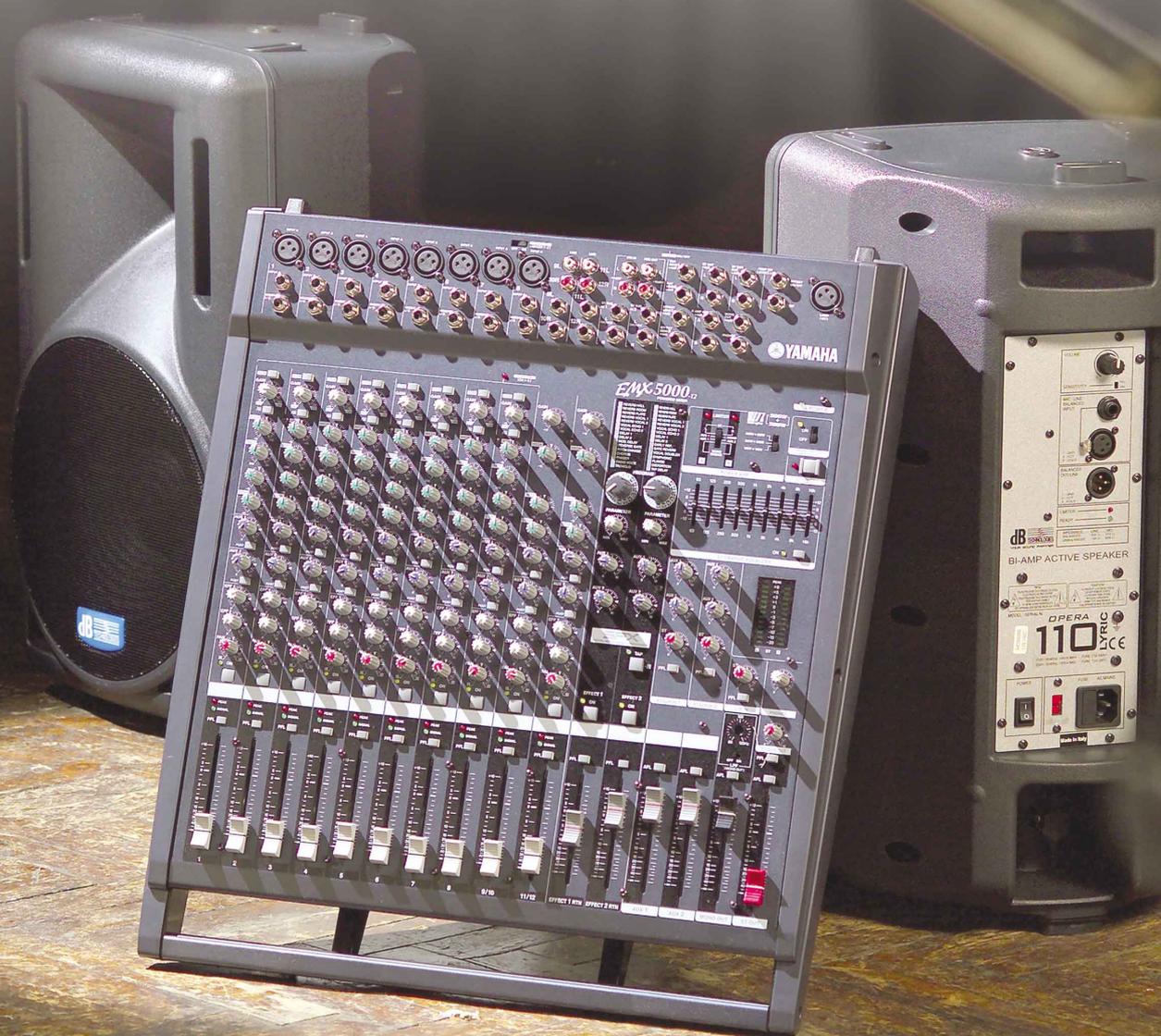


Sound On Sound's FREE live sound supplement

# Sound On Sound **LIVE**

Live sound products  
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Tips and techniques for  
better on-stage sound



Sound On Sound Live supplement

Issue number 2: November 2004

**SOUND ON SOUND**

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On test

Yamaha EMX5000-12

Powered stage mixer

# Yamaha EMX5000-12

Powered mixer

A couple of innovative design features and top-quality built-in effects help this versatile stage desk to stand out from the crowd.

