MSP10 STUDIO

SPECIFICATIONS

General specifications	
Type	Amplified 2Way Bass Reflex Powered Speaker (Bi-Amp.)
Crossover Frequency.	2.0 kHz, 30 dB/oct
Frequency Range	40 Hz to 40 kHz (–10 dB)
Sensitivity	–10 dB at –6 dB position (for 100 dB/SPL, 1 m on Axis)
Maximum Output Level	110 dB (1 m on Axis)
Dimensions (W x D x H)	265 x 329 x 420 mm (10 3/8" x 12 7/8" x 16 1/2")
Weight	20 kg (44.1 lbs)

Speaker unit	
Speaker Unit	LF: 20 cm Cone (4 Ω, magnetic shielded)
	HF: 2.5 cm Titan Dome (8 Ω, magnetic shielded)
Enclosure	Type: Bass Reflex

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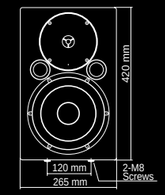
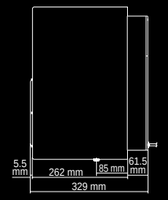
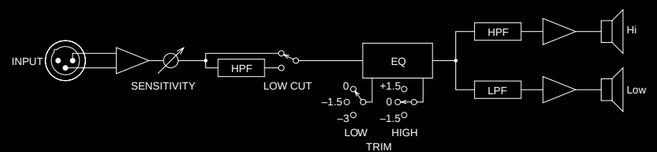
Amp. unit	
Maximum Output Power	LF: 120 W at 400 Hz, THD= 0.02 %, RL= 4 Ω HF: 60 W at 10 kHz, THD= 0.02 %, RL= 8 Ω
Input Sensitivity/ Impedance	–6 dB to +4 dB/10 kΩ
Hum & Noise	≦–67 dBu (Volume= Min) DIN Audio filter
Signal to Noise Ratio	≧98 dB (IEC-A Weighting)
Controls	TRIM Switch LOW: 3 positions (0 dB, –1.5 dB, –3 dB at 50 Hz) HIGH: 3 positions (+1.5 dB, 0 dB, –1.5 dB at 10 kHz) LOW CUT Switch: ON/OFF SENSITIVITY Control POWER Switch: ON/OFF
Connectors	Input XLR-3-31
Power Indicator/ Clip Indicator	Green/Red LED
Power Requirement	USA and Canada: AC 120 V, 60 Hz Europe: AC 230 V, 50 Hz Korea: AC 220 V, 60 Hz Australia: AC 240 V, 50 Hz
Power Consumption	USA and Canada: 150 W Others: 170 W
Option	Wall mounting bracket BWS251-300





BLOCK DIAGRAM



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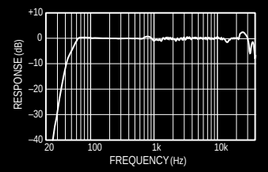
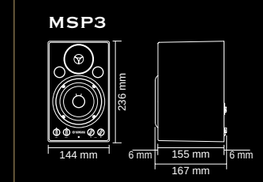
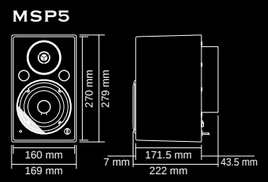
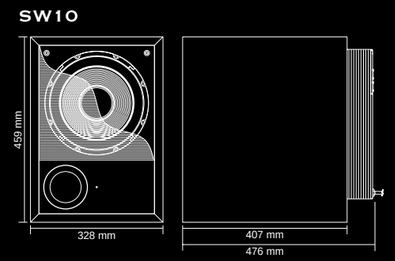


