Musical Fidelity M3i

INTEGRATED AMPLIFIER

Sometimes, you can get too close to your own product. It's the only reason I can think why Musical Fidelity would be promoting its latest M3i integrated amplifier with the catch-phrase: '*high-quality, 70wpc, a bit less than half price of the M6i.*' For my money, that's bound to confuse anyone who is not familiar with Musical Fidelity's range, and therefore doesn't understand that the M6i looks almost identical to the M3i and is pretty much the same size (the M6i is the same width and depth as the M3i, but it's 25mm higher). But I guess how Musical Fidelity advertises its products is its business. If I'd been doing the copywriting for the advertisements, I probably would have written something along the lines of:

'Very nearly as powerful as the mighty M6i, much better-looking, and less than half the price!'

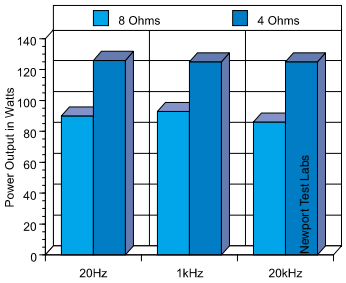
...but that might not have got the Anthony Michaelson seal of approval and, like all things at Musical Fidelity, everything has to have the boss's approval, because he runs a tight ship over there in Middlesex.

THE EQUIPMENT

I wrote above that the M3i is 'better-looking' than the M6i because in my opinion, it is. In fact, it's a damn fine-looking amplifier by any standard: indeed every time I walked past it during the time I had it in for review I couldn't help but admire its sleek, black lines, its understated control set, and its discreet blue indicator LEDs. OK... so the volume control isn't exactly 'discreet' but you can't say it's not functional... not to mention extremely easy to adjust.

Not that you'll be adjusting it manually in the normal scheme of things, because it's motor-driven and therefore easily adjusted using the supplied infra-red remote which also allows you to control all the front-panel controls, plus access another feature that is not available from the front panel: output muting. Because it's motor-driven, the control has the 'dead' feel that is common to all motor-driven controls, but it is better than most in terms of operation because, if you turn it by hand, rather than with the remote's volume buttons, there's no back-lash when you let it go, which means that the volume level stays exactly where you set it. The volume control's only failing that I could see is that there are no markings around the perimeter, so replicating a volume level you've determined previously will mean having to make your own mark on the front panel. There is another minor issue in that the 'V' that's engraved on the knob is not actually very visible from across the other side of a room, so if you're sitting over there when you fire up your system, you won't be able to see how high the volume is set before switching music on via the remote control. Luckily, if it's too loud, the mute control will be right at your fingertip!

Front panel input selection is made by pressing the small input source buttons arrayed towards the bottom of the front panel. These are, from left to right: CD, Tuner, Aux/HT, Aux 2, Aux 3, and Tape. (On the photograph above, what looks like it might be a button at the far right of these controls is actually the infra-red sensor.) When I first saw that there was an Aux/HT input, I thought Musical Fidelity was attempting to oversimplify, but it turns out this particular input really IS a 'dual' input, with an additional switch on the rear panel that dictates whether it functions as a standard auxiliary input, or as a special 'Home Theatre' input. The difference between the two modes is that in the Aux made, the input signal is routed through the volume control, whereas in the HT mode, the input signal bypasses the volume control circuitry and goes straight to the power output devices.



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

For those readers unfamiliar with the usefulness of having an 'HT' input on an amplifier, essentially it means you can use a high-quality, audiophile amplifier to drive the left and right front channel speakers in a home theatre system, while you use your home theatre receiver to drive the centre and surround channels. When you're using the HT input, (that is, when you're watching movies) the home theatre receiver's volume control is used to control volume. When you're playing two-channel sources, on the other hand, the home theatre equipment remains switched off, and the M3i's volume control is used to control the level of sound in the room. It may take a little thinking (and maybe a demo from a hi-fi dealer) to get your head around how this works, but I can tell you that it works marvellously well, and properly implemented, will ultimately deliver far superior sound in both normal stereo and

'home theatre' modes, while at the same time saving you a whole lot of dough!

