studio

magazin

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BIG
INTERFACE
QSC TOUCHMIX-30 PRO

Hardware digital mixers seem to have gone out of fashion in the studio world. It seems a long time ago now that new digital mixers by market leaders such as Yamaha or Tascam were de rigeur in many control rooms and formed an important part of studio workflows. These days, new compact digital mixers coming to market are often designed specifically for broadcast or, as is most often the case, live mixing applications. Today the most innovative digital consoles for studio use are made by manufacturers such as Stage Tec, Lawo or Studer, to name a few prominent examples. They are generally produced only in large-scale versions offered in a price category that automatically makes them exclusive, addressing a very specific customer group. In modern studios, most mixers are integrated into DAW software. They can do everything expected of that product type, including a design concept that encompasses dynamic and static saving of all mixer functions and any loaded plug-ins.

The mixer page shows eight inputs plus the Main or Aux mix. At the top are the selectable banks, access to the Aux mixes is provided on the left

The EQ page, here with the additional RTA view

Anyone who wants to physically touch faders, sliders and buttons these days buys a controller. These products are often capable of offering at least the most commonly needed functions in hardware in a way that's comfortable to use. But they won't offer a large number of AD/DA converter channels, the cost of which can quickly rise out of reach for many. I must admit that I had previously associated the American manufacturer QSC with the development of power amps. The company has, of course, since presented digital mixer designs in the form of the TouchMix-30 Pro and the scaled-down sister versions, the TouchMix-16 and Touch-Mix-8, all of whom primarily address the live sound market. The user interface design, however, focusses on touch control using the integrated touch-sensitive screen, the accompanying hardware function buttons and a central incremental rotary control.

If that were all it offered, the TouchMix-30 Pro would fall outside our purview. But it can also function as a comprehensive 32/32 USB audio interface, and is fitted with 24 microphone preamps. That makes the TouchMix-30 Pro a powerful tool for all those colleagues who deal with mobile recording applications. It also has ample amounts of integrated DSP power, offering EQ, dynamics processing and effects on a scale provided only by very few audio interface designs. Taking a closer look at the functions provided here, the TouchMix-30 pro generates quite a few approaches relevant to studio work, such as connection to any DAW, or multitrack recording to a USB thumb drive plugged directly into the mixer. To give those of you who also work in live sound an idea of what this extremely compact mixer is capable of, we shouldn't avoid examining at least the most important functions, some of which are also significant for studio use.
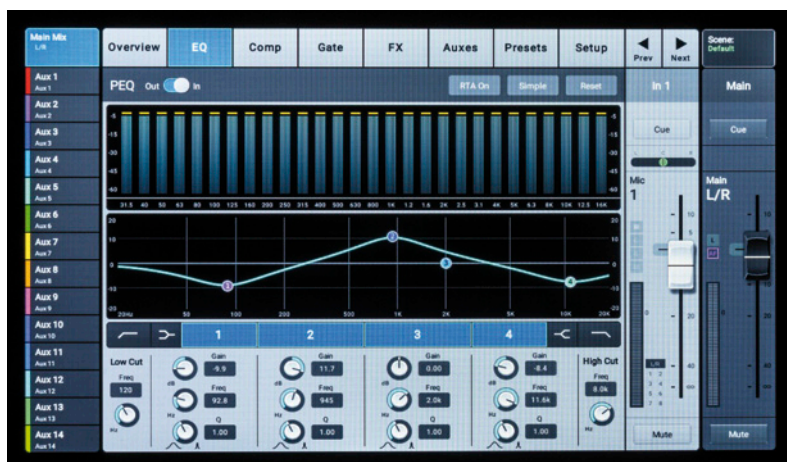
Overview

This review focusses on the top model in the range, the TouchMix-30 Pro, an extremely compact unit that can easily be carried in your luggage. 32 mixer channels and inputs are provided, including 24 Class A microphone preamps in XLR format, 6 Line inputs as stereo TRS jacks and one stereo USB connection that lets you directly play back audio from external USB storage media. Also onboard are 14 physical analog D/A Line-level outputs that can be used in live applications as Aux outputs, as well as two XLR output pairs, one each for the Main and Monitor mixes. A TRS jack output for headphone cue mixes is provided, while the Aux 11/12 and 13/14 channels are also available as TRS jacks. There's a separate input for a talkback mic with phantom power. Used as a USB audio interface, the TouchMix-30 Pro - hereafter referred to as the TM30 - delivers 32 inputs and 32 outputs for your DAW. As an alternative, the USB port lets you record 32 tracks to adequately sized USB storage media. Bearing the I/O configuration in mind, it's time to familiarize ourselves with internal mixer functions. User control is accomplished with a 10-inch multi-touch screen, accompanied by a coherently designed hybrid system of touch and hardware controls. All functions can be accessed directly via the touchscreen. Additionally, the mixer also offers an incremental rotary encoder to let you finely adjust the currently active parameter. The TouchMix Control app for iOS and Android smartphones and tablets allows users to remotely control single functions or all mixer functionality. With its LAN port, the TM30 can also be integrated into a WiFi network via a wireless router, primarily to support musicians in setting up personal mixes on their smartphone. In the studio recording role, the TM30 has a full-featured system to handle headphone monitor mixes. Engineers can use a tablet to access the full user interface to con-

The effect page with all available parameters

Here an example showing the 'Dense Reverb' on FX Returns to the Auxes

trol mixer functionality while, for example, at different locations.