MSP SERIES SPEAKERS







SPECIFICATIONS

	MSP3	MSP5	SW10
Type	Amplified, 2-way, bass-reflex powered speaker	Biamp. 2-way, bass-reflex powered speaker	Amplified bass-reflex powered speaker
Overall Frequency Response	65 Hz-22 kHz (–10 dB)	50 Hz-40 kHz (–10 dB)	25 Hz-150 Hz (–10 dB)
Maximum SPL	98 dB (1 m)	101 dB (1 m on axis)	111 dB (1 m on axis)
Power Consumption	30 W	60 W	160 W
Dimensions (W x D x H)	144 x 167 x 236 mm (5 11/16" x 6 9/16" x 9 5/16")	169 x 222 x 279 mm (6 5/8" x 8 3/4" x 11")	328 x 476 x 459 mm (12 7/8" x 18 3/4" x 18 1/16")
Weight	4.4 kg (9.7 lbs)	7.5 kg (16.5 lbs)	26 kg (57.3 lbs)

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Near-perfect Evolution

More than 30 years experience in the design and production of top-performance speaker systems has won Yamaha an enviable position in the recording field: respected professionals depend on Yamaha to help them achieve award-winning sound.

The venerable NS10M STUDIO monitor speaker is an excellent example: from its introduction in the 80's through to its recent discontinuation (due to unavailability of the necessary pure virgin pulp for its distinctive white woofer cone), the NS10M STUDIO was the definitive near-field speaker monitor in an overwhelming majority of professional studios throughout the world. But times change, and technology must evolve. The MSP10 STUDIO is an example of near-perfect evolution. It takes over where its predecessor left off with precision and performance that are perfectly suited to today's production needs.

The Yamaha MSP10 STUDIO Powered Monitor is poised to become a cornerstone of the "new age" of audio production, in which advanced digital production consoles such as the Yamaha DM2000 and 02R96 as well as high-sample-rate digital source material and ultra-accurate reproduction media are rapidly becoming the norm.

"Good" Sound Is Not Necessarily "Right" Sound

The last thing an audio professional needs is flattering sound. They need the truth – precise reproduction that clearly reflects even the tiniest changes in EQ, dynamics, effects, or any of the multitude of parameters that add up to create the final sound. Thus, unlike many home-use systems that can simply be made to sound "good," reference monitors have to sound "right," and that's an entirely different story. Here's where inspired design, uncompromising material selection, innovative technology, micron-tolerance manufacturing, and a good dose of one elusive skill that only comes through long experience – knowing what "right sound" sounds like – become vitally important.

The MSP10 STUDIO design team, headed by Akira Nakamura, designer of the original NS10M, has all the necessary skills, resources, and dedication. And with development assistance and feedback from industry luminaries, the Yamaha MSP10 STUDIO delivers performance you can bet your career on.

Powered for Consistent Quality & Convenience

In any situation speakers are part of an interactive "system." This includes the speakers themselves, the amplifier that is driving them, and the room in which they are used. Ideally, all of these elements must be carefully controlled to achieve optimum performance. By integrating the power amplifiers and speakers, at least part of the equation can be kept under perfect control (the room is up to the user). The MSP10 STUDIO power amplifier/speaker system is ideally matched and precisely tuned to achieve the best possible performance. Of course, the power amplifiers themselves are of the finest quality. And unlike component power amplifiers which must be designed for acceptable (read: "compromised") matching with the widest possible range of speakers, the MSP10 STUDIO's amplifiers are designed and manufactured specifically to drive the system's woofer and tweeter – specifically in the MSP10 STUDIO enclosure. No matter where the MSP10 STUDIO monitors are used, and with what sources or other audio gear, you know that you're always receiving the benefits of a perfectly matched power amplifier and speaker system. You'll hear the difference. You'll also benefit from the convenience of not having to deal with external amplifiers and cabling.

Advanced Bi-amp Design

There are a number of advantages to multi-amp speaker setups, but many people shy away from the added cost and extra equipment required. With the MSP10 STUDIO everything you need is built-in – all you have to do is supply the line-level input. The 8-inch cone woofer is driven by a 120-watt power amplifier, while the 1-inch titanium-dome tweeter has its own 60-watt power amplifier. In the MSP10 STUDIO this particular power and impedance combination results in the perfect balance between the low-mid and high frequency ranges.

The frequency ranges are divided via a carefully designed electronic crossover before the power amplifier inputs, featuring steep 30-dB/octave roll-off curves in both the low- and high-pass filters. The steep roll-off minimizes inter-modulation between the frequency bands at the crossover point, achieving significantly smoother, cleaner crossover performance in the critical midrange. And the fact that the crossover is a line-level electronic design completely eliminates the loss, distortion, and sometimes severe inter-modulation that are almost unavoidable in conventional passive crossover networks driven by a single power amplifier.

