FM ACOUSTICS NEWS

Volume 3, Autumn 1991

PREFATORY REMARK

From the reactions received, it is nice to see that the clear, no-nonsense information in FM ACOUSTICS NEWS is appreciated. Some readers have recommended that we attempt to more clearly segregate the "professional" news from the news for "domestic users". This may be a good idea, but not all units strictly fit into just one or the other category. Some FM ACOUSTICS units provide superb performance in both the professional and the domestic fields. An example is the FM 236 series of Linear Phase Electronic Crossovers. Also, many engineers and producers who have worked professionally with FM ACOUSTICS products insist on FM ACOUSTICS products for their private systems, too. Combined information for professionals as well as domestic users is therefore not unreasonable. Those paragraphs that clearly apply only to one category or the other will be separated.

We are trying to avoid double mailings. There is enough paper wasted in this world, so PM ACOUSTICS do not want to contribute unnecessarily to this situation. In the event that you should receive more than one copy of FM ACOUSTICS NEWS, please send us a short fax or postcard so that we can- correct this. Please indicate the correct name and address, as well as the other names and addresses under which you received your copies.
The world's trees thank you for your cooperation.

SPOTLIGHT PROFESSIONAL PRODUCTS

THE FM 801A PRECISION-HIGH-POWER AMPLIFIER

The FM 801A, a giant leap in advancing the absolute State-of-the-Art in amplifier technology.

The new FM 801A is a giant leap in advancing the absolute State-of-the-Art in amplifier technology. This new precision power amplifier establishes a definite world reference standard.

"Suddenly my monitors have an additional octave of bass reproduction - the experience is just incredible"

A comprehensive research program on the performance and micro-stability of power semi-conductors operating under large voltage variations and at very high current levels yielded most interesting results. It proved that the performance of both the power and driver transistors changes because of factors that previously were not recognized as having any significant influence. With this information and further discoveries made during this

research, a new standard in the performance of power amplifiers became possible. This research project, which cost close to a million Sfr., is now yielding brilliant results in the FM 801A.

> ...a dynamic range is achieved that until now has not been possible.

Based on FM ACOUSTICS' unique enhanced Class A input and proprietary voltage gain circuitry, a combination of the newly modeled driver and output stages and a refined, higher capability power supply, a dynamic range is achieved that until now has not been possible. The result is a reproduction of bass fundamentals which never before has been experienced.

The superfast drivers and output transistors allow a phenomenally analytic and detailed high-frequency re-production. Helped by FM ACOUSTICS proprietary ultra-high performance power supply, the new amplifiers establish an absolute standard of accuracy which quite amazingly considerably surpasses even that of the FM 1000, which is used worldwide as **the** reference standard amplifier.

The maximum output voltage capability of the FM 801A is 180 V pp. and the continuous output current capability is more than $40A^{RMS}$ - but for dynamic signals peak current is absolutely unlimited, momentarily reaching several hundred A under heavy load. This allows the FM 801A to drive any known speaker with unprecedented standards and without any form of limiting, compression or other negative influence on the audio signal. This freedom of any limiting action, or compression is a very important aspect that is unique to FM ACOUSTICS precision power amplifiers.

> ..allowing the FM 801A to drive impedances of 1 Ohm and lower!

While me FM 801A can drive any load (it drives electric drills, lamps, shake tables etc. too...) and is able to supply any amount of current with dynamic signals, it still protects itself against short-circuits and all other possible abuse - such as HF oscillation of preceding equipment, DC offset, symmetrical and asymmetrical input overload etc. This is possible because of unique protection systems that not only are capable of precisely differentiating between audio signals and error signals but are also capable of protecting the amplifier 100% while allowing the FM 801A to drive impedances of 1 Ohm and lower. Even with the most complex and inductive loads, absolutely no limiting or part-limiting can occur. The amplifier always remains absolutely stable.

For high accuracy in monitoring systems in recording studios, as well as in broadcast and truly high-class concert installations, the FM ACOUSTICS precision high-power amplifiers provide absolutely unequalled performance. In sound system applications 1 single FM 801A replaces 2-4 high-power amplifiers of other makes, at once providing much cleaner reproduction, much more definite punch and dramatically higher available SPL in combination with unparalleled long-term stability and reliability.

FEATURES OF THE FM 801A

- Unparalleled reproduction accuracy.
- Each amplifier is individually fine tuned
- Tremendous impact - true repetitive power levels of up to 3000 W per channel.
- The max.. continuous output voltage is 180 *V.*
- Repetitive peak output currents are unlimited
- Continuous output current capability of $40A^{RM8}$.
- The FM 801A can perfectly drive any speaker.
- Proprietary, fully discrete enhanced Class A circuitry.
- Power supply capability of 10000 VA repetitive peak power.
- Highly efficient resonance damping of all chassis parts and other components.
- No possibility of signal compression, limiting nor any other negative influence on the audio signal.
- No fuses (DC, line or output) nor any other non-linear elements in the audio circuits.
- Open circuit protection. Amplifier is absolutely stable with or without load.
- Unique dynamic diaphragm control gives much superior impulse and bass response.
- Superb ultra-low loss FORCEPLUG 200 connectors dramatically improve interconnection to speakers.
- Amplifier and speakers are safeguarded from errors by ingenious multi-sensor protection systems.
- All protections trigger the output and reset automatically when the error disappears. Either the amplifier works perfectly or it switches off, signaling the type of error on the frontpanel.
- Entirely damped and frozen transformer. No mechanical hum or plate vibration.
- Lowest electrical and mechanical noise.
- Superb input balancing of discrete Class A input circuitry (90dB CMRR) .
- Proprietary, ultra-low ESR supply capacitors.
- IntellIigent, multi-sensor temperature control.

