

JAS Audio

Orsa Loudspeakers



NAD, now one of the world's best-known audiophile equipment manufacturers, was founded by a group of hi-fi dealers who were unhappy that the major multinationals making the equipment they were selling were not listening to feedback from them or their customers. Apparently, JAS Audio started much the same way in 2002, except that rather than being started by a group of hi-fi dealers, it was instead kicked off by a small group of audiophiles based in Hong Kong.

This being the case I was surprised to see, upon peeling away the bottom-most speaker grille, a familiar face: Morel's MW168 bass/midrange driver. What was a driver made in Israel doing in a speaker manufactured in China by a company based in Hong Kong? It subsequently transpired that a company associated with JAS-Audio is the official Morel distributor for Hong Kong. This being the case I almost expected to see a Morel tweeter underneath the top-most grille cover. Instead I was confronted by the equally familiar face of one of China's best-known export products, the LCY-130 twin-ribbon tweeter, which is taking care of the high frequencies on an increasing number of high-end speakers right around the world.

The Equipment

The Orsa is a bass-reflex design, but you'll look in vain for the port, because there isn't

one... or not a port as we know it. What JAS has done is manufacture the Orsa as two separate cabinets: one holding the bass driver, and the other the tweeter. It has then bonded the two cabinets together with four bolts, using four brass spacers between the cabinets to ensure the two surfaces remain exactly 6mm apart. So if you crouch down so your eyes are midway between the tweeter and the bass/midrange driver, you can look right 'through' the speaker.

The trick to the vanishing bass reflex port is that JAS has put it in the top of the lower cabinet, so it vents into the slot between the two cabinets, then dissipates omni-directionally. Or this is what is supposed to happen. In fact, because JAS has also cut a large hole in the bottom of the cabinet housing the tweeter, much of the vent's output is delivered first into the upper cabinet, and only then to the slot. I must admit I couldn't see any reason for doing this, so it remained a mystery until I read Steve Holding's lab report. One useful reason for having a hole in the upper cabinet is that it provides a handy route for the wire coming from the crossover (which is located in the bottom cabinet, behind the Morel) to join up to the rear of the LCY tweeter.

The bass reflex ports are not so much 'ports' in the conventional sense that they have tubes mounted behind, because in

the Orsa, the tube is mounted 'outside' the cabinet, because in fact the tube's function is replaced by the 6mm gap between the cabinets. This gives a volume of 360cm³, the same as a port with a diameter of 75mm and a length of 8cm. This is clever, but has the disadvantage that the internal 'fill' of the cabinet can be exhausted into the gap between the cabinets, to become visible to the dismay of the pernickety. I was surprised to find there was acoustic fill in the upper cabinet, despite the fact that the rear of the LCY-130 is completely sealed, and so generates no air pressure. Initially I thought it must be there to ameliorate the effects of the air being projected into it from the 120x80mm vent in the lower cabinet however, when I received Steve Holding's lab report, I finally realised that the purpose of the chamber is to absorb high-frequency sounds that leak through the bass reflex port in the lower chamber—and if you're a regular reader, you'll realise that this is a major problem with most bass-reflex ports.

Morel's MW168 bass/midrange driver is impressive. It has a Theile/Small diameter of 125mm (the overall diameter is 160mm), for an effective piston area (SD) of 120 cm². (Note: In the past, *Australian HI-FI* used to refer to the effective piston area as the effective cone area, usually abbreviated to 'ECA' for the obvious reason. In future, we will adopt the standard Theile/Small

Brand: JAS Audio
Model: Orsa
Category: Loudspeakers
RRP: \$3,990
Warranty: Five Years
Distributor: Sound Reference Pty Ltd
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E: sales@cxatonaudio.com.au
W: www.soundreference.com.au

terminology for this measurement (Effective Piston Area and the standard Thiele/Small abbreviation for this parameter, which is 'SD', for Speaker Displacement.) The cone is driven by a 75mm diameter voice-coil wound with two layers of hexagonally-extruded aluminium wire. This shape means the second layer interlocks perfectly with the first to ensure a high-density coil. The coil is driven by a double ferrite magnetic system that is attached to a pressed steel frame and vented through an insect-proofed hole in the rear of the magnet. Maximum linear excursion (Thiele/Small parameter 'X') is stated by Morel as $\pm 3.5\text{mm}$. The cone is made from Morel's patented 'DPC' polymer. DPC stands for 'Damped Polymer Composite' and is exactly what it seems to be: polypropylene mixed with damping materials. The cone has quite a shallow profile that's interrupted in the centre by a dustcap 75mm in diameter and made of the same material as the cone. The surround suspension is made from rubber. This polymer/rubber combination ensures environmental durability in Australia's climate, which can quickly destroy cone surrounds made from foam.

