McIntosh Laboratory MC462

POWER AMPLIFIER



SPECIFICATIONS Description Solid-state, response: 20Hz-20kHz, class-AB stereo power ampli-±0.25dB; 20kHz-100kHz, ±3dB, Voltage gain: 29dB, fier. Inputs: 1 pair single-ended (RCA), 1 pair balanced. 8 ohms. Input sensitivity: Outputs: 1 pair single-ended, 4.2V balanced, 2.1V unbal-1 pair balanced; 6 pairs anced. Damping factor: 40. five-way binding posts (2, THD: 0.005% maximum,

fier I already owned. The recently reinvigorated debate in these pages comparing solid-state and single-ended tube

designs got me to thinking. One thing led to another, and

Warranty: 3 years, limited, Dimensions 17.5" (445mm) non-transferable. W by 9.45" (240mm) H by 22.5["] (572mm) D. Weight: McIntosh Laboratory, Inc., 115.3 lb (52.3kg) net, 148.4 lb 2 Chambers Street, (67.3kg) shipping. Binghamton, NY 13903. Tel: (607) 723-3512. Serial number of unit re-

tion-cancelling capabilities. (This is also how the MC462

can deliver the same 450Wpc output to its pairs of 2, 4, or 8

All of this firepower ran amazingly cool-when I laid a

hand on the top panel, it was barely warm. This cool running is in part achieved through what McIntosh describes

as their current-generation ThermalTrak Power Transis-

half of the MC462. These include a nice touch: the initials

from above—as if you're standing atop a subway grille on a

of McIntosh's pride in the MC462's lineage: circuit block

occupies an impressive amount of real estate, but finding room for it wasn't as hard as I at first thought—that 22.5"

standard.

ments-maps-precision.

diagrams handsomely adorn the top plate.

Manhattan street. Also visible from that vantage is evidence

At 17.5" wide by 9.45" high by 22.5" deep, the MC462

1 When this review is reprinted on www.stereophile.com, it will be accompanied by an interview with McIntosh president Charlie Randall.—Ed.

tap's gain lower at 20.4dB, and the 2

ohm's even lower, at 17.4dB. The gains

using the unbalanced input were 6dB

is usually the case. All three sets of

outputs preserved absolute polarity

1 See www.stereophile.com/content/measure-

(ie, were non-inverting), the XLR jacks

being wired with pin 2 hot, the modern

higher rather than 6dB lower; the latter

MC are formed by the sinks' vertical fins and are visible

tors; the MC462's power output circuit monitors their temperature and adjusts bias accordingly. Another reason is the extensive, heavy-duty heatsinking built into the rear

If you want to lift it onto a rack, you'll need two people, a

Frank McIntosh and his company got off to a very strong

serious handcart, and a strong, deep shelf.

Web:

450Wpc into 2, 4, or 8 ohms (26.5dBW). Frequency

4, 8 ohms). Power output:

stereophile.com . May 2019 MCINTOSH LABORATORY MC462 start in 1949, in Silver Spring, Maryland, with their first product, the tubed Unity Coupled 50W1 Power Amplifier.

A patent was granted that same year for the Unity Coupled circuit and transformer. In 1951, McIntosh Laboratory moved to Binghamton, New York, where they've been ever since.

250mW-rated power. Sig-

nal/noise, A-weighted: 95dB

balanced (122dB below rated

ohm speaker taps.)

viewed AGP1268.

Price \$9000. Approximate

number of dealers: over 200.

The design element that allows McIntosh to do this has been a technical cornerstone of all their solid-state amps: a single-winding transformer called an autotransformer—or, in the trade lingo arguably coined by McIntosh, an Auto-former. Beginning in 1967 with their first transistor amp, the MC2505, McIntosh has used output-stage Autoformers to optimize impedance matching between output devices and loudspeaker loads, as well as to protect the latter from DC. Fifty-two years later, an output-stage Autoformer allows the company to combine the outputs of multiple push-pull amps in a manner that, they say, has unprecedented distor-

Fax: (607) 724-0549.

www.mcintoshlabs.com.

