

# FM ACOUSTICS NEWS

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Volume 7, Spring 1996

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## "Component of the Year"



### *The Resolution Series 411 Precision Power Amplifier*

A great success: Japanese panel of experts selects the new FM 411 as the "Component of The Year". And in addition the FM 411 is declared No. 1 "Best Buy" amplifiers at any price.

The judges who allocate the Stereo Sound "COMPONENT OF THE YEAR AWARD" are a group of eleven very experienced audiophiles/writers who scrutinize audio components during the entire year. In January, by secret ballot, the products evaluated are graded by each expert.

The nice thing about this grading is that the products under test have to perform in eleven different audio systems; they are combined with many dozens of other components and are judged by eleven different pairs of ears! This is the most meaningful of tests as the products are evaluated in a true cross-section of different audio systems; a most recommendable and realistic approach, superior to the usual "reviews". The FM 411 won the highest number of stars, and in addition had the most even distribution of stars in all of the 11 systems (this means that it provided the most constantly excellent performance in all systems). No less than 572 components were submitted for audition. The FM 411 outperformed every other amplifier!

Not only did the FM 411 win the "COMPONENT OF THE YEAR" award; but it also won the "BEST BUY" of any power amplifier at any price (including amplifiers that sell for 200 - 250% of the price of the *Resolution Series*® 411!).

The FM 411 truly is a "BEST BUY".



## Unique Features of the *Resolution Series*®

- ♪ A true breakthrough in audio electronics.
- ♪ Proprietary processes, parts and circuits.
- ♪ Absolutely singular accuracy of reproduction.
- ♪ Unique enhanced Class A amplification stages cascaded throughout.
- ♪ Amplifiers feature unlimited peak output current (hundreds of Amperes!).
- ♪ Proprietary, ultra low loss "FORCEPLUG" output connectors bypass the limitations of the usual amplifier output connectors.
- ♪ Ingenious on board intelligence protects load and amplifier from error situations.
- ♪ Absolutely no current or voltage limiting. No compression or any other negative influence on the audio signal is possible.
- ♪ *Resolution Series*® amplifiers perfectly drive any loudspeaker impedance, whether electrostatic, dynamic, ribbon or foil types.
- ♪ No fuses or other non-linear elements in the output, DC supply or anywhere else in the audio circuitry.
- ♪ Extreme high power burn-in and shake table testing of every single unit.
- ♪ No risk of obsolescence and guaranteed spare parts availability for a minimum of 10 years.
- ♪ Professional long term reliability.

## The world's finest audio electronics

The *Resolution Series*® is the ultimate range of audio electronics. The fact that there literally were no constraints on time, resources or finances has allowed FM ACOUSTICS' engineering team to leave the beaten path of audio electronics design, try different ways to resolve common problems, optimize these new technologies and test these thoroughly **before** starting production. The result is not another pretentious looking unit filled with monstrous cooling fins, steel chassis or fancy design. Instead, optimization of hundreds of little details has led to a reasonably sized and not over-weight range of products executed in a way unlike any other. There are always some who require a visual impact, who are impressionable with eye catching "designer" styles or the "battleship" designs of other makes. Such units are fine as status symbols, but for those who listen, audio systems should first and foremost satisfy the ears. And this is what the *Resolution Series*® is all about, nothing fancy or pushy,... but audio electronics that are true to the music.



*Inside view of a Resolution Series® Power Amplifier.*

The *Resolution Series*® comprises several power amplifiers, preamplifiers and phono linearizers. Total dedication to achieve the absolute ultimate in accuracy, allows the use of manufacturing methods and selection procedures of entirely different standards. While some of the technology is unorthodox, it is always based on the proven laws of physics and on practical experiences in the field. It is not so that all - more or less - established design criteria are simply thrown overboard. The true laws of physics do not change but some of the existing theories and assumptions are simplistic and antiquated. There are far too many products indistinguishable from each other, too many products that fail to create musical involvement.

Those who have heard the *Resolution Series*® components report again and again how "breathtaking" its incredible realism and accuracy is. This must be heard to be believed.

To arrive at such results other units used in conjunction with the *Resolution Series*®, however, must be of the absolutely ultimate standard. In order to obtain optimal performance, a series of specific requirements must be fulfilled - requirements which may not be of great importance with other makes but which are an absolute necessity with the *Resolution Series*®. By including a single non-optimal component - even "just" an interconnect cable - accuracy may be reduced. Only by paying *extremely* close attention to detail and by adhering to specific procedures can certain pitfalls be avoided and optimum performance of the *Resolution Series*® be achieved.

