

new  
crystal



VERSATILE  
BROADCAST  
CONSOLE



CONDENSED  
CONSISTENT  
CONTEMPORARY

# crystal

## VERSATILE BROADCAST CONSOLE



## SHINES LIKE A DIAMOND

To achieve the highest levels of productivity, your tools must operate as extensions of yourself, irrespective of the application. With two distinct modes of operation—Power Core and Controller—crystal is the perfect companion for a variety of broadcast applications: small to mid-sized on-air studios; regional studios; news and commentary suites; smaller production studios; MCR control and OB vehicles; podcast recording studios; remote production applications; backup and disaster recovery sites; DAW control and integration as well as workflow uniformization.

Based on Lawo's acclaimed diamond philosophy, crystal's design feels instantly familiar and straightforward, giving professionals a highly intuitive mixing console. Meet the seamless synergy of physical and virtual operation with intelligent, context-sensitive controls that fall naturally to hand. Get the power of diamond in a more compact and cost-effective package and leverage Lawo's high-quality audio and workflow expertise.

An IP-native, crystal is available in both a light and a dark finish. Both versions offer a wealth of shades and hues that allow you to tailor the desk to your exacting needs. Optional Virtual Extensions provide immediate information for every function.

Touch-sensitive, motorized faders and color LED keys work in tandem with vibrant, full-color displays. With crystal you've got the power to remain in the creative zone.



# crystal

## VERSATILE BROADCAST CONSOLE

### DESIGNED FOR SUPERIOR PERFORMANCE

While crystal is a true radio production workhorse for small to mid-sized on-air studios, its applications go way beyond radio. Its IP-native, high-density 6- or 14-fader control surface is amazingly configurable.

Every control on crystal's surface has been exactly placed. Directly derived from diamond, for which our talented designers studied the way that producers, hosts and talent work, it makes moving from a large to a smaller studio or MCR seamless, because the design philosophy and superior quality of crystal and diamond are identical.

The result is masterful. There's the visually stunning Virtual Extension\*, a full-HD, 10-point multi-touch screen display filled with context-sensitive information that augments advanced workflows. Illuminated controls group functions by color, a full-color display on each fader strip shows source names, input metering, source functions and user labels, and Lawo's AutoMix functionality allows for hands-free mixing by automating the task of keeping levels optimized.

All of this, plus a host of other assistive mixing technologies, enable crystal operators to produce technically superior radio programs, while simultaneously delivering compelling, engaging content.



(\*) Optional

### UNIQUE CRYSTAL FEATURES

- High-density control surface with a minimal footprint
- Light and dark surface options with motorized faders for perfect optical integration into any application scenario
- High-quality parts and components in a cost-effective package
- Consistent workflow and layout, pioneered by diamond
- Same DSP capacity and assistive mixing technologies across all studios and setups
- Unified mixing engine, I/O device and configuration software across all setups: crystal, diamond, and virtual interfaces
- Built on broadcast and open IP standards for a modern infrastructure, including wide-area applications
- Shared user, rights and snapshot management across all studios and setups

### OVERVIEW



#### PERFECT FOR FAST-PACED PRODUCTIONS

Like the cockpit of a high-end sports car, the crystal broadcast console exemplifies performance, quality, and most notably, purposeful design. Every switch, selector and display has been thoughtfully placed for maximum utility, exactly where the operator expects it to be, to eliminate errors and streamline workflow.

This operational design allows customization to suit nearly any radio and broadcast workflow setup, whether self-op, remote control, remote production, in-studio operation, in an OB truck, etc. IP connectivity provides even more flexibility. Both seasoned and up-and-coming operators will find crystal intuitive to operate.

#### EXTENSIVE VISUAL CLUES

Today's operators rely on screens and graphical feedback more than ever before. crystal's Virtual Extension (powered by Lawo VisTool) integrates on-screen displays with physical controls in a way that's both visually pleasing and highly functional. In addition to metering, clocks and timers, the optional Virtual Extension's full-HD touchscreen displays context-sensitive data related to active controls.

See the EQ curves; watch the effect of compression and other DSP functions via gain reduction meters; view PPM and/or loudness metering for every input and output; adjust input settings; make changes to routing, user management, snapshots and more. An optional upgrade to VisTool Unlimited facilitates integration of controls for third-party playout software, codecs, and applications such as social media platforms.

The optional Virtual Extension screens may be mounted directly to the console frame when the latter is placed on the desktop, or used as a stand-alone device for uncompromized efficiency. If the console is flush-mounted, screens locate adjacent to the console, providing an integrated, "all-in-one" mixing experience without the need for external monitors.