- Optimized low-noise cooling assembly.
- Switching spike suppressors.
- Airflow restriction sensor circuitry protects against dirty or blocked fan filter.
- Mains spike suppressors (5000V suppression)
- Rigorous l00h (500 thermal cycles) bum-in in specially-built high temperature room.
- Individual 50000 cycles vibration testing.
- Dual-testing protocol included in every product
- Handcrafted in Switzerland to highest performance MIL, DIN & IEC standards.

Readers of AUDIO Magazine Germany elect the FM 811 as "The Amplifier Of The Year".

AWARDS

FM ACOUSTICS' *Resolution* Series™ components are hailed as the world's most advanced audio electronics.

The *Resolution Series* ™ 811 has been elected as the

"AMPLIFIER OF THE YEAR"

by the readers of the largest European audiophile magazine, AUDIO. With 22.8% of the total votes going to the Resolution Series 811, FM ACOUSTICS was far ahead of all the other amplifiers. The next best amplifier had only slightly more than half that many votes. This must be viewed in light of the fact that FM ACOUSTICS does not have strong PR and is therefore more of an "inside tip". After the review panel had powered up the testing panel felt that to accommodate the FM 811 and experienced the improvement with any source material they realised that "this is something else". After weeks of listening there was no doubt about **the absolute** reference. Never in the history of AUDIO had this happened: the testing panel felt that to accommodate the FM 811 in the "best" list would not be possible in their 0-100 point list and therefore the range of points was increased to 110 because of the phenomenal performance of the *Resolution Series.*

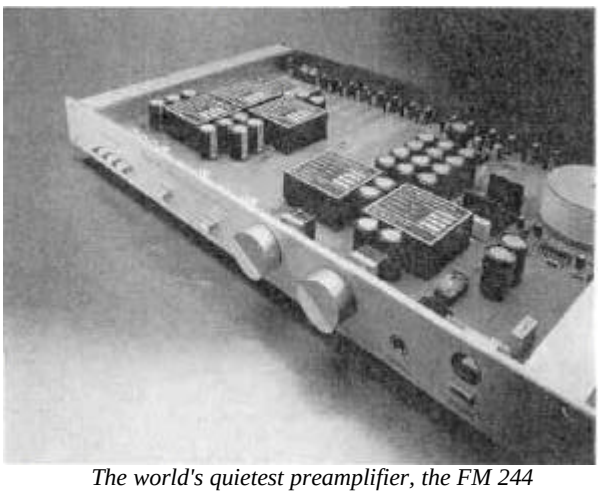
When, after initial hesitation, famous recording engineer Bert Whyte heard the Resolution Series 244/611/811 combination he was quite taken. He felt it mandatory to live with the Resolution Series for many months in order to gather detailed knowledge and to *"...really put them to the test."* As associate editor of the American AUDIO magazine, he included his experiences in a repot in die November and December 1990 issues. It is very informative reading. With permission from Audio Magazine, a full colour reprint is now available. Just ask for it.

In 1990 Japan's prominent audiophile magazine, "Stereo Sound", dedicated the coveted

"COMPONENT OF THE YEAR"

award to the Resolution Series ™. This award is one of a continuing series of prestigious compliments that ***the*** Resolution Series ™ products are receiving.

THE PERFORMANCE OF THE RESOLUTION SERIES



The world's quietest preamplifier, the FM 244

With a moving-coil input signal-to-noise figure that is better than 80 dB below 0 dBm, the Resolution Series FM244 preamplifier is setting an absolute world standard. The signal-to-noise of the FM 244 is no less than 5dB -12dB better than the most famous preamplifiers. The FM 244 is by far the quietest preamplifier available.

The signal-to-noise of the FM 244 is no less than 5dB - 12dB better...

With a gain of 56.5 dB, the amazing wideband equivalent input noise figure of **138.5 dBv** is reached by the FM 244. This is extraordinary. Even when compared with the most advanced, super-expensive, high performance, high speed industrial operation amplifiers, the 244 is no less than 5 dB better. This is an example of the superior performance that the Resolution Series is capable of.

A BOOM PERIOD

The 1989 turnover at FM ACOUSTICS increased by 48%, in 1990 a more manageable 23% was achieved. While for other manufacturers such increases in turnover are relatively easy to cover - as the automated machines can just be run a little longer - the production methods at FM ACOUSTICS are entirely different. Because of the extremely close selection of practically all components, these critical selections must be done entirely by hand. Production increases can therefore only be moderate. By optimizing every move, training additional staff and keeping an extensive parts inventory, we did cope rather well. Rather than relaxing specifications, FM ACOUSTICS has actually fine-tuned and ameliorated production methods. Standards have been raised again.

RESEARCH & DEVELOPMENT

In audio technology, the cost of being the leader is very high. Only huge investments in R&D guarantee corresponding results. More than 20% of FM ACOUSTICS' total turnover goes into research & development, a figure which is many times larger than the typically R&D costs in the audio industry.

No budget restrictions are imposed on the R&D or the production departments.

New ideas constitute only one ingredient for the creation of great products and inventions. If research and development is to lead to real advances, a sufficiently large supply of capital is also mandatory - so that no financial limitations are imposed when R&D costs exceed budget. When entering new areas of technology, these costs can never be projected with exactitude. Suddenly, just when things are getting interesting, different methods, more time, new materials, and/or additional equipment may be required. If at this point available finances are limited, even the most inventive research team stands no chance of attaining ultimate results. To avoid such constrictions, R&D funding at FM ACOUSTICS is in principle unlimited, and no budget restrictions are imposed on the R&D nor on the production departments. This is one of the main factors contributing to the achievement of optimal results.

