

# Atoll Electronique

## IN50 Integrated Amplifier



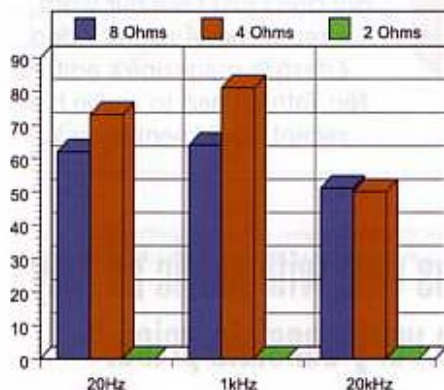
France is fiercely protective of its regional names. By way of example, look at the enthusiasm it exhibits to protect the words 'champagne' and 'burgundy' where it concerns the wine industry. It appears that the French are also very picky about the regions in which their hi-fi equipment is manufactured, because Atoll Electronique takes considerable pains to point out that all its equipment is assembled entirely in its own factory in Brecey, and that almost all its component parts it uses are sourced from within France itself, with the chassis being made in Brittany, the aluminium front panels laser-cut in Lorraine, the circuit-boards etched in Haute-Loire, and the power supplies assembled in the Rhône region. Where components can't be sourced from within France itself, Atoll says they come from within the EU.

As I should not have to tell you, the company is French to its roots, which were put down in 1997 by Stephane and Emmanuel Dubreuil, who started the company after becoming disenchanted with the high prices being charged for high-end audio electronics in France. The two brothers founded the company specifically to manufacture 'true high-end audio electronics for budget-conscious audiophiles' and that's been their guiding philosophy ever since. Says Stephane: 'Our passion is stronger than ever, and we pursue perfection and satisfaction, day by day, for the sheer pleasure of our customers.'

### The Equipment

One thing the brothers Dubreuil realised right from the outset was that in order to provide high-quality at a low price, they'd have to sacrifice component recognition. So, rather than each Atoll component being instantly identifiable as a particular model, different models would have to look almost identical. The result is that the IN50 I received for this review is virtually indistinguishable from the IN80 and IN100 integrated amplifiers as well as from the PR100 and PR200 preamplifiers, because the chassis on all five are absolutely identical... right down to the front panels. Atoll uses a truly clever system where the same front panel is used on all three amplifiers and two pre-amps, the model number being printed on a small piece of plastic that's attached to the back of the panel and is visible through a hole that also serves as the 'O' in the word 'Atoll' that's engraved on the front. Check out the photo above and you'll see what I mean. Atoll uses the exactly the same approach with its CD players: the CD50, CD80 and CD100 also have interchangeable chassis. What it means generally for consumers is that they're assured of a top-notch, high-quality chassis at an absolutely rock-bottom price, and in particular that unless you look carefully at an IN50, you won't be able to distinguish it from the much higher-powered and higher-priced IN100.

Initially, I thought Atoll had decided not to include bass and treble controls



**Power Output:** Single channel driven into 8Ω, 4Ω and 2Ω non-inductive loads at 20Hz, 1kHz and 20kHz.

"I was almost quite literally bowled over by the vibrancy of the sound from Atoll's IN50. It was as if the amplifier was not in the chain at all."

or a loudness contour circuit for cost-cutting reasons, but it transpired that I was mistaken. According to Stephane, they elected not to allow alterations in sound quality of any kind. 'Such adjustments have many disadvantages' he says. 'If you use them, the frequency and phase responses become non-linear, additional colourations and artificial and parasitic noises are introduced, which take a toll on sound clearness and transparency and hamper the whole system's dynamics. [As for] using bass or treble controls to correct imbalances from the loudspeakers or from the room, this is the same as correcting a problem by introducing another problem, which destroys the integrity and unity of the high-fidelity system.' (By the way, the quality of these quotes is due to my extremely poor French, so I am to blame, not Stephane, but I can assure you that my English translations are a whole lot better than the English in the IN50's Owner's Manual.)