#### KEY FEATURES – POWER CORE MODE

- Touch-sensitive, motorized 100mm faders with selectable OdB-notch and over-press function
- Context-sensitive full-color displays
- Programmable multifunction keys on each fader strip and central section with standard region-specific or customized labels
- Rotary encoders for parameter control and monitoring
- Lawo crystal Apps (powered by Lawo VisTool) for integrated workflows, either via the Virtual Extension module or external displays features:
  - ✦ Channel strips with User Labels and status info
  - ✦ PPM and/or loudness input and output meters
  - ✦ Graphical parameter control for DSP settings, source assignments and audio routing
  - ✦ Clock, date, configurable timers, on-air and system health monitoring
  - ✦ User keys, video thumbnails and previews
  - ✦ Centralized and shared snapshot management and user authentication
  - ✦ Integrated web browser with user bookmarks
- Lawo's AutoMix and AutoGain assistive mixing technologies
- Integrated Mix-Minus (clean feed); conference logic with independent conference busses
- Mixer and user snapshots for instant recall of console layouts, DSP parameters, user settings, etc.
- Lawo crystal Apps (powered by Lawo VisTool) for integrated workflows, either via the Virtual Extension module or external displays

### TWO MODES

The new crystal can be used in one of two modes.



#### POWER CORE MODE

True to its name, Power Core mode allows to use the console in combination with a Power Core engine, Lawo's software-defined, high-density DSP mixing engine and modular I/O device.

In this mode, crystal supports the Power Core Compact license for single 6-fader or extended 14-fader setups, and the Power Core MAX license. Accommodating up to four consoles, one Power Core with the MAX license allows four studios to share its processing power and business logic in the following configurations:

- 4x 6-fader crystal consoles;
- 3x 14-fader + 1x 6-fader crystal consoles (or any combination in-between)

See also the feature list of Power Core mode on the left page.

#### KEY FEATURES – CONTROLLE MODE

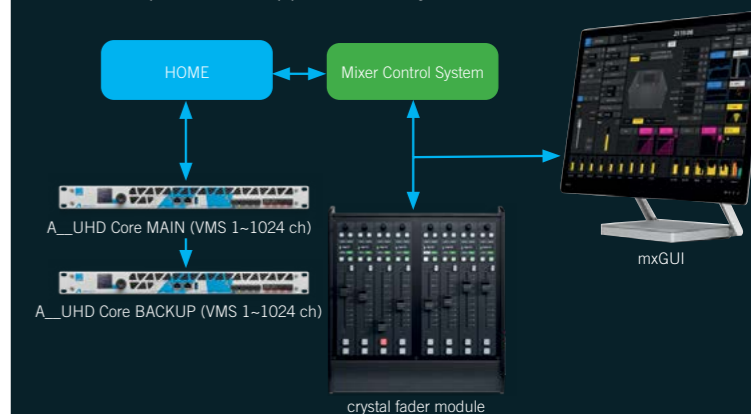
- Use crystal as an OSC (Open Sound Control) hardware controller based on a fixed OSC command syntax provided by crystal
- Map mc<sup>2</sup>/A\_\_UHD Core SEL/Access, Mute, AFL/PFL and Fader User functions and control parameters like preamp gain, panning, contribution levels, etc.
- Configuration from the Custom Functions section of the mc<sup>2</sup> GUI
- The buttons of crystal's master section are available for banks and layers\*\*, user buttons, and monitoring sources alongside the CRM section
- Support for any integrated application



#### CONTROLLER MODE

In response to the request for a small IP-native extension panel for mc<sup>2</sup> audio production consoles, a crystal Main or Fader module can be used as a control panel for an mc<sup>2</sup>/A\_\_UHD Core-based back-end. In Controller mode, crystal is the perfect tool for second-row/grams mixer applications, or as a dedicated control surface for an otherwise headless system. This opens up new possibilities in distributed production workflows, or for backup purposes.

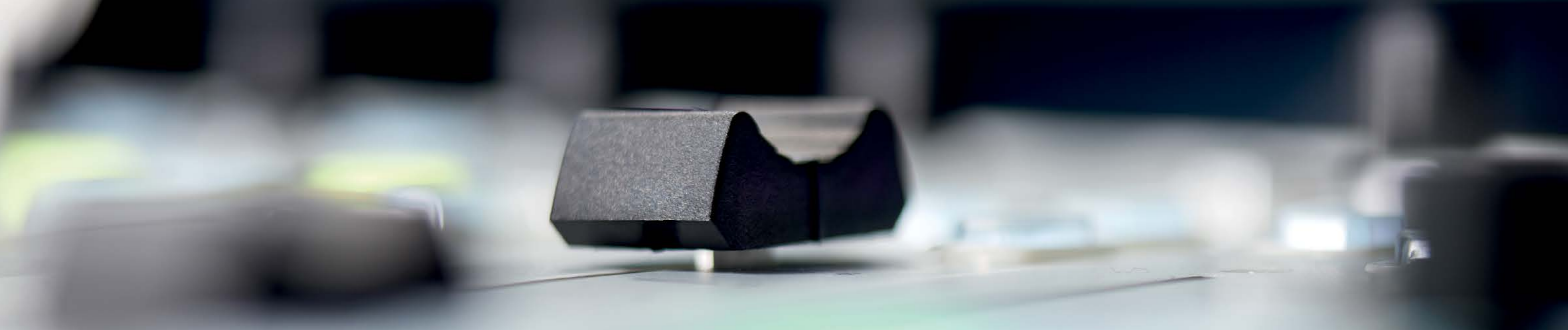
When used as a companion in an mc<sup>2</sup> system, literally any console strip can be mapped to the crystal surface.