Distributors of FM ACOUSTICS products are trained and kept up to date on general aspects and specific recommendations. If there are questions in regards to a system installation or the merit of a component connected to a *Resolution Series*®, contact your distributor.

If you are interested in further details and performance evaluations, various reports provide more insights into the *Resolution Series*® components. Several of these are worth reading as they explain some of the unique aspects of the *Resolution Series*® in more detail, contact FM ACOUSTICS for reprints and translations.

Wonderful reception worldwide:

## The FM 222 Phono Linearizer / Preamplifier

Since its introduction the FM 222 has astounded record collectors, music enthusiasts and remastering engineers in many parts of the world. In NEWS No 6. essential functions of the FM 222 (such as cartridge loading, normal/vertical operation and variable RIAA de-emphasis) were explained.

Here are further details on additional features of this revolutionary unit that is capable of extracting more music from record grooves than ever thought possible.

- The FM 222 circuitry employs no overall feedback or feedforward.  
The unit is built with FM ACOUSTICS' true balanced enhanced 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.
- The combination of proprietary ultra-linear circuitry and an absolutely stable output buffers guarantees that the FM 222 can drive practically any cable length, even hundreds of meters.
- The absolutely outstanding signal-to-noise ratio of the FM 222 has never before been achieved. The FM 222 better than the best existing designs by no less than 6 - 20 dB (that is up to 10 times lower noise!).

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### Experts call it "absolutely phenomenal"

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- The FM 222 input circuits automatically recognize if the source is balanced or unbalanced. Signals from unbalanced sources are perfectly balanced right at the input of the FM 222.
- The CMRR - the specification that defines the accuracy of balancing - is 100 dB(!), an absolutely unmatched figure\*.
- The FM 222's phenomenal CMRR is achieved with totally discrete circuitry (no musically unsatisfactory op-amps, transformers, hybrid circuitry or IC's).
- Tremendous reserves of headroom and output drive capability are engineered into the FM 222.
- The FM 222 allows connection to any balanced or unbalanced equipment. Internal sensors automatically adjust for optimal performance. Every interface will be 100% correct. Every load - be it true balanced, pseudo-balanced or unbalanced, whether it has high or low impedance - is perfectly driven by the FM 222's precision output buffers.

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\* Usual so called "balanced" units rarely have a guaranteed CMRR. Typical values are around 30-60dB. The FM 222 brings a tremendous improvement in balancing (the higher the CMRR value in dB's, the more accurate the balancing).

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### "A completely new listening experience..."

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- Power can be supplied either from the FM 266 True Balanced Line Stage or - for those users who do not (yet) own an FM 266 - from the optional FM 202A power supply.
- Special thermal control circuitry guarantees that the *Resolution Series*® 222 does not have any form of distortion or changing tonal characteristics when warming up. The optimal operational temperature is reached within a few minutes; there is no hour long warm-up required as is the case with a lot of other audio equipment.
- To assure that the FM 222 will not become obsolete, totally modular technology is used.  
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 222 can be kept at the forefront of technology and performance once new technologies should become available.

b) If servicing should ever be necessary, a defective 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. No further calibration is required.

- With the advent of the FM 222 record collections gain an entirely new life. Never before was it possible to extract so much detail from record grooves.

For more information, ask for a full description on the FM 222 Phono Linearizer/Preamplifier.

A comment from a recent demonstration:

*"(...) the presentation was astounding, a resounding success. The FM 222 is simply breathtaking. In the evening we were listening to classical recordings. The listeners were absolutely captivated by the "weight" of the music reproduction. When the music finally stopped, everyone remained quiet, some were moved so much that they had tears in their eyes. We honestly required some time to realize we were not in the concert, but listening to a music system. An absolutely singular experience."*

Is the FM 222 out of your budget? ... Here is the alternative:

## The new FM 122 Phono Linearizer / Preamplifier



When a totally faithful phono reproduction of the original is required - the FM 222 Linearizer/Preamplifier is THE ultimate solution. But now there is an alternative for smaller budgets. The FM 122 uses the same technology, parts and has most of the features of the FM 222 but employs standard cartridge interfacing. This allows for considerably lower cost without compromising. Quality is not scaled down in the FM 122. It uses identical components as the FM 222. The same unique selection procedures and manufacturing methods are employed as well.