Look inside the IN50 and you'll see where Atoll has been rather spendthrift: Philips' highest-quality capacitors, an Alps volume control and Alps source selector, 0.1 per cent metal film resistors, and IRFP140/150N MOSFET output devices (two pairs). The PCB is well laid out, mostly symmetrical, with the multiple vacant spaces revealing that Atoll is also re-purposing the same PCB on its other products, so it is not only the front panels and chassis that are shared between different models. The power supply is not overly-generous, with a small 160VA toroid providing two 35V rails that feed into a pair of 6800µF/63V smoothing capacitors. The output stage appears to combine standard fuse protection (3.15 amp) with PTC resistors but I did not have a circuit diagram to hand. I was also a little perplexed that my Atoll did not have a motorised volume control like the models I'd seen reviewed in French audio magazines. Even though no remote was supplied with my review sample, I just assumed this was an added cost extra, so that you could add remote controllability to any IN50 just by purchasing a remote. This turned out not to be the case: Atoll provides

two completely different models: remote and non-remote.

I regret to report that the rear panel looks a bit amateurish, and uses connectors that are more popular with kit amplifier constructors. Still, they do the job. You get five line-level inputs, tape and pre-amp outputs and a single set of speaker outputs. Atoll's manual warns against paralleling multiple speakers to this single output, but its brochure rates the IN50's output into both 8 ohm (50-watts per channel) and 4 ohm (70-watts per channel) loads.

The Atoll IN50 is 440mm wide, 90mm high and 270mm deep. It weighs 7kg.

### Performance

I had expected that the circular semi-transparent stylised IN50 logo inset into the front panel would light up when I switched the Atoll on, so I was a bit disappointed when it didn't. *Sacré bleu!* Surely eliminating a single LED is taking cost-cutting to extremes? As it is, there's only a dull yellow LED on the front panel midway between the tape monitor button and the headphone socket to indicate the power status of the IN50. Later I realised the lack of an LED was probably because on models where the remote control is fitted, the infra-red sensor is likely located behind the logo.

In deference to the IN50's relatively low power output rating, I connected it to my most efficient pair of reference loudspeakers (yes, I regret to say that I am a loudspeaker tragic, with more pairs dotted around my home than I—or my long-suffering wife—can poke a stick at. Most are commercial designs in various sizes and technologies, but several are home-brewed.) I was almost quite literally bowled over by the vibrancy of the sound from Atoll's IN50. It was as if the amplifier was not in the chain at all, and my CD player had developed the magical ability to drive my loudspeakers on its own. (The IN50 I was supplied did not have a phono input, so I couldn't connect my trusty Linn, but you can option one in.)

This 'connectedness' is very unusual,

## Atoll Electronique

Brand: Atoll Electronic

Model: IN50

Category: Integrated Amplifier

RRP: \$995

Warranty: Two Years

Distributor: Duratone Imports Pty Ltd

Address: Botany Street

Phillip

ACT 2606

T: (02) 6282 1333

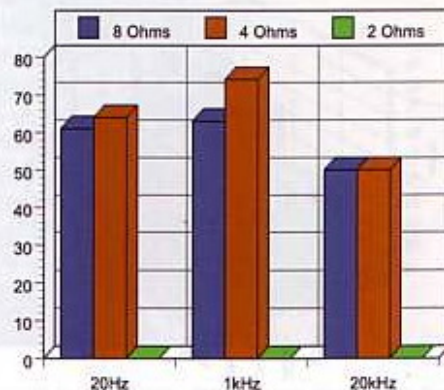
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particularly in solid-state amplifiers, which rarely have the ability to provide a direct conduit between source and transducer. The effect is difficult to describe, but it's somewhat akin to that feeling you get when you're walking down a suburban street where everyone has their stereo blaring away and all of a sudden you stop dead still in front of one house, because you're immediately aware that in this dwelling, the music is being created by a real musical instrument: be that instrument a piano, a violin or even an electric guitar. This feeling of instant recognition is similar to the connectedness I heard when listening to music through the IN50.

