PRODUCTION PARTNER
Fachmagazin für Veranstaltungstechnik

Midas M32 Put to the Test

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Midas M32

After the big success of Behringer's X32 mixer, Music Group now presents the M32 under its Midas label. Since both mixers have many features in common, you might wonder if the M32 is simply "a Behringer console with a Midas label" or if it has more to offer. We will find out.

After Uli Behringer had taken over the traditional Midas company, people in the music industry discussed at length how this radical merger would affect the English brand: Would Midas become a run-of-the-mill mass-producer in the future? It didn't, yet. Both brands have retained their status in the market and they are well positioned. Nevertheless, there are overlaps from which both product lines can profit – and the small Venice and Verona mixers from Midas had proven before that large quantities can easily be sold under the Midas label as well. And since the price of the M32 ranges in the lower middle class, it is already appealing to a large customer base.

We wanted to know whether Behringer simply used the DSP hardware, software and user interface of the successful X32 as a basis, equipped it with a premium chassis and more solid controls and called it a Midas console. Luckily they didn't take the easy way out. Let's remember our Behringer X32 review in PRODUCTION PARTNER 9/2012: "In conclusion one can say that the X32 input stages feature solid and up-to-date technology, which cannot cope with (sometimes more than ten times more expensive) high-end consoles, of course, but that was to be expected." And this is where the Midas R&D team set out to improve the M32 and lift its analog technology and AD/DA converters to the next higher level. So during our test we will only talk in brief about the features, operation, etc. of the console and refer you to the X32 instead, while we'll rather concentrate on possible changes and improvements of the hardware.

M32 Signal Structure

First let's take a short look at the basic concept of the 32-channel console with complete remote and recall functionality. It provides 16 mix buses, 6 mute groups, 8 DCA groups, 100 mm Midas motor faders, a 7" color display (unfortunately no touch operation) as well as plenty of on-board functions and effects. The hardware inputs and outputs are linked to the internal components of the

console via a block or channel matrix. The mixer itself provides 32 analog inputs with preamps and 6 line-level aux inputs. The output section comprises 16 balanced XLR outputs and again 6 1/4" aux outputs. Two additional "control room" monitor outputs feature XLR and 1/4" connectors. An expansion slot, which is pre-equipped with a Klark Teknik DN32 USB card, provides up to 32 inputs and outputs respectively. As an alternative to this standard USB card, you can insert interfaces for MADI and Dante networks as well as an ADAT interface which comprises 4 x 8-channel inputs and outputs to TOS link and a Word Clock connector (which is normally not available).

The M32 provides an on-board audio network interface in the form of two AES50 interfaces with 48 inputs and 48 outputs each, for which Midas offers a number of suitable stage boxes. A typical addition to the M32's AES50 connection would be the DL16 (16 outputs and 8 inputs) which is also operable in standalone mode and features the Klark Teknik SuperMac technology for minimal latency. The DL16 looks like its S16 Behringer counterpart, although the preamps and power stages used in the Midas are identical with those used in the M32. You can connect three DL16s per AES50 interface for a total of 6 stage boxes and 96 inputs/48 outputs. Three DL16s can be cascaded without additional hardware and the Cat 5 cables used can be up to 100 meters long. The sources are assigned to the 32 mixer channels via the internal matrix.

Firmware release 2.08 (for the M32 and the X32), which should already be available by the time you read this, will make things even easier for the members of the Music Group family. Firmware version 2.08 will establish compatibility between a wide range of devices so that both the X32 and M32 will be able to use the following hardware components:

– all Behringer or Klark-Teknik expansion cards of the 32 series (X-UF, X-USB, X-ADAT, X-DANTE, X-MADI, DN32-USB, DN32-ADAT, DN32-DANTE, DN32-MADI)

– both stage boxes (Behringer S16 and Midas DL16)

– the big Midas stage boxes of the DL251 series (with firmware 2.5)

