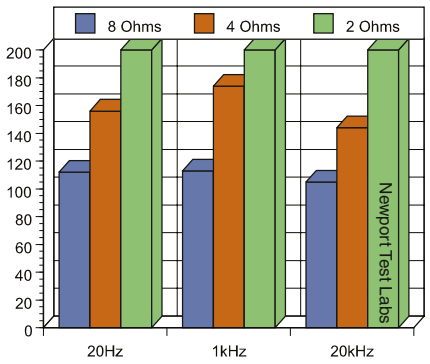
Marantz PM7003

Integrated Amplifier

Marantz has been carefully fine-tuning the circuits inside its stereo amplifiers for many years, a process that has included gradually filtering down technology and components that were once available only in its high-end products down to its budget-priced models. The PM7003 is the latest amplifier to benefit from these processes, and has benefited to such a great extent that in many ways it's similar to the highly-awarded PM7001KI. One of its most outstanding technical features is the use of completely symmetrical circuitry, which can only help its ability to stereo image, however the PM7003 also benefits from containing Marantz's Hyper Dynamic Amplifier Modules (HDAMs) which use current feedback rather than voltage feedback. These enable greater dynamics, particularly when the amplifier is driving speakers whose impedance drops below their nominal value. The PM7003's 'ace in the hole' is that it's the current holder of the 'Best Amplifier of the Year award from *Sound & Image* magazine.



Power Output: Single channel driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz. [Marantz PM7003]

The Equipment

As you can see from our photograph, the PM7003 is outwardly conventional, though Marantz's design department has managed to add in some nice cosmetic touches that put its external appearance a cut above the average. I'm thinking here of the vertical 'scallops' in the front panel that bisect the large rotary input selector on the left and the identically-sized volume control on the right. Marantz has also been cunning with the four rotary controls that sit at the centre bottom of the front panel. From left to right, these are for speaker selection (Off, A, B, A+B), bass, treble and balance. I don't know if you'll be able to see from the photograph, but they sit partially behind the front panel and protrude through it. This not only gives the panel some visual 'depth' but means that the knobs can't be accidentally misaligned by a bump or a knock, so you'll always get a nicely smooth (and noiseless!) rotation. The circuitry of the bass and treble controls isn't the conventional Baxandall topology either, Marantz instead provides dual-frequency EQ, which is very unusual in this price range, and far superior. The bass, treble and balance controls all have central detents, so you can easily find the 'neutral' position, but otherwise have smooth actions over their rotational ranges.

Above these rotary controls is a long slot that indicates which input source has been selected. This, too, is really clever design, because the bottom of the slot is angled and there are blue LEDs hidden away in the 'roof' of the slot, so that when an input is selected and the LED illuminates, it shines downwards and the light is reflected out into the room. The beauty of this is that the whole slot tends to be vaguely blue-coloured, which adds to the overall impressive appearance of the amplifier, but there's a practical purpose, which is that it's easy to see which input is selected from almost anywhere in the room, such is the spread of the reflected light. The 'quality' of the illumination is also far more appealing than if Marantz had just fixed blue LEDs into the front panel.

Things get even better when you use the front panel rotary to select your preferred input source, because the control has a continuous action and there's a satisfying 'click' sound from the internal relays as you scroll through the available inputs (Phono, CD, Tuner, Aux/DVD, Recorder 1, Recorder 2). Although it appears as though there are only six inputs, there's actually a 'Direct In' set of terminals on the rear panel so you can, if you wish, go directly into the power amplifier section to bypass the tone and balance controls. This is selected via a pushbutton on the front panel. (As befits an audiophile amplifier, there's also a 'Source Direct' selector, which also allows you to bypass the tone and balance controls.)