MEASUREMENTS & REALITY

Current measuring techniques - while definitely having their applications (e.g., in quality control) - are not fully representative of what is actually heard and experienced by the listener. The results of such measurements must be carefully weighed when compared with the ear's ability to detect minute differences. By pretending that amplifier A, which may have an inherent distortion of say 0.001%, is "better" than amplifier B, which in the same measurement may give a reading of 0.002%, is misleading, to say the least. When considering such measurements one always has to compare them with reference to the entire reproduction chain. In the above example it must be set into relation: the speaker following the amplifier - even if it is one of low distortion design -will create 100 to 1000 times more distortion than the amplifiers do. Therefore, such measurement procedures can become highly academic and are of little relevance to the actual reproduction of the system. On the other hand, if an amplifier shows distortion of a high magnitude (say from about 0.1% upwards), it is likely that there is a design or manufacturing problem that can negatively influence the performance.

Even today some electronic engineers, manufacturers, reviewers and others involved in audio pretend that the existing measuring techniques are more accurate than the human ear and that the ear can be fooled. Under certain circumstances the ear can indeed be fooled, especially when using tricks such as randomly switched short-term A-B testing or by using signals of low resolution. However, it has been adequately proved that:

The human ear is actually one of the most sensitive organs

American Indians could determine both type and location of prey simply by listening to the sounds it made.

The ear can be trained

This ability to precisely interpret the faintest sounds hundreds of yards away and to recognise their characteristics was part of their "training" which began in early childhood. This is a good example of the magnificent levels of resolution that the human ear can be trained to detect. Fine improvements can be achieved in a short period of training.

The ear can distinguish minute differences

that no measurement device can detect. We have, e.g., the unique ability to "hear into the noise". An example of this is the ability of human hearing to still be able to distinguish a sound that is actually below the noise floor (similar to e.g., signals in VHP Radio).

We do have a good long-term memory for sounds

Contrary to an often heard statement that pretends the opposite. A good example of this is that most of the time we can instantly recognise a voice we heard months earlier, **even** over such a bad transmission media as the telephone.

OBSOLESCENCE

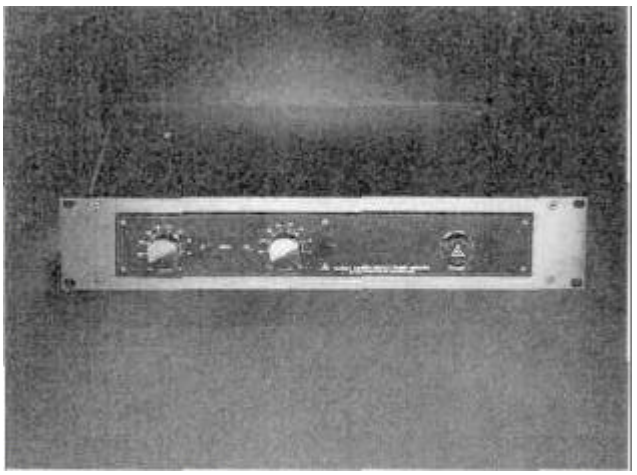
Because FM ACOUSTICS' engineering is so far advanced, products do not become obsolete. A good example of this is our first electronic product, the FM 800A, which was introduced in late 1975. With fine ameliorations it is still being produced today! It still has that magic sound reproduction for which FM ACOUSTICS has become famous.

..the finest details of singular tonalities as well as the exact dimensions of the sound stage are clearly audible."

Another example is the FM 300A, which is manufactured today the same way as when it was introduced in 1982! This shows how "right" these product designs were. The products keep their value and are not subject to obsolescence. There are few products in today's world which have such extended lifespans and are such good investments!

"...I want to briefly summarize the results of our listening comparisons of various power amplifiers with the FM 300A. ...The FM ACOUSTICS had a deeper, more contoured bass, a more true and natural reproduction of highs, a more exacting reproduction of the actual recording environment, and more clearly audible details of the actual recordings. ...The FM 300, in comparisons with the other power amplifiers tested, showed g seemingly unspectacular but extremely honest and true to nature reproduction which, above all else, made the finest details of singular tonalities as well as the. exact dimensions of the sound stage clearly audible.

Dr, Udo Unger, Suedwest-Tonstudio, Stuttgart



Cherished the world over:
FM300A precision power amplifier

REPORTS / REFERENCES

After hearing the improvement in accuracy obtained by replacing the amplifiers in their Neumann cutting system, **Studio Sonderegger** of St. Gallen, Switzerland, commissioned FM ACOUSTICS to modify the complete cutting electronics in their State-of-the-Ah studio.

American Helix Technology Corporation of Lancaster, Pennsylvania, is specialising in custom CD manufacturing and CD project management, has decided to use FM ACOUSTICS precision power amplifiers for their quality control department. James Boyer, Vice-President of American Helix, remarked that he had worked with FM ACOUSTICS amplifiers on a number of occasions with superb results. At American Helix they were looking for an amplifier that,

"*in combination* ***with stability and long-term reliability, guarantees perfect audio reproduction".***

As he added succinctly: *"For us, this is a tool. not a toy.". An* FM 600A/ULI Precision Power Amplifier was designated as "the right choice" for American Helix's specific needs.

Amongst the comments that we have recently received are the following:

"...With the combination of the Resolution Series 611 power amplifier and the 244 preamplifier the range, of my loudspeakers seems to have actually expanded. The lows and the highs are far superior to what one has come to expect from the make of speakers I am currently' using. As a cello player and a devoted audio fan of about 40 years. I have no hesitation about unconditionally recommending FM ACOUSTICS equipment. If is superior to anything I know"

Albert Arbor, Sun City West, Arizona

"...We have been demonstrating the RESOLUTION SERIES 811 amplifier and 244 preamplifier and the results are fascinating. With that composition we could hear a very enjoyable, deepest and widest sound stage and therein lies the "truth" of music. We found that the FM 244 preamplifier and the FM 811 power amplifier fire the most natural, transparent, musical and harmonic solid state audio components that we have ever bestowed upon our ears.

