crystal
Welcome to digital broadcasting.

English

Networking Audio Systems

LAWO

crystal: Ready to perform.

There is just one short sentence that perfectly describes the crystal: the ideal mixing console for broadcasters who want to be on air – now. Simple, clear and unambiguous. With the crystal, we offer a tool that combines the highest quality with well-conceived ease of operation. The technology is all there, but it's your programmes that must be centre stage. Unnecessary gimmicks shouldn't overwhelm you; better that clear operating concepts assist you, so you can concentrate on your objective – to produce great broadcasts. Using an attractive console, at an attractive price, and made by one of the most distinguished audio technology manufacturers in the world.

crystal – Welcome to digital broadcasting.

Highest usability for radio hosts:
crystal in everyday broadcasting.

A quick glance at the news, run through the guest list and the playlist, and then it kicks off – the Monday morning show with thousands of listeners. It's just as well that radio presenters can now fully rely on their mixing consoles, because they know exactly what is where. The ergonomic design simplifies operation, even in a hectic situation. Well laid-out displays provide the right information, all of the time. And it's actually enjoyable to handle a broadcast with the new crystal – even on a Monday morning, just after 4.30 am.

Advantages of the crystal in everyday broadcasting:

- Well laid-out control surface for the best possible overview
- Short user training time, thanks to a universal operating concept
- Ingenious n-1 conference logic for convenience and security during transmission
- VisTool touchscreen software for visual feedback and extended ease of operation
- Easy connection to radio automation systems

Flexible operation for editors:
crystal at the editor's workstation.

Your editors have everything they need: a selection of original sounds, fundamental expertise and pointed comments. They also have a deadline, because the lunch-time show starts in 40 minutes. That's why they want to concentrate on the content of the feature and not on the technology. Fortunately, they have the ideal tool with the crystal, because this new mixing console can be operated easily, even when the job becomes complicated. All the required functions are right there and directly accessible. Standardised templates guarantee logical workflows. And there are also system-wide functions that increase efficient operation. Thus the next few hectic minutes are no problem, at least, not as far as the technology is concerned.

Advantages of the crystal in everyday editing:

- Compact desktop console for flexible operation
- Ergonomically designed control surface for intuitive operation
- Direct access to the most needed functions (e. g. listen selection or GPIO control)
- Ready-for-operation – standard configurations get you going
- Integration in video environments and larger systems via MADI and SDI (embedded audio)
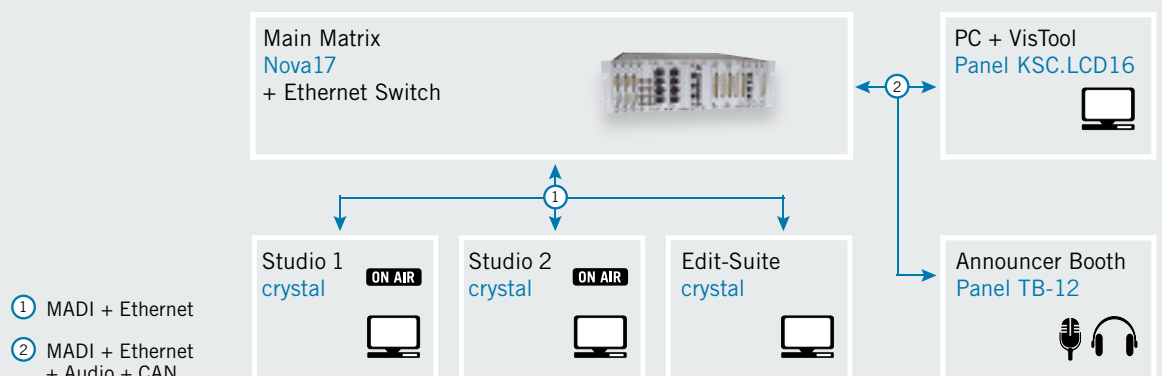
crystal networking

A shining single workstation solution and a brilliant team player: the crystal offers many features when it comes to networking – from the option of being able to connect audio via MADI through to its functional integration into comprehensive broadcasting systems. The advantage: you benefit from more efficiency at work, while saving unnecessary costs.

- Cost efficient MADI interfaces for high-performance audio networking
- System-wide availability of signals (listen selections, live feeds etc.)
- Network control via TCP/IP for resource sharing or multi-studio operation
- Support of system-wide functions (broadcast button, talkback, control data etc.)
- Integration in video environments and larger systems via MADI and SDI (embedded audio)

Main Matrix
Nova17
+ Ethernet Switch

PC + VisTool
Panel KSC.LCD16

Studio 1
crystal
ON AIR

Studio 2
crystal
ON AIR

Edit-Suite
crystal

Announcer Booth
Panel TB-12

1 MADI + Ethernet

2 MADI + Ethernet
+ Audio + CAN

More than more:
crystal highlights.

Compact system core

Just 1 RU high, 19 inches wide – with the crystal, highest quality now comes in a compact package. The system core does not only stand out with its neat dimensions, but also with a speed that is ready for immediate action; this PC-free unit guarantees a short boot time. A further advantage of the crystal is the comprehensive feature set available in even the basic version, that enables you to make a quick start on your everyday work. What if you want to expand the boundaries? Additional options are available to meet the widest range of requirements – even glass fibre links to the main control room.

Ergonomic control surface

Its compact construction and high-value design make the crystal an ideal desktop unit. Apart from its modern looks, the crystal is particularly attractive because of its outstanding ergonomics. It doesn't matter whether you choose the 4, 8, 12 or 16 fader model, multi-coloured status displays and two high-visibility OLED displays per channel guarantee optimum workflow, even in critical situations. As far as components are concerned, particular importance is attached to quality and durability. After all, the crystal reflects two important maxims: ‚Made in Germany' and ‚Made by Lawo'.