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guided tour of the plant, how it all comes together.1 I could feel McIntosh's conservative approach: doing the maximum, not the minimum, at all stages of design and manufacturing,

What are you? The solid-state MC462 power amplifier replaces the MC452 and is now the most powerful stereo amplifier McIntosh

to maintain a high level of quality.

MEASUREMENTS

50 100 200 500 1k 2k

dles on the faceplate and the rear deck on which the speaker terminals are vertically arrayed, and the amp's four rubber feet are sensibly separated by only 12.5" from front to back. The black glass faceplate proudly displays two large meters backlit in McIntosh blue, each about 5.5" wide by 2.5" high. The

Fig.1 McIntosh MC 462 (2 ohm output), frequency response at 2.83V into: simulated loudspeaker load (gray), 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), 2 ohms (red)

complementary pairs is taken to an extreme. In most push-pull amps, the two phases of the signal waveform are amplified separately by two single-ended amplifiers, the outputs of which are then combined to recreate the waveform in fulland in the combining, some distortion products are cancelled out. What McIntosh has created is a push-pull amp in which each phase of the signal waveform is itself amplified by a push-pull output section: There are two complete push-pull amplifiers in each channel, their outputs combined in what McIntosh refers to as a Quad Balanced architecture.

A week after the MC462's arrival I saw for myself, on a

offers, with a specified continuous power output of 450Wpc

into 2, 4, or 8 ohms, and peak output current of 75 amperes per channel. (McIntosh claims a 66% increase in dynamic

power-supply filter capacitance.) The MC462's distortion is specified as not exceeding 0.005% at rated power output, and

In the MC462, which operates in class-AB, the concept of

headroom over the MC452, achieved by a big increase in

as no more than 0.002% in the mid-frequencies.

performed a full set of measurethe heatsinks were very hot, at 158.6°F (70.3°C). I usually precondition ampliments on the McIntosh MC462, using my Audio Precision fiers for an hour, but I was concerned SYS2722 system (see the January that the MC462 would get even hotter. 2008 "As We See It"1). Before doing The McIntosh's voltage gain varied any testing, I preconditioned the according to which output Auto-MC462 by running its 8 ohm output former tap was used and whether the at one-third power for 30 minutes into balanced or unbalanced inputs were 8 ohms—thermally the worst case for used. From the balanced inputs, the an amplifier with a class-AB or class-B 8 ohm tap's gain into 8 ohms was a output stage. At the end of that time lower-than-usual 22.9dB, the 4 ohm Ap)

5k 10k 20k 50k

depth includes the two hefty han-

meters' upper scale is calibrated in watts, to indicate the MC462's output: the large numbers top out at 450, and after that, in smaller numbers, come "900" and "1.8k," referring to the amp's dynamic headroom: brief bursts of watt-

age beyond the MC462's rated continuous output. The MC462's

specified dynamic headroom is

3dB-in the real world, that's a

lot. The meters' lower row of

in decibels, from -50 to 0.

figures calibrates the amp's output

The rest of the front panel is

minimalist. There are a green-lit "Olde English" McIntosh

and the other two tell you when the Power Guard circuit

logo and three small red LEDs: one indicates Standby status,

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Control of mechanical

and circuit noise seems

to be a real strength of

McIntosh products.

0.05

0.0003 100m

5

channels driven, distortion (%) vs 1kHz continuous

Fig.5 McIntosh MC462 (8 ohm output), both

10 20

50 100 200

Hold lets the needles linger on peak

The rear end of the MC462 is

output levels before slowly resuming

Α

(1dB/vertical div.).

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action. The other knob, Power, has positions for Off, On, and Remote, the last for connecting to a McIntosh preamp for power-up/down sequencing.

