



FM ACOUSTICS NEWS

Volume 4, Winter 1992/93

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FM ACOUSTICS EXPANDS AND MOVES...

A brand-new building located right on the lake of Zurich in Horgen, 15 minutes from Zurich city by tram or car will be the new home of FM ACOUSTICS. The modern building has 60% more space, plenty of daylight and a nice view of the lake of Zurich and the eastern Alps. Production and turnover has increased regularly over the last years. Larger custom designed bum-in rooms, parts stock, manufacturing area etc should help to keep delivery more terms reasonable. The next News has more details on our new location. From 1st of February 1993 on please send all mail to the following address and also note our new Telephone and Telefax numbers:

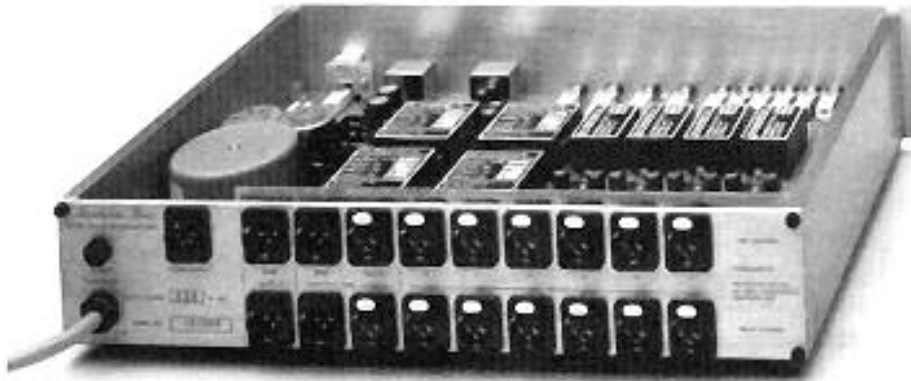
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*The Resolution Series*TM 266

The world's most unique preamplifier





- The only truly balanced preamplifier
- Allows a reproduction standard that even astounds experienced listeners
- Unbalanced and pseudo-balanced signals
- are automatically balanced right at input
- Proprietary enhanced Class A circuitry
- CMRR of 100 dB (about 100-1000 times better than other so-called "balanced" equipment)
- Passes critical "floating test" with flying colours
- Tremendous headroom and reserves in input signal handling capability (+21dBV!)
- Each of the balanced input paths has precisely the same characteristics as the other
- Truly balanced super-coupling outputs automatically adjust and optimise performance for balanced or unbalanced loads

Entirely discrete circuitry using special curve-tracer analysed and listening selected semi-conductors

- Zero overall feedback/feedforward
- Hand-selected and individually matched components of DIN, IEC & MIL standard
- Proprietary precision Balance and Output Level controls are specially shielded guaranteeing unparalleled freedom from noise & interference
- Extremely low impedance of power supply
- Totally modular concept, guaranteeing that the FM 266 does not become obsolete
- Outputs drive any load with perfect reproduction and stability
- No more matching problems between electronics and cables ...more in the next FM ACOUSTICS NEWS...

The experts agree...

"The *Resolution Series*TM provides truly singular performance"

The *Resolution Series*TM precision power amplifiers and pre amplifiers are the result of a tremendous 8 year effort utilising the most advanced research methods and facilities. At the outset it was clear to all involved that this would be the **ultimate** statement of precision audio electronics. This could only be achieved if an entirely different approach to R&D, design, engineering and production methods were granted and encouraged. Singular performance with any load be it highly capacitive, inductive or of lowest impedance provides a new level of accuracy of reproduction. Entirely new technologies, testing machines and production methods had to be developed, as nothing with the required precision and detailed analysing

capability was and is available. Only with such a "zero restrictions" policy can ultimate performance be attained. It was a formidable task, often straining all involved to the limit. But eventually it was a thoroughly satisfying experience. The backing from all of the parties involved nourished the creative spirit and resulted in proprietary developments that facilitated this breakthrough in the performance of precision audio electronics. At its price of nearly Sfr. 50'000, the *Resolution Series*TM 811 may be out of reach for many, but its absolute "cost no object" development philosophy allowed the attainment of absolute standards. The insights gained and the results" of the developments are applied to the entire *Resolution Series*TM product range.

The *Resolution Series*TM is the **ultimate** statement of perfection, crafted for those few who are fortunate enough to be able to appreciate the absolute best.

