

Laboratory Test Results

The Dr Jekyll and Mr Hyde nature of the Yamaha A-S700's power supply/output stage management has meant that when it's driving loads lower than 8Ω, using the 'High' setting of the impedance selector, its power output is very high indeed. As you can see from the tabulated figures, and also from the bar graphs accompanying the main part of the review, when only a single channel is driven into a 4Ω load, using a 1kHz test signal, the A-S700 puts out a stunning 256-watts continuous per channel. Under such load conditions the power output drops a little at the frequency extremes, but it's still greater than 200-watts per channel. Using the usual 'both channels driven into 8Ω' criteria that is the accepted industry standard for measuring power output, the Yamaha A-S700 delivers a minimum power output of 115-watts per channel at 20kHz, but can manage a little more at higher frequencies, to the tune of 130-watts at 1kHz and 127-watts at 20kHz. The only situation in which the Yamaha didn't deliver at least 90-watts per channel into the test loads was when its impedance selector was set to 'Low' and it was being driven by a very low-frequency (20Hz) test signal, under which conditions it fell a little shy, returning just 82-watts per channel, which as you can see by comparing the dBW columns, is just 0.4dB down on rated output.

Total harmonic distortion was very low, as you can see on Graphs 1 through 4, which show THD at an output of 1-watt into both 4Ω and 8Ω loads, and THD at 90-watts into an 8Ω load, and at 105-watts across a 4Ω load. At one watt output, the primary harmonic distortion component is the second harmonic, and it's around 90dB down (0.003%) when driving 8Ω loads and a little higher (-85dB/0.005%) when the amplifier is driving a 4Ω load. The third harmonic is sitting at around -95dB (0.001% THD) for both loads. All higher distortion components are more than 100dB down (0.001%) though there are more higher-order components visible when it's driving 4Ω than when it's driving 8Ω. Overall THD+N was measured at just 0.006%. Note that on both graphs, the noise floor is sitting right down at -120dB above the fundamental (at 1kHz), while even at the extreme left of the graph, where you'd expect to find power supply noise, the LF noise is at 99dB and 95dB respec-

Yamaha A-S700 Integrated Amplifier - Test Results		Serial No: Y011018TV
Test	Measured Result	Units/Comments
Frequency Response @ 1 watt	2.5Hz-91kHz	-1dB
Frequency Response @ 1 watt	1.2Hz-159kHz	-3dB
Channel Separation	86dB / 64dB / 40dB	(20Hz/1kHz/20kHz)
Channel Balance	0.076dB	@ 1kHz
Interchannel Phase	0.27 / 0.03 / 0.59	deg (20Hz/1k/20k)
THD+N	0.0006% / 0.004%	1 watt/rated o/p
S/N Ratio (unweighted/weighted)	87dB/93dB	dB re 1 watt output
S/N Ratio (unweighted/weighted)	98dB/103dB	dB re rated output
Input Sensitivity (CD input)	18.4mV/177mV	(1 watt/rated output)
Output Impedance	0.0371Ω	OC = 2.8292V
Damping Factor	215	@ 1kHz
Power Consumption	0.82/23 watts	Standby/On
Power Consumption	53 watts /303 watts	1-watt/Rated O/P
Mains Voltage Variation	242-252 volts	Min-Max

Yamaha A-S700 Integrated Amplifier - Test Results for Power Output							
Channels Driven	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8Ω (HiZ)	145	21.6	153	21.8	153	21.8
2	8Ω (HiZ)	115	20.6	130	21.1	127	21.0
1	4Ω (HiZ)	240	23.8	256	24.0	232	23.6
2	4Ω (HiZ)	162	22.0	190	22.7	182	22.6
1	8Ω (LoZ)	100	20.0	100	20.0	100	20.0
2	8Ω (LoZ)	82	19.1	90	19.5	90	19.5
1	4Ω (LoZ)	156	21.9	169	22.3	167	22.2
2	4Ω (LoZ)	115	20.6	135	21.3	126	21.0

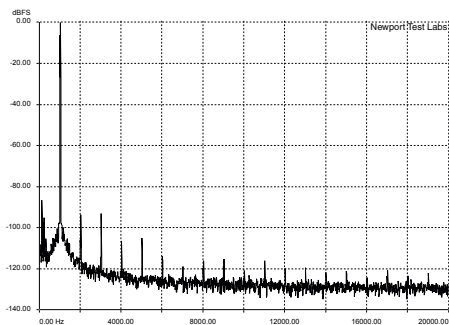
Note: Figures in the dBW column represent the output level, in decibels, referred to one watt output.

tively. At higher outputs, the 'skirts' around the fundamental show that these output levels are stretching the limits of the A-S700's power supply's ability to deliver both voltage and current, but despite this, the harmonic distortion components are still very low (all more than 90dB down) and low-order. Note the noise floor has dropped even lower over most of the graph, though at the extreme left, the stress on the power supply has resulted in increased power supply noise. However, as you can see from the overall signal-to-noise ratios, the Yamaha A-S700 is an exceptionally quiet integrated amplifier, returning a best result of -103dB A-weighted, referenced to rated output. Referenced to 1-watt output (which allows easy comparisons with other amplifiers...

