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# NAGRA*news*

INFORMATION JOURNAL FOR SOUND INDUSTRY PROFESSIONALS AND AUDIOPHILES

## Recording live, recording life!

Ten fascinating Nagra users' stories



**Nagra MSA**  
New Solid-State amplifier

FPGA and VHDL - digital technology at Nagra

## ENDLESS RENEWAL OF A LEGEND

The product range of Nagra audio consists primarily of recorders for many varying professional recording situations and HiFi models for the discerning Audiophile. All the models present exceptional acoustic characteristics, and benefit from meticulous precision and state-of-the-art manufacturing techniques, married with the dedication and perfection of hand-assembly. This perpetuates the decades-old Nagra tradition around the world.

by  
G rard Beuchat,  
Vice-President  
Managing Director



The latest generation of Nagra products fulfil this tradition of excellence, while integrating the most modern multi-media communication possibilities. They are developed to fit into an audio/visual production chain centred around computer-based editing.

Nagra recorders are tools positioned to fulfil the rigours of specific location recording situations with the highest possible sonic performance. The current range covers requirements in media, cinema, classical music recording and security applications.

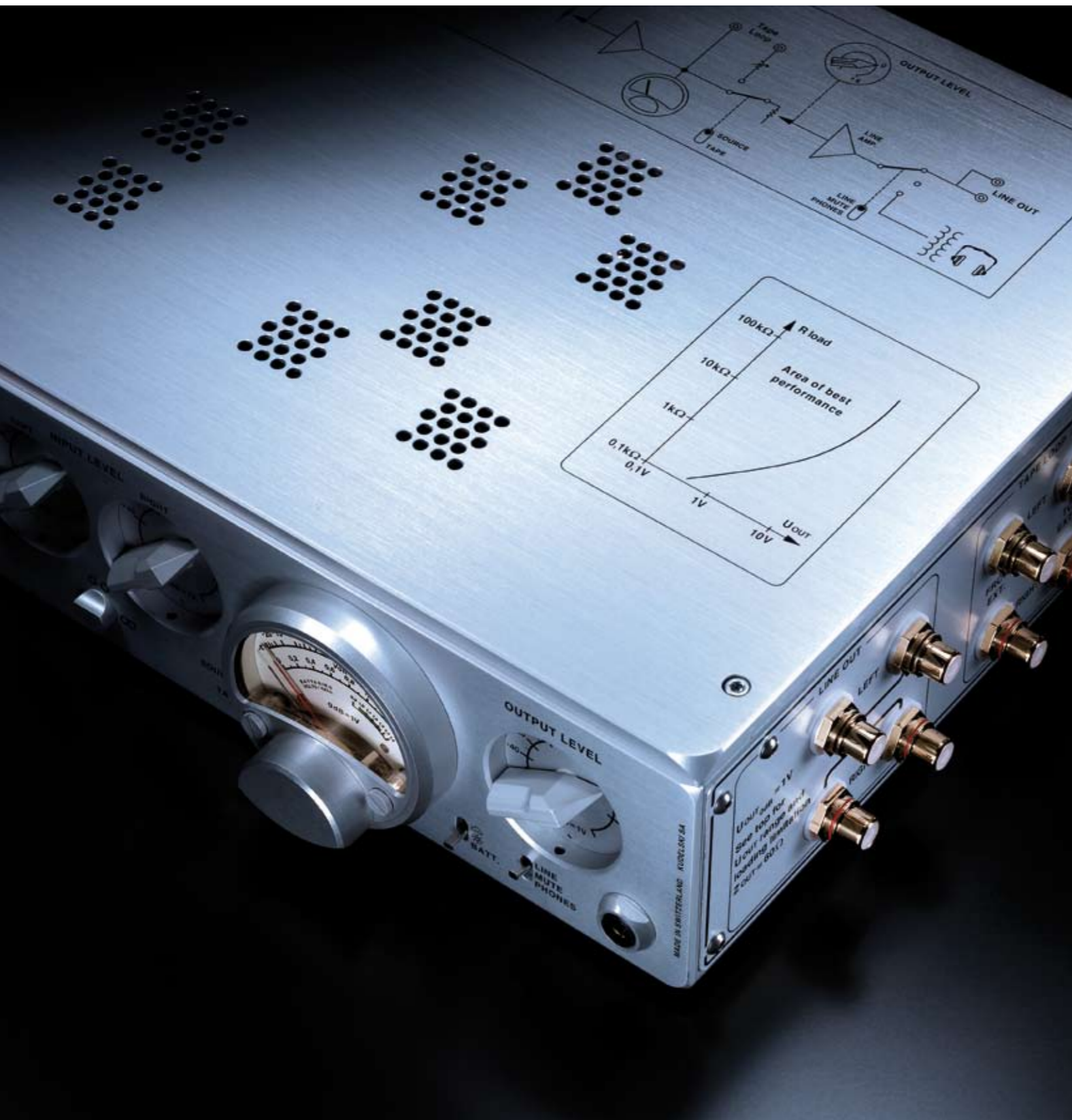
Since 1995, Nagra Audio has expanded its operations into the high-end Hi-Fi market destined to private individuals. This diversification has been a very positive move and represents about one third of the revenue.

The range of products in this sector is growing annually. The catalogue contains all the key elements for an individual to create a very high-quality installation. We have both solid-state and valve electronics, the latter drawing growing enthusiasm over the last 10 years. Far from nostalgia, the Nagra tube engineering brings tube-based equipment to the forefront of modern design, offering musical performances with a new degree of purity.

Those best placed to comment on what we do are, without doubt, the end-users. Highly qualified professionals and passionate amateurs have sent us stories of their experiences rich with interesting details. We are very thankful to them for their time and explanations of the use of our equipment under such diverse environmental situations.

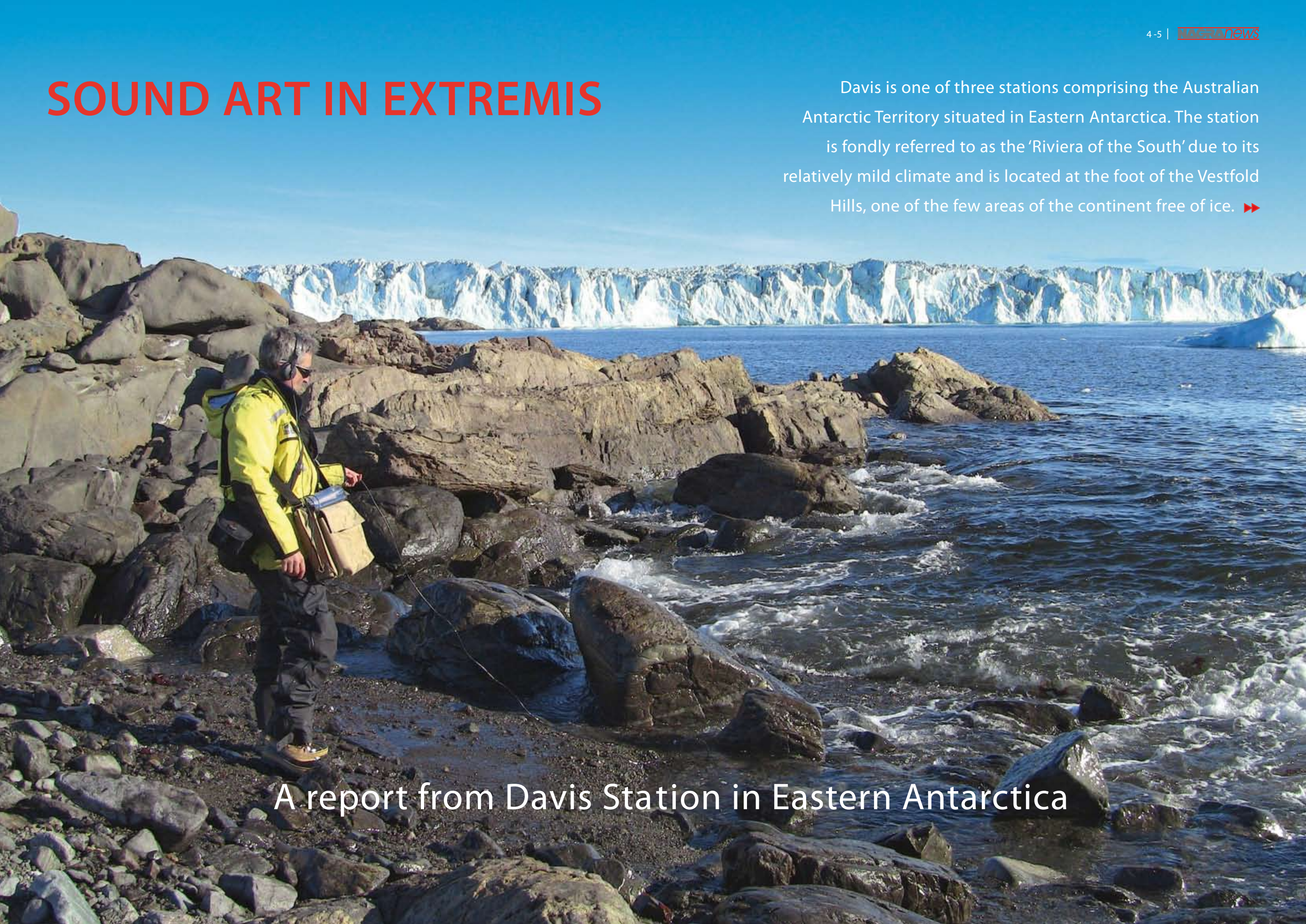
We have assembled some of their articles throughout this edition of NagraNews. For us, each one of them is a vibrant encouragement to continue our perpetual quest for audio excellence.