Famous Italian star **Adriano Celentano**
becomes owner of several
*Resolution Series*TM electronics

There has been no limitation in these designs: there was no time limit (it is now 8 years since FM ACOUSTICS started fundamental research work that led to conclusive design criteria). There was no limit on research funds (the engineering group had literally no financial restrictions). There were no targeted sales prices or limits on production time and -costs, and the research as well as the production preparation team were allowed to use whatever components they desired - whatever the cost. The *Resolution Series*TM eschew any effects, is totally void of colorations, however euphonic they may be, allows even the most minute details in a performance to spring alive. Such efforts result in an incomparable rendering of musical events. It is a true experience to fully comprehend the magnitude of this breakthrough, but as one reviewer says: "These units open up a new level of music reproduction. They are far beyond even the highest of the high end as we know it".

A DIFFERENT APPROACH

Dating back a bit the information below is still worth presenting...

MARK TWO STUDIOTEKNIK of Stockholm, Sweden, a consulting company specialized in the conception of high-class audio systems, has recently run tests to find the ultimate electronic crossover. These tests were done for a project commissioned by PIONEER Electronics AB (Sweden) to develop an absolute State-of-the-Art "reference" audio reproduction system to be used to highlight the capabilities of the professional TAD/PIONEER speaker components. The project was a design study rather than a commercial effort, with the goal of creating an ultimate system capable of reproducing recorded music with truly highest accuracy but at the same time at the SPL's used in control rooms. A true "no compromise" approach was taken by MARK TWO in developing this speaker system. No financial restrictions were imposed on MARK TWO, and this assisted in achieving the absolutely remarkable end result.

MARK TWO decided early on that it would be necessary to incorporate the absolute best in crossover technology in order to extract the ultimate in performance from the system. After comprehensive tests with various crossover designs, the FM ACOUSTICS FM 236/4 Linear-Phase Electronic Crossover was found to give the best results. It "ideally solved the problem of controlling all electrical and acoustic parameters" of the system.

The final design resulted in a stereo five-way system designed in separate enclosures, all stacked in a tower-like arrangement. The bass system is based upon a "compound" concept, i.e., two speaker units working together in acoustic series in the same cabinet.

"The FM 236-4 is absolutely excellent"

To optimize the system performance various electronic crossovers were put through comprehensive testing procedures.

As stated by MARK TWO'S Andreas Olsson:

"Four different crossover units have been tested: 3RD order Butterworth, 4th order Linkwitz-Riley (2 units) and the FM ACOUSTICS units with Gaussian type slope characteristics. We congratulate FM ACOUSTICS for having been selected number one. A very flat response better than $Y\pm 2\text{dB}$ over the 30Hz-16KHz range without the use of equalizers) was accomplished in the speaker system with the FM 236/4. This unit was also definitely better in definition and perspective, giving a better performance in all respects!"



A system that reproduces the entire audio spectrum with an outstanding degree of realism. Designed for Pioneer Sweden by Mark Two of Stockholm.

Mr. Olsson went on to further explain that:

"Crossover filters are often the choice of a compromise between the speaker frequency response, power limitation and the requirement for phase consistent transitions. The best solution proved, to be the FM ACOUSTICS approach: combining absolute linear phase characteristic (FM ACOUSTICS guarantees a phase accuracy at the crossover point of better than 2°) with a unique Gaussian filter providing a consistently increasing slope of 36 dB/octave. To our knowledge this is the ; only filter that achieves correct phase transition, very high attenuation outside the pass band, and correct step response without any ringing or overshoot... The small crossover frequency modules can be replaced in seconds. This allowed precise fine tuning of the system. The FM 236/4 is absolutely excellent."

The signal from the sources is fed via the pre-amplifier to an FM ACOUSTICS FM 214 Precision Balanced Line Driver which boosts and perfectly balances the signal to the crossovers. The resulting system can reproduce frequencies in the whole perceptible audio spectrum with an astonishing degree of realism and lowest dynamic and static distortion.

After a successful press conference, the system demonstrated its excellent capabilities in the "Berwaldhallen", the concert hall belonging to Swedish Radio, to an audience of 500 professionals, musicians and engineers.

THE FM 236/4 MKII SERIES

The FM 236 /4 MKII is based on the immensely successful FM 236/4 Linear-Phase Electronic Crossover and contains all features and all principal design and performance characteristics of the FM 236. The FM 236/4 MKII series of Linear-Phase Electronic Crossovers consists of 3 and 4-way mono versions of the FM 236 MKII Linear-Phase Electronic Crossover. It also uses FM ACOUSTICS' unique linear-phase technology and includes all of the features of the FM 236 MKII.