The volume control moves smoothly, but the friction betrays the fact that it's motorised, enabling it to be controlled by the small RC003PM remote Marantz provides with the PM7003. The only problem I could see is that there's only a small notch on the rotary control to indicate its position (rather than an

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LED) so if you're using the remote to alter volume and you're on the other side of the room, it'll be difficult to see where the volume is set. The control layout on the remote is excellent, with the buttons 'falling' easily under your fingers even if you want to use only one hand. The remote provides one additional function, that of output muting. The mute function is a great feature and works perfectly if you use the remote control, in that it automatically disengages if you touch either the volume up or volume down buttons. However, it doesn't disengage if you move the front panel's volume control. Unlike some mute circuits, the PM7003's mute will remain engaged if you switch from one input source to another, which is the operational mode I personally prefer.

I was pleased to see that Marantz has fitted not only a headphone socket (an endangered species, it would seem), but also that it's a full-sized 6.35mm phone jack type, rather than the silly little 3.5mm type. It was a slight disappointment that the jack is only nickel-plated, rather than gold-plated, however this is one time I'd like to think this was an economy measure on Marantz's part, and not because the gold bezel would have clashed with the colour of the front panel anodizing.

Around the back of the Marantz PM7003 there are some signs of cost-cutting, with the CD inputs being the only ones deemed worthy of gold-plating. The speaker terminals do the job, but they're quite small and cramped, so it's difficult to fit thin wires into the speaker posts. As a result, it's probably a better bet to fit your speaker cables with banana plugs. I would normally recommend dual Pomona connectors, but the Marantz posts aren't on standard centres, so you can't use dual-connectors with the PM7003. Other rear-panel features include a pair of preamplifier output terminals, a grounding post for the phono input terminals and a pair of remote control terminals so you can link the PM7003 with other Marantz components to integrate the remote control functions.

The amplifier measures 440×364×123mm (WDH) and weighs 10.5kg.

Listening Sessions

I had first-hand experience of the cramped nature of the speaker terminals during my listening sessions when I stupidly tried to swap cables in the middle of a session, while the amplifier was playing. (This is right up there in the 'don't try this at home' category of idiot things you shouldn't do, and I have no excuse for it.) The result was that I accidentally shorted the speaker terminals. The plus side of this misadventure is that it proved the efficacy of Marantz's protection circuit, which immediately sprang to the rescue and shut the amplifier down. However, what happened next surprised the hell out of me, because instead of the silence I expected, the amplifier instead started buzzing from inside. At this point I suspected the worst—that I'd blown the amplifier up—and would have to telephone Qualifi, the Australian distributor, to apologise abjectly. However, after about 15 seconds, the whirring stopped and the amplifier sprang back into life (I'd removed the short circuit in the interim) as if nothing had happened. Further investigations revealed that unlike most other amplifiers with protection circuits, which require you to switch the amplifier off, then back on again, to reset the protection, the PM7003's internal protection circuit resets automatically (albeit noisily!), without the need for manual intervention.

Marantz has a made a habit of understating the power output of its amplifiers over the years, and I didn't need to have a long association with the PM7003 to discover that the company hasn't changed its ways, because

the power delivery was exceptional. If you've already cheated and looked at the measurements made by *Newport Test Labs* (and Steve Holding's analysis of them), you'll see that whereas Marantz rates the PM7003 at 70-watts per channel, the sample I was using (which was the same one sent to the lab for measurements) was capable of delivering 90-watts per channel into 8Ω loads and more than 130-watts per channel into 4Ω loads. And that's with both channels driven. What this means when you're listening is not so much that you can drive your loudspeakers to extremely loud listening levels (though this is also the case), but that when you are listening at any volume level, there will always be more than sufficient power on tap to make sure that transients are delivered fast and clean, and that when there's a lot of deep bass action which might starve the power supply of a lower-powered amplifier, the Marantz PM7003 sails on smoothly, taking it all in its stride. Recovery is fast too. There's no unwanted overhang after a transient—the circuit stabilises instantly, and the control ▸