In Controller mode, the Main and Fader modules of a crystal console operate independently over IP. Connection parameters can be configured using crystal's Web UI. This turns the new crystal into a convenient hardware controller for, e.g., digital audio workstations (DAW) and many other software applications.

(\*\*) Depending on the presence of an mc<sup>2</sup> mixer





## HIGHLIGHTS

### PREMIUM COMPONENTS

crystal consoles are constructed using the same well-tested, high-end faders, keys, and rotary encoders found on our flagship Lawo mc<sup>2</sup> live-mixing consoles to ensure long life and perfect operation every time. Silent motorized faders permit flawless integration with program automation and playout systems—perfect for operations involving voice tracking, remote production, or DAW control. Programmable LED button color coding highlights common control functions. And crystal's familiar Lawo design language puts operators instantly at ease.

### ENHANCED CONTROLS

All-new crystal module designs exemplify Lawo's attention to detail. Vibrant full-color displays above fader strips reveal useful information about sources. Guided key frames provide tactile feedback, helping talent find the right controls even when looking elsewhere. Workflow principles designed using the Lawo Unified Experience (LUX) ensure that users feel at home in every studio.

### ASSISTIVE MIXING FEATURES

crystal employs smart algorithms that speed up production workflows. The AutoMix function automatically maintains the balance of talk-radio productions, and AutoMix Grouping allows this intelligent automatic mixing to be applied to multiple independent source groups. AutoGain, an automatic gain setting function, optimizes guest and host mic levels with a single button press. Smart tools like these help operators concentrate on creating compelling content rather than watching levels.

### ALL ETHERNET

For broadcast operation, crystal connects to Lawo's Power Core mixing engine natively via Ethernet. This all-IP interface offers flexible new options for installing and maintaining equipment. Place the engine in the studio and connect it to crystal directly. Or locate the engine remotely in your rack room or data center. Even install it in an entirely separate facility, connected via LAN or WAN.

As many as four independent studios can share the resources of one Power Core; by using IP multicast, the crystal control modules in each studio will stay perfectly synchronized.

### STANDARDS-BASED, FUTURE-PROOF

Lawo didn't just adopt IP—we helped define it with RAVENNA, the basis for the AES67 standard. Our manufacturer-agnostic approach to Audio-over-IP results in flawless performance not only with RAVENNA equipment but nearly all compliant broadcast equipment—plus seamless interfacing with major radio automation systems via Ember+ and HTML integration.

### TWO COLOR VERSIONS, COUNTLESS USE CASES

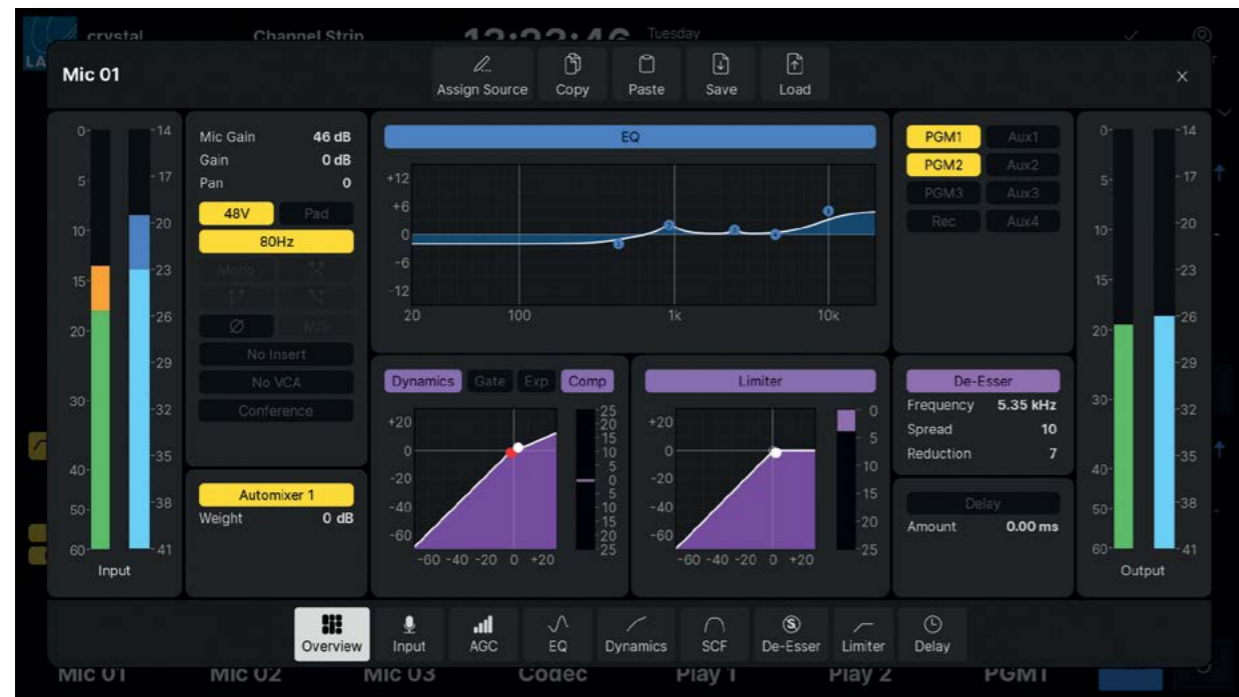
crystal is available in a light or dark finish and with either 6 or 14 faders. The Main module comes with a master section and six channels faders. The Fader module adds eight more channel faders if so desired, but can also be used by itself in areas where no master section is required. In Controller mode, it can be a convenient stand-alone controller.