Some of the salient features of the FM 236/4 MKII are;

- Unmatched reproduction accuracy
- No speaker lobbing irregularities thanks to perfect in-phase response
- Higher clean sound system SPL's thanks to lower diaphragm excursion of drivers
- Perfect step response with absolute freedom of overshoot and ringing
- Full 90dB attenuation results in much lower sound system intermodulation distortion
- Discrete Class A balanced symmetrical input featuring a CMRR of 90dB over the full frequency range
- Pure discrete enhanced Class A circuitry throughout. No feedback or feedforward
- Absolutely no IC's, op-amps, discrete op-amps or transformers in audio path
- Balanced outputs are truly symmetrical and perfectly pass critical floating test
- Plug-in board with 4 discrete precision levelling amplifiers/limiters optimised for each frequency band
- SIGNAL PRESENCE and PEAK LED as well as THRESHOLD LEVEL and LIMIT ON-OFF switches and indicators for each frequency-band are locate on front panel.

The FM 236/4 MKII is not simply the ultimate crossover. It is a superb combination of:

A truly Super-class Linear-Phase 3- or 4-way 6dB/octave Electronic Crossover
 4 superb sounding, proprietary precision levelling amplifiers/limiters in discrete Class A technology
 4 superior, truly balancing, symmetrical line drivers
 All this in a sturdy 1 unit 19" rack chassis with a build quality second to none..

The FM 236/4 MKII Linear Phase Electronic Crossover's output buffers allow a gain of up to +18dB, as requested by several mobile P.A. companies. The output drivers allow +28dBv of drive voltage! The advantage of this is that higher drive levels can be used and a corresponding better signal-to-noise ratio and interference rejection is



achieved. Furthermore, the superior line drivers can drive many hundreds of meters of cable the most difficult loads (multiple amplifiers) in parallel. Even in the largest sound reinforcement system only two FM 236/4 crossovers are required (instead of the usual one crossover per 2-4 amplifiers).

Another added feature in the **MKII** Version are extended potentiometer axles rather than the previously recessed axles that could only be adjusted with a screwdriver. The new LEVEL and LIMITER THRESHOLD potentiometers allow adjustment either by hand or with a screwdriver.

Recently we invested in two of the new FM 236/4 Linear Phase Electronic Crossovers... The results were simply unbelievable! Just by exchanging the crossovers we obtained between 3 to 7 dB in increased system SPL... There is far less strain on the individual drivers and a considerable reduction in distortion. Thanks to this increase in distortion-free SPL, the FM 236/4 has saved me from investing an additional US\$ 40'000.- in speakers and amplifiers - and we now have even more reserve than a system twice the size! The calculation is quite straight-forward; the savings in transportation costs alone paid for the purchase of these Linear-Phase crossovers. Investing in FM ACOUSTICS products pays off amazingly well, despite the initially higher price! If you care about quality and cost/performance ratios, you should check out the FM ACOUSTICS units."(Name withheld by request), PA. Rental Company

To avoid any possibility of signal degradation, a special circuit which does not use any IC's or VCA's in the signal path of the limiters is employed.. In fact no IC's are used the audio circuitry at all. The discrete circuitry uses 120 hand-selected (!) transistors which are additionally subjected to FM ACOUSTICS' unique listening-test procedure. This is done with each individual semiconductor and only perfectly matched semiconductors are used. These are operating in their most linear drive-mode. Error correction and feedback circuitry can be avoided with the resulting phenomenal reproduction accuracy FM ACOUSTICS products are famous for.

The unique, discrete limiters are fine tunable to any system installation and any driver complement, thereby epitomizing performance of the entire system. The combination of these discrete limiters with FM ACOUSTICS' proprietary 36 dB/octave linear phase filter technology gives better results than other protection mechanisms of "processor systems" that are employed to keep the drivers operating within safe limits. By adjusting the threshold and, if necessary, the internal limiter delay settings, the FM 236/4 can be configured to work optimally with any speaker system. It offers accurate protection. Thanks to FM ACOUSTICS' linear phase filters, no sliding frequency protector circuits are required (these always change the spectral balance of music at middle and high volume levels and thereby upset the whole dynamic frequency balance of a system).

The enthusiastic reactions to the performance of the FM 236 series of Linear-Phase Electronic Crossover is a clear indication that the time for a new generation of crossovers has come. Many hundreds of FM 236 series crossovers have already been installed worldwide. From applications in world class concert hall systems to laboratory reference use, from multi-way studio monitoring applications to truly demanding mobile and even domestic audiophile uses, the FM 236/4 clearly improves complete sound system performance. The FM 236/4 MKII guarantees an incomparably pristine reproduction with **any** system and any combination.