What it meant was that my latest spinner, Eurotrash taksim, seemed almost live in my living room, with the hauntingly beautiful voice of Deborah Kayser lilting from the speakers, and Peter Neville's curious percussion effects so real that I wondered from time to time whether my better half was playing along in the kitchen. The songs (from around Greece) are wonderfully realised. I was particularly entranced by *Mavro mou helidoni*, a Byzantine folk song composed on the fall of Constantinople, and *Thalassa*, a song of loss from the Dodecanese islands. The sound of Achilles Yiangoulli's



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




bouzouki has been captured perfectly, while the Atoll IN50 also delivered the double-bass of Nick Tsiavos with chilling accuracy, but at the same time a friendly, familiar warmth. Melbourne broadcaster Doug Spencer was right when he said of Tsiavos: *'[his] mastery of the bow reminds you that his instrument is a bass violin.'* The midrange sound of the IN50 must really have been impressive, because when listening to this CD I even warmed to the sound of Anthony Schulz's instrument—and I'm not usually a fan of the accordion!

So it went, for CD after CD, genre after genre. This unassuming little amplifier was able to deliver music, beautifully unadorned, and ready for admiration. I guessed it must have been delivering more than its rated power into my speakers, which are not only highly efficient, but also moderately low-impedance, because throughout all my listening sessions I was able to extract more than sufficient volume for all practical purposes, and I never once heard any clipping, even on the peaks. It was only when I connected the least efficient speakers I own and played a few Beethoven symphonies at very high volume through them, that the sound-field squeezed

too close, and I could hear the bass starting to harden. However, even as this started to happen, I was simultaneously marvelling at the dynamics of which the IN50 is capable.

Also worthy of mention is the stereo imaging, which I found remarkable. It's sharp and precise, yet without ever being so crisply focused that it appeared manufactured and artificial. The sense of the performance 'space' that's created in front of you is almost tangible.

### Conclusion

I am not sure who it was who said 'simplicity is its own reward' (Google told me it was Mary Greene Chandler Ware, in 1854, but I don't really trust the Internet as an information source) but I was certainly constantly reminded of the saying whilst I had the pleasure of reviewing Atoll's IN50, because I suspect much of its extraordinarily good sound is simply the result of there being very little circuitry in the way of the signal. Best of all, given the extraordinarily low asking price, there's also very little to prevent audiophiles—and particularly Francophiles—from personally benefiting from this simplicity. 

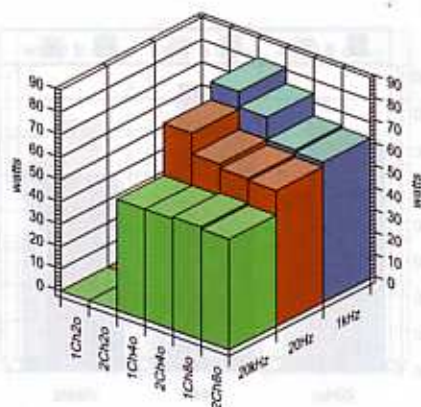
Andrew Larrup

### Test Results

Newport Test Labs measured the power output of the Atoll IN50 at 1kHz as 63-watts both channels driven into 8 ohms and 74-watts both channels driven into 4 ohms. This means that the Atoll's power output was 1dB higher than specification at 8 ohms, and a mere 0.2dB above it when driven into 4 ohms. However, the amplifier could not sustain this output level at the frequency extremes. At 20Hz it certainly came close, returning both-channels-driven figures of 61-watts per channel into 8 ohms and 64-watts per channel into 4 ohms. However, at 20kHz, crossover notch distortion components became too intrusive once output power exceeded 50-watts, irrespective of load resistance, so this was the point at which output was measured, rather than the more usual clipping point.

Measurement of power output was made difficult due to the use of PTC resistors in the output stage as one form of protection (fuses are used as a fail-safe for the PTCs), because these positive temperature coefficient resistors prevent the amplifier from being operated continuously at rated output when it's driven by a standard sine wave test signal. When connected to 8 ohm loads, the low current draw means that the PTCs are relatively slow to trigger, but when driving 4 ohm loads, the higher current draw means they act much faster. When tested with 2 ohm loads, the PTCs triggered so fast that it was impossible to make any measurements of power output at all. While I would not expect the PTCs to interfere or otherwise affect the amplifier's operation when it's used to play music, rather than test signals, it would still be best to ensure the amplifier is very well-ventilated, since heat will affect the operation of the PTCs, and it would also be better to use speakers with a nominal impedance of at least 6 ohms or higher for best performance.

