It is not unknown for some canny marketing types to ‘leverage’ old model numbers to stimulate sales of new and often completely different products. This marketing tactic involves releasing a new product with the same (or very similar) model number as a product the company previously sold that was popular with consumers.

One example of this in the automotive world is Nissan’s ‘Z’ series of sports cars. The current Nissan 370Z started its model life as the Datsun 240Z, a model that was so phenomenally successful for Nissan that when it ‘retired’ the Datsun marque, it deemed it essential to keep the ‘240Z’ numbering system to ensure the continued success of the model. So the 240Z transitioned to become the 260Z, then the 280Z, and so on, but even Nissan’s latest numbering schema still contains the ‘DNA’ of the original model number. (The actual car, unsurprisingly, bears very little resemblance to the original… inside or out!)

NAD has taken very much the same approach with its new D3020 integrated amplifier. The original NAD 3020, released back in 1978, was designed as a flag-bearer INTEGRATED AMPLIFIER

NAD D3020
for a company that had recently re-badged itself (from the rather clumsy ‘New Acoustic Dimension’ to the tight and catchy ‘NAD’). The amplifier was deliberately both over-specified and under-priced (at least according to the hi-fi equipment reviewers of that era). The result of these strategies—not to mention the fact that it was a bloody good little amplifier!—was that the NAD 3020 was a runaway success story for NAD.

The company sold more than a million 3020s, which made it the best-selling amplifier of its time and it’s still fondly remembered even now, regularly getting mentions on listings such as ‘Best Amplifier’, ‘Hot Products’, and ‘Ten Most Significant Amplifiers of All Time.’ Recognising a good thing when it saw it, NAD leveraged the 3020’s popularity by following up with similarly-named models, such as the 3020A, 3020B, 3020E, 3020i and 3120.

Unlike all previous 3020 variants, which used entirely linear power supplies and linear output stages, this new D3020 uses switching circuitry: both a switch-mode power supply and a Class-D output stage. For the record, although most audiophiles refer to Class-D amplifiers as being ‘digital’ (even I’ve been guilty of it on occasion), they’re not really: a Class-D amplifier is simply just a specific type of analogue amplifier. It’s probably most correct to call Class-D a ‘switching’ amplifier, which is why I have done so, using the authority of none other than the famous Bruno Putzeys, an expert in Class-D design (he invented the self-oscillating version that’s used by Hypex) whose own definition of how a Class-D amplifier is that it: ‘operates by deriving a discrete-state signal (usually two-state) from a continuous control signal and amplifying this using power switches.’

As you’d expect from an amplifier made in the 21st century, the D3020 also has onboard aptX Bluetooth circuitry to enable wireless music streaming from a Smartphone or other Bluetooth-equipped device, as well as an asynchronous 24-bit/96kHz USB input, so you can play back computer-based music from a desktop or laptop (or wired from a portable device).

THE EQUIPMENT

Although I have seen some photographs (in print and on the web) which show the D3020 oriented horizontally, the designers intended it to be mounted vertically, not least because the D3020’s display is on the top of the unit, and the cooling vents are on either side. (It would appear that the ‘horizontal mounters’ have taken their mounting cues from the writing on the rear panel, which appears to indicate the unit should be horizontally-mounted. I would not personally recommend this, not least because it blocks off one of the cooling vents.)

Before 240V mains power is applied, the NAD D3020 appears not to have any controls at all, save for the large (and rather wobbly...) rotary control protruding from the front panel. However, after you’ve powered-up, sections of the previously-dark Perspex on the top and front of the D3020 light up to reveal that the top surface of the amplifier is a touch-sensitive pad that allows you to turn the power on and off—and select input source—while the front panel is a display that indicates the input source you’ve selected and the current volume level. At the bottom of the front panel is a 3.5mm headphone socket.

