

# Internally connected

The DSP\_AMAS set is a device that allows wireless connection between a source and the processor Mosconi 6to8 bypassing, with cunning, the limitation of any present OEM system. Without striking a blow.



The designers Mosconi have over 20 years' experience in the field of amplifiers. Their success is confirmed by the EISA award attributed to AS 100.4 in the year of the brand's debut on the market. Their experience with signal processors is much more recent. However, currently on the catalogue, the 6to8 and 4to6 processors, and the one inside the amplifier ONE120.4-DSP reflect the philosophy that distinguishes their products from other products currently on the market: sober and robust, designed to meet the needs of enthusiasts and to offer them superb performance through slim and very effective designs.

All processors, especially the 6to8 model,

were designed to meet versatility requirements not only to achieve significant results in sound customisation, but also and above all in the ability to interface with the most advanced OEM "armored" systems.

Those with delocalised sources and divided into several parts, or those with customised, filtered, equalised and maybe delayed amp/speaker, for which it seems impossible (or even just uneconomical) to provide a total system substitution.

### 6to8 versatile and expandible

Beyond its prerogatives in terms of signal processing, i.e. crossover, equalisation and time delay management potential on each of the 8 outputs independently, it was precisely the 6to8 processor capabilities in terms of interfacing with OEM systems that allowed it to win an EISA award in the "integration" category last year.

Extensive test results regarding the 6to8 were presented in number 210 of ACS. It comes in a brushed aluminium case and

offers up to 6 input and 8 output channels (hence the name).

The inputs accept low-level signals in the 2 to 8 volt range, or high-level signals in the 5 to 20 volt range, and are equipped with a potentiometer to adjust the input signal for each of the three pairs of channels.

A special device is able to check the input signal and to generate a suitable signal to switch on the amplifiers; this device is also able to "fake" an OEM head-unit by creating a dummy load.

The eight outputs can be configured with substantial versatility through the Windows based software controlled by a PC connected via USB or via Bluetooth through an optional module labelled MOS\_BTM.

Through this module, you can also connect an Android (or Blackberry) device allowing volume and sub level control as well as preset recall during normal operation, by means of an App.

The same operation can be done through the DSP\_RCD too, a traditional controller with knob and display.

The Mosconi 6to8 is therefore the real

#### Mosconi DSP\_AMAS Streaming audio device

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heart of the system, with a really high computing power and optimum functionality to be connected to systems equipped with analog outputs.

Moreover, Mosconi designers have been clever enough to provide a wide range of optional devices that can be bought separately from the 6to8 processor or even at a future time when further requirements arise.

The first option, SP-DIF, which fits inside the frame, provides two optical digital inputs and two optical digital outputs.

The second option, alternative to the first and labelled SP-DIF MULTI, extends these possibilities by offering two optical and one coaxial digital inputs, one optical and one coaxial digital output, a connector for a hands-free microphone, and the option to host the DSP\_AMAS set (object of the test), a Bluetooth interface with streaming audio playback.

### AMAS: Advanced Multi Audio Streaming

What is the DSP\_AMAS set made of?

Well, the heart of the device is a tiny PCB (about 2 x 3 cm), then a small panel which replaces that of the 6to8 outputs, plus an external antenna providing optimal signal reception and an extension allowing the antenna to be used away from the 6to8. For example, when it is placed under the bottom of the trunk or hidden within the car body.

The BT module is plugged in a slot on the SP-DIF MULTI board, which is therefore essential for the DSP\_AMAS.

The main function of DSP\_AMAS is to al-

low a Bluetooth connection between the 6to8 and an external device (smartphones, pads, tablets, ...) with the particularity that it can receive streaming audio at the maximum resolution allowed by the standard Bluetooth and "inject it", digitally, directly in the path of the 6to8 digital input signal, as if it were a "Bluetooth digital input".

But, haven't we already talked about another Bluetooth module labelled MOS\_BTМ?

Exactly, but they have different functionalities. The MOS\_BTМ, which is inserted into a slot next to the power connector also in the absence of the SP-DIF MULTI board, allows the control of the functionality of the system, replacing the USB cable connection and the controller, whereas the DSP\_AMAS set operates on the audio stream.

What file formats can the DSP\_AMAS play?

This question is more complex. The Bluetooth module selected by Mosconi is an LT1440 by the German company Lintech, known for the complexity and reliability of its products.

This device is compliant with Bluetooth 2.0 Specification, which provides the full support of the Advanced Audio Distribution Profile (A2DP) and Audio Video Remote Control Profile (AVRCP), required for audio streaming capabilities, as well as of many other Bluetooth profiles.

