

APPLE

## APPLE HOMEPOD REVIEW: LOCKED IN

*It sounds amazing. Is that enough?*

By Nilay Patel | @reckless | Feb 6, 2018, 8:30am EST

Photography by James Bareham; Video by Phil Esposito, Becca Farsace, Andrew Marino, and William Joel

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I don't think I've ever described a tech product as "lonely" before, but it's the word I thought about the most as I was reviewing Apple's new HomePod.

The HomePod, whether Apple likes it or not, is the company's answer to the wildly popular Amazon Echo and Google Home smart speakers. Apple is very insistent that the \$349 HomePod has been in development for the past six years and that it's entirely focused on sound quality, but it's entering a market where Amazon is advertising Alexa as a lovable and well-known character [during the Super Bowl](#) instead of promoting its actual features. Our shared expectations about smart speakers are beginning to settle in, and outside of engineering labs and controlled listening tests, the HomePod has to measure up.

And while it's true that the HomePod sounds incredible — it sounds far better than any other speaker in its price range — it also demands that you live entirely inside Apple's ecosystem in a way that even Apple's other products do not.

The question is: is beautiful sound quality worth locking yourself even more tightly into a walled garden?



Nothing about the HomePod when you see it in person is what you'd expect. It's been both smaller and larger than people I've shown it to have thought, as it's so minimally designed that it's hard to get a sense of scale from photographs. It's also heavier than it looks, and it doesn't feel at all like other speakers: the outside is wrapped in a custom spongy mesh fabric Apple proudly told me was developed by its "soft materials

team.” I do not know if that team has any cats, but I suspect cats are going to love the HomePod.

The HomePod’s power cord is built in and wrapped in fabric, and on top, there are LED-backlit volume buttons and a “display” that isn’t really a display at all — it’s LEDs under a cloudy glass panel that diffuses them into a single blob of swirling colors. There’s no obvious way to make this area show anything with precise lines, like an interface; Apple told me it was designed to be a touch surface, not to display text. On the bottom is a hard, rubbery material. You need to place the HomePod on a hard, flat surface: most of its speakers fire down, and it sounds pretty bad if you set it on something uneven or soft. But most of the time, it sounds excellent.



I have been incredibly curious about how the HomePod actually works since it was first announced, and it turns out the answers are even more interesting than I anticipated. Apple invited me and other journalists to tour its audio labs in Cupertino with Phil Schiller, hardware VP Kate Bergeron, and senior director of audio design and engineering Gary Greaves. I also spent time talking to some of the engineers who worked on the HomePod to dive into the details, and what the HomePod does while playing music is far more involved than you’d expect.

### *ALL OF THIS PROCESSING ISN'T TO ADD ANYTHING TO THE MUSIC; IT'S TO ELIMINATE THE ROOM*

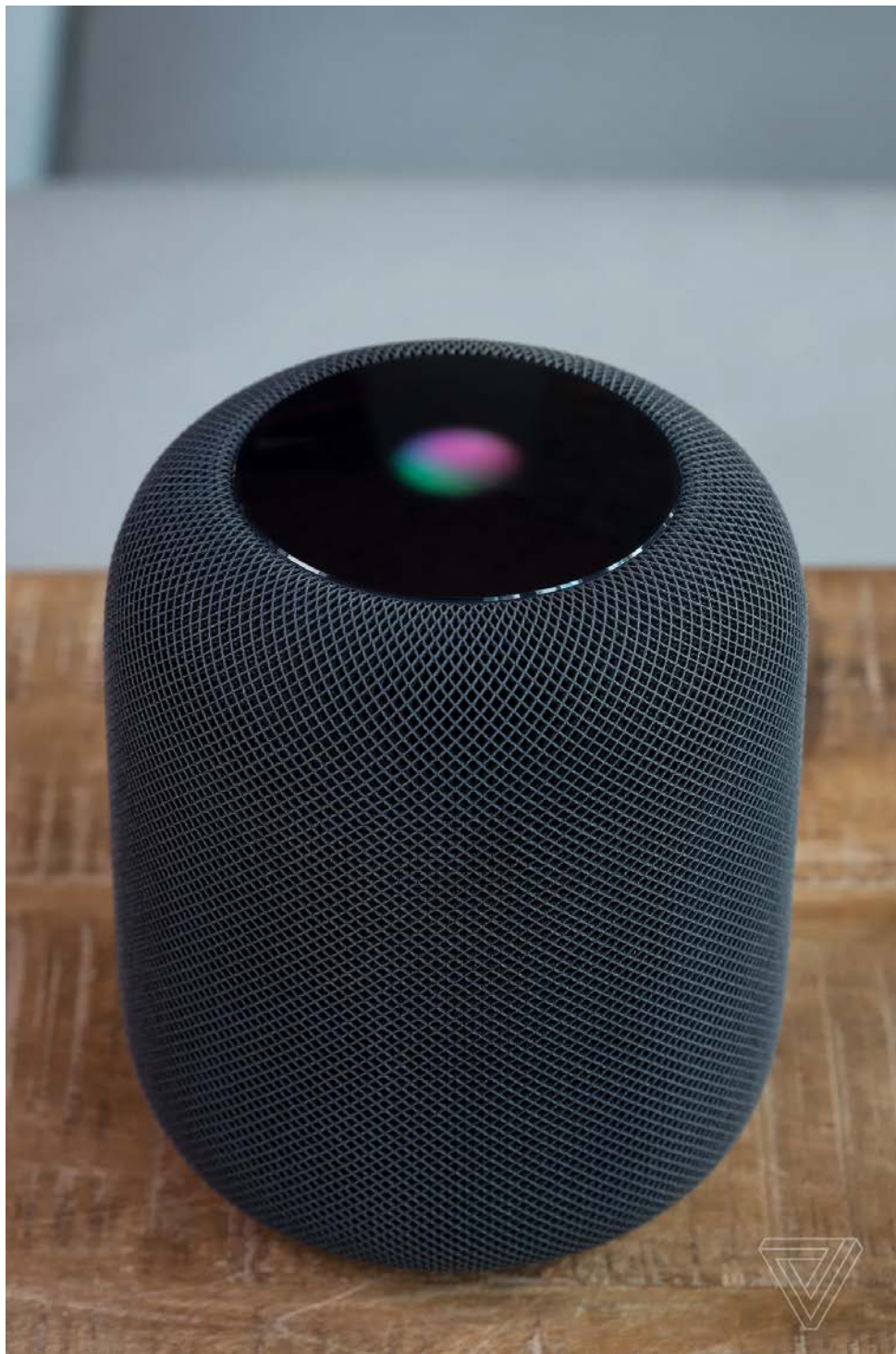
The HomePod isn’t just one speaker, it’s actually eight of them, all controlled by Apple’s own A8 processor and tons of custom software. There are seven tweeters that fire down and out from the bottom, and a single four-inch woofer pointing out of the top for low frequencies. There is also a total of seven microphones: six around the middle for Siri, and a seventh inside that measures the location of that woofer so Apple can precisely control the bass.