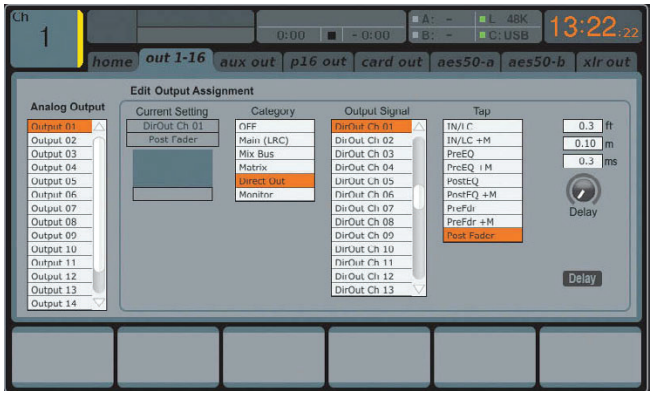
– the smaller Midas stage boxes of the DL151 series

The buttons ml the right select the control block that is shown on the display. The buttons/controls on the bottom of the display are used for navigation.

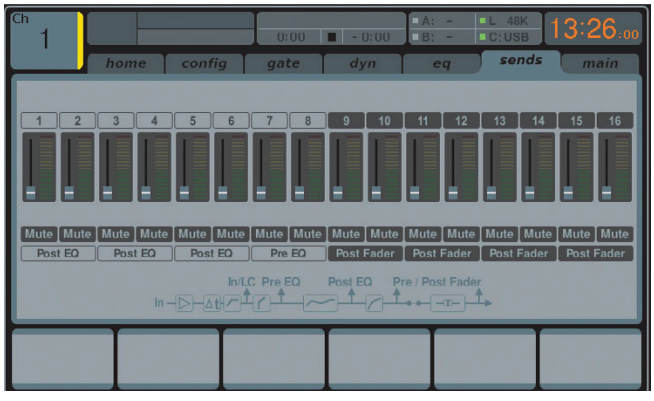
Control Surface and Remote Software

As mentioned before, the functionalities of the M32 mixer surface and internal DSP system are completely identical with those of the X32. However, the looks and chassis design as well as the feel of the control elements have distinctly changed. The M32 brochure proudly points out that the designers from car maker Bentley helped to develop the console. After we had a look at the design of the current Bentley vessels we were in doubt whether this would be a good or a bad sign ... but after all we like the classy appearance of the M32 - it deserves to bear the Midas name, not least because of the daylight-viewable screen, the motor faders (tested for 1 million life cycles) and their small, configurable scribble strips which indicate the fader function.

ill. 1: Overview of the external editor software: EQ window selected, all the filter parameters and the resulting curve are displayed



ill. 2: Routing functions of the editor software



ill. 3: The 16 sends of an input channel and the clear signal flow diagram for possible tabs in the editor

Furthermore, the M32 profits from the comprehensive software collection for computers, tablets and smartphones which has been developed by Music Group for its flagship X32. During our test, the M32 editor software was still in its final testing phase and was provided to us before its official release. The "M32 Edit" software versions for Apple OS X, Microsoft Windows or Linux run without installation and can be launched without any preparation. The Ethernet connection between computer and console is accomplished either via cable or WiFi. Illustrations 1 to 3 nicely show the clear layout and structure of the software. The buttons to the right of the screen are used to select basic functions (home, routing, effects, etc.). The rest can be directly accessed with the tabs. Lower operational levels that hide something unexpected don't exist. The 16-fader block of the mixer can be assigned to inputs 1–16, 17–32, Aux and FX Return or Bus Master. The block of 8 is used for the DCA groups, buses 1–8, buses 9–16 and Matrix-Main. Alternatively, the faders can be deployed for monitor mixes or as sends for buses 1-8 and 9-16, for example. You can also use the software offline to prepare a setup without the console or simply to check the range of functions and operations before actually buying the mixer.