Streaming via Bluetooth in the A2DP profile can reach a data flow of 3 Mb/s in the version 2.0 + EDR, and can support many music file formats, compressed or not: MPEG-1.2 obviously (the so-called "MP3", or more correctly referred to as

MP2 Layer 3 format); MPEG-2.4 and therefore also the AAC format; ATRAC formats; a proprietary codec called SBC (Low Complexity Sub Band Coding), with a compressed but high-quality audio streaming capability.

Other formats can also be played through the optional codecs defined "Not A2DP". In most cases, the data format that the receiver must be able to decode is set at 44.1 or 48 kHz, 16 bit. In the MPEG-2.4 AAC format, the decoding of streams with sample rates up to 96 kHz is optional, whereas with MPEG-1.2, it stops at 48 kHz. At 16 bits in any case. "NO A2DP" format compress up to 24 bits.

The input data stream (bitstream) is "hooked" by the receiving unit (defined in the Bluetooth standard with the acronym SNK) and the audio signal is extracted and turned into digital PCM format (see Picture 1).

This is assigned to a DSP, which, besides performing other functions, makes it available in the appropriate format to be sent to an on-board SPDIF input. To sum up: the received signal is decoded, converted to PCM and sent to the input of the DSP6to8. But, how can we determine the format for sending Bluetooth data from the source (called SRC) and then check what transformations this format undergoes in the encoding, decoding and transmission in the SNK? Well, in theory this would be possible by intercepting the bitstream but in reality it is impossible to analyse it, in fact with the Bluetooth 3.0 version the bitstream is generated after a further compression based on aptx protocol. The latter allows operating with several



Mosconi 6to8 processor with its controller. Thanks to the DSP\_AMAS set it is also possible to control the processor via an app for Android and Blackberry devices.



The output panel, which is provided with the DSP\_AMAS set, has a few peculiarities if compared to the "standard" panel. The most important is the slot for the Bluetooth module. However, it is not a complete plug-in module, as it looks because it has been designed to remain out of the frame since the outer part hosts the Bluetooth antenna. And if this were not enough there is an additional external antenna.

factors ranging from extreme compressions up to lossless compressions. Thus, we do not know what flows in the bitstream. Nor do we know how and how often the signal is transformed until it reaches the 16 bit PCM 48 kHz format at the internal "auxiliary" digital input of the 6to8.

To test consistency we cannot but rely, on the most precise measuring instrument: the ear.

### DSP\_AMAS in practice

I basically performed a double test, in my car and at home.

Beyond the usage impression of the 6to8, which is solid and reliable, in its logical and essential German software, the device does not present any big surprises from the point of view of the installation. Once the 6to8 is disassembled following the instructions in the manual, I plugged the tiny PCB, the panel and the external antenna and "set the ball rolling".

The installation of the latest software version, downloaded from Mosconi website and freely available (so that it can be evaluated by everybody), com-

plete with driver, did not involve any special problems on a trusty Windows XP based computer.

The first thing to do is to configure the 6to8 to activate the optical input which the DSP\_AMAS format refers to, and balance the signal "mixing" which provides a priority in the selection of inputs to the same module.

In short, the Bluetooth bitstream has priority over other inputs and, if a track from the connected device is played, the other inputs are muted.

Then I switch to the pairing. Nothing more simple and immediate. The 6to8 and my iPhone recognise each other and fit perfectly together.

I play a track (MP3) stored in my memory and, after adjusting sensitivity, the song begins to play well. Simple. Immediate.

If it is difficult to understand all the format flows within the synchronization systems between computer and iPhone, it is almost impossible to understand what is transmitted via Bluetooth and what is converted to PCM and sent to the digital input.

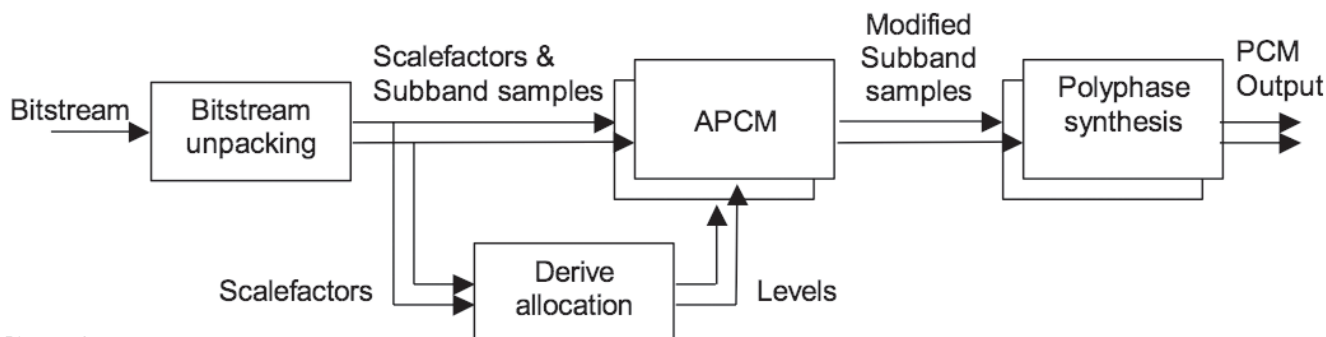
So let us proceed to the listening tests to verify, at least if the signal which originates with a different code, is perceived.