What’s important to understand is that all of these speakers and software aren’t trying to *add* anything to music; you’re not getting 3D audio or wacky surround effects or anything like that. Apple’s goal is to *eliminate* unwanted extra sounds you might get from reflections in the room the HomePod is sitting in. It’s then trying to tune to the speaker to sound as neutral as possible in that room, and this process is very, very involved.



When you set down a HomePod and play music, it goes through a number of steps to tune itself. First, it tries to create a model of the room it's in by detecting the sounds reflecting off walls. It does this in two passes: the first pass builds a model to a high degree of initial confidence, and the second pass refines the model. This happens faster if you're playing music with a lot of bass.

Then, it creates a virtual array of soundbeams using that seven-tweeter array. Placed near a wall, the HomePod creates three beams: one pointed out the front for "direct" sounds like vocals and guitars, and two pointed at the wall to reflect "ambient" sounds like applause and room noises. This is called "beamforming," and it's a nifty, complicated idea; Apple told me it has something like 200 patents for the HomePod.



So the HomePod is using all seven physical speakers to create an array of virtual speakers and assigning those virtual speakers different parts of the music for increased clarity and bass. It's not trying to create wide stereo separation — later this year, you'll be able to pair two HomePods for that — it's just trying to get as much from the audio you're playing as possible, while eliminating the effects of the room you're in.

To figure out what to play on those direct and ambient soundbeams, the HomePod compares the left and right channels of the song and figures out what sounds are mixed more prominently and what sounds are mixed into the background. Prominent sounds are sent to the direct soundbeam, and background sounds are sent to the ambient

long done to upmix stereo audio so it plays on all your speakers, but it's a very different application of that basic idea.

In terms of ideas I'm into, a virtual array of soundbeams that points guitar solos at my face is super high on the list.

While all of this is happening, that seventh microphone inside the HomePod measures the position of the subwoofer as the other six mics measure the reflections of bass in the room, and it adjusts the bass output constantly to keep it from overwhelming the rest of the music. I asked Apple directly what the buzzword salad of "transparent studio-level dynamic processing" means on the HomePod spec sheet, and it refers to tuning the bass response in this way: it's a custom multiband compressor that's constantly tweaking the bass levels. And because the HomePod knows about the bass driver's specific position and the sound it's creating in the room, it can push it right up to the edge of distortion in a way normal speakers can't.

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***THE HOMEPOD CAN PUSH THE BASS SPEAKER RIGHT UP TO THE EDGE IN A WAY OTHER SPEAKERS CAN'T***

The wild thing is that all of this happens at once, without needing any help from you, within about 10 seconds of playing music for the first time. If you move the HomePod, an accelerometer detects the motion and does it all over again seamlessly. That's much faster and simpler than something like Sonos TruePlay, a manual process that requires 45 seconds of waving a phone around the room every time you move the speaker, or the Audyssey calibration systems on home theater gear that take forever to set up correctly.



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