VisTool touchscreen software

Additional functionality and an even better console overview: VisTool touchscreen software is a perfect complement to the crystal's control surface. Not only signal processing but also various other functions can be graphically displayed. Additional features such as access to snapshot databases, routing matrix control or timers, all add to the ease-of-use and confidence in everyday operation.

Modular panels

Do you need additional buttons, want to modify your workspace layout, or require more control facilities for additional devices? Then the KSC series panels are the perfect solution for you. Whether it is playback, pre-listen or red light control – the wide selection of panels will suit all requirements. Depending on your needs, up to fifteen of these button control panels can be fully integrated into your system.

Everyday work can be a breeze:
crystal operating philosophy.

When anyone sees the crystal for the first time, they are always enthusiastic. Partly because this new mixing console from Lawo is simply a visually attractive device, but also because the operating elements are arranged in just the way that discerning users always wanted. For example, the high resolution OLEDs guarantee an optimum overview of console status in every situation, and from every angle. Or the user templates, that mean long setup times are a thing of the past – thanks to standard configurations – and make instant start ups possible. And buttons with an elegant RGB look that colour code themselves according to their function: yet another convincing reason for the professional user.

Console shown actual size

crystal – Welcome to digital broadcasting.

Point by point:
Advantages of the crystal operating surface at a glance.

1 **Rotary controls** For setting DSP parameters, and the adjustment of microphone preamps or aux send levels.

2 **Multi-function buttons** For the control of DSP parameters and bus assignment, and also for assignments to individual functions (e. g. PFL, conference, talkback). Button labelling is provided by the adjacent OLED display, while visual feedback is provided by multi-coloured LEDs.

3 **OLED display** For the labelling of multi-function buttons and to display DSP parameters. Bus assignments are also shown on this high quality display.

4 **Access button** Channel selection to change DSP parameters or source assignment.

5 **Faders** Long-life 100 mm faders with built-in dust shield.

6 **Multifunctional status display** This oval display indicates the source group or audio presence using multi-colour LEDs.

7 **OLED display** Indicates the source name (label). Permanent display, large characters and central positioning provide for maximum security during operation.

8 **Multi-function buttons** Large buttons for the most important or regularly used functions such as ON/OFF, PFL, mute or the start control for source feeds – optimally and neatly placed in the lower area of the control surface.

9 **Peak meter with integral correlation meter** For the level and correlation display of summed or monitor signals.

10 **Ambient Light Sensor** Provides automated brightness control of displays and buttons, according to the ambient light in your work area.

11 **Function buttons** These buttons are used to operate DSP parameters, select summing and aux buses, and for snapshot control.

12 **Rotary control with label button** This is for setting the level and balance of, for example, the monitor or headphone signals. Using the assignment button, the control can be labelled. The button can also be used to mute the corresponding output.

13 **Multi-function buttons** Normally used to select monitor sources. The buttons can be individually assigned and labelled.

14 **Multi-function buttons** Further buttons for MUTE, DIM or talkback.

Simply suitable:
crystal control surface variations.

crystal
4-fader model

crystal
8-fader model
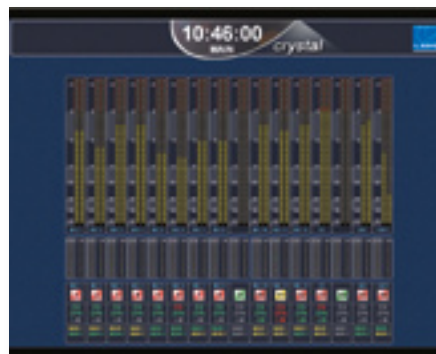
crystal
12-fader model

crystal
12-fader split model

crystal
16-fader model

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14

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For an even better overview:
VisTool touchscreen software.

Extend your mixing console with the Vis-Tool* software option and you'll benefit from a better overview and even more functionality. With this useful facility you can, for example, extend the capacity of the crystal with additional functions such as timers or snapshot databases. Additionally, this innovative tool allows you to view channel parameters, or provide an overview by arranging level and status displays on several layers. Once again there is a choice of versions. However, whatever you decide on – the basic VisTool CS version (included) or the optional VisTool Edit software that allows you to freely configure user surfaces – with our touchscreen software you will definitely benefit from even more efficiency in your workplace.

VisTool plus points:

- Better overview and intuitive operation via the touchscreen
- Up to 6 logic-controlled timers for comprehensive event control
- Work with snapshots in a central database
- DSP parameter display (e. g. dynamics and EQ characteristics) simplifies signal processor control
- Additional level display for input channels or summing buses
- Interfaces for logic, routing matrix and DSP control can be freely arranged and supplemented with display elements

(* VisTool operation requires a PC with Windows® 2000/XP, including an Ethernet connection and suitable monitor/touchscreen.)

Basic version: VisTool CS
The sensible extra for daily production routines.
Every crystal now comes with VisTool CS as standard. This software version includes, among other useful functions, two level displays and one timer, as well as providing direct access to the snapshot database. And if you need more? Just order one of the other versions and you'll soon be enjoying the comprehensive extent of this innovative software's performance.

For even more functionality:
Extend your crystal with panels.

Extend your crystal with a number of button control panels and you are ideally equipped for a variety of tasks – for example conference use, talkback circuits, or prelisten and playback of audio sources from other work areas. Up to fifteen panels can be integrated cost-effectively into the system using the CAN interface, or may be connected, depending on type, via Ethernet (TCP/IP).