The rear panel is clearly labelled and has full-sized, gold-plated multi-way speaker terminals despite the limited space available. There are two SPDIF digital audio inputs (one Toslink optical, one via gold-plated RCA), one USB input (via a Type B terminal) and two analogue inputs (one via a pair of gold-plated RCA terminals and the other via a 3.5mm stereo socket). There’s also a subwoofer output terminal, again implemented via 3.5mm phone socket. (Such small phone sockets aren’t my favourite connectors, as they’re not overly robust mechanically, but NAD obviously didn’t have the room for larger ones).

Also on the rear panel is a triangular-shaped 240V input socket (à la Hewlett-Packard), and a 3.5mm 12-volt d.c. trigger input.
If you look at a photograph of the rear panel, you might be confused (as was I) by the fact that the ‘AUX 2’ terminal is also labelled ‘Optical 2’. After looking in the Owners’ Manual, I went back to the packaging I’d stored away and discovered the Toslink mini-adaptor NAD provides that converts this analogue wired input to a digital optical one.

While I had the Owners’ Manual out, I took the opportunity to look up the purpose of a tiny button (and with a diameter of only 2mm, I think I can safely call it tiny) labelled ‘Bass EQ (Service)’ that is recessed into the rear panel so deeply that you can’t accidentally operate it (though you can still do so with a finger: you won’t need a ballpoint pen). It turns out that although the D3020 does not have tone controls, it does have a Bass EQ button that, according to NAD’s aforementioned manual, will: ‘Boost overall bass response by at least 6dB.’ And when you push the button, the word ‘BASS’ appears on the front panel.

Internally, NAD uses a particular implementation of Class-D amplification which it licences from the well-known Dutch manufacturer Hypex. Hypex markets two different ‘flavours’ of Class-D: UcD (Universal Class-D) and N-Core, of which two NAD is using UcD. ‘The UcD is a very innovative analogue Class-D amplifier that is self-oscillating and uses a variable modulation frequency based on operating conditions,’ said Björn Erik Edvardsen, who not only designed the original 3020 for NAD, but also this new D3020. It’s superior to most other Class-D technologies because of its load invariance, which means its sound doesn’t change with different speaker impedances; it’s unaffected by very low impedances; its loop gain is constant over the full audio frequency range (leading to low distortion even at high frequencies); it can be constructed using discrete parts (so no need for expensive control ICs); and distortion is extremely low even into low impedance at high frequencies. Edvardsen says he has further refined the circuit’s performance by upgrading the output FETs and reconstruction inductors (by using low-saturation cores) to allow more current delivery when using low-impedance loads. The power supply is a stiff switch-mode supply featuring synchronous (active MOSFET) rectification that eliminates supply pumping, which is an undesirable failing exhibited by most single-ended Class-D amplifiers. ‘It also benefits from the latest refinement of NAD PowerDrive, our exclusive circuit that gives phenomenal performance, both measured and subjective,’ says Edvardsen.

The remote control that comes standard with the D3020 is quite small (and so likely to be easily lost… at least in my household), and completely black. That is, not only is the remote itself black, but also the buttons, which makes identifying them rather tricky. However, since you’re really only ever going to use the volume up/down buttons and the input source switch (plus the power on/off) familiarising yourself with the button layout should be quite easy. (And if you’re visually challenged, there are indents to allow you to identify the keys by touch alone.) Although the remote’s ergonomic design has some minor short-comings, we should be grateful that NAD supplies a remote control at all: many amplifier manufacturers (including more than a few high-end ones) now charge extra for their remotes.

Although the NAD D3020 comes with an Owners’ Manual, I was very impressed with the website NAD has built for the D3020, which has pdf versions of the manual in five languages, plus a ‘Quick Set-Up’ guide in English. There are also pdf versions of the D3020’s datasheet, a copy of an NAD ‘White Paper’ concerning the D3020’s design, a list of the codes used by the D3020’s remote control, plus two downloadable software programs: a firmware update for the D3020 (currently in Version 2.4) and a USB audio driver.

Although the NAD D3020 comes with an Owners’ Manual, I was very impressed with the website NAD has built for the D3020, which has pdf versions of the manual in five languages, plus a ‘Quick Set-Up’ guide in English. There are also pdf versions of the D3020’s datasheet, a copy of an NAD ‘White Paper’ concerning the D3020’s design, a list of the codes used by the D3020’s remote control, plus two downloadable software programs: a firmware update for the D3020 (currently in Version 2.4) and a USB audio driver.