The FM 236/4 MKII is a monophonic unit and can be supplied either as a 3-way or a 4-way crossover. Both are available with or without plug-in limiter boards. The limiter board can be installed in the field within 10 minutes with a screwdriver. Thanks to modular construction, a 3-way model can later also easily be updated to a 4-way model and vice versa.

ATTENUATION AND DIAPHRAGM EXCURSION

Drivers only perform adequately within a limited bandwidth. Signals out of this range must be attenuated as steeply as possible. The electrical bandwidth supplied to a driver must always be considerably narrower than its mechanical limits would allow.

Fig. 1 & 2: Attenuation curves of the FM 236 (Fig. 1) in comparison with those of a popular crossover (Fig. 2).

The much higher attenuation of the FM 236 results in remarkably lower distortion, higher SPL capability and considerably increased headroom of the entire soundsystem.

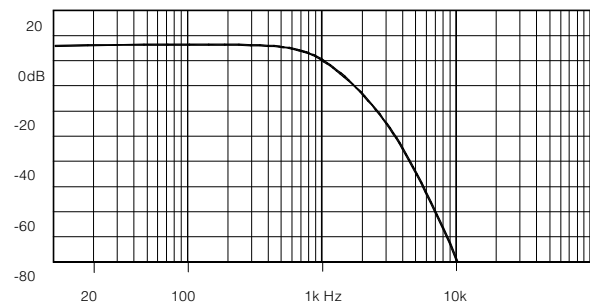


Fig. 1: FM 236 LINEAR PHASE CROSSOVER 36dB/OCTAVE

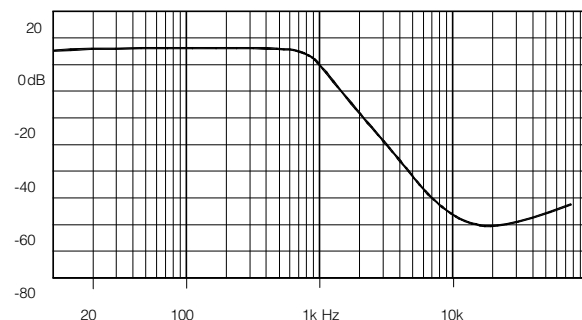


Fig. 2: WIDELY USED 18dB/OCTAVE CROSSOVER

A unique advantage of FM ACOUSTICS Linear-Phase technology is the attenuation characteristics of its Linear-Phase filters, which have the feature of full attenuation (attenuation to -90 dB!) See Fig. 2). This results in absolutely singular performance, which is better understood when comparing Fig. 1 and Fig. 2. With standard filters the response of a driver is not attenuated any further once the typical stop-band damping has been reached (with the usual filter circuits a maximum of 40-60 dB of total attenuation is obtainable). Fig. 1 shows the attenuation curve of a popular crossover while Fig. 2 shows the attenuation of the FM 236 series of Linear-Phase Crossovers. As can be seen standard crossovers suddenly stop attenuating (this example at around 5 kHz). Above 7 kHz the signal level fed to the low frequency driver actually increases! The low frequency driver is thus supplied with increasing high-frequency signal with the obvious negative results of radiation in the stop-band. This of course results in strong additional distortion, non-uniform diaphragm excursion, lobbing irregularities, etc.

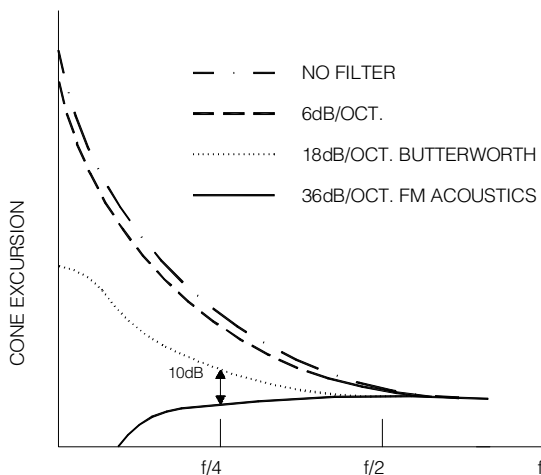


Fig. 3: *Voice-coil/diaphragm excursion in relation to frequency for two standard filter circuits and the FM236's linear-phase filters. At $1/4f$ of the normalized frequency the diaphragm excursion is no less than 10dB lower with the FM236 series of Linear-Phase Crossovers.*

Exactly the same applies to the HP filter. As the low frequency attenuation of standard crossovers is much less than that of the FM 236 crossovers, the HF driver has to handle much larger levels of low frequency signal. This requires higher diaphragm excursion to achieve the same SPL. The result is much higher distortion and less headroom. When using the FM 236 series of crossovers the dramatically reduced diaphragm excursion and freedom from overshoot results in . With the FM 236/4 drivers can actually handle much higher signal levels which results in reduced distortion at a given SPL (or a considerable increase in achievable SPL when operating at the same distortion level).