We have evaluated the FM ACOUSTICS products & listening to them ourselves and by obtaining the opinions of visitors to our showroom who have heard the performance of these components. In their opinion FM ACOUSTICS is the best HIFI electronic design that they have ever heard, and they had never imagined a solid state electronic preamplifier and power amplifier could produce such a melodious sound".

W.Sumitra, P.T. Salcon Sakti, Jakarta, Indonesia

For those who can read Japanese: in issue No. 98 of the Japanese magazine STEREO SOUND, a report on the FM 266 and the FM 811 is under "Exciting Components"- a superb six page article. In the same issue the FM 236 Linear Phase Crossover is also reviewed, very impressively. And yet again in the same issue, the Resolution Series™ 611 is rated under "Best Products".

Like in other parts of the world, listeners .and reviewers are simply taken by the performance of FM ACOUSTICS products. This is well reflected by the following comment on the Resolution Series™ 244/811 combination**:**

'"The 811 and.244 are incontestably the best 1 have ever heard in what I call dynamic expression, the ability to fully reproduce the wide dynamic range of the best CD's with absolute accuracy and to do so without the slightest flint of compression, all throughout the music spectrum. I heard things on familiar recordings which I had not previously perceived." Bert Whyte in AUDIO magazine, December1990.

YOU GET WHAT YOU PAY FOR

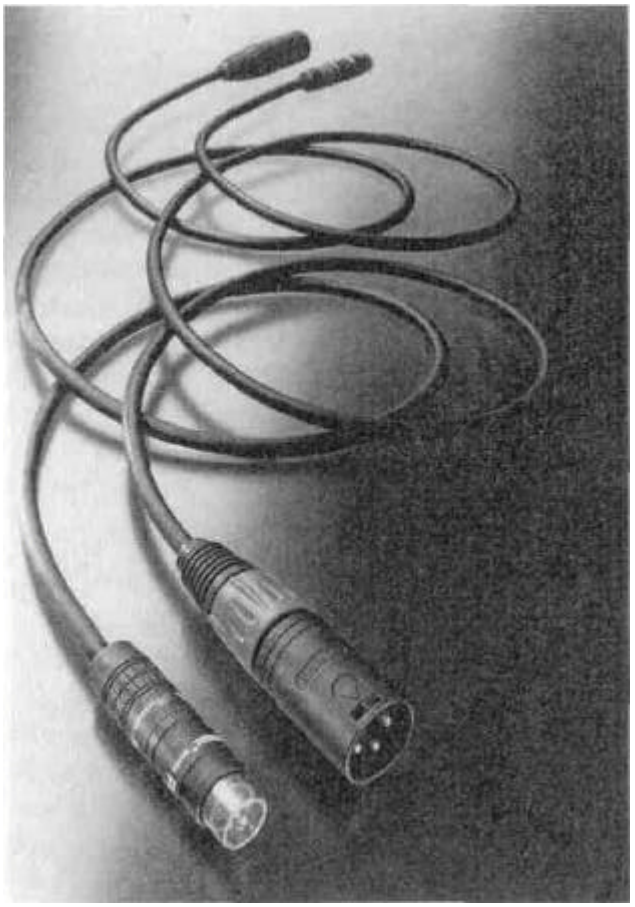
In general it is a simple truth that "you get what you pay for". Some manufacturers take advantage of this belief and intentionally heavily overprice their products, but they are unlikely to be able to hide the true value of their products for long. Under normal circumstances the Price of a component is a function of cost. To the uninitiated a unit of larger size may "look" more expensive. That way it is easy to impress the uninitiated. But what "looks" massive and expensive is not really refined nor is it at the "edge of technology".

Rather than trying to make the units look impressive by an overbearing use of massive amounts of steel and aluminium FM ACOUSTICS invests in **advanced technology.** Discrete aesthetics underline the philosophy of the ultimate statement of perfection,

SPOTLIGHT DOMESTIC PRODUCTS

Introducing...

Precision Interface Technology



Precision Interface Technology interconnect cables. No Hokus Pokus but a true breakthrough in performance

With help from the world's leading experts a series of low- and line level interface cables have been created, cables that are *absolutely* unique. They attain a standard of interfacing that has never before been available, a

TRUE BREAKTHROUGH

Precision Interface Technology ™ cables are not unique just because of one or two more-or-less fancy features or characteristics, nor is there any hokus-pokus involved. Their singular performance is the result of the most comprehensive analysis and profound understanding of **all** aspects of precision signal transmission.

P.I.T. allow balanced & unbalanced interconnections that are clearly superior to what has been possible so far.

Because various systems require individual interface solutions, **P.I.T.** offers specifically optimized interconnects for any application. With over one hundred different cables to choose from, the **correct solution** for any system interface can be guaranteed, whether it is true-balanced, earth-free, pseudo-balanced, unbalanced or any combination.

Technical Bulletin No. 31 gives detailed information on how to choose the correct cable for any interconnect requirement.