User Interface

The mixer's surface is divided into three sections. 24 input level controls for the preamps are presented in two rows along the top. Below these is the 10" touchscreen set in an area of the user surface that is differentiated by a darker color. On its right are the hardware controls. With the exception of the large rotary encoder surrounded by a circular ring of blue LEDs, these controls are all of the push-button type. Next to the screen are five menu buttons dedicated to controlling on-screen functions: Home/Mixer, Menu, Rec/Play, Antifeedback and RTA. These allow users a quick way of switching between all the availa-

ble user interface layers globally. Pressing the Home button returns you to the main screen, which we'll now have a closer look at. The screen is divided into three sections. At the top are fader bank buttons that are selected in groups of eight: 1-8, 9-16, 24-30 plus Stereo-In (TRS jack) und 2Track-Record/Playback. Next come the FX Masters, Aux Outs 1-8 and 9-14 as well as the faders for eight sub groups (audio) and eight DCA groups, whose function should be self-explanatory. Arranged vertically on the left we find virtual buttons giving direct access to the 14 Aux outputs. Tapping on an Aux Out calls up the Aux send level for the displayed fader bank and lets you dial those in as required.

On the right-hand side of the screen, the display shows the Master fader for

the Aux or Main mix, arranged vertically. Each fader channel is equipped with a mute button, a level display, a pan pot and a selector button for the Cue mix output. Let's have a closer look at the functions relevant to studio workflows. Tapping on the Select button on any channel opens up a further control layer. The standard view presented here is an overview of all channel functions such as the graphic EQ curve, dynamics processing and levels for the FX and Aux sends. Selecting the buttons at the top of the screen displays more information for the following channel functions: EQ, Compressor, Gate, Effects, Auxes, Presets and Setup. This last button offers additional parameters for each channel, including polarity, 48V phantom power, delay (in feet, milliseconds and meters), digital gain and assigning a Sub, DCA and mute group.

Once you select one of these pages, you can navigate through the channels using two arrow buttons to call up those functions. The Channel EQ is of a four-band parametric design and is controlled onscreen via the EQ graphic display or virtual rotary encoders. The currently selected parameter is automatically assigned to the rotary control to allow users to fine tune it haptically. The two outer bands can be switched to shelving mode, while additional high- and low-pass filters are also provided. The

Aux Send page for Input 1, with a good overview of level settings

Setup page with basic channel settings

compressor offers the standard parameters like threshold, ratio, attack and release as well as a makeup gain setting. There's also an independent de-esser as well as access to side-chains. The 'Knee In' control lets you choose a knee shape setting. Information on the effects your settings are having is shown in three level displays for the input, output and gain reduction that are arranged next to each other. QSC has chosen an interesting approach to the graphic displays for setting up the compressor. Attack and Release are displayed on a time axis as they act on levels affected by the other settings and not as marked points on a static curve. Even the knee curve display changes between a curved and a more angled version depending on whether the "Knee In" button is active. The channel fader and Main Mix fader always use this display. The noise gate is also presented in this time graph display format. It has controls for threshold, attenuation, attack, release and hold. The same three level displays are also provided. The effects section includes a delay (mono and stereo), two reverb algorithms, a pitch shift/correct feature and a chorus. Effects are brought into the signal chain using a wet/dry mix control, an overall delay setting and a feedback control.

The 'Auxes' screen lets you set the levels of the channels feeding the various mixes (pre/post). The effects can, of course, also be used on the Auxes. Worthy of a mention here is the large array of presets for all channel functions. These are more likely to be of interest to beginners. Let's leave this function layer and turn our attention to the Menu button. The Menu button lets you save and recall complete mixer setups as well as the channel assignments to DCA groups and Aux outputs. Each setting can be named using the virtual keyboard that appears onscreen. The Talkback section lets you set the level while also giving access to the noise generator function. Users can talk or send noise test signals to individual, multiple or all Aux channels, to FX channels but also to the Main mix. All channel functions such as EQ, compressor and so on are also available on all Aux channels and the master mixes. One functional area that's of special interest to us is, of course, 'Rec/Play'. The red function button to the right of the display takes you directly to this section. The Record Mode selects whether MP3 files are to be played back from a device or from a USB stick plugged into the mixer, or whether the mixer is used to record to a connected DAW. 32 tracks are provided here. In my studio, the connection to Nuendo 8 worked with no problems using the appropriate driver. It's important that the channels you want

to record are armed for recording on the mixer's Recording layer. The lower half of the screen provides transport controls including recording and playback for the multitrack USB drive. Each session in multitrack USB recording mode can be given its own name using the virtual keyboard. If you are connected to a DAW, the system automatically assigns 32 inputs and outputs. The workflow here mirrors what you'd expect working with any other audio interface.