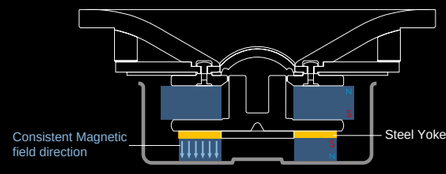
MSP10 STUDIO FEATURES

The Drivers – Where Materials and Precision Manufacturing Really Count

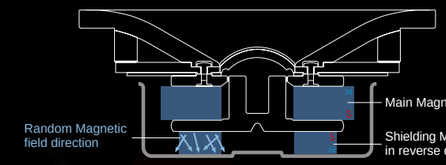
The MSP10 STUDIO woofer and tweeter units feature some important design innovations that contribute directly to improved sound quality. The 8-inch woofer, for example, features a mineral-impregnated polypropylene cone with low-damping rubber surrounds for exceptionally smooth response. Low-reflection high-rigidity die-cast magnesium baskets both maximize mechanical precision while minimizing unwanted coloration of the speaker's output. The 1-inch tweeters feature titanium domes that offer the perfect combination of light weight and rigidity for precise reproduction right up to 40 kHz. The tweeters have an exceptionally powerful 17,000 gauss magnetic circuit that results in extremely fast response for crisp, natural transients, and are integrated with a waveguide that achieves uniform high-frequency dispersion of 120 degrees. But if there's one thing that sets the MSP10 STUDIO drivers apart from the rest, it's not so much what they're made of as how they're made: precision, micron-tolerance manufacturing. The slightest eccentricity in the alignment of the tweeter domes and waveguides, for example, can seriously affect performance. So can the alignment of the coils and magnetic circuits. These are details that require a considerable investment of energy and resources to do properly, and they are exactly the details that make the MSP10 STUDIO the superior studio monitor that it is.

Magnetic Shielding That Won't Distort Your Sound

In today's production environment, which often includes computer and video displays as well as a range of magnetic media, magnetic shielding is essential. Conventional magnetic shielding schemes have the unfortunate side effect of distorting the magnetic flux of the speaker's critical magnetic circuit. The end result is distorted sound. This was one of the biggest obstacles the MSP10 STUDIO design team had to face, but one they overcame with a new "advanced magnetic structure" that achieves effective shielding while maintaining the integrity of the speaker's magnetic circuit for significantly lower distortion as well as an improved definition.



Advanced Magnetic structure



Normal Magnetic structure

And Don't Forget the Enclosures ...

Yes, the boxes are part of the system too, and demand as much attention as the electronics and drivers themselves. The MSP10 STUDIO's bass-reflex enclosure is constructed from high-quality MDF (Medium Density Fiber) and braced to eliminate coloration-causing resonance. Resonance-free operation is further ensured by a painstaking 9-step finishing process that includes no less than 5 layers of piano-finish paint. The result of all this attention to detail is response that is so natural and transparent that you can hear details even in delicate decays and reverb tails.

Connectors and Controls

The MSP10 STUDIO features a balanced XLR-type connector for input. This provides direct compatibility with professional gear and allows the use of balanced lines for maximum audio quality even where long cable runs are required. Rear-panel controls include an input sensitivity control with a –6 dB ~ +4 dB range, and trim switches that enable you to adjust the bass and treble in three positions. (0 dB, –1,5 dB, –3 dB at 50 Hz and +1,5 dB, 0 dB, –1,5 dB at 10 kHz) – allowing the system's response to be quickly matched to the room. There's also a low cut (80 Hz) switch that is useful when the MSP10 STUDIO is used with the SW10 Subwoofer. For convenient wall mounting Yamaha offers an optional BWS251-300 Wall Bracket.