Happy reading! ■



# SOUND ART IN EXTREMIS

Davis is one of three stations comprising the Australian Antarctic Territory situated in Eastern Antarctica. The station is fondly referred to as the 'Riviera of the South' due to its relatively mild climate and is located at the foot of the Vestfold Hills, one of the few areas of the continent free of ice. ▶▶

A person wearing a bright yellow jacket and dark pants stands on a rocky, dark-colored shore. They are looking towards the right, where the ocean waves are crashing against the rocks. In the background, a massive, white ice cliff stretches across the horizon under a clear blue sky. The scene is set in a coastal area of Antarctica.

A report from Davis Station in Eastern Antarctica

## SOUND ART IN EXTREMIS

By  
Philip Samartzis,  
Sound recording  
engineer



**Davis Station is the base for scientific research centered on atmospheric and space physics, biodiversity, geophysics and hydrography, and is home to up to 80 summer expeditioners between November and March, and 25 winter expeditioners during the remainder of the year.**

**Aside from scientific research, a large number of building and restoration works are currently underway to improve the services and amenities of the station in order to support the growing demand being placed on its facilities.**

▶ I was recently awarded an Australian Antarctic Division Arts Fellowship to undertake a series of sound recordings that document the Australian Antarctic program. The sound recordings will be used for a series of new works for installation, performance and publication that reflect the environmental, philosophical and poetic dimension of Australia's incursion into Antarctica and its subsequent effects upon the human condition. The project has several distinct phases that commenced with the documentation of the icebreaker Aurora Australis traveling between Hobart and Davis Station across the Southern Ocean where it encountered torrid seas and pack ice over its 12-day journey. The second phase, which I am currently undertaking, is at Davis where I am located for six-weeks capturing life in and around the station including the variable conditions that shape the natural and built environment. The final phase of the project is the return journey to Hobart via Macquarie Island where the Aurora Australis will be stationed for ten days in order to re-supply the station for the winter.

### WITH A NAGRA VI AND ARES BB+

To achieve the best possible outcome in extreme and volatile conditions, I chose to use a Nagra VI and Ares BB+, both of which have handled the grueling Antarctic climate with ease. The Nagra VI has provided great flexibility with its multi-channel functionality enabling me to experiment with multiple microphone set-ups to capture various perspectives of life on the ice. Recently I traveled to the Larsemann Hills located some 100 kilometers from Davis to undertake recordings of sea ice where I combined two B&K 4006 omni-directional microphones and a DPA 8010 hydrophone to great effect. Due to its size and weight

I tend to use the BB+ when working in particularly difficult terrain, as I am required to carry a full survival kit when off station in addition to my recording equipment, restricting what I can carry. Oftentimes I employ both recorders in the field when I know a change in the conditions is imminent to maximize a recording opportunity. I did this only recently whilst recording Adelie Penguins at Crooked Lake Rookery in the Vestfold Hills. I was dropped near the rookery by helicopter and was given only 90 minutes at the location. I set-up both recorders quite a distance from one another and managed to double the amount of recorded material.

### KATABATIC CONDITIONS

Both units have proven to be robust and resilient in conditions where temperatures currently hover between -10° and -20° Celsius, exacerbated by katabatic winds from the Antarctic Plateau that regularly gust between 30 and 50 knots. The recorders are going to have to endure further hardship as we gradually move towards the big freeze that is winter but I am confident that both will continue to be impervious to the extremities of Antarctica. Whether I endure the rigors of the ice over the coming months equally as well is another matter. ■

The author would like to acknowledge the Australian Antarctic Division and the Australia Council for the Arts for their generous support and encouragement.

Temperatures currently hover between -10° and -20° Celsius, exacerbated by katabatic winds

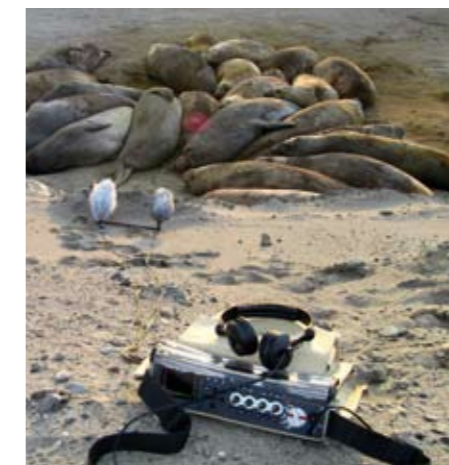


Recording sea ice at the Larsemann Hills

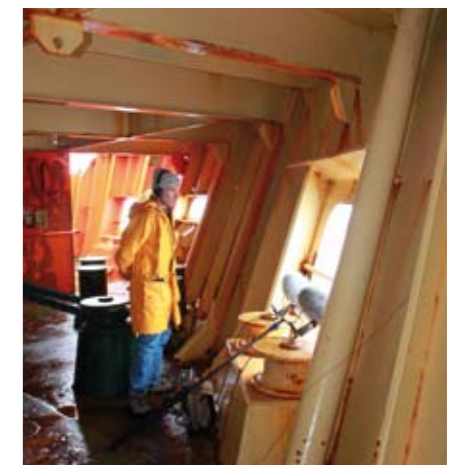
Sound recordist in action



Recording elephant seals with the Nagra VI



Good morning Captain!



# THROUGH THE VATICAN

## with a Nagra VI

For the last three weeks I have been working with my Nagra VI in the Vatican on the shooting of "The servants of God", a 90 minute a high quality documentary about the lives of Vatican staff members.

by  
Frank Schreiner,  
Sound recording  
engineer

The film was commissioned by the ARD (first German broadcaster) and reports on how the Vatican staff members consider themselves, through their duty, as servants of God. The protagonists are, amongst others, the Vatican's security chief, a journalist at radio Vatican, an altar server, the Pope's photographer, the head of the Vatican's museums and several bishops and cardinals.

To meet the high expectations of the pictures, an HD Cam was used for the filming; for special shots high-tech equipment, such as a flying camera in the Sistine Chapel and a giant camera dolly (often Steadicam), was indispensable. This kind of equipment is not usually employed in such projects and therefore, demonstrates the high requirements. Naturally, the sound needs to match the picture quality. The sound recording strategy is very complex and the Nagra VI was just the right recording tool to attain the optimum results required by the project.

From time-to-time simultaneous translation is essential. The translation is sent to the producer and the cameraman and is recorded on both the camera and the Nagra VI. A boom, two wireless microphones as well as a two way radio link for interpretation are all in use at the same time. The complex connections work as follows, on the inputs of the Nagra VI:

- Track 1: The boom microphone
- Track 2: Wireless microphone # 1
- Track 3: Wireless microphone # 2
- Track 4: Simultaneous translation
- Track 5-6: The mix

The fast and easy steps for the set up of the inputs, as well as for the tuning of the built-in mixing console, are delightfully obvious and simple to use. On the outputs of the Nagra VI:

- Channel 5: down mix is transmitted wireless to channel 1 of the camera
- Channel 6: down mix is transmitted wireless to the interpreter the translation is transmitted wireless back to the Nagra VI input channel 4 as well as back to the camera input channel 2.

I admit the installation is a little complex. At first, I even feared I might not have an appropriate overview of my work. However, thanks to the easy to handle matrix decoder, I can easily verify any sound source at any given time. To me, the manufacturing of a matrix decoder with proper switches instead of a software version is very satisfactory. A quick glance is sufficient, and if I can't have that look at that very moment, a simple touch of the switches tells me which track I am listening to.

This was the first set-up for this method of work which, logically, and in my own wording, I named and stored as "set up 1" on the templates.