TB-12
19"/1RU panel with 12 backlit buttons, talkback microphone and loudspeaker

KSC.T20
19"/1RU panel
with 20 backlit buttons

KSC.LCD16
19"/1RU panel
with 16 LCD buttons

KSC.LCD15P1
19"/1RU panel with 15 LCD buttons,
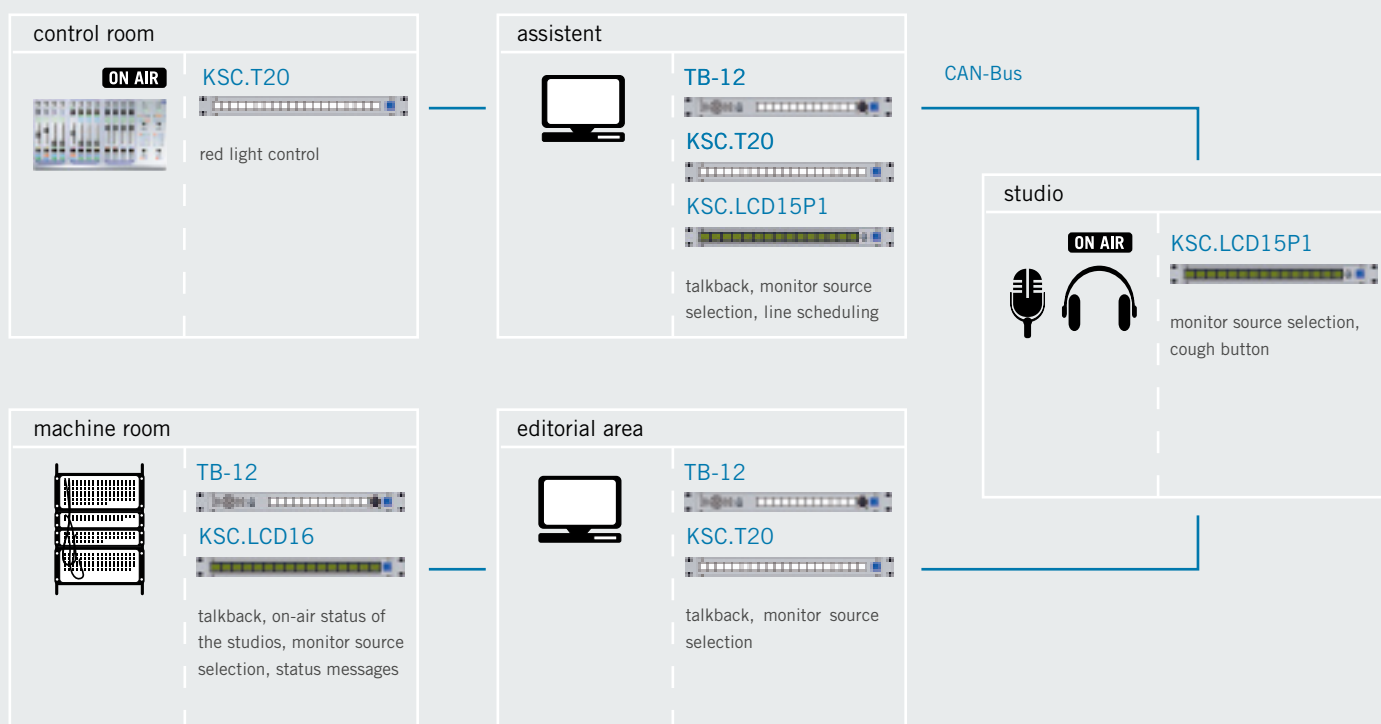and 1 rotary control (e. g. for level control)

KSC.LCD14P2
19"/1RU panel with 14 LCD buttons,
and 2 rotary controls (e. g. for level control)

KSC.GPIO32
19"/1RU panel with 32 GPIO contacts
and 8 VCA inputs

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control room

ON AIR

KSC.T20

red light control

assistent

TB-12

KSC.T20

KSC.LCD15P1

talkback, monitor source
selection, line scheduling

CAN-Bus

studio

ON AIR

KSC.LCD15P1

monitor source selection,
cough button

machine room

TB-12

KSC.LCD16

talkback, on-air status of
the studios, monitor source
selection, status messages

editorial area

TB-12

KSC.T20

talkback, monitor source
selection

High performance and simply handled:
crystal system core.

Equipped to the hilt, the crystal system core can be started up instantly. In its basic configuration, this crystal base unit comes with all the required audio interfaces, and provides complete routing, control and central signal processing (DSP) facilities. Everything is handled within the system core: communication between the control surface and panels, network connections for VisTool and for diagnostics and service, interfaces for external equipment such as radio automation systems and, naturally, audio peripherals. Should your requirements still not be covered, the crystal can be extended with up to two audio interface cards, fitted to the integral expansion slots. The cards come in various types: analogue line, AES3 or HD/SD SDI (embedded audio). In addition, the high-performance MADI option, with up to 256 additional channels, facilitates connection from the core to other mixing consoles or audio networks, via glass fibre links.
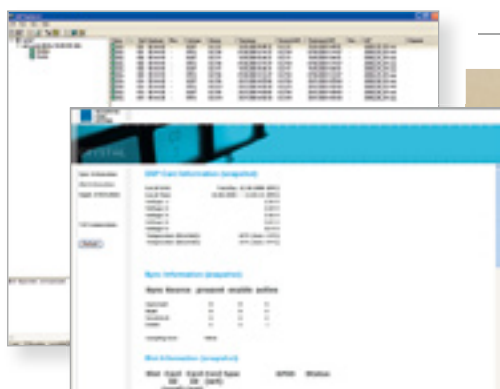
Innovative and uncomplicated:
crystal service features.