kicks in. There are only two control knobs: the one at left, labeled Meter, turns the meters' Lights Off if desired; the Watts setting shows you real-time meter readings, while measurements, continued The MC462's unbalanced input impedance measured very close to the specified 22k ohms from 20Hz to 20kHz. The balanced input impedance was twice the unbalanced, as expected. The output impedance was lowest from the 8 ohm Autoformer tap, at 0.09 ohm at 20Hz and 1kHz, rising to 0.13 ohm at 20kHz. The 4 ohm tap's output impedance was almost twice that of the 8 ohm tap-not what I was expecting—while the 2 ohm tap's was 0.14 ohm at low and middle frequencies, rising to 0.185 ohm at the top of the au--60

which you first tighten with your fingers, then tighten a further quarter-turn with a small wrench (supplied), for a snug connection. System and setup Not wanting to face too many variables, and to give the MC462 enough time to break in, I spent my first days with my system unchanged, listening to my Harbeth 30.2 40th Anniversary Edition loudspeakers, which Herb Reichert reviewed in April 2018.2 Central upstate New York, where I live, benefits from ample clean power, but kicking that power's quality up a big notch is my AudioQuest Niagara 7000 power-line conditioner. What first caught my ear when I cranked up the MC462 was nothing—no noise of any kind through the speakers or directly from the amp itself. Control of mechanical and circuit noise seems to be a real strength of McIntosh products-I'd had a similar experience when introducing the McIntosh MC275 amp into my rig. The two amplifiers in

analysis of the MC462's noise floor (fig.4) revealed spuriae at 60Hz and its odd-order harmonics, these due to magnetic interference from the AC power transformer. All of these spuriae are very low in level, however, and will 0.02 0.01

Fig.7 McIntosh MC462 (2 ohm output), both

channels driven, distortion (%) vs 1kHz continuous

and dynamics of recorded music.

at the highest-gain output (8 ohms)

and with the balanced input shorted

87dB. This ratio improved to 96.2dB

when the measurement bandwidth

was restricted to the audioband, and

to 99.6dB when A-weighted. Spectral

to ground, was equally superb, at

measurements, continued

0.005

spanked-in a good way. I needed to hear the MC462 with genuine three-way speakers, preferably a pair difficult to drive. Audio Classics Ltd. was kind enough to loan me a new pair of Bowers & Wilkins'

up the 702 S2s to the MC462's 4 ohm speaker taps and listened, Look closely and you'll see the letters "Mc" formed by the MC462's heatsink fins review in January 2019, I had on hand the perfect musicthe Grateful Dead's Pacific Northwest '73-'74: Believe It If You Need It (3 CDs, Dead.net/Rhino R2 572292). These live measurements, continued Figs. 5-8 indicate that distortion is extremely low, lying below the noise floor at powers below 30W or so. I therefore plotted how the THD+N changed with frequency from the 8 ohm output at a level of 28.3V, equiva-

lent to 100W into 8 ohms and 200W

into 4 ohms, where I could be sure I

was looking at distortion rather than

noise. The result (fig.9) reveals that

the THD into 8 ohms (blue and red

rises above 1kHz, but still remains

below 0.007%. I haven't shown the

traces) and 4 ohms (cyan, magenta)

The thing to listen for is Phil Lesh's hot-rodded fivestring Alembic bass guitar, dropping what he called his "bass bombs." The Harbeth 30.2's specified low-end limit is a relatively modest 50Hz, whereas the B&W 702 S2's is a claimed 28Hz. With the MC462 firmly in the saddle, the B&Ws rode along with the Dead through the monstrous "Truckin'/Jam/Not Fade Away" sequence from the Portland Memorial Coliseum in May 1974. Though not summoning the 32'-high bass soundwave that John Swenson states the Wall of Sound could create, the McIntosh-B&W combo still let me feel the foundation of Lesh's bass, and produced a strong visceral sense of the thundering barn-burning the Grateful Dead were capable of 45 years ago. Now that I'd fished a bit in pools downstream from the McIntosh MC462, what about casting a line upstream? My McIntosh C2300 preamplifier uses 12AX7A tubes in its line-level and phono stages. Was it perhaps time to branch out in my choice of preamplification? I swapped in J E Sugden's solid-state Masterclass LA-4 line preamplifier, lined, nothing-but-the-facts preamp. As of this writing, I have yet to read what Jim and John think of it, but I don't expect their takes to be less than positive. With the Sugden LA-4 in the chain, I dipped into one of the great complete cycles of Beethoven's piano sonatas, recorded for Telarc by John O'Conor in 1987. I listened to Sonata 21, "Waldstein" (CD, Telarc CD-80160), O'Conor playing a fine Hamburg Steinway. Everything was right about the sound-no sense whatsoever of any strain, and an used for this recording were B&W 801Fs. For additional corroboration, I walked downstairs to the living room and