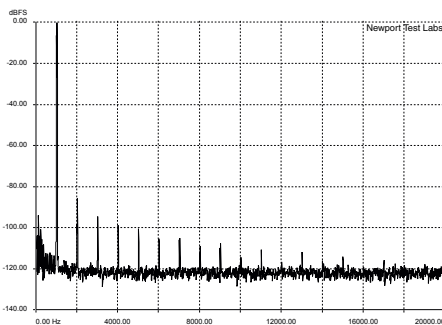
or at least easy if their S/N ratios are referenced to the same output) the Yamaha's S/N was measured by *Newport Test Labs* as 93dB.

CCIF IMD was also very low, as you can see for yourself from *Graph 5*. There is very little regenerated signal at 1kHz, and even the upper sidebands at 18kHz and 21kHz are around 95dB down.

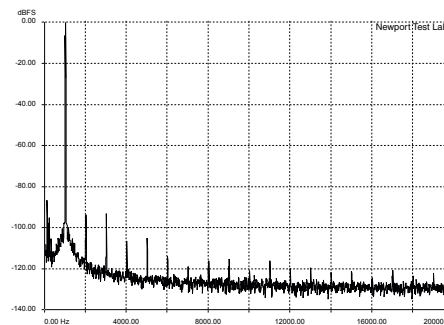
Frequency response was extended, with the A-S700 returning a result of 1.2Hz to 159kHz ± 1.5 dB. Across the audio band it was superbly flat, as you can see from *Graph 9*. On this graph, *Newport Test Labs* has compared the CD Direct circuit path with that of the Pure Direct. As you can see, the Pure Direct trace is the flatter of the two, due to the CD Direct response rising around 1.5dB below 20Hz. This



Graph 3: Total harmonic distortion (THD) at 1kHz referenced to 90-watts across an 8-ohm non-inductive load using high-Z output impedance setting. [Yamaha A-S700 Integrated Amplifier]



Graph 2: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across a 4-ohm non-inductive load using high-Z output impedance setting. [Yamaha A-S700 Integrated Amplifier]




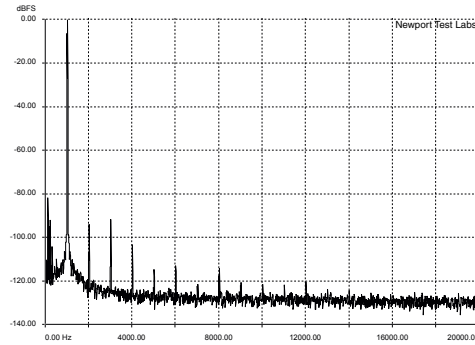
Graph 3: Total harmonic distortion (THD) at 1kHz referenced to 90-watts across an 8-ohm non-inductive load using high-Z output impedance setting. [Yamaha A-S700 Integrated Amplifier]

lift is so small—and at such a low frequency—that it would not be audible. What might *just* be audible is the slight increase in level you'd hear when switching from CD Direct to Pure Direct or from the ordinary CD path to the Pure Direct path. As you can see, the flattest, most linear response is provided via the Pure Direct path, closely followed by the CD Direct path...just as you'd expect, really!

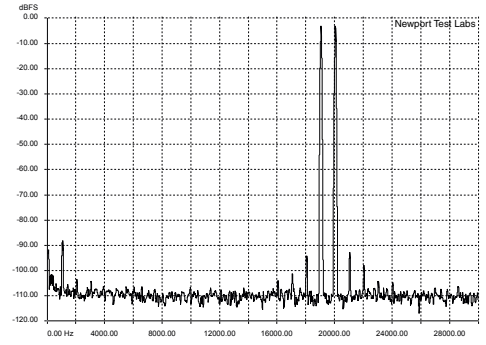
Channel separation was not the A-S700's strong point, as you can see from the traces crossing *Graph 7*. Channel separation is a good 86dB at 20Hz and still a very respectable 64dB at 1kHz, but it eventually decreases to just 40dB at 20kHz. This is more than adequate to ensure perfect stereo imaging but shows there's likely a little capacitive coupling inside the amplifier. HF channel separation improved when either of the direct modes was deployed. The graph showing the action of Yamaha's loudness contour shows that Yamaha is compensating for both the low- and high-frequency roll-off issues that affect the human ear. (Some loudness contours address only the low-frequency hearing problem.) The curve's shape is excellent, giving a maximum 18dB boost at low frequencies that is nicely shelved at 40Hz and just on 8dB of boost at high frequencies, shelved at 20kHz. The action of the tone controls is also beautifully constrained, with the A-S700's circuit offering around +12dB of boost and -12dB of cut. If you use extreme settings of the controls there will be an audible effect on the midrange level, but that's pretty much what I'd expect.