Measurements in the Lab

Because the QSC TouchMix-30 Pro has no digital interfaces, we're using the special capabilities of our Audio Precision APx555 to 'talk' directly with the ASIO drivers. We had to fall back on the universal ASIO4ALL driver because the manufacturer's ASIO driver refused to communicate with our measurement device.That's not a ground for reproach, however, as our audio analyzer isn't a DAW. But where there's a will, there's a way. We'll now start reviewing the test results generated by the analog inputs. The test subjects were inputs 1 and 21. We selected the latter because it's the first of the four combo connectors while the others are XLR-only. We wanted to determine if there was a qualitative difference between these two different in-
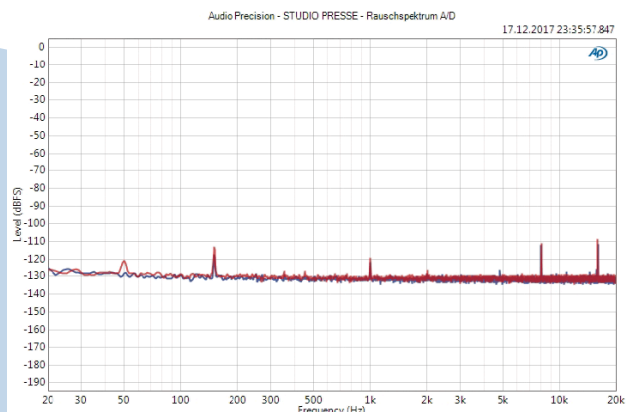
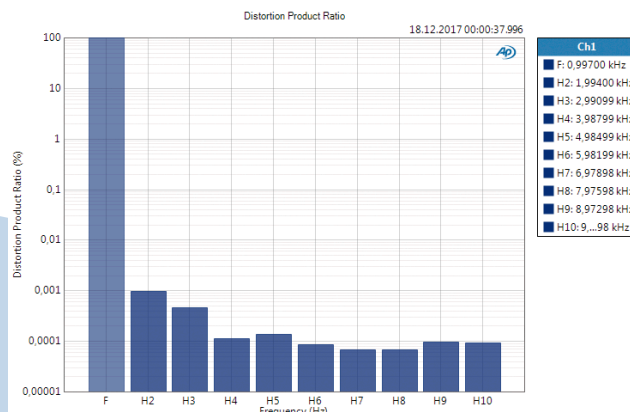Figure 1: Noise spectrum of the input stage at maximum preamp gain

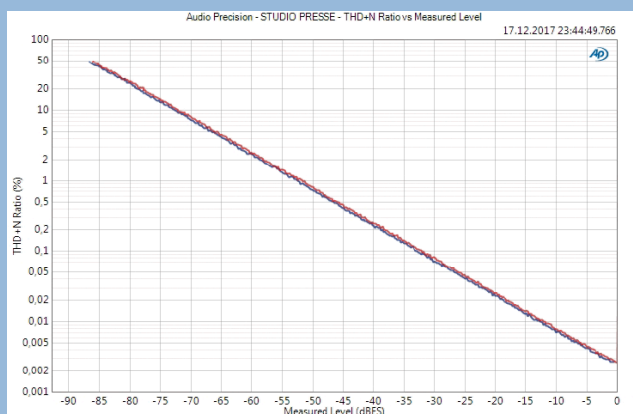Figure 2: Harmonics of the input stage at maximum preamp gain

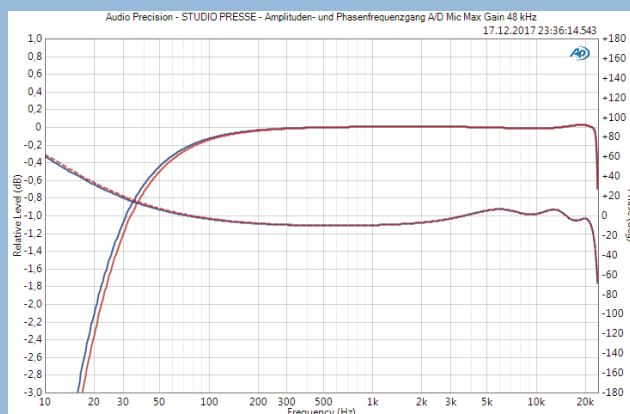Figure 3: THD+N plotted against preamp gain