The savings in cost have been possible because the FM 122 employs the standard unbalanced cartridge connection, which halves component count and labour compared with the FM 222, and because it can be made in more realistic quantities.

The FM 122 Linearizer/Record preamplifier provides an entirely new dimension in the reproduction standard of vinyl records. Together with its larger brother, it is clearly the culmination of phono preamplifier design. With its fine-tuning possibilities, far more information from record grooves can be extracted than ever thought possible. With these phono linearizers one can 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 offers a multitude of brilliant features that have never before been available. With the FM 122 record collections gain an entirely new life (and value). More detailed information on the FM 122 is now available from our distributors or directly from us.

## THE MYTH OF CLASS A

Designers who claim their power amplifiers function in "pure Class A" are really bending the truth. They do not mention that the Class A operation is only possible when the amplifier drives an 8 or - rarely - a 4 Ohm resistor. In the real world however, amplifiers are connected to speakers and a speaker never behaves like a resistor. In reality, the amplifier sees a complex load combining elements of capacitance, inductance, resistance, varying levels of Back-EMF (the current that is fed back into the amplifier when the speaker voice coil has been excited), etc. In addition, other dynamic phenomena are happening and these dramatically change the speaker's "nominal" 8 or 4 Ohm impedance. The true impedance of a speaker is many times more demanding (read: appears much lower) than its "nominal" impedance rating suggests. An amplifier driving a speaker having a "nominal" 8 Ohm impedance must in reality be able to drive below 2 Ohm, one driving a 4 Ohm load must be able to drive below 1 Ohm, and this with absolute stability and linearity.

Being realistic: what is marketed as say a 100W "pure Class A" power amplifier may be able to realize perhaps 10W "pure Class A" when connected to a real world speaker. The rest of the power is delivered in Class B. The fact is that **all** power amplifiers with reasonable power output manufactured today provide - when connected to speakers - just a certain

amount of Class A, and at higher levels resume to operation in Class B. Have you seen such facts mentioned in any reviews or product reports?

But there is no need to despair: it is a myth that "pure Class A" in a power amplifier output stage is a guarantee for good performance. Of course a certain amount of Class A biasing is needed for optimal performance because of distortion phenomena, but in the output stage Class A is more important in the 0.1W - 10W region rather than in the "above 10W" region. In an optimally designed output stage Class A does not even help that much; it is in **other** areas where "pure Class A" is important and where "pure Class A" can be implemented optimally. While the output circuitry may be Class A up to a certain level, the voltage gain, pre-driver and driver stages often do **not** operate in Class A! Exactly at this point in the design it is feasible to run in Class A because the fixed - non varying - impedances of the next stage are known and hence the stage can be biased in true Class A.

In FM ACOUSTICS power amplifiers pure "Class A" is used in all amplifier stages. In the output stage a specially "enhanced Class A" is employed. Together with the unique selection procedure explained in FM ACOUSTICS NEWS No. 5, the enhanced Class A amplifier stages guarantee that there is no chance of dynamic or static distortion in the circuitry, the true "wire with gain".

## FM ACOUSTICS UNIQUE FORCEPLUG 200

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### The world's best speaker connection

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**FORCEPLUG 200** connectors use multiple, large-surface area, controlled inertia contact springs. They are used exclusively with FM ACOUSTICS precision power amplifiers. They guarantee precision connection of a singular standard.

**FORCEPLUG 200** precision connectors are carefully terminated to **FORCELINES**<sup>®</sup> cables using specific soldering techniques (crimping would be much faster and cheaper, but pressing and crimping - as done in other speaker cables - do not guarantee optimal results). These proprietary connectors perfectly accommodate the enormous purified multiple conductors of **FORCELINES**<sup>®</sup> cables.

Specially coated contact areas guarantee a contact resistance of **less than 0.00008 Ohms** (yes: 80μΩ!), magnitude better than any other speaker connector. The resulting performance is unequalled.

Agreed, with many of the usual amplifiers such a connector will not make that much difference, but with their unique dynamic damping, the FM ACOUSTICS amplifiers can provide much better control of the speaker diaphragm.



200A output connectors on an FM ACOUSTICS power amplifier. It's details like this that make the difference!