Yamaha have built mixers and power amplifiers for as long as I can remember, and they're also a major player in the field of digital effects — so it's only reasonable to have high expectations in all areas of performance when they produce a powered live mixer with effects. Two models in the EMX series are available, a 12-channel version and a 20-channel version. Aside from the number of input channels, the two are

similar and we've chosen to review the 12-channel version.

## The EMX5000-12

Outwardly, the EMX5000-12 is a fairly straightforward mixer, not much deeper than a normal stand-alone mixing desk, but under the hood is a 500W-per-channel stereo power amplifier that uses Yamaha's new 'EEEngine'

Test  
info

Reviewed by Paul White  
Photos by Mark Ewing



high-efficiency amplifier technology to keep heating to a minimum. Few details are supplied, but I suspect that this technology uses automatic power-rail switching to match instantaneous power needs.

A variable-speed fan system monitors the heatsink temperature and adjusts its speed accordingly. This design is claimed to use 50 percent of the energy of Yamaha's conventional amplifiers and to generate around 35 percent of the heat during normal

#### At a glance

### Yamaha EMX5000-12

#### Pros

- Lots of power considering the size and weight of the mixer.
- Two really good effects processors.
- Clear, logical control surface.
- Built-in sub filter.
- Good value for money.

#### Cons

- EQ mid-band sweep range could go lower.
- Graphic EQ can't be split into two mono units for main and monitor use.
- Not all the line outputs are balanced.

#### Summary

There are no significant weaknesses in this powered mixer, which combines Yamaha's power-amp technology with two very flexible yet simple effects processors, a comprehensive mixer and a nine-band graphic equaliser. Its shortcomings are very minor compared to its strengths.

#### Information

- £ Yamaha EMX5000-12 £659; EMX5000-20 £849. Prices include VAT.
- T Yamaha-Kemble +44 (0)1908 369269.
- W [www.yamaha-music.co.uk](http://www.yamaha-music.co.uk)

use, though it's no featherweight — the EMX5000-12 weighs a hefty 15kg, so it's just as well that its arm-rest doubles as a carrying handle.

Unusually, Yamaha have included a power-switching feature that allows the user to select between three maximum output levels (500, 300 or 100W per channel), to suit the size of room being played. This could also be useful if you connect speakers with a lower power rating than the maximum, to avoid overdriving them. As you'd expect, the amplifiers are fully protected against short-circuited outputs, DC offset or overheating, while limiters in the signal path prevent clipping under high signal conditions. The amplifier can be used in mono bridge mode (1000W) or may be used to drive a main speaker in mono plus a separate monitor, the latter fed from Aux 1. A further permutation allows both channels to be used to drive monitors (sourced from Aux 1 and 2) for situations in which the EMX5000 is being used purely as a monitor mixer.

Another unusual feature is the incorporation of two effects processors, each fed from its own post-fade send pot. Each can produce 16 'SPX'-style effects. The first nine effects produced by each 'engine' are identical and comprise reverbs and delays, while the remaining seven differ between the two engines and include various specialised vocal treatments, special effects such as 'Radio Voice', pitch shifting, modulation effects, and Yamaha's classic 'multi-chorus' Symphonic treatment. A single Parameter control per effect processor allows the most important elements of each preset to be adjusted. The delay includes a very welcome tap-tempo function enabling the delay time (of the tap-delay program only) to be set very quickly during a performance.

