

# crystal



RADIO  
MIXING  
CONSOLE



**COMPACT**  
**INTUITIVE**  
**AUTOMAGIC**

# crystal series

INTRODUCTION





# crystal series

## INTRODUCTION

The crystal success story continues: with over 1,000 installations in radio facilities and small broadcast applications, SNG and ENG vans and TV production suites, broadcasters around the world know that crystal, the most cost-effective entry point into the Lawo world of mixing, offers all of the flexibility and customizability Lawo is known for while providing a future-proof investment for both commercial and public broadcasters. With crystal, standards-based AES67 + RAVENNA networking is available today. Smart technology, ready to use.

The crystal mixing console comes with VisTool, powerful touchscreen optimized PC software for extended visualization and control of crystal installations. In its basic version, VisTool delivers an easy-to-use context-sensitive interface, while VisTool Unlimited can be completely customized to meet any requirements, displaying all parameters or only those that are essential.

With crystalCLEAR, the virtual mixing console is a reality – a completely touchscreen-based mixing console that truly opens new horizons for self-operation. Without the limitations of physical knobs, buttons and faders, the virtual console presents operators with only relevant controls and information, hiding anything not needed for the task at hand. And, like every crystal console, crystalCLEAR optimizes radio workflows with smart functions like AutoMix and AutoGain.

# crystal

OVERVIEW





# crystal

## **SMART TECHNOLOGY: READY TO USE.**

crystal consoles come fully operational, with a preset layout that meets the general demands of a wide range of radio applications. In addition, it allows an unparalleled degree of customization, offering a pool of features second to none. The perfect choice for either stand-alone operation or networked environments, crystal ensures maximum efficiency for on-air operation and production in all aspects of everyday work.

## WHAT'S NEW?

Based on feedback from the users of more than 1,000 crystal mixing consoles, the new crystal offers extensive improvements. The console's user surface is completely re-designed, providing a clear layout in a slim and classy chassis. A contoured hand rest enhances the console's ergonomics, and the re-designed buttons improve the readability of their labels. The new preset configuration facilitates quick and easy use, and is the perfect basis for further customization. In addition to other features, crystal provides all fader sources, a general bus configuration, a control room and guest monitoring.

crystal's versatile compact engine serves as the console's system core, and features power supply redundancy and optimized expansion slots for even more convenient addition of I/O cards. Advanced functions like the integrated AutoMix and one-touch AutoGain provide outstanding ease-of-use, especially to journalists and presenters in self-op situations.

# crystal

## DESIGN



## DESIGN

### **STATE-OF-THE-ART TECHNOLOGY AND ULTRA-SLIM CONSTRUCTION.**

The crystal console is a genuine eye-catcher in any studio. But it is not just the appearance of the console that is impressive.

The build quality and integral attributes of crystal will meet the highest demands – from its superb all-metal case and 100 mm faders with integral dust shield, to its excellent signal processing capabilities.



#### **ERGONOMIC DESIGN FOR OPTIMAL WORKFLOW.**

Apart from its modern appearance and renowned Lawo build quality, crystal's outstanding ergonomics will also impress. Two high-visibility OLED displays per channel provide an ideal overview. Various functions can also be assigned to multi-purpose buttons (e.g. PFL, on/off, start/stop, mute, conference, and talkback). Multi-color LEDs indicate different functions by color schemes. In addition, a set of four user buttons on each fader strip can be assigned with dynamic functionality that is labeled in the OLED display.



# crystal

## HIGHLIGHTS



## HIGHLIGHTS

### **CUSTOMIZATION**

crystal consoles come with a thoughtfully-designed initial preset, but offer a high degree of customization and an unparalleled pool of workflow optimizing functions and features.

The console provides all of the comprehensive functionality found on a conventional mixer, as well as an integrated matrix of up to 288 I/Os. These I/Os can be pre-packaged from a broad range of modules including RAVENNA Audio-over-IP, MADI, AES and Mic/Line.

The control surface is available in variants offering from 4 to 16 faders. All pushbuttons are illuminated with RGB LEDs, enabling users to work with color schemes customized for different functions – e.g., giving every signal processing function its own coloring (blue for EQ, magenta for DYNAMICS, etc.).

Nearly every button on the user interface can be configured to meet the individual requirements. Custom functions can be easily labeled using exchangeable inlays. In addition, the console provides status LEDs below the faders, which can be used as visual cues (e.g. red for DJ mic, blue for guest mic, yellow for radio automation, etc.) or signal presence indication. Better overview gives confidence in operation, especially in busy live situations.

The possibilities for system administrators are countless. They range from small n-1 set-ups to a full-blown conference matrix, and from single control-room monitoring to multiple monitoring buses. Or from a few internal console snapshots to unlimited console and channel snapshots in a database, and from a fully accessible console to a restricted user interface defined by user-rights management.



To complement the console's surface, external 19"/1RU remote key panels are available with illuminated pushbuttons or LCD keys. An auxiliary GPIO interface for extended control of third party devices completes the range of expansion panels.

Beyond the limitations of hardware user interfaces, VisTool – Lawo's customizable touchscreen GUI-builder software – provides additional functionality and clear, context-sensitive presentation of DSP parameters, signal levels and the user snapshot database.

## SMART AUTOMIX & AUTOGAIN

With the integrated AutoMix function, mixing and hosting a talkshow is a breeze. Simply let the console take over control of the microphone mix, while the talent conducts the interview. AutoMix reduces ambient noise from open microphones while keeping the overall volume of the mix at a constant level. AutoMix also works perfectly as a ducking function for voiceovers live on air.

Looking for even more simplification? With AutoGain, the talent can calibrate all microphone signals easily and without understanding dB values and overloads. At the press of a button, AutoGain levels microphone gains automatically within seconds, while the talent just talks into the microphone.

# crystal

INTERACTION



## SURFACE CONTROLS

- 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, Autogain, Automix). Button labeling is provided by the adjacent OLED display, while visual feedback is provided by multi-colored LEDs.
- 3 **OLED DISPLAY** For the labeling of multi-function buttons and to display DSP parameters and bus assignments.
- 4 **ACCESS BUTTON** Channel selection to change DSP parameters or source assignment.
- 5 **FADERS** Long-life 100mm faders with built-in dust shield.
- 6 **MULTIFUNCTIONAL STATUS DISPLAY** This oval display indicates the source group or audio presence using multi-color LEDs.
- 7 **OLED DISPLAY** Indicates the source name (label). Permanent display, large characters and central positioning provide for maximum readability 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 placed for quickest access in the lower area of the control surface.
- 9 **AMBIENT LIGHT SENSOR** Provides automated brightness control of displays and buttons, according to the light present in your work area.
- 10 **PEAK METER WITH INTEGRAL CORRELATION METER** For the level and correlation display of summed or monitor signals.
- 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 labeled.
- 13 **MULTI-FUNCTION BUTTONS** Normally used to select monitor sources. The buttons can be individually assigned and labeled.
- 14 **MULTI-FUNCTION BUTTONS** Further buttons for MUTE, DIM or talkback.

# crystal

## INTERACTION



## THE VISUAL RADIO CONSOLE

### INTUITIVE, NATURAL CONTROL

In today's radio station, the computer monitor is the studio's centerpiece. Playout system controls, phone queues, news and weather, even live copy are all onscreen – and the number of those screens has increased dramatically. Yet, while today's talent expects interactive displays, consoles still force them to use physical controls, diverting attention from displayed information. And when focus is lost, shows suffer.

crystal solves this problem by melding physical and virtual controls. Faders, source assignments, monitor selection and other familiar controls are all available on crystal's beautifully crafted work surface – while at the same time, on-screen console controls are squarely within the operator's field of focus, enabling intuitive touchscreen operation. It's this blend of physical and virtual that makes crystal one of the most powerful, easy-to-operate consoles ever designed.