## PRICE AND VALUE

More and more manufacturers put the money into exterior chassis design, exotic finishes, nicely glowing tubes and other sights for the eye, but audio performance?

Trying to impress people with eye catching designs has always been a way to get attention. This is fine for a "design" product that should primarily give visual attraction. However: while an attractive exterior can be a consideration, it should certainly not be the prime consideration in audio equipment. Unfortunately, when analyzing today's "high-end" products one has to realise that in many the main efforts are concentrated on the exterior rather than the interior of the units. The musical performance is often not impressive. In some flashy looking products priced at 10'000's of US\$, one finds cheap components and rather poor wiring. The units may look attractive, but reproduction is disappointing. Inspecting a unit that is priced close to US\$ 90'000, one finds disappointing performance, mediocre components and really outdated technology. Not that a nice tube amp cannot have its charm: for someone who has a high-efficiency speaker system and listens mainly to vocals and smaller ensembles, this can be a good alternative, as many solid state designs are still somewhat lacking in musicality. However, one should not be tempted to buy overpriced products because of their looks. A good investment is one of lasting value which will sound "right" even after years of use.

Flashy looking overpriced equipment has become more and more common (both in solid state and tube equipment). Indeed, a product selling for US\$20'000 can be a better value for money than one selling for US\$ 8'000. But more and more products are intentionally overpriced to make the client believe they are "valuable". Additionally, the overpriced product can then be offered with an impressive discount bullying the buyer into the belief that he got "a good deal". But this "deal" may after all provide little value for money. Do not get simply impressed by the looks or the price tag of a product. Look beyond the flashy surfaces and listen for a while; then consider the real value.

Often a good indication of the value is the price that second hand units are offered at. If the price has dropped to half the list price in a year or two, it is unlikely a wise investment. The most expensive is not always the best, but on the other hand, the best is very very rarely inexpensive.

## CMRR (Common Mode Rejection Ratio)

With a few exceptions high-class microphones are balanced. Balancing has several obvious advantages, one of them being the rejection of Common Mode signals, such as hum, noise and interference.

A popular concept is that a connection that has two signal wires and a shield is balanced. However, there is much more required: by far not everything that has two signal lines, a shield and XLR connectors is **truly** balanced.

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Frequently the preamplifier input stages leave a lot to be desired...

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One measurement that provides a great deal of information on the accuracy of balancing, is the Common Mode Rejection Ratio, or "CMRR". Common mode signals are unwanted signals that enter both signal lines simultaneously (e.g. hum, noise, interferences). Such signals must be rejected from the audio circuits.

The "CMRR" is the capability of the input circuits to reject such signals; this is expressed in dB. In many balanced input stage designs CMRR values of 30-60 dB are typical. This is far from sufficient. The CMRR value should be above 80 dB, and this not just at one frequency as is often specified, but rather at the more crucial frequencies of 50/60 Hz (mains frequency = hum) and above 10kHz (interferences). Also, the CMRR should be as linear as possible over the full frequency range of the unit.

Optimizing the CMRR requires experience, intelligent design and extremely careful fine-tuning. This is time-consuming and inevitably results in considerably higher costs. Considering the very high price of modern mixing desks, it comes rather as a surprise that almost all of the mixing desk microphone preamplifier input stages leave a lot to be desired. The reason: cost saving considerations or the result of ignorance on the part of the designers. No wonder recordings can be so much improved by using the *ClassAmp*<sup>®</sup> M-1 (CMRR > 100dB!), and records can be replayed to never before attained standards with units like the FM 222.

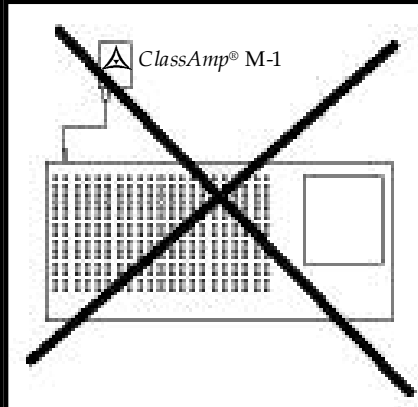
Is it just a coincidence that most manufacturers' data sheets do not specify, much less guarantee, the CMRR?