Constructionally, the mixer is pretty much what you'd expect from Yamaha — steel chassis, sleek lines and a clear layout, though I'd swear the knobs are more Mackie-like than on previous models. The only connections not accessible from the top panel are the power inlet and the speaker outputs, the latter on both Speakons and quarter-inch jacks. In normal use, the minimum speaker load is 4Ω per channel, while in bridge mode the minimum load is 8Ω. It's unusual to have the choice of jack speaker outputs on an amplifier this powerful but it is, nevertheless, welcome, as anyone who has ever turned up at a gig with faulty or missing Speakon cables will testify.

The majority of the audio connections are on jacks, other than the Speakons, the XLR mic inputs and the phono connections for consumer recording and playback devices. Aside from the balanced mic and line inputs, »



On the rear panel you'll find the speaker outputs, available (usefully) on both Speakon and quarter-inch jack connectors.

internal ones, if required. That leaves a conventional pan control, a channel On button, a PFL (Pre Fade Listen) button and a 75mm channel fader.

The On button has a bright status LED, while two further LEDs indicate the presence of signal in the channel (green) and levels 3dB below clipping, measured post-EQ (red). Phantom power (48V) is global and is activated using a slide switch above the mic inputs. A red status LED above the channel trim controls shows when this is turned on.

The stereo channels have the same general layout as the mono channels but are line-only, with no pad or filter switches. In addition, the EQ has no swept mid, instead having a fixed mid frequency of 2.5kHz. As these are stereo channels, a balance control takes the place of the pan control, but the aux and effect send arrangement is identical to that of the mono channels. The inputs are available on both jacks and phonos, allowing the easy connection of CD players and so on.

Two further simple stereo line inputs are available as Sub inputs (they can also be used in mono by inserting a jack into only the left input socket) and their controls reside in the master section. These have basic level controls plus sends for Aux 1 and 2, enabling them to be fed to stage monitors. They also have PFL buttons for monitoring purposes via the headphone output, and they can be used as effect returns when connecting external effects devices. Tape inputs and outputs are also available on phonos for recording gigs and playing back the evidence! A tape-return level control is situated in the master section, along with a PFL button.

### Master section

To the left of the master section are the two effects sections, each controlled by means of a 16-way rotary effect-selector switch and the Parameter control I mentioned earlier, which varies the most important parameter of the selected effect. Each

A mono channel strip from the EMX5000-12.

most of the connections are unbalanced, which may seem unusual, but then the majority of connections used by gigging musicians, as opposed to professional PA operators, do tend to be unbalanced.

Technically, the mixer has a robust but non-esoteric specification, including a 20Hz-20kHz frequency response (+1dB/-3dB) and a mic-amp EIN (Equivalent Input Noise) figure of -128dB. Distortion is less than 0.5 percent from input to speakers and the quoted levels of hum and crosstalk are more than adequately low for a product of this type.

### The inevitable tour

This particular mixer has eight mic/line channels and a further two stereo line-only channels. Its mono channels are fairly conventional, with an input-gain trim control, a 26dB pad switch and a choice of XLR mic or balanced-jack line inputs. A further TRS jack provides a channel insert point and there's also a switchable 80Hz low-cut filter. There's no mic/line switch — you simply plug into the appropriate socket.

Most mixers of this size have three-band equalisers and this one is no exception, though the mid frequency is sweepable between 250Hz and 5kHz. Personally, I'd have liked it to go a little lower, as there are often boxy artifacts in the 150-250Hz range

## "There are few (if any) features that aren't needed, and it's built like a tank."

that need a little cut, but you have to accept compromises when the EQ has only three bands. The high and low controls are conventional shelving filters operating at 10kHz and 100Hz respectively, and all three bands have a +/-15dB gain range. Following the EQ are two Aux sends, each switchable from pre-fade to post-fade by means of buttons in the channel strip, after which there are two further effects sends dedicated to feeding the two internal effects engines. These two effects busses also feed physical output jacks so that external effects can be used instead of the

of the two effect processors also has an Aux 1 and an Aux 2 control, allowing a specified amount of effect to be sent to the stage monitor outputs. At the bottom of each effect strip is an On button with a bright yellow indicator LED. The second effect processor can be bypassed using an optional footswitch, and a second footswitch jack is available for setting the delay tap tempo, which is useful if you're both performing and mixing yourself from the stage. To the right of the footswitch jacks is an XLR that provides 12V power to an optional lamp — again, extremely useful, especially in dark venues.