Rear Panel

BWS251-300

SW10
Powered Subwoofer

MSP5
Biamp. 2-way, bass-reflex
Powered Monitor speaker

MSP3
2-way, bass-reflex
Powered Monitor speaker

MSP Series Speakers Deliver High Quality Performance

INTERVIEW

An Interview With the Man Behind the Sound

In order to learn as much as possible about the MSP10 STUDIO and its background, we talked directly to Akira Nakamura, head of the MSP10 STUDIO design team. Nakamura was also the brain behind the legendary NS10M and NS10M STUDIO. Here are some of his comments:

Interviewer: What were the first projects you were involved in at Yamaha?

Nakamura: It was speakers right from the very beginning, but the first ones I worked on were for musical instruments – Yamaha Electone organs, to be specific. We couldn't get the sound we wanted from speakers purchased from other manufacturers, so we started developing and manufacturing our own.

Hi-fi speakers weren't an issue back then?

Not in the beginning. I joined the company and started working on musical instrument speakers in around 1965, but serious development of hi-fi speakers wasn't started until about 1970.

What audio speakers did you work on prior to the NS10M?

Most of them, but perhaps the most notable was the Yamaha NS1000M. I think we released it in around 1974. The NS1000M became one of the longest-selling hi-fi speakers, ever. As I remember, the NS10M was released several years later, in about 1978.

Was the NS10M an instant success?

In the home-use market, yes. It wasn't until several years later that studios began adopting the NS10M for near field monitoring. This was because it was originally developed for the home market, and was only sold through outlets targeted at the home market. But once the studio people caught on, we had to expand our retail routes to include the pro-audio market.

Why did the NS10M become the industry standard for audio production?

At the time, most studios were using small single-unit cube-shaped speakers for near-field monitoring – actually they were probably used mostly to hear how projects might sound on a boom-box or car stereo. But the engineers were looking for a compact monitor with a bit more power and a wider frequency range, as well as something that more accurately represented the home audio sound of the time. The NS10M was perfect. It also had the midrange definition that the engineers needed for rock and pop production, and eventually became the engineers' primary tool for sound creation and mixing, rather than simply a means to hear the results on a less-than-perfect system. It wasn't long before you could walk into just about any major studio and find a pair of NS10Ms sitting on the console meter bridge. This was an advantage for the engineers, because they were familiar with the NS10M sound and could expect the same quality in just about any studio, anywhere in the world.

So Yamaha didn't start out to deliberately create a studio monitor speaker?

Not really. We were only interested in achieving the cleanest, most natural reproduction possible. As it turned out, what we were trying to achieve was precisely what the audio production professionals were looking for.

The white NS10M woofer cone was quite distinctive, is there a story behind the color?

We were in the process of trying out different pulps and papers for use in speaker cones, but nothing gave us the sound we wanted. Looking for the cleanest, most impurity-free cone paper we could find, we eventually came across a type of especially pure pulp that a photographic-materials manufacturer was using. That was our answer.

The "NS10M STUDIO" was introduced in 1987. What was the story behind that development?

In addition to optimizing the design for horizontal placement, there was the "tissue paper issue". There was a period in which the pro-audio magazines and papers were full of articles about how engineers were placing layers of tissue paper in front of the NS10M tweeters to give them the balance they needed. There were even arguments as to how many layers of tissue paper gave the best response, how far it should be placed in front of the tweeter, and so on. So we sat down with the speakers – and a supply of tissue paper – and began an extensive series of tests. The overall balance of the NS10M-plus-tissue idea was fine but, as you would expect, some of the high-frequency definition was lost. We figured out a way to deliver the required balance without losing detail, and that became the NS10M STUDIO.

After selling more than 200,000 units, NS10M STUDIO was discontinued in 2001, causing great shock to the engineers and the industry. Why was it discontinued?

The white cones. Due to a number of unavoidable reasons it has become impossible to continue manufacturing those cones. Without those cones there can be no NS10M. Fortunately, we were able to produce enough maintenance units to keep current users supplied for several years. Also, it was about the time that the NS10M STUDIO was being widely adopted that we began work on the MSP series speakers with the goal of providing powered convenience with superior frequency response and an extended low end. Now that the MSP10 STUDIO has been perfected, there's really no better choice.

Tell us something about the new MSP10 STUDIO: what were the main sonic goals behind its development?

