Meridian Audio 568.2
Sophisticated Digital Preamplifier/ Surround Processor

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An Engineering-Driven Company

Founded in 1977 at the dawn of the digital era in consumer electronics, Boothroyd/ Stuart-Meridian is named for its two founders: Allen Boothroyd, a well-noted industrial designer and J. Robert (Bob) Stuart, a remarkable engineer. To this day, Bob has the title of Chairman and Chief Designer. Meridian's roots are in analog audio, but it is their substantial achievements in digital audio reproduction for which they have gained their greatest fame. During their 25-plus years of operation, they have consistently defined the leading edge of digital audio technology for two-channel and multichannel sound.

Located just up the road from Cambridge University in Huntingdon, this U.K.-based company has introduced such landmark products as the first audiophile-grade compact disc player (in 1984, no less), followed by the first transport/DAC combination in 1986. Meridian hasn't rested on their laurels since then, introducing several firsts, including the first available software upgrade to Dolby® Pro Logic® II, and the first DVD-Audio player to output digital high-resolution multichannel audio, which is fully copy protected. Over the years, Meridian has grown steadily to a staff of over 100 employees, including an engineering staff of approximately 16. This engineering staff must handle numerous facets of their broad product lineup. The diverse engineering disciplines include DSP (digital signal processing), digital audio, loudspeaker design, solid-state amplifier design, and industrial design. Given the relatively large percentage of engineering staff within the company, it is obvious that the company is engineering-driven.

Much talk has been made about Meridian and their complete, integrated Digital Theatre™ solution. I have heard this solution, and it is nothing short of phenomenal, especially as you climb the ladder from the DSP33 speakers, all the way to their statement loudspeaker, the DSP8000. Meridian is

quite proud of the performance of their digital preamplifier/surround processors.

In addition to their well-known DSP loudspeakers, Meridian offers three preamplifiers/surround processors. Their entry-level offering is the 561. The midrange product, reviewed here, is the 568.2. Finally, Meridian's flagship preamp/processor is the 861, a fully modular, card-based design, intended to be future-proof.

Meridian is rightfully proud of the performance of their surround processors when used with conventional equipment, not just as part of a Meridian Digital Theatre. It is with my usual reference system that I reviewed the 568.2. Also part of this review was Meridian's 598 DVD-Audio/Video player, which will be featured in an upcoming issue.

Exterior Build And Features

The THX® Ultra-certified 568.2 comes delivered in more of a European footprint of roughly 13 inches wide (321mm), 13 inches deep (321mm), and 3.5 inches high (88mm). The weight is listed at 11 pounds,

although it certainly feels much heavier than that when pulled from the box. One of the first things that I happened to notice is that the 568.2 has a cooling fan underneath, indicating some serious heat generation internally. It features a rather austere-looking, dark gray front panel, with just the power button providing a splash of purple color. The top panel is in a shiny black (almost like piano black) glass plate, which neatly hides away the goodies awaiting inside. An LED display, albeit seemingly dated, is available for user prompts and information, if you can't make use of the 568.2's on-screen display.

When turning around the 568.2 to examine the rear panel (the "business end"), one is greeted with an array of inputs, though not quite as numerous as other preamp/processors and receivers. Digital inputs are limited to four coaxial (labeled D1 to D4) and a single TOSLink (O1). Analog audio inputs are limited to two pairs as well. Video switching comprises a single composite and S-video input, with pass-through directly to the video display with OSD information. The version of the 568.2 I received had the MM option installed (known as the

568.2MM), which has a single MHR Smart Link™ interface (see sidebar), for multichannel digital audio input from a Meridian DVD-Audio-capable player with MHR Smart Link installed.

If your input requirements exceed those offered by the 568.2, there is a companion external switch box, the 562V.3 ($2,700), which provides substantial input/output capability, including the option to fit the unit with a phono stage which accepts either MM or MC cartridge inputs. In addition, video switching is vastly improved, and includes composite, S-video, and component video.

Meridian has designed the 568.2 with the frontal soundstage taking apparent preeminence, with balanced (XLR) outputs available for the front channels. Unbalanced (single-ended) outputs are available for all channels, and these can be configured for stereo (or dual) subwoofers as well.