The front-panel buttons themselves simply ooze quality. The tip of each button is slightly hollowed, which imparts a great tactile sensation, and the buttons move inwards about half a millimetre when pushed, at the same time giving off a soft 'click'. There's even another, softer, click when you release the button. Loved it! When you select a source by pressing one of the buttons, the LED above it illuminates in bright blue. (All LEDs are blue except for the one that indicates that the muting circuit is operational. This is a red LED.)

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Moving around the back of the amplifier, I was pleased to find the RCA inputs and outputs are gold plated with a very high-quality gold plate. The HT/Aux slider switch, on the other hand, is a fairly low-cost item. A higher-quality (and more attractive-looking) switch would have been nice, though I guess that since it will only ever be switched one or two times in the amplifier's lifetime (if at all), so long as it does its job, it allows Musical Fidelity to shave a few dollars from the final retail price. In addition to the RCA inputs and outputs I'd have expected to find, given the labelling of the source buttons on the front panel, Musical Fidelity has also provided pre-amplifier output terminals. This, too, is excellent design, because it gives you the opportunity to use the M3i as a preamplifier, driving external power amplifiers at some stage in the future. So you potentially have the ability to upgrade the overall quality of your system without making any components redundant, and also that you can potentially extend the useful working life of the M3i—though given the obvious quality of the internal and external components, this will be outlandishly long in any case.

I was extremely pleased to find that the speaker output terminals are on standard 12.5mm centres, so I could use a single Pomona dual banana plug for each channel. In fact, I'd recommend you do the same, because the left- and right-channel posts are exceedingly close together… so close that if you use any type of connector—or bare wire, for that matter—other than banana plugs, I'd suggest you pay close attention that you don't accidentally short any of the terminals or accidentally make a connection between the two channels.

Removing the top of the M3i revealed that Musical Fidelity is using a single Sanken STD03D/03P Darlington pair in each output channel. These devices replace the SAP power transistor series previously made by Sanken, which were its first attempt at integrating temperature sensors to measure junction temperature. However, the SAP series design included an integral emitter resistor that, in the event of a fault, usually went open-circuit to protect the rest of the device, but since it was on-board, the whole device had to be replaced anyway. The new STD series devices eliminate this troublesome emitter resistor, but otherwise, the internal diode and driver transistor structure are the same. The new SAP series devices have proved very popular with amplifier designers—and obviously Musical Fidelity is a fan—but the design doesn't lend itself to circuit design modifications. As you can see from the photograph, the toroidal power transformer is not overly large, and smoothing is accomplished by just two small 10,000µF/63V capacitors. Rectification is via a standard encapsulated bridge device. The PCB is nicely laid out, with very high-quality components, and shows that Musical Fidelity is still using standard large-scale through-board components, not tiny surface-mount devices, so should it ever be necessary, servicing will be a snap. Chassis build quality is also first-rate, and MF uses a proper heat-sink, not one of those folded tin-foil types manufacturers often use when the heat-sinking is internal and the casing is a 'full metal jacket' type.

MUSICAL FIDELITY M3i
Integrated Amplifier

BRAND: Musical Fidelity
MODEL: M3i
CATEGORY: Integrated Amplifier
RRP: $1,999
WARRANTY: Two Years
DISTRIBUTOR: Audio Marketing Pty Ltd
ADDRESS: Unit 14L, 175 Gibbes Street
Chatswood
NSW 2067
(02) 9882 3877
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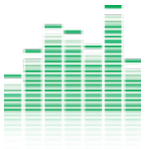


- Relaxing sound
- Superb build
- HT mode

- Slow volume adj
- Speaker terminal spacing

LAB REPORT

Readers interested in a full technical appraisal of the performance of the Musical Fidelity M3i should continue on and read the LABORATORY REPORT published on page 88. 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.

Lab Report on page 88

IN USE AND LISTENING SESSIONS

That the Musical Fidelity sports circuit protection to prevent any turn-on 'thumps' from damaging your loudspeakers will be in evidence every time you switch it on, because it takes around six seconds for the circuitry to stabilise, during which time the red 'Mute' LED glows and you can't use the amplifier. After six seconds, there's a loud 'click' from an internal relay and the amplifier is ready to go. Despite the electronic controls, the M3i has extra internal logic that means that whenever you switch it on, it will always default to whichever was the last source component you used—CD, Tuner… whatever.