### SMOOTH WORKFLOW FOR PROS

- Single- or dual-frame, tabletop or counter-sunk mounting
- Optional, 13.3" Virtual Extension modules with HD color TFT display for extended information and touch control
- VisTool Unlimited upgrade lets you design custom pages and create logic workflows. Ember+ and HTML enables integration of third-party hardware and software
- Standards-based RAVENNA/AES67 Audio-over-IP networking with ST2110-30/-31 and ST2022-7 compliance
- Premium 100mm touch-sensitive, motorized faders work seamlessly with automation and playout systems
- A color display above each fader gives extended source information and metering
- Fader mappings allow operators to group faders with similar sources for easy one-button recall and adjustment
- Stereo, mono and multi-channel\* mix outputs
- Lawo AutoMix and AutoGain assistive mixing technologies
- Power Core engine with expandable I/O accommodates AES67, MADI, analog, AES3 and Dante® audio I/O

(\*) Multi-channel workflows require a Power Core MAX license

### HIGHLIGHTS



### crystal Virtual Extension

Today's high-performance radio demands that operators run at the pace of a Formula One driver. They have a million things to do, operations to keep watch on, and adjustments to make. And all of these events are timed down to the split-second, with no room for error. Because of this, screens are more a part of radio studios than ever before. Displays surround the radio operator: screens for playout systems, loudness monitoring, routing operations, social media... all of this can be overwhelming.

crystal solves screen proliferation with the optional Virtual Extension, which can be added to any crystal console (even the smallest single-frame model). These HD touch displays are powered by Lawo VisTool and designed using the LUX design system.



Stand-alone Virtual Extension Module

With desktop consoles, the laser-sharp 13.3" touchscreens are fully integrated with the console frame, with an ergonomic viewing angle. If you prefer your crystal console to be flush mounted (counter-sunk), Virtual Extension screens can also be flush mounted adjacent to console modules, or content displayed on your own choice of display monitor. In environments where space is at a premium, the Virtual Extension module can be used as a stand-alone device.

### THE POWER OF LUX

crystal's incredibly intuitive controls are designed using LUX: the Lawo Unified Experience, a framework for conceiving, designing, and building solutions that put users first. Its design elements present users with a familiar and consistent interface across the entire Lawo product portfolio.

In today's fast-paced radio production environments, it isn't enough for talent to simply be provided with knobs and switches. Whether interviewing guests, delivering breaking news, creating an energetic breakfast show or a late-night music program, operators need tools that help them remain in the creative moment—solutions that are effortless and invisible, so that thought is spent less on how to use your console and more on creating your "theatre of the mind".

LUX provides informative visual elements, both onscreen and on the console surface itself, ensuring that common workflows are as simple and efficient as possible, with more advanced control

features just a touch away. In this way, crystal helps keep content creators focused, while bringing them the tools they need when and where they need them.

### VISTOOL UNLIMITED (OPTIONAL)

- Unlimited possibilities for configuring customized layouts and workflows
- Open existing configurations and adapt them to your needs
- Save and re-use groups of items as snippets
- 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 graphic elements
- Create multiple pages of different layouts, display them on multiple screens and switch as you like during operation
- Integrate with broadcast controllers, playout and codec systems even social media and communication platforms