The second working method had to fulfill the following parameters: a stereo recording of a band while nearby, at the same time, the work of the Pope's security chief is documented with a second camera. This too is easy to execute with the Nagra VI:

- Track 1: Wireless
- Tracks 3-4: Stereo microphones (pointing out how easy it is to route inputs 3-4 to a fader in the pot.assignment menu).

Again, the set-up has to be named individually and stored in a template. Obviously, I have more set-ups which,

like the two mentioned, I use in turn: to describe all of them would go too far. Nevertheless, while it is important to mention that every set-up can be named as desired in the template storage, I have to mention one criticism. When, according to work load, it is necessary to constantly switch from one set up to another, I sometimes don't know which template is active. With the next software update, I therefore wish these implementations: whether by press button, by simple wording or by scrolling, the active template must be readable on the display.

I'd like to mention an improvement from the last software which I very much appreciate. The possibility to store the re-edited metadata in a report is immensely

helpful for post-production. What's the use of delivering good material when nobody can find it? To enter the metadata I use a very practical small keyboard, it allows me to quickly type all the needed information. The only flaw for a German speaker is the absence of the "umlaut", it is bothering to always be forced to type the double vowels instead of a single one with two dots, with this writing I also lose one type space. The next update will hopefully come my way.

There are many other first-rate properties of the Nagra VI that ought to be mentioned, although the article would go on forever and I don't want to tire everyone.

The last item I really have to bring up is the ability to work through a 12 hour

working day without a change of battery. It's just fantastic! ... and by the way, with that one and only battery I also feed three DX 2020 audio receivers and two TX 2020 audio transmitters.

Of sheer enthusiasm I almost forgot, working with the Nagra VI is so easy and relaxed that while working in the Vatican's museums, I still had plenty of time to enjoy and admire all the master pieces of Rafael, Michelangelo and many other artistes. One is almost bathing in art. ■

From the Vatican 22.01.2010  
Translated from German

The author recording in the Vatican



The Norwegian Film School is a prestigious institution in the Scandinavian film and broadcast world, located in Lillehammer, a city famous for hosting the 1994 winter Olympics. The sound education lasts three years and only accepts six new students every second year.

by  
Norwegian Film  
School

There were no doubts in their minds as to which machines were first priority when prior to the 09/10 semester, the Film School wanted to invest in three new portable multi-track digital recorders. Support from Lydrommet, Nagra's Norwegian agent, and a prominent company in the Norwegian sound industry was also instrumental in the Film School's choice of recorders. Professor of Sound, Jan Lindvik, who is the head teacher of sound education, explains:

"We went for Nagra VI first and foremost because we were after reliable machines. Obviously the students are not the finished article yet, and therefore we need machines that can handle a bit of rough treatment. Another important factor regarding reliability is the Norwegian winter, with cold winds and snow coming from all angles, and reliability is the epitome of the Nagra brand.

Another very important factor, albeit obvious, is the sound quality. In the film world, Nagra Kudelski has always been synonymous with quality, from the Nagra III of the 60's to the Nagra IV-S of the 90's. Speaking as an ex-sound engineer, I am thrilled that Nagra with its model VI wants to re-establish itself as the leading brand in location recording. The pre-amplifiers in the Nagra VI are amongst the best in the world, with signal-to-noise-ratio at 114 dB. Many would consider this to be overkill, but I believe that this is the most important part of the recording chain. And it is here that Nagra is head and shoulders above the competition.

Last but not least, it was important to us that the machines were user friendly, in other words that the menus were easy to navigate through and that all the switches and buttons were easily accessible. We can say for a fact that the Nagra VI satisfies this demand! I also find it really cool that the good old "Nagra wheel" (Main function selector) is back. With all this in mind, we are really looking forward to start using our Nagra VI's this fall!"

# BACK TO SCHOOL!

## Three Nagra VI at the Norwegian Film School



## CLAUDIO RECORDS

# A true “Eureka moment” testing Nagra LB digital recorders at Wigmore Hall



Having made the decision in the early eighties to found my classical music business on the excellent Nagra IV-S (a decision I never regretted incidentally), I was immediately placed in another league and able to compete instantly with ‘the best’. Pure analogue at its pinnacle!

by  
Colin Atwell,  
Classical recording  
engineer

In those days there was a standard test we would carry out which involved listening to the artist on the stage of the Wigmore Hall for example, performing in front of our stereo pair and immediately walking into the green room to listen to the resultant sound coming directly through the monitors without any recording equipment in line. Inserting the IV-S had its inevitable though small losses but importantly still kept it “natural”.

### THEN CAME DIGITAL TECHNOLOGY

Then, Japanese Digital technology came along, offering all the advantages of non-destructive editing, lossless copying, larger dynamic range and no H.F. compression. Inevitably, “the baby went out with the bath water” as the DDD CD arrived. Had we lost the natural sound of analogue forever? Some accepted this fact as the inevitable cost of progress, whilst others remained dissatisfied.

With the advent of High Resolution Audio (192 kHz/24bit PCM), which seems to me to be a step in the right direction (no more filling in all those ‘guessed’ co-ordinates producing a ‘Picasso’ like digital 44.1/16bit sine wave), I started to experiment, firstly, with my ProTools 192 system, then with a Tascam 192 DVD Recorder. The results were impressive.

### NAGRA LB UNDER TEST

In December 2008 a new 1st edition Nagra LB, (from a reliable Swiss company) presented itself in my studio, from that “Gentleman” of the audio industry John Ruddling of Nagra UK. John Owens was also more than generous to allow me to put two LB’s through their paces for almost a year and during that period, they have been subjected to many extremely rigorous tests both in the studio and on location during long sessions, yielding only the sort of results one would expect from a company like Kudelski.

During this period, I was able to carry out my favourite standard test at the Wigmore. Using our custom Claudio microphone pre-amps (CMA-1XE) and inserting the Nagra LB made NO audible difference! Nor did recording and comparing the playback! I walked between the stage and the green room several times and to my astonishment it felt as though I was still standing in front of the artist. A true eureka moment! The realism was there, with all the fine nuances of the Wigmore ambience precisely reproduced and the sheer way that the music was able to breathe again totally convinced me that I was back on the right track at last. After this revelation, how could I ever use any other equipment again? As a matter of interest, this effect was lost at other sample rates including 96kHz/24bit and with DSD (used for Super Audio Disc).

### NAGRA LB UNDER TEST

Admittedly, the ProTools system still had a slight edge over the Nagra LB but comparing the large cost difference and the incredible portability and reliability of the new LB my choice was made simple. My artists/clients too, were impressed with the amazingly natural sound from this system, so much so that orders have increased now that I am using the LB’s full time, surely an essential ingredient in today’s competitive climate. But now comes the real challenge. Given that for the first time in my experience, we are able to ‘capture’ sound as it really is and in all its magnificence, how to relay this to the wider audience of music lovers and audiophiles? Well, the answers simple! DVD-A!!!

Good DVD-Audio player’s with high quality Digital to Analogue Converter’s (DAC) working at 192kHz/24bits are currently available and are relatively affordable, especially, if you are serious about sound! It’s all a question of marketing!

Running at 192kHz/24bit places heavy demands on the equipment with data transfer rates and accuracy of data integrity being paramount, whilst consuming Giga Bytes of CF memory. With the LB, file transfer is quick, easy and consistent. If you are worried about running out of storage space the LB works seamlessly with a G-RAID 500GB external HDD via the USB2 port.

### THE BEST OF ANALOGUE AND DIGITAL SOUND

To summarise, I found the NAGRA LB to be robust, reliable and designed for the professional without being ‘over’ complicated, with real switches, a sensible meter display and usable i/p, o/p levels and quality connectors. In short, a natural successor to the Nagra IV-S, combining the best of analogue and digital sound in one small box!

The excellent performance of the LB together with a set of hybrid (Ansmann NiMh 1.2v AA MaxE 2500mA) batteries, lasting up to about 8 hours and a SanDisk (Extreme Pro 64Gb/90mb/s) CF card, with a continuous recording time at 192kHz of nearly 16 hours, all adds up for me, to make the new Nagra LB an unbeatably fantastic product and a sound investment! ■

© 2010 Colin Atwell (www.claudiorecords.com)



# LIGHTNESS, DISCRETION, EASE OF USE, VERS ATILITY

## Everything a reporter needs in-the-field



At the Assemblée Nationale in Paris, France

by  
Guillaume Garvanèse,  
journalist

With web-casting, I have discovered a marvellous creative area. The possibility to offer internet users a unique audio-visual experience. I never thought that I would have the need for a professional audio equipment – which was a mistake.

