

# One Tuff Chevy

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Photographed by John Skalicky



Home-theater sound technology hits the road in Gary Reber's 1996 Impala SS.

**Let's** start out by saying that this Impala SS is just a bit more than a typical demo-systems vehicle. It is the world's first vehicle equipped with a Digital Theater Systems (DTS) surround processor. In addition to movie theaters, DTS can also be found in many high-end home theater products. DTS technology is now making good on the promise of the dream of a seamless, discrete 5.1-channel sound atmosphere, placed squarely in the hostile environment of a typical automobile.

Gary Reber, editor and publisher of *Widescreen Review*, a publication dedicated to covering the world of high-performance home theater, is the owner of this Impala SS. Reber is a recognized expert on great sound and video, and has been one of the primary proponents of DTS as a home-theater sound platform for both Laser Discs and the new Digital Video Disc format. Reber is also a major-league car buff with a particular affinity for big, bad Chevy's.

After learning KH

America—the parent company of KEF KAR Audio and Coustic—had licensed DTS Digital Surround for car audio applications, Reber wanted to be first in line for a DTS Digital Surround automobile sound system. This came about through the

tem was installed by Haas Auto Stereo in Culver City, California, by Brett Pierce, John Mosler, and the owner, Jeff Haas.

“Achieving a realistic reproduction of a music performance in the cramped and oddly-shaped interior of an



The center console (above) house a custom-mounted KEF 4-inch Uni-Q center-channel speaker, as well as the motorized DTS volume controls.

efforts of several individuals: Coustic/KEF KAR Audio President, Reese Haggott; vice president of design evolution, Rich Coe; and Jamey Rawlings in technical support. The sys-

automobile is a challenging task,” Reber said. “The combination of glass, carpet plastic, and leather, and their proximity to the speakers and listeners, is not optimum, to say the



The front door panels and structures (above) were modified to replace the stock 6-inch factory speakers.



With the trunk open, the system components are exposed. The system includes three Coustic amplifiers for the LF, RF, LS, RS, and both subwoofer channels. The DTS and Circle Sound processors are visible on the driver's side of the trunk.

least. Coupled with irregular road noise, and muscle-car exhaust notes in this case, and you have a challenge indeed. DTS was a simple solution to attack these problems.”

The system consists of a Coustic CD-337 Digital AM/FM/CD Receiver, which can read the DTS-encoded digital signal off the CD.

Monster Cable supplies all connections including the Silver Digital M1000SV digital cable, delivering the digital bitstream to a KEF KAR Audio 3006 5.1-channel DTS Digital Surround processor with 20-bit resolution Burr-Brown DACs.

The DTS processor was designed by Anthony DeChiro, well-

known for his home-theater designs. In most ways, this is the mobile 12-V version of the critically acclaimed Chiro C5.1 Multichannel Decoder.

The KEF DTS processor decodes the digital bitstream signal, which proceeds to a Coustic DX-28DR Class A three-way electronic crossover then to the 200-watt Coustic AMP420X 4-channel amplifier powering the four corners of the system; the left-front (LF), right-front (RF), left-surround (LS), and right-surround (RS) channels. The decoded center-front (CF) signal is to a separate 50-watt Coustic AMP-210 for the critical center-channel speaker.

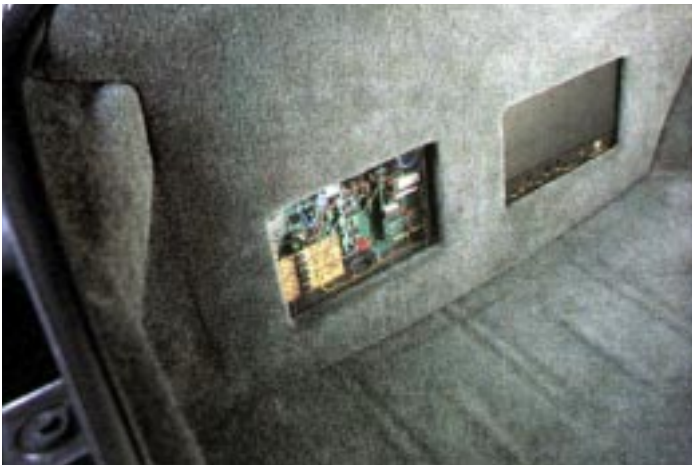
The KEF 3006 has a summing circuit provision, which was used to sum the bass frequencies below 120 Hz contained in all five full-frequency channels plus the Low Frequency Effects (LFE) channel. **This signal is routed to the Bag End ELF-M integrator and electronic subwoofer system controller.** Then it travels to the Coustic DX-28DR electronic crossover, which separates the subwoofer signal. Then it is directed to the two bridged-mono 300-watt Coustic AMP220 power amplifiers. **The Bag End ELF system provides**

**near-optimal time, frequency, and shape response of the subwoofers. The electronics, except for the head unit and system remote volume control, are mounted in the Impala's trunk, with attention paid to maximizing space and aesthetics.**

Two sealed-box subwoofer enclosures are fitted directly under the back window shelf. Although they use some of the trunk, given the cavernous size of the Impala's trunk, the space they displace is hardly missed.