- Power output
- Stereo focus

- Muting logic
- Speaker terminals

Marantz PM7003 Integrated Amplifier

Brand: Marantz
Model: PM 7003
Category: Integrated Amplifier
RRP: $1,199
Warranty: Two Years
Distributor: Qualifi Pty Ltd
Address: 24 Lionel Road
Mt Waverley, VIC 3149
T: 1800 242 426
T: (03) 8542 1111
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E: info@qualifi.com.au
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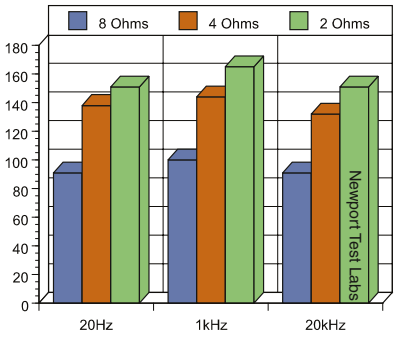
LAB REPORT

Readers interested in a full technical appraisal of the performance of the Marantz PM7003 Integrated Amplifier should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

over even the largest, heaviest bass drivers is impressive. You can prove this to yourself by finding a CD with a solid bass beat and winding the volume up. I'll bet you (or your speaker!) gives up before the PM7003 does!

Perhaps even more impressive in this digital age, when recordings are being made with almost perfectly silent backgrounds, is that the PM7003's own circuit noise is so spectacularly low—so low that even the quietest sounds were reproduced exactly, and against a completely silent background, without even a hint of distortion. And if you're listening to 'digital black', that's exactly what you'll hear: nothing at all. But the advantage of the Marantz's ability in this area is not so much the lack of noise *per se*, but the fact that this lack of noise means that when background noises are present in the recording, whether it's the ambience of a concert hall, or the rustles and murmurs of the audience in a jazz club, or even the boisterous crowd at a rock concert, you will be able to hear these background noises perfectly. True, you may not want to hear someone cough, or place a drink quietly down on a table while you're trying to listen to the music, but it happened, and it was captured as a part of the musical event, so it's only right that you should hear it just as clearly as if you were there, which is a luxury the Marantz can indulge.



Power Output: Both channels driven into 8-ohm, 4-ohm and 2-ohm non-inductive loads at 20Hz, 1kHz and 20kHz. [7003]

Listen to Lily Allen's *The Fear* (on her great 'It's Not Me, It's You' album) and hear the way the PM7003 can breathe life and energy into this over-engineered, over-compressed track, and the way the clarity of the amp's reproduction lets you hear the engineer at work. And after you've done this, switch to *Chinese* and *Who'd Have Known* and just enjoy her art for itself. And if you haven't heard Pink's *Please Don't Leave Me* through the PM7003 (and a good pair of speakers), you're also missing out on an auditory experience. Listen carefully to the rasp in her voice and the way the intermittent background vocal '*Dah dah dah dah*' sits perfectly captured in its own acoustic space, distinct from the rest of the mix. (And once you've heard this track loud and live, see if you can ever go back to listening to it over an iPod via earbuds!)

For stereo focus, you can't do better than using the Marantz PM7003 to listen to *Revelry* (Kings of Leon). Check the tightness of the focus on the drum kit, particularly in the opening bars. This same tight focus is also audible on the intro to the Fray's *You Found Me*, from 'Never Say Never.' However for something completely different—and I mean completely different, I was completely entranced by Melbourne pianist Michael Kieran Harvey's latest release on Move: New Music for Keyboard, which contains Martine Friedel's *The School of Natural Philosophy*, Graham Hair's *Transcendental Concert Studies* and the original version of Hilda Paredes' *Triptico* amongst others. The recording is amazingly good and the piano (a Yamaha C7) sounds are frighteningly realistic. The only jarring point for me was that Harvey switches to a Kawai MP9000 electric keyboard to play Richard Meale's *Coruscations*. Harvey himself notes that this is, so far, 'the only performance of this version'. I, for one, sincerely hope it stays that way! However, the other 23 tracks are more than sufficient reason to run out and buy this CD!