Uncomplicated maintenance of the crystal mixing console can be carried out via a network. You simply enter the IP address of your crystal into a web browser and – with a network connection in place – you are immediately provided with a complete overview of the current status of your console. Special tools are provided to perform configuration changes and software updates just as elegantly.

crystal service advantages:

- Stability and shortest boot time thanks to a PC-free control system

- Integral OLED display shows the most important system core parameters, directly on the device

- Simple status monitoring via a web browser and the integral web server

- Simple maintenance: software and configuration updates can be carried out from a central point, via the network interface

- Project-specific solutions provide additional status displays on the control surface and VisTool interface, as well as the central logging of reports and alerts from one or more systems

Standard configuration 'Radio On-Air':
The smart solution for radio hosts.

Whether for a local station or public broadcaster, in a self operated or a traditional radio studio – the crystal template 'Radio On-Air' has everything you need for everyday broadcasting. It starts with the microphone connection, which, with the crystal, comprises two inputs for the DJ and two inputs for guest microphones. How about going live to a sports arena or a phone-in competition? With two hybrid lines, plus conference buses and a control output, you can start immediately. Further features: feeds can easily be connected to your mixing console via one of the four AES or analogue line inputs.

For communication between DJ, guests and technicians, the internal talkback is ready to go, while the external talkback system guarantees undisturbed contact with the outside world. In addition, you will be reassured by the crystal's control facilities – for example, red light signalling and monitor muting, and the entire programme can be transmitted in analogue or digital formats. As you can see, with the radio template you can get into the programme straight away – without complicated configuration or lengthy and tiring setup times.
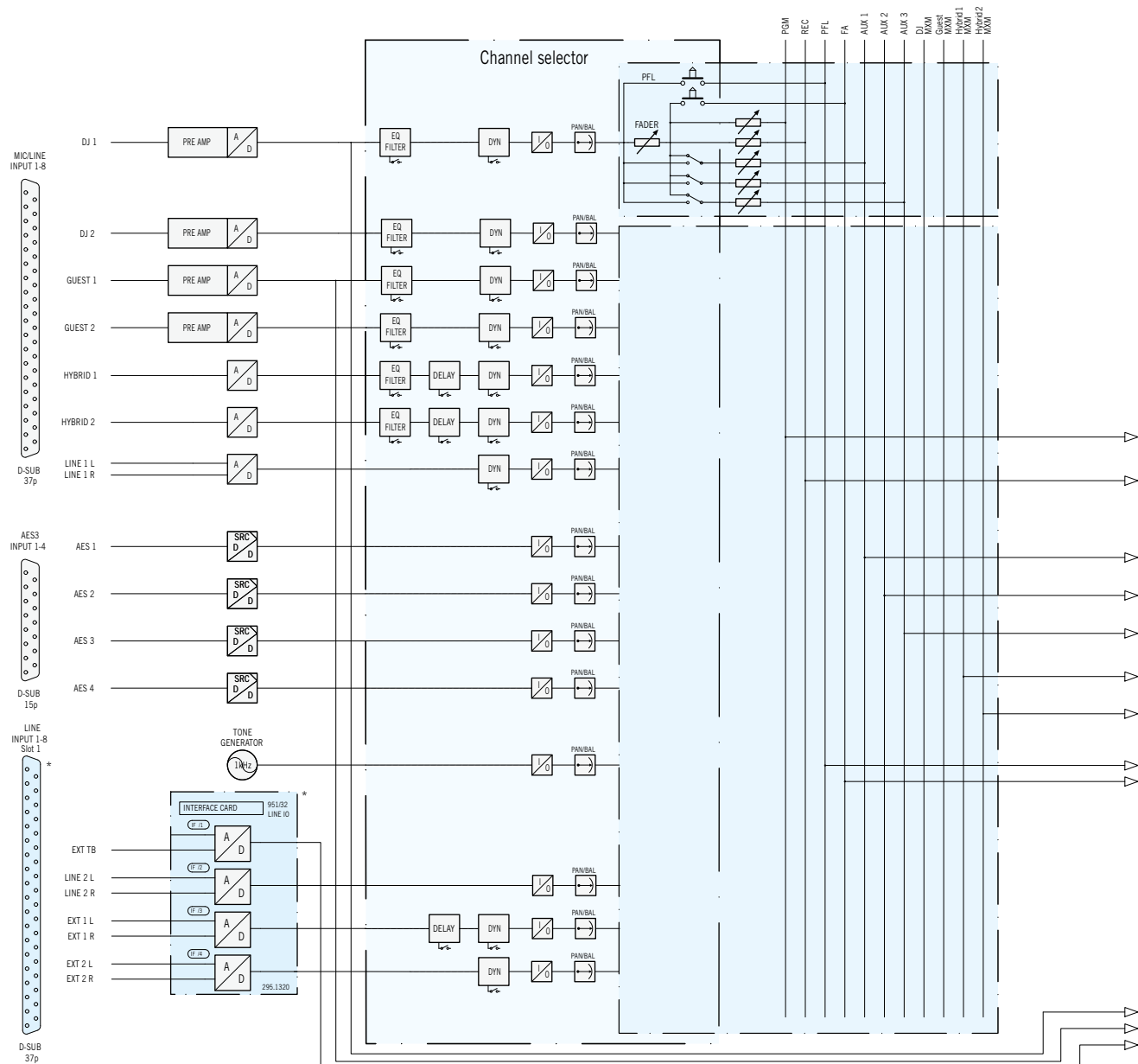
Ready, Steady, Go:
User templates ensure a rapid start.

A computer for which you first have to write the programs? Not everyone's idea of fun! This is why we have developed a range of intelligent standard configurations, based on many years of experience and the user feedback we have received. The result: the crystal user templates that are particularly convincing where it is important – in practical and everyday operation. The proof is in the templates themselves: your console is ready for use after just a few adjustments; long preparation times are not required, and you can concentrate right from the start on what is most important – your programme. Benefit from these new standards in user guidance, and select the configuration that suits your application!