The installation still retains room for the full-size spare wheel and tire by relocating it from the center of the trunk to the passenger's side. The trunk is custom carpeted in dark gray with cutouts to expose all of the electronics, including the KEF KAR DTS 3006 processor beneath its Plexiglas-top housing.

Two Coustic DR-312P 12-inch woofers are used for the low end of the system. Each is mounted in its own custom-designed sealed MDF enclosure of less than 1 cubic foot. A multi-layered wool baffle between the woofers and rear deck was constructed to direct the full output of the woofers into the Impala's interi-



Two trim panels allow the system to be displayed at different levels.



More detail comes into view as the final trim panel is removed, exposing the two surround-sound processors and the center-channel amplifier.

or, while also solidly securing the box to the rear deck.

Coupled with the innovative Bag End ELF-M dual-integrator processor, this bass system provides linear performance down to the sub-listening range. The ELF-M is a compact one-rack-unit package suited for 12-V mobile use. It provides low-distortion, extended-bass response down to 18 Hz. The ELF system's loudspeaker controller incorporates dual inte-

grators, active equalization, frequency dividing, and system protection limiters. The ELF integrator replaces conventional crossover filters and achieves frequency separation without phase shift normally associated with filters.

The LF, RF, LS, and RS satellites are KEF 8165 6 1/2-inch Uni-Q composite two-way loudspeaker drivers. The Uni-Q design relocates the elements of a conventional two-way loudspeaker layout, by plac-

ing the tweeter at the apex of the midrange/woofer diaphragm. The result is a single acoustical point source that delivers essentially the same sound balance over a remarkably broad range of listening positions, both in front and toward the sides.

The RS KEF Uni-Q's are mounted in the factory locations in the Impala's rear shelf. The front door mounted Uni-Q's were not as simple to install as the rears. The front 6 1/2-inch Uni-Q's replace tiny 4x6-inch speakers pointed at the legs of the car's front passengers. Haas' installers custom crafted a mounting for the larger replacement Uni-Q's that featured a 30-degree angle to direct the sound of the front speakers on axis toward the passengers.

The CF channel is reproduced by a KEF 8140 4-inch Uni-Q composite two-way loudspeaker driver mounted in an opening in the forward end of the center floor console. A mounting was fashioned to direct the sound upward. The smaller Uni-Q CF speaker rounded out the complement of five satellite speakers needed for full DTS Digital Surround reproduction. One of the options provided for in

the DEF DTS processor is a phantom center-channel mode without requiring the use of a CF speaker.

Also, in the center floor console are the two switches operating the motorized volume control for the DTS processor. These act as the only volume control of the system while in the DTS Digital Surround mode. The system also operated with non-DTS encoded CDs automatically when a regular CD is inserted into the Coustic CD head unit. The volume on the head unit can be adjusted so that when switching to regular CD or AM/FM reception, the level is matched to the volume of the DTS Digital Surround mode.

To ensure the ultimate battery-power response, Reber opted to install an Optima D750U Yellow Top Spiracle Technology deepcycle battery. This battery is specially designed to support maximum ignition-off power response for accessories such as high-powered stereos, thus delivering cleaner bass and purer sound.

A second surround processor is part of the component complement—a Circle Surround CSA12 Car Audio Surround Decoder, featuring Rocktron Corporation's multidi-



The rear deck retains its stock appearance (top). With the trim panels in place, the rear amp rack (below) displays the heart beat of this system, the Coustic amplifiers.



mensional surround-sound format decoder designed specifically for music-listening applications. The Circle Surround decoder creates a 360-degree listening environment, putting you in the center of the musical performance with incredibly discrete-sounding resolution. It is designed to automatically convert stereo material or decode other surround-sound matrix encoded

systems in to 5.1-channel surround sound without undesirable side effects. The processor uses no artificial delays, reverbs, or harmonic enhancements not found in the original material. Advanced steering logic derives two independent surround channels (not mono) from the stereo mix information when processing conventional two-channel music sources. The CSA12 is installed between the

head unit and the Coustic DX-28DR Class A three-way electronic crossover processor, just ahead of the Coustic amplifiers located in the trunk.

The \$11,552 price tag attached to this system, including installation, is not all that outlandish, especially given the cutting-edge nature of the technology employed in its construction and the quality of sound reproduction that it is capable of delivering. Reber is proud of this system and has already displayed it at a number of car shows and sound-off competitions. At each outing, with its massive 20-inch wheels and myriad performance and appearance modifications (all outlined in the May issue of *Widescreen Review*), this is one ominous black beauty that never failed to impress visually or sonically. All Reber Needs now is a widescreen, heads-up video-display device. Knowing Reber, he's probably working on it.