Conclusion

Whereas up until only quite recently you would have been hard-put to assemble a collection of modern, modestly-priced high-quality two-channel integrated amplifiers, it's great to see that you are now able to choose between a fair few models from more than a handful of manufacturers. This means, of course, that Marantz's PM7003 now has some stiff competition out there in the market! However, it's my opinion on the basis of the sound quality it delivered during my listening sessions—and the performance it delivered on the test bench—that the PM7003 has the goods, the looks, the power, the pedigree… and not least the price… not only to get it past the post but also to leave the others more than a few lengths behind.

Test Results

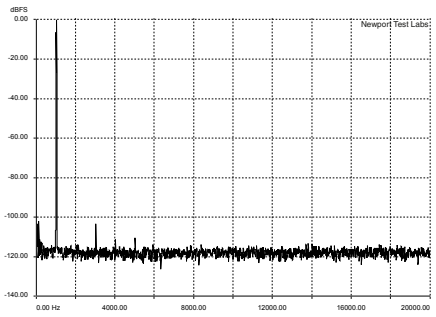
Rated by Marantz at 70-watts continuous per channel, *Newport Test Labs* measured the output of the PM7003 at 1kHz at 100-watts (20.0dBW) per channel, both channels driven into 8Ω, and 113-watts (20.5dBW) per channel when just a single channel was driven. These outputs dropped marginally at the frequency extremes, with the both-channels-driven figures coming in at 91-watts (19.6dBW) at 20Hz and 20kHz. When only a single channel was driven, output at 20Hz was 0.3dB higher than at 20kHz, at 112-watts (20.5dBW) vs. 105-watts (20.2dBW).

Driven into 4Ω with a 1kHz test signal, the Marantz PM7003 was measured as delivering 114-watts (21.6dBW) per channel with both channels driven and 174-watts (22.4dBW) with only a single channel driven. There was the inevitable reduction in output power at the frequency extremes, but the PM7003 still managed to deliver 138-watts (21.4dBW) at 20Hz and 132-watts (21.2dBW) at 20kHz both channels driven.

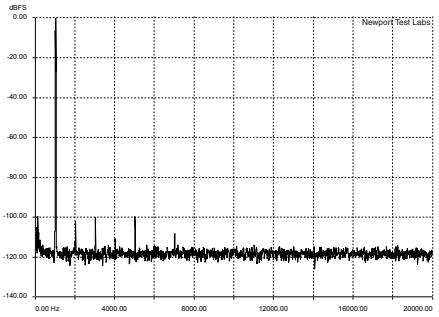
Tested with gruelling 2Ω loads, the Marantz PM7003 delivered a maximum 200-watts (23.0dBW) single-channel driven at 1kHz at which point the amplifier's protection circuitry cut in, presumably because at this power level the output stage was handling 10-amps continuously. However the protection circuitry must be a little smarter than a simple current trip, because it cut in at a somewhat lower power output level (154-watts) at 20Hz and 20kHz. When both channels were driven into 2Ω loads, the PM7003 managed to deliver 165-watts (22.2dBW) at 1kHz and 151-watts (21.8dBW) at 20Hz and 20kHz. All this information is presented in tabular form in *Table 1* and graphically as the bar column graphs.

The PM7003 also proved to be a very wide-band device, with a power bandwidth extending from 1.4Hz to 280kHz. The –1dB frequency response was necessarily narrower, but still an extraordinarily wide 2.5Hz to 172kHz. Across the audio band, the frequency response was 0.1dB down at 20Hz and 0.05dB down at 20kHz, so the normalised response comes in at 20Hz to 20kHz ±0.05dB. If you look at *Graph 5*, which shows this response, you may just be able to see that there are actually two traces, not just the one. The black trace shows the PM7003's response into a standard 8Ω non-inductive load. The red trace shows the response into a load that simulates that of a typical two-way bass reflex bookshelf speaker. You can see that this frequency response is almost completely unaffected by having to drive the more difficult reactive and capacitative load, which means the 'sound' of the amplifier will remain the same, no matter what loudspeakers you connect to it. It also indicates a superior damping factor, and indeed the DF was measured at 145 at 1kHz.