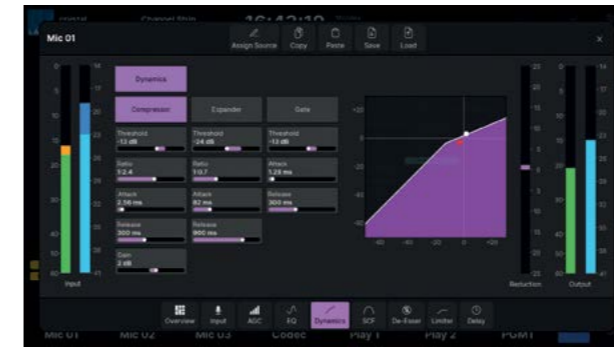


# crystal

## VIRTUAL EXTENSION



crystal Virtual Extension screen for Main module



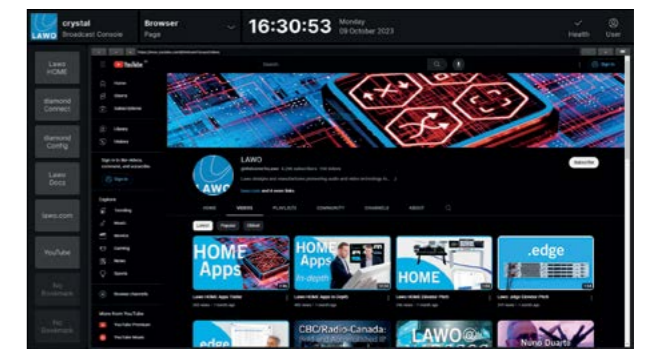
crystal Apps: Intuitive parameter control – dynamics



crystal Apps: Intuitive parameter control – EQ



crystal Apps: Channel strip overview



crystal Apps: Web, direct messaging and social media integration

### INTUITIVE HYBRID CONTROL AND WORKFLOW

In today's radio stations, computer monitors are the studio's centerpiece. Playout system controls, phone queues, news and weather, social media platforms, even live copy are on-screen—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.

Lawo solves this problem by melding physical and virtual controls. crystal consoles with Virtual Extension modules (powered by Lawo VisTool GUI-builder software) can now use intuitive touchscreen controls that are perfectly integrated with the console itself, and are optimally located within the operator's field of focus. Or, if you prefer, you may use any standard touchscreen computer monitor in conjunction with the crystal Display App.

### THE VIRTUAL EXTENSION APP

If you equip your crystal with the optional Virtual Extension module, a pre-configured app is ready to run. Each fader strip is augmented with a real-time bargraph display and tallies that illuminate when DSP processing is active, plus bus assignment indicators and an info-strip with source name and details. An interactive parameter control page is shown when a channel's Access mode is activated. Just touch the screen to trim voice

processing and other DSP parameters, fine-tune delay times, recall console snapshots, load audio sources and adjust source and monitor gain.

When the Main module is used with the Virtual Extension Module, two "slots" are provided on-screen that you can fill with program output meters, loudness metering, user short-cut keys, synchronized clock, event timers—even video feeds.

### THE DESKTOP APP

Do you prefer to use your favorite touchscreen monitor for control and information instead of the Virtual Extension module? The crystal Desktop App comes with every crystal console and works with any standard touchscreen display.

The crystal Desktop App is extremely flexible. It provides all of the touch-based console control functionality found in the Virtual Extension, and also helps combat display proliferation in the studio. Operators can instantly "dock" the crystal display, which shrinks to a toolbar that continues to provide vital clock, timer, metering info and user controls, while freeing the rest of the screen for playout systems, audio editors and other tasks.

### REMOTE CONTROL, SNAPSHOT & RIGHTS MANAGEMENT

IP-based studio infrastructure makes it very easy to control devices remotely and share information between studios. The crystal apps take maximum advantage of studio networking, giving you the ability to operate your console remotely with complete access to every function from a PC with LAN/WAN connection. Thanks to an unlimited number of Snapshots and DSP profiles that can be stored and recalled from any networked console, individual talent profiles or customized show setups are available anywhere—even to operators working remotely from home studios, OB setups, etc. There's also a sophisticated rights-management system that gives engineers the power to tailor access to console features based on multiple user groups, or 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. Even make designated snapshots available to only specific users.

### GO UNLIMITED

Upgrade to VisTool Unlimited to design completely original control screens. Drag-and-drop elements from a comprehensive library of included vector objects to build meter walls, embed HTML windows, control software and hardware peripherals via Ember+. Create your own workflows using the powerful and easy-to-use Logic Engine, even import custom graphics to create screens that match your station's unique branding.

### crystal Apps

- Preconfigured and included with every Lawo crystal console
- Attractive and modern LUX design elements provide clear, attractive screen output at all resolutions
- Runs on standard Windows PCs
- Docked, windowed or full-screen modes depending on the application
- Full-screen pages with input and output PPM and/or Loudness meters
- The desktop app can run alongside any Windows App using a docking mode with timer and clock, main output monitors and meters, and snapshot management
- Easy-to-use, intuitive input and output routing
- Multi-touch operation enables simultaneous onscreen control of a wide range of parameters
- Outstanding user management with custom snapshots available locally or across the network
- Settings for tailor-made console layouts and workflows
- System Health information

### MAIN MODULE

The crystal Main module is perfect for small-to-medium sized on-air studios, production rooms, or OB applications. Along with comprehensive controls, it includes six faders and two multifunction keys placed below the fader strips, as well as a context-sensitive display with four multifunction keys.