There are other popular powered monitor speakers on the market that have a nice "comfortable" sound, but we came to the conclusion that they weren't really accurate enough for critical monitoring applications. We wanted to create a monitor that delivers the source without "softening" it in any way. Engineers need to hear frequency, they need to hear dynamics, imaging, separation … there are so many parameters that must be kept under control. The MSP10 STUDIO was designed from the outset to allow the listener to hear every single aspect of the sound as clearly as possible so that he or she can make the most effective creative decisions and sonic adjustments. If a slight change is made to the EQ on one track, you need to hear it. If the reverb time of the ambience used on the vocal track is adjusted by a fraction of a second, you need to hear that, too. Once we knew what we wanted to achieve, we had to translate those concepts into actual design parameters and refinements – drivers, amplifiers, crossover, enclosure, finish – everything counts.

The original MSP10 and the new MSP10 STUDIO look quite similar – how can we tell them apart?

Visually the only difference is in the location of the Yamaha logo (in the MSP10 STUDIO it is below the woofer), and the fact that the radius of the enclosure corners is a little sharper in the new version. The main differences, however, are internal. It's the difference between sound designed for listening and sound designed for monitoring, and that meant making significant refinements to the midrange performance and crossover parameters as well as parts and assembly precision.

How does the MSP10 STUDIO fit in with modern monitoring practices?

These days many engineers monitor at low levels. Paradoxically, this allows them to hear detail that gets "washed out" at higher levels. When we tested other powered monitor systems we discovered that they tended to lose definition at such low levels, so we put a great deal of effort into ensuring that the MSP10 STUDIO stayed clean and precise right down to the lowest levels.

How about surround monitoring?

Of course, the MSP10 STUDIO is an ideal monitor for surround applications. The 120° dispersion of the tweeter waveguide makes it a perfect choice for surround setups – plus the fact that is basically an excellent monitor speaker.

Were there any major obstacles to achieving the desired performance?

Many. But the areas that required the most time and energy were probably the actual manufacturing processes. In order to achieve the desired high quality consistently in all units, we had to dramatically increase the dimensional precision of all parts, as well as the assembly procedures used to put them together.

What is different about the new "advanced magnetic circuit"?

Speaker engineers who are serious about sound quality have known about the problems with magnetic shielding for quite some time. Magnetically-shielded speakers have a "cancellation circuit", which is basically a reverse-polarity magnet attached to the back of the speaker's normal magnetic circuit. Conventional cancellation circuits consist only of a magnet and outer yoke — a configuration which results in a random flux pattern when magnetized. This disturbs the magnetic field of the main magnet and has a deleterious effect on the sound. With the new "advanced magnetic circuit", an extremely consistent flux pattern is produced in the "shield" magnet by placing it between inner and outer yokes at the magnetizing stage. The result is significantly improved sound quality.

Why is the MSP10 STUDIO so heavy? (The MSP10 STUDIO weighs 20 kg, compared to about 12 kg for the leading competitor.)

Well, being heavier is not something we can really brag about, but in the process of optimizing overall performance we simply ended up with a heavier enclosure, heavier woofer, and heavier transformers in the amplifiers. We weren't prepared to compromise performance for reduced weight.

How large a factor is the reduced radius of the MSP10 STUDIO enclosure corners?

The change is subtle, but it does make a significant difference to the sound. By simply changing the corner radius by a few millimeters we achieved noticeable better definition and imaging. This might be partly related to external diffraction, but it is more likely to be a result of the change in the structure and solidity of the corner joints that affects the overall performance of the enclosure.

And what about the 9-process, 5-layer finish? Is it really that important?

Very important. What's on the surface of the enclosure has a significant effect on the way it responds. The right finish can effectively control unwanted resonance in the wood. The benefits of this are most noticeable in delicate decays and reverb tails – in the MSP10 STUDIO they fade out most naturally, without a trace of coloration. The finish we're using is very similar to the finish used on pianos. There's no way to completely eliminate enclosure resonance, but we've succeeded in making it as transparent and "musical" as possible.

AKIRA NAKAMURA
CHIEF ENGINEER SPEAKER DEVELOPMENT