Fig.4 McIntosh MC462 (8 ohm output), spectrum of 1kHz sinewave, DC-1kHz, at 1W into 8 ohms (linear frequency scale). stereophile.com • May 2019 can enable or disable the Auto Off function, which shuts down the MC462 after it hasn't sensed an input signal for 30 minutes. I particularly liked McIntosh's patented goldplated speaker binding posts. Each has two moving parts,

hear wussup in my system. I cued up "Return to Paradise." Hearing music from the MC462 for the first time, I thought of visual metaphors. I thought of turning the contrast setting up or down on a television, or adjusting the amount of color saturation. Zooming in and out also has its audio analogs. The audio picture—the soundstage width and depth-enlarged in all parameters, and the colors seemed deeper. I heard a kind of fleshing out of Horn's voice, her deep mezzo gaining heft and impact. The other aspect that grabbed me was the percussion in this track, which is complex and subtle, capable of revealing a system's ability to resolve minute details. I heard intricate percussion sounds that I didn't recall having heard before, and the drum kit also had more impact, with more swing. Sticking with my arsenal of past R2D4 picks, and because I knew it would make me smile, I put on Count Basie &

that the MC462 exceeded its specification even with both channels driven, its 8 ohm output clipping at 516Wpc into 8 ohms (27.1dBW). The trace in this 0.05 0.02

THD+N trace into 2 ohms from this output, because it was >2% in the midrange and treble and >3% in the bass at 28.3V, which is equivalent to 400W into 2 ohms. The moral: Match the MC462's nominal output to the

The distortion signature is primar-

ily of the second and third harmonics

(fig.11), though the right channel (red

trace) had slightly more distortion

(fig.10); these components are very

low in level, even at high powers

CDT CD transport. Masterclass LA-4.

We all have our default settings. Each February, for Stereophile's annual "Records to Die For" feature, I could happily pick Shirley Horn's Here's to Life (CD, Verve 314 511 879-2). Every time, it's the first recording I reach for when I want to

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Fig.6 McIntosh MC462 (8 ohm output), both channels driven, distortion (%) vs 1kHz continuous output power into 4 ohms.

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His Atomic Band doing "Roll 'Em Pete," from the killer collection Complete Live at the Crescendo 1958 (5 CDs, Phono 870245). Joe Williams nails it to the boards: "Well, you're so beautiful, but you've got to die someday. / All I want's a little loving, just before you pass away." Now that was something to die for-I had to laugh with pleasure. Via the MC462, Basie's piano was charging hard and taking no prisoners. The saxes and brass had such wallop I felt I was being 2 See www.stereophile.com/content/harbeth-monitor-302-40th-anniversary-Into 4 ohms (fig.6), the McIntosh's

8 ohm output clipped at 720Wpc

(25.6dBW). It's fair to note that I don't

hold the wall voltage constant for this

test; with both channels clipping into

4 ohms, the wall voltage had dropped

output delivered 190Wpc (22.8dBW)

with both channels driven into 8 ohms at 1% THD+N, 298Wpc with both

channels driven into 4 ohms (21.7dBW,

Hz

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(%) vs frequency at 28.3V into: 8 ohms (left

channel blue, right red), 4 ohms (left cyan, right

fig.7), and 536W (21.3dBW) with one

channel driven into 2 ohms (fig.8).

0.05

from 121 to 115.4V. The MC462's 2 ohm

recordings are from the period of the Dead's tours famous

for the Wall of Sound, the massive PA system they briefly

McIntosh C2300 stereo amplifiers—a direct ancestor of the

toured with in the 1970s. The Wall was powered by 48

3 See www.stereophile.com/content/bowers-wilkins-702-s2-loudspeaker.

MC462-and put out a tidy 28,800W!

Fig.12 McIntosh MC462 (8 ohm output), HF innodulation spectrum, DC-30kHz, 19+20kHz at 100Wpc peak into 8 ohms (linear frequency scale)

(0.0002%). Summing up the McIntosh MC462's measured performance is easy: It is an extraordinarily well-engineered, exceptionally powerful amplifier. -John Atkinson Hz

than the left (blue). Tested with an

equal mix of 19 and 20kHz tones at

high power into 8 ohms from the 8 ohm output, the levels of higher-order

intermodulation products were ex-

tremely low (fig.12), and the second-

order difference product at 1kHz lay at a "roots-of-the-universe" -114dB

Audiodesksysteme Vinyl Cleaner Pro, VPI Periphery Ring

restored my system to what it had been before, the only new element being the McIntosh MC462. To eliminate guesswork I used my personal North Star, a recording of my own compositions for chamber ensembles and string orchestra, which I conducted-Tight Lines (LP/CD, Stereo-My own No.1 priority in the reproduction of music is the

living, breathing re-creation of the harmonic series. That is the "nature" in music, the vibration of the spheres. You'll want to be thoughtful in choosing what to pair the MC462 The McIntosh MC462 Quad Balanced power amplifier

Fig.2 McIntosh MC462 (2 ohm output), small-Fig.3 McIntosh MC462 (8 ohm output), smallsignal, 1kHz squarewave into 8 ohms signal, 10kHz squarewave into 8 ohms

> straightforward. In addition to the six pairs of speaker output taps sticking straight up from the shallow rear deck are AC in, a fuse bay, and, jutting out horizontally from the rear panel, pairs of balanced and unbalanced inputs

and outputs. One small switch lets you select between balanced and unbalanced operation, and with another you dioband. As a result, the response with low-frequency reproduction. A 10kHz our standard simulated loudspeaker² squarewave was reproduced without varied by ± 0.2 dB (fig.1, gray trace). overshoot or ringing (fig.3). The channels' levels match to within The McIntosh MC462's channel 0.1dB, and the audioband response separation (not shown) was superb, into 8 ohms (blue and red traces) and measuring close to 120dB in both 4 ohms (cyan, magenta) is flat up to directions below 1kHz, though it did 20kHz. Into 2 ohms (green trace), a decrease to 70dB at 20kHz, due to slight top-octave rolloff reaches -0.4dB capacitive coupling between the at 20kHz. The MC462 reproduced a channels at some point in the circuit. 1kHz squarewave with short risetimes The wideband, unweighted signal/ and flat tops and bottoms (fig.2), noise ratio, ref. 2.83V and measured suggesting that the amplifier's use of 2 See www.stereophile.com/content/real-lifeoutput transformers doesn't affect its measurements-page-2

> 0.05 0.02 0.01 0.005

0.0003 100m

The music goes 'round and 'round . . .

my reference system that had preceded the MC275, a solid-state and a single-ended tube design, each produced some level of hum, as well as noise through my speakers, that I could never eliminate. But the MC462 provided those impressive backgrounds of "black" silence deeply desired by audiophiles—they really do play a role in the appreciation of microscopic and macroscopic differences in levels of detail edition-loudspeaker

McIntosh specifies the MC462

(26.5dBW) into a load matched to the nominal output Autoformer tap. With

THD+noise reaches 1%, fig.5 indicates

clipping defined as being when the

as being able to deliver 450Wpc

not be audible.

0.005

graph stops at 1%, as that is when the amplifier's protection was triggered.

Fig.8 McIntosh MC462 (2 ohm output), both

output power into 2 ohms.

channels driven, distortion (%) vs 1kHz continuous

lowest impedance magnitude of the loudspeaker used.

> 40th Anniversary Edition. Clamp.—Sasha Matson

ASSOCIATED EQUIPMENT Analog Sources VPI Aries turntable & 3D 12" tonearm with Synchronous Drive System; Lyra Etna cartridge. Digital Sources Apple MacBook Air computer running Pure Music, Qobuz; Bricasti M1 DAC; Musical Fidelity M1 Preamplifiers McIntosh Laboratory C2300, J E Sugden Power Amplifier McIntosh Laboratory MC275. Integrated Amplifier Peachtree Nova. Loudspeakers Bowers & Wilkins 702 S2, Harbeth M30.2 ables Digital: AudioQuest Diamond (AES) & Coffee (USB). Interconnect: AudioQuest Fire & Sky. Speaker: AudioQuest Firebird. AC: AudioQuest Dragon. ories AudioQuest Niagara 7000 power conditioner, Mapleshade equipment rack, TonTräger speaker stands,