### Björn Erik Edvardsen designed the original 3020 for NAD and also this new D3020. It’s superior to most other Class-D designs because of its load invariance

Although the NAD D3020 comes with an Owners’ Manual, I was very impressed with the website NAD has built for the D3020, which has pdf versions of the manual in five languages, plus a ‘Quick Set-Up’ guide in English. There are also pdf versions of the D3020’s datasheet, a copy of an NAD ‘White Paper’ concerning the D3020’s design, a list of the codes used by the D3020’s remote control, plus two downloadable software programs: a firmware update for the D3020 (currently in Version 2.4) and a USB audio driver.

Although the NAD D3020 comes with an Owners’ Manual, I was very impressed with the website NAD has built for the D3020, which has pdf versions of the manual in five languages, plus a ‘Quick Set-Up’ guide in English. There are also pdf versions of the D3020’s datasheet, a copy of an NAD ‘White Paper’ concerning the D3020’s design, a list of the codes used by the D3020’s remote control, plus two downloadable software programs: a firmware update for the D3020 (currently in Version 2.4) and a USB audio driver.

### IN USE AND LISTENING SESSIONS

NAD has cleverly arranged the speaker terminals so you should be able to wire your speakers neatly using bare wire, with minimal ‘wire show’, but I would personally recommend you use dual Pomona terminals to connect your speakers (or, if you prefer, individual banana connectors). However, because the unit is so narrow, if you do connect a full complement of inputs and outputs, you’ll have quite a bit of wire showing behind the amplifier. Nonetheless, please resist the temptation to re-orient it horizontally!

The D3020 can be set to automatically go to standby mode (in which it draws less than 0.5-watts of power) when there is no active source. If set for automatic standby, it will enter this mode after 30 minutes of no sensing an input signal, or anyone using the controls. I am a great fan of saving power, but I also have a love/hate relationship with auto standby controls, because some amplifiers will ‘wake up’ from standby mode only if the remote stand-by button is activated (which means you have to know where it is… see my earlier comment about NAD’s remote), or if the mains power button is switched ‘off’ then rapidly pushed back on. Both systems annoy me (irrational, but true!). The D3020’s remote can certainly be used to re-activate the amplifier, but you can also do it by simply holding your finger over the ‘Power’ button on the top of the amplifier. This action is OK by me. Happy with this! (If you’re not, at least you have the option of setting the D3020 so it never turns off. Don’t imagine you’ll be wasting power, either, because the power draw when idling is less than 20-watts.)

Some users (and I was one) might find switching between inputs a little ‘clunky’ because of the touch sensor, but it’s not hard to keep up with what’s happening by using the front panel read-out. Repeated touches on the top panel result in the input cycling round in the direction: OPT1, OPT2, Coax, USB, Aux1, Aux2, BT. (This sequence runs ‘top to bottom’ in the display). In the event that you do switch the D3020 to standby (or it drops into standby automatically) it will re-select the last-used input upon switch-on, as well as the last-used volume level. Nice!

Not-so-nice was the rather ‘spongy’ feel of the volume control and the front-panel display of volume level which has markings for only six levels (–100dB, –80dB, –60dB, –40dB, –20dB and 0dB). In practise, however, you’re more likely to use the remote to adjust the volume level, and although the display gives you a rough idea of the volume level, rather than an exact numerical readout, it ‘does the job’, as they say. (Although there are only six levels indicated, the display varies in brightness as you go from one level to another, so there are nuances you can pick up on. However, although you can see these nuances in display brightness as you’re actually adjusting the volume level, if you just come into the room and look at the display without touching the volume control, it’s difficult to work out the level that’s been set.) An accurate read-out of volume level would be more important if the NAD D3020 had a mute button, but it doesn’t, so it’s not so much of an issue. And if the lack of a mute button bothers you, just leave one of the six available inputs unused and switch to that whenever you want to ‘mute’ the sound. (Since the D3020 is firmware-upgradeable, it is feasible that NAD could ‘add’ in a Mute button via a firmware upgrade, even for existing models. If NAD thinks this is a good idea, I’d suggest using...
the play/pause button, since it’s not used for anything else on the D3020. Check with your dealer to see whether this upgrade has been implemented.)