The 568.2 includes interfacing and a protocol for system automation and control, which will be discussed later.

Technology And Internal Features

Let's talk about the technology that is laid at your disposal with the Meridian 568.2, starting with the heart of the processor, the DSP engines. In most processors, you will see one DSP device, or maybe two. The 568.2 has five DSP engines, all of which are the latest-generation Motorola® 56367 (a.k.a. Symphony®) DSPs with 150 MIPS (million instructions per second) available per DSP. This is serious horsepower for digital signal processing.

As I've said before, modern processors are remarkable with the various and sundry functions they perform. Meridian supports all of the common decoding algorithms (Dolby Digital, DTS® Digital Surround™, and Dolby Pro Logic II). Meridian was the first to market with Pro Logic II, which was released for installation in the final days of 2000.

For movie soundtrack listening (utilizing presets known as "Cinema DD" and "Cinema DTS"), a variety of options are available, including an Academy Curve to roll off the extremes of the frequency spectrum, for emulating the loudspeakers used earlier in the 20th century, for which mono was the order of the day.

Meridian EZ is a proprietary implementation similar to DTS-ES® and Dolby Digital EX processing in other products. Meridian EZ derives the seventh and eighth back surround channels from 5.1 sources, whether the source is Dolby Digital or DTS Digital Surround, and whether or not the audio is

encoded with back surround via Surround EX™ or DTS-ES, respectively.

The 568.2 currently does not offer DTS-ES, DTS Neo:6®, or DTS 96/24. According to Bob Stuart, should there be sufficient demand and/or software availability, Meridian will consider inclusion of these surround decoding/processing modes in their products.

Of all the DSP tools available with the 568.2, there were two in my opinion that were of supreme value, both of which had heavy involvement from the late Michael Gerzon.[1] The most useful was the inclusion of Trifield, since it is usable with any stereo source. Over the years, Meridian has algorithmically implemented Trifield in their processors with success. The intent with Trifield is to produce more natural and believable stereo reproduction through judicious inclusion of the center channel. In addition, depending on system configuration, the surrounds can be unobtrusively engaged as well. The depth of the soundfield can be adjusted, thus expanding or contracting apparent room depth.

The other inclusion, though less useful (due only to the dearth of available recordings) was Ambisonics UHJ decoding. The implementation of Ambisonics is best described by exploring the Web site at www.ambisonic.net. The goal of Ambisonics is to store the acoustic space and the performance within that space. This can be presented in two or more channels.

For PCM inputs, the 568.2 engages upsampling when High Speed Output is selected. This can initially be confusing to the uninitiated, since it is easy to come to the false conclusion that the 568.2 need not be checked for upsampling to be engaged, even when using analog loudspeakers. For those of you that didn't catch my subtle hint, I listened for an entire day in this fashion.

Upsampling is most often implemented with the aid of a sampling rate conversion (SRC) application specific integrated circuit (ASIC) such as the Analog Devices® AD1896 or the Cirrus Logic® Crystal®

1. Michael Gerzon was a leading researcher in audio capture and reproduction, a fellow in the AES (Audio Engineering Society), and a college professor. He was a member of the team that developed Soundfield microphoning techniques, the Ambisonics encoding format, and Trifield processing. In all cases, the goal was the same—to increase (during capture or playback) the spatial accuracy of sound recordings.

CS8420. These devices are available for under $20 in quantity. These ASICs homogenize PCM data streams, accepting a variety of sampling rates and depths, while outputting predictable 96 kHz/24-bit or 192 kHz/24-bit, depending on which ASIC is used.

Meridian has taken a different approach, with the formidable complement of DSPs at their disposal in the 568.2. Rather than paying no regard to input sampling frequency, a custom algorithm has been implemented. Meridian favors Synchronous SRC, which means that only integer ratio upsampling is performed. For example, when the input sampling frequency is 44.1 kHz, output is 88.2 kHz, and when the input sampling frequency is 48 kHz, output is 96 kHz. I had the opportunity to discuss this choice with Bob Stuart prior to this review's publication. According to Stuart, Meridian feels that using an Asynchronous SRC (nonlinear ratios) does far more harm than good. Among the many issues cited, the worst of the lot included the introduction of substantial jitter and some awfully ugly mathematical manipulation.