To be able to throw the internet users into the universe that I created, it was important for me to offer them a sound as “rich” as possible. Internet data transfer speed is increasing all the time, and it is no longer a dream to imagine high quality audio files. Therefore, I needed a light and versatile audio equipment with an excellent sound quality. With the Nagra LB, I found the familiar comfort of the ARES-C in the package of the ARES-BB+.

### IN-THE-FIELD

I am used to producing sound and pictures. It's why the modest size of my equipment bag is essential: Nagra LB, LEM microphones (mono) and AT8022 (stereo) and Sony PX200 headphones. This small volume is extremely convenient as I add my camera and lenses to this. My back is very thankful, especially because such a job often takes half a day or more!



My first experience with the Nagra LB and a camera was at a demonstration in Paris. I had to slide into a dense crowd, interview people and take pictures. I spent more than three hours walking without noticing the weight of my new equipment.

While recording, the large colour screen of the LB is a great advantage. I can watch and adjust the levels very quickly, and at the same time I can also focus on my interviewee. I particularly appreciate this display clarity because the technical aspects have to be forgotten during the recording: only the interviewee is important at that moment. Barely a second is needed to verify the recording settings of the LB, as well as the duration of the recording and the remaining time available on the memory card.

As I switch from the LEM microphone to the AT8022 microphone for ambience tracks, I have two different set-up's saved in the templates which can be recalled in an instant, and hence change the entire configuration of the LB in a flash.

I don't like looking like a reporter while I'm working. A lot of technical equipment can intimidate certain people or create hostile reactions. In my opinion it can interfere with the relationship with the interviewees.

### DISCRETION

I don't like looking like a reporter while I'm working. A lot of technical equipment can intimidate certain people or create hostile reactions. In my opinion it can interfere with the relationship with the interviewees. In its bag, the LB seems to be a small shoulder bag and remains unnoticed most of the time. Once, I was working in an helcare center for deprived people. Everybody knew who I was but the discretion of the equipment really helped the personal contact.

### SOUND MANAGEMENT

With the folder management function I am able to sort the files on-the-run: a folder for “Interviews” and another for “Ambiances” etc. The possibility to place markers during the recordings, saves an immense amount of time with the rushes.

During a job, I spend a lot of time listening to the previous recordings. To do this I use the internal audio editor to assemble the tracks. I make a quick listen, add additional markers and then cut the parts that I wish to isolate. When the subject is a simple interview and time is limited, I do the editing directly on the Nagra.

Once I have finished, I empty the memory card into my PC and then make a back-up of the rushes on an external hard disk. The editing can now begin. Starting from the original 16 bit 48 kHz files the material is compressed to MP3 at a bit rate

of 192 kbits/s. I make the most of the excellent pre-amplifier quality and warm sound to render the highest quality end-product despite the compression.

### THE ARES-ML

On top of the Nagra LB I use an ARES-ML on a daily basis. Ultra-portable with an excellent audio quality, I use it to catch some day-to-day sounds or even to conduct interviews on the fly when I do not have the LB with me.

The ARES-ML once allowed me to make a recording which would not have been possible otherwise. One evening, we were following Afghan immigrants through the red-light area of Paris. Surely appearing like private investigators, one of the subjects suddenly became very aggressive towards our photographer, to such an extent it prevented him from working. On my side, I was able to continue recording; the ARES-ML didn't seem to bother them, and I was able to keep all the sound. On that particular day, even the LB wouldn't have been discreet enough to calm their worries. ■

Nagra LB: also an ideal equipment to capture nature sounds





## New Nagra MSA stereo amplifier

### Power is nothing without refinement!



A new Nagra is not a regular event. It is the fruit of great reflexion, the result of hard work, precision tests, as the Swiss firm pushes product design to the limits. Thus the arrival of the MSA must be respected as it deserves. To fit so much electronics into such a compact chassis while guaranteeing perfect operational reliability, even in extreme situations is a challenge that Nagra embraces. ▶▶

## NEW NAGRA MSA STEREO AMPLIFIER

by  
Serge Desrochers,  
Nagra consultant



“The new Nagra is a degustation of an infinite variety of sound. Rarely has the audio restitution of an amplifier been so subtle, and so separated from the electronics. If the realism of this unit is so easily managed, it is primarily because the MSA has such an exceptional harmonic wealth. The frequency response is defined with a superior spectral equilibrium. Not a single sound component is out of place. The bass is deep, well structured and exempt of weight. It rolls without being constrained. The mid-range is remarkably natural. Nothing is added, yet presents an unquestionable presence. It achieves the combination of the virtues of purity and density perfectly. It wants to get to the point while incorporating highest possible audible detail. The treble is fresh with astonishing sobriety.

The MSA is part of their timeless creations that we call classics. It reaches this class while still in infancy. We salute its profoundly elegant and homogeneous musicality, its remarkable compactness, and its polyvalence that will appeal as much to audiophiles as to professionals.”

Laurent Thorin, *Haute Fidélité* magazine

►► The Nagra MSA stereo amplifier is the result of a two-fold development objective: to devise an electronic design capable of gracefully dealing with the vast majority of speaker systems on the market, including those that are known to be difficult to drive, and to fit it into a harmonious casing expressing the traditional design lineage of previous Nagra equipment.

The MSA displays 60 Watt RMS power per channel at 8 ohms. The two channels can be parallel-bridged to reach 120 Watt RMS at 4 Ohms, in mono mode: in this configuration, the output current capacity is also doubled. Such a power range is considered by Nagra engineers to be perfectly adequate to meet the requirements of most of today's speakers, which, although much more efficient than in the past (sensitivities nowadays easily reach 92 to 95 dB), in reality reach their physical and acoustic limits way before the 60 Watt boundary.

By tackling power issues in a rational way, Nagra has been able to avoid any unnecessary complexity in its amplifier circuits, which is always a good course to take when seeking maximum transparency in sound transmission. In electronics, if you want more power, you have to pay the price for it: in particular, output stages must host multiple transistors, a situation which causes unavoidable difficulties in terms of component matching, stability, energy supply, heat emission and premature ageing.

### STABLE PERFORMANCES IN ALL SITUATIONS

Speakers are more and more efficient in terms of output; however, they remain complex loads to control, often with very irregular impedance curves. Amplifiers

must then deal with sudden impedance variations of great magnitude, especially in the lower frequency ranges, and this can affect the stability of the circuits.

To guarantee an unwavering handling of the sound signal under all circumstances, the power supply must be able to instantly react to an abrupt increase of the electrical current demand and still maintain stable voltage levels perfectly. To this effect, Nagra engineers have developed an advanced solution consisting of a power supply that incorporates an active power correction system, known as PFC – Power Factor Correction. This technology benefits from the vast experience of Nagra engineers, who are constantly adapting it to the evolution and the requirements of the audio world.

The MSA project development also focused on a judicious balancing of the different stages: power supply, input driving and power circuits.

At Nagra, the engineering success of an amplifier is measured by the overall balance of the circuits within it, which determine, more than the criterion of sheer power itself, an outstanding behaviour and excellent sound performances.

### AN EVOLUTION OF THE NAGRA MPA AND PSA AMPLIFIERS

A new piece of Nagra equipment is rarely designed from scratch. The developments that were undertaken for generations of previous achievements often represent priceless pillars upon which new evolutions and the latest improvements are based.

The Nagra MSA can thus be considered as an evolution of the MPA amplifiers, and more recently of the PSA and PMA pyra-

midal amplifiers. The global topology of the circuits is mostly the same, with some in-depth improvements affecting several specific aspects.

The circuits for example were completely redrafted. New components were affected to parts where they could bring better performance. The MSA includes a mother board fixed to the bottom of the large heat sink, as well as six other secondary circuits: the input, control, power filtering, drivers, the PFC power factor correction (one board per channel) and the output connectivity circuits.

All circuits have gold-plated print on epoxy resin boards and are the result of advanced developments aimed at improving the ground planes, as well as fine-tuning the component lay-out, in order to prevent ground loops and interference radiation. For the same reasons, the number of wired connections is reduced to the strict minimum. Supply and power transistors that need to be cooled are mounted upside-down on the mother board, which allows them to be directly fixed to the heat sink.

The mains transformer is located above the mother board on a thick metal plate that acts as both a support and as an electronic shielding.

### ADVANCED POWER SUPPLY

With a PFC-driven power supply, the electrical current is always kept in phase with the voltage, in a perfect sinusoidal curve, with no interfering peaks and no distortion. From the networks' perspec-

tive, this type of power supply is seen as a pure resistance and it avoids polluting it: in a way it behaves as if there was electrical decoupling with the network. Another obvious advantage is the cleanliness of the current that is propagated downstream to other circuits.