# FOR PROFESSIONAL USERS

## *ClassAmp*<sup>®</sup> M-1 = OPTIMAL SIGNAL ROUTING

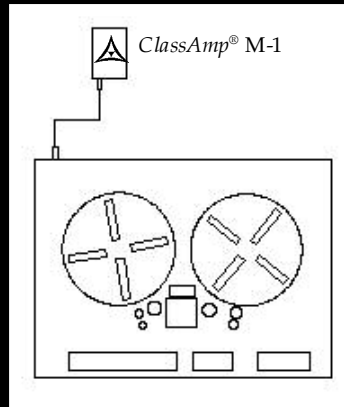
### Non-optimal Signal routing using Line-In input

1)



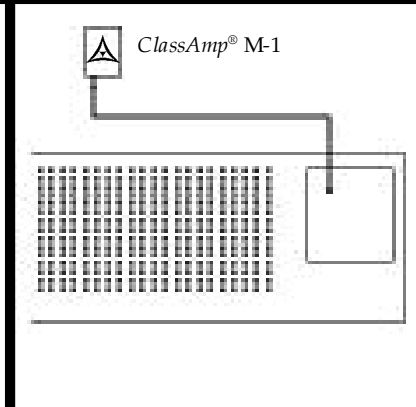
This connection will not yield optimal results because the signal still goes through some channel electronics.

2)



The line level signal from the *ClassAmp* M-1 is fed directly to the Recorder or Disk.

3)



The line level signal enters the patch bay via a direct XLR input, bypassing all channel electronics.

To allow an objective comparison between an on-board mixing desk preamplifier and the *ClassAmp*<sup>®</sup> M-1, careful setting up is needed. When done right, the difference even to the best of mixing desks is tremendous.

*"I did test the M-1 on a recording for John Berry. It was a performance of "O Holy Night" for a Christmas record with violin and cello obligati. The producer, Chuck Howard, and the audio engineer, Bob Campell-Smith, were amazed at the ClassAmp<sup>®</sup> M-1's quality when used with a modified AKG C-12 and a modified Neumann U-47. Both, cello and violin sounded absolutely stunning!!"*

*John Catchings, Nashville TN, U.S.A.*

Make sure to bypass the **entire** mixing desk channel electronics and to use the adequate signal route that will go through the minimum of desk electronics. This is often best done by **NOT** feeding the high-level output from the *ClassAmp*<sup>®</sup> M-1 to the mixing desk line level inputs (see Figure 1). While in this case, one is bypassing the on-board microphone preamplifier, the signal will still go through some channel electronics and this even when the channel is switched to "bypass"! Connecting in such a way, a considerable amount

of the improvement the *ClassAmp*<sup>®</sup> M-1 makes would be masked. The aim is, of course, **NOT** to feed the *ClassAmp*<sup>®</sup> M-1 signal through additional desk electronics!

The correct path for the signal is to enter the patch bay via a direct input, or direct to the monitor/tape return patch bay input, so one is listening to the signal of the *ClassAmp*<sup>®</sup> M-1 with minimal additional electronics (see Figure 3).

The ultimate way is to feed the output of the *ClassAmp*<sup>®</sup> M-1 directly into the recorder, bypassing the mixing desk entirely (see Figure 2).

*"I had the pleasure of testing the ClassAmp<sup>®</sup> M-1 Precision Microphone Preamplifier. I must say it was an extraordinary experience. The ClassAmp<sup>®</sup> M-1 sounds absolutely beautiful. It has incredible analytical capabilities. When somebody talks close to a microphone, it literally gives the impression that the person stands right before you. There can be absolutely no criticism. The sound quality is simply phenomenal. Rich and tight bass, clear and precise high frequencies, exactly as it should be !!!"*

*Producer (name withheld by request)*



## Leo Nucci invests in *ClassAmp*<sup>®</sup> M-1

Italian baritone, Leo Nucci, has recently acquired a pair of *ClassAmp*<sup>®</sup> M-1 Precision Microphone Preamplifiers. Leo Nucci is regularly performing at the MET in New York, Covent Garden in London, La Scala di Milano, Vienna, Zurich, Chile, Israel etc.

After hearing the recording of his performance at Castiglione de'Pepoli made with a *ClassAmp*<sup>®</sup> M-1, Mr. Nucci was so impressed with the transparency, the dynamic range, the transient response and the total absence of coloration that he immediately ordered a pair of *ClassAmp*<sup>®</sup> M-1's.

Since then not a single one of his recordings has been made without *ClassAmp*<sup>®</sup> M-1's. They are used on the main microphones and are optimal in capturing the vigour, emotion and the subtlety his performances are famous for.