In addition to Synchronous SRC, the sampling depth (word length or bit resolution) is extended to 24 bits, along with proper re-dithering of the output (when input is less than 24 bits). As with other algorithmic manipulations, SRC is hand-coded by Meridian's staff of DSP engineers. Meridian believes that their hand-coded algorithms are superior to algorithms implemented strictly in silicon.

The 568.2 uses a quartet of Analog Devices AD1852 DACs, each capable of delivering 117 dB of signal-to-noise ratio. Analog Devices only has one DAC with marginally better performance in their stable of DACs, the AD1853.

Up until now, I've discussed much of the digital prowess of the 568.2, and I would be remiss if I didn't point out that the 568.2 is a fully digital processor. But what does that really mean? Any analog source input is

given an analog-to-digital conversion, after which the source becomes JADS™ (Just Another Digital Source). At this point, all of the formidable tools of the processor are at the users disposal.

There is one area where the "fully digital" concept is not in effect. When using the 568.2 with analog outputs, the volume control is actually a hybrid digital/analog control. When the volume control reaches a point where 24-bit resolution can no longer be maintained, a switch is made over to an analog volume control, so that no output resolution is lost.

Setup And Configuration

Configuration of the 568.2 can charitably be described as "challenging" when using the front-panel controls and the on-screen display. While not impossible, it is difficult, even for those of us who are well-versed in surround processor setup. As an alternative to front-panel configuration, Meridian does provide a PC-based setup program which works rather handily, after which an upload to the processor gets your configuration installed quickly (in a minute or less). I make my living in the computer field and felt right at home with the configuration software utility. However, others might not find it quite as comfortable.

The best approach, if you purchase a Meridian processor, is to have your dealer perform the configuration of the processor. Given the price tag for this product, it is not unreasonable at all to expect to receive this type of service. In many cases, given sufficient familiarity of the target system, a Meridian processor can be preconfigured quite accurately (except for loudspeaker calibration). Once set up, the processor can essentially be forgotten.

While we're on the topic of configuration, it is important to at least give you a feel for what the capabilities of the 568.2 are in terms of automatically handling your inputs. Let's take, for example the 598 DVD-Video/Audio player. For this source, I can preconfigure DSP presets for every conceivable type of input and apply the processing that I feel is appropriate. For example, I have "Movie 2" defined to apply Dolby Pro Logic II Movie decoding, so that I do not have to engage Dolby Pro Logic II manually when a 2.0 (Dolby Digital or DTS Digital Surround) source is detected. In addition, I have the PCM stereo input for "Music 2" set to Trifield processing. It is even possible to assign different crossover frequencies for music and movie sources. Suffice it to say, anything that comes into the 568.2 can have a default mode associated, and this is part

of why the assistance of your dealer or an expert custom installer will be invaluable.

Controlling Your Processor

Included with any Meridian component is the Meridian System Remote (MSR), a unified remote control for Meridian's products. There's no polite way of putting this, other than to say it's big, such that you have to hold it with two hands, and place it on your lap in order to work the controls. While I do give credit to the MSR for being logical in layout, and for the keys being well-grouped, it possesses no backlighting at all. A single

9-volt battery powers the MSR, and to insert, you literally must disassemble the MSR, then clip the battery into place.

An unusual feature with the MSR is that there is a "Shift" key. This allows you to access second functions when in Shift mode and theoretically doubles the available number of keys. For example, assuming that you have a Meridian DVD player connected via Comms (discussed below), you would use the combination Shift+Play to switch between audio streams on DVD-Video discs, and DVD-Audio discs with v1.1 authoring specifications. Shift+Stop opens and closes the disc drawer.

After about a day or two, I got to the point

MHR Smart Link™

How does a company go about designing and implementing a proprietary digital interface? In the case of Meridian, they designed around the precept that the signal shall be maintained digitally as much as possible. This allowed for greater ease in handling, since in its digital form the signal is least fragile. In addition, the interface was designed such that signals, copy protected or not, would be transferred at maximum resolution. Furthermore, the design was such that a user could elect to "break out" of an all-digital Meridian solution and utilize analog amplifiers, if desired.