It seemed to me that the most likely customers for the D3020 would be those creating desk-based systems to provide high-quality computer-based sound, and those creating minimalist hi-fi systems, probably using NAS storage or streaming from their phone. My assumption was that it was likely that such customers would have high-quality, two-way bookshelf/stand-mount speakers, so most of my listening was done using such speakers (though I did take the time to audition the NAD D3020 with two pairs of large, floor-standing loudspeakers).

Having experienced high-quality Class-D amplifiers previously, I was not surprised by the amount of power the D3020 was able to deliver, but if you haven’t you will certainly be surprised. It’s amazing that such a physically small amplifier, without any visible heatsinks, can produce such deafening levels of sound. However, having experienced Class-D amplifiers previously, I was absolutely amazed by how good the D3020 sounded, particularly across the midrange and up into the treble. As I swapped speakers in and out, I was also surprised by the fact that the sound quality and volume level of the high frequencies remained constant no matter what speakers I used. Previously, I have found that the high-frequency sound of Class-D amplifiers I have evaluated in the past changed considerably depending on the speakers being used, so that speaker choice became critical in determining the ‘sound’ of the amplifier. This definitely did not occur with the NAD D3020. Its high-frequency sound, in particular, will remain identical irrespective of the speakers you use with it. And that high-frequency sound is excellent! Its level was always perfectly balanced against the mids and it was also unerringly clean, with no distortion, no high-frequency noise and no audible h.f. ‘clutter’.

This lack of clutter and the crisp high-frequency sounds were demonstrated beautifully on Mikael Paskalev’s recent strangely-named album ‘What’s Life without Losers?’. Listen to the acoustic guitar intro to ‘Woman’ and you’ll know immediately what I mean. The clarity of Paskalev’s ‘unique’ voice is also reproduced accurately by the D3020. The same goes for the next track (‘Susie’) even though the song, the music and the singing are totally bonkers. If you can last long enough to hear Brother (Track 9… and trust me, Paskalev really is an acquired taste!) you’ll hear that the NAD D3020’s bass delivery is super-solid and super-precise. No overhang, no unwanted warmth… just wham and slam whenever required. I did take the opportunity to try out the Bass Boost button. Its effect was immediately obvious and rather too overpowering for my tastes… at least with the speakers I tried. You may think differently, which is no doubt why NAD has made it switchable (and relatively inaccessible).

Once I had established that the NAD was a well-powered and good-sounding amplifier, I wondered if these traits remained true irrespective of how the signal was sourced, so I switched from using wired analogue signals to using Bluetooth, and then switched back and forth between ‘wired’ and ‘BT’ deliveries of exactly the same music. While I did have to express a preference for the hard-wired delivery of music, the two were so similar in sound quality that I’d be hard-pressed to justify this preference solely on sonics alone… because depending on the music being played, the differences were indeed small. The same happened when I used the NAD D3020’s USB connection, except that the differences became infinitesimally small. There’s certainly some superior D–A conversion going on inside the D3020.

CONCLUSION

In all the reviews I have seen of the NAD D3020 it seemed that most of the reviewers were intent on trying to compare it with the original 3020. Frankly, I think that’s a complete waste of time. Good though the original 3020 might have been, we’re talking about an amplifier that was designed and manufactured more than 30 years ago. Technology has moved on since then, NAD has certainly moved on… and so have the undeniable talents of designer Bjorn Erik Edvardsen. Indeed I suspect Edvardsen would be quite offended if anyone suggested that he hadn’t learned anything about amplifier design in the past thirty-five years. In fact the opposite is true: Edvardsen has learned a lot since he designed the original 3020, which is precisely why we now have the D3020.