By precisely superimposing current and voltage, the PFC power supply generates little losses. It guarantees a very efficient energy transfer and doesn't collapse when the load increases: it is therefore capable of reacting extremely rapidly to stress situations, even paroxysmal ones,



as is required by power output stages in an amplifier.

The Nagra MSA PFC power supply is built in ways that distinguish it fundamentally from other more conventional switching mode power supplies. In particular, it has no flyback transformer and no snubber circuit, which can lead to hot-spots on the printed circuit board. Instead, it is fitted with a sizeable 200 VA toroidal transformer that reduces the voltage

level to suit the power stage ( $\pm 35$  V), and from which all other voltages are derived. This transformer runs at the power grids' frequency, and therefore avoids generating any residual HF noise.

The filtering section of the power supply, which takes up a good portion of the mother board's space, was also very carefully devised. The quality of the final result depends significantly on the calculation accuracy, on the nature and the choice of the components used, as well as on their size. For example, multiple polypropylene capacitors are used, and also generously dimensioned self-inductance coils and two sturdy 84'000  $\mu$ F electrolytic capacitors in the power supply output stage.

### AMPLIFICATION CIRCUIT

The topology of the amplification section is unique: the driver stage is organised in what is known as a double current transfer configuration, which gives the power stage a considerable tolerance to residual ripples coming from the power supplies. It relies on a pair of AB-biased MOSFET type transistors assembled on each channel in a push-pull common source arrangement (output on the drains).

These components, chosen for their excellent audio characteristics, are very carefully hand-selected. The result is so precise that the circuit requires only very little negative feedback. It allows the MSA to perform smoothly under all circumstances, with no sign of instability, even when it is running in bridged mode, with very low impedance loads. Above all, it is a true Nagra electronic ambassador, by virtue of its transparency and its integrity. ■

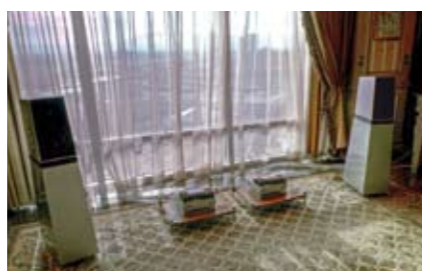
## NAGRA MSA ON WORLD TOUR

### A promising start to its career

The new Nagra MSA power amplifier encountered tremendous success at the shows where it was presented around the world. The unit was used in both Mono-block and Stereo situations, in rooms of varying sizes and driving a selection of loudspeakers.

Nagra Hi-Fi

In all the configurations, the Nagra MSA seduced visitors with its transparency, definition and musicality. The amplifier is starting its career under a good omen and integrates itself into the Nagra HiFi range as a classic.



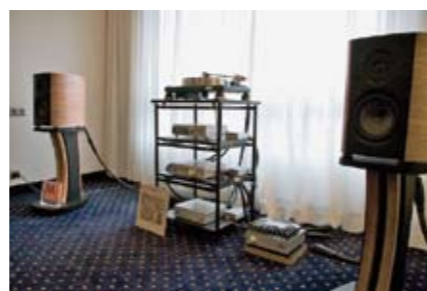
LAS VEGAS, USA, CES2010, Mirage Hotel – set with Verity Amadis speakers



MONTREUX, Switzerland, Montreux Palace – set with Verity Rienzi speakers



REGENDS DORF, Switzerland, Swiss High End Show – set with Wave Control Cheetah speakers



BRUXELLES, Belgium, Marriott Hotel – set with Magico Mini speakers



ATHENS, Greece, Imperial Hotel – set with Verity Lohengrin II speakers



TOKYO, Japan, Tokyo Forum – set with Avalon Aspect speakers



PARIS, France, Salon Haute Fidélité – set with Verity Lohengrin II speakers



MADRID, Spain, Mauro Hotel – set with Pipedreams Model 15 speakers

## NAGRA 300i

### Soon on the market

Nagra Hi-Fi

For a manufacturer of high quality electronics, even one as experienced as Nagra, designing an amplifier around the 300B triode is a particularly difficult task. A challenge because the 300B is probably the most popular power tube in the world, and it is not as transparent as it may seem. Yet the transparency and neutrality are fundamental criteria of all Nagra equipment since the very first recorder was developed.

Nagra thus found it a particularly interesting challenge, to take its turn to contribute to the 300B myth, by developing an out-of-the-ordinary amplifier in every respect, using an authentic Nagra electronic design. The development team, that work on all Nagra products – recorders and HiFi, designed an original topology for this amplifier by driving the 300B with MOSFET transistors.

Backed by experience in amplification from the VPA tube amplifiers, Nagra took great care with the output transformers, which are hand-wound in-house in Switzerland. The 300i develops 20 Watts RMS per channel into 8Ω.

The 300i is an integrated amplifier with its own pre-amplification stage, and is derived from the 300p power block version. Both amplifiers develop 2 x 20 Watts output power. For the first time since their introduction to the HiFi market, in homage to the 300B, Nagra has named these new amplifiers after the tube rather than a three letter acronym they traditionally use.

During the CES in Las Vegas, the 300i was presented and demonstrated to the press. The echoes were very encouraging, not only for the audio quality but also for the mechanical design itself. Expectations are high both at Nagra and from 300B fans.

The 300i will be launched at the end of 2010 and the beginning of 2011. The Nagra 300p will follow soon after. ■



The future Nagra 300i amplifier is a compact chassis in harmony with the Nagra pre-amplifiers and CD-players

### 4 new distributors for NAGRA Hi-Fi

2009 was noted for several changes in our distribution chain and the arrival of Nagra in some new countries previously not covered. Welcome to the new distributors, who, through their product enthusiasm and loyalty to our company, allow numerous enthusiasts to discover our creations.

#### France

APHRODITE'S MELODY  
Costa Kekemenis  
direct: 06 03 00 21 24  
info@aphroditemesmelody.com  
www.aphroditemesmelody.com

#### Serbia, Montenegro, Bosnia & Herzegovina

BM  
Vojvode Milenka 9  
11000 Belgrade  
tel: +381 1136 18000  
fax: +381 1136 18218  
office@bm.rs  
www.bm.rs

#### Singapore, Malaysia

AVP Soundcraft  
444A Race Course Road  
Singapore 218688  
tel: +65 6298 7833  
tel: +65 6298 7833  
fax: +65 6294 5916  
avpsoundcraft@yahoo.com.sg

#### South Korea

Audio Gallery  
Samsun-dong 4ka-364-2  
Sungbook-ku  
Seoul  
tel: +82 2 764 6468  
fax: +82 2 927 5083  
galleryas@yahoo.co.kr  
www.audiogallery.co.kr

# ROLL SOUND! ACTION!

## Third feature-film on my NAGRA VI

On the film set, the first class quality of the NAGRA VI is without doubt, in my opinion, its ability to be forgotten!

The Nagra VI is an important partner that knows how to hide technicalities

Castel Mare del Golfo, Sicily, Italy



by  
François Maurel,  
Location recording  
engineer

### CAVIAR FOR THE EARS

On the film set, the first class quality of the NAGRA VI is without doubt, in my opinion, its ability to be forgotten! I am thinking in particular about the pre-amplifiers and the A/D conversion which I consider unbeatable and beyond all imagination. Concerning the headphone monitoring quality it is quite surprising, "Caviar for your ears"

On the set therefore: Roll Sound! ACTION! It records. Irreproachable reliability, you know it works. It can be learnt in a few minutes. Quick and intuitive, the Nagra VI's interface allows immediate use.

Configuration changes of the machine, depending on the scene, are done in a fraction of a second. In addition, the presence of a large, very readable full colour screen is reassuring. You always know where you are, and what's going on.

The 6 tracks of the Nagra VI are ample. For me, I generally use only two (Boom/



"In the rough" on location

Radio) except for the occasions when the acoustics of a set require a stereo pair, when I use two more tracks. Its long battery life: I was surprised to go for two days without changing the battery pack.

### JOB DONE!

Finally, the other strong-point of the NAGRA VI is evident when the assistant calls for the end of the day – No time lost burning a DVD. It records to its internal disk and CF card and the simple press of a button, the card pops out...into an envelope and bingo – Job done! A simple rotation of cards with the post house and the set is easy to manage.