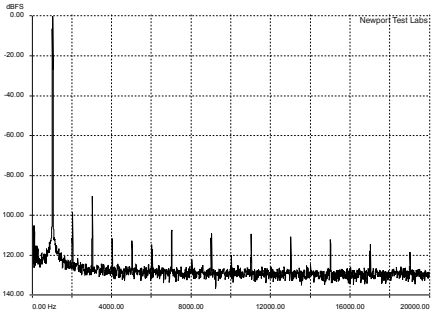
Graph 6 also shows two frequency responses. The black trace is the same as that shown in *Graph 5*, showing the frequency response into a standard 8Ω non-inductive load. The input for this trace was the CD input, as stated, but with the 'Direct' button on the front panel activated so the signal bypassed the tone and balance stages. The red trace is simply the response in the 'Standard CD' mode (that is, with the front-panel 'Direct' button out). You can see that pressing the direct button actually increases the overall output level by about 0.2dB, but by about 0.5dB at low frequencies. Also, if you don't use the Direct button, the low-frequency response rolls off earlier, and more quickly. However, in real terms, the 'normalised' frequency response is still 20Hz to 20kHz ±0.2dB, which is self-evidently excellent! While I am discussing frequency response I should also mention the Marantz PM7003's channel separation, which is graphed in *Graph 8*. You can see from the red (separation) trace that best performance is actually at 500Hz, where it's 84dB, but the 1kHz result, which is the one most often used for specifications, is at 82dB. Low-frequency separation was good at 74dB, but the high-frequency figure of 54dB, although more than adequate, was a little less than I'd expect from an amplifier retailing for more than $1,000 and to me



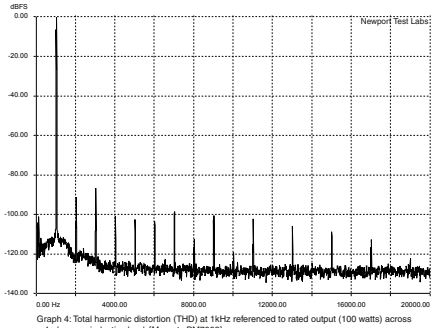
Graph 1: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across an 8-ohm non-inductive load. [Marantz PM7003]



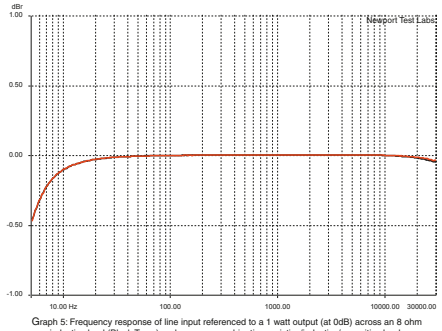
Graph 2: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across a 4-ohm non-inductive load. [Marantz PM7003]



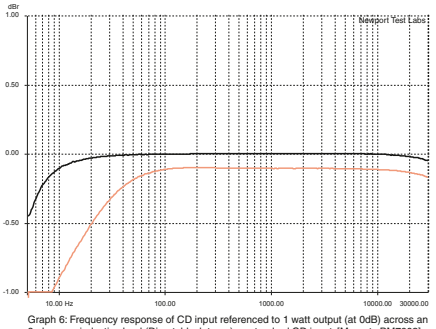
Graph 3: Total harmonic distortion (THD) at 1kHz referenced to rated output (70 watts) across an 8-ohm non-inductive load. [Marantz PM7003]