If you’re after a small form-factor, vertically-oriented amplifier that’s absolutely ideal for computer-based/streaming applications, NAD’s new D3020 is a little cracker. —Dean Shopes
LABORATORY TEST RESULTS

With the D3020 it appeared to me that NAD has continued its clever ploy of deliberately understating the power output of its amplifiers in order to guarantee that, when tested, they will always deliver significantly more than their rated power, no matter what technique is used to measure them. From a purely technical standpoint, this approach was very easy to justify when linear power supplies and output stages were involved, because there are many variables that can affect the measurement of the power output of these circuits. However, when it comes to switching power supplies and Class-D output stages, it’s a lot more difficult to justify such an approach, because variations in mains voltage don’t have the same effect on power output, and there are far fewer measurement variables. So the fact that the ‘30-watt’ NAD D3020 delivered a minimum power output of 40-watts into 2Ω (with a 20Hz test frequency and with both channels driven) and a maximum of 128-watts per channel (single-channel driven into 2Ω, at 1kHz and above) suggests to me that any manufacturer other than NAD would have specified the D3020 at 40-watts per channel.

In point of fact, I’d personally be quite happy rating the D3020 with an output of 40-watts per channel, not least because this

is not only its maximum output into 2Ω loads, but also its maximum output into 8Ω loads, with both channels driven. As you can see from the tabulated figures in the test section result, it delivers a little more power (52-watts per channel) at 1kHz, and a little more again at 20kHz (55-watts per channel). I am a bit chary of power output results at 20kHz when it comes to Class-D amplifiers, because it’s very hard to measure due to the lack of high-frequency harmonics in a digital amplifier, whereas with an analogue amplifier, power output still increased, to 50-watts (at 20Hz), 60-watts (at 1kHz) and 65-watts (at 20kHz). (Because of these figures, many amplifier manufacturers would be happy to rate the D3020 at 60-watts per channel, because this is its both-channels-driven result at 1kHz.)

Into 2Ω loads, one would expect the ideal analogue amplifier to again double its 4Ω output but in fact very few are capable of this, because of the current demands required. In the case of the D3020, you can see that at this

measuring at 20kHz is as easy as measuring at 1kHz. However, even allowing for some error in the measurement, the D3020 would certainly be capable of delivering its measured 1kHz power (52-watts) at 20kHz.

Unlike a Class-AB output stage, where in most cases one could expect its power output into 4Ω to be significantly higher (ideally, double!) than its power into 8Ω, a Class-D output stage does not behave like this, as you can see from the tabulated results. However, very low impedance, the output effectively returns to almost exactly what it was with an 8Ω load. In fact, this is excellent performance for a Class-D output stage, meaning that so far as Class-D designs are concerned, NAD is perfectly justified in labelling the output of the D3020 as being ‘load-invariant.’

The frequency response of the D3020 is shown in Graph 5. You can see the trace is very flat being just -0.06dB down at 5Hz and -0.05dB down at 20Hz, then ruler-flat from 60Hz up to around 2kHz, after which slowly falls to be 0.1dB down at 10kHz then 0.2dB down at 18kHz before falling to be -0.6dB at 20kHz and then -1dB at 28kHz. When normalised, this puts the overall audio-band response as 20Hz to 20kHz ±0.3dB. You can see there are two traces on this graph. The red trace shows the D3020’s response into a standard non-inductive 8Ω laboratory test load. The second (black trace) shows the response into a load that simulates that which would be presented by a typical two-way bookshelf loudspeaker system. As you can see for yourself, there are barely any differences between the two traces, which indicates that the tonal character of the D3020 will be uniform irrespective of the loudspeaker load, which is an admirable trait.

The effect of the NAD’s Bass EQ switch is shown in Graph 5a. You can see that although the EQ switch provides around 6dB of boost (peaking at 80Hz) it also results in around 3dB of boost across the band from around 6.5Hz up to 1.3kHz. Significantly, using the EQ button attenuates the low-frequency response of the amplifier, so it’s 10dB down at 40Hz and 20dB down at 28Hz.