All the major functions in the master section have their own fader — namely Effects Return 1 and 2 for the on-board effects, Aux 1 and 2 sends, Mono Out and the main Stereo Out. Above the last are the PFL (Pre Fade Listen) and AFL (After Fade Listen) switches (see 'Jargon explained' box). The Mono output may be used to feed a subwoofer and has a recessed switch that brings in a low-pass filter. This operates between 80Hz and 120Hz and can be manually adjusted via a recessed pot accessible with a screwdriver. When the amp mode is set to 'PA plus monitor', as explained earlier, the Mono Out fader also adjusts the level of the 'speaker B' outputs and, if mono bridge mode is selected, sets the level of the 'speaker A' outputs. The main outputs are unaffected by the low-pass filter settings, so if you need to restrict the low-end feed going to the main speakers when using a sub-woofer you'll have to arrange this some other way — for example, by using an active crossover processor (see 'Jargon explained' box).

The switch that changes the amplifier outputs between their various modes (stereo, bridged mono, 'mono plus monitor' or two monitors, as listed earlier) is located to the right of the effects section near the top of the panel. Here you'll also find the three-way switch that sets the maximum power available, a 'Yamaha Speaker Processing' switch, and a standby button that mutes the mono channels but leaves the stereo channels active for carrying interlude music or whatever else you need. Yamaha Speaker Processing is essentially an alternate low-end voicing that can be used to compensate for the tonality of some speakers. Really, you just have to try



it with your speakers and see if they sound better with it or without it.

Below these switches is a nine-band graphic equaliser with bands set at 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz, all with a +/-12dB range. The equaliser affects the main stereo output and the stereo line output, and because the controls are stereo there's no way to use different EQ settings on the main and monitor outputs when the mixer is used in 'mono plus monitor' mode. The graphic EQ can be bypassed when not needed, and though nine bands is far too few to use for accurate feedback suppression, it is useful for compensating for room or speaker characteristics in a fairly general way.

A stereo bargraph meter in the master section monitors the two master channels, and directly below this is the headphone level control and the stereo Sub Out level control, which also has both PFL and AFL switches. This output essentially duplicates the main stereo output but has independent level control, so if you were to drive an additional power amp and speakers from it, you could control the level independently of the other speakers driven directly from the EMX5000's amplifier.

## Test driving

With a mixer like this, I look for clarity of interface, quiet mic amps and good-sounding EQ, as well as bomb-proof construction. On all counts the EMX5000

comes out well, and the mid-band EQ is particularly adept at tuning out honky mid-range artifacts, though I'd still have liked more low range on the sweep control. A small gripe is that the headphones always monitor the PFL/AFL buss, rather than being switchable to various useful sources, though in live-sound situations the former is usually enough to manage with.

I've tested several other mixers with built-in effects, and it comes as a pleasant surprise to find one with such good-sounding effects — including reverbs whose decay time can be tamed to a useful degree, using the Parameter knob. Also, having two sets of effects makes it easy to combine different effects, to allocate different effects to different mixer channels, or to set up two different vocal treatments and then switch between them very easily. Another very nice feature which the manual rather underplays is that any change you make to the parameter knob for an effect is remembered when you change patches. I also checked what happened when the mixer was powered down — and it came back up with my modified effects settings still intact! In other words, you get a degree of programmability without having to go through any save or load routines. I'd have felt happier with a clip LED at the input to the effects processors but, despite piling on a lot of send level, I never actually managed to coax any audible distortion from the effects.