FM ACOUSTICS unique Linear-Phase filters guarantee perfect blending of drivers: a phase accuracy of **better than 2°** at the crossover can be guaranteed - absolutely unique in crossover technology. This, in combination with complete attenuation (down to -90 dB) guarantees total optimal damping of unwanted frequencies and therefore optimal performance of the individual drivers. The resulting distortion reduction gives a dramatically increased transparency of reproduction and at the same time makes possible higher clean SPL's.

THE ULTIMATE LINE DRIVER

Experiencing matching problems?
 Need to drive long lines?
 Interfacing unbalanced to balanced?
 ...Here is the ultimate solution..

In the FM ACOUSTICS tradition the FM 214 and FM 216 contain various features that come from plenty of experience in the field. These are important in practical use and are not found on other balancing units:

- ◆ No coloration or distortion
- ◆ Perfect step response, superb rise time and no slew rate limitation coupled with total freedom from overshoot and ringing
- ◆ Extremely low hum and noise levels
- ◆ Highest headroom thanks to FM ACOUSTICS' proprietary discrete pure Class A circuitry
- ◆ Internal ground link to lift electrical ground from chassis (multiple interface units can be installed in same rack)
- ◆ A separate external power transformer for each unit to avoid ground loops
- ◆ Precision on-board power supply regulation and stabilization
- ◆ Delayed turn-on with automatic muting and instantaneous switch off
- ◆ Inherently distortion-free stages (the usual error correction is avoided)
- ◆ Phenomenal dynamics
- ◆ Highest drive capability and absolute stability guarantee precision signal transfer over very long distances (hundreds of meters) and this even with high capacity cables.
- ◆ Proprietary pure discrete Class A circuitry eliminates audio transformer distortion and limitations of OP-amp based designs.

The FM 214 and FM 216 are the perfect interface units, resolving any interface, level and impedance problems. Applications include the interconnection of unbalanced consumer and semi-professional equipment with any type of balanced professional equipment. The FM 214 is without doubt the ultimate live driver. With the FM 214 and the FM 216 it is also possible to upgrade an unbalanced system interconnection to a symmetrical balanced interconnection. Pristine transfer of the original signal is guaranteed.



FM ACOUSTICS' intrinsically accurate proprietary, discrete Class A technology is utilised in the FM 214 balancing "step-up" precision line driver and its corresponding FM 216 precision line level interface/attenuator.

A long series of extensive tests in a large variety of applications proves the distinct sonic and technological superiority of these units when compared with any other interface unit available. The FM 216 complements the FM 214 for all applications where a true precision step-down/unbalanced unit is required. It is a precision attenuator which carries all of the unique FM ACOUSTICS features. This unique standard of

- Perfect interfacing between system components
- Optimization of signal transfer
- Practically unlimited drive capability

Using these technologies any possibility of signal degradation is avoided, and preservation of the finest musical detail is guaranteed. The result is absolutely unparalleled accuracy in interfacing and therefore optimal system performance. The improvement in performance compared with existing line drivers is astounding; once this difference is experienced, it becomes clear why the FM 214 and the FM 216 are such a success.

The FM 214 and FM 216 are the perfect interface units/ resolving any line drive, interface, level impedance and balancing problem, a small investment that gives great results...

The FM 214 and the FM 216 also solve HF and parasitic oscillation problems. They are a small investment that give great results, as confirmed by users the world over. They find use in situations where unbalanced units must be optimally interfaced with professional balanced equipment operating at levels of +4dBv, +6dBv, +8dBv and other professional levels. They surpass the most exacting requirements of any State-of-the-Art recording/reproduction system.

We evaluated the FM 214 and FM 216 in POWERPLAY STUDIOS in extensive listening evaluations. The units were compared to the original signal and also directly with another famous brand, balancing unit which is used in most broadcasting stations. The listening team consisted of six people. The FM ACOUSTICS interface units sound definitely cleaner, less "covered" and more lively. They clearly exhibited a wider stereo image. There was better depth and even within the depth there was better definition. In addition to that there was much improved location of the individual instruments, and some listeners commented on "a greater beauty and naturalness" of sound. When switching back to the other unit the soul of the music was gone - it sounded almost dead. It is again and again astounding how you guys have mastered the magic of audio electronics,"
Peter Mac Taggart, Switzerland
Independent Engineer/Producer

THE FM 214 IN BROADCAST APPLICATIONS

All of the signals that are so carefully prepared for broadcasting are actually going through cheap IC or transformer based interface units. These units have a detrimental effect on the pristine quality of the music. The FM 214 is therefore the optimal solution for interfacing unbalanced to balanced signal lines (and vice versa) in broadcasting stations. And cost is negligible.

