "guinea pig". This is a widespread but unprofessional way to try to get the bugs out of an unfinished product, and it certainly takes unfair advantage of the end-user. An FM ACOUSTICS product is only introduced after each member of the development team is fully satisfied with all aspects of the product and after a wide variety of users have also expressed their agreement with the superior performance. As a preliminary matter, each new product must work in numerous different applications and in combination with a multitude of other products in the field for at least a full year. Only after all possible improvements have been incorporated (whatever their cost) are products put into regular production. Thanks to this there are practically no updates needed in our products.

## FORGERS AT WORK!

Reports have reached us that some FM 801A power amplifiers have appeared that perform like FM 801's but are sold as FM 801A's! An inspection revealed that the frontpanel of a standard FM 801 had been "made into" an FM 801A frontpanel by silk screening an "A" onto the frontpanel. As both amplifiers use the same chassis and have the same size the difference is not immediately obvious. If you are about to get an FM 801A check with us to make sure you do not fall victim to forgers. All we need to know is the serial number printed on the back panel and who the seller is.

### *Double Mailings?*

*We are trying to avoid double mailings and have a full time person who keeps track of our mailing lists. However it still is possible that you are listed twice (for instance as individual as well under a company name).*

*If you receive more than one copy of FM ACOUSTICS NEWS and only need one, please send us a short fax or postcard and indicate the correct name and address as well as the other name and address at which you receive the copy you do not need.*

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A "rave" review is something nice but what critics have to say about the *Resolution Series*™ is beyond raving.

The French journal "L'Audiophile" has bestowed

## "Les muses d'or"

("the golden muses" award) on the *Resolution Series*™. The reasons are interesting and the article provides rather intriguing reading.

Famous for their uncompromising and critical approach Jean Hiraga and Patrick Vercher explain the reasons for the "shock" they had when hearing the *Resolution Series*™ for the first time. Ask for a free 8-page colour reprint and an English translation of l'Audiophile "Les, muses d'or".

## NEW LITERATURE

- "Les muses d'or", reprint of report in "L'audiophile"
- English translation of above
- Technical Bulletin 31, Rev. 2: "Selecting the correct interconnect cable"
- Article on "Conceptual errors in microphone preamplifiers" (Studio Sound, April 1993)
- Article on "The truth about balancing" (Audiophile Reference, Hong Kong, Chinese & English)
- New data sheet FM 801A
- New data sheets *Resolution Series* 611, 811, 266
- Data sheet of *ClassAmp* M-1
- Prospectus of *Resolution Series*™ in Chinese
- Chinese translation of FM ACOUSTICS NEWS 4 (both available from our Taiwanese distributor)

## SNEAK PREVIEW

Amongst other information in the upcoming FM ACOUSTICS NEWS you will find:

- Exciting news about the most dramatic improvement of the last decades in - believe it or not - LP/ Vinyl reproduction
- In light of above: interesting information on cartridge linearization
- More on the *ClassAmp* M-1 mic preamplifier
- Understanding cable design and performance

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