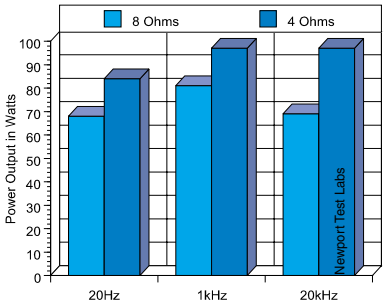
Despite the internal heatsink the M3i runs surprisingly cool, though I would still recommend you don't stack anything on top of it, to allow the heat to escape through the plentiful vents provided, and that you give it space to 'breathe' in the cabinet—the comprehensive *Owners' Manual* provides the necessary ventilation instructions.

In my initial 'warm-up' sessions with the amplifier, which I did from the comfort of my couch, I discovered the volume control's up/down action is rather slow. This actually helps with precise volume setting once you have achieved the approximate level you want, but it's a bit tedious if you're starting from zero and winding up, or winding back to zero. It made me realise why Musical Fidelity has supplied a muting circuit!

After burn-in, I settled in for my first long session of listening, and was immediately impressed by the 'easy-going' nature of the M3i. The sound was wonderfully free-flowing, with a beautifully light touch so that after a few moments, I discovered that I suddenly felt extraordinarily relaxed, and had become so side-tracked that I was really listening to the music itself, rather than 'evaluating' the amplifier, and had to pull myself up and do some self-talk along the lines of: 'concentrate on those bass lines… are they clean and easy to follow?' and so forth. In fact this happened so often during the weeks I had the M3i in my system that I realised it's one of this amplifier's best traits, yet annoyingly, is the one that's most difficult to quantify: that is, when you listen to the M3i, you'll find yourself relaxing and enjoying the music!

Indeed I became so relaxed that I actually came to appreciate Björk's album Medúlla, which I'd initially purchased because I'm an e.e. cummings tragic and it was one of the few SACDs available at the time, but I had never been able to get into it. I'd pulled Medúlla out again and brushed the dust off because I'd heard a Björk duet on FM that morning, and thought that it might be a revealing album for the M3i. Little did I realise it would be revelatory! I hadn't listened to the album for quite some time, so it's possible that my evolving musical tastes may have played a part in my newfound enjoyment of the album, but I think it was mostly the M3i weaving the magic—I even started to appreciate the very weird *Ancestors*, which you'd have to describe as a 'duet' (between Björk and co-writer Tanya Tagaq Gillis) even though it's just piano accompanied by whispers, moans, and hoomi and there are no actual lyrics. However, if you'd like to audition the 'ease' of the M3i's delivery with music that's a little more mainstream, I'd recommend pretty much any of Angus and Julia Stone's albums, but feel that Down The Way, their latest, is very probably their strongest—certainly it shows that Julia's songwriting skills and vocal talents are developing apace. It's certainly the best-recorded of their albums: the quality of the sound is amazingly fresh and vibrant, and this too is highlighted by the M3i's ability to react instantaneously to even the fastest, most minute changes in pace and/or inflection.

I assessed the accuracy of the Musical Fidelity M3i's rhythm, tone and pace with two favourites: J. S. Bach and Glenn Gould and the M3i affirmed what I'd already guessed, that it's pitch-perfect, and its tonality is super-accurate so whatever the artist and producer recorded on the disc is exactly what you'll hear in your living room—no more, no less. The M3i delivered not only the 'pianists view' of the piano that Gould favoured (and recorded), but also the incredibly percussive nature of the instrument, as well as the slight tuning discordancies that Gould preferred… plus, of course, the M3i delivered Gould's vocalise in exact perspective. I know it annoys many people, but I'm a fan because it lets you 'hear' what Gould is thinking when he plays or, more importantly, what he's thinking about *how* he'll play a few seconds down the line.



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

The M3i made very short work of all my rock and jazz CDs, all of which I was able to play at deafening levels, yet still have the kick drums and electric basses powering through with all the depth and sheer 'thwack' that I'd expect from an amplifier of this calibre. It proved just as capable when replaying full orchestral works, complete with kettledrums, though I did find that if I turned the volume up too high, the sound of violins, in particular, could harden slightly, which usually is indicative of some slight limitations in power output. However at all my usual listening levels, the M3i sounded just as sweet with an orchestra as it did with all the styles I've mentioned previously.