On the next 2 pages you will find a letter received from Craig Dory of the acclaimed DORIAN RECORDINGS. It is such a precise description of FM ACOUSTICS precision electronics that it is reprinted here in its entirety.

Mr. Manuel Huber
FM ACOUSTICS LTD
Tiefenhofenstr. 17



CH-8820 Wädenswil / Switzerland

July 31, 1991

Dear Manuel,

I just wanted to write a short note to pat you and your entire staff at FM Acoustics all on the back and to let you know what a pleasure it is to use your amplifier and speaker cables in monitoring our recording and post-production sessions. And, I wanted to let you know that we've chosen the FM Acoustics 811 and Forcelines speaker cables as Dorian's new references for our monitoring systems!

First, I must say that I've never seen an amplifier physically constructed with such care and attention to detail. The various military and NASA contractors could probably learn something from a study of your construction standards and parts-selection procedures.

The sound? Simply put, after hours and hours of use in several separate recording and post-production sessions, the 811 is the most signature/less amplifier that we have ever used. Period. It's all there: detail, color and control.

You know the normal demands placed on the monitoring system well. At Dorian, we depend on the monitoring system to "see" into the recording chain and, as the only metric, in placing the microphones in exactly the right spot for the artist(s) and repertoire being recorded. We depend on our monitoring system to provide us with an absolutely unimpeachable aural "picture" of the recording without adding a signature of its own.

While using the 811 and Forcelines cables, I am able to hear substantially more detail and gradations in tonal color, as well as more of the subtle spatial cues that we use in selecting and placing our microphones in setup. I am more able to discern from what surface a particular reflection is coming, and what coloration to the sound that particular reflection it is producing, more quickly, and with less guesswork.

In short, what we call the "range of acceptability" for microphone placement is narrowed with the 811 - with it, we have better information from the monitoring system to choose and properly place our microphones for the recording. As well, the "window" through which we look into the recording seems to be "cleaner" with the

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FM Acoustics

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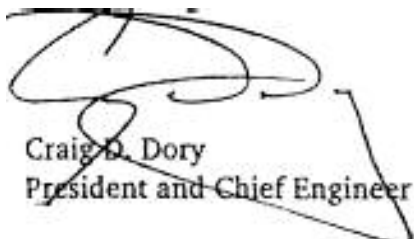
811 and Forcelines cables. What this all translates into, is better recordings from Dorian.

In addition, one of the more impressive features of the 811/Forcelines combination is their ability to control loudspeakers in the low end of the audio spectrum where time-coherent current delivery and speaker control are most critical. Our organ recordings with Jean Guillou and our new orchestral recordings with the Dallas Symphony are particularly challenging to amplifiers and their ability to control woofers. The FM Acoustics amp and cables produce a seemingly bottomless and distortion-free low-end, with absolute control of the loudspeaker.

We have never heard another amplifier reproduce the 16- and 32-foot stops from the Tonehalle and St. Eustache organs properly. Until we began using the FM Acoustics amps and Forcelines, we had no idea, for sure, whether or not certain passages with complex organ pedalwork had actually made it onto the recording or not. Because of the current demands placed on the amplifier by our recordings, those passages always sounded muddy and somewhat bloated. After listening with the 811 and Forcelines cables, we were definitely relieved to hear that *all* the music from Jean Guillou's performances had made it to the recordings. WOW! In a properly set up control room, we even feel the pressure waves caused by the notes Jean Guillou sets up with his unrelenting pedalwork and from the standing waves in the original recording space - just as we remember from the recording sessions. What a difference!

As well, orchestral tuttis (passages where the entire symphony plays together) can be particularly demanding on an amplifier. Especially in fortissimo passages, the textures of the combined orchestral instruments can "load up" the soundstage, as well as become very harsh and constricted, due to current limiting. In our recent recordings with the Dallas Symphony, the FM Acoustics amplifier and Forcelines cable presented a rock-solid soundstage for all dynamic markings and orchestral textures. We were able to record a full symphony orchestra using our minimal microphone techniques because we could hear, in the control room, all the information (the subtle detail and tonal color) that we needed to make microphone choice and placement decisions, even in tonally complex, tutti passages.