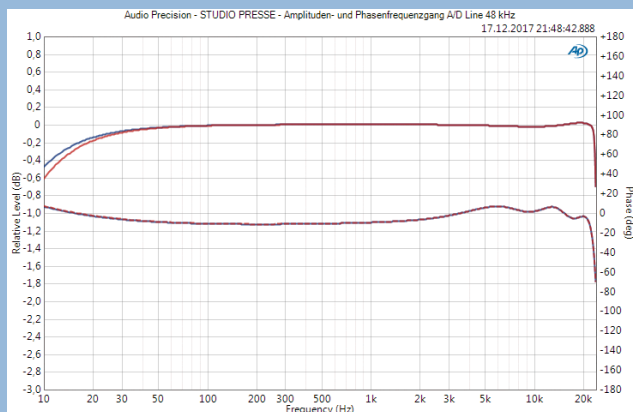Figure 4: Amplitude (solid) and phase (dotted) in relation to frequency, input stage at maximum preamp gain

Figure 5: Amplitude (solid) and phase (dotted) in relation to frequency, input stage at minimum preamp gain
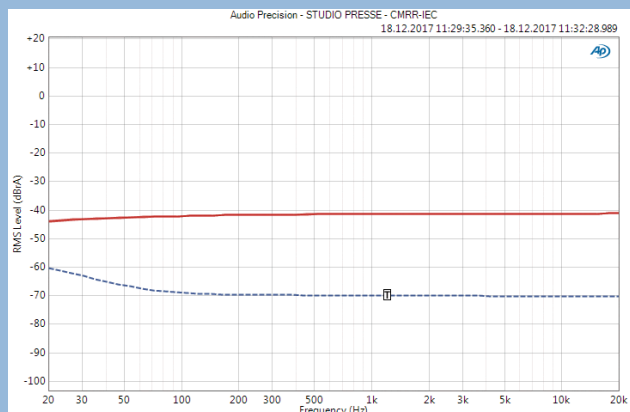

Figure 6: IEC-compliant CRMRR of the input stage with 10 Ohm resistor (higher curves) and with classical balanced circuit (lower curve)
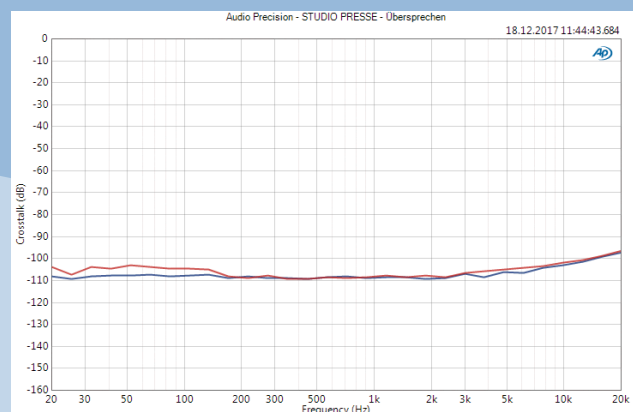

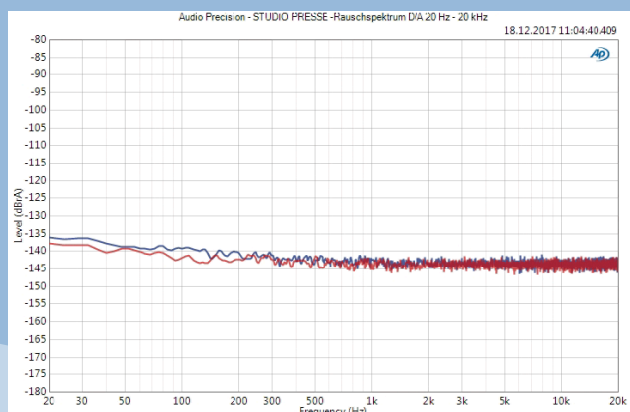Figure 7: Crosstalk between channel 1 and 2 on the main outputs

Figure 8: Noise spectrum of the main (blue) and monitor (red) outputs

put connector types. We used the XLR contacts on the combo connector. It's not necessary to choose between Mic and Line modes for the inputs. All that's required is to turn the input gain to the left down to the lowest possible level. The maximum input level is +15.6 dBu. The results are not always identical for both inputs, which is why we have listed them one after the other, where applicable. We measured an unweighted noise level at the A/D converter of -110 and -109 dBFS (20 Hz - 20 kHz). This value can be taken as the available dynamic range for that channel. The analog inputs showed a basic gain of 6 dB. If we turn up the mic preamp to 40 dB (giving a total of 46 dB gain) around 105.7 dB dynamic range is available. The equivalent input noise (EIN) at this gain level is 124.1 dB. At maximum gain of 54.2 dB (60.2 dB total) the dynamic range falls, albeit to value that's still very good: 92.3 dB. For this value, the EIN is 124.9 dB. The noise spectrum at maximum gain, shown in Figure 1, is balanced and shows only minimal 'needle' artefacts (we suspect that these are due to interference from internal sources). We detected no humming noises. With the preamp gain still turned up to the maximum setting, 0 dBFS translates into a good THD+N value of 0.0027%. The distortion spectrum is shown in Figure 2, and shows a gratifying emphasis of the K2 harmonic, which is influenced by the preamp. Figure 3 shows the relation of THD+N against the input gain level. Let's investigate the relation of amplitude and phase with frequency. Figure 4 plots amplitude and phase against frequency at maximum preamp gain. The preamp causes a slight reduction in the low frequencies. Figure 5 shows the same frequencies at Line level. In order to measure the CMRR and the crosstalk between two adjacent channels, we used the signal path from the analog input to the analog output. The IEC-compliant CMRR is measured to be a below -40 dB across the spectrum, a good value. Figure 6 shows the frequency progression, whereby the total value is determined by the higher two curves created by inserting an unbalanced 10-Ohm resistor into the signal path. In a real world example, the result improves and gets closer to the lower curve. The crosstalk was measured across the first two inputs routed to the Main outputs. Figure 7 shows a nearly constant value of -110 dB, giving us no cause for complaint. But that is to be expected with equipment that is completely digital. Now we'll focus on the D/A converters. The measurements were made at the Main outputs. All levels were set to unity gain (0 db). The maximum output level at the Main outputs is +21.9 dBu for 0 dBFS. This value is almost the same for the individual Aux outputs and the Monitor output, where we measured a difference of -0.3 and 0.4 dB respectively. The noise level of the converter is -110 dBFS RMS unweighted (20 Hz-20 kHz), a good result. Figure 8 shows the noise spectrum, which has no disturbances. We measured a very low THD+N value on the main outputs of 0.0009% at 0 dBFS. At the same level, we measured 0.0015% at the Monitor output. The distortion spectrum for the Main output is shown in Figure 9. The spectrum for the monitor output is almost identical. The progression of the
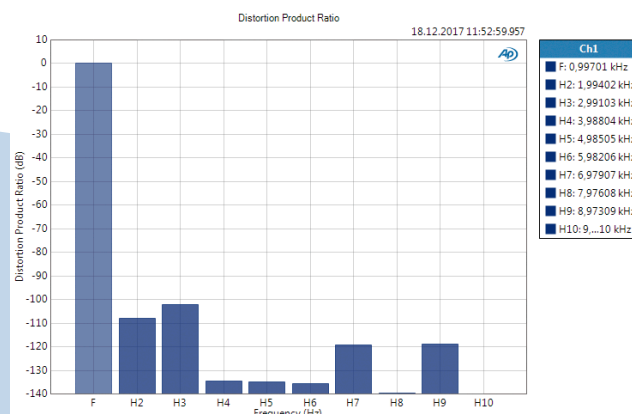

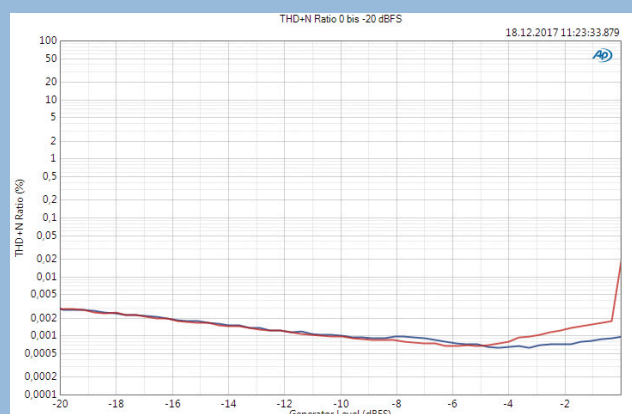Figure 9: Harmonics of the output stage

Figure 10: THD+N plotted against output level for main (blue) and monitor (red) output
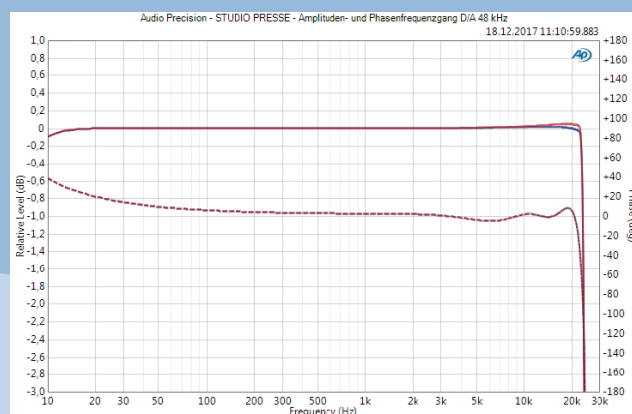

Figure 11: Amplitude (solid) and phase (dotted) in relation to frequency for the main (blue) and monitor (red) outputs

THD+N value for higher gain levels is shown in FIgure 10. It confirms the slight divergence in response between the two output types. Now we come to the results for amplitude and phase at the D/A converter, shown in Figure 11. The differences between the two outputs are slight, but visible. The reasons for this difference might be that the analog circuit part of the converter is different in some way, or that the same converter is mounted in two different component densities. These days, for instance, we generally see the use of eight-channel converter chips. At 14 Aux outputs
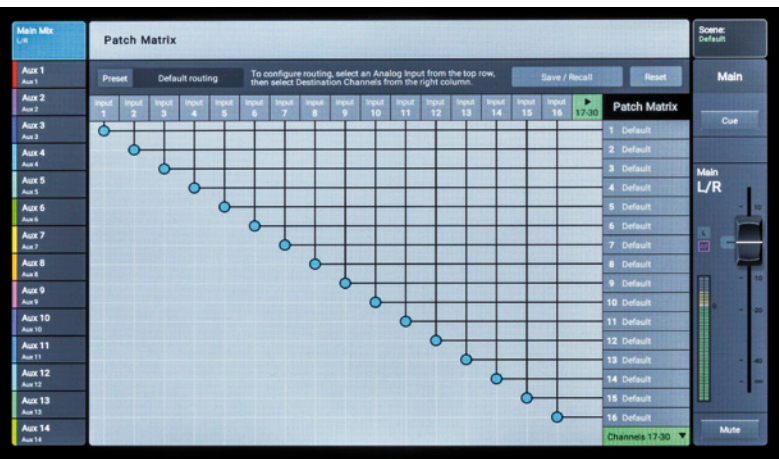
The patch matrix lets users route inputs to any destination
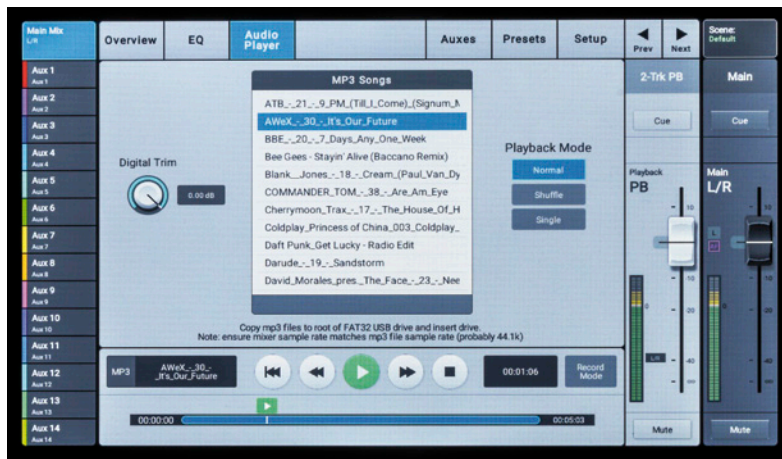
Audio playback feature for connected USB storage media
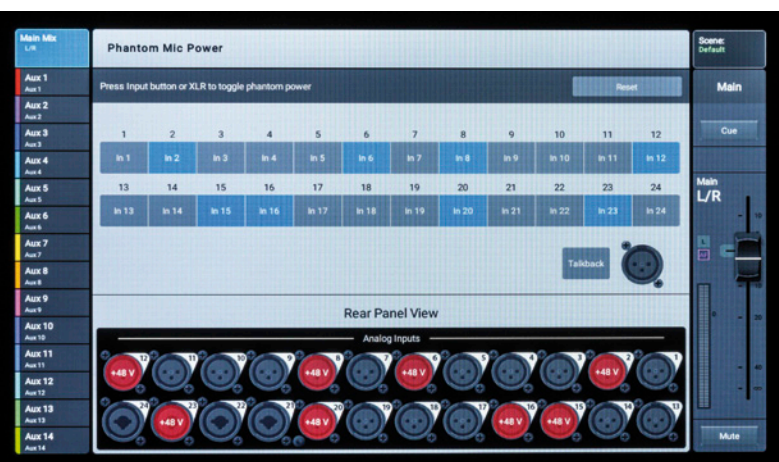
A very good solution: Phantom power is applied for inputs when marked red

A full overview of Aux Send levels and the respective Master mixes

and the Monitor outputs, that would translate to two chips. Because the quality of both outputs is good, we don't need to speculate any further. Overall, we can confirm that this unit has a high level of analog quality. The technology used in the converters is state of the art for a piece of equipment in this class. If you want better converters, be prepared to pay a whole lot more. The preamp used here is low in noise and shows low levels of distortion. At the same time, it has a pleasant distortion spectrum. It's amazing what you get these days for a comparatively small budget.