The "M32 Mix" software for iPad, which enables you to remotely control many important functions, is already available in the App Store. As the M32 allows simultaneous access of up to ten iPads, they can easily be used as personal monitor mixers. After its release in late 2014, the "M32 Cue" app will enable you to do the same thing in simplified form with an iPhone or iPod Touch. Bundles including recording software will not be offered.

Signal Processing

Before we turn our attention to the measuring results, let's take a quick look at the comprehensive processing functions of the input channels. The signal passes through the following circuits:

– analog and digital gain
– phase reverse
– channel delay
– low-cut filter
– gate
– insert point (pre)
– 4 x parametric EQ
– dynamics
– insert point (post)
– fader

The gain split function of the inputs decouples the analog head amp gain from the digital gain, so that each connected console (FOH, monitor, etc.) can set an individual digital gain for the respective channel. This not only goes for the common access to a dedicated stage box, but also for the analog inputs in the consoles, which can be used together like a stage box. For example, the 32 mic inputs of the monitor mixer can be used as a stage box on stage.

Each input channel of the M32 features a sweepable high-pass filter and four fully parametric equalizers, which can be defined altogether either as bell filters or high/low shelf filters or high/low-pass filters.

The parameters of the parametric EQs are:

– low shelving: 20 Hz–20 kHz ±15 dB
– bell: 20 Hz–20 kHz ±15 dBQ = 0.3 ...10
– high shelving: 20 Hz–20 kHz ±15 dB
– high-pass filter: 20 Hz–20 kHz
– low-pass filter: 20 Hz–20 kHz

The additional low-cut filter at the input is a 4th order filter and its cut-off frequency is variable between 20 and 400 Hz. Furthermore, the bell filters can be operated in PEQ and VEQ mode which differ with regard to the Q-factor.

Less glitter and glamour as the X32 and more clearly layed out: unobtrusive surface of the M32

What Makes the Difference: Input Section

Let's examine the measuring results now. They could differ considerably from those of the X32, since Midas features 192 kHz A/D and D/A converters together with a 96 kHz architecture: However, the console internally operates at a fixed sample rate of 48 kHz at the mo-

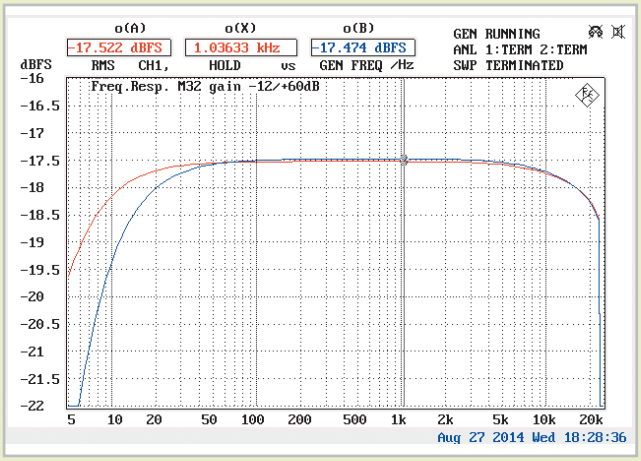
ment. It is not clear yet when 96 kHz will be made available by a software update. It will probably depend on customer demand - how beneficial this option is expected to be and how urgently people are asking for it.

Let's turn to the facts of the measured values. At first we measured the preamps in combination with the A/D converters. We fed the test signal into the analog inputs of the console and routed it back to our measuring system via the AES/EBU digital output at the insert out. The gain setting on the scale ranges from +60 to -12 dB of which 62 dB are converted by a DCA (digital controlled amplifier) on the analog side and 10 dB are converted on the digital side.