*optional

# crystal – Welcome to digital broadcasting.
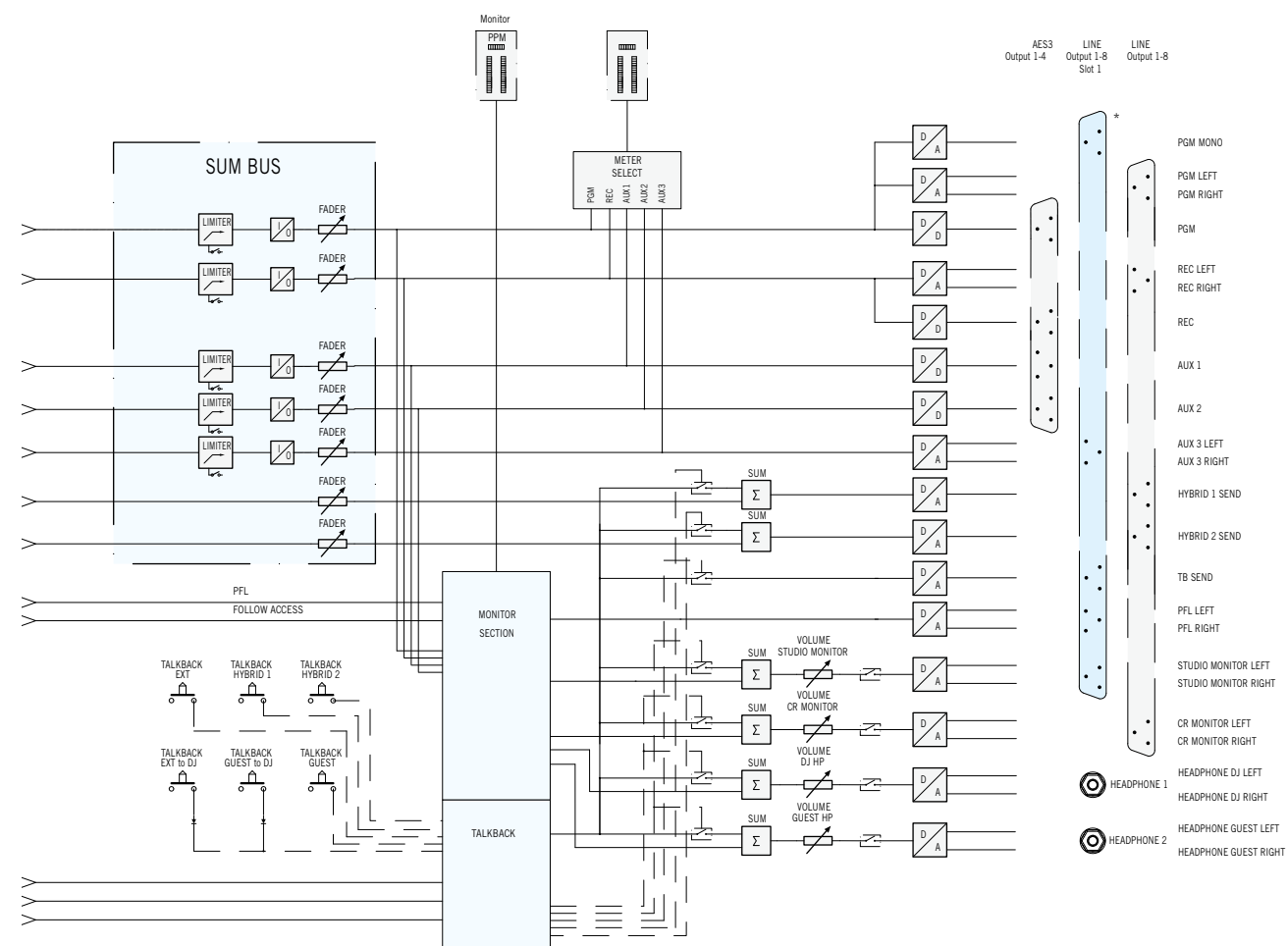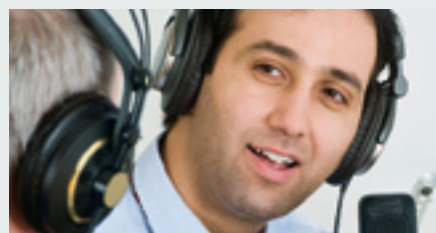
Standard configuration 'Edit Suite':
The smart solution for editors.

An enormous variety of requirements awaits you at the editing workstation. This is why the 'Edit Suite' standard configuration provides a host of pre-programmed settings that are perfectly suited to various applications in radio and TV. Thanks to four digital and six analogue inputs, a variety of feeds can be connected, and two microphone inputs allow additional contributors to be easily added to the content. And what if a telephone interview is called for?