**1. ROTARY CONTROLS** for adjusting guest and studio monitor settings; intercom, PFL and talkback levels; gain, EQ, dynamics; and RAVENNA source pool selection.

**2. MULTIFUNCTION DISPLAYS** indicate the actions available for selection by the adjacent rotary control, and the functions of the four adjacent keys. Metering and gain level displays are shown as needed.

**3. CONTEXT-SENSITIVE KEYS** with programmable multicolor backlights allow operators to select functions shown on the multifunction display.

**4.** The **ACCESS KEY** selects sources for parameter control. Double-tap for quick source assign and stream patching.

**5.** The **TOUCH-SENSITIVE MOTORIZED FADERS** are premium Lawo quality, completely silent and feature a selectable 0dB notch. Programmable Fader-Start and Fader Over-Press features allow custom logic functions to execute when faders are opened or closed. The Main Module comes equipped with 6 channel faders.

**6. CHANNEL ON & PFL KEYS** with guided key frames and color-guided lighting provide On/Off, Mute and PFL (Cue) functions, plus manual start of audio devices if desired. May also be programmed as multifunction keys.



Ambient light sensors automatically adjust the brightness of console displays.

- 7. DSP MENU KEYS** give operators direct access to all audio processing functions.
- 8. SYSTEM KEYS** for snapshot save and recall, and other commonly-used system settings.
- 9.** The **MULTIFUNCTION KEYS** in the Master section are freely programmable for frequently-used functions, and may be individually labeled.
- 10.** The **MONITOR CONTROL SECTION** is available for detailed monitor and headphone adjustments. It comprises a display, a rotary encoder with a LED ring and 10 multifunction keys.

### FADER MODULE



Ambient light sensors automatically adjust the brightness of console displays.

- 11. ROTARY CONTROLS** for setting DSP parameters or making quick manual adjustments to mic, line, and send levels, etc.
- 12. CONTEXT-SENSITIVE MULTIFUNCTION KEYS** control bus assignments, DSP settings, AutoMix, Conference and Talkback assignments. The nearby TFT display indicates the function of each key. All buttons have multi-color backlights, programmable to help users quickly identify functions by color.
- 13.** The **MULTIFUNCTION DISPLAYS** show the action assigned to each of the four multifunction keys, such as parameter control, source assignment, even dynamic stream patching using the RAVENNA source pool feature.

- 14.** The **ACCESS KEYS** select sources for parameter control. Double-tap for quick source assign and stream patching.
- 15. 8 TOUCH-SENSITIVE MOTORIZED FADERS** are completely silent and feature a selectable 0dB notch. Programmable Fader-Start and Fader Over-Press features allow custom logic functions to execute when faders are opened or closed.
- 16. CHANNEL ON & PFL KEYS** with guided key frames and color-guided lighting provide On/Off, Mute and PFL (Cue) functions, plus manual start of audio devices if desired. May also be programmed as multifunction keys.

The heart of any mixing console. crystal Fader modules are 8 faders wide, with fast, silent motorized faders that respond instantly to layer changes, playout systems and remote operator input. Styled after our award-winning line of mc<sup>2</sup> audio production consoles, color-guided controls provide instant visual feedback for active functions. Full-color displays above the faders supply source information, confidence metering, and more. This module allows to add 8 channels to a 6-fader Main module, for a total of 14 channel faders.

**Smooth, clean work surface** resists dirt, fingerprints, and other marks, remaining tidy even with constant use.



# Power Core

SOFTWARE-DEFINED, HIGH-DENSITY DSP MIXING ENGINE AND MODULAR I/O DEVICE



## Power Core

### AOIP MIXING ENGINE + I/O NODE

At just 1RU, Power Core's compact form belies its immense signal capacity. It reduces rack space requirements and maximizes operational flexibility while helping to reduce installed cost.

By default, front-panel I/O in Power Core Rev3 includes 4 RAVENNA/AES67 Ethernet ports on SFP, capable of up to 256 bi-directional AoIP streams (512 audio channels). Or use them to provide LAN segment separations or LAN-WAN gateway applications using bi-directional Unicast streams. 4 high-density MADI ports supply up to 256 channels of audio, making Power Core perfect for native MADI-to-AES67 AoIP conversion. A USB and SD Card port simplify maintenance operations. Two Ethernet control ports plus CAN and serial control ports complete the scene.

Around back, 8 expansion slots accept a variety of optional I/O interface cards. Auto-switching, redundant power connections are standard. Power Core's internal auto-ranging AC power supply is complemented by a 12VDC backup power supply inlet.

A single Power Core can handle thousands of simultaneous signals. As many as 96 channels of DSP input processing can be unlocked for anything from EQ to de-essing, from dynamics to delay sync. Depending on the license package—Compact or MAX is required for crystal—Power Core boasts resources to power up to 4 independent mixing consoles (hardware or software).

Used with a Lawo control surface, it's a powerful mixing/routing engine with an internal routing matrix of up to 1,920 x 1,920

crosspoints. In its most advanced configuration, Power Core's massive DSP capabilities can be unlocked to apply audio correction to vast numbers of signals plant-wide. Whatever your workflow, Power Core is always optimized for the task at hand.

Power Core is standards-based from the ground up. It uses RAVENNA, the standards-based advertising and discovery protocol that's AES67 compliant. It employs the open-source EMBER+ control protocol to connect and control any studio hardware or software. SMPTE ST2110-30 compliance ensures seamless operation in combined radio/TV broadcast plants and trucks, while ST2022-7 Seamless Protection Switching enables simultaneous, redundant network links. Naturally, Power Core also works with Lawo HOME, the management platform for IP-based media infrastructures.

Power Core comes with 8 rear-panel slots that accommodate a variety of audio and control modules. Simply pick the I/O cards you need and slide them into Power Core's waiting expansion ports. More details can be found online and in the Power Core brochure.



## Power Core AIOX



AIOX, the audio extender for Power Core, embodies Lawo's philosophy of "smaller is better." It delivers up to 64 channels of I/O in just 1RU—a distinct advantage over conventional I/O conversion boxes of 3RU or more. This equals significant savings in rack space required, power consumed, and in cost-per-input.

Each AIOX unit has 8 rear-panel slots that can host nearly any combination of modular 8-channel I/O cards. With these, you can easily expand your RAVENNA/AES67 networks by choosing à la carte from a large selection of microphone, line, and digital audio cards, and a useful GPI/O logic card.

Using a new proprietary high-speed, low delay point-to-point audio and control protocol, AIOX connectivity utilizes the Power Core's MADI ports to exchange bi-directional audio between devices with an ultra-low latency of only 3 samples per direction. It also eliminates installation hassles with zero-configuration, plug-and-play deployment.

Combining the maximum 20 AIOX units with a Power Core engine adds up to 1,280 analog or digital audio inputs, outputs and GPI/O—within just half the space of a typical TOC rack. Users can distribute AIOX as edge devices using copper links, coax, or fiber links that support Single and/or Multi-mode operation (depending on SFPs used). Audio and control share the same link.

### MAXIMUM FLEXIBILITY

There are countless ways to easily expand your facility with AIOX. Put one in your newsroom with 8 Mic or Line I/O cards for all the mic and monitor channels you'll ever need. Place two together in a main On-Air studio to guarantee fully-redundant I/O. Install an AIOX in cross-campus studios, or in performance spaces as a 64-channel stagebox or edge I/O device.



Local I/O for News Studios

Point-to-point connection

Central Rack Power Core



Local I/O for Typical Studios

Point-to-point connection

Point-to-point connection



Redundant I/O for Critical Studios



### crystal Control Surface

- Table-top or counter-sunk versions
- Single-frame or split-frame configurations for up to 14 faders
- Touch-sensitive, motorized 100mm faders with a selectable OdB notch
- Context-sensitive full-color displays
- Snapshots for instant recall of console layouts, user settings and other operational parameters
- Sophisticated user- and rights-management system with on-screen, single sign-on (SSO) or RFID login
- crystal Apps (powered by Lawo VisTool) included for integrated workflows using both the Virtual Extension module and “off-console” external displays. Features metering, graphical parameter controls, timers, user functions, audio routing and much more.  
(Apps require separate Windows workstation; ask your Lawo representative for details)
- Native connection to a Power Core engine via LAN or WAN
- Available in attractive and sturdy light and dark finishes

#### DIMENSIONS

- Modules (Main and Fader): 342mm x 356mm
- Table-top frame: 352mm x 383mm
- Height: 45mm (44.4)
- End-plates for counter-sunk mounting: 10mm each

#### CONFIGURATION AND MAINTENANCE

- Console Designer software for system and logic programming
- Secured Web interface for system setup and diagnostics
- Software tool for remote software updates
- Remote control and maintenance via IP

#### OPTIONAL EXTENSION PANELS

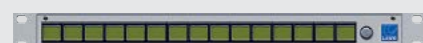
Several rack-mounted 1RU panels with illuminated buttons, LCD keys, pots & GPIO are available to provide control logic and control level adjustments for conferences, talkback and monitoring. Up to 30 panels can be connected via CAN-Bus or TCP/IP.



**KSC.T20**  
(950/80) 19”/1RU panel with 20 backlit buttons



**KSC.LCD16**  
(950/81) 19”/1RU panel with 16 LCD buttons



**KSC.LCD15P1**  
(950/82) 19”/1RU panel with 15 LCD buttons, and 1 rotary control (e.g. for level control)



**KSC.LCD14P2**  
(950/83) 19”/1RU panel with 14 LCD buttons, and 2 rotary controls (e.g. for level control)



**KSC.GPIO32**  
(950/84) 19”/1RU panel with 32 GPIO contacts and 8 VCA inputs



Main Module (6 faders)



Fader Module (8 faders)



Main Module (6 faders)



Fader Module (8 faders)



Main + Fader Modules (14 faders) + Optional Virtual Extension



Main + Fader Modules (14 faders) + Optional Virtual Extension

### POWER CORE

#### SIGNAL PROCESSING - POWER CORE

- Maximum of 96 Input channels, each with Input gain, a signal presence indicator, direct outs, Inserts, Aux sends with Pre/Post switching, pan/balance, AutoGain for each mic input
- 5-parameter equalizer: 3 fully-parametric bands plus 2 semi-parametric bands (can also be shelf, high-pass or low-pass filters. High-granularity EQ with extended “Q” values
- Dynamics: gate, expander, limiter, compression with self-keyed side-chain filter, De-Esser with adjustable trigger frequency
- Maximum of 8 individual AutoMix groups (up to 96 channels each) and 16 VCA groups allow creation of multiple independent mixes
- All sources and all busses may be metered onscreen using EBU R128 Loudness Metering and/or PPM
- Sync delays of up to 5,300ms with switchable units (meters, milliseconds, frames)
- Up to 80 summing busses depending on license, configurable as Program, Record, Aux, Group, Mix-Minus (clean feed) or General Purpose. A full DSP channel with EQ, Dynamics and Delay functions may be applied to any of these busses (up to 16 stereo or 32 mono busses)
- Channels and busses may be grouped into Stereo and 5.1 Surround bundles

#### SOFTWARE DEFINED FUNCTIONS

- Some features described are extra-cost options. Power Core may be configured as a pure audio I/O device, mixing console engine, shared core for up to 4 independent mixing consoles (MAX version), or a router with extensive DSP capabilities. Ask your Lawo representative for detailed options and prices.

#### SYNCHRONIZATION

- PTP (IEEE 1588)
- BMCA-PTP interface support
- Wordclock input and output
- MADI input and internal generator
- 48 kHz or 44.1 kHz

#### STANDARD AUDIO INTERFACES

- 4 MADI (each 64 channels I/O) with SFP cages (MADI ports 1/2 and 3/4 can be grouped as redundant interfaces)
- 4 RAVENNA/AES67 with SFP (up to 256 bi-directional streams with up to 512 I/O channels in total). May be grouped as redundant interfaces using SMPTE 2022-7 standard or LACP
- ST2110-30 compliant for seamless audio interchange in combined radio/TV broadcast plants
- Some interfaces may not be active with certain license packages. Please consult your Lawo representative for details.

#### AVAILABLE I/O EXPANSION CARDS

- 8 Mic/Line inputs
- 8 Mono/4 Stereo Line inputs
- 8 Mono/4 Stereo Line outputs
- 4 Stereo AES inputs with SRC + 4 AES output (bit-transparent)
- 4 HD-BNC AES inputs with SRC + 4 HD-BNC AES outputs (bit-transparent)
- GPIO: 8 GPI & 8 GPO + 2 VCA inputs
- 2 Mic/Line in + 2 Line out + 2 Stereo Headphone out
- 2 MADI (64 I/O channels each) with SFP cages
- 1 MADI incl. SRC (64 I/O channels) with SFP cage
- 2 DANTE (two redundant connections, 64 total channels)

#### OPTIONAL POWER CORE AOIX EXPANSION UNIT

- Each AIOX unit has 8 rear-panel slots for nearly any combination of modular 8-channel I/O cards (up to 64 additional I/O per unit)

#### CONTROL

- RAVENNA/AES67 discovery, connection management, and dynamic stream patching
- Ember+ and RAS control protocols for integration with automation, playout, hybrid and codec applications
- Integration with and control via Lawo VisTool, HOME, VSM, A\_line devices, DSA Line Scheduler and RAVENNA matrix server
- Programmable logic core for external “On-Air” tallies, Fader Start commands, Talkback integration and Studio Environment
- IP multicast control protocol in solutions featuring multiple crystal frames and panels
- TCP/IP, CAN, and RS422 control protocols supported

\* Some Power Core features listed here may not be supported by certain license packages. Please consult your Lawo representative for details.



# new crystal

## VERSATILE BROADCAST CONSOLE



© 2023 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 October, 2023.

### HEADQUARTERS

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

### INTERNATIONAL OFFICES

CANADA + 1 416 292 0078  
CHINA + 86 10 6439 2518  
NORWAY + 47 22 106110  
SINGAPORE + 65 9818 3328  
SWITZERLAND + 49 7222 1002 0  
UK + 44 333 444 5296  
USA + 1 888 810 4468

### RENTAL SERVICE

+ 49 7222 1002 0  
rental@lawo.com

690-0014-000



This document is printed on FSC®-certified paper.



www.lawo.com