Listening Tests

My real-world listening tests focus, of course, on using the TM30 in a studio environment as an audio interface. The important aspects here were the sound and the extended possibilities offered by the TM30's DSP. Fundamentally, I viewed this mixer as an audio interface with a few special extras. The crucial part of the equation was, of course, the sound of the preamp in combination with the converters. My first tests used microphone recordings and Line level signals. As we saw in the test results section, the TM30 operates at an exceedingly satisfactory level, meaning that we are justified in having high expectations of the TM30's performance in terms of sound quality. I would characterize the sound of the preamp as being neutral and natural with a slight - and very nice - analog attitude. That expresses itself in a certain warmth and a rounded, defined sound that can handle almost any musical genre or en-

visioned sound. As an audio interface, this puts the TM-30 in the upper mid-range populated by many successful audio interfaces. Yet the TM30 has the advantage that it offers an ample 24 mic preamps, a feat matched by almost no other audio interface. Challenging live and studio productions can be accomplished using the compact TM30, with the option to directly record to an attached USB storage device or via connection to your DAW environment of choice. There isn't a stagebox available for this mixer. It's practically its own stagebox. Considering the compact form factor, that's not going to cause any problems worth mentioning. With the six additional Line TRS jack inputs, the total number of inputs is 30. These can be recorded onto 30 separate tracks. An interesting consideration here is the on-
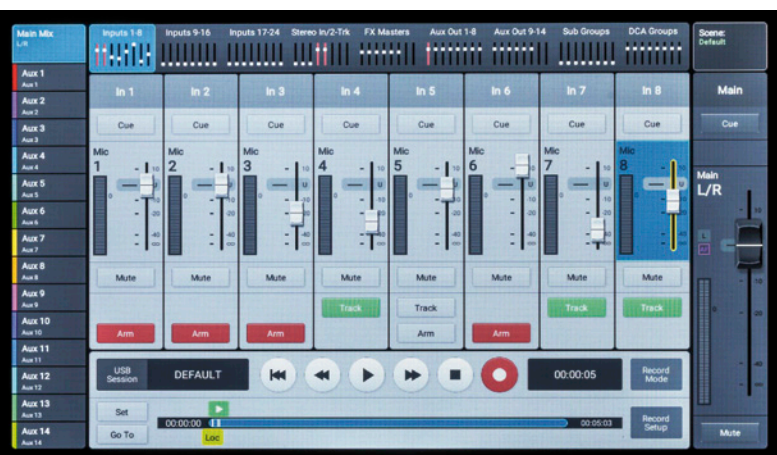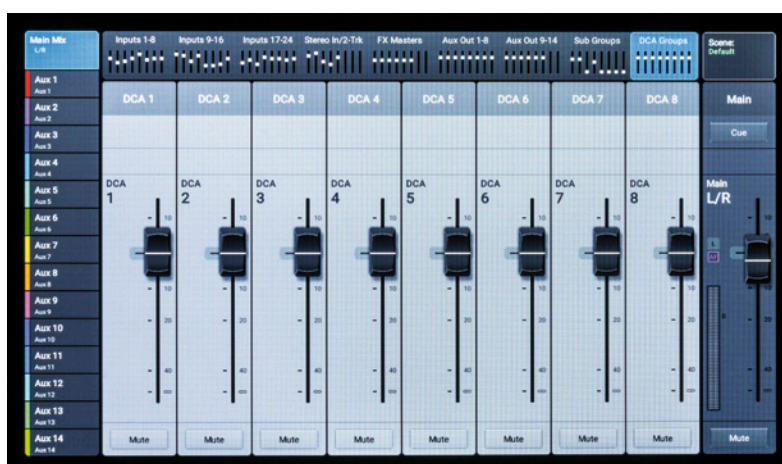
Inputs 1 through 8 with record arming and playback control

Compressor behavior shown with all available parameters and level displays
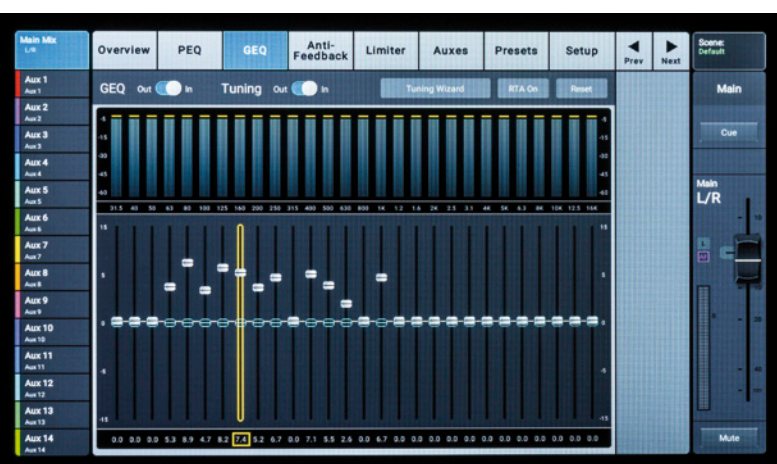
The graphic EQ for the Main Master, with RTA display