Thank you Manuel and FM Acoustics for bringing these products into the light of day. From now on, you will all be a part of each new Dorian recording. With best regards and wishes for continued success.



Craig D. Dory
President and Chief Engineer

SPARE PARTS AVAILABILITY



FM ACOUSTICS guarantees that 99.8% of all parts of all products are always available ex stock.

FM ACOUSTICS not only supplies the ultimate audio electronics, but also guarantees that these investments keep their value and do not become obsolete.

FM ACOUSTICS products have a superb reliability record. This is due to several reasons, amongst them initial component verification, proprietary components selection, unique production methods, extremely extensive pretesting of every single part assembly, double pre- and final tests and heavy duty burn-in and vibration screening procedures which **each** unit must undergo prior to leaving the factory.

Over 3000 different components are on stock in quantities of up to 10,000 pieces.

With the extensive life expectancies associated with FM ACOUSTICS electronics, the longterm value of the product is partially based on the availability of parts. This means maintaining a comprehensive stock of spare parts at all times- currently over 3000 components are on stock (in quantities of up to 10,000 pieces each), a total of close to 1 million parts. For many manufacturers such an investment in parts is prohibitive, as it ties up an immense amount of capital. However, without this commitment FM ACOUSTICS could never produce to the standard it does. Unparalleled spare parts availability is guaranteed: 99.8% of *all* spare parts for *all of our* products can be supplied ex stock *at all* times! For every product FM ACOUSTICS guarantee an absolute minimum spare parts availability of 10 years. In fact, with the exception of 2 parts **every** component of every product ever manufactured by FM ACOUSTICS is still available!

...an FM ACOUSTICS product will not lose value, performance or become unusable because of the non-availability of a particular part

This extensive stock not only helps to stabilize production, but it also allows a rapid response to customers' needs should the occasion arise. When technology and performance advance, existing investments can be kept in pristine condition and maintained at the highest standard. They will not lose value, performance or become unusable because of the non-availability of a particular part. The secondhand prices of FM ACOUSTICS products prove this: they often go for as high as their original price, and repeatedly one hears of sales at figures even higher than the original price, something that very rarely happens with audio equipment. Some of the products are actually starting to become collector's items.

STABILITY OF LINE DRIVERS

Analysing failure reasons in audio installations, one finds that quite a few of today's preamplifiers, crossovers, CD players, and even professional tape machines, mixing desks, outboard equipment, etc., have poorly designed line drive stages. While they may work acceptably on the test bench, their performance in the field is not something to "write home" about.

In many designs, performance suffers because of insufficient stability reserves

When connected to real-world loads some even become unstable or oscillate at very high frequencies far above the audio band. These problems may be occurring momentarily or continuously. There have been critical situations, such as where a certain make of crossover worked for two years but then suddenly its output circuits went into wild parasitic oscillation, ruining expensive speakers and amplifiers. Analysing such failures yielded interesting and not too well-known results: even over this relatively short period of time the parameters of the IC's used in the line stage can change considerably. Because of insufficient stability reserves in many designs, performance suffers and the whole circuit can become partly or fully unstable.

In semiconductor production large tolerances are quite common...

One must be aware of the fact that in semiconductors production **extremely** large tolerances are quite common, and that very few characteristics are guaranteed by the manufacturers. Furthermore, these characteristics are only guaranteed at the time of sale. How the semiconductors perform after a couple of years is an entirely different matter - and one that is unfortunately not of great concern to many semiconductor manufacturers.

FORCEPLUG 200



As the amplifiers of the Resolution Series and FMACOUSTICS large professional amplifiers are capable of delivering peak currents of up to 400A, special high-power, lowest-loss, precision connectors have been developed. In conjunction with the singular FORCELINES cables, these connectors assure absolutely pristine signal transfer to the speaker - something which is not achievable with the ordinary 5-way binding posts used in other amplifiers. The FORCEPLUG connectors guarantee an incredibly low contact resistance of less than 80 u Ohms and this even after 1000 insertions. FORCEPLUG connectors guarantee a continuous current handling capability of 200A^{RMS} and 1200A^{Pk}.

RECENT INSTALLATIONS

For their new OB van **Munwha Broadcasting Corp. of Seoul Korea** has selected an FM 600A/ULI precision power amplifier.

*

The FM 801A continues to provide superior results in professional applications. Comments confirm the uniqueness of this amplifier.

After careful evaluation the famous **Mountain Studios in Montreux** have decided on an FM 801A for the main monitoring. David Richards, resident engineer/producer remarked that the FM 801A improved the monitoring so much that they were, able to remove the equalizers previously needed completely.