*"...Absolutely extraordinary results. I am using them with Schoeps microphones and the difference to the preamplifiers I had been using before is just incredible!"*

### Comments from field tests

*"The first thing one remarks with the *ClassAmp*<sup>®</sup> M-1 microphone preamplifier is a total absence of background noise, and this even at extremely high gain settings. On a recording where costly German-made microphones were used, the output of the *ClassAmp*<sup>®</sup> M-1 was fed directly into the recorder, bypassing the entire mixing desk. This recording method was compared to previous recordings done via the standard preamplifiers. The previous recordings suddenly sounded shockingly poor, giving only minimal approximation of the music. In contrast, in the recording in which *ClassAmp*<sup>®</sup> M-1's were used, the real characteristics and timbre of the microphones appeared. There is a dynamic and linearity that was just never heard before. Using the *ClassAmp*<sup>®</sup> M-1 one suddenly had two completely different microphones resulting in an entirely different recording. The presence of voices and the clarity and warmth of acoustic guitars were astounding. There really was no comparison."*

*"Actually the *ClassAmp*<sup>®</sup> M-1 brings not only improvement in the recording chain, but also helps the performance and creativity of the artists. As an example, when feeding back to the singers' headphones the more precise signal recorded via the *ClassAmp*<sup>®</sup> M-1 the singers' performance improved dramatically. They commented that they heard themselves better and more naturally. They said they had never played and sung so comfortably before."*

### +/- 0.01dB

+/- 0.01dB. Yes, you read correctly, 1/100 of a dB. This was the accuracy required for probably the most demanding project that a microphone preamplifier has ever been used in.

After extensive comparisons to a multitude of other units the University of Zurich decided for the *ClassAmp*<sup>®</sup> M-1.

For research on the behaviour of psychologically unstable persons, a new voice stress analysis has been developed. The voices of the persons under test are analyzed before application of medication and at different levels of medication. The aim is to observe and monitor any change in the sound of the voice. Custom written computer programs help to gain deeper insights and better understanding.

After various tests involving many microphone preamplifiers, the *ClassAmp*<sup>®</sup> M-1 was selected as giving the best performance. In this truly demanding application, the *ClassAmp*<sup>®</sup> M-1 must extract the finest details with extreme accuracy. As an example of the stringent requirements: the tolerance of the frequency response had to be within the incredible figure of +/- 0.01 dB from 20 Hz to 20 kHz !

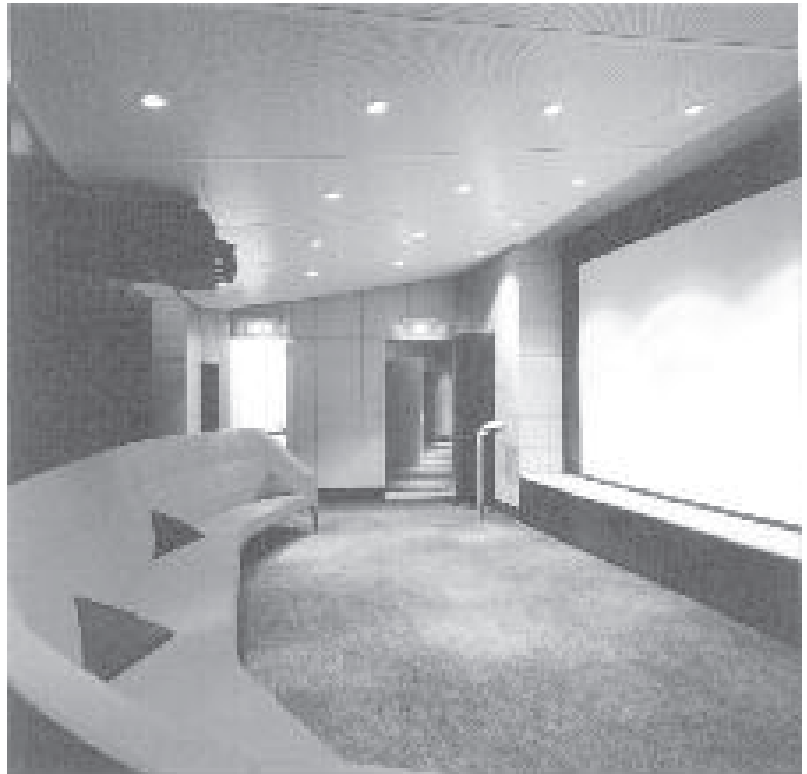
The *ClassAmp*<sup>®</sup> M-1 was the only unit that did fulfil this and the other special requirements.