The graphic equaliser works as well as any nine-band equaliser can be expected to and is certainly better than nothing when struggling with feedback problems, though it is really of more use for general room-sound tailoring. However, I think Yamaha have missed a trick by not providing two sets of mono controls, so that one equaliser could

## Jargon explained

**Active crossover:** A crossover is an electronic circuit designed to separate high- and low-frequency signals from each other so that each can be fed to speakers optimised for the role — ie. large and robust for bass, small and light (and therefore fast) for high frequencies. If a crossover is placed between the power amps and the speakers (usually built into the speakers), it is said to be 'passive'. An 'active' crossover is used to divide signals before the power amps, so separate amps are then used for each band, further adding to efficiency. Crossovers can be two-way, simply splitting highs and lows; three-way, adding a mid band; and occasionally four-way.

**PFL/AFL:** Pre-Fade Listen/After-Fade Listen. On a live sound desk, pressing the PFL switch on a channel will allow its signal to be heard in the engineer's headphone mix in isolation. The channel fader position has no effect on this, as the signal is picked up from before the fader in the circuit, allowing a source to be identified and checked for quality before introducing it into the mix. AFL does the same thing, but derives its signal after the fader.

**Bridging:** A method of achieving more output from a power amp. If the same signal is applied to two channels of an amplifier, one of them with opposite polarity, a speaker output can be derived between the positive output of one channel and the negative of the other, allowing the amp to apply twice the voltage across the load.

be used in the monitor path and one in the main when operating in 'main plus monitor' mode. Some users may also bemoan the fact that not all the line outputs are balanced, but that's rarely a problem in the kind of rigs this type of mixer is typically used in.

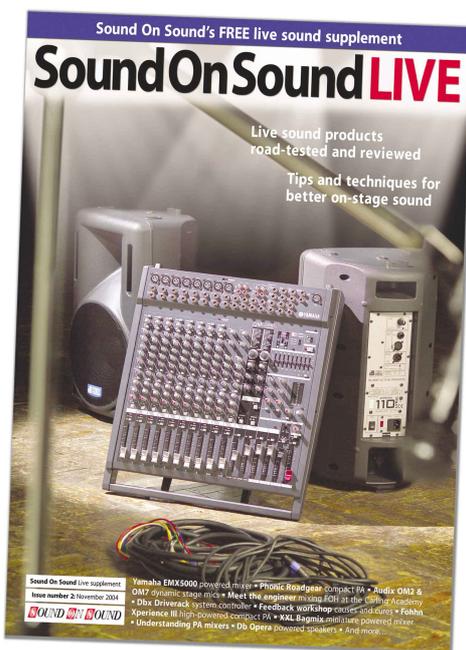
Aside from these fairly minor observations, I have to say that I really enjoyed trying out this mixer. It has oodles of clean power, made all the more useful by the built-in limiters, it has an integral filter for feeding a sub, which makes life very easy if you have a spare sub-woofer and power amp but no electronic crossover, and the effects are excellent. It also feels reassuring, in that everything is set out clearly, there are few (if any) features that aren't needed, and it's built like a tank. I also think the faders feel good, and though they're not a full 100mm, 75mm somehow feels a lot longer than the basic 60mm faders usually offered as an alternative. Operating the EMX mixers is simplicity itself for anyone who's ever used a mixer before, and I think the inclusion of switchable power limits is a really great idea for anyone who may not take all of their speakers to all of their gigs. If you have passive speakers and need up to a kilowatt of power to drive them, as well as a requirement for a live mixer with great effects, the EMX range could be just what you need. **EOS**



Part of the master section, showing the clearly laid-out dual effects processors (far left). One parameter of each selected effect is available for tweaking via the Parameter knobs. At the top right you can see the power amp controls, with limiters. Below them is the nine-band graphic equaliser section.

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