CONCLUSION

Anthony Michaelson sometimes runs with some fairly 'left-field' circuit concepts (as well as some 'out-there' aesthetics) so it's with some satisfaction that I can report that my take on his new M3i is that it's anything but 'new'. Michaelson has instead re-discovered the essential ingredients that go into a first-rate integrated amplifier—linear power supply, simple output stage, short signal paths, useful features, solid build and a timelessly elegant appearance. Take my word for it: you're looking at an amplifier that is destined to become a classic.

greg borrowman

continued on page 88

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TEST RESULTS

Newport Test Labs reported that on its test bench, the Musical Fidelity M3i delivered its rated output into 8Ω loads only when a single channel was driven, though under these conditions, it happily delivered far more than its rated output, as you can see, returning figures of 93-watts (19.6dBw) at 1kHz, 90-watts (19.5dBw) at 20Hz and 86-watts (19.3dBw) at 20kHz. As you can see from the dBw figures, these outputs are virtually identical: you certainly couldn't detect the level differences even under the optimum listening conditions. However, in Australia, amplifiers intended for domestic use are rated according to output power they can deliver continuously when both channels are driven into 8Ω, and this must be able to be delivered at all frequencies between 20Hz and 20kHz. As you can see, this means that in this country, the M3i would attract a rating of 68-watts per channel, as this is the maximum power available at 20Hz, even though under the same test conditions it will deliver 81-watts at 1kHz. The differential between the single-channel-driven and both-channels-driven figures when driving 4Ω loads would seem to indicate that the limiting factor is the capability of the M3i's power supply with the both-channels-driven output into 4Ω being barely 1dB more than the output into 8Ω, whereas I would have expected an increase of around 3dB. As you can see, output peaked at 97-watts into 4Ω, which it managed at 1kHz and above. At low frequencies, power output into 4Ω dropped to 84-watts per channel.

The M3i easily met its frequency response specification of 10Hz to 20kHz –0.1dB, and indeed *Newport Test Labs* measured the frequency response as being far better: 6.4Hz to 60kHz ±0.5dB and with 3dB down-points at 3.2Hz and 110kHz. This is excellent—and wideband—performance. This high level of performance is reflected in the square wave oscillograms, particularly at 1kHz and 10kHz. The 100Hz oscillogram shows the low-frequency limitation, even though it's only very minor (the tilt on the top of the square wave), but you can also see that there's no 'bending' of the top of the square wave to indicate the presence of group delay. While you are examining the square waves, note the superior performance returned by the Musical Fidelity M3i when it was driving a highly reactive load (8Ω paralleled with a 2µF capacitor). There is barely no overshoot (perhaps to one-eighth wave height) and also almost no ringing. In subjective listening sessions, listeners prefer the sound of amplifiers that deliver this type of performance when reproducing square waves, attributing to them the same smoothness of sound they associate with valve amplifiers, but without the other unwanted sonic anomalies associated with valve devices.

Channel separation was excellent, registering a 'worst-case' result of 76dB at 20kHz, which is still far in excess of what will be required, and improved to 93dB at 1kHz, and then improved even further—to 98dB—at 20Hz. Inter-channel phase shift was also neg-

Musical Fidelity M3i Integrated Amplifier -- Test Results

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	90	19.5	93	19.6	86	19.3
2	8 Ω	68	18.3	81	19.0	69	18.4
1	4 Ω	126	21.0	125	20.9	125	20.9
2	4 Ω	84	19.2	97	19.8	97	19.8

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

Musical Fidelity M3i Integrated Amplifier -- Test Results

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	6.4Hz – 60kHz	–1dB
Frequency Response @ 1 watt o/p	3.2Hz – 110kHz	–3dB
Channel Separation (dB)	98dB / 93dB / 76dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.016	dB @ 1kHz
Interchannel Phase	0.13 / 0.02 / 0.51	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.008% / 0.010%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	78dB / 86dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	79dB / 95dB	dB referred to rated output
Input Sensitivity (CD Input)	22mV / 190mV	(1-watt / rated output)
Output Impedance	0.245Ω	OC = 2.658V
Damping Factor	32.6	@1kHz
Power Consumption	N/A / 21.58	watts (Standby / On)
Power Consumption	42.9 / 276.5	watts at 1-watt / at rated output
Mains Voltage Variation during Test	244 – 258	Minimum – Maximum

ligible, returning a best result of 0.02° at 1kHz and a 'worst' result of just 0.51° at 20kHz. Balance between the left and right channels was extraordinarily good, with *Newport Test Labs* reporting a result of 0.016dB.