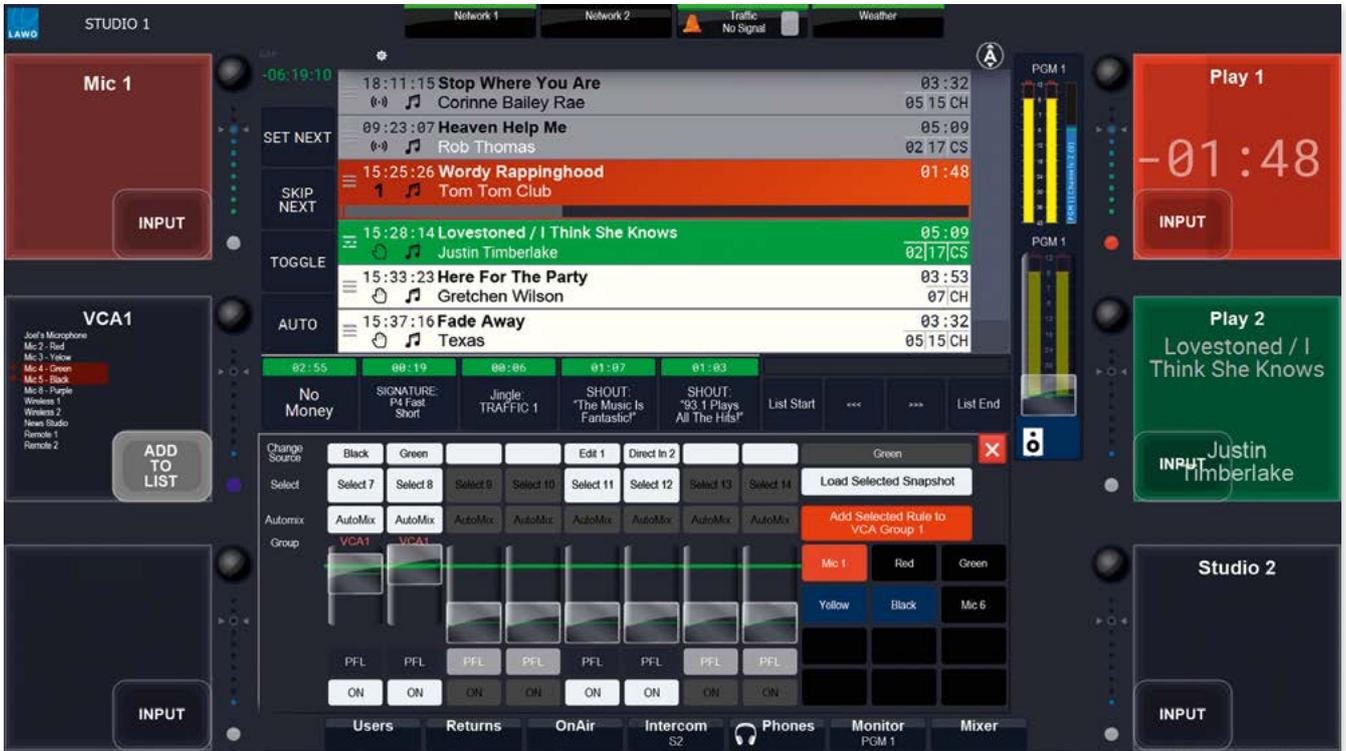
### YOUR CONSOLE, YOUR INFORMATION, YOUR WAY

crystal's control screens do more than just display meters – they're optimized for use with today's multi-touch displays. Powered by Lawo VisTool, a sophisticated GUI builder with a vector-graphics engine that renders clear, beautiful displays at any size or resolution, crystal combines multi-touch controls with information

in an infocenter designed for today's fast-paced studio environment – optimized with all the tools talent needs to produce seamless, error-free shows. Meters, timers, clocks, EQ, dynamics, routing displays, input parameters, channel assignments and more are part of crystal's interactive toolkit. Touch the screen to adjust voice processing, take phone calls, recall console snapshots, load audio sources and more. Use on-screen virtual faders to quickly adjust source and monitor gain. Build custom displays that combine Web browsers, playlists – even video feeds.

Best of all, crystal never insists on having a whole screen to itself. To help combat display proliferation, crystal's display instantly "docks", freeing screen space for playout systems, audio editors and other crucial tasks. When docked, console controls are stored out of sight, while important real-time meters and clocks remain visible within a compact sidebar.

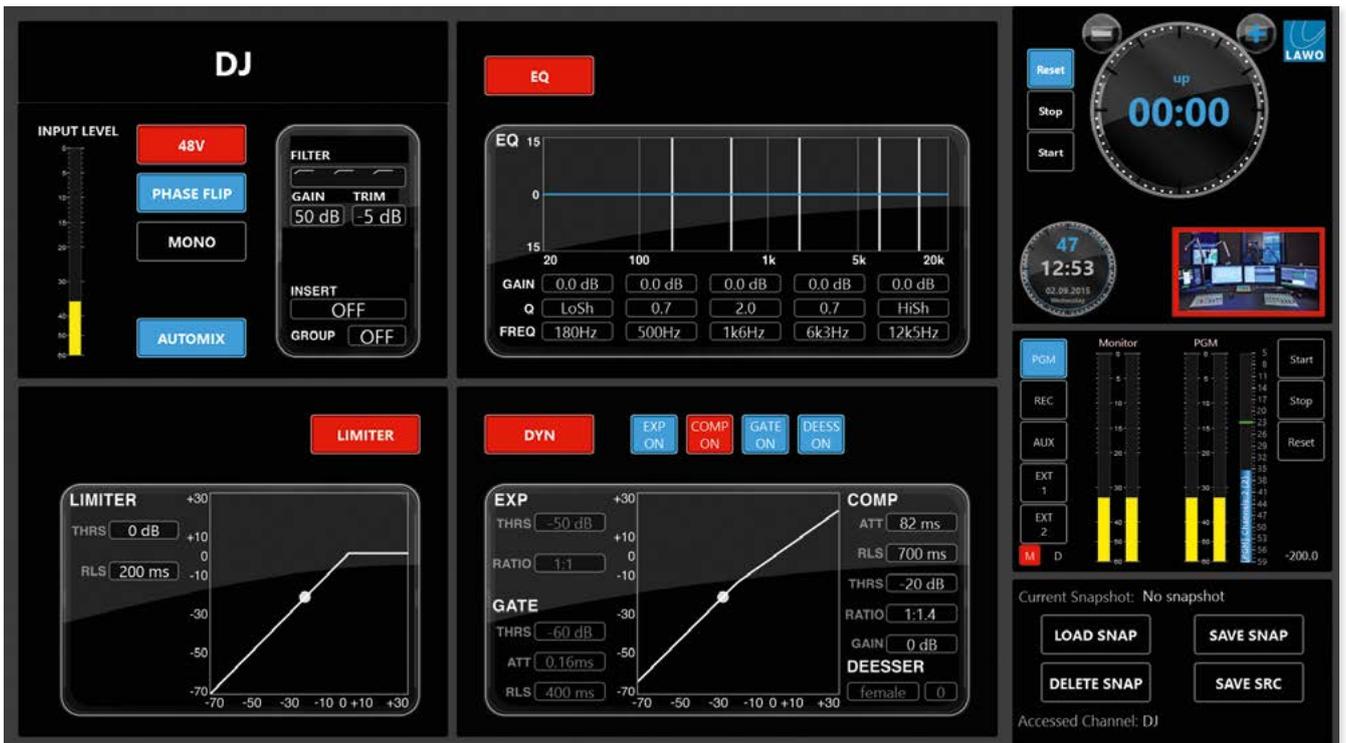
crystal comes with a pre-configured collection of control screens ready to run as a multi-touch, docking display. Timer and NTP-synchronized clock, Loudness Metering, monitoring and metering of main outputs, output routing and Snapshot tools are provided; an interactive settings screen is shown when a channel's Options mode is activated.