The Nagra VI on the set is an important partner that knows how to hide technicalities. ■

# HUDSON FAIR AND ATELIER HUDSONIC

## Recognized for excellence in american recording

To this vision of the City of Chicago from the beginning of the last century one needs to add, Music Maker for America. Chicago, the popularizer of Jazz and the Blues, is also the city with a vital classical music scene.

an interview  
with Hudson Fair  
by NagraNews



The producer's latest release is on Harmonia Mundi Records and is called, «Recital at Ravinia.» It is, once again, a lovely program with Lorraine Hunt Lieberson and pianist Peter Serkin. Harmonia Mundi Catalog # HMU 907500. This release incorporates extreme tube modus sound, a Neve console and is recorded on a Nagra V

Led by the Chicago Symphony and Lyric Opera of Chicago, it also includes a robust tradition of choral singing, and it's the place where Ravinia, the oldest summer music festival in the United States, has entertained summer crowds for more than 105 years.

It is in this great music metropolis that Hudson Fair has made his headquarters and plied his craft of classical music recording. Celebrating 30 years in the classical music recording business, Fair has run his recording business as a specialist operation focused on capturing the emotion in the musical performance and conveying it to a wider public. Atelier HudSonic and their small cadre of engineers are the busiest recording professionals in the American Midwest and one of the most active in the US with high profile projects.

### CHORAL MUSIC SPECIALIST

Originally making his reputation as a specialist in making choral music records and in vocal recording, Fair is known for his success with piano recordings and chamber music. Later, spreading his wings, he has been sought after to record large orchestral works for major orchestras. The recipient of a "Gramophone" Magazine award for Excellence in American Recording in 2006, this was followed the next year by a Grammy for the award winning "Rilke Songs" sung by mezzo- soprano Lorraine Hunt Lieber-son with pianist Peter Serkin. (Bridge Records # 9178) Productions from Atelier HudSonic have received numerous

Grammy nominations in the category, "Best Classical Album."

Starting out as Ealing Mobile Recording, Ltd. his company is now called Atelier HudSonic, embracing the 21st. century notion of the cult of the individual. The company has depended on Nagra tape recorders since 1982 and since 1995 on Nagra digital machines for consistently high results and reliability. Says Fair, "being a professional means always being consistent with your results. Our Nagra tape machines have never broken and never let us down. Now with the new Nagra VI, Kudelski has offered professionals the best recorder in the world. The a/d and d/a converters are the best I've ever heard." At his studio and listening room can be found a Nagra T-Audio, Nagra D, Nagra V and the Nagra VI. A Nagra IV-S was used until 1995.

### 275 RECORDINGS PER YEAR

"Starting in the late 1980's, I made 275 recordings per year for 15 years straight. These were a mixture of live recordings, recording sessions and live radio broadcasts. The venues were halls, churches, opera houses, castles and famous European chamber music rooms. This period of concentrated work allowed me and my associates to encounter every different type of recording situation, to face the challenges they posed and solve the challenges and problems right there and then on the spot. Not the least of these challenges was learning to successfully motivate artistes who may be having a bad day. I am always focused on the performance and the music, focused too on the quality and timbre of the sound pick-up. I almost never give a second thought to the equipment." Well that certainly may be true during the recording session itself but Fair goes on to say that he has

carefully considered each part of the signal chain. "I use a hybrid approach which incorporates the best of the old and new. Sometimes this includes tube mics, tube mic pre-amps and analog consoles and other times I choose modern solid state designs and digital consoles. FLEA tube microphones are my current favorites along with old Neumann M50 mics. Modern mic amps like dav electronics Broadhurst Gardens range, Gordon mic amps, Schoeps mics and Nagra digital recorders get me to where I want to be as far as sound is concerned. I already hear the sound I want in my head and I work backwards through the chain of equipment to choose and combine gear which gets me close to what I hear in my mind's ear."

### LISTENING TO LEARN

Fair goes on about what formed his musical taste and the sounds in his ear. "Being in Chicago and being able to hear the glory days of the Chicago Symphony with Georg Solti made a big impression on me as a youth. 20 years after Solti's arrival I worked as the tape op running tape machines for his Decca Records sessions. The bombing brass, the weighty quality of the sound, the huge dynamics offered without apology became a landmark for me. Earlier, all through school, I had listened to thousands of hours of recordings. I tell new student recordists that listening to the best recordings is a requirement for

success. I tell them that they cannot be educated until they listen to 3000 hours of recordings starting with Furtwangler and going through Reiner, Bernstein and Solti. What are the dynamics in these recordings? What are the performance

come highly respected and sought after as the producer and engineer for NAIM records). Even earlier at age 10, he joined a very good church choir that worked on the British Royal School of Church Music system. This participation, joyfully led by



Grant Park Orchestra in the Jay Pritzker Pavillon in Millenium Park in downtown Chicago

Marlan Allen, trained his ear to hear proper choral blend and style. Later, in Chicago, he says that he had the best teachers possible when working in choral music recording. The two most important were the late William Ferris of the William Ferris Chorale and the ever creative and active com-

poser and conductor Richard Proulx, an innovator and legend in American church music.

standards? What is the recording set-up like that achieved the sound? Classic technique achieves classic results!

Starting in high school, Hudson was bitten by the hi-fi bug and has always kept one foot in the camp of high resolution, even before the advent of digital recording and playback. As an employee at Victor's Stereo in Chicago in the 1970's, Fair learned to recognize high quality reproduction from LP's and from analog tape. Fair credits Victor Palulis and Ken Christianson as the people who opened his eyes and ears to the possibility of holographic stereo sound in the 1970's. (Christianson has now gone on to be-

He says his work would not be possible without his valuable association with WFMT Radio, the largest classical music broadcaster in America based in Chicago. There, starting in 1984, Fair was only allowed to record spoken word recordings until he had demonstrated reliability and good humor. Only later in the 1980's did his bosses allow him to work with music groups. WFMT today reigns supreme as the broadcaster with the most syndicated programming, the most live broadcasting and one of the best on-air signals



## PRO MUSICA TESTING THE NAGRA LB Nagra's to live for

►► in the whole country. Today, Fair is a key member of the WFMT production department where he is in charge of live broadcasts from the Ravinia Festival, of the Grant Park Orchestra summer broadcast series and special opera live broadcast events. "Learning from Norman Pellegrini at WFMT was one of the most important parts of my Chicago music career. WFMT has been one of the main pillars of my success in the business." (Pellegrini died in July 2009)

Fair credits his later mentor, Teije Van Geest, the Dutch tonmeister, as the man who launched him on his mission to convey the emotional quality of music in recorded sound. Van Geest, the legendary leader at Tonstudio van Geest outside Heidelberg, invited Fair to work with him beginning in 1988. «Teije took me to the next level that year and each time I worked with him it was like being in a master class at the highest level of recording. My first job with him was in Zagreb, Yugoslavia where we stayed for 3 weeks recording all 9 Beethoven symphonies. We had two sessions per day for 21 days – it was high drama. Van Geest hired me for my first recording at Carnegie Hall and also for a lot of organ recordings. His work with Arvo Part on ECM Records is fantastic and a model of modern choral sound. Teije's usual method is one that honors and encourages the musician to do his or her best. It is his psychology in sessions and his manner and approach that I have learned from and copied."

### GOING STRAIGHT IN TO THE NAGRA VI

Turning again to the Nagra VI, Fair really likes how the machine is designed to evolve through software updates. He describes the ease of updating the machine as "miraculous" and the sound

### CHICAGO

"Hog Butcher for the World,  
Tool Maker, Stacker of Wheat,  
Player with Railroads and the Nation's Freight Handler;  
Stormy, husky, brawling,  
City of the Big Shoulders"

Excerpt from Chicago Poems by Carl Sandburg (1916)



Ravinia control room 10



Grant Park



Stars of Lyric

of the converters as "the top available today." He adds, "we have very fancy outboard a/d and d/a converters here at our place for many years. I used to have to depend on these to encode the

sound for the digital machines. Now I just go straight in to the Nagra VI. The high quality and refinement of the converters and the analog electronics surrounding them is mind blowing. Add to this the ease with which recorded files can be transferred and managed on the Nagra VI and you have what is clearly the most advanced recorder in the world. I am always confident when using this machine and its functions are now second nature to me."

Still active with analog tape and using a Nagra T-Audio, Fair has taught at Northwestern University in Evanston, IL and at DePaul University and Columbia College in Chicago. Research interests include binaural recording work for iTunes headphone listeners and spatial recording and playback using large numbers of loudspeakers to re-create the sonic field. Ambisonic recording and playback is also an area of research.

The producer's latest release is on Harmonia Mundi Records and is called, "Recital at Ravinia." It is, once again, a lovely programme with Lorraine Hunt Lieberson and pianist Peter Serkin. Harmonia Mundi Catalog # HMU 907500. This release incorporates extreme tube modus sound, a Neve console and is recorded on a Nagra V. ■

From the short time I have had the Nagra LB, I can already state that I could release a project and not think twice about its sonic integrity. I would even go so far as to say it is the coolest thing I have ever used to record music with

by  
Ken Christianson,  
Producer and  
recording engineer

First let me state that I have always been an analog guy. I purchased my first Nagra 4S machine in the spring of 1982 and I have never found another tape machine that has bettered it. When I first heard it I was using various modified Studer Revox units, upon hearing it, I knew I had to have one, it simply made the other recorders sound like cassette decks. It was the best investment I have ever made.