On the implementation side, you need a physical interface to transmit and receive the data. Rather than building a custom system MHR Smart Link™ uses S/PDIF transmitters and receivers between the source and end point. It is important to note that although the physical interface is standardized for data transmission, it cannot be utilized by components that are expecting standard S/PDIF data flow and layouts.

In order to be approved for transfer of copy protected, high-resolution audio (DVD-Audio) data from the 4C group (Toshiba, Intel, Matsushita, and IBM), the audio data is encrypted for transfer across the interface. This means the source end for MHR Smart Link encrypts, and the end point decrypts. In the case of a Meridian Digital Theatre™ system, this could mean multiple encryptions and decryptions. MHR Smart Link is more than just an encrypted digital pipeline for transfer of audio data. As value added to the equation, Smart Link also contains metadata within the data stream. The short definition of metadata is that it's any data above and beyond audio payload and data control information.

Some of the items carried within MHR Smart Link's metadata include:
• Number of channels (1 to 8)
• Channel layout (Stereo, 5.1, 2+2+2, 4.0+Height, etc.)
• Content type (origination as Dolby Digital/DTS*, DVD-Audio, or Music)
• Sampling rate and depth
• Copy information for CPRM (Copy Any, Copy Once, Copy Never).

* When decoded Dolby Digital or DTS Digital Surround is passed from the 598 (or 800) DVD player, the Dolby Digital or DTS indicator lights up on the surround processor to indicate the original program mode.

Regardless of which digital solution you are using, MHR Smart Link is a buffered input/output system. Both send and receive are buffered on their respective sides of the link. This helps to assure minimal jitter when passing decrypted data onto the DSPs for signal processing. On the processor side, digital signal processing consists of time alignment, bass management, signal processing (Ambisonics, Trifield), equalization functions, and other assorted tasks.

In the case of Meridian's DSP loudspeakers, the DSPs will perform equalization for boundaries near the loudspeakers, equalize for the case of horizontal placement (center channel) and apply complementary high-pass, low-pass, and band-pass (three-way designs) all in advance of dedicated amplifiers to the drivers.

After all this writing about MHR Smart Link, I haven't explicitly stated the major benefit: instead of multiple analog cables and often nonexistent (or inadequate) bass management and time-alignment options, DVD-Audio can be treated like other digital sources. This opens up all available DSP options in the surround processor's formidable arsenal. ■

where the MSR was usable in a darkened environment, but I still programmed the functions of the MSR into my Philips Pronto to make life a little easier. I still have the MSR in my room and use it from time to time when I've left the Pronto someplace other than its charging base.

Besides the usual remote feature, Meridian has a nifty connection method called Meridian Comms. There's no easy way to say this, but I have a complicated system. I'm lucky enough to be able to hide this nastiness with a Commando Cloth drape in front of my way-too-full equipment rack. Depending on what's in for review at a given time, I might have as many as eight components requiring an IR sensor attached to the front panels, or connected into a 3.5mm phono jack on the back panels. This doesn't include the front projector, a (future) retractable screen, or the hard-wired remote on my analog multichannel preamplifier.

Meridian has developed an elegant solution to help tame this mess. Comms utilizes a five-pin DIN connector for integrated control of Meridian products. With Comms, I have an IR sensor attached only to the device designated as controller (in my case the 568.2). All other devices are targets, and require no sensor, as commands will be sent and received via Comms.

Comms has physical limitations, but none of them are likely to be reached in practice. A system is a collection of devices connected via Comms, sharing a common system ID. Comms can support up to eight systems, with each system containing eight devices. Therefore, a total of 64 devices can be controlled via Comms.

Sonic Performance

Red Book CD

Traditional CD isn't going away anytime soon, and every preamp/processor should be able to handle CD audio with reasonable aplomb. In the case of the 568.2, my expectations were easily surpassed. As a DAC for CDs, I found that the 568.2's performance exceeded both the Krell HTS-7.1 (reviewed in Issue 70, March 2002) and the Perpetual Technologies P-1A/P-3A combination.