A song by Antonella Vitale, with percussion and guitars, which originates in the native format PCM 96/24 (that is in Wav), has been reduced to a linear PCM 44/16 format, converted to FLAC (96/24 and 44/16), to MP3 (128 bps) and to AAC (256 bps).

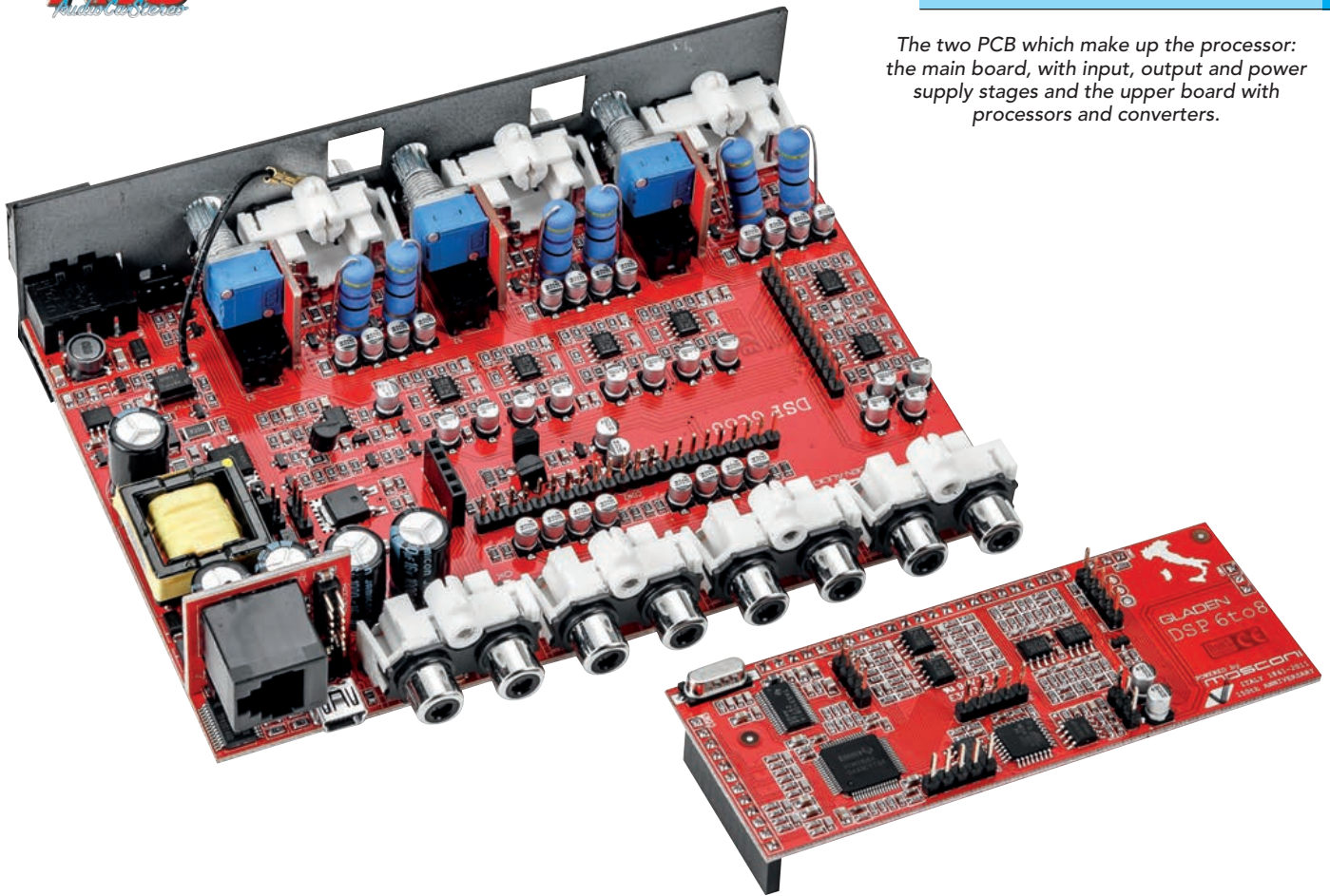
All of it has, then, been imported into the iTunes library and therefore on the phone, which has been able to play all the formats, except the FLAC.