With over one hundred different cables to choose from, the **correct solution** for any system interface can be guaranteed

P.I.T. cables make exclusive use of **FORCESHIELD;**
a patented new dual shielding technology that:

- achieves a **interference rejection** of **130dB** (20 to 40 dB higher than the other high-quality interconnect cables)
- guarantees **shielding** to frequencies above **80 MHz**
- eliminates **interference** by 100% proper conduction to ground
- provides absolute **shield coverage** of **99.9%**

Precision Interface Technology interconnects guarantee**:**

- extremely **high rejection** of magnetically and electrically induced coupling
- phenomenally **low crosstalk**
- lowest residual system noise floor resulting in **an increase in dynamic** contrast and signal to noise ratio
- intercable capacitance and shield/signal wire capacitance are reduced to low values without sacrificing any other performance aspect.
- absolutely **phase accurate** signal transfer
- **perfect linearity** with both static and dynamic signals
- **no skin effect** throughout entire bandwidth
- signal-transfer speed **1000 x faster** than needed **for perfect** audio reproduction
- total preservation of **time coherence**
- **all** cable parameters influencing performance are carefully optimized
- ultra-high flexibility of cable avoids any strain **on** chassis receptables and connectors
- In P.I.T. interconnect cables **all** parameters affecting performance are carefully combined to achieve optimal results in **all** systems
- P.I.T. cables are unique in that they do not act as "equalizers" and do not induce frequency errors and response aberrations of complete systems.
- **P.I.T.** cables provide ultimate linearity
- Transfer speed is in the nanosecond region (1 nanosecond = 1/billionth of a second!).

I can hear clear & definite improvements and this repeatedly with whatever signal and electronic chain I use.

A comment by Rico Sonderegger, famous for his mastering work with many top artists explains the clear superiority of P.I.T. cables:

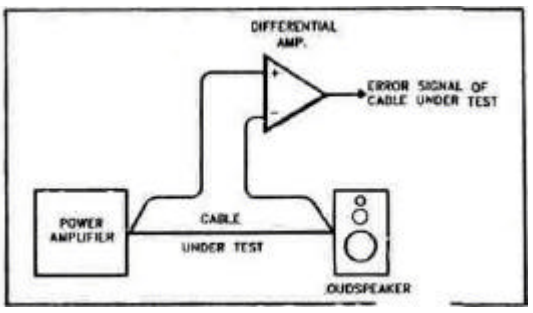
"By simply replacing my "'previous quite expensive silver cables with the Precision Interface Technology™ interconnect cables, I can hear -a clear and definite improvement and this repeatedly with whatever signal and whatever electronic chain I use".

Another client reported the following;

"A number of months had passed and none of the experts was able to find the cause of this continuous residual interference noise. It could not be made to disappear .The interconnect cables had been replaced before but the astounding result came when we installed ***P.I.T.'s:*** *suddenly the interference was gone. Amazing."*

THE NEW FORCELINES 3

FORCELINES ™ come much closer to the theoretical ideal of perfect signal transfer than any other speaker cable available. There are sound scientific reasons for this, confirmed by a wealth of practical experiences in a wide variety of demanding applications.
A valid and relatively simple test that was previously used for comparison of different electronic circuitry can be used to compare speaker cables. The performance differences between speaker cables can be documented and it is clearly audible. The block schematic below shows the principal test setup:



..the output of the differential amplifier shows the negative influence...

The speaker cable is monitored at the amplifier output as well as at the speaker input. The amplifier output is connected to the inverting input of a precision differential amplifier having a very high CMRR (common mode rejection rate). From the loudspeaker end of the cable the signal is fed into the non-inverting input of the differential amplifier. By nulling out any difference before the cable is connected, the output of the differential amplifier will just show the losses in the cable and/or the negative influence that the cable has on the signal transfer. A perfect cable would be inaudible. The nice thing about this test is that the cables are not simply tested while connected to a dummy load - which can never present a true loading impedance; this test is done by using an actual amplifier and speakers! It works very well with speaker cables because decent amplifiers have a low output impedance. So the additional load of the measuring setup can be neglected, and the cables to the differential amplifier have no influence.

This initial test was done with only a few different cables in order to see if the test was valid at all. The results obtained prove the validity of the test.

There are sound scientific reasons confirmed by a wealth of practical experiences...

With FORCELINES ™ 3 all of the exceptional and unique qualities of FORCELINES ™ 5 and FORCELINES ™7 are preserved, but an even higher accuracy can be attained. FORCELINES ™ 3 are used for the absolutely most demanding systems and low impedance loads where the ultimate in signal transfer is required. They are also used as grounding/earthing wire in studios and system installations. With a purified copper cross-section of 25.6 mm2 (=AWG 3; a length of 10m of FORCELINES™ 3 cable contains no less than 5 kg of purified copper!), an incredibly low resistance of 0.66 Ohms per km (!) is achieved. The current handling capacity is 1800A[1'] and 320A°'".

...FORCELINES give by far the most accurate performance of any cable...

FORCELINES ™ 3 provide by far the most accurate performance of any speaker cable manufactured/and they do this perfectly throughout the entire audio range. Special drawing techniques and individual strand preparation guarantee completely linear, absolutely time- and phase-coherent signal transfer.

TOM JUNG MOVES UP TO FORCELINES

Tom Jung of DMP" uses FORCELINES in his studios and on location)

Tom Jung of DMP sure knows his trade. Recognized the world over as one of today's leading audio engineers, Tom is also known to be exceedingly demanding of his equipment. After installing FORCELINES ™, Tom Jung remarked:

...FORCELINES™ are the most transparent cables I have ever heard.

"I have been going through many changes with my" reference system, using different speakers and experimenting with different cables, I've come to the conclusion that both FORCELINES ™ speaker cables and P.I.T. interconnects are excellent. When it comes to speaker cables, FORCELINES™ are the most transparent cables I have ever heard. They simply add nothing to - nor do they take anything away from - the original .music. Thank you for making such great cables!" ***Tom Jung , DMP,*** *Stamford, U.SA.*

EVALUATING SPECIFICATIONS

Specifications should not be a major factor when selecting a product. This is because few manufacturers actually guarantee minimum specifications for each and every product that leaves the factory.