I even grabbed a few Dolby Digital DVDs that have sounded terrible in the past, to find out what the 568.2 (and its integrated upsampling for PCM inputs) could do with them. For example, the *Greatest Hits* collection from Styx was dreadful-sounding, yet the 568.2 made this a bit more palatable. The vocals still sounded thin but were substantially better than what I was accustomed to.

When exceptional material was played, I simply disengaged my critical thinking, sat back, and listened to the music. A particular favorite of mine was the Bob Mintzer Big Band's *Camouflage* (DMP), a pure digital recording from the mid-1980s. Here, it's the world of subtleties that got unmasked. The clatter of Mintzer's saxophone keys during one of his incredible cadenzas was a great example. Another was hearing the sharp, percussive attack of Randy Brecker on a trumpet solo. While these might have led you to believe that the 568.2 was exaggerating these qualities of the trumpet, that was not the case. Instead, it was being able to notice the difference between being slightly off-axis of the trumpet bell and having the bell pointed straight at you.

Dolby Digital And DTS Digital Surround (Not Coming From The 598)

It is necessary to make a distinction between the performance of Dolby Digital and DTS, when played through the 598 and another DVD player. For the upcoming review of the 598, I will cover the Dolby Digital/DTS performance, whereby the 568.2 performs upsampling of decoded Dolby Digital/DTS input, passed from the 598 through the MHR Smart Link. I was pretty much stuck with the impression that Dolby Digital/DTS decoding was far more similar than different. While this was true with stock algorithms provided with DSPs, it definitely wasn't so in the case of the 568.2. Here, once again, Meridian hand-codes their Dolby Digital and DTS algorithms to specifications, and the results are better than other solutions that I have had an opportunity to hear.

For a splendid example of the improved Dolby Digital/DTS decoding, I would point to Diana Krall's *Live In Paris* concert DVD. Here, she had lots of pop, sizzle, and sibilance in her vocals, and I was pleasantly surprised that the 568.2 brought down the sibilance into a more acceptable range. It was no longer the sore thumb on an otherwise superb recording. In addition, the tonality of Anthony Wilson's great guitar work was a little more authentic to the hollow-bodied electric guitar he employs.

Trifield

Shortly before penning this review, I had the opportunity to demonstrate the 568.2/598 combination at an area home theatre enthusiasts gathering. One of the discs I brought along as a demonstration was Ray Brown's *Soular Energy*, a new release on Hi-Res Music. This is an analog recording, lovingly sampled to 192 kHz/24-bit and 96 kHz/24-bit for release as a DVD-Audio disc. Because of the available processing power, one is able to apply the Trifield algorithm, even to the MHR Smart Link input.

Everyone was very pleased with the presentation, and we all enjoyed this great recording, presented in a digital high-resolution format. Someone at the gathering asked me to shut off Trifield so that we could listen to just two-channel stereo. Once I did that, the front soundstage collapsed. I think that lasted about 15 seconds before I was requested to turn Trifield back on.

What I heard with Trifield, was a much more realistic portrayal. Even with a pair of stereo loudspeakers tuned to perfection for imaging, the inclusion of Trifield, along with a center channel would be revelatory for those who heard it.

Trifield isn't perfect, although the imperfections aren't with Trifield itself. (Note to readers: that was intended as irony!) Trifield painfully points out the need for an identical front trio of loudspeakers. Even "voice-matched" or "timbre-matched" loudspeakers will only carry you so far. In my main reference system (a.k.a. System A), I have planar speakers for front left and right, with the manufacturer's best center channel option. As good as the center channel is, Trifield points out rather blatantly the sonic inconsistency of my center channel. Neither the timbre nor the apparent image height were quite right with Trifield, though I could certainly live with this for the time being.

Even given the above inconsistencies which were so plainly exposed, I have found that Trifield rendered traditional stereo all but unlistenable. While I have experimented with other methods for enhancing stereo reproduction (Dolby Pro Logic, Dolby Pro Logic II, and DTS Neo:6), none of them created the same level of believable illusion that Trifield delivered.