Here too, the pre-prepared hybrid channel proves the practical suitability of user templates. And that's not all, directly from the console, without the use of external hardware, an optional SDI interface card enables the de-embedding and embedding of audio signals – in both HD and SD video formats. Naturally, the editing configuration leaves nothing to be desired in terms of talkback, signalling and listen facilities.
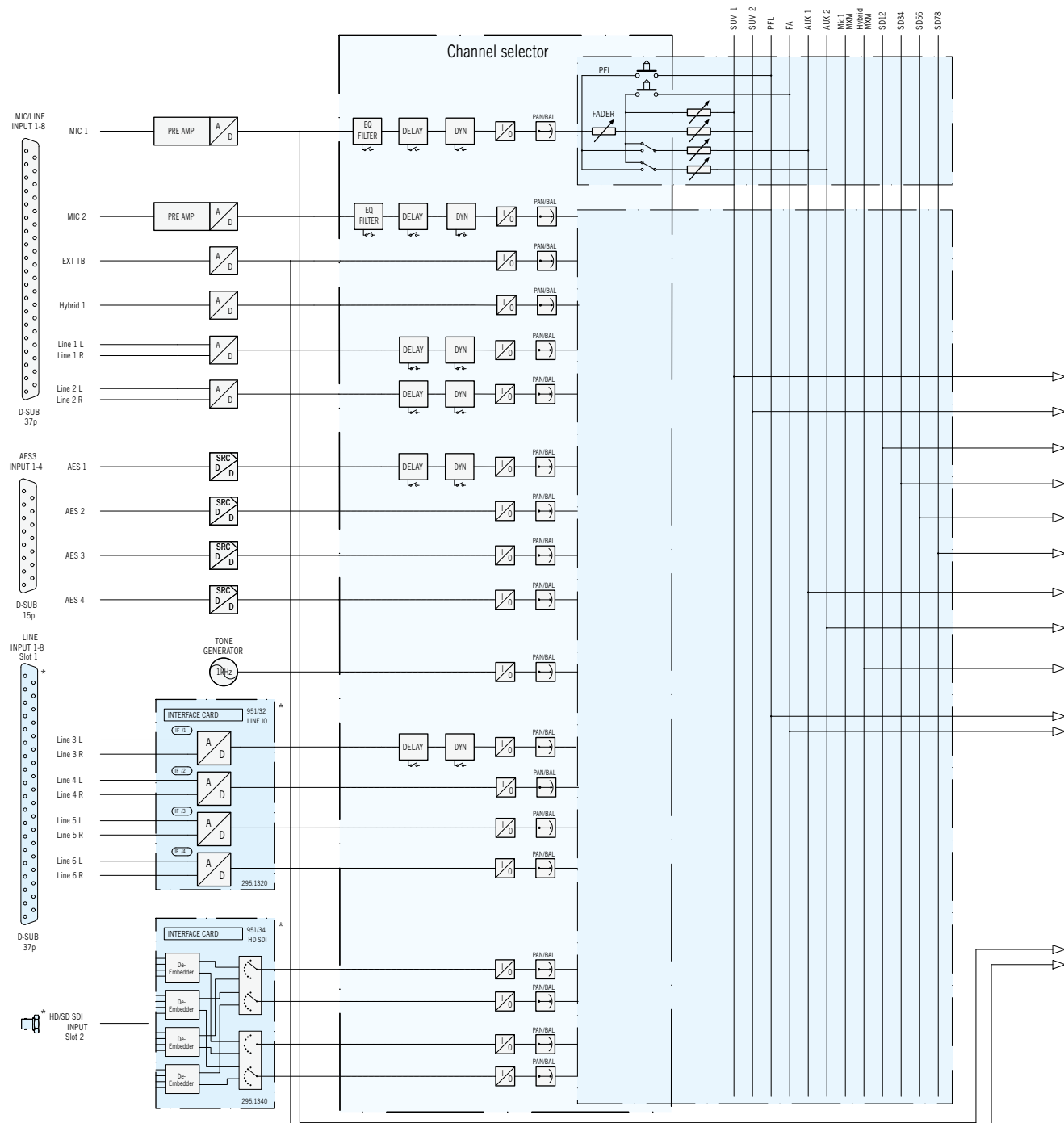
As individual as you want it:
crystal configuration.

The crystal is very convincing as a reliable everyday partner. For this reason, our standard configurations are arranged to fulfil most conventional requirements. But what happens if your specific application requires a special functionality? The crystal is already prepared for this eventuality. Besides operation with user templates, the console's flexible technology also permits modified configurations – and the consequent possibility of adapting the console to your personal requirements; if you'd like to know more, we'll be happy to tell you.

crystal – Welcome to digital broadcasting.
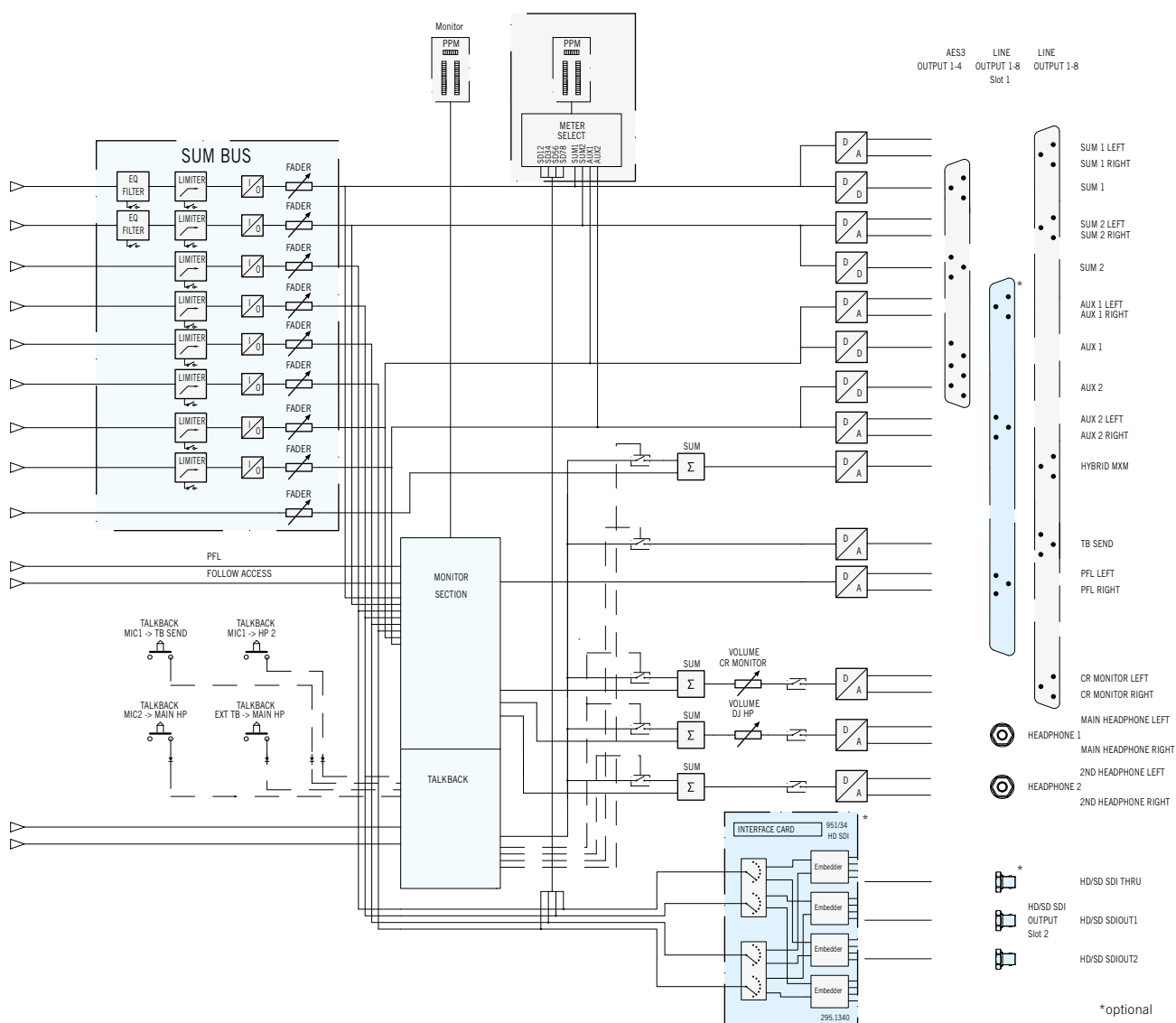
Variety is the key:
Further crystal benefits.

Flexible Upgrades:
The future-proof solution for increasing demands.
Your productions are becoming more and more complex, and you need direct access to more channels? No problem, because, at any time, you can replace your existing crystal control surface for a larger one. By the way, swapping two identical control surfaces can be carried out even while the system is running – without interrupting the flow of your programme.

Conference systems:
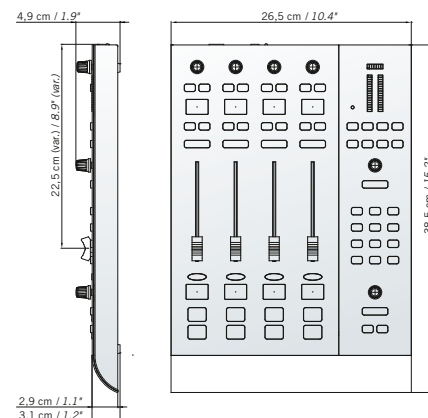#### Multitasking with a single mixing console.
Whether it's a radio quiz, a multi-lingual programme or an interview with your foreign correspondent – with the crystal you have the best means of live programme preparation: two completely independent conference systems not only facilitate multiple simultaneous pre-conference communication, the complete mix-minus functionality is always at your service.
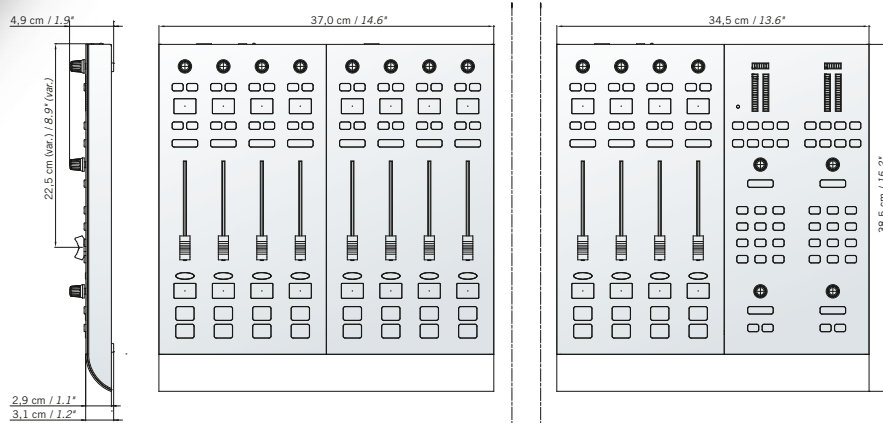
Mobile applications:
So your mixing console is always there where you are.
Even in its largest configuration, the crystal can still be transported conveniently and easily. And not just because of its neat dimensions, but also with its easy installation and fast commissioning, the crystal is eminently suitable for the use in a mobile setup.
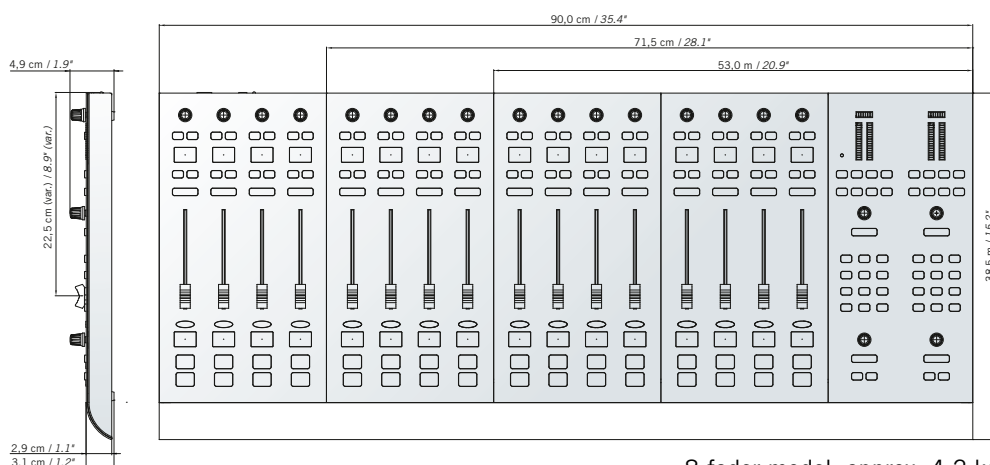
Handy can be elegant:
crystal's ideal measurements.