Forward to summer of 2008, I had tried



every digital device I could get my hands on, including over the years Nagra machines which were the best, but somehow they all left me cold. Enter the Nagra VI which John Quick allowed me to try and I believe I got one of the first units in production. Now the primary purpose of this for me was to transfer my analog tapes to Hi Res digital not really thinking I would ever make a serious musical recording on it.

Well of course I had to try it out and I made a live recording at the Green Mill here in Chicago, with my good friend and amazing pianist, Laurence Hobgood, and a great quintet. It turned out to be one of the most satisfying recordings I

had ever made there, and I have been doing shows there for years. I have now made and released a good number of beautifully performed classical and Jazz recordings that I am quite proud to put my name on. There are always trades offs in any device and although there are aspects of the sound I may prefer on my 4S, I am generally at a loss to state them. I just feel like I am listening to music and that's it. When I look at the recording and play back chain there are always compromises, the VI is undoubtedly the least of those.

Recently I have had a chance to investigate the new Nagra LB, which its primary purpose is for professional broadcast. It is also a marvel in music applications and, although the sound is not as full bodied in sheer dynamics, it shares the

same sense of musicality and perhaps is even a little more analog sounding. From the short time I have had this unit, I can already state that I could release a project and not think twice about its sonic integrity. I would even go so far as to say it is the coolest thing I have ever used to record music with. I love it and now this analog guy is quite content to record with my new Nagras: for me, digital has finally arrived! ■

Promusicaudio.com  
truestereo.net

PS: For anyone looking to archive any analog sources such as Lp's etc once you use these machines I guarantee they will put a big old fat smile on your face.

## AT THE MONTREUX JAZZ FESTIVAL

### Nagra Official Partner

For a long time, Nagra recorders have been used to record the concerts of the famous MJF in Switzerland. Since 2004, this collaboration has taken a new dimension, with an active participation of Nagra in the "Montreux Jazz On Screen": a program of concert screenings selected from the archives of the Festival

by  
Matthieu Latour,  
Nagra Hi-Fi sales and  
marketing manager

*Montreux  
Jazz Festival*

#### MONTREUX JAZZ ON SCREEN

These high-definition screenings recreate sound conditions close to reality. They are an ideal shop window for Nagra technology and have attracted hundreds of Festival participants. The concept was also used for the Worldwide Festivals, editions of the MJF organized in other cities throughout the world, such as Singapore and Atlanta.

The Montreux Jazz On Screen welcomes fifty or so spectators per showing in the "Salon Rotary" a Roccoco style hall, of the Montreux Palace Hotel. For the event Nagra transforms the room into a high quality cinema, with an elite sound system and HD projector. An acoustic sound management system is installed to reinforce the absorption of the room which requires quite a lot of power. Nagra chose two bridged MPA amplifiers, giving 500 Watts per channel into 8Ω, driving a pair of Verity – Parsifal Ovation loudspeakers.

The acoustic result was exceptional for a sound reinforcement use. At the end of the shows, some of the participants actually went to look behind the screen to check that there weren't any other speakers lurking in the shadows!

#### PIANO CONTEST

The Montreux Jazz Festival is also an opportunity for Nagra to make a few live recordings. Firstly, the Piano Contest, which, after a pre-selection process, unites a dozen or so candidates from around the world. With the aim of promoting tomorrow's talent, the Montreux Jazz Festival has created its own foundation "Foundation 2" which organizes the competition. In 2009, under the presidency of Chucho Valdes, the jury was made up of several accomplished pianists such as Moncef Genoud.

The piano contest is backed by Bösendorf, who make available their reference Concert Grand Piano 290 Imperial for the candidates to use. This magnificent instrument offers 97 keys and an 8<sup>th</sup> octave in the low register.

The recordings, of course, use Nagra equipment. A Nagra VI allowing the simultaneous recording of six channels of 24 bit 96 kHz. The pick-up system was made up from two microphone pairs, Neumann M 150 (Omni-directional tube microphones) in semi-proximity and a pair of Schoeps CMC 6 / MK5 (Cardioid pattern) for the ambience. The post-production was kept to a minimum as to maintain the most natural sound possible.

The winner of the public prize, defined by spectator's votes wins a Nagra ARES-ML recorder, something to start recording their career like other prestigious artists such as Stevie Wonder and Herbie Hancock.

#### MASTER RECORDINGS

Nagra also has the opportunity to record a few master recordings without any signal treatment in the mobile VOYAGER recording studios, which record all the concerts of the festival in multi-track formats. The artists can then purchase the multitrack recordings for later mixing and releasing of DVD's or high quality CD's. The live recordings and mixing are done by David Richards, the mythical sound engineer of Mountain Studio, creative producer for Queen, David Bowie and Chris Rea to name just a few. Nagra records a 24/96 digital AES stream onto the NAGRA VI directly on the output of the SSL C200 console. This same signal is then fed through a limiter/compressor before being fed to the video vans. As a result Nagra benefits from a signal with minimal modification to the dynamic range. David Richards' mixing, although live, is of such high quality that artists rarely re-mix the material and make the DVD's directly.

#### MINI NAGRA HIFI EXHIBITION

The 4th and 5th of July, local enthusiasts and audiophiles were invited to listening sessions "On the Summit of HiFi" organised by JPN Audio, Nagra and Verity reseller in the French-speaking region of Switzerland.

Held in a wonderful room in the Montreux Palace, the mythical hotel of the Lémanique Riviera, two systems were installed specially for the occasion. It was the first "Avant-Premiere" of the new Nagra MSA amplifier, combined with a pair of Verity Rienzi loudspeakers. ■



Jazz On Screen: archive projection



Rehearsal for the piano contest



Nagra listening session in the Montreux Palace Hotel

#### CONTEST: 50 CD'S TO BE WON

Win a CD of the 2009 Piano Competition by participating in our competition. Register on our web site: <http://www.nagraudio.com> through the CONTACT us and put "Piano Competition" in the subject line. The first 50 lucky entries will receive the CD by mail. Please be sure to fill in your full mailing details carefully.

# OVER LAKE GENEVA

## A memorable day at the Potter's

On the initiative of JPN Audio, Nagra reseller in the French-speaking region of Switzerland, and the support of Stephen and Kerstin Potter, the internationally accredited classical guitarist Maurizio Grandinetti and Nagra created a cultural project with innovative technology. It involved recording of a concert, partly using a guitar built by Maurice Ottiger, a renowned local luthier, and its reinfusion in the same space - in a dream house situated in the commune of Glion, just above the famous Montreux station on the side of Lake Geneva.

by  
Jean-Pierre Denyset,  
JPN Audio



Maurizio Grandinetti on the guitar and his wife Consuela playing the harp

Below: Stephen Potter introducing the concert

### THE ROOM

The room chosen for the recording is situated on the top floor of the house, and offers a large 250 m<sup>2</sup> arena covered with parquet flooring. The walls of the loft are sloping, giving an interesting acoustic effect. The solid wood parquet enriches the sound with a natural tympani with a lot of early reflection and the rest of the room reacts very favourably with very little parasitic interference, and no echo flutter. The large dimensions of the room limits the problems of low frequency standing waves.

Finally the most critical problem comes from outside, the passing of high altitude aircraft, and the odd mountain rescue helicopter – which remind us that we are at the foot of the Alps – and a subsidiary one being the rumble of the water in the central heating!

The sound pick-up was made up of Neumann and Schoeps microphones, a Nagra D-II at 48 kHz 4 channel (when this recording was made the NAGRA VI was not entirely finished). Nevertheless for the transmission of the concert in 2009, it was naturally used as the source.

### THE CONCERT

For the event, Consuela, the wife of Maurizio, harpist and professional singer, joined her husband to play in solo and

duo certain pieces. It was an opportunity for some local audiophiles and enthusiasts to listen to a concert in an intimate yet different environment.

### EDITING AND MASTERING

Maurizio Grandinetti is familiar with digital editing techniques and does it himself. The editing of the pieces was done on a Digidesign Protools system. Matthieu Latour, Commercial Sales Manager of Nagra's Hi-Fi division, but above all, a sound engineer, mixed the different tracks, aligned the timings of the different microphones and made a slight mastering to harmonize the levels. The treatment was minimal, specifically without adding any artificial reverberation.