Ambisonics

I specifically ordered an Ambisonic title, and started by listening to this title in stereo, then Trifield. Certainly, it sounded fine in stereo and substantially better in Trifield. After cycling through all the DSP modes, with a final strike of the DSP button I entered Ambisonic decoding mode. I am trying very hard not to fall into audiophile cliché here. But the fact is, the only other times I've been transported into the acoustic space of a performance (not a facsimile of the space) has been during demonstrations of David Chesky's 6.0 (4.0 plus front left and right height channels), which was put to marvelous effect in demonstrations by both Meridian and Muse Electronics on a few occasions. Ambisonics just sounded right in reproducing the acoustic space in which the program was presented.

Conclusion

There comes a point in time with your system (and your hobby) that you declare this to be as good as you can afford, and the cost to get your system up to the next level becomes unpalatable. The 568.2 is that point for me. I have heard Meridian's flagship 861 surround processor on a number of occasions, and there is no question in my mind that the 861 is a superior processor. But it is also over twice the cost of the 568.2, a component very few can afford.

The 568.2's shortcomings are real…if you have a complex system, you will need to purchase a 562V.2 or 562V.3 to increase the availability of inputs. It is a fully digital processor, and as such any analog inputs are going to be digitized. There is no 5.1 input for multichannel SACD, and MHR Smart Link is a proprietary connection that will one day be superceded by a standardized high-resolution digital audio interface.

When I say that the 568.2 betters the competition, I am referring to just the basics, including CD playback and decoding of Dolby Digital, DTS Digital Surround, and Dolby Pro Logic II. When you add in the superb DSP algorithms such as Trifield and Ambisonics, and then add the MHR Smart Link in for good measure, you have a processor that helps to define state-of-the-art performance in the sub-$10,000 price category.. ∎

Associated Reference Equipment

Multichannel Preamplifier: EMM Labs Switchman MKII
Power Amplifiers: CINEPRO 3K6 Series III, Krell KAV-2250/Theater Amplifier Standard
Loudpeakers: Soundline Audio SL-2/SL-3/SL-6
Subwoofer: SV Subwoofers CS Ultra
DVD-Audio/Video Source: Kenwood DV-5700
SACD Source: Sony SCD-CE775
DVD-Video/CD Source: Krell DVD Standard
Satellite Receiver: EchoStar Model 6000 HDTV w/8VSB And 8PSK Modules
Interconnects (Analog And Digital): BetterCables.com Silver Serpents
Loudspeaker Cables: Analysis Plus Oval-9
Power Conditioning: Balanced Power Technologies BP-2/Ultra
Power Supply: PS Audio Power Plant 300

Meridian Audio 568.2MM Preamplifier/Surround Processor

Audio Inputs: 2 Analog Stereo, 6 Digital (4 Coaxial, TOSLink, HD-15 For MHR Smart Link™)
Audio Outputs: 7.1 Single-Ended (RCA), Left/Center/Right Balanced (XLR), Digital Record Loop, Digital MHR (4) For Meridian DSP Loudspeakers
Video Inputs: Composite, S-video
Video Outputs: Composite, S-video (Both With On-Screen Display)
Other Inputs/Outputs: Meridian Comms (2), RS-232 For Control, Programming, And Software Upgrades
Decoding And Processing Modes: Direct, Music, Trifield, Ambisonics, Super Stereo, Music Logic, Dolby® Pro Logic®, THX®, THX Surround EX™, Mono, Discrete, TV Logic, Dolby Digital, Dolby Digital THX, DTS®, DTS THX, DTS Music, MPEG, MPEG THX, MPEG Music, Dolby Pro Logic II Music, Dolby Pro Logic II Movie, Dolby Pro Logic II THX, Cinema
Digital Signal Processors: 5 Motorola® Symphony® 56367 At 24-Bit/150 MIPS
Audio Digital-To-Analog Converters: 4 Analog Devices® AD1852 At 192 kHz/24-Bit
Dimensions (WHD Inches): 12.7 x 3.5 x 13.1
Weight (In Pounds): 11
Price: 568.2MM, $7,745 (With MHR Smart Link); 568.2, $6,995 (Without MHR Smart Link)

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