...only guaranteed minimum specifications together with carefully controlled listing tests will provide meaningful information.

Typical specifications will not really tell you much about the true value of a certain component, only guaranteed minimum specifications together with carefully controlled listing tests will provide meaningful information. Almost all manufacturers quote standard specifications such as output power and distortion. However, other specifications are more important: low impedance drive capability, continuous and peak current capability, output voltage, operation of various stages inside amplifier, attention to thermal considerations not only in the output stage but for all parts of the amplifier, maximum mains overvoltage, operating humidity etc. Last but not least it is of prime importance how long the manufacturer will guarantee the availability of spare parts.

...professionals should be made aware of the most misleading statements.

A HOKUS-POKUS AMPLIFIER

While specifications and measurements are only valuable up to a certain point and must always be put in relation to the application and to the other equipment used, there are certain minimal requirements that an acceptable product must meet.
FM ACOUSTICS has no intention of publicly evaluating or even policing other manufacturers, but professionals should be made aware of the most misleading statements brought about by the worst of the "snake oil vendors".

One of the latest entries into the power amplifier market is said to perform miracles. Copying the precise wording of the specifications for FM ACOUSTICS FM 1000 data sheet (even a typo was copied...), the French amplifier is claimed to produce a maximum output current of "more than 100 A continuous and more than 120 A peak". As anyone who has a mild idea knows, the relation between PEAK and RMS level is not 120%. But this is not all:
looking at the unit one will notice that this amplifier uses 4 DC voltage fuses rated at 6.3 A! This means that the output current capability is a far cry from the claimed "more than 100 A continuous". Consequently this amplifier is unable to perform adequately and provides much less than the claimed output power (540W^{RMS} into 4 Ohms, l000W^{RMS} into 2 Ohms, 1950W^{RMS} into 1 Ohm...). In fact it fails to drive any of the more accurate speakers available today. It creates harsh limiting and a corresponding loss in performance.
Below a few of the specifications which are - as the manufacturer quotes: "Guaranteed minimum for every single amplifier which leaves the factory". To make sure that there was no fault of an individual unit several were measured.
The table below shows the output power specified by the maker and on the right-hand side the actual performance of the amplifiers that were tested. This is a good example of how misleading specification sheets can be. Frequently there are disturbing differences between what is stated in the spec sheet and what the unit actually is capable of , although cases with such extreme lack of performance as in this one are not often encountered. Scope photographs showing the performance of the amplifier were also taken. They confirm the serious problems of this amplifier. The horrifying spiky current limiting that activates at low levels literally destroys the waveform and not only strongly reduces SPL capability for the entire system but also results in extreme signal compression. While the bumps in the scope photo in

Description in Data Sheet	**Advertised Specification**		**Actual Specification**	
MINIMUM POWER OUTPUT WITH MUSIC SIGNAL OR TONE BURST:	„ 540W into 4 Ohms“ „ 1000W into 2 Ohms“ „1950W into 1 Ohm “		420 W 544 W *	412 W 530 W *
			*immeasurable. Harsch current limiting activates (see Fig. 3)	
DISTORTION:	„0.009 and 0.15%“	8 Ohms: 4 Ohms: 2 Ohms:	0.3% 0.33% 0.4% 0.45% ** **	
			** Measurements were impossible due to instabiliy (Fig. 4) (see scope pictures on next page)	
LOAD IMPEDANCE:	„SINCE DOWN 1 OHM TO INFINITE. LOADS SYSTEMS WITHOUT LIMITING			

PERFORMANCE VERIFICATION

Upper trace: Sine Wave or Burst Lower trace: Distortion

Left: Amplifier under test Right: FM 801A

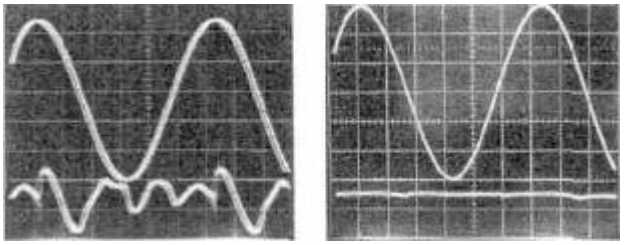


Fig. 1: Sine Wave 1.6 kHz / 40V RMS / Load = 4 Ohms

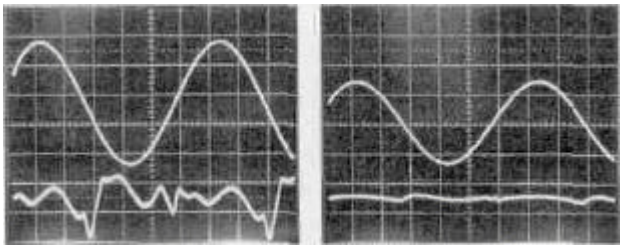


Fig.2: Sine wave 1.6 kHz / 30V RMS / Load = 2 Ohms

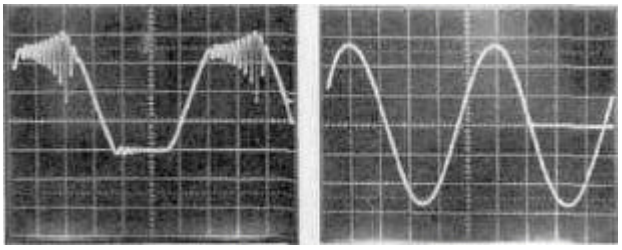


Fig.3: 4:4 Burst 1,.6 kHz / 25 V RMS / Load = 1 Ohm

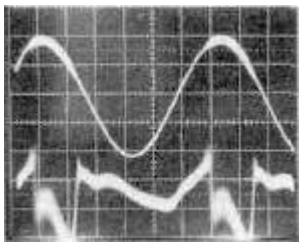


Fig.4: Sine Wave 1.6 kHz / 13V RMS / Load = 8 Ohms
(HF oscillation of amplifier under test)