## ON-SCREEN CONTROLS

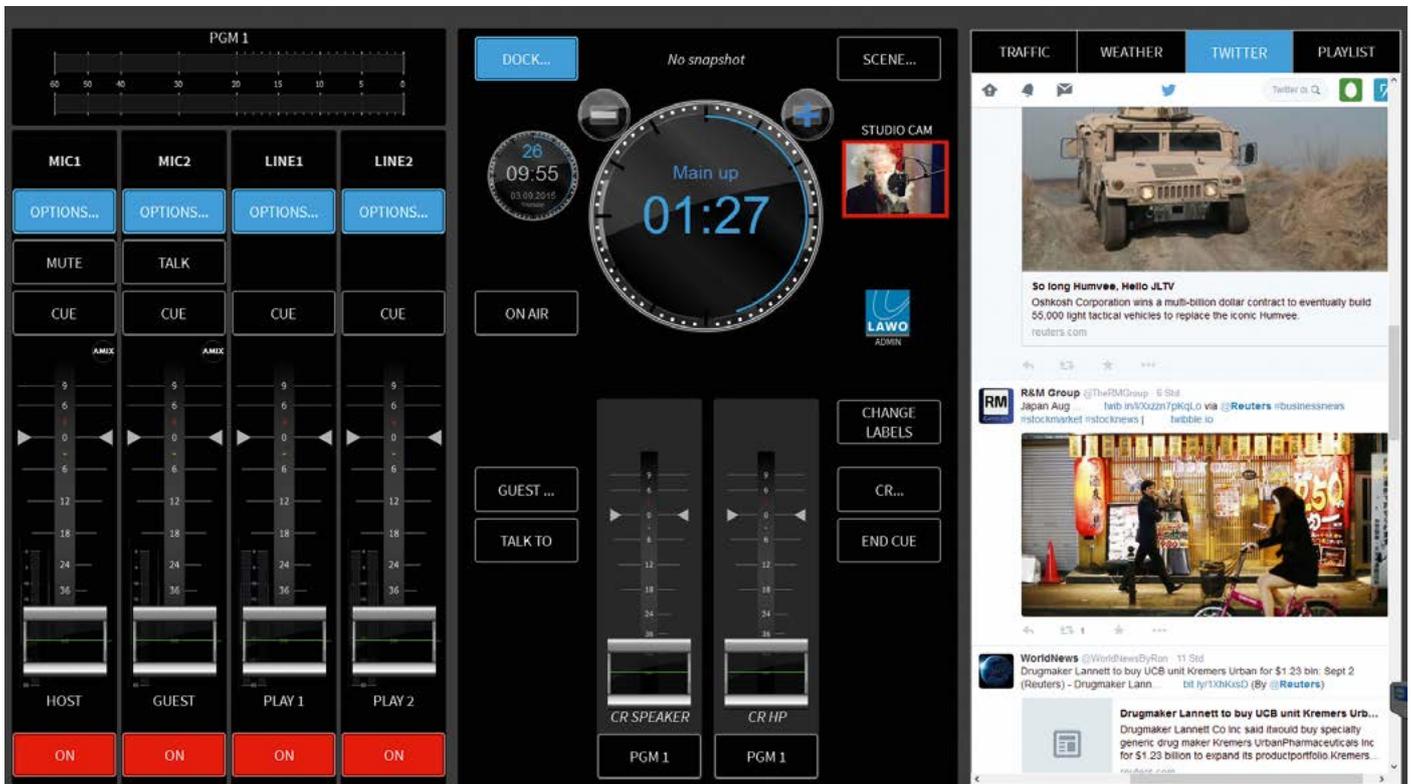
### INCREDIBLY CUSTOMIZABLE

Standard crystal screens are built with VisTool Standard GUI-builder software. But you can have even more power by upgrading to VisTool Unlimited to design and build custom touch-sensitive screens to match your station's unique operating style. Just drag-and-drop



# crystal

## VISTOOL



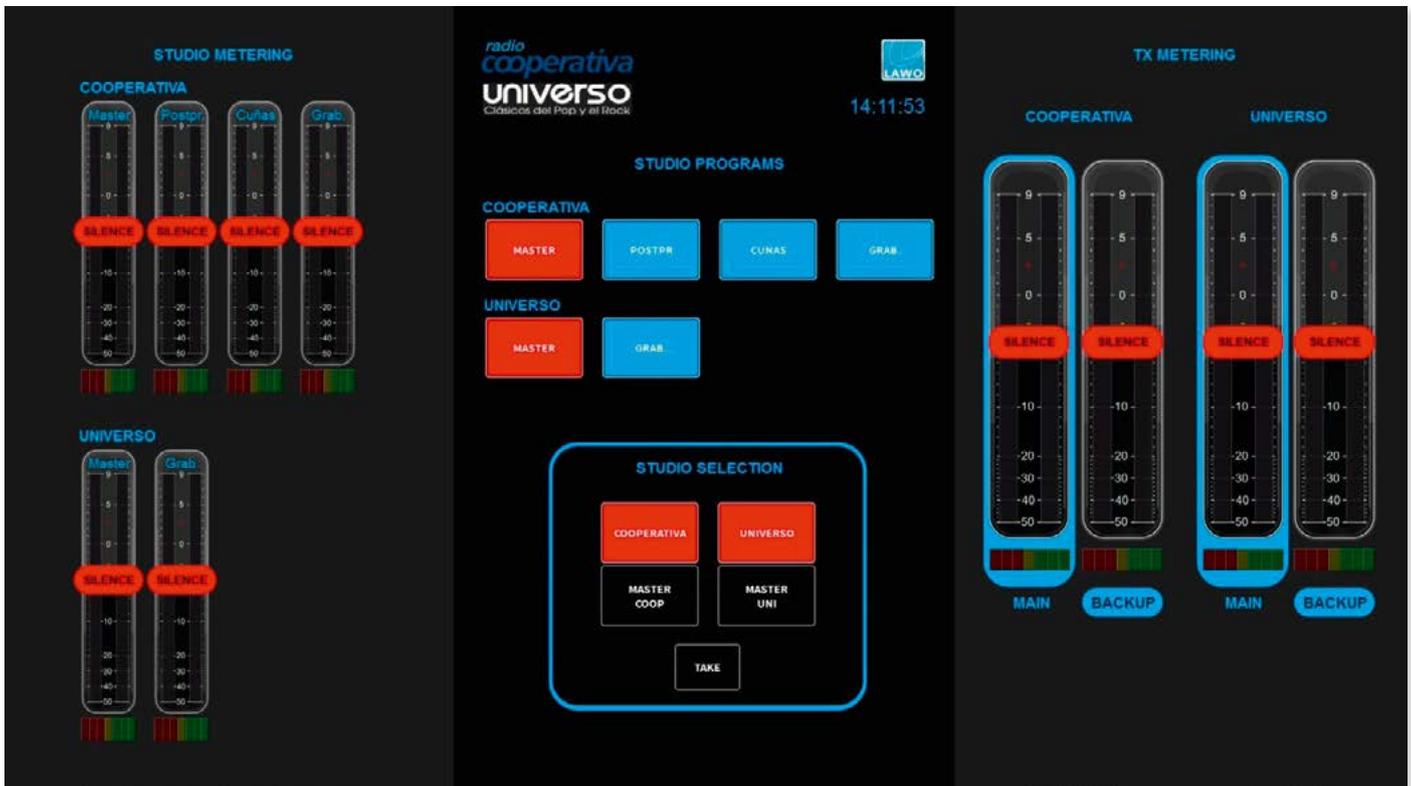
elements onto the screen to build control screens, meter walls, and integrate studio software tools using the open-source Ember+ control protocol. A comprehensive library of objects is included – and you can also create your own custom graphics. Make multiple pages of layouts, display them on multiple screens and switch between them at will. You can even save groups of screen objects as “snippets”, which can quickly be re-used as you build more custom screens.

### REMOTE CONTROL AND USER MANAGEMENT

Today's networked studio infrastructure makes it easier than ever to control devices remotely, and share information between studios. VisTool is designed to take maximum advantage of studio networking, giving you the ability to operate your crystal console remotely with complete access to every function, using just a PC and network connection.

VisTool also allows you to share console settings between studios. An unlimited number of snapshots and DSP profiles can be stored and recalled from any networked console, allowing individual talent settings, or customized show settings, to be available everywhere in the station. You can even make console configurations portable – profiles can be customized to individual operator preferences, and then load automatically when each user logs in at the console.

There's also a sophisticated rights-management system that gives studio engineers the power to tailor access to console features based on multiple user groups, or even on a user-by-user basis. Set up different access levels for technical personnel, experienced DJs, and trainees. Decide which console features are accessible, and which ones are locked. Make individual snapshots available for recall by specific users – even restore voice processing settings automatically for each user login. The sky's the limit!



## KEY CRYSTAL DISPLAY FEATURES

- Create and use multiple pages per console
- Connects to console via TCP/IP
- Multi-touch operation enables onscreen control of a wide range of console parameters
- Outstanding user management with custom snapshots available locally or across the network
- Create and save “snippets” to easily recall and re-use functions while building new screen sets
- Docked, windowed or full screen – VisTool shares screen space beautifully with other apps
- VisTool Editor enables creation of custom page layouts
- Large included library of scalable vector objects includes buttons, meters, text displays, faders and rotary controls, loudness indicators, confidence meters, processing curves and more – plus, import your own custom graphics

## ABOUT VISTOOL STANDARD

- Included with every crystal console
- Preconfigured to get you up and running quickly
- Overview screen includes docking bar with timer and clock view, monitoring and metering of main outputs, and access to Snapshot database
- Built-in X-Y matrix for output routing
- Full screen view of channel parameters

## ABOUT VISTOOL UNLIMITED\*

- Unlimited possibilities for configuring customized layouts using the graphics library in VisTool Editor
- Create multiple pages of different layouts, display them on multiple screens and switch them during operation
- Open existing configurations and adapt them to your needs
- Save and re-use groups of items as snippets.
- Download more snippets from our website

## NETWORKING CRYSTALS

### DESIGNED FOR EFFICIENT SYSTEM ARCHITECTURES.

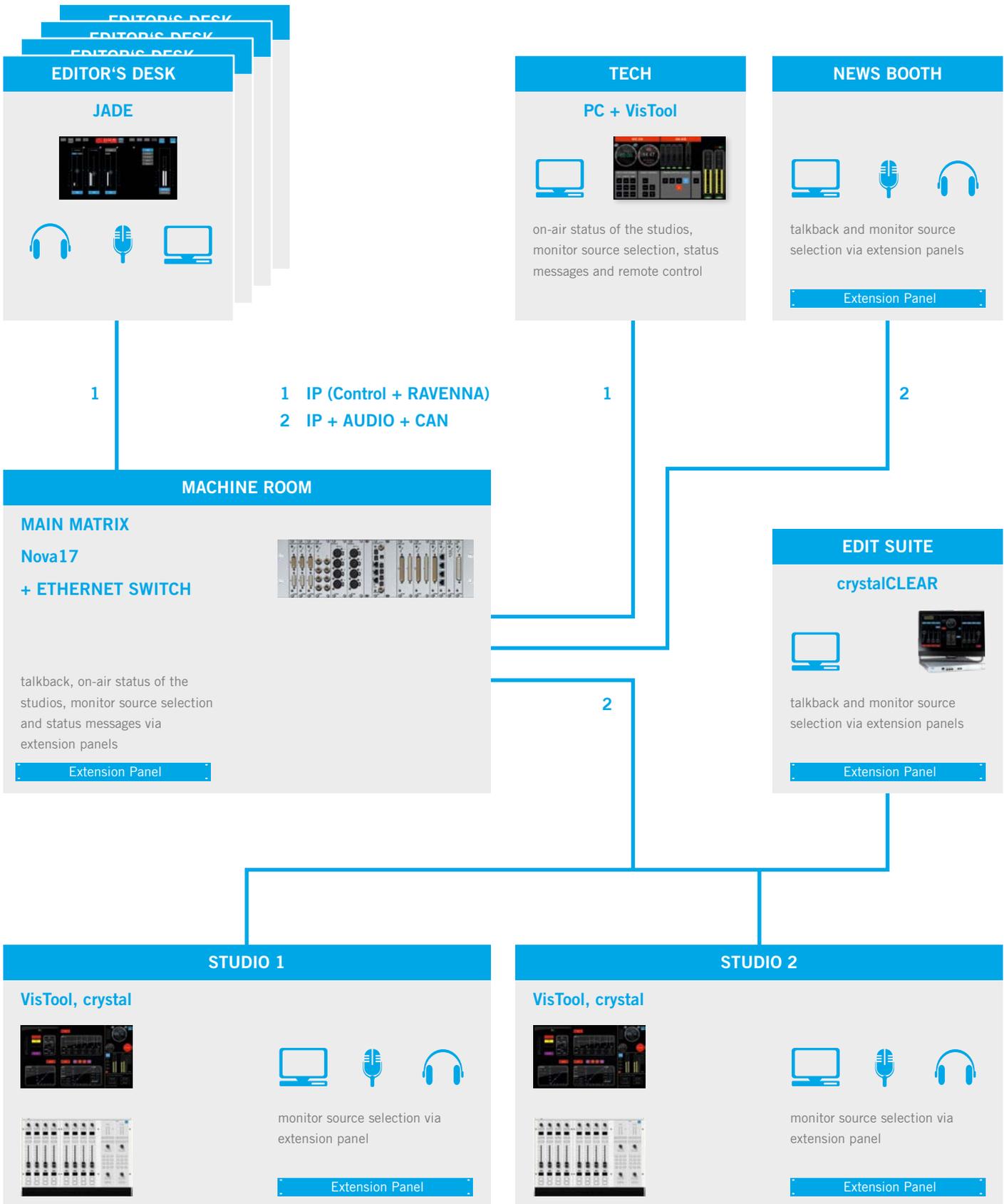
As single workstation solution or as a player in a team, crystal offers many features when it comes to networking. From MADI through AES67 + RAVENNA Audio-over-IP to remote control, crystal provides full functional integration. The console can also integrate external control panels for specific tasks such as conferencing, talkback, I/O routing or auditioning of audio sources from other work areas. Up to 30 panels can be integrated into the system via CAN bus or Ethernet (TCP/IP).

#### AT A GLANCE

- AES67 compatible RAVENNA Audio-over-IP networking for seamless integration of playout servers
- Cost efficient MADI interfaces for high-performance multi-channel 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 larger systems via MADI and AES67/RAVENNA Audio-over-IP

### ABOUT RAVENNA. THE OPEN STANDARD FOR REAL-TIME IP MEDIA NETWORKING.

RAVENNA is a technology for real-time distribution of audio and other media content in IP-based network environments. Utilizing standardized network protocols and technologies, RAVENNA can operate on existing network infrastructures. RAVENNA is designed to meet the strict requirements of the pro audio and broadcast markets, and features low latency, full signal transparency and high reliability. While primarily targeting the professional broadcast market, RAVENNA is also suitable for deployment in other pro audio market segments like live sound, install and recording. Possible fields of application include (but are not limited to) in-house signal distribution in broadcasting houses, theaters, concert halls and other fixed installations, flexible setups at venues and live events, OB van support, inter-facility links across WAN connections, and in production and recording applications. Unlike most other existing networking solutions, RAVENNA is an open technology standard without a proprietary licensing policy. RAVENNA is fully compatible with the AES67 standard.



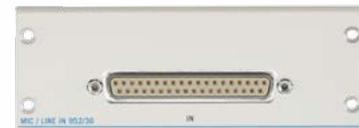
# crystal

## COMPACT ENGINE

### COMPACT ENGINE

#### COMPACT SIZE: HIGH PERFORMANCE

Equipped to the max, crystal's compact engine system core can be fired up instantly. In its basic configuration, the 1RU compact engine comes with all 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 audio peripherals. Should your requirements still not be covered, the console can be extended with up to two audio interface cards, fitted to the integral expansion slots. The cards come in various types: mic, analog line, AES3 or AES67/RAVENNA Audio-over-IP. In addition, the high-performance MAD1 option, with up to 256 additional channels, facilitates connection from the core to other mixing consoles or audio networks, via fiber links.



4x Mic In / 4x Line In



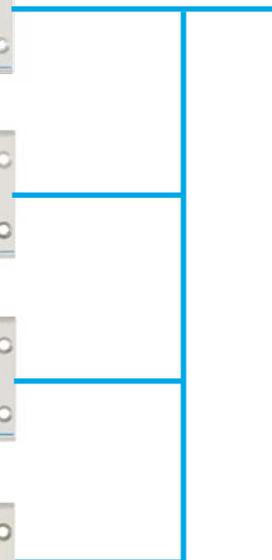
8x Line In / 8x Line Out

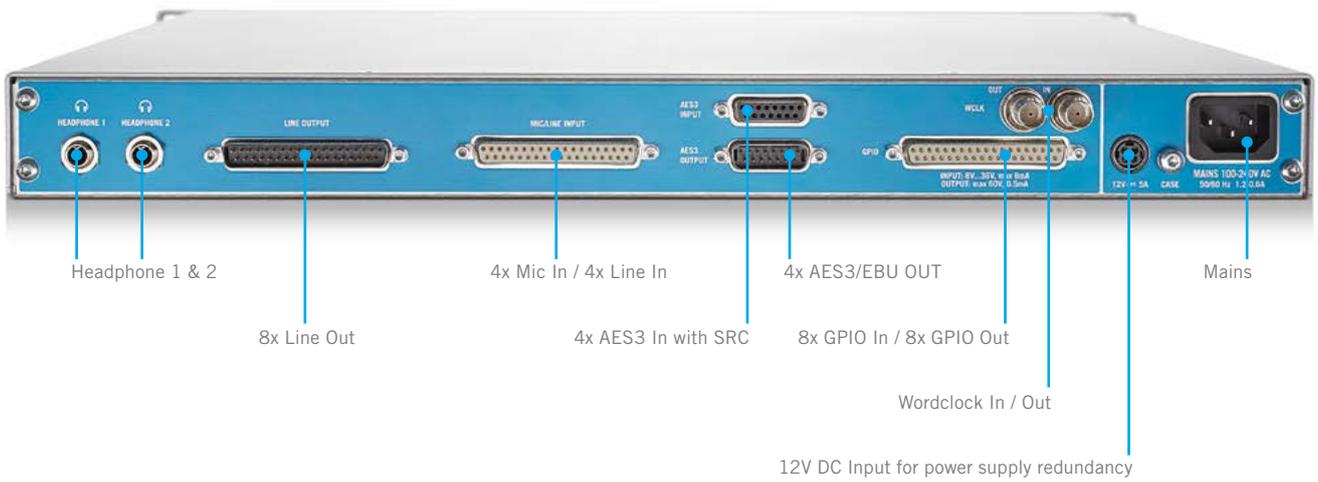
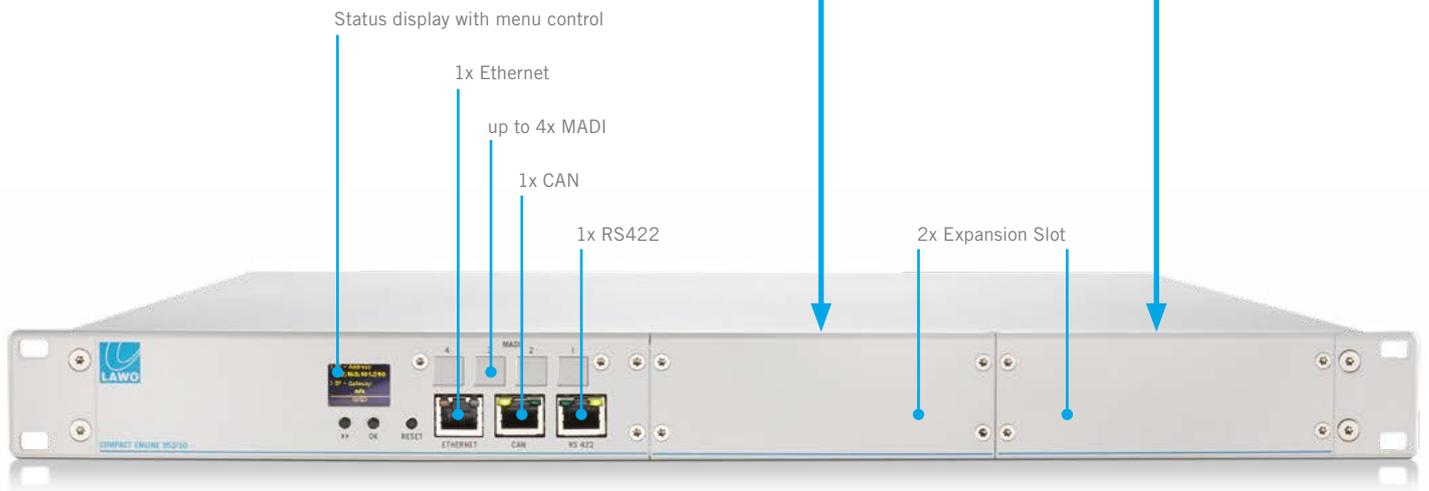


4x AES3 In with SRC / 4x AES3 Out



1x RAVENNA (8/64 channels, redundancy port)





# crystal

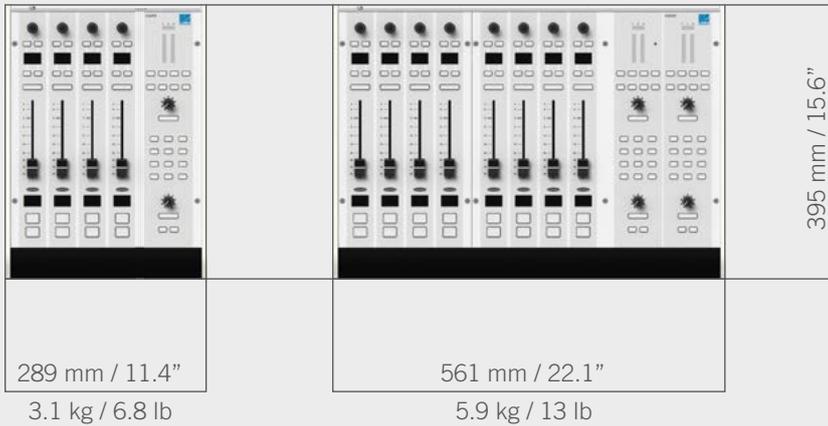
## SPECIFICATIONS

### SPECIFICATIONS

#### crystal console

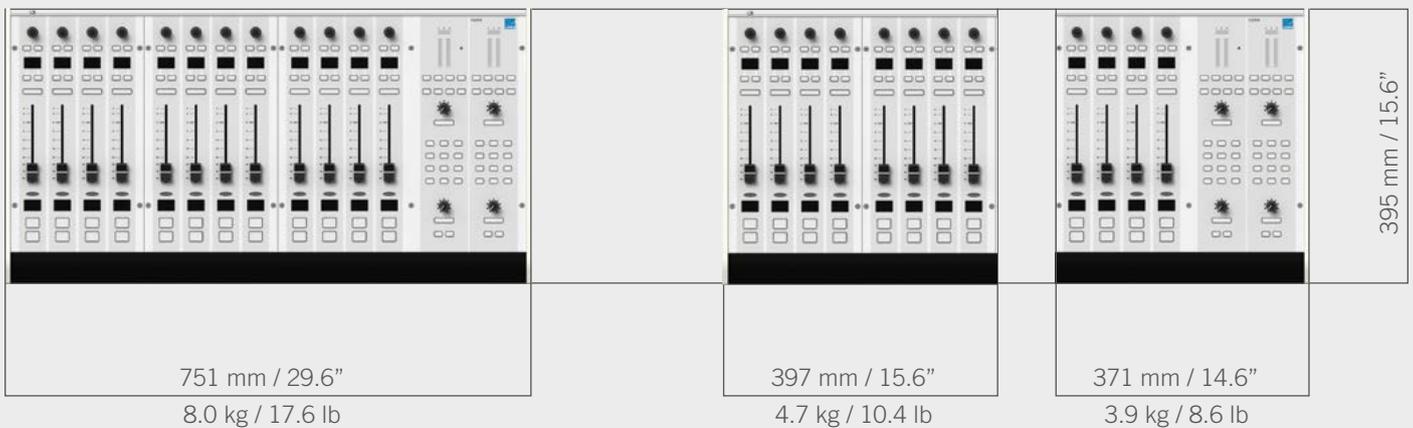
4-fader model (952/41)

8-fader model (952/42)

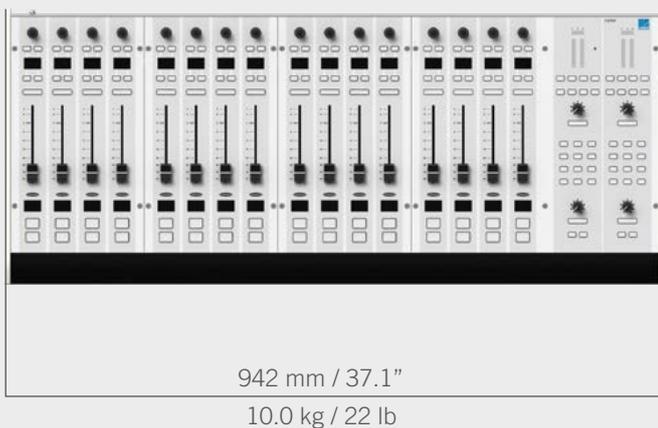


12-fader model (952/43)

12-fader split model (952/44)



16-fader model (952/45)



Power Consumption: max. 32.4W

## compact engine (952/30)



Weight:	3.0 kg / 6.6 lb (952/30 without expansion cards)
Height:	1RU / 44.0 mm
Width:	19" / 482.6 mm
Depth:	16.3" / 414 mm
Power Consumption:	max. 56W

## EXTENSIONS



### 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

## CONTROL SURFACE

- Control surface variants with up to 16 faders
- Compact design with case height only 35 mm (1.4")
- Long-life 100 mm faders with dust protection
- OLED displays (160° viewing angle)
- Buttons with multi-color backlight (RGB)
- Ambient light sensor for automatic brightness control
- Fully stand alone operable

## SYSTEM CORE

- Compact engine 19" / 1RU 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 and 12 V DC connection with redundancy switch over

## SIGNAL PROCESSING

- Up to 24 fader channels with input gain (max. +18 dB) and pan/balance
- Up to 100 definitions for sources and summing buses; mono or stereo, 5.1 surround
- 16 Equalizers: 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 De-esser / AutoMix (mono equivalent)
- 16 Delays, up to 320 ms (mono equivalent)
- 48 parallel mix inputs (mono equivalent)
- 32 Summing buses (mono\* including PFL)
- 32 Minimixers (2 x 2 mixers for monitoring, stereo-to-mono, etc.)
- Internal tone generator

(\*crystal mode)

## SPECIFICATIONS

### CONTROL

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

### SYNCHRONISATION

- Wordclock input and internal generator
- Optional sync via MADI or card slot 1 (AES or RAVENNA)
- 48 kHz and 44.1 kHz

### INTERFACES

- 4 Analog mic inputs (incl. bass cut, stereo coupling possible, also usable as line inputs)
- 4 Analog line inputs
- 8 Analog 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 up to 4 ports (max. 256 mono channels)
- 2 slots for I/O extension cards:
  - 4 Analog mic in/4 Analog line in
  - 8 Analog line in/8 Analog line out
  - 4 AES3 in with SRC (stereo)/4 AES3 out (stereo)
  - RAVENNA/AES67 Audio-over-IP

### INPUT CHANNEL SPECIFICATIONS

- Mic inputs  
Input level for digital full scale level: -29... +26 dBu  
Frequency response:  $\pm 0.1$  dB (20 Hz...20 kHz)  
Dynamic range: 115 dB(A)  
THD+N: -95 dB
- Line inputs  
Input level for digital full scale level: -29... +26 dBu  
Frequency response:  $\pm 0.05$  dB (20 Hz...20 kHz)  
Dynamic range: 115 dB  
THD+N: -93 dB

### Digital Inputs

- AES-3 format with sampling rate converter (SRC)
- Input impedance: 110 ohms
- Sampling rate converter range: 4 kHz...216 kHz
- Input resolution: 24 bit
- Dynamic range: 125 dB
- THD+N: -125 dB

### OUTPUT CHANNEL SPECIFICATIONS

#### Analog Outputs

- Output level for digital full scale level: +24 dBu
- Frequency response:  $\pm 0.3$  dB (20 Hz...20 kHz)
- Dynamic range: 112 dB
- THD+N: -93 dB

#### Digital Outputs

- Sampling rate: 44.1/48/96 kHz
- Output impedance: 110 ohms
- Dynamic range: 125 dB
- THD+N: -125 dB

### 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

- Software for the enhancement of the control surface, support of touchscreens
- Visualisation of DSP parameters, loudness, signal levels/states
- Additional functions and controls (e.g. timer, snapshots)
- Min. PC requirements: Intel i5 or higher (CPU Benchmark min. 1350 Points @ <http://www.cpubenchmark.net/>), min. 2GB RAM, Windows 7 or higher

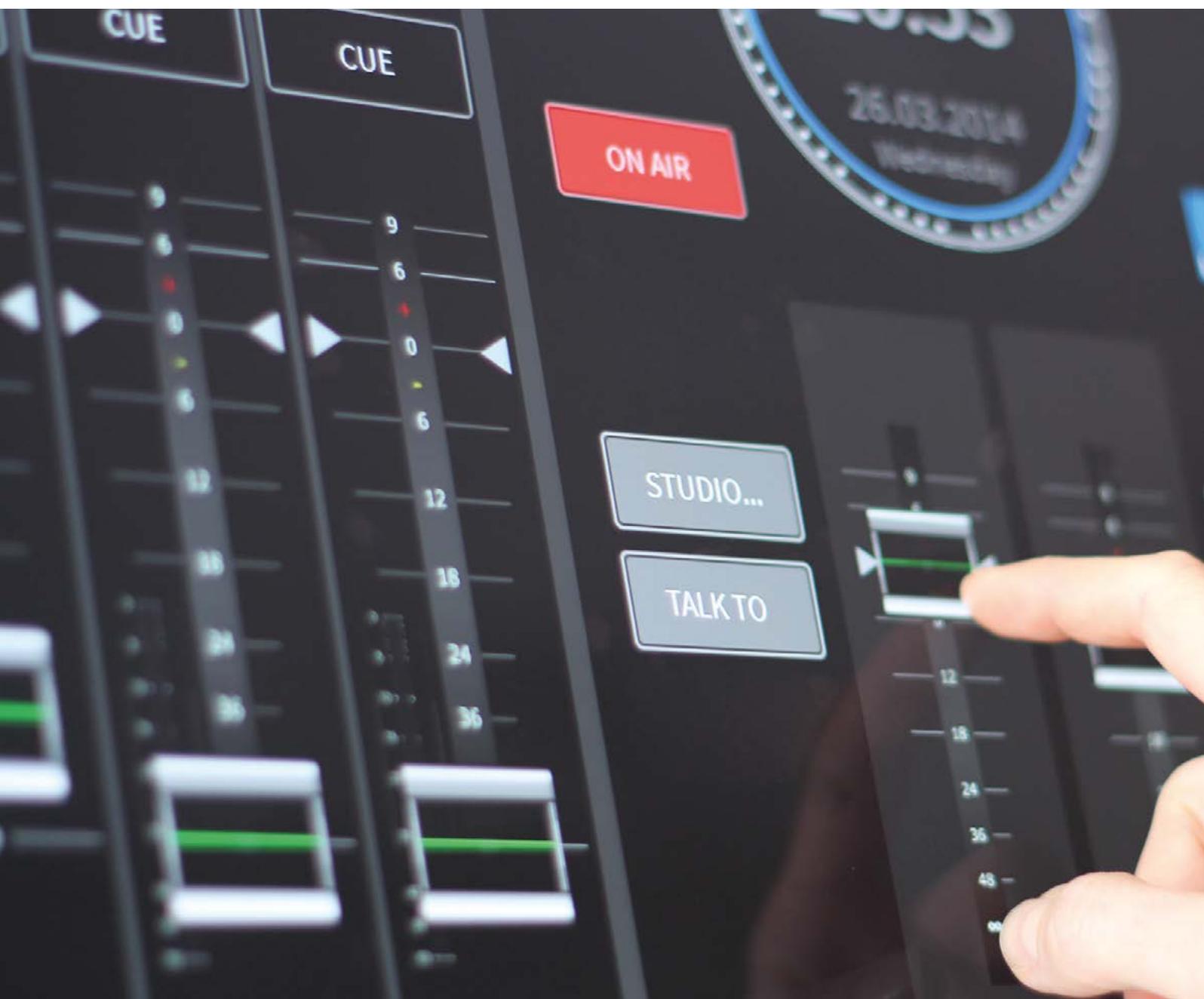
### EXTENSION PANELS (OPTION)

- 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 30 panels via CAN-Bus or TCP/IP



# crystal CLEAR

VIRTUAL RADIO MIXING CONSOLE





# crystal CLEAR

## VIRTUAL RADIO MIXING CONSOLE

### REMIXING RADIO

crystal's Compact Engine + VisTool = crystalCLEAR, the virtual mixing console for radio. Its entire control surface is software, driven by a high-resolution multi-touch computer display. Without the limitations of physical knobs, buttons and faders, crystalCLEAR presents the user with only relevant controls and information, hiding anything not needed for the task at hand.

Sometimes a few faders are all that is needed to control levels during a segment. In this case, crystalCLEAR provides the necessary faders to users. At other times, more faders may be required to host a show mix of multiple signals.

crystalCLEAR is fast, intuitive and easy. Operators will feel at home right away. It's as easy to drive as a tablet computer, while powerful enough to manage complex workflows in the most fast-paced broadcasting environments. One touch and you'll be convinced.

# crystal CLEAR

## FUNCTIONALITY



## FUNCTIONALITY

### COMPREHENSIVE SCOPE OF FUNCTIONS

Most DJs, whether novice or experienced, say crystalCLEAR is faster and easier to use than traditional radio boards with physical knobs and buttons. crystalCLEAR has a flat menu structure, with only two levels. The top level is the main screen, which provides familiar controls. The option screens that users may wish to access are only one touch away from the top screen. Complete familiarity can be attained within only 15 minutes of use. A large clock and a small event timer are central to the display. Touching the timer will cause it to become large and change places with the clock. crystalCLEAR can be instantly reconfigured by recalling a SCENE or PRESET. Different shows and/or different users are easily accommodated. Even though the layout and functions are quite intuitive, a “panic” button returns crystalCLEAR to the current SCENE without any user changes. And unlike a physical surface, crystalCLEAR remembers every detail when loading a SCENE, even the fader positions.

Though simple for operators, crystalCLEAR has all of the functions needed to create even complex live and recorded radio programming. There are dozens of available sources, any eight of which can be active on faders at any given time. Each source is configured in advance (by the installer/engineer) as a mic, line, phone or codec. The system knows exactly how to treat each of these different source types when they are assigned to active faders.

Microphone sources, for example, will automatically mute the monitor speakers when engaged. crystalCLEAR will automatically create backfeeds (mix-minus) for phone and codec sources and activate TALKBACK features. All of this is transparent to the operator, who never has to worry about creating a mix-minus or ensuring that speakers are muted before bringing up a fader. Everything is “automagic”.

### FEWER BUTTONS: MORE CONTROL

Software control is more flexible than the hardware buttons and knobs found on traditional control surfaces. For example, assigning a DJ microphone to a fader on crystalCLEAR defines the multi-purpose button above the fader as MUTE, thus giving the DJ a convenient COUGH button. The same button acts as a TALK key on external sources. On other sources without specific features, this button need not even be visible. The result: fewer buttons and options are needed to run a show than would be required on a physical control surface. And yet, even with its streamlined interface, crystalCLEAR is right at home in the most fast-paced and complex of radio workflows.

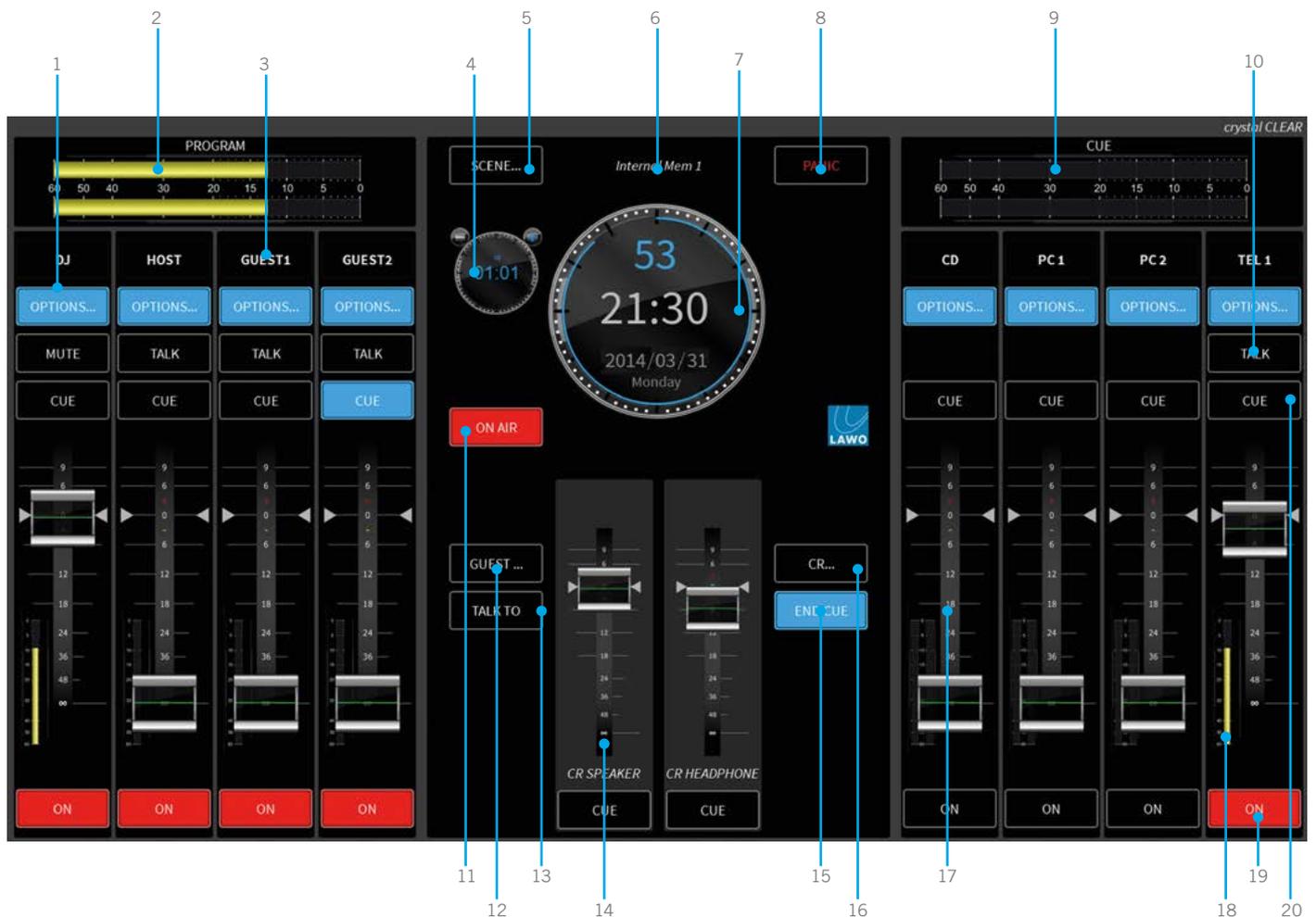
Engineers will be happy too. There are no faders to get dirty or fail, buttons to break or lamps to replace, and even novice users can learn the system in minutes without training or making frantic phone calls during the overnight shift. In addition, the system can be accessed by an engineer using standard tools – even remotely.

## SMART AUTOMIX & AUTOGAIN

Like all crystal consoles, crystalCLEAR offers integrated AutoMix and AutoGain. The AutoMix function adjusts the levels of active and inactive microphones, giving a constant ambient that allows an interview to be conducted without technical operation – the console manages the microphone mix, while the talent conducts the interview. AutoMix also works perfectly with automated voiceovers live to air, while AutoGain provides yet more simplification. This feature calibrates all microphone signals at the press of a button. The operator need not understand dB values and overloads, as AutoGain levels microphone gains automatically within seconds, while the talent or guest talks.

# crystal CLEAR

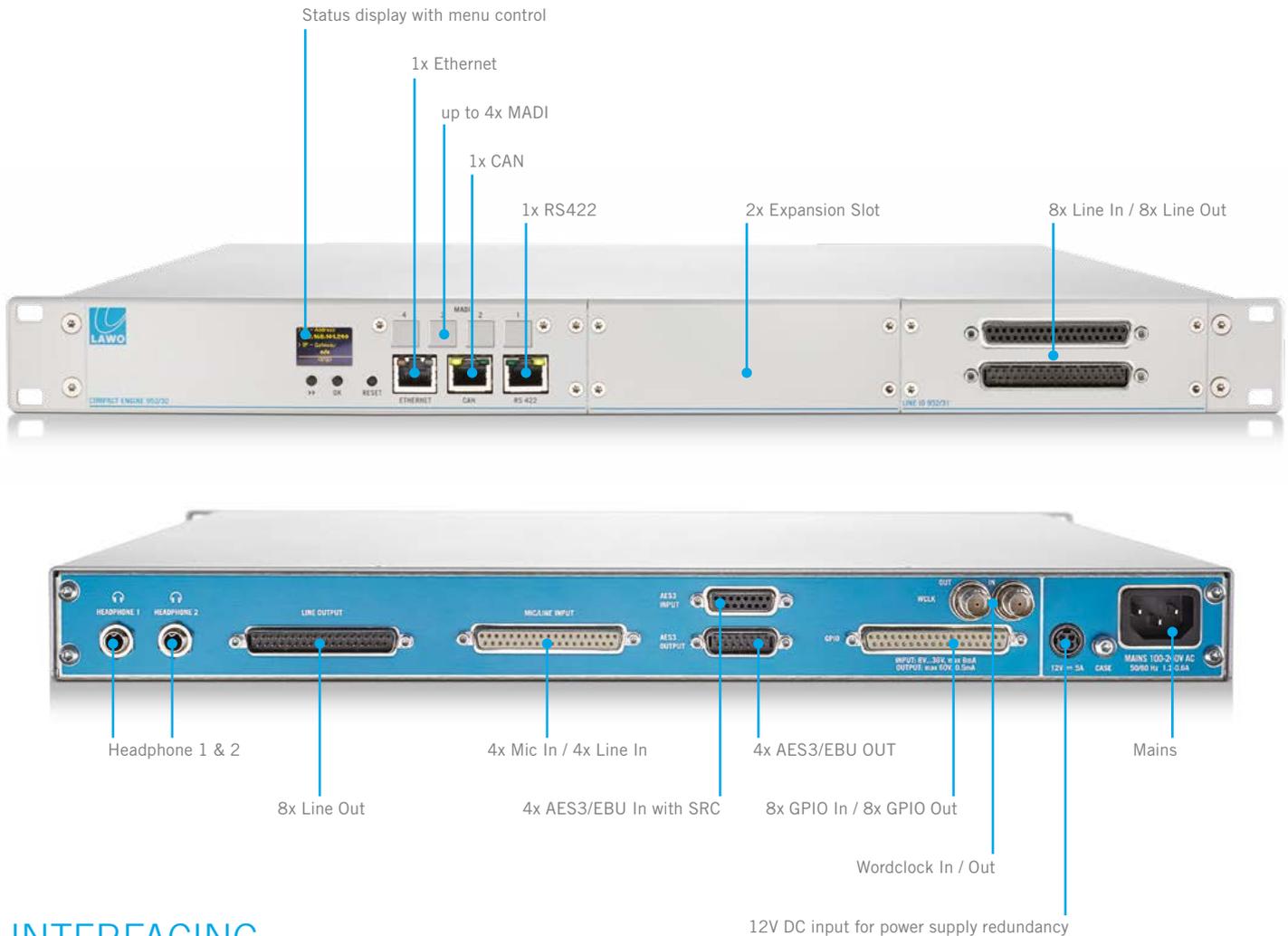
## INTERACTION



## INTERACTION

- Options key opens source related functions menu, and gives access to channel presets
- Metering of Main Program Output
- Source name indication, also calls the source selection menu
- Count down/up Timer for channel open indication. Swaps position with clock when touched
- Access to SCENE preset menu
- Indication of currently loaded preset
- Large Clock with colored seconds indication for precise readability
- PANIC button reloads last snapshot
- Metering of monitored source
- Source related multi purpose key to activate channel, specific functionality
- Central indication of open microphones and speaker mute activation
- Opens GUEST monitoring menu for source and volume setting of the guest headphone
- Central TALK TO guests button activates a global talk from the DJ to his guests.
- Volume control for control room speaker and DJ headphone
- Indicates active CUE and ends it when touched
- Opens Control room monitoring menu with source selection and split mode setting
- Large format, easy touch controlable faders for precise touch screen operation
- Integrated Metering signal showing the input signal pre fader
- On/Off key activates channel for mixing
- CUE enables pre fader listening for any source

# INTERFACING



## INTERFACING

### USER INTERFACE

- Multi-touch enabled mixing control
- Intuitive GUI optimized for fast-paced radio workflows
- 3 stereo mixing groups (PGM-1, PGM-2, RECORD)
- Integrated CUE (PFL) feature with metering
- Programmable SCENE presets recall every detail
- Precision stereo PPM meters
- Large time-of-day clock (synchronizable to NTP server)
- Event timer can count up or down and can be automatically started by selected channels
- Talk buttons automatically appear on mix-minus channels
- Support for guests with talkback
- PANIC button clears any changes to current SCENE
- 24 sources available, eight can be simultaneously active
- Advanced DSP for microphones and external sources

### DSP CORE (compact engine)

- Broadcast-grade compact 1RU rack-mount audio engine
- All audio in engine – PC is control only
- Low noise microphone preamps
- Two separate amplified headphone outputs
- Balanced analog inputs and outputs
- AES/EBU digital inputs and outputs
- Integrated Line I/O extension card
- Optional RAVENNA AoIP interface (AES67 compliant)
- Power supply redundancy
- GPIO for ON AIR lamp and speaker cuts

# crystal CLEAR

## SPECIFICATIONS

## SPECIFICATIONS



### PC REQUIREMENTS

- Intel i5 or higher (CPUBenchmark min 1350 Points @ <http://www.cpubenchmark.net/>)
- Min. 2GB RAM
- 16:9 display resolution (up to Full HD, touch enabled)
- Windows 7 or higher

### SIGNAL PROCESSING

- Touchscreen optimized “software only” control surface
- Up to 8 touch enabled faders + monitoring section
- 4 mic channels, each with fully parametric 3-band EQ, 2 filters, dynamics unit (gate, expander, compressor, limiter, de-esser)
- 3 external lines, each with fully parametric 3-band EQ, 2 filters, dynamics unit (gate, expander, compressor, limiter, de-esser)
- AutoGain & AutoMix functionality



#### COMPACT ENGINE

- 19" / 1RU DSP core with signal processing and audio I/O
- Active cross ventilation, system-controlled
- Integral wide-range power supply 100 – 240 V AC and 12 V DC connection with redundancy switchover
- Weight 3.0 kg / 6.6 lb (952/30 without expansion cards)
- Height 1RU / 44.0 mm
- Width 19" / 482.6 mm
- Depth 16.3" / 414 mm
- Power Consumption max. 56W

#### CONTROL

- Preconfigured logic core
- Interface for integration with radio automation systems
- Networking via TCP/IP (Ember+)

#### SYNCHRONISATION

- Wordclock input and internal generator
- 48 kHz and 44.1 kHz

#### INTERFACES

- 4x analog mic / line inputs
- 6x analog stereo line inputs / 8x analog stereo line outputs
- 2x headphone outputs (stereo)
- 4x AES3 inputs (stereo, with SRC) / 4x AES3 outputs (stereo)
- 1x TCP/IP RAVENNA AoIP (4x stereo in / 4x stereo out)\*
- GPIO (8x optocouplers, 8x silent cmos relays)

\* optional

# crystal

## RADIO MIXING CONSOLE

© 2018 Lawo AG. All rights reserved. Windows is a registered trademark of Microsoft Corporation. Other company and product names mentioned herein may be trademarks of their respective owners. Product specifications are subject to change without notice. This material is provided for information purposes only; Lawo assumes no liability related to its use. As of March 2018.

### HEADQUARTERS

Lawo AG  
Rastatt  
GERMANY  
+ 49 7222 1002 0  
sales@lawo.com

### INTERNATIONAL OFFICES

BENELUX	+ 31 6 54 26 39 78
CANADA	+ 1 416 292 0078
CHINA	+ 86 10 6439 2518
NORWAY	+ 47 22 106110
SINGAPORE	+ 65 9818 3328
SWITZERLAND	+ 49 7222 1002 0
USA	+ 1 888 810 4468

### RENTAL SERVICE

+ 49 7222 1002 0  
rental@lawo.com