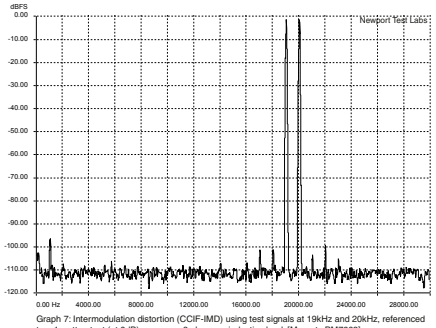
Graph 4: Total harmonic distortion (THD) at 1kHz referenced to rated output (100 watts) across a 4-ohm non-inductive load. [Marantz PM7003]



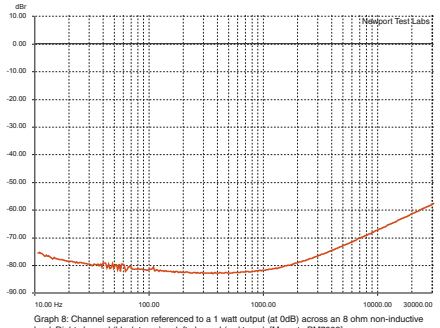
Graph 5: Frequency response of line input referenced to a 1 watt output (at 0dB) across an 8 ohm non-inductive load (Black Trace) and across a combination resistive/inductive/capacitive load representative of a typical two-way loudspeaker system (Red Trace). [Marantz PM7003]



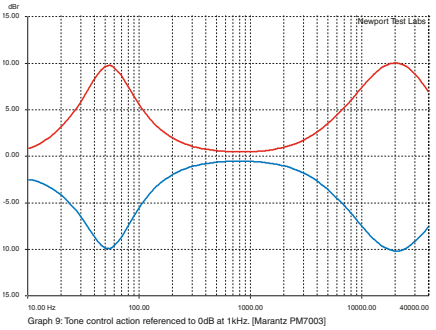
Graph 6: Frequency response of CD input referenced to 1 watt output (at 0dB) across an 8 ohm non-inductive load (Direct, black trace) vs standard CD input. [Marantz PM7003]



Graph 7: Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, referenced to a 1 watt output (at 0dB) across an 8 ohm non-inductive load. [Marantz PM7003]



Graph 8: Channel separation referenced to a 1 watt output (at 0dB) across an 8 ohm non-inductive load. Right channel (black trace) vs left channel (red trace). [Marantz PM7003]



Graph 9: Tone control action referenced to 0dB at 1kHz. [Marantz PM7003]

suggested some capacitative coupling effects. It's also a good time to mention the unusual contour of the Marantz' tone controls, which shows Marantz's engineers have not recycled the same old Baxandall circuit that's usually used. The graph shows you'll get boost and cut of 10dB, but only at 50Hz and 20kHz, with the responses rolling off quite steeply either side of these points. This is very good design, because it means that if you choose to boost the bass frequencies, you won't be wasting power by unnecessarily boosting infrasonic frequencies. Similarly, if you boost the treble, you won't be over-driving the tweeter at frequencies higher than 20kHz—particularly important now that the response of so many tweeters extends out to 40kHz and beyond. Despite the different circuit approach, operating the tone controls will still affect the level across the midrange by about 0.8dB, but this is also the case with Baxadall circuitry, so it's fairly standard.

Signal-to-noise ratios were excellent, as you can see from the tabulated figures, with the PM7003 breaking the magical three-figure mark by returning a tested S/N of 103dB A-weighted referred to rated output. This is a great figure when you consider that the reference is just 70-watts. The low differences between the unweighted and weighted results show that the power supply of the Marantz is quiet, so there's very little mains hum—something also evidenced by the lack of energy in the noise floor at the extreme left of *Graphs 1* through *4*. Referred to a 1-watt output, which gives us a chance to accurately gauge the Marantz PM7003's noise performance against other amplifiers with different power output ratings, *Newport Test Labs* measured 83dB (unweighted) improving to 89dB with A-weighting. This is superior performance.