Fig.3 may appear "interesting", they show a **serious** problem. If one compares Fig. 3 left with Fig. 3 right this action becomes obvious. The spectral distribution is changed and strong additional harmonics are created, which manifest themselves in aggressive distortion. This results in not only dramatically limiting the SPL and the squashing of dynamics but if the signal frequency is very low (e.g., a bass drum or E bass), also in a muddy, ill-defined bass and a boomy mid-bass reproduction. This also creates strong additional HF distortion, which results in unnatural brightness. This aggressive limiting action is a typical characteristic of the protection circuits used in many amplifiers. While with static measurements into "normal" impedance's such amplifiers seem to give acceptable results the difference to a truly high class amplifier becomes apparent when using **dynamic** signals and **real-world** loads. The difference is dramatic.

....a good example of how misleading specification sheets can be.

What is interesting is that this expensive French amplifier has large amounts of 3rd harmonic distortion - not just a nominal level as found in certain equipment, but a rather embarrassing level of 0.45%, cause for serious concern*. While there is no need to lower harmonic distortion to extreme levels, distortion levels of 0.3% - 0.45% must be termed unacceptable. It causes the unit to have a coloured response. In the studio the consequences are mixing errors. This amplifier has one decent characteristic performance: wide frequency response. It however fails to satisfy most other major performance criteria. As a comparison scope photographs of an FM 801 A are on the right side. As can be clearly seen the unique output stages of FM ACOUSTICS amplifiers achieve peak current capability cleanly and without any limitation. There is no form of dynamic compression possible.

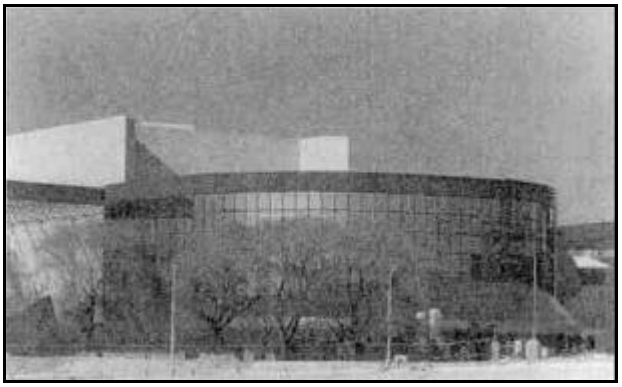
STRONG SALES IN SOUTH KOREA

A number of renowned broadcast and recording facilities in the South Korean market have recently moved up to FM ACOUSTICS, among them the following:

- Hyundai Recording Studios
- Jeil/EMI Recording
- Jigu/CBS Recording
- Tae Kwang
- King Records
- Shinsegae Studios
- Korea Broadcasting System
- Daedo Rec. Studios

FM ACOUSTICS products appeal to a quite different type of clientele, people who will settle for nothing less than absolute top performance and a maximum return on their investment. Time and time again after extensive listening comparisons in critical listening environments, the choice to purchase an FM ACOUSTICS product becomes crystal clear. Even in a country with

* It has to be realized that there are many loudspeakers today that feature distortion levels of 0.1% and even lower. An amplifier used with such speakers should consequently have distortion levels at least ten rimes lower than this - so that the distortion does not change the speaker characteristic noticeably. While distortion reduction to extremely low values is not recommended (with high feedback margins this is not difficult to achieve), there is no advantage once a reasonably low distortion characteristic is attained. Everything must be put in proper perspective.



International Broadcasting Centre of KBS, Korea's largest broadcasting station

...absolute top performance and maximum return on their investment.

tremendous taxes that raise the price by about 60% the resulting improvement in the end product justifies the investment. This is why professionals in Korea are replacing their existing amplifiers with superb hand-made FM ACOUSTICS products.

In Japan, FM ACOUSTICS amplifiers were supplied to:

One World Prod., Kawasaki;	DVC, Tokyo
Tokyo Broadcasting Systems	Video Tech, Tokyo
Art Plaza 1000, Tokyo	Z'd Studio, Tokyo

CONDULMER STUDIO FEATURES FM ACOUSTICS

Located in near Venice, Italy, Condulmer Recording Studio has quietly become a major player in the Italian recording scene. Condulmer boasts a Neve Necam 96 desk, digital and analogue tape recorders and a tremendous list of outboard equipment. But what makes Condulmer unique is extras such as a 27 hole golf course, tennis courts, a swimming pool and restaurants on the premises. They even have their own stable...

Recent projects at Condulmer include (among many others) recordings for groups as famous and diverse as DANGER ZONE and SIMPLY RED, as well as LP projects for MIRIAM MAKEBA, ALICE, DAVID SYLVIAN, VASCO ROSSI and PAOLO CONTE.

Sandro Franchin, owner and resident engineer at Condulmer, explains that since installing their new monitoring system each and every one of the diverse artists that have used or heard the monitoring system has been in favour of its performance and sound. Some of them actually came back because of the monitoring system's qualities. Mr. Franchin had the following words of praise:

"The sound of FM ACOUSTICS electronics is very natural, warm, clear and without any coloration. It is easy to identify the position of each instrument in height and width as well as precise depth. The amplifiers are perfectly linear at any volume level, and their characteristics do not change even under the heaviest conditions." "And you can rely on them: these products - we purchased everything but the brand-new FM 801 A used - have never heeded any particular maintenance during ; the three years that they have been in constant use at our ^studios. And the previous owner, Stonecastle Studios, had them in Constant'14 how operation for 5 years before we acquired them. I think the ultimate compliment is that all of the artists who worked here over the last year had only positive, comments on the monitoring. And this is quite a unique achievement, as these artists "represent many different musical tastes and styles."