Well, the sounding is quite different! The best format (FLAC) sounds more "solid", although we know that it was converted to a bitrate value more appropriate to Apple. The MP3 format sounds more "foggy". The AAC format is slightly better and almost indistinguishable compared to PCM (Wav format). With the App "FLAC Player +" I was able to play both the Flac 96/24 and the 44/16. The difference is clear, although minimal, in this case as well.

However, still unsatisfied, I tried a totally different device: OS Android on Galaxy S3. With "n7player" I can play all the songs mentioned and all my impressions are confirmed. The differences are there and the 96/24 seems to be the one, of all formats, that sounds better, with more "air", more



Picture 1.



The two PCB which make up the processor: the main board, with input, output and power supply stages and the upper board with processors and converters.

detail and more precision. In short, as expected.

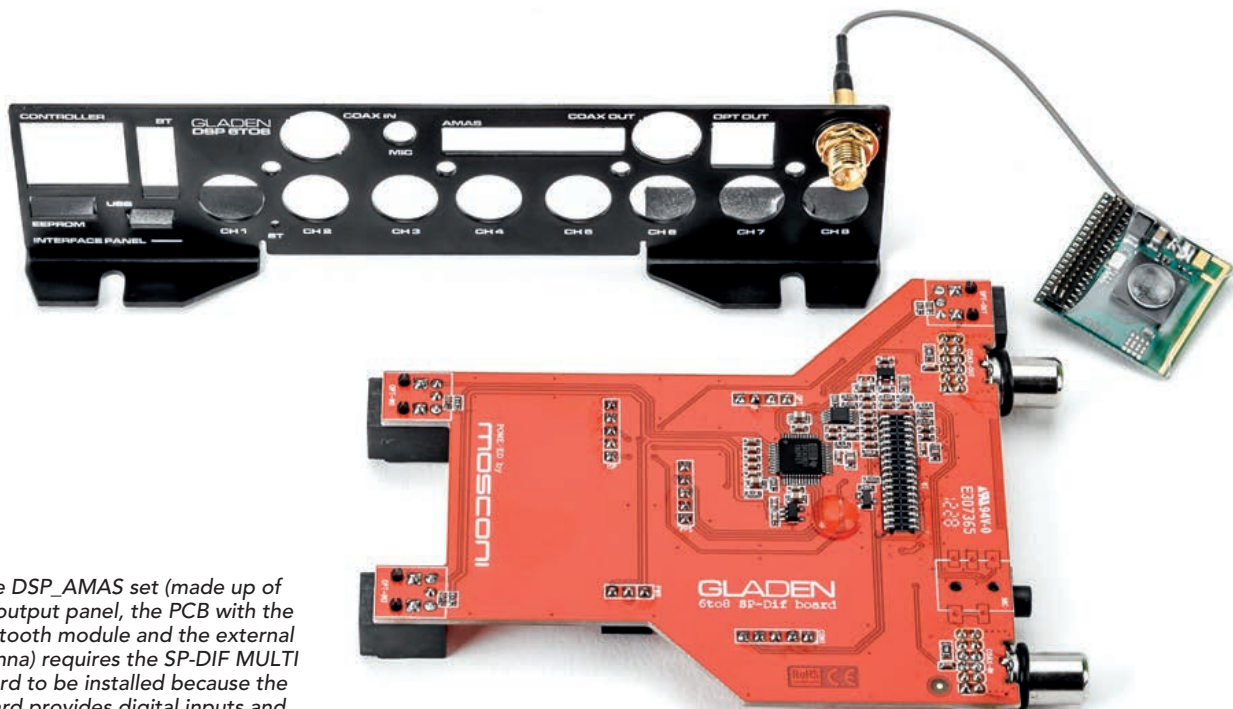
**Conclusions**

Imagine the less accessible OEM sound system in the world; it is possi-

ble to insert a 6to8 in the system, independently from it, and proceed with the Bluetooth source. Just select the track and start the music. The pairing is automatic, immediate, sure. The processor plays excellently well. And, it is also versatile. These are the reasons for the EISA award to DSP\_AMAS: high

quality even in the most difficult cars! And in case the processor is connected to the OEM system, well, the integration capabilities of the 6to8 will be clearly proved: not without reason it won the "Integration EISA Award" a couple of years ago...

**Rocco Patriarca**



The DSP\_AMAS set (made up of the output panel, the PCB with the Bluetooth module and the external antenna) requires the SP-DIF MULTI board to be installed because the board provides digital inputs and outputs to the 6to8.