### THE TRANSMISSION

In December 2009, the Potter's once again offered us their hospitality so as to playback the recordings. About twenty lucky people were able to benefit from the experience. For the event a Nagra and Verity Audio system was installed in the same room where the initial recordings were made. This posed a few acoustic problems notably the increase in the acoustic signature of the room, present during both the recording and the playback of the pieces. In any case the result was enthusiastically received by the participants who "Re-experienced" the initial concert over and over again.



View of Lake Geneva from the Potter's house

### THE PROGRAMME

Maurizio Grandinetti prepared several varied pieces:

- **Giovanni Zamboni Romano,**  
From Sonata I:  
Allemande  
Courante
- **Elliott Carter:**  
Changes for guitar
- **Mario Castelnuovo - Tedesco:**  
Tonadilla in the name of André Segovia
- **Elliott Sharp:**  
Seek



A short break on the terrasse of Potter's dreamhouse



Top: The vast room transformed for the concert



Bellow: The Nagra team prepares for the recording. From left to right: Jean Coquel, Jean-Pascal Panchard, Matthieu Latour

### THE SYSTEM

The NAGRA VI as a playback source, drove a Nagra PL-L pre-amplifier, and in turn a pair of VPA tube monoblock amplifiers. The speakers were Parsifal Ovation from the Quebec manufacturer Verity. Despite the size and volume of the room the 50 Watts of the VPA's easily filled the room with a very natural sound which demonstrated again how the notion of power is purely subjective.

The evening finished by listening to old master recordings of the Montreux Jazz Festival – for which Nagra has been a technical and strategic partner for many

years – until late into the night. These included recordings of Ella Fitzgerald and Nina Simone dating from 1969 to tracks recorded in 2009, only a few kilometers below the house, and completed a memorable evening. ■

To follow Maurizio Grandinetti:  
[www.mauriziograndnetti.net](http://www.mauriziograndnetti.net)

Special thanks to Maurizio and Consuela Grandinetti as well to Kerstin and Stephen Potter.

Photos  
JPN AUDIO – Jean-Pierre Denyset



# FPGA AND VHDL – DIGITAL TECHNOLOGY AT NAGRA

## A winning combination

For over 30 years, the conventional way of creating a recorder, or any other electronic device, has remained unchanged: assemble the appropriate hardware and, control it with one or more micro-processors which are, in turn, controlled by a software program instructing them as to the operations they are to perform.

by  
Jean-François  
Herminjard,  
R&D Nagra

The advantages of such processors are well known: their flexibility! - The possibility to perform millions of operations per second and to modify, add, remove and correct the operational features of the device with a simple software upgrade. Everybody understands this fact, and nobody wants to return to the traditional ways using discrete components.

So what else? What happens if the “appropriate hardware” around the processor needs to be changed? What happens if the existing processors are overloaded and you need an additional processor for another task? You can’t! as it is not possible to change the physical hardware by means of a software update, the only solution is to re-design the circuit and make a new printed circuit board, implicating both time and additional expenses. Well, in fact you can! How? This is where a special chip called an FPGA (Field Programmable Gate Array) and VHDL (Very high speed integrated circuits Hardware Description Language) comes into play.

### DESIGNING POWERFUL HARDWARE VERY RAPIDLY

VHDL is a powerful programming language allowing the conception of huge hardware schematics to be generated inside the FPGA which is actually “programmable” hardware. This limits the risk of hardware errors and gives the possibility of designing extremely powerful hardware rapidly. With this technology

we can build the correct hardware with the maximum quality and reliability while maintaining the minimum power consumption. For dummies, a VHDL listing looks like regular lines of programming software with words like “if”, “then”, “else”, “procedure”, ... (the syntax is derived from the Ada language), but the actual meaning is completely different.

By designing and assembling the “appropriate hardware” within an FPGA, it becomes hardware that you can change with a simple “software” update. Is this new? No! at Nagra we have been using this technology for over 20 years; the Nagra-D, designed in the late ‘80s was our first recorder using such technology, albeit in a very elementary form in those days. Today, on all our digital machines, when you change the software you are actually changing part of the hardware too.

### MAXIMUM EFFICIENCY, MINIMAL POWER CONSUMPTION

So what is new? The first FPGA to exist was very limited, and was only able to create a few simple functions. Year on year, the complexity and the size of FPGA has grown and grown, going from some tens gates 20 years ago to several hundreds of thousands of gates today. The computing power of today’s FPGA now exceeds a traditional processor! They can perform simultaneously several billion operations per second.



The FPGA inside the Nagra VI

Could we imagine a machine without a processor at all and just an FPGA? Yes, and this is exactly the step we have taken with the Nagra VI; it is our first digital recorder with absolutely no micro-processor inside! only programmable hardware. All the hardware for the digital electronics, including all the necessary processors are “created” automatically when the machine’s power is turned on. The ability to build the right hardware in the right place, to add or modify processors convinced us that this VHDL/FPGA technology combination goes in the direction we need: the ultimate in flexibility, the maximum efficiency married with minimal power consumption.

### THE RIGHT PROCESSORS WITH RIGHT HARDWARE

As a typical example, a 16-bit digital gain adjustment on a 24 bit sample requires

40 bits for computing. A standard 32 bit processor cannot perform this operation without limiting the precision of the result, the 8 least significant bits are lost, resulting in a loss of audio quality. A 64 bit processor would need to be used to perform this task and would result in 24 unused extra computing bits. With an FPGA we can design and implement the 40 bit computing unit that we need to do the task correctly, without using a 64 bit processor, expensive device using more power consumption that we don’t need.

The hardest thing in all this new technology is to deal with the hardware schematics. With conventional schematics, hardware like that of the NAGRA VI would cover the floor-space of a gym hall and is thus far too large to work with. Instead, we use the VHDL to “describe” the hardware which is “constructed” when the VHDL is compiled. This hardware is then

programmed into the FPGA in a split second every time the power to the recorder is switched on.

However, software is not dead! We still write a lot of it, as we can create processors in FPGA and, of course, we do. But, now, we can guarantee having the right processors with right hardware, with the possibility to change both with a simple software update.

### OPENING NEW HORIZONS

We are still writing code on a PC to program our recorders but our “thinking method” and design principles have changed radically and opened new horizons for us.

One final additional advantage of the FPGA technology is that the equipment becomes less susceptible than traditional electronic hardware to component failures, dry solder joints etc. rendering the overall concept far more robust and better suited to the environment in which it is designed to work. ■

## NAGRA PROFESSIONNAL RECORDERS

### Outstanding digital machines you can rely on



#### 1. Nagra VI six-track digital recorders

3½" colour LCD TFT display, 120 GB internal hard disk, Compact Flash removable media, PCM linear digital 16/24 bit recording, 44.1, 48, 88.2 and 96 kHz, 4 analogue + 2 digital inputs. Available in three colors

#### 2. Nagra LB two-track digital recorder

24 bit, up to 192 kHz. Built-in audio editor, 2 colour displays, USB 2.0, Ethernet/Bluetooth communication, pre-recording buffer, PCM linear or MPEG compressed (BWF files), internal flash and removable Compact Flash, internal speaker

#### 3. Nagra ML stereo digital handheld recorder

Linear PCM, MPEG 1 Layer II & III recoding formats, 4 GB internal memory, up to 35 hours per GB of recording time (MPEG 64 kb/s), USB 2.0 communication, built-in microphones and optional plug-on external microphones

## NAGRA HIGH-END PRODUCTS

### Ultimate engineering for ultimate performance



#### 1. Nagra CDC

CD player with preamplifier

#### 2. Nagra PL-P

Phono and line tube preamplifier

#### 3. Nagra PL-L

Line tube preamplifier

#### 4. Nagra BPS and VPS

Phono preamplifiers: BPS solid state (left) and VPS tube circuitry



#### 5. NagraVPA

Tube monoblock amplifiers, pure class A, 50 Watts RMS

#### 6. Nagra PMA and PSA

Solid-state monoblock (PMA) or stereo (PSA) amplifiers. 200 Watts rms (PMA) or 2 x 100 watts rms (PSA)

#### 7. Nagra MSA

Solid-state amplifiers. Highly configurable 60 watts per channel stereo, 60 Watts per channel mono bi-amp or 120 Watts parallel-bridged mono

# Nagra ARES-ML digital handheld recorder

## Now with 4 GB internal memory!

### Main features

- Small dimensions, light weight
- Easy and simple operation
- On-board audio editor
- Linear PCM, MPEG 1 Layer II & III recording formats
- 4 GB internal memory
- Up to 35 hours per GB of recording time (MPEG 64 kb/s)
- USB 2.0 communication
- Built-in microphones and optional plug-on external microphones
- Built-in loudspeaker