Harmonic distortion was low, as you can see from the four spectrograms that show the Musical Fidelity M3i's output spectrum. *Graph 1*, which shows distortion at an output level of 1-watt, shows there's just a single 2nd harmonic at –97dB (0.0014%), a third harmonic at –108dB (0.0003%) and a fourth harmonic at –110dB (0.0003%). The signal at the extreme left of the graph is 50Hz mains hum and harmonics: you can see that the 50Hz fundamental is more than 80dB below 1-watt. Overall, this put the 1-watt THD+N result at 0.008%. *Graph 2* shows the same power output level, but into a 4Ω load, and you can see that although only the first three harmonics are still present, the distortion levels have increased sightly, with the second- and third-order components coming in at around –95dB (0.0001%) and the fourth-order component rising to –104dB (0.0006%).

Distortion increases at high power levels, as it invariably will, but into 8Ω, all distortion components were still low-order, (the human ear perceives low-order distortions as being 'good-sounding') and very low in level: the highest of them (the third-order component) is a full 90dB down, equivalent to just 0.003% THD. This third increases in level to –78dB (0.01%) when the amplifier is delivering its rated output into 4Ω, but even this level is well below the hearing threshold of human hearing. You can see from *Graphs 3* and *4* that the levels of mains-related noise have barely shifted from the 1-watt level and from the tabulated figures that the overall THD+N figure is an excellent 0.01%.

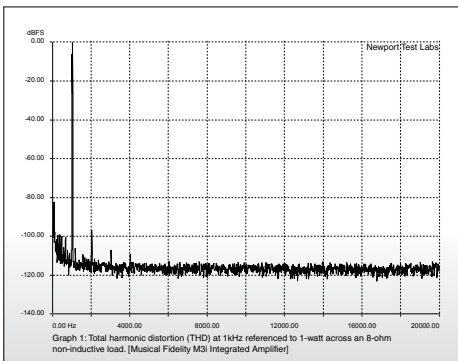
The A-weighted signal-to-noise ratio measured by *Newport Test Labs* came in just one single decibel short of Musical Fidelity's specification of 95dB which, given model-to-model variability and a certain latitude for measurement error, I'm more than happy with: It's an excellent result. The discrepancy between the weighted and unweighted figures indicates that most of the noise is low-frequency, and correlates marvellously well with the noise signal level on the graphs showing the distortion spectrum at rated output (*Graphs 3 and 4*). The noise floor across the midrange and high frequencies is, of course, much, much lower, hovering at around –115dB below 1-watt and more than 120dB down referenced to rated output.

Graph 5 shows two frequency response traces. The flatter of the two (the black trace) shows the Musical Fidelity M3i's response into a standard non-inductive laboratory 'dummy' load. You can see it's just 0.5dB down at 9Hz and only 0.3dB down at 20kHz. The red trace shows the amplifier's frequency response when it is terminated with a load that is representative of a typical two-way bookshelf loudspeaker (essentially it's the circuit developed by Ken Kantor, but modified with a Zobel network, as recommended by John Atkinson, the schematic for which can be found here: www.stereophile.com/reference/60/.) This trace exhibits more response variations and a slightly curtailed low-frequency response (–0.5dB at 12Hz) but it is still excellent, extending from 20Hz to 20kHz ±0.013dB. It is, however, indicative of a fairly high output impedance, and this proved to be the case, with *Newport Test Labs* measuring output impedance at 0.245Ω at 1kHz, in turn putting damping factor at a lowish 32.6. Although low, this factor still provides more than sufficient damping under real-life listening conditions, as proved by famous speaker researcher Floyd E. Toole when he was working for Canada's National Research Council and investigated this very phenomenon.