This is clever design on the part of NAD, because it means you won’t be able to overload your bass drivers when using the EQ circuit, nor will you ‘waste’ any amplifier power trying to amplify very low frequencies.

---

**Many amplifier manufacturers would be happy to rate the NAD D3020 at 60-watts per channel, because this is its both-channels-driven power output at 1kHz**

---

**NAD D3020 Integrated Amplifier**

<table>
<thead>
<tr>
<th>Channel</th>
<th>Load (Ω)</th>
<th>20Hz (watts)</th>
<th>20Hz (dBW)</th>
<th>1kHz (watts)</th>
<th>1kHz (dBW)</th>
<th>20kHz (watts)</th>
<th>20kHz (dBW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>69</td>
<td>18.4</td>
<td>71</td>
<td>18.5</td>
<td>81</td>
<td>19.1</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>41</td>
<td>16.1</td>
<td>52</td>
<td>17.2</td>
<td>55</td>
<td>17.4</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>92</td>
<td>19.6</td>
<td>104</td>
<td>20.2</td>
<td>118</td>
<td>20.7</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>50</td>
<td>17.0</td>
<td>60</td>
<td>17.8</td>
<td>65</td>
<td>18.1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>50</td>
<td>17.0</td>
<td>60</td>
<td>17.8</td>
<td>65</td>
<td>18.1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>40</td>
<td>16.0</td>
<td>60</td>
<td>17.8</td>
<td>60</td>
<td>17.8</td>
</tr>
</tbody>
</table>

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

**NAD D3020 Integrated Amplifier**

<table>
<thead>
<tr>
<th>Test</th>
<th>Measured Result</th>
<th>Units/Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Response @ 1 watt o/p</td>
<td>3Hz – 28kHz</td>
<td>–1dB</td>
</tr>
<tr>
<td>Frequency Response @ 1 watt o/p</td>
<td>1.5Hz – 5kHz</td>
<td>–3dB</td>
</tr>
<tr>
<td>Channel Separation (dB)</td>
<td>83dB / 86dB / 79dB</td>
<td>(20Hz / 1kHz / 20kHz)</td>
</tr>
<tr>
<td>Channel Balance</td>
<td>0.005</td>
<td>dB @ 1kHz</td>
</tr>
<tr>
<td>Interchannel Balance</td>
<td>0.09 / 0.03 / 0.9</td>
<td>degrees (20Hz / 1kHz / 20kHz)</td>
</tr>
<tr>
<td>THD+N</td>
<td>0.007% / 0.017%</td>
<td>@ 1-watt / @ rated output</td>
</tr>
<tr>
<td>Signal-to-Noise (unweighted/weighted)</td>
<td>83dB / 90dB</td>
<td>dB referred to 1-watt output</td>
</tr>
<tr>
<td>Signal-to-Noise (unweighted/weighted)</td>
<td>86dB / 93dB</td>
<td>dB referred to rated output</td>
</tr>
<tr>
<td>Input Sensitivity (CD Input)</td>
<td>57mV / 314mV</td>
<td>(1-watt / rated output)</td>
</tr>
<tr>
<td>Output Impedance</td>
<td>0.070</td>
<td>@1kHz</td>
</tr>
<tr>
<td>Damping Factor</td>
<td>114</td>
<td>@1kHz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>0.48 / 16.3</td>
<td>watts (Standby / On)</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>18.81 / 81.7</td>
<td>watts at 1-watt / @ rated output</td>
</tr>
<tr>
<td>Mains Voltage Variation during Test</td>
<td>240 – 250</td>
<td>Minimum – Maximum</td>
</tr>
</tbody>
</table>
It does, however, mean that you should only use the EQ with small two-way speaker designs whose low-frequency response rolls off below 100Hz. If you use it with large, floor-standing speakers, the EQ will certainly boost their frequency response from 65Hz to 130Hz, but will dramatically reduce response below 65Hz.