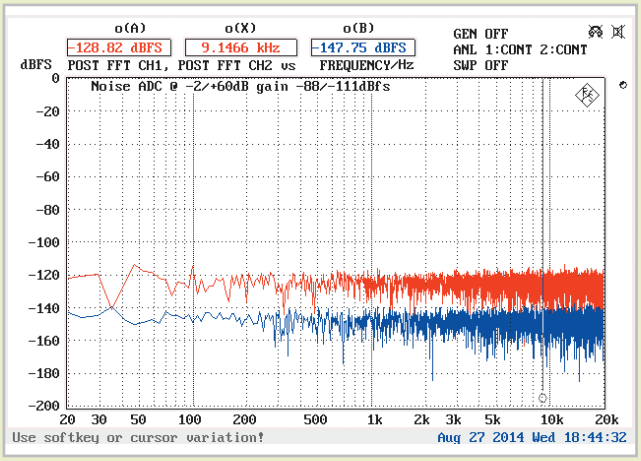
It should be noted that the preamp at the input can handle a maximum of +24 dBu. Beyond that clipping sets in. The frequency response measurements of illustration 1 show a slight decrease in level at the outer edges which corresponds exactly to the data sheet – and which is completely uncritical. More important are the signal-to-noise values, which are measured in 10 dB steps over the whole gain range for the preamp and the A/D converter.

The table indicates the different gain settings and the corresponding sensitivity values for 0 dBfs, i. e. for full-scale level as well as the measurable noise at the digital output. The ADC achieves dynamics of 111 dB, which hardly change up to +30 dB. At higher gain values the preamp noise sets in. At 60 dB gain you still get effective dynamics of 88 dB. Equivalent input noise is –126 dBu linear and –129 dBu A-weighted.

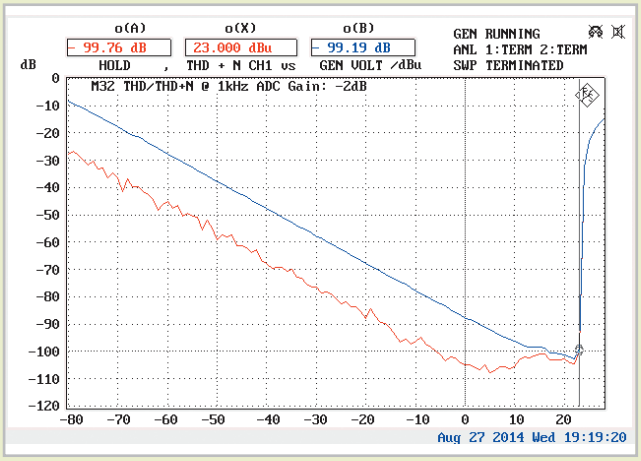
Distortion was measured in test series with -2 dB and +60 dB gain, which means minimum and maximum gain at the preamp.



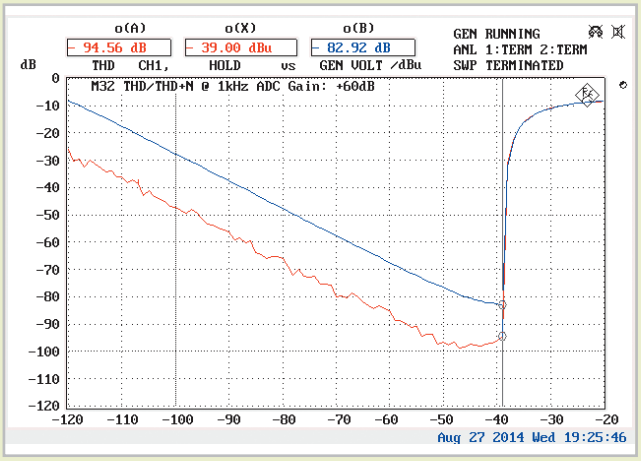
ill. 4: Frequency response at minimum (red) and maximum (blue) gain with –17,5 dBfs corresponding to an input voltage of +16 dBu and –56 dBu respectively.



ill. 5: Noise spectrum at the D/A converter output with minimum and maximum preamp gain. The –111 dBfs at minimum gain are dominated by the DAC and the –88 dBfs at maximum gain are dominated by the preamp. Both spectrums are free of monofrequent components.



ill. 6: THD (red) and THD+N (blue) for the preamp with subsequent analog/digital converter at a minimum gain of –2 dB – clipping starts at an input level of +24 dBu.



ill. 7: THD (red) and THD+N (blue) for the preamp with subsequent analog/digital converter at a maximum gain of +60 dB – clipping starts at an input level of –38 dBu.

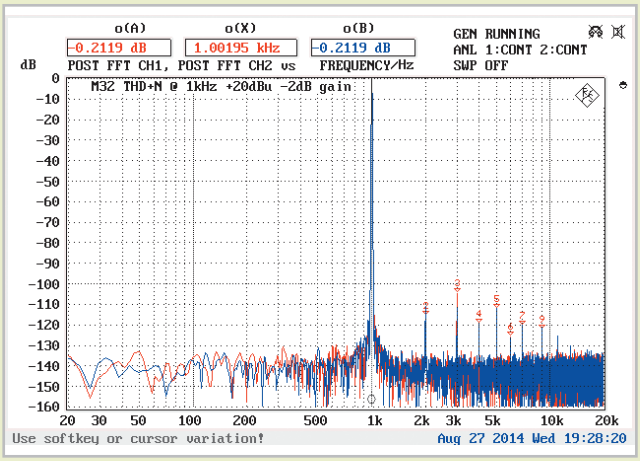
Gain	0 dBfs	Noise	
dB	corres. dBu	line weigh. dBfs	EIN dBu
–12	+34 *1	–121	–87
–2	+24 *1	–111	–87
0	+22	–109	–87
+10	+12	–109	–97
+20	+2	–109	–107
+30	–8	–108	–116
+40	–18	–106	–124
+50	–28	–98	–126
+60	–38	–88	–126

Noise at the ADC output in dBfs relative to gain. All measurements at 200 ohms input impedance.
EIN = -126 dBu (lin.) -129 dBu (A) @ max.gain.
***1 Regardless of the gain setting, the preamp starts to clip above +24 dBu input level**

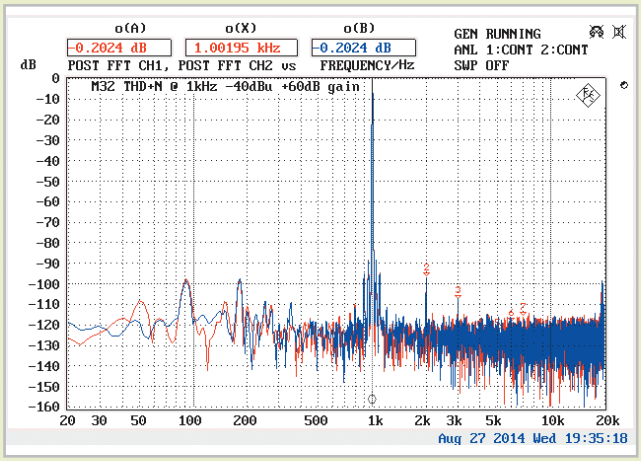
The curves of illustrations 6 and 7 show minimum THD values of –108 and –100 dB, which hardly increase before clipping.
Both values are extraordinarily good and exceed those of the Behringer X32 by 10 dB and more. Right before clipping the difference is even 20 dB. Nonetheless the X32 values of -80 dB are really good already. A distortion level of –100 dB requires more than standard circuits and standard components.
The harmonic distortion spectrums of illustrations 8 and 9 show generally clean and evenly distributed noise as well as distortion components, which are dominated somewhat by odd values (k3, k5, ...) at lower gain levels (ill. 8). But they all stay below the –100 dB line (= 0.001 %). The picture gets even better at maximum preamp gain. Here only k2 and k3 components can still be found - with very low distortion values of –95 and –105 dB. This is almost the optimum, especially when you consider the extreme gain.
The transient intermodulation distortion (DIM) makes the same positive impression. We measured optimum values of -90 dB which were almost beyond the measurable range. A more critical issue is the increase of the DIM distortion which starts at +4 dB way before clipping and becomes apparent mainly at low gain values.

Complete Performance: Analog to Analog

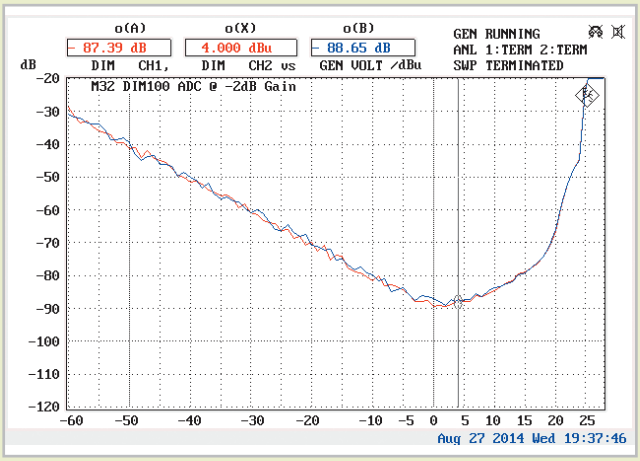
Isolated measurements of the analog output buses alone – i. e. a digital test signal fed into the inputs and tapped at the analog outputs - is unfortunately impossible, since the console doesn't provide an AES/EBU input. Alternatively we made an overall measurement from analog inputs to analog outputs at a gain setting of 0 dB. Illustration 12 shows the curves for THD and THD+N, which retain their excellent values over the complete signal path. Clipping is about +21 now, which corresponds to the maximum output voltage at the balanced analog outputs.
Since the noise level can be determined without an input signal, separate measurements of DACs and output stages are possible: Without a signal on the digital side the noise level (ill. 13) is –91 dBu linear and –95 dBu A-weighted. The available dynamics of striking 116 dB are more than 10 dB better than the 105 dB of the X32. The important thing about the output dynamics is that this value is reproducible 1:1 and that it is directly reflected in the amount of noise produced by the PA.
When you look at the harmonic distortion spectrum on its way through the Midas M32 from preamp to ADC, DAC and output stages you don't have to worry about signal quality even at high



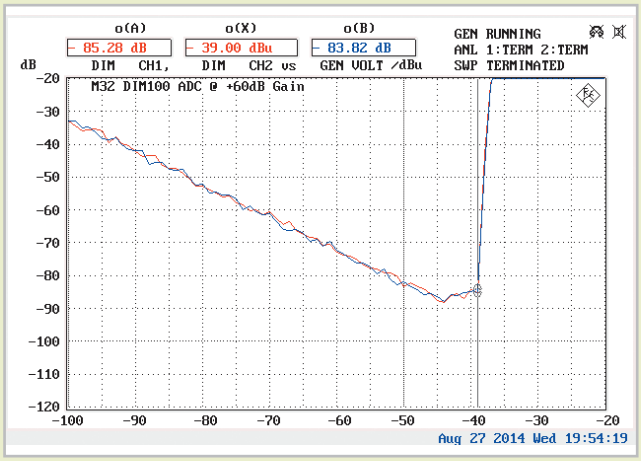
Ill. 8: Harmonic distortion spectrum of the preamp with A/D converter – gain fully counterclockwise and +20 dBu input level. Distortion is dominated by odd values but nonetheless extremely low. All curves are staying below -100 dB.



Ill. 9: Once again the harmonic distortion spectrum of the preamp with A/D converter - now at gain fully clockwise and –40 dBu input level.



Ill. 10: Transient intermodulation distortion (DIM) of the preamp with ADC at minimum gain. The -90 dB minimum is a very good value, but the curve starts to ascend way before clipping.



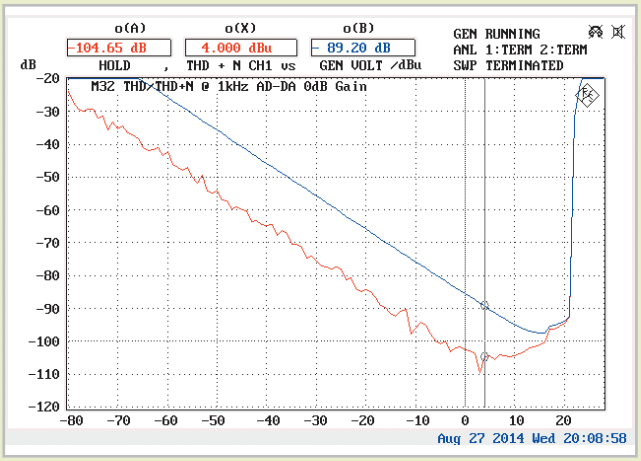
ill. 11: Transient intermodulation distortion (DIM) of the preamp with ADC at maximum gain. All in all the curve shape is better than it was with minimum gain.

levels (+14 dBu during measurements). The blue curve in illustration 15 proves that the distortion values stay excellent regardless of frequency. However, if you insert a critical filter (narrow band, low frequency) into the signal path, distortion values in the low range (red curve) increase considerably. This is caused by rounding errors of the filter algorithm, which could have definitely been avoided by using more DSP power. Our last overall measurement dealt with DIM distortion from analog input to analog output. Illustration 16 shows values starting below -80 dB for level values up to +15 dBu at the input and output, i. e. for the complete relevant level range. Another 10 dB advantage compared to the Behringer X32.

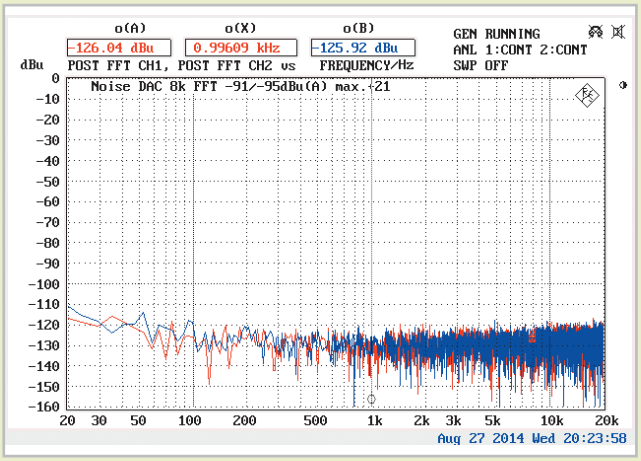
Bottom Line

At first you might wonder if the Midas M32 console is simply a refined Behringer X32 copy. But at second glance you will notice that a lot of synergy effects have taken place. Even skeptics must agree that the Behringer X32 is already a great console with an abundance of features. There is still room for improvement with respect to design and feel, however, and its audio specs range in the upper middle class, considering modern technology.

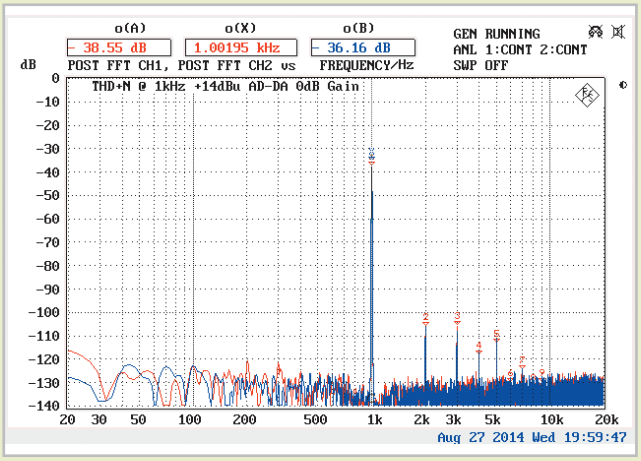
And this is the basis Midas built on: DSP core and feature set stayed untouched. However, at the critical points of the hardware – i. e. preamps, ADCs, and DACs - significant improvements have been made which lifted the audiophile



Ill. 12: THD (red) and THD+N (blue) measured from analog input to analog output. The overall gain during measurements was 0 dB.



Ill. 13: Noise spectrum at the analog output with -91 dBu overall level or -95 dBu A-weighted.



Ill. 14: Harmonic distortion spectrum at 1 kHz and +14 dBu, measured from analog input to analog output (overall gain: 0 dB).

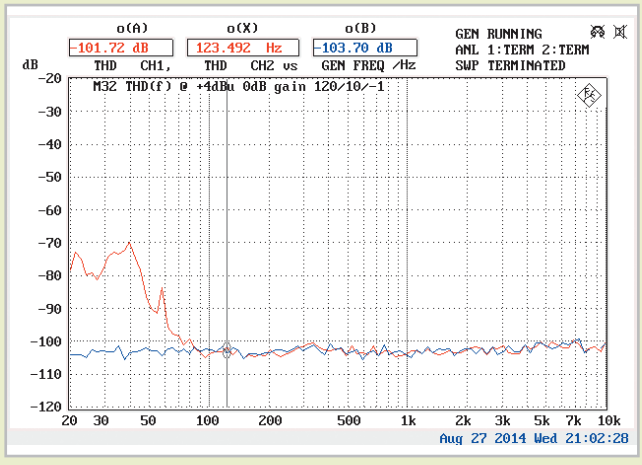
The layered inputs on the left can be mixed via sends-on-fader to single buses (monitor buses, effects, etc.) instead of L/R on the right.

qualities from good middle class to premium class - exactly as you would expect it from Midas. And to convey this quality to the outside, design and handling have been completely revised, refined, and equipped with premium control elements as well.

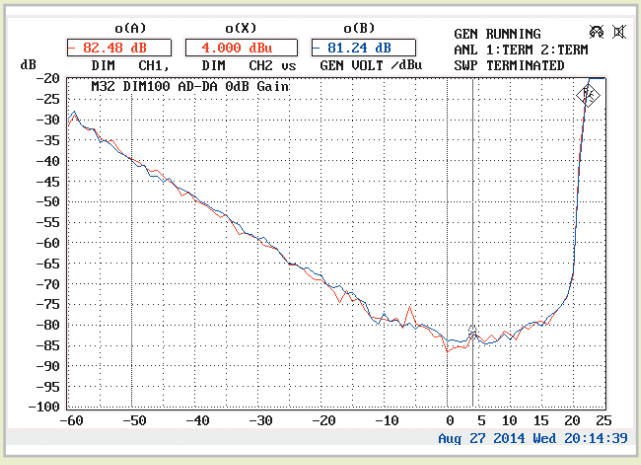
Since these changes primarily affect the most cost-intensive parts of the console, the final price inevitably has to reflect that. The MSRP will presumably be 4999 € including VAT. (The MSRP of the X32 is 3624 €, its street price is 2300 € at the moment - almost unbelievable).

So which console should you buy? If the price tag is of paramount importance, we recommend the X32. If you are running a "serious" rental company, playing in a professional band, or operating a permanently installed high-quality PA in a club, the Midas M32 lets you take it one huge step further: You can't go wrong with this mixer and the price/performance ratio is at least as good as that of the X32. And if you can't make a decision at all, you can still mix components of both brands ..

Text & Measurements: Anselm Goertz
Photos: Dieter Stork



Ill. 15: THD in relation to frequency at +4 dBu input level (overall gain: 0 dB)



Ill. 16: Transient intermodulation distortion (DIM) measured from analog input to analog output (overall gain: 0 dB). Again, 10 dB better than the X32.