The LCY-130 tweeter is a quite unusual twin-ribbon design, because although the ribbons are rectangular, they are suspended behind a circular opening rather than the more usual rectangular opening. Also, the diameter of this circular opening is slightly smaller than the length of the ribbons. (Each ribbon is 40mm long, whereas the diameter of the opening is just 38mm). The reason is vertical dispersion. Ribbons in rectangular cut-outs are very beamy in the vertical, so you always have to aim them directly at ear level to get the correct high-frequency balance. Ying Tai Trading, which manufactures the LCY-130, says this fault can be corrected by using a circular cut-out in front of the ribbon, rather than a rectangular one. The company says that its measurements show that conventionally-mounted ribbon tweeters are 16–22dB down at 20kHz at 20° off the vertical axis (up or down) whereas the LCY-130 is only 4.3dB down under the exact same measurement conditions. All measurements are shown at the company's website [www.lcy.com.hk/diyhp/25114/enus/corpnnews.html], which shows a comparison between the vertical dispersion of the LCY-130 and a ribbon in a conventional assembly, for three different frequencies (10kHz, 15kHz and 20kHz) at five different vertical angles.

The magnets driving the ribbons are

very powerful neodymium types, so JAS Audio has fitted a mesh cover over the circular opening in order to prevent nearby ferrous objects from flying into the tweeter and damaging the delicate ribbons. After final checking in the factory, these grilles are further covered by small pieces of non-porous tape to prevent the ingress of small metallic particles. These pieces of tape remain in place during shipping, so if you're unpacking a brand-new pair of Orsas, remember to remove the tapes after you have set-up the speakers!

As you can see from the photograph, the baffle on which the Morel bass/midrange is located slopes backwards quite steeply, whereas the LCY-130 ribbon is mounted completely vertically. This may be to regularise the very different radiation patterns of the cone and ribbon drivers. Also, the fact that the lower section of the speaker protrudes forward presumably means that JAS is aligning the voice-coils to ensure phase accuracy.

Around the back of the Orsa is a key-hole with two positions, marked 'Reference' and 'Dynamic'. The Orsa manual was unforthcoming about the difference between the two, but a quick call to local distributor David Neilen of Sound Reference, revealed that the speakers should normally be used with the key set to the 'Reference' position, but that if a more dynamic sound was required, switching to the Dynamic setting would deliver it, though with a slightly more 'forward' midrange. The left and right speakers are keyed alike, and Jas Audio provides two keys so that you have a spare. I think I'd recommend leaving one in the rear of one speaker for safe-keeping, and locking the other away with your spare house keys.

JAS is also not very forthcoming about the crossover network in the Orsa, either in its promotional literature, its Owners Manual or on its website [www.jas-audio.com], presumably in order to avoid disclosing the exact operation of the 'Reference/Dynamic' switch. It's reported that the crossover frequency is 2.4kHz with a second-order low-pass section and a first-order high-pass. This seems likely, given the crossover components, which comprise five air-cored inductors (all cross-mounted, to eliminate electro-magnetic interaction between them), five Bencic XPP capacitors (all rated at 160 V a. c.), a pair of Yonex MKP capacitors, a pair of Jinshan 10-watt cermet resistors and a pair of 5-watt resistors. The speaker terminals look like WBTs but don't carry that (or any other) brand name. They

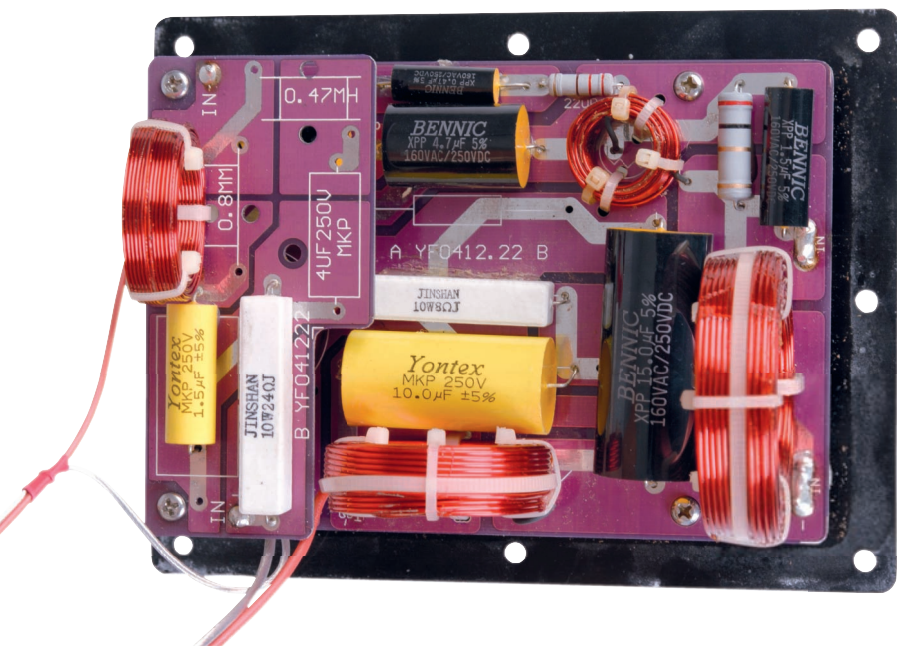
have the useful 'dual tightening' system where there's one locking system for end-fitted banana plugs and another for post-mounted cables and spade connectors. I was not happy with the poor English ('Two Ways') on the rear plate: How hard can it be to get this right?