4,9 cm / 1.9"

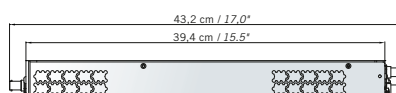22,5 cm (var.) / 8.9" (var.)

2,9 cm / 1.1"
3,1 cm / 1.2"

26,5 cm / 10.4"

38,5 cm / 15.2"

4-fader model: approx. 2.2 kg

4,9 cm / 1.9"

22,5 cm (var.) / 8.9" (var.)

2,9 cm / 1.1"
3,1 cm / 1.2"

37,0 cm / 14.6"

34,5 cm / 13.6"

38,5 cm / 15.2"

12-fader split model: approx. 3.1 kg (faders) + 2.7 kg

4,9 cm / 1.9"

22,5 cm (var.) / 8.9" (var.)

2,9 cm / 1.1"
3,1 cm / 1.2"

90,0 cm / 35.4"

71,5 cm / 28.1"

53,0 m / 20.9"

38,5 m / 15.2"

8-fader model: approx. 4.2 kg
12-fader model: approx. 5.6 kg
16-fader split model: approx. 6.9 kg

43,2 cm / 17,0"
39,4 cm / 15.5"

4,4 cm / 19,0"

48,3 cm / 19,0"

For complete details of weight and other specifications, please see datasheet.

crystal – Welcome to digital broadcasting.

Technical data:
Everything at a glance.

Control surface
- Control surface variants with up to 16 faders
- Compact design with case height only 3 cm / 1.2"
- Long-life 100 mm faders with dust protection
- OLED displays (160° visible angle)
- Buttons with multi-colour backlight (RGB)
- Ambient light sensor for automatic brightness control
- Fully stand alone operable, opt. touchscreen software

System core
- Base Unit 19" / 1 RU with control system, signal processing and audio interfaces
- Integrated routing matrix (non-blocking) with up to 288 inputs and 292 outputs
- Active cross ventilation, system-controlled
- Integral wide-ranging power supply 100…240 V AC or alternatively 12 V DC connection
- Optional redundant PSU, external (future option)

Signal processing
- Up to 16 fader channels with input gain (max. +18 dB) and pan/balance
- Up to 128 definitions for sources and summing buses; mono or stereo, 5.1 surround (future option)
- 16 Equalisers: 3 fully parametric bands and 2 filters (mono or stereo)
- 16 Dynamics units: gate, expander, compressor (mono or stereo)
- 16 Limiters (mono or stereo)
- 16 Delays: up to 320 ms (mono*)
- 32 Summing buses (mono* including PFL)
- 32 Minimixers (2 x 2 mixers for monitoring, stereo-to-mono, etc.)
- Internal tone generator (1 kHz)

(*Stereo coupling possible)

Control
- Programmable logic core (red light, fader start, broadcast button, talkback integration etc.)
- Integrated n-1/conference logic (2 independent systems)
- Serial interface for integration with radio automation systems
- Networking via TCP/IP

Synchronisation
- Wordclock input and internal generator
- Optional sync via MADI or slot 1
- 48 kHz and 44.1 kHz sampling rates

Interfaces
- 4 Analogue mic inputs (incl. bass cut, stereo coupling possible, also usable as line inputs)
- 4 Analogue line inputs
- 8 Analogue line outputs
- 2 Headphone outputs (stereo)
- 4 AES3 inputs (stereo) with sample rate converter (SRC)
- 4 AES3 outputs (stereo)
- GPIO (8 optocouplers, 8 silent cmos relays)
- Optional MADI extension with 4 ports (= 256 mono channels)
- 2 slots for I/O extension, per card alternatively:
  - 8 Analogue line in/out
  - 4 AES3 in/out (stereo) with input SRC
  - HD/SD SDI embedder/de-embedder (4 x stereo)

Configuration and maintenance
- Software for system configuration and logic programming
- Integral web server for system diagnosis
- Dedicated SW tool for software updates
- Remote maintenance using VPN

VisTool (option)
- Software for the enhancement of the control surface, support of touchscreens
- Visualisation of DSP parameters, signal levels and states
- Additional functions and controls (e. g. timer, snapshots)
- Min. PC requirements: PentiumIII-800 MHz with 512 MB RAM, OS Windows® XP Professional, Ethernet interface
- Supported resolutions: SVGA, XGA, SXGA, SXGA+, WSXGA, WXGA, UXGA

Panels (option)
- Several panel variants (19"/1 RU) with illuminated buttons, LCD-keys, potentiometers and GPIO
- Control of logic functions and level adjustment for e. g. conferences, talkback and monitoring
- Connection of up to 15 panels via CAN-Bus (opt. TCP/IP)

Please note that certain system components and functions may require individual configuration, which may incur additional costs, depending on the respective service provided.

As of February 2009.
Subject to change without prior notice, no responsibility is taken for the correctness of the details provided.

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- pro audio with a smile

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