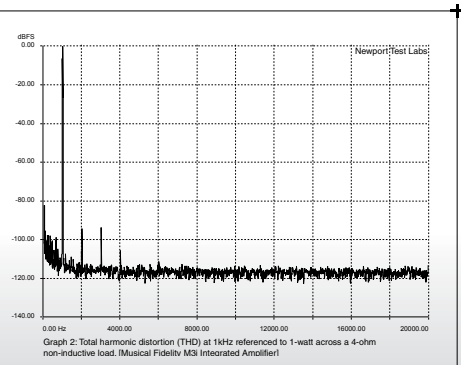
Intermodulation distortion was exceptionally low, as you can see from *Graph 6*, which shows CCIF-IMD. The high-frequency sidebands clustered around the two test signals are more than 95dB down, and although there is some unwanted regenerated signal down at 1kHz (this being the difference signal between the two test signals) it, too, is nearly 100dB down. Again, this performance is associated with 'good sound' in listening sessions, so it complements the result in the square wave test.

The power consumption figures show that the M3i draws a bit over 21-watts when idling (no signal), which increases to a modest 42.9-watts at an output level of one watt, so I'd expect the M3i will consume around 50–100-watts during normal operation—that is, less than a single incandescent light bulb.

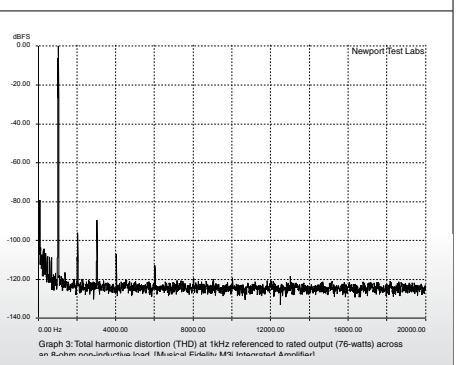
Overall, this is a well-designed, though rather modestly-powered, integrated amplifier that produced an excellent set of graphs and tabulated results on *Newport Labs'* test bench. ***Steve Holding***



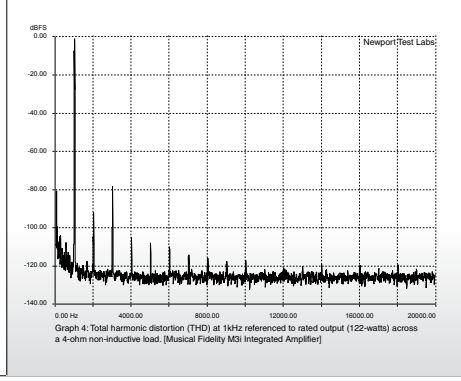
Graph 1: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across an 8-ohm non-inductive load. [Musical Fidelity M3i Integrated Amplifier]



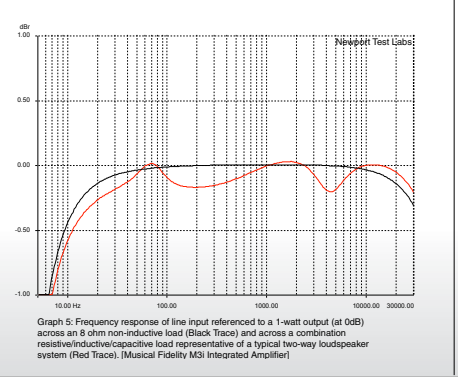
Graph 2: Total harmonic distortion (THD) at 1kHz referenced to 1-watt across a 4-ohm non-inductive load. [Musical Fidelity M3i Integrated Amplifier]



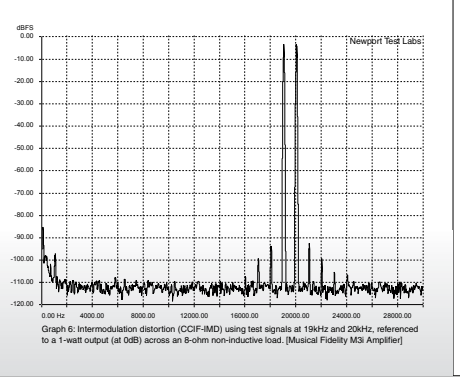
Graph 3: Total harmonic distortion (THD) at 1kHz referenced to rated output (76-watts) across



Graph 4: Total harmonic distortion (THD) at 1kHz referenced to rated output (122-watts) across a 4-ohm non-inductive load. [Musical Fidelity M3i Integrated Amplifier]



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). [Musical Fidelity M3i Integrated Amplifier]



Graph 6: 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. [Musical Fidelity M3i Amplifier]