The input sensitivities are spot-on for interfacing with other hi-fi components, while the very high damping factor shows that the Yamaha A-S700's own 'sound' will not change at the whim of the speakers you connect, so you will be hearing the true response of whatever speakers are connected. The square wave performance is excellent, with the 100Hz waveform showing the tilt expected from a frequency response that does not extend to d.c. but no evidence of phase inaccuracies. The 1kHz waveform is close to perfect (a little snip off the leading edge mars it) while the 10kHz waveform reflects the fact that the Yamaha A-S700's frequency response is only 3dB down at 159kHz. There is quite a deal of overshoot and some ringing evident when driving a severe capacitive load, but the amplifier's output stage settles down quickly and is demonstrably completely stable.

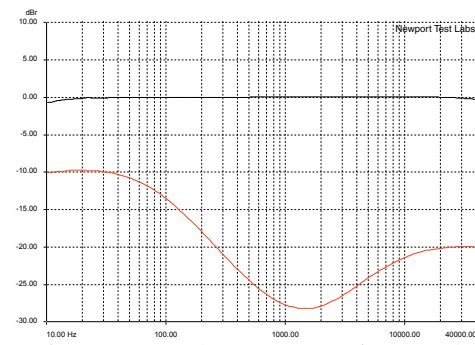
I was pleased to find that the Yamaha A-S700's standby power consumption is so low that it already meets the Australian laws that will come into force two years from now. However you can see that the circuit is also relatively efficient, as the amplifier draws just a shade over 300-watts from the mains when operating at its maximum output and mostly will draw less than 100-watts even when it's working hard. Overall, I'd have to say that Yamaha's A-S700 delivers a truly outstanding level of performance.  **Steve Holding**



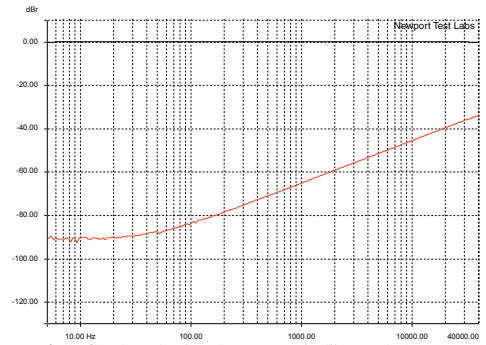
Graph 4: Total harmonic distortion (THD) at 1kHz referenced to 105-watts across a 4-ohm non-inductive load using high-Z output impedance setting. [Yamaha A-S700 Integrated Amplifier]



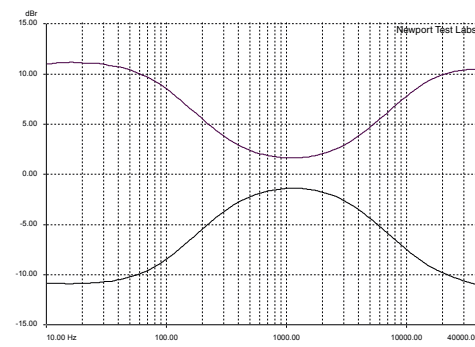
Graph 5: Intermodulation distortion (CIIF-IMD) using test signals at 19kHz and 20kHz, referenced to a 1-watt output (at 0dB) across an 8-ohm non-inductive load. [Yamaha A-S700 Int. Amplifier]



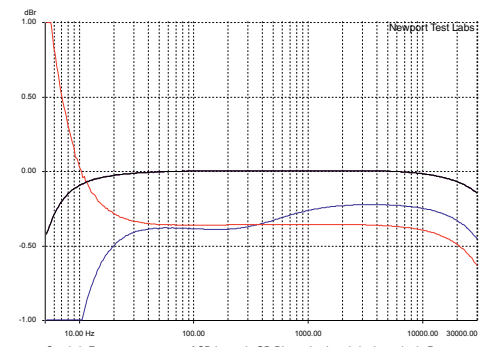
Graph 6: Loudness control action referenced to 0dB at 1kHz. [Yamaha A-S700 Integrated Amplifier]



Graph 7: Channel separation referenced to a 1-watt output (at 0dB) across an 8-ohm non-inductive load using high-Z output impedance setting. [Yamaha A-S700 Integrated Amplifier]



Graph 8: Tone control action referenced to 0dB at 1kHz. [Yamaha A-S700 Integrated Amplifier]



Graph 9: Frequency response of CD input via CD Direct circuit path (red trace), via Pure Direct circuit path (black trace), and through the standard CD input with both direct paths switched off (blue trace). All measured using 8-ohm non-inductive load. [Yamaha A-S700.]