...all of the artists who worked here have been in favour of the monitoring system.

With such experiences and the resulting insights gained, the purchase of FM ACOUSTICS electronics has again proved to be a wise investment.

Condulmer Recording Studio utilizes a three-way active monitoring system incorporating 2 FM ACOUSTICS 236-X100 Precision Linear-Phase electronic crossovers. Two FM 1000 Monophonic Ultra-High Power Amplifiers drive the JBL 2245H speakers on the bottom end, the mid-range is covered by a JBL 2123H speaker driven by 1 PM 801 A Precision High-Power Stereo Amplifier. The top end consists of a JBL Custom speaker driven by an FM 300A.

BROADCASTERS MOVE OVER TO FM ACOUSTICS

The world's leading broadcast companies are increasingly realising the importance of precise monitoring and what difference an FM ACOUSTICS power amplifier can make to the performance of the monitoring system. Generally, broadcast houses are very rational about their purchases, which are most often non-emotional, "stick-to-the-facts" decisions.

With this type of rationalising many professionals in the broadcast industry are now realising that an investment in an FM ACOUSTICS product is a well-advised decision. This explains the marked movement towards FM ACOUSTICS electronics. While until recently mostly

FM ACOUSTICS' smaller precision power amplifiers, such as the FM 300A and FM 600A, are requested for broadcast applications, there have recently been more frequent applications where higher power is required and larger power amplifiers are used. Among others, Tokyo Broadcasting System has invested in 2 FM 801's.

an investment in an FM ACOUSTICS product is a well-advised decision.

Here are some of *the* institutions who's involvement with FM ACOUSTICS precision electronics has been reported:

- AB Television, La Plaine St. Denis, France
- BHC Studios, Milan, Italy
- BLU Morning, Milano, Italy
- Cherry Island Studios, Tokyo, Japan
- CMS Studios, Tokyo, Japan
- Davout Studios, Paris, France
- Dorian Recordings, Troy, New York, U.S.A.
- Excalibur Studios, Milan, Italy
- Flame Recording Studios, London, England
- Havana Productions, Peschiera del Garda, Italy
- Farm Recording Studios, Cessalto, Italy
- II Villaggio, Agrate Brianza, Italy
- Israel Broadcasting Corp., Jerusalem, Israel
- Kiva Recording Studios, Memphis, Tennessee, U.S.A.
- Magic Studios, Milan, Italy
- May Day, Milano, Italy
- Mega Studios, Paris, France
- Midi Studio, Taipei, Taiwan
- Mulino Recording, Acquap., Italy
- NTM, Vimodrone, Italy
- Odyssey Productions, Nashville, TN., U.S.A.
- Olympia Tonstudios, Munich, Germany
- Polish Radio & TV, Warsaw, Poland
- Proton Studio, Hohenems, Austria
- Raezor Studio, London, England
- Rockhouse Blu Studio, Italy
- Studio Delphine, Paris, France
- Studio Sitar, Pontevedra, Spain
- Swedish Broadcasting, Stockholm, Sweden
- Swiss Broadcasting, Switzerland
- Trident Recording Studio, Muggio', Milano, Italy
- Watermelon, Milano, Italy
- Zack Studios, St. Gallen, Switzerland

RECENT EXHIBITIONS

At the 1990 summer CES Show in Chicago PM ACOUSTICS, in conjunction with several other high-end audio manufacturers - such as Duntech, Wadia, and Dorian Recordings, conducted seminars and demonstrations.

...the best sound at the CES Show

These took place in the main auditorium of the Chicago Historical Society Museum, a 800 seat hall. To operate a "

hi-fi" system in such a hall is normally impossible. However the sound produced by the FM 811/Duntech Black Knights was outright amazing and it was no wonder that for the second time in a row it received acclaim as the best sound at the Show. At the CES in Las Vegas (January 10th - 13th, 1991), FM ACOUSTICS presented the *RESOLUTIONS SERIES*™, FORCELINES™ and *Precision Interface Technology*™ interconnects in a roomy, comfortable suite and two adjacent rooms. Once more FM ACOUSTICS walked away with the honour of "The Best Sound at the Show".

This June FM ACOUSTICS was located at "The Lakeside Suite" in the McCormick Center Hotel at the CES Show. At this show the fantastic FM 266 super balanced preamplifier was premiered. More on this phenomenal new product in the next issue of FM ACOUSTICS NEWS.

LITERATURE

The following documentation has become available:

- Technical Bulletin 23, Rev. 2: *Selecting the correct speaker cable*
- Technical Bulletin No. 29: *New European Mains Voltage Standard*
- Technical Bulletin No. 31: *Selecting the Correct Interconnect Cables*
- Reprint of review of the FM 811 in AUDIO magazine, Germany
- English translation of above review
- Reprint of Bert Whyte's report on the *Resolution* ***Series*** AUDIO magazine USA, Nov. & Dec., 1990
- Copies of review in THE ABSOLUTE SOUND:

  The Resolution Series 611: A new Approach To Reference Quality

- "Swiss Companies Producing World Class Audio Electronics" Journal of Berne, 1990
- English translation of report in Journal of Berne

- Data sheets:
  - FORCELINES™
  - Data sheet Resolution Series 811
  - Data sheet Resolution Series 611
  - Data sheet Resolution Series 244
  - Data sheet Resolution Series 266
  - Data sheet FM 236/4 MK II
  - Data sheet PM 236 MK II
  - Data sheet FM 801A
  - Data sheet *Precision Interface Technology* interconnect cables

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