Distortion was very low at normal output levels. As you can see on the graphs, there's just a single second-order harmonic distortion component (HDL<sub>2</sub>) in the output,



Power Output: Single and both channels driven into 8Ω, 4Ω and 2Ω non-inductive loads at 20Hz, 1kHz and 20kHz.

LAB  
REPORT

Readers interested in a full technical appraisal of the performance of the Atoll Electronique IN50 should continue on and read the LABORATORY REPORT published on the following pages. All 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.

and it's approximately 86dB below signal reference, which is equivalent to around 0.005% distortion. This would be completely inaudible, but even if it were, second-order distortion is simply the 'octave' above the fundamental, so even if it were high enough to be audible, it would be perceived as being a 'fuller', 'richer' sound, rather than an unpleasant one.

At rated output, I was surprised by how closely the output spectrums of the Atoll matched, irrespective of load. Basically, at rated output, the Atoll shows HDL<sub>2</sub> at -70dB (0.03%), HDL<sub>3</sub> at -72dB (0.02%), with fourth- and fifth-order components hovering around -90dB (0.003%), and sixth- and seventh-order components at around -105dB. These are good results, and sum to an overall THD+N figure of 0.12%, well below audibility. Note that the noise floor is sitting for the most part at -120dB, which is excellent, but the jagged points clustered down at the left of the graph mean there is some mains hum (and related components) and that the power supply is operating right on its design limit.

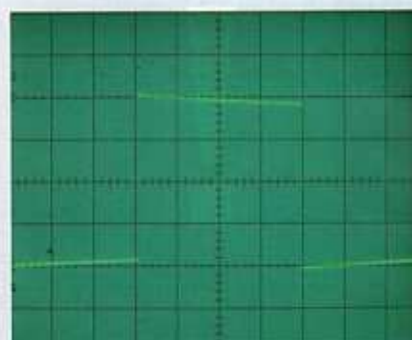
The IN50 is not a particularly wide-band design, but the sample measured nonetheless exceeded Atoll's specification of 5Hz to 80kHz (though the company does not state dB limits) using 3dB down-points as the reference, with Newport Test Labs measuring response at 2.5Hz to 83kHz. Tightening the tolerance further, the Atoll IN50's frequency response came in at 4.2Hz to 62kHz  $\pm$ 0.5dB. As you can see on the graph, this response was measured into a standard non-inductive load. Driving a simulated loudspeaker load, the IN50's response was measured at 10Hz to 30kHz  $\pm$ 0.3dB. Across the audio band (20Hz to 20kHz) it was better again, at  $\pm$ 0.1dB. This result pointed to the Atoll having a fairly high output impedance, which subsequently proved to be the case, with the lab measuring 0.376 ohms at 1kHz, which in turn gives an effective damping factor of 21 (at 1kHz). This is ample, but relatively low, so if the IN50 were used to drive a speaker system with a very large, heavy bass cone (between 300 and 415mm in diameter) there might be an audible effect at very low frequencies.

CCIF intermodulation distortion testing consists of using two equal-amplitude, high-frequency signals spaced closely in frequency. Here we've shown the result when 19kHz and 20kHz signals are used. There are virtually no sideband products, with the signals at 18kHz and 21kHz being around -90dB down. There's also almost no signal at the difference frequency (1kHz).