The finish on the Orsa's cabinet is outstanding, with the mirror-gloss surface that's typical of most high-end speakers made in China. Finishes available include Rosewood, Piano Black, and Cherry. The veneer is laid over the peculiarly soft fibreboard that seems to be unique to Chinese manufacturers. Two different panel thicknesses are used in the construction of the Orsa: 27mm (front baffles) and 19mm (all other panels). Although at first glance the two cabinets look to be regularly sized, the sloping baffle on the lower cabinet has angled bevels and the two grilles are different sizes, and therefore not interchangeable.

Listening Sessions

Lengthy experimentation with positioning the Orsas revealed that although I was able to get excellent results with them placed on a large flat surface (a long, large display cabinet in my living room) I was able to extract the maximum performance of which they're capable only when I placed them on stands and moved them out about a metre from the wall of my main listening room.

The first set of stands I used put the tweeters at ear-level, which I'd normally say was the ideal position, but with the Orsas, I found the high-frequencies a little bright, so I thought I'd take advantage of the usual lack of vertical dispersion of ribbons to drop them a little, so I switched to lower stands, which put the tweeters well below ear level. I guess I should not have been surprised, given the research by Ying Tai, but I was, nonetheless, to hear the same, slightly bright high-frequency sound. I



guess I thought they may have been gilding the lily a little about the improvement in vertical dispersion. In the end, I switched back to the original stands, and then used the time-honoured method of reducing high frequencies by facing the speakers directly up the room so that my listening position was slightly off-axis. This delivered a perfect balance between mids and highs. (Interestingly, both my wife and daughter preferred the slightly zingier sound when the speakers were aimed directly at the listening position.)

Since I had two people on hand, I then enlisted their aid to help me do an A-B check on the difference in sound between the 'Reference' and 'Dynamic' settings of the crossover. This was made a little tricky because it necessitated having two differently sized people standing behind each speaker, which would have absorbed some of the bass differently for each speaker, but at least it was the same absorption for both settings. I could not hear any difference in the sound between the two settings, so I opted to use the 'Reference' setting for all my listening sessions.

One of the first discs I listened to proved to be a perfect vehicle to demonstrate the Orsa's many strengths all on its own. Multi-instrumentalist and vocalist Jenny Gall's new CD 'Cantara' (Elidor Records JG1B06, available through www.indie-cds.com) has an incredible range of beautifully-recorded instruments and natural sounds (she calls them 'field sounds') including solo, harmony and multi-tracked voices. The music on the CD is 'music sung or made originally by Australian women' including Gall herself. Some superb effects are reproduced perfectly by the Orsas, such as the trumpets and viola on *The Bonny Bunch of Roses*, the harp on *The Stockman's Last Bed* and most

stunningly, the vocals, 'fiddle' and piano on *As Sylvie Was Walking* and the surreal sonic effects on *Blue Fox*. The Orsas delivered the sounds on *Cantara* with uncanny accuracy (helped along by a beautiful recording): the detail and transparency delivered by the ribbon tweeter are spectacular. Firing the sound from the ribbon through the small opening has not affected the incredible 'air' to the high-frequency sound at which ribbons excel and of course there's that micro-detailing enabled by the low-mass ribbon that will captivate you. Dome tweeters (of any material) sound 'dead' at low playback volumes because most of the electrical energy is expended overcoming the diaphragm's inertia. In a ribbon tweeter, which has almost no mass, even the tiniest voltage is converted directly into sound. Orsa's ribbon is also good at delivering sounds that would normally 'fall between the cracks', so that you will hear subtle nuances in performances you've never heard before, where a pianist has given extra 'weight' to a particular note, for example.