"As concerns the 3BOP Infrasonic (10 Hz) Control Rooms, my comments on the "sonics" of the room equipped with triple FM 801A power amplifiers are simply:

This Kinoshita Monitor-FM ACOUSTICS Amplifier-10Hz Room combination exhibits a level of musicality I have as yet never experienced, except when standing in the midst of an un-amplified acoustic band or orchestra. It boggles the mind, the naturalness of music timbre and transients, the sonic detail and seemingly endless re-serve power; this sound plateau defies imagination and words to describe it."

World-famous studio designer **Tom Hidley**, designer of Bop's fantastic new studio complex in Bophuthatswana, Southern Africa, had this comment regarding the combination of Kinoshita Monitors, FM 801A precision power amplifiers and the newly designed 10 Hz room.

"We have spent close to a year evaluating most top amplifiers. We even had some made especially for us, using new tube technology. After all these efforts, we received our FM 801A 's, installed them in half an hour, warmed them up for 2 hours and then listened..... All I can say now is this: If you are serious about your music, really serious, and you are tired of playing around, then get an FM 801A - and enjoy".

*Andre Perreault, Managing Director
BOP RECORDING STUDIOS
Republic of Bophuthatswana*

*

Famous Italian Star Adriano Celentano not only privately owns a Resolution Series power amplifier but installed two FM 801 precision power amplifiers in his studios. Enrico la Fake, producer/engineer remarks:

*"The FM ACOUSTICS have a neutrality and timbre that surpasses even the best of esoteric HiFi amplifier"
It is the optimum combination".*

TOMORROW'S HEADACHES

A company that is here today and gone in a couple of years will induce tomorrow's headaches. It is important to purchase from the right source! Only when a company has proven itself to be stable and efficient over the long-term does one have some assurance that information, service, parts and additional products will all be available in the future when they are required. It pays off well to select carefully and make a wise choice.

SPECIFICATIONS

The singular qualities of the *Resolution Series*TM cannot be explained utilizing standard measuring methods and evaluation procedures. Most measurements performed on audio equipment (and the results thereof) have little musical relevance and should therefore not be given too great an importance. Contrary to current practices, specifications should not be optimised just for the sake of a specification sheet that reads well. The most important factors governing the reproduction accuracy of audio electronics cannot be measured with today's methods.

Music consists of transient signals with extremely complex harmonic structures that are continuously changing in level and spectrum...

When a certain minimum standard of performance is achieved, the factors measured as standard (such as e.g. and TID, THD and IM distortion) have little or no relevance for the actual audible performance of equipment. These distortion measurements are not totally useless, however, for when interpreted correctly they can indicate the presence of certain problems. Lowest IM, TID and THD distortion figures **per se** are not of prime importance, and they most certainly should not be the reason for compromising other aspects. There are many audio electronics on today's market which boast very low IM, TID, and THD distortion ratings when measured with standard equipment. But when actually driving real world loads, these units create many times more distortion than other units which are specified with "worse" ratings on the data sheet. Such data must be interpreted correctly, otherwise they can be very misleading

Today measuring techniques are not fully representative of what is actually heard.

FM ACOUSTICS has succeeded in devising their own racy. While these specifications still only tell "part of the story", FM ACOUSTICS specifications are guaranteed for every single unit which leaves the factory. They help to give an idea of the dedication perfection and craftsmanship that go into FM ACOUSTICS' products. The final proof is in the listening and here one realized the excellence.

"WATTS"

Again and again users experience that FM ACOUSTICS power amplifiers achieve considerably higher clean maximum SPL's than other amplifiers that are boasting higher power output in their specifications sheets. The additional reserve and unique mild clipping characteristics of FM ACOUSTICS power amplifiers explains why there is no harsh distortion even when the amplifiers are driven into clipping. This partly explains the expression.

"One FM ACOUSTICS Watt is worth
2-3 OTHER Watts".

NEW LITERATURE & INTERESTING READING

- Technical Bulletin 23: "*Selecting the correct speaker cable*"
 - Data Sheet FM 214 & FM 216
 - Data Sheet FM 236 MKII
 - Report on *Resolution Series*TM in "La revue du Son"
 - English Translation of above
 - Reprint of Bert Whyte's article on the FM 266 in Audio magazine USA: "Swiss Neutrality"
 - Letters from users
 - List of Professional users
 - Cassette tape showing the errors created by different types of speaker cables
- There also were reviews in the following magazines:
- Review on *Resolution Series* 266 and 811 in the Japanese Stereo Sound Magazine (Japanese, no translation)
 - Japanese Review on the *Resolution Series*TM 611X in the Stereo Sound Magazine (Japanese, no translation)

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