Not that such accuracy will be absolutely necessary for recording purposes, but it shows the capabilities behind the product. Truly unique.

## FM ACOUSTICS IN THE "EVOLUON" IN EINDHOVEN

A complete FM ACOUSTICS' system has been installed in the world famous "Evoluon" in Eindhoven. Here, in the new Auditorium in the "Philips Competence Center", an FM 801A, an FM 600A and an FM 300A power amplifier are providing optimal reproduction for the demanding new technology presentations. To assure clean and precise signal reproduction over the entire range, an FM 244C Control Preamplifier is used. It drives an FM 236-X100 MK II Linear Phase Electronic Crossover, which divides the frequency range and sends only the lowest frequency to the FM 600A that drives the subwoofers. The high pass output of the FM 236-X100 MK II is supplying the rest of the frequency spectrum to other FM ACOUSTICS' power amplifiers. To assure that the various sources deliver absolutely pure signals, two FM 214 balancing line drivers have been installed right at the output of the sources. FORCELINES® speaker cables and Precision Interface Technology® interconnect cables were used in the entire installation, a concept of Philips in cooperation with consultant Carlos Olms of London. In the words of the experts, FM ACOUSTICS was chosen because "there simply is nothing comparable".

Philips really is to be commended for not allowing the decision to install the absolute best to be overturned by the all too common cost considerations. An accurate system now impresses audiences that visit the complex several times a day.



The characteristic Evoluon building houses the Philips Competence Center which is equipped with FM ACOUSTICS preamplifiers, power amplifiers, electronic crossovers, Precision Interface Technology® and FORCELINES® cables. In the words of the experts FM ACOUSTICS products were chosen because "there simply is nothing comparable".

## BEWARE OF WRONGLY WIRED CABLES

It has been brought to our attention that several manufacturers of expensive "audiophile" interconnect cables are wiring the cables incorrectly. In the case of one expensive American made cable, the wiring error is such that it could result in damaged equipment! This just shows how superficially some manufacturers go about designing their products. Make sure that you carefully check yourself, or have an experienced technician check, the wiring of the cables you plan to invest in - especially "balanced" types - **before** your equipment suffers damage.

When interconnecting **balanced** equipment it is of highest importance that the correct cables are used. Truly balanced equipment is much more sensitive in this respect than "pseudo-balanced" equipment. For instance when connected to true symmetrically balanced equipment most so called "balanced" interconnects do **not** allow optimal balanced interconnection. In certain circumstances, quite large frequency errors can result. There have been two cases where "bright and distorted" sound was attributed to *Resolution Series*<sup>®</sup> components. Examination showed that the interconnect cables that were used had wiring errors! The result: a frequency response error that degraded the sound quality of the system. Exchanging the cables to *Precision Interface Technology*<sup>®</sup> true balanced interconnects and the "bright distorted" sound was gone.

## CABLE SELECTION

For connection of *Resolution Series*<sup>®</sup> preamplifiers and power amplifiers it is possible to use other interconnect cables than *Precision Interface Technology*<sup>®</sup> cables. However, it must be realized that, with the exception of *Precision Interface Technology*<sup>®</sup> cables, **NO** currently available cable is capable of guaranteeing the accuracy of CMRR (Common Mode Rejection Ratio) that the *Resolution Series*<sup>®</sup> electronics are capable of. The cables that do the balanced interconnection between *Resolution Series*<sup>®</sup> components are **very** critical and special measures must be taken to guarantee that the outstanding CMRR of the *Resolution Series*<sup>®</sup> preamplifier (> 100dB!) and amplifier is not degraded in the cables. With other so called "balanced" equipment that has typical CMRR values anywhere from 30dB to 60dB, a cable that provides a similar CMRR will be o.k. But with the outstanding CMRR of FM ACOUSTICS' equipment (guaranteed at 90 - 110dB (!)), the demand on the interconnect cable obviously becomes **much** higher. With typical high quality "balanced" interconnects of other brands, 30 - 50dB of the CMRR that the *Resolution Series*<sup>®</sup> provides will be lost due to the cable! This way, much of the hard earned rejection of interference, hum and noise is given away. In the typical so called "balanced" systems of other makes (that are not true balanced) the CMRR is not as critical, but in true balanced systems, the difference is clearly audible. To extract the **optimum** capability from *Resolution Series*<sup>®</sup> systems, the true symmetrically balanced *Precision Interface Technology*<sup>®</sup> interconnect cables must be used.