Despite the corporate connection, the sound of the Orsas proved that the Morel driver was a good choice to match with the LCY-130 because it, too, is fast and dynamic. To my ears it was also a good tonal match, which is difficult to achieve when transitioning to a ribbon tweeter. In all the time I listening to the Orsas, using a wide range of source material, I had no sense of there being any 'disconnection' between the midrange and the high frequencies, or even between the lower and upper harmonics of the midrange. The midrange was excellent, with perhaps an ever-so-subtle forwardness that pushed alto voices a little to the fore, but it was otherwise completely neutral.


Bass was understandably a little shy in the deeper reaches, because the Morel is

not a large driver, the enclosure is quite small, and JAS Audio is obviously having to use the Morel over its entire designed operating range, but the bass that issued forth provided a firm underpinning that was completely musically satisfying. Turning up the amplifier volume resulted in some slight congestion to the overall sound, but even when listening at high levels I didn't have to work the speakers hard enough to reach this point, so it's moot. Indeed, quite the contrary: I found that such was the accuracy and detail on offer from the Orsas, I was entirely happy to listen at somewhat lower levels than I usually do, which also gave the bass a little more freedom.

Conclusion

I could not help but wonder whether the key-operated crossover adjustment is more a gimmick to attract attention to what is, after all, a relatively new and completely unknown loudspeaker brand without a track record and, given the difficulty of attracting attention in a world over-crowded with loudspeakers, I can hardly criticise JAS Audio if this is indeed the case.

The rub is that the design of JAS-Audio's Orsa is sufficiently different and that the brand has such a genuinely interesting 'background story' in its own right that such a gimmick should have been completely unnecessary—hi-fi reviewers should have been rushing to review the Orsas simply for their own (very considerable) merits.

Once you hear a pair of Orsas you'll realise instantly there is a new and very serious competitor in the high-end speaker arena. 

greg borrowman

LAB
REPORT

Readers interested in a full technical appraisal of the performance of the JAS Audio Orsa Loudspeakers 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.

Test Results

As usual, *Newport Test Laboratories* used a variety of test methodologies to evaluate the frequency response of the JAS Audio Orsa loudspeakers. Measured using a wideband pink noise stimulus, and averaged over the normal listening window, the Orsas returned a very flat response, extending from 60Hz to 40kHz $\pm 3\text{dB}$ (though the graph's upper limit is 20kHz). The graph shows this response (which is unsmoothed, by the way) and you can see that between 100Hz and 20kHz, save for a small dip between 2kHz and 3kHz, the response lies within the bounds of $\pm 1.5\text{dB}$, which is exceptionally smooth. Particularly noteworthy is the performance of the ribbon tweeter above 10kHz. Most tweeters—but particularly small-domed neodymium types—overheat and compress when presented with high-voltage pink noise test signals. The Orsa ribbon tweeter's performance was completely unaffected by either the complexity of the signal or the high level. I can see why LCY charges so much for them!

A second frequency response sweep, this time using a gated sine test signal, showed that there is some degree of compression at high frequencies, but it was not evident on the pink noise trace because the LCY-310's 'native' frequency response rises 5dB between 4kHz and 20kHz, then remains at this elevated level to 30kHz, before rolling off slightly. (This graph stops at 30kHz.) The green trace shows the on-axis performance. *Newport Test Laboratories* also tested the 30° off-axis performance, which is graphed

using a red trace. You can see that off-axis, the response between 4kHz and 20kHz is far more linear, though the penalty for this linearity is a steep roll-off above 20kHz. If you listen to CDs, which contain no information above 20kHz, this won't matter at all, even if you can hear above 20kHz, which few can do.

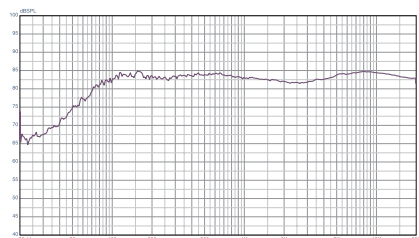
Newport Test Laboratories also measured the high-frequency response of the Orsas for the two positions of the 'Acoustic Setting' switch. The two traces ('Dynamic' and 'Reference') are overlaid in *Graph 3*. You can see that there is no difference in level between the two—for all intents and purposes it looks as though there is only the one trace. I can therefore conclude the switch has no effect on frequency response, tonal balance, or sound pressure level. However, equally I have no doubt the switch does *something*, because this is evidenced by *Graph 4*, which shows the impedance of the Orsa for both settings of the switch. You can see that with the switch in the 'Dynamic' position (blue trace) the impedance diverges at 1kHz to reach a maximum at 5kHz that is about 4 ohms higher than when the switch is in the 'Reference' position (black trace).