Distortion at an output of one watt was very low. Graph 1 shows THD at one watt with an 8Ω load and you can see there’s a second harmonic at –90dB (0.0031%), then a third at –110dB (0.0003%), a fourth at –115dB (0.0001%). There are higher-order components, the first six of which are clustered about 120dB down (0.0001%). Up higher the noise floor rises and there are some enharmonic components presumably related to the switching frequency of the Class-D circuit or the power supply. However, looking at the big picture, if you discount the second harmonic (which sounds pleasant to the ear anyway, as it’s the octave of the fundamental), all other harmonics are more than 100dB down, so each one individually contributes less than 0.001% distortion to the total THD figure. As you can see from the tabulated figures, total THD+N at one watt was 0.007%, as measured by Newport Test Labs.

Graph 2, which shows output at one watt when driving a 4Ω load, shows minor increases in the levels of harmonic distortion at this lower load impedance but interestingly, enharmonic distortion increases, with secondary distortion products appearing (as smaller ‘spikes’) alongside the harmonic distortion components. However, once again, all distortion components—harmmonic and enharmonic—(except the 2nd at –84dB, or 0.0063%) are more than 100dB down.

Distortion at rated output (30-watts into 8Ω) was also low, as you can see from Graph 3. The second and third harmonic distortion components are both around –80dB (0.01%). There’s a fourth at –95dB (0.0017%), a fifth at –90dB (0.0031%), a sixth at –110dB (0.0003%) and a seventh at –98dB (0.0012%), after which all other components are more than 100dB down. Distortion into 4Ω loads (at an output of 60-watts per channel) is slightly higher overall than it is into 8Ω loads but, with the exception of the 2nd and 3rd harmonics (both of which sound ‘good’ to the ear), all other distortion components are more than 100dB down. Overall THD+N, as measured by Newport Test Labs, was 0.017%: far too low to be audible as distortion.
Intermodulation distortion was also low, with the two test signals resulting in an unwanted regenerated signal at 1kHz that was 83dB down. There are some sideband distortion products either side of the 19kHz and 20kHz test signals, but except for the ones at 17kHz, 18kHz, 21kHz and 22kHz, all are at or more than 100dB down. Signal-to-noise ratios were satisfactorily low, but particularly good considering the use of a switch-mode power supply, with the unweighted figures coming in at 83dB referred to one watt and 86dB referred to rated output. Once a standard A-weighting curve was introduced into the measurement system, these figures improved to 90dB (IHF-A) and 93dB (IHF-A), this first figure being equal to NAD’s specification and the second being 3dB better.

Channel balance was very close to perfect, at 0.005dB and channel separation was far better than NAD’s specifications, with Newport Test Labs measuring it as 83dB at 20Hz, 86dB at 1kHz and 79dB at 20kHz. Phase errors between channels were also very low, at 0.09° at 20Hz, 0.03° at 1kHz and 0.9° at 20kHz. Excellent performance.

Square wave performance shows the superiority of the NAD D 3020’s low-frequency extension, which is just 1dB down at 3Hz and 3dB down at 1.5Hz. It also shows that the amplifier will be completely stable into highly reactive loads so this, coupled with the amplifier’s excellent performance with 2Ω loads, means you will be able to drive any loudspeakers, even those reputed to be ‘difficult’. The leading edge ringing on the 1kHz wave was caused by a lab filter used to remove the h.f. switching signal that’s obvious on the 10kHz wave, so the response is actually excellent. The 10kHz square wave shows the NAD D3020’s absolute high-frequency limitations (1dB down at 28kHz and 3dB down at 52kHz) as well as high-frequency switching signal (the ripple on the waveform), which in this case wasn’t filtered out by the lab. This h.f. signal is so high in frequency that it would be completely inaudible, but in any case would be filtered out by your loudspeakers.

Power consumption in standby was better than NAD’s specification, coming in at 0.48-watts and was only 16.3-watts at idle. When delivering one watt continuously, the D3020 consumes 18.81-watts from the mains, and working at maximum, it consumes only 81.7-watts from the 240V a.c. mains—less than a standard incandescent light bulb.

Overall, the laboratory test results prove that the NAD D3020 is a very well-designed Class-D amplifier, with outstanding performance.