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## NHK BROADCASTING

NHK, the National Broadcasting Company in Japan, has been using FM ACOUSTICS' equipment for years. Recently, NHK decided once more to invest in the newest FM ACOUSTICS stereo high power amplifier - the FM 801A.

The FM 801A is literally the **only** professional amplifier in the world that truly drives the complex impedances (1 Ohm and below) that many of today's critical speaker loads present. It is still not realized how difficult to drive some of today's speakers are. Today's amplifiers may operate fine when driving resistive and relatively simple loads, but they are quite lacking when asked to optimally drive and control real-world loads. Under dynamic music conditions, they reach their limits and become non-linear much more quickly than generally thought.

With an output capability of 180V<sub>PP</sub>, in addition to literally hundreds(!) of Amperes of repetitive peak output current, the FM 801A can deliver repetitive peak power levels in excess of 3000 Watts per channel;

but it is **not** the power rating itself that lifts systems, using this amplifier to new heights of reproduction accuracy. FM ACOUSTICS' exclusive "dynamic damping" circuitry controls the speaker diaphragms in an unprecedented way. The result is much more dynamics as well as a tightness and extension in the bass with a realism never before heard.

## PROFESSIONALS ???

The situation is somewhat embarrassing: Users at home invest considerable amounts of money to achieve the best music reproduction, while many of those who record, produce and master the music are skimping on their investments. In the last years the situation has become somewhat ironic, as in fact most studio monitoring systems sound inferior to today's high quality home systems! This situation is rather unique; is there any other profession where the amateurs use more sophisticated systems than the professionals?

# TRUE BALANCED PHONO CABLES !

Signals from MC (Moving Coil) and from MM (Moving Magnet) cartridges are **extremely** sensitive to all kinds of negative influences, such as hum, noise and interferences. With the massive advances in record reproduction, the phono interconnection has become a weak link in the reproduction chain.

After most thorough analysis of the specific requirements and intensive research, *Precision Interface Technology*<sup>®</sup> of Switzerland introduces the ultimate solution to Phono Interconnection.

P.I.T. phono cables are unique; their unmatched performance and accuracy is the result of the most in-depth understanding of every aspect of low level signals transmission, of shielding and - as important - the behaviour of the cartridges with the various types of preamplifiers input stages.

The variety of tonearm configurations and connectors requires individual solutions. *Precision Interface Technology*<sup>®</sup> offers specifically optimized phono interconnects for **any** application. Seven different cable types allow the correct solution for interfacing any cartridge to unbalanced, pseudo-balanced, as well as true balanced phono stages.

Now you can improve your system by simply replacing your phono cables with *Precision Interface Technology*<sup>®</sup> Phono Interconnects.

*Precision Interface Technology*<sup>®</sup> Phono Interconnect cables make exclusive use of FORCESHIELD; a proprietary new triple shielding technology that:

- achieves a signal-to-noise ratio and interference rejection of 132 dB (this is 30 to 50 dB better (!) than the other high quality interconnect cables)
- guarantees optimal shielding to frequencies above 80 MHz
- provides unparalleled shield coverage of 99.9%, even when cables are bent (a situation where most cable shields loose efficiency)
- ultra accurate balancing (magnitude better than other so-called "balanced" cables)
- lowest crosstalk
- achieve very low residual system noise floor resulting in better dynamic contrast and signal to noise ratio
- absolutely phase accurate signal transfer
- guarantees total preservation of time coherence
- all cable parameters are carefully optimized with consideration for **all** variables, including different cartridge types and preamplifier input stages
- extreme cable flexibility avoids strain on tonearm. Tonearm can float freely without the usual negative influence on turntable suspension

### *Special Offer:*

Try a pair of *Precision Interface Technology*<sup>®</sup> Phono cables on your turntable/tonearm system for 30 days without obligation. There will be massive improvements: more transparency, delineation of fine details, increased dynamics contrasts, no mechanical stress on the tonearm, etc...  
Contact FM ACOUSTICS for details.



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