Nearfield testing of the bass driver showed the Morel MW168 starts rolling off quite rapidly just above 100Hz but is quite smooth above this frequency until around 800Hz, where there's a small suck-out that rapidly restores itself before the response again rolls off above 1.5kHz. The trace recorded by *Newport Test Laboratories* is similar to that provided by Morel itself

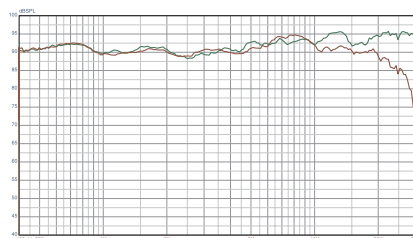
on its data sheet for this product. The near-field response for the bass reflex port is merely an approximation, because due to the unusual design of the Orsa, it's not possible to make an accurate measurement using the near-field technique. Viewed in this light, it appears that JAS-Audio has used a standard Theile/Small alignment. An advantage of this design is that there is no high-frequency output from the port at all, because all the higher frequencies are transmitted directly into the upper cabinet, where they're absorbed completely. You can see that above the peak output at 63Hz, the port's output rolls off smoothly and evenly.

The impedance graph (on which phase is also graphed, as the red trace) shows that like most Chinese designs, the impedance of the Orsa is relatively high, dropping below 6 Ω only below 20Hz and between 170Hz and 300Hz, with resonant peaks at 50Hz and 100Hz. Technically, this is a 6 Ω design. The only tiny mismatches between the left (red) and right (black) speaker impedance traces shows that JAS Audio is properly matching its speakers during manufacture. The phase angles and impedance values mean this will be an extremely easy load for any amplifier, but the speaker should be particularly well-behaved when it's driven by a valve amplifier. JAS Audio specifies sensitivity at 88dB SPL but *Newport Test Laboratories* measured 87.5dB SPL. This is slightly higher than average, and a good result when one takes into account the small physical size of the speaker.

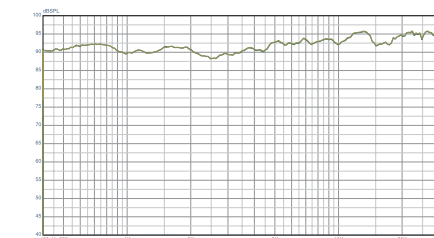
Steve Holding



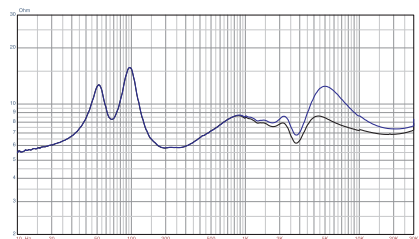
Graph 1: Pink noise frequency response (unsmoothed) at 2.83v at 3.0 metres (averaged in-room response).



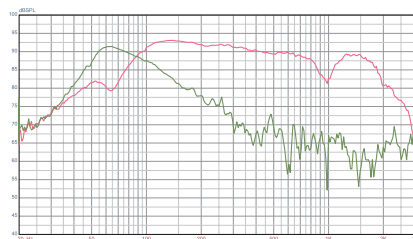
Graph 2: Gated sine frequency responses (unsmoothed) at one watt, at 1.5 metres. On-axis (green trace) vs. 30 degrees off-axis (red trace).



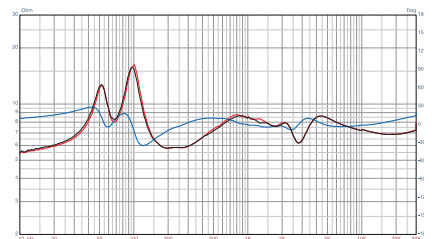
Graph 3: Gated sine frequency responses (unsmoothed) at one watt, at 1.5 metres. Dynamic setting vs. Reference setting see copy.



Graph 4: Impedance vs. frequency, showing difference in impedance between 'Dynamic' setting (blue trace) and 'Reference' setting (black trace) of rear-panel switch.



Graph 5: Nearfield frequency response of both bass drivers and reflex port. (Note data for port has not been re-scaled to compensate for difference in radiating area. Also, see copy for more information about reflex port data.)



Graph 6: Impedance vs. frequency, with both left and right speakers graphed (see copy), plus phase response for left speaker only. Use degrees information at right-hand end of graph for phase angle measurements.