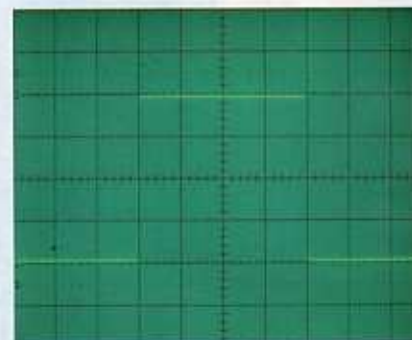
Atoll Electronique IN50 Integrated Amplifier - Test Results		
Test	Measured Result	Units/Comments
Frequency Response @ 1 watt	4.2Hz-62kHz	-1dB
Frequency Response @ 1 watt	2.5Hz-83kHz	-3dB
Channel Separation	-56dB / 64dB / 50dB	(20Hz/1kHz/20kHz)
Channel Balance	0.038dB	@ 1kHz
Interchannel Phase	0.07 / 0.01 / 3.66	deg (20Hz/1k/20k)
THD+N	0.17% / 0.12%	1 watt/rated o/p
S/N Ratio (unweighted/weighted)	78dB/83dB	dB re 1 watt output
S/N Ratio (unweighted/weighted)	88dB/93dB	dB re rated output
Input Sensitivity (CD input)	19mV/137mV	(1 watt/rated output)
Output Impedance	0.376 $\Omega$	OC = 2.8292V
Damping Factor	21	@ 1kHz
Power Consumption	NA/16.5 watts	Standby/On
Power Consumption	42 watts /252 watts	1-watt/Rated O/P
Mains Voltage Variation	241-246 volts	Min-Max

Atoll Electronique IN50 Integrated Amplifier - Test Results for Power Output							
Channel	Load ( $\Omega$ )	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 $\Omega$	62	17.9	64	18.0	50	16.9
2	8 $\Omega$	61	17.8	63	17.9	50	16.9
1	4 $\Omega$	73	18.6	61	18.5	50	16.9
2	4 $\Omega$	64	18.0	74	18.4	50	16.9
1	2 $\Omega$	See Copy	N/A	See Copy	N/A	See Copy	N/A
2	2 $\Omega$	See Copy	N/A	See Copy	N/A	See Copy	N/A

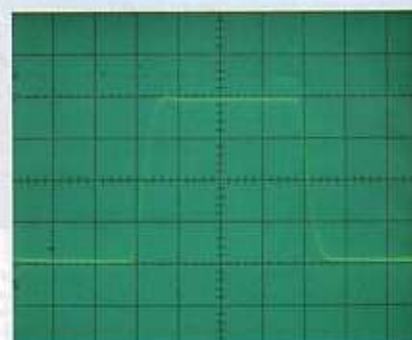
Note: Figures in the dBW column represent the output level, in decibels, referred to one watt output.



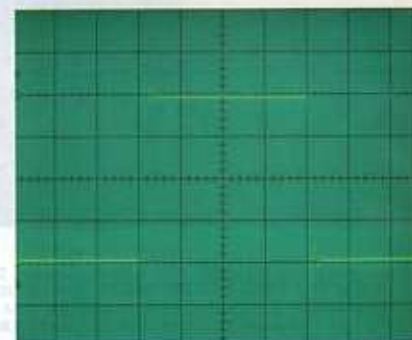
100Hz Square Wave (8 $\Omega$  resistive load)



1kHz Square Wave (8 $\Omega$  resistive load)



10kHz Square Wave (8 $\Omega$  resistive load)



1kHz Square Wave (8 $\Omega$ /2 $\mu$ F capacitive load)



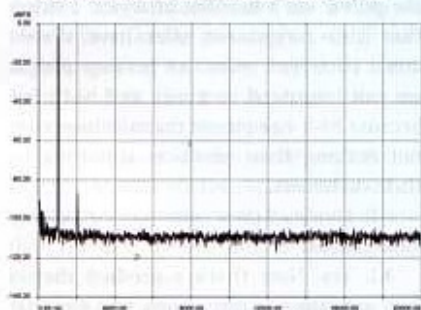
These are all excellent results. The signals visible at the extreme right of the graph are ordinary second-harmonic distortion components at 38kHz, 40kHz and 42kHz. All are more than 60dB down (0.1%).

The square wave measurements confirmed what the other measurements already revealed. The 100Hz square wave shows that the IN50's response rolls off at low frequencies (the tilt on the wave) while the slight curves on the flat 'tops' (tilted) reveal some low-frequency phase shift. The 1kHz square wave is excellent. Adding capacitance revealed that the amplifier is inherently stable, and easily able to drive highly capacitive and reactive loads. There is some ringing evident, but it's both contained and restrained. The 10kHz square wave shows the amplifier's high-frequency and rise-time limitations, while the slight 'kink' at half-way up the waveform shows the beginnings of the crossover distortion that led to the 50-watt ceiling on power output at high frequencies.

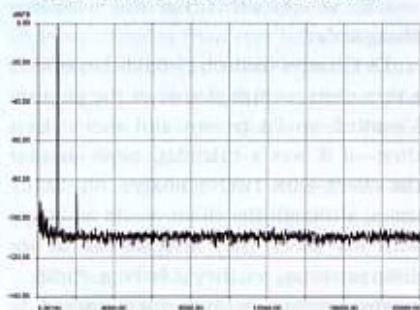
Channel separation was more than adequate, as you can see from the graph, with a best of around 64dB at 1kHz, a result that was maintained right across the midrange, only decreasing to 50-56dB at the frequency extremes. The balance between channels came in at 0.38dB (at 1kHz) with inter-channel phase just 0.01° out at this frequency. Phase strayed only at 20kHz, where a tiny 3.66° error was noted. The measured signal-to-noise ratios were good, and certainly more than sufficient, but given the simplicity of the design, I was intrigued that the figures weren't higher. Still, an A-weighted result of 93dB is not to be sneezed at, with the unweighted result of 88dB revealing that most of the noise was low-frequency. Maximum power consumption was measured as 252-watts, but when the amplifier is being used to play music at average levels, mains power consumption would hover between 42-watts and around 80-watts.

Steve Holding

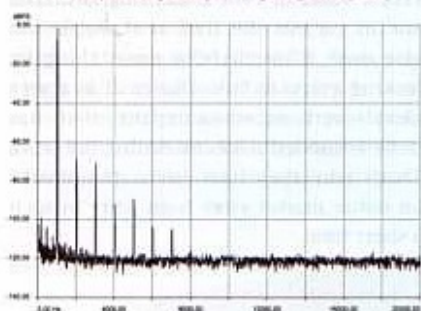
Alzet Elektronique IN50 Integrated Amplifier THD @ 1kHz @ 1 watt (8 ohms)



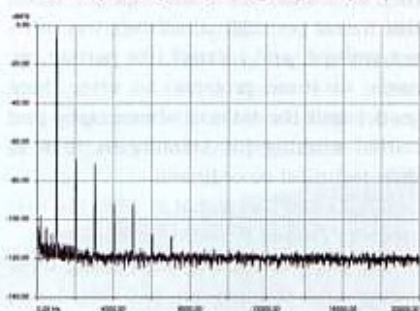
Alzet Elektronique IN50 Integrated Amplifier THD @ 1kHz @ 1 watt (4 ohms)



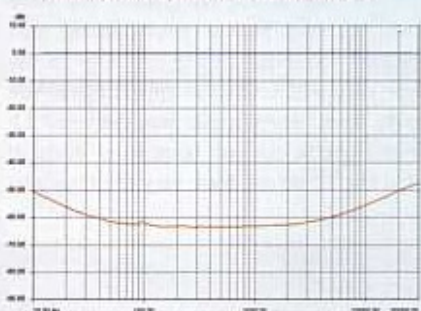
Alzet Elektronique IN50 Integrated Amplifier THD @ 1kHz @ 50 watts (8 ohms)



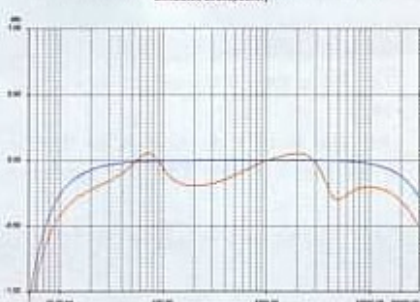
Alzet Elektronique IN50 Integrated Amplifier THD @ 1kHz @ 70 watts (4 ohms)



Alzet Elektronique IN50 Integrated Amplifier Channel Separation @ 1 watt



Alzet Elektronique IN50 Integrated Amplifier Frequency Response @ 1 watt (8 & Simulated Loudspeaker)



Alzet Elektronique IN50 Integrated Amplifier IMD @ 18/20kHz @ 1 watt (8 ohms)