Distortion was also excellent: very low irrespective of load impedance but, as you can see from the graphs, at its lowest when the amplifier was driving 8Ω loads. At an output of 1-watt across 8Ω, there's a third harmonic distortion component at –103dB (0.0007%), a fourth harmonic at –112dB (0.0002%) and a fifth harmonic at –110dB (0.003%). Summed, and adding in the noise, this gives a total THD+N figure of 0.007%, which is excellent. Distortion increases slightly when load impedance is halved to 4Ω as you can see, but all distortion components are still more than 100dB down (0.001%). As you'd expect, distortion is much higher at rated output (70-watts) and you can see (from the elevated noise floor below 4kHz) that the power supply is also struggling a little, but into 8Ω all harmonic distortion components except the second (at -100dB) and the third (which is at –90dB equivalent to 0.003% THD) are below –110dB. Decreasing the load impedance to 4Ω and increasing power output to 100-watts returned the spectrum shown in *Graph 4*. In this graph the second harmonic is at –90dB (0.003%) and the third is at –85dB (0.005%) with all others sitting at or below –100dB. Again, needless to say, terrific performance. Total THD+N at rated output was measured at 0.002%.

Marantz's PM7003 also performed brilliantly when it came to intermodulation distortion (or, rather, the lack of it!). The spectrum for CCIF-IMD is shown in *Graph 7*. You can see the two test signals at 19kHz and 20kHz just to the right of centre at exactly the correct level. The sidebands either side are all more than 100dB down and there is no effect on the noise floor, which is wonderful. Even better is that there's hardly any regenerated signal at 1kHz—just a small blip at –96dB (0.001%).

The 100Hz square wave shows some tilt, showing that the response does not extend down to d.c. but there's no curvature to indicate any low frequency phase shift. The 1kHz square wave falls just a little short of perfection, evidenced by the subtle curving at the top of the rise (where the first vertical meets the horizontal), but it's nonetheless a very good square wave. The 10kHz square wave is far, far better than I would have expected, which is obviously a direct result of the extraordinarily extended frequency response (280kHz) of the PM7003 design. Just look at that fabulous rise time! The performance into a highly capacitative load is also exemplary, with just an initial overshoot to around half wave height followed by a few cycles of quickly-damped ringing. The amplifier is obviously completely stable into such loads. ***Steve Holding***

Marantz PM7003 Integrated Amplifier - Test Results for Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8Ω	112	20.5	113	20.5	105	20.2
2	8Ω	91	19.6	100	20.0	91	19.6
1	4Ω	156	21.9	174	22.4	144	21.6
2	4Ω	138	21.4	144	21.6	132	21.2
1	2Ω	154*	21.8*	200*	23.0*	154*	21.8*
2	2Ω	151	21.8	165	22.2*	151	21.8

Note: Figures in the dBW column represent the output level, in decibels, referred to one watt output. *Protection triggers.

Marantz PM7003 Integrated Amplifier - Test Results

Test	Measured Result	Units/Comments
Frequency Response @ 1 watt	2.5Hz–172kHz	–1dB
Frequency Response @ 1 watt	1.4Hz–280kHz	–3dB
Channel Separation	74dB / 82dB / 54dB	(16Hz/1kHz/20kHz)
Channel Balance	0.52dB	@ 1kHz
THD+N	0.007% / 0.002%	1 watt/rated o/p
S/N Ratio (unweighted/weighted)	83dB/89dB	dB re 1 watt output
S/N Ratio (unweighted/weighted)	97dB/103dB	dB re rated output
Input Sensitivity (CD input)	21.7mV/183mV	(1 watt/rated output)
Output Impedance	0.055Ω	OC = 2.8292V
Damping Factor	145	@ 1kHz
Power Consumption	0.31/35 watts	Standby/On
Power Consumption	57 watts /313 watts	1-watt/Rated O/P
Mains Voltage Variation	240–252 volts	Min–Max