

mc²66

Inspired by your needs



English

mc²66 *Inspired by your needs*



mc²66. More Power. More Speed. More Flexibility.

Excitement behind the scenes.... the tension is building.... in just two hours the curtain goes up on a major live event. What a relief to be able to rely on a mixing console that lives up to your highest expectations in any situation – the mc²66 by Lawo.

For all types of production, the mc²66 gives you that crucial advantage when it comes to power, speed and flexibility. The latest generation Lawo consoles excel, not only by having the largest audio matrix and most powerful DSP core, but also by virtue of an ergonomic philosophy that provides clear, consistent operation and guarantees maximum functionality and efficiency, whatever the job. Your operation benefits from a very professional tool tailored to your specific requirements; a tool that allows you the freedom to concentrate on what matters most: the best sound.

More Power:

512 DSP channels, 144 summing buses and 8192 x 8192 crosspoints send a clear message on their own. However, the impressive powerhouse that is the mc²66 goes even further than these raw specifications. Highest quality signal processing in particular gives the mc²66 the power and precision that you expect from a professional tool, and there are many other outstanding features. For example, in every channel, all the audio sections deliver the highest quality – from the superb limiter to noiseless delay changes – and all available, all of the time.

More Speed:

In audio production as in sport... speed is the key! And the mc²66 guarantees to be always that bit faster. Our recently developed operating philosophy, "Assign at Destination", allows you to set the controls the way you want them – with speed and confidence, even at critical moments. This ability is a hallmark of the mc²66: total control, all the time, in any situation.

More Flexibility:

With the mc²66 you are always in command of all your console's resources. You can change the channel section parameters during runtime without losing your production data; you can adapt the DSP power at any time, so it is optimised for the current production; it is even possible to achieve, without the need for inconvenient reboots, fast switching of the main bus outputs between mono, stereo or surround, at the same time as the on-air integration of a mic board in a stage box. Result: with the mc²66 you get a mixing console that guarantees total flexibility.

More Precision:

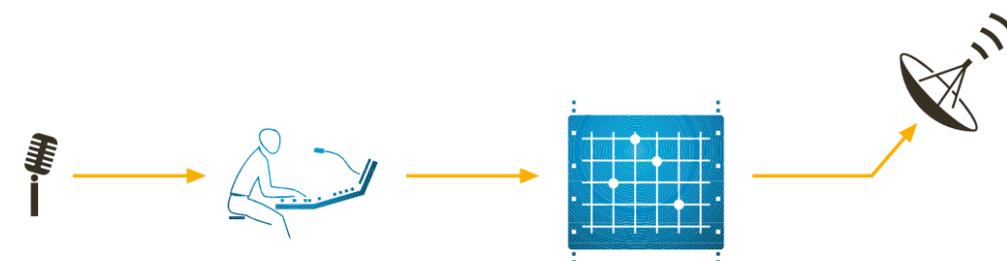
Complex productions require absolute concentration and precision. For this reason the mc²66 is designed to provide support in critical situations, and so reliably releases you from many tasks. Thanks to innovative functionality – such as Audio-follow-Video, external control of camera mic amp levels, convenient console partitioning, and the ability to simultaneously create multichannel and stereo mixes – you can make the mc²66 a dependable partner, particularly for those ambitious tasks, but a partner that you will also value greatly in your day-to-day operations.

More Security:

