



Ed Frias EFE Kit by Speaker City

Assembled and Reviewed by Duncan, Colin, and Nancy MacArthur

ED FRIAS EFE KIT

Speaker City, USA
115 South Victory Blvd.
Burbank, CA 91502
1-818-846-9921
Fax: 1-818-846-1009
www.speakercity.com

List price: \$170 per speaker
System: two-way rear-tuned bass reflex
Woofer: imported 6.5" polypropylene cone
Tweeter: imported 1" textile soft dome
Impedance: 8Ω nominal
Power rating: 100W RMS continuous, 150W maximum.
Frequency response (±2dB), 45Hz-20kHz
Sensitivity: 89dB (2.83V/1m)
Dimensions: 13" × 8.75" × 9.75" (H × W × D)
Available finishes: black oak, golden oak, and red oak

Ed Frias of EFE Technology designed this small two-way speaker for monitoring, music listening, and HT applications. The EFE design is available as a kit from several distributors; the Speaker City version is reviewed here. The Ed Frias EFE Kit (henceforward called the "EFE") uses a 1" dome tweeter and a 6½" mid-woofer and a redesigned (May 2003) crossover network; much information about the crossover is available at the GR research website (<http://www.gr-research.com/edspeaker.htm>).

The hardest aspect of building this kit was persuading the distributor to send it to us. The EFE arrived on our doorstep six weeks after the initial order, after three phone calls from Ed Dell to Speaker City.

The kit came in three large (but not huge) boxes (Photo 1). Two boxes contained the finished enclosures, double-boxed with the outer box separated from the inner box by a couple of inches of random foam "cutoffs." The foam was correctly distributed and provided good shipping protection, and the shipping boxes clearly are meant to serve as ship-

ping containers for the finished systems.

All the remaining components were well packaged in the third box. (The crossovers were so well packed that we spent a fair bit of time getting into them.)

COMPONENTS

The first instruction made sense: It told us to take an inventory of the supplied parts. Unfortunately, we had no parts list. Our kit consisted of the following (Photo 2):

- 1 page of assembly instructions
- 2 finished enclosures with grilles
- 2 woofers
- 2 tweeters

- 2 tweeter gaskets
- 1 bag fibrous stuffing
- 1 accessory bag containing:
 - 2 input terminal cups

PHOTO 1: The Speaker City EFE kits came well packed in three cardboard boxes (cats not included).

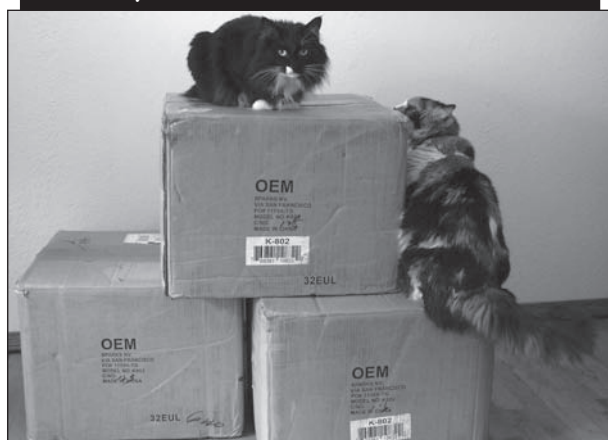


PHOTO 2: All components contained in the EFE speaker kits.



- black Phillips-head screws (10 long and 21 short)
- quick-connect terminals (17 wide, 3 medium, and 9 narrow)
- 2 lengths of 18-gauge "speaker wire"

The EFE cabinets (**Photo 3**) appear well constructed and finished. The port tubes are pre-mounted into the rear of the enclosure, and the grilles are pre-assembled. Our pair was finished in "red oak" veneer with square corners.

Although the red-stained oak doesn't imitate a more expensive wood veneer, it offers a welcome alternative to the usual light oak or black oak finish options. The overall level of "fit 'n' finish" is very good for a speaker in this price range. A curious aspect of these cabinets is that while the input terminal cups are recessed in the rear of the enclosure, the drivers aren't recessed into the front.

Peerless manufactures both drivers used in the EFE design: type 105DT2608 for the tweeters and X176WR3308 for the woofers. These drivers are of high quality and undoubtedly contribute to the good sound of the finished system. The woofers have

integral gaskets, while the tweeters have separate gaskets. All four drivers were packed well to prevent damage during shipping.

The crossovers (**Photo 4**) supplied with the Speaker City kits are fully assembled and mounted on small boards (the boards are not printed circuit boards). All connections are made with solderless connectors. The crossover parts are good (but not superb) quality. All capacitors are film-type and the coils are air-core, although two of these seem to be mounted with metal bolts through the center.

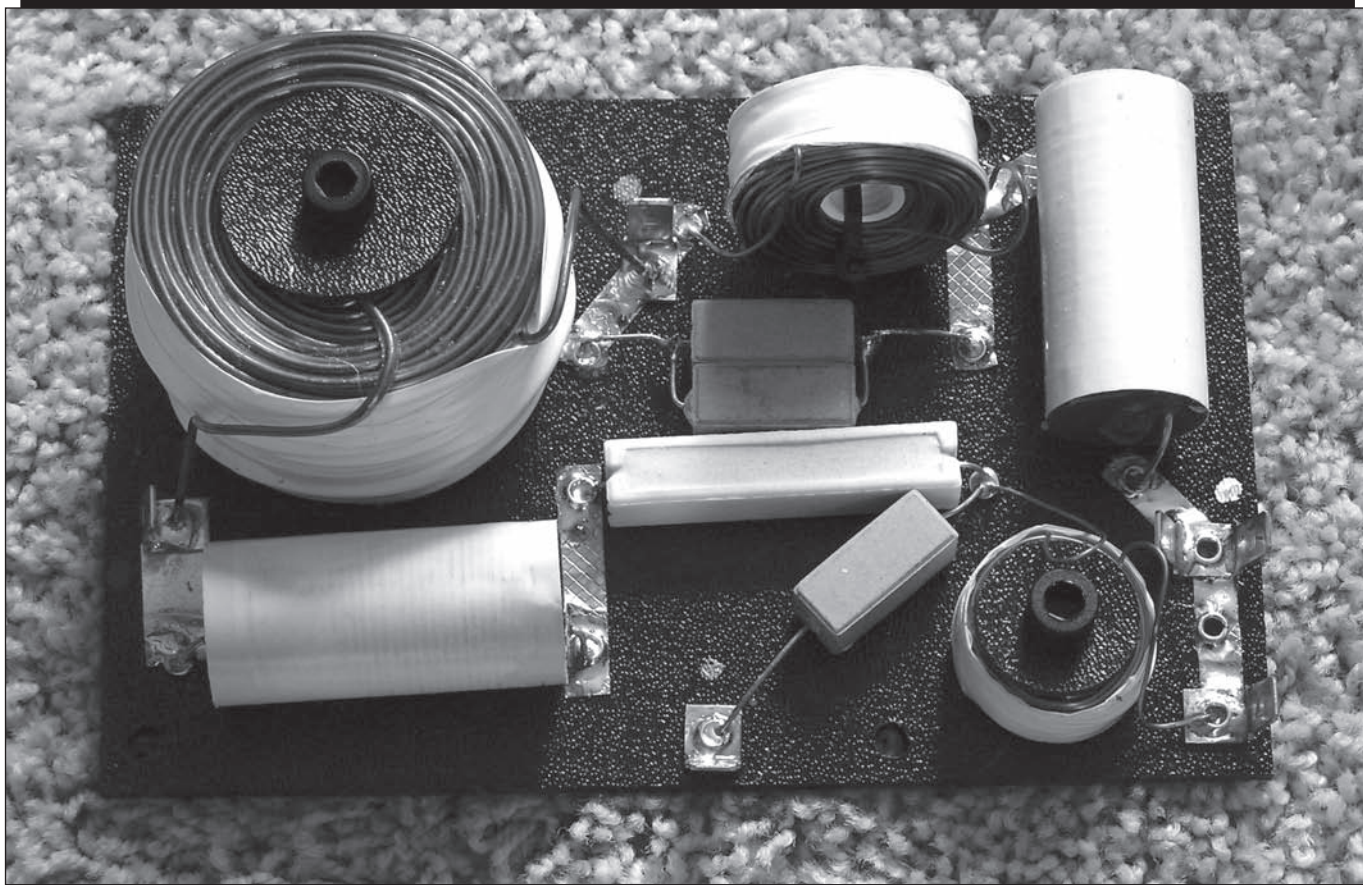
These crossovers, described on the Speaker City website, appear to use

a first-order filter with impedance compensation for the woofer and a second-order filter for the tweeter. The drivers are connected "in phase." The crossover schematic on the website shows multiple

PHOTO 3: Close-up of one of the EFE cabinets.



PHOTO 4: Close-up of the assembled crossover from the Speaker City EFE kit.



resistors to set the level of the tweeter, but these resistors were not included in the kit. Otherwise, the schematic seems to be representative of the assembled crossovers. However, the mechanical drawing from the website bears little resemblance to the crossovers in our kit.

This inconsistency in the mechanical drawing leads indirectly to one of our major issues with this kit. Although the input, woofer, and tweeter connections to the crossover are color-coded, the color-coding is explained only on the *bottom* of the crossover board, not in the instructions. Once you mount the crossovers into the cabinets, you no longer have access to this information. Because the website drawing is not correct, it cannot be used as a reference.

As noted above, the kit provides odd numbers of screws and connectors, and you must choose which are most appropriate for each application. (In our case the kit contained plenty of each type.) The internal wiring appears to be standard 18-gauge "speaker wire," which is paired and color-coded and probably is appropriate for speakers in this price range. The input terminal cups contain gold-plated "5-way" connectors, which are of a higher quality than the other small parts. In short, the EFE kit includes all parts (along with some extras) needed to assemble these speakers.

KIT ASSEMBLY

The assembly instructions provided by Speaker City consist of a single page that appears to be generic for all kits made by Speaker City. This instruction sheet has a list of tools and ten instructions that can best be described as an outline for building this speaker. Where appropriate, we have included the instruction numbers in our description of the assembly process. In several cases we suggest an alternative order for the steps.

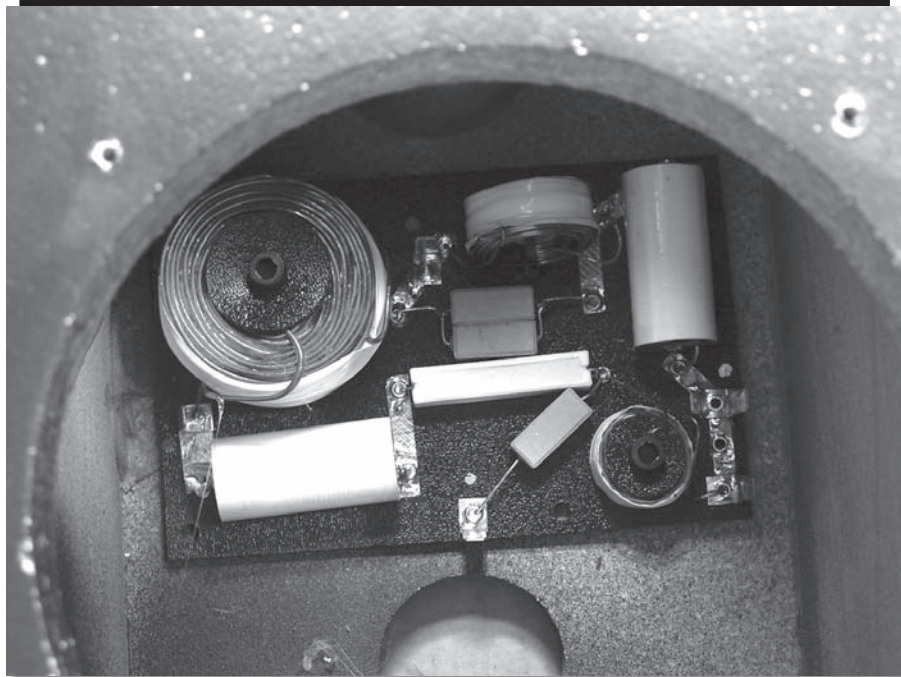
The instructions list four tools required for assembling these kits: cordless drill, measuring tape, soldering pencil, and solder. Of these items, Colin and I needed only the first, but we also used a marking awl, hot melt glue gun, screwdriver, solderless crimping tool, and a wire stripper. None of these tools are particularly exotic, but a neophyte kit builder might not have them on hand.

Although the inclusion of a soldering pencil in the tools list suggests the intention to solder the wires onto the ter-

minals, the supplied insulated terminals are not appropriate for solder connections. We used a crimping tool instead (also not a perfect solution).

As mentioned above, taking an inventory (Instruction 1) is always a good first step. In this case this step should include a little planning and a complete reading

PHOTO 5: The crossover boards are mounted with hot melt glue on the real inner wall of the cabinet between the terminal cup and the port.



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of the instructions to avoid any potential pitfalls. Any assembly of a pre-finished speaker requires a soft, clean, assembly location (Instruction 2) to avoid marring the finish of the enclosures. We found a carpeted floor to be ideal.

Because the supplied instructions do not specify which screws and connectors are appropriate for each use, you should plan how best to utilize the supplied hardware. In our case, we used the long screws to mount the woofer and the shorter screws

to mount the tweeter and input terminal cup. Although we could have mounted the crossover board using the shorter screws, we chose to use hot melt glue instead. (Glue is easier to use in a confined space.) We chose the wide connectors for the crossover and woofer, the medium connector (plus one wide one) for the input terminals, and the narrow connectors for the tweeter.

We drilled all the pilot holes (Instruction 5) for both drivers and the input cup before mounting any electronic components in the enclosures. We used a $\frac{1}{8}$ " drill bit for the woofer and $\frac{3}{32}$ " for the tweeter and terminal cup. Rather than blowing off the excess wood particles as Instruction 5 suggests, we used a vacuum cleaner to avoid distributing the particles around the workspace.

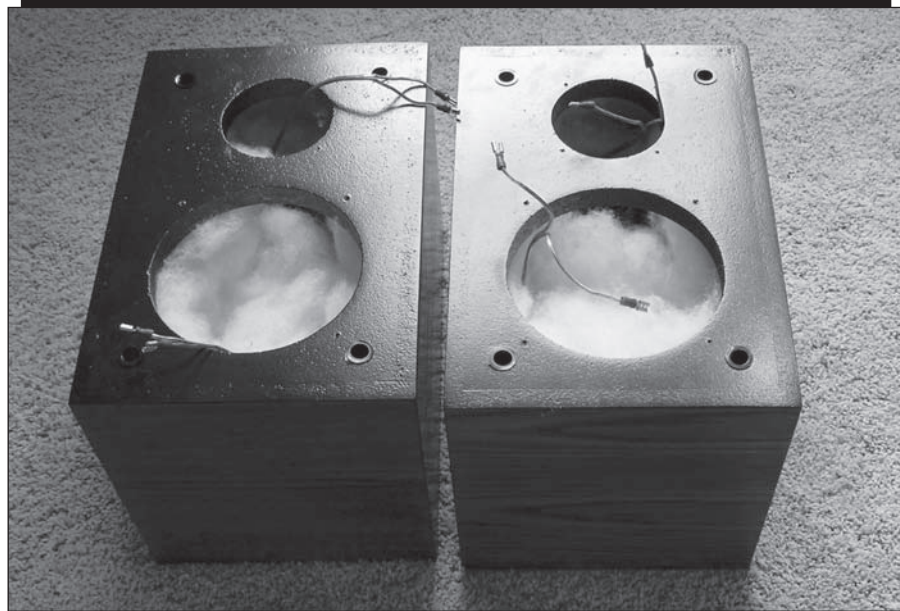
We mounted the crossover (Instruction 3) using hot melt glue on the back wall of the enclosure (**Photo 5**). This location lets you keep all of the wire lengths reasonable, although, given that the wire is not pre-cut, other locations were possible.

After physically mounting the crossover board, we attached the input terminals to the crossover using a technique that worked well for all connections. Simply strip one end of a long piece of speaker wire and crimp two wide terminals onto the end of the wire. Then thread the wire through the input cup hole and attach the terminals to the appropriate lugs on the crossover board. At this point we cut the cable long enough to conveniently reach the cup resting outside the box. Then we terminated the free end of the cable, attached it to the input terminals, and screwed the terminal cup into place.

This termination technique allows you to remove the terminal cup if required, ensures that the minimum reasonable length of wire is used, and avoids the need to measure wire lengths. By cutting all cables using this procedure, we ended up using less than half the supplied wire. At this point we attached the woofer and tweeter wires to the crossover (first half of Instruction 8), cut the wires to the appropriate length, and left them hanging out of the correct openings in the front panel.

Next we stuffed the speaker enclosures (Instruction 6). The supplied insulation material was in the form of a $1\frac{1}{2}$ " thick blanket about 2' wide. We cut 1' by 1' squares, punched holes for the woofer and tweeter wires, and pushed the mate-

PHOTO 6: The EFE cabinets following stuffing but before the drivers are attached. Note the driver connection wires sticking out of the stuffing.



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rial into the back of the enclosures over the crossover. A second 1' by 2' piece was wrapped around the inside of the enclosure to cover the sides. We stuffed fist-sized pieces of the remaining material into each enclosure until a firm, but not

packed, density was reached (**Photo 6**).

This procedure used only about two-thirds of the supplied insulation material. It's possible that the boxes are incorrectly tuned; further experimentation probably would be helpful. The only hitch with In-

struction 7 involved placing gaskets around the driver mounting holes: only the tweeters have separate gaskets.

Once the box is stuffed, the other end to the wires coming from the crossover to the drivers can be terminated and attached to the correct driver (second part of Instruction 8). We terminated all four wires, then attached one driver at a time and screwed them into the holes in the cabinets (Instruction 9). Finally we replaced the grilles and connected the finished speaker systems to an amplifier (Instruction 10). As always, we started with the volume turned all the way down and turned it up slowly, listening for problems. Step-by-step instructions from the distributor would be helpful, but until those instructions appear, we'd recommend the following assembly order: plan, 1, 2, 5, 3, 4, 8a, 6, 7, 8b, 9, 10, enjoy.

PHOTO 7: The completed EFE loudspeakers ready for listening.



OPERATIONAL ISSUES

Once complete (**Photo 7**), the EFEs didn't resemble "kit" speakers, aside from their lack of a manufacturer's logo. Both speakers performed flawlessly immediately after construction (Speaker City recommends a 10- to 16-hour break-in

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period prior to any serious listening).

The only difficulty in using the EFEs was the small size of the input terminal cups. Getting fingers into the cup to tighten or remove speaker cables wasn't easy. Fat speaker cables exacerbated the problem, but it recurred to some degree with every type of connector other than banana plugs.

We listened to the EFEs as part of three different setups. System 1 was a music-only system using a Manley StingRay integrated tube amplifier. System 2 was a home theater powered by an Onkyo TX SR601 receiver; the EFE speakers were used in the front channels. System 3 was a computer-based system with an AudioSource AMP-1 amplifier. We used System 1 to judge the ultimate ability of the EFEs, System 2 to judge the applicability to HT, and System 3 to judge the effectiveness of the EFEs as a step up from an entry-level speaker (Madisound Sledgeling, in this case).

LISTENING CRITIQUE

As with previous listening critiques, we auditioned the EFE using tracks from the

Hi-Fi News and Record Review Test Disk III (track 2: Parry's "Jerusalem," track 4: Vivaldi's trumpet concerto, tracks 5 and 6: excerpts from Prokofiev's "Peter and the Wolf," track 7: Purcell's "Welcome, Welcome Glorious Morn," track 10: a Corkhill percussion piece, and track 14: Rio Napo RSS demo), as well as a wide variety of other music.¹ We judged imaging (between the speakers), naturalness with human voice, and bass extension (for a 6½" speaker) to be strengths of the EFE, and height of image, congestion with massed instruments, and occasional treble harshness to be its weaknesses.

By far the greatest strength of the EFE lies in the lateral imaging it produces between the speakers. The voices and instruments on every track auditioned were placed with pinpoint accuracy; the words "strong imaging" appear and reappear in our listening notes. Although making a general comparison is inappropriate, lateral imaging is the single area where the EFEs surpassed the far more expensive Genesis 400 speakers normally resident in System 1. (Note: the EFE's ability in this area doesn't extend much beyond the physical

location of the speakers.)

Another significant virtue of the EFEs was the naturalness they brought to vocal reproduction. This characteristic was particularly evident with voices that we know well in a live context (the MacArthur Road and Stabat Mater recordings), but also with voices that we know less well (the Comedian Harmonists, Cowboy Junkies, and Flatt & Scruggs disks). The accuracy of mid-range reproduction was also evidenced by the "you are there" naturalness of the vibraphone on the Modern Jazz Quartet pieces.

The amount of bass produced, particularly on the kick drums of the BROTHER recording, is impressive for a single 6½" driver. Of course, it's no match for dual 8" or 12" drivers, but it easily beats the single 6½" in the Sledgeling. The mid-bass seemed a little loose on certain recordings such as *MacArthur Road*. (This characteristic may be due to the recording or to the stuffing issue mentioned earlier.)

Unfortunately, for \$170 you're not going to get it all. Along with the sterling lateral imaging mentioned before, you get extremely restricted vertical imaging and ambiance. Although the EFEs were placed



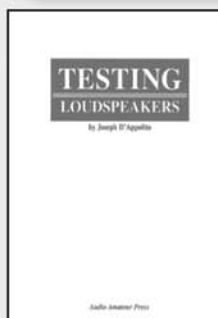
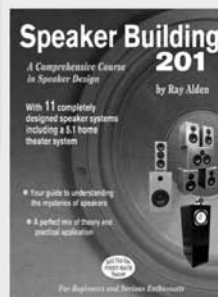
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on relatively tall speaker stands (28"), many performers sounded like munchkins playing under a low ceiling. This effect was less pronounced on certain recordings (piano music, for example) but was obvious with vocal groups.

Although EFEs performed well with unaccompanied or lightly accompanied voices and single instruments, they became slightly muddled with large ensembles. The Charlie Daniels recording, for example, sounded slightly smeared. To be fair, this CD is a "difficult" recording that sounds terrible on many systems. Although the EFE's performance in this area wasn't perfect, it was acceptable.

The EFE loudspeakers lacked transient detail when compared with live music or even with their more expensive electro-mechanical brethren. With the Beethoven piano sonatas, the tone of Brendel's piano is spot on, but the lack of crisp transients lets you know that you're listening to a recording.

The high-frequency response of the EFEs is variable. Some instruments, such as the brushed cymbals in *Blues on Bach*, sound marvelous, while others, such as the Vivaldi trumpets, sound downright painful.

FINAL THOUGHTS

DM: This Speaker City kit strikes me as more a complete collection of parts than a finished kit. With one trivial exception (a solderless connector), all components required to assemble a pair of Ed Frias EFE speakers are included. If the builder has sufficient experience and a reasonable collection of DIY hand tools, I would certainly recommend the Ed Frias EFE design as being musical and well worth the money. This kit represents a very significant step up from entry-level speaker systems as well as being well suited to home theater applications. I would be curious as to how the Speaker City version stacks up against the same design supplied by other manufacturers.

NM: I'd like to emphasize that this kit is appropriate for experienced speaker builders only. The EFEs weren't Colin's first kit, but he would have had trouble building them without help from his father. These speakers were musical and non-fatiguing, and we all enjoyed listening to them.

CM: The EFEs are a significant step up

from my current speakers. I wouldn't hesitate to buy them.

1. RECORDINGS USED FOR LISTENING

Beethoven, Ludwig van, *Beethoven Piano Sonatas: "Pathetique," "Moonlight," and "Appassionata,"* Alfred Brendel, pianist, Philips compact disk 411 470-2.

BROTHER, *This Way Up*, Rhubarb Records compact disk RR07CD.

The Charlie Daniels Band, *Fiddle Fire*, Blue Hat Records compact disk BLH-9703-2.

The Comedian Harmonists, *The Comedian Harmonists*, Hannibal compact disk HNCD 1445.

Cowboy Junkies, *The Trinity Session*, BMG Canada compact disk 8568-2-R.

Dvorak, Antonin, *Stabat Mater*, Jiri Belohlavek, Supraphon compact disk SU 3311-2 231.

Dylan, Bob, *Highway 61 Revisited*, DCC Compact Classics compact disk GZS-1021.

Flatt & Scruggs, *On Foggy Mountain*, Sony compact disk A 18071.

Hi-Fi News and Record Review, *Test*

Disk III, compact disk HFN 020

Jethro Tull, *Thick as a Brick*, Mobile Fidelity compact disk UDCCD 510.

MacArthur, Dan, Margaret, Megan, and Gary, *MacArthur Road*, Front Hall compact disk FHR 040CD.

The Modern Jazz Quartet, *Blues on Bach*, Atlantic compact disk 1652-2.

Strauss, Richard, *Also Sprach Zarathustra*, Andre Previn, Telarc CD-80167.

Tchaikovsky, Peter Ilyich, *Tchaikovsky 1812*, Erich Kunzel, Telarc CD-80041.

Watson, Doc and Merle, *Pickin' the Blues*, Analogue Productions compact disk CAPFG 026.

This review marks the first audio article for Colin, whom we first met as a four-year-old in "Building a Toy Soldering Iron" (*Speaker Builder*, 3/97, p. 20). His parents, Duncan and Nancy, have written for *audioXpress*, *Speaker Builder*, *Glass Audio*, *Audio Electronics*, *Audio Amateur*, and *Hi-Fi News and Record Review*. The MacArthurs live in northern New Mexico. —Eds. **aX**

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