DCA Groups view

board DSP, which includes a professional offering of filters and dynamics processing tools. As mentioned above, the filters offer four parametric bands; the two outer bands can be set to shelving mode. Additional high- and low-pass filters are available, too. The filters work very capably and remain absolutely neutral in terms of their sound. They allow both surgical procedures on your audio material as well as softer coloration. Comprising a limiter and compressor, the dynamics tools function very discreetly and fulfill the role, for example, of ensuring a consistent audio signal with reliable and sonically neutral protection against level peaks. Once you've got your audio material stored safely on your hard drive, the comprehensive DSP provided by this mixer can provide valuable services during the mixing stage. The effect quality is respectable, but users will no doubt want to bring in trusted plug-ins from their own effect libraries. It might sound a bit far-fetched, but I can imagine using the 14 Aux sends to route audio to analog summing hardware and analog processing gear. The quality of the converters makes this kind of workflow seem absolutely viable. After a short time getting to grips with it, the mixer's complex user interface structure becomes exceedingly controllable. In a studio environment, creating quasi-realtime headphone mixes can be realized in a convenient way, with musicians using their smartphones as personal mixers. This even includes the option of inserting a reverb to make performers feel more comfortable but without it ending up on the recording. As a user who prefers faders and buttons, I really had to grapple with the interface concepts that rely on the touch-sensitive screen. 'Touching' and 'sliding' the faders was surprisingly responsive. Thanks to the multitouch implementation, you can move several faders at once. What does seem a bit cumbersome is that touching a fader simultaneously activates and graphically highlights it. So when you push several faders, the highlighting on the channel jumps around somewhat erratically, albeit without impinging on the function itself. Every time you feel that the touchscreen paradigm has reached its limits, you have the alternative of using the large rotary wheel to make fine adjustments to the on-screen knobs, some of which are miniaturized virtual rotary encoders. It complements them with a good, reliable haptic form of input. The
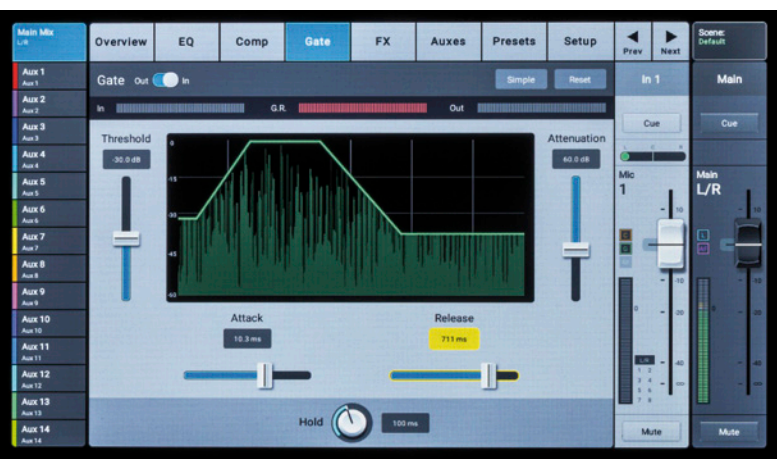
Display for the Gate effect, similar to compressor and limiter

Main RTA with measurement point selection

menu structure is so good that you always maintain a global overview of the whole 'picture' of the entire mixer. For more experienced users, most functions are self-explanatory and I seldom found myself reaching for the manual. Although the TM30's touchscreen interface requires a slightly different approach, the mixer has the advantage of offering a highly compact package that turns into a kind of luxury audio interface when used in the studio. Working with the mixer leads you discover many useful functions that can inspire you to creative ideas. You can, for example, use the eight freely programmable hardware buttons to combine functions you keep coming back to into macros. For live engineers, the wizard features offer a wide selection of presets for the processing modules; these even include full mixer scenes for specific music-related tasks. In studio and live applications, the ability to save a scene is a great help. It lets you configure the mixer with only a few taps of the screen for specific tasks, including ancillary tasks like headphone mixes and routing tracks, setting up mixes or naming channels. The handling on the '48 V side' is practical and neatly managed. The microphone inputs are displayed with a photo and colored red when phantom power is activated.

Summary

In the form of the TouchMix-30 Pro, this American manufacturer has created a hybrid solution that functionally combines live and studio work in a clever way. Even if you don't want to use the mixer's wide range of DSP functions when recording, you still get a 32-track audio interface with 24 preamps for an almost brazenly low price of 1,999 Euros. If you compare this with prices for interfaces with two or four inputs, it quickly becomes clear just how affordable this offering by QSC really is. The large touch-sensitive screen is an easy-to-use information center that offers an excellent overview for recording work. Creating a wireless network by plugging a router into

the LAN port adds more useful ways of controlling functionality using tablets and smartphones. The accessories available for this mixer include a tablet holder for an iPad or Android tablet, offering a pseudo meterbridge or a way of extending the user interface. Available in many live mixers these days, the remote control layer can be used by live engineers to work from different positions in a room or live venue. As someone who likes his technical toys, I had a lot of fun with this product, using it as a kind of uber-interface to create different and very interesting ways of working. The era of compact digital mixers in studios might not be over after all, as long as they can also function as an audio interface.