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phile STPH022-1/2). The MC462 became a literal studio reference, a conduit: I stood there again before the musicians as they made music out of dots on pages. ... and it comes out here I count 81 amplifier models issued by McIntosh Laboratory through 2003. I'm told the count is now well over 100-a company with that kind of history now competes mainly against itself. McIntosh fans have their favorites from the company's various design eras. As listeners, we also have our individual likes and dislikes-some rational, some not

with, upstream and down-this amp interrogates whatever it comes in contact with with such authority that it could veer to the analytical side of the sonic spectrum. With a simpatico system the McIntosh MC462 will bring the breath of life to sits today on the bottom shelf of my rack like a stocky Buddha, calmly radiating energy as the forest creatures—eg, the red squirrels that winter inside the walls of our old Victorian-gather 'round, smile, and nod their heads. One thing they all agree on is the price-\$9000 is more than fair for the excellence delivered, given the inflationary forces wafting

knowing I was getting the same 450Wpc of power no matter which taps I used. And thanks to a heads-up from John Swenson's

Got one right here. I hooked

with 4 ohm loads."

Fig.10 McIntosh MC462 (8 ohm output), 1kHz waveform at 50Wpc into 8 ohms, 0.00056% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale). stereophile.com . May 2019

reviewed in the April 2019 issue by Jim Austin and then sent on to me by John Atkinson. The LA-4 is a compact, streamextremely even sense of timbral distribution throughout the audioband. The CD booklet states that the monitor speakers played a bit of the "Waldstein" on my 1936 Steinway Model M. Yup—that's what a piano sounds like. I'm a newbie when it comes to streaming, but I'm glad I waited-I'm really digging what I'm hearing from Qobuz's new US service. Streaming at hi-rez from my Mac lap-

DAC, I browsed a new cycle of Sibelius's seven symphonies, recorded over several years by Paavo Järvi and the Orchestra of Paris (24-bit/96kHz FLAC, RCA/Sony SYNX

19075924512). The Sugden-McIntosh-B&W combo tore

the roof off, with fantastic energy propelling the end of Symphony 3. Sibelius also loves him some pizzicato—and

the plucked strings in the second movement were woody

the overall sound of these recordings. When the strings played hard, things started sounding a bit hashy and brittle. Was it the recording or the gear? Like many people, I own

leading the Vienna Philharmonic, from the early 1960s

(3 CDs, London 430 778), I got a fast answer. The gear

was correctly revealing the truth about the recordings. The

Maazel cycle has a far richer, less strident sound, and that's

what I heard. For good measure, I put on the same movement of Symphony 3 from the cycle recorded by Leif

more than one Sibelius cycle—all I had to do was pull them out and compare. Switching to the cycle with Lorin Maazel

But while I enjoyed the performances, I wasn't wild about

top (McIntosh Laboratory licensed the use of the name "Macintosh" to Apple years ago) through my Bricasti M1

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floorstanding 702 S2s, reviewed in May 2018 by Kalman Rubinson.3 In his sidebar accompanying Kal's review of the 702 S2s, JA measured an easygoing sensitivity of 90.2dB for the B&Ws. However, though this model's nominal impedance is specified as 8 ohms, JA found that it dipped down to 3 ohms in the bass, and concluded: "I think [the 702 S2] should be used with amplifiers that are comfortable

output power into 4 ohms.

-20 -60 -80 -100 Fig.11 McIntosh MC462 (8 ohm output), spectrum of 50Hz sinewave, DC-1kHz, at 100Wpc into 8 ohms (linear frequency scale).

> two, and my pick in this three-way Sibelius faceoff. It was time for bringing it all back home, as the Poet said. After many more moments musicaux like those described, I

recommended-insisted on, even.

through the High End. The senses of ease and literally quiet power created by the MC462 are palpable and most wel come. A first-round vote pick for induction in Class A of the

Segerstam and the Helsinki Philharmonic Orchestra, from the early 2000s (4 CDs, Ondine ODE 1075-2Q). Here were warm, strong, yet varied sonics, in comparison to the other

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next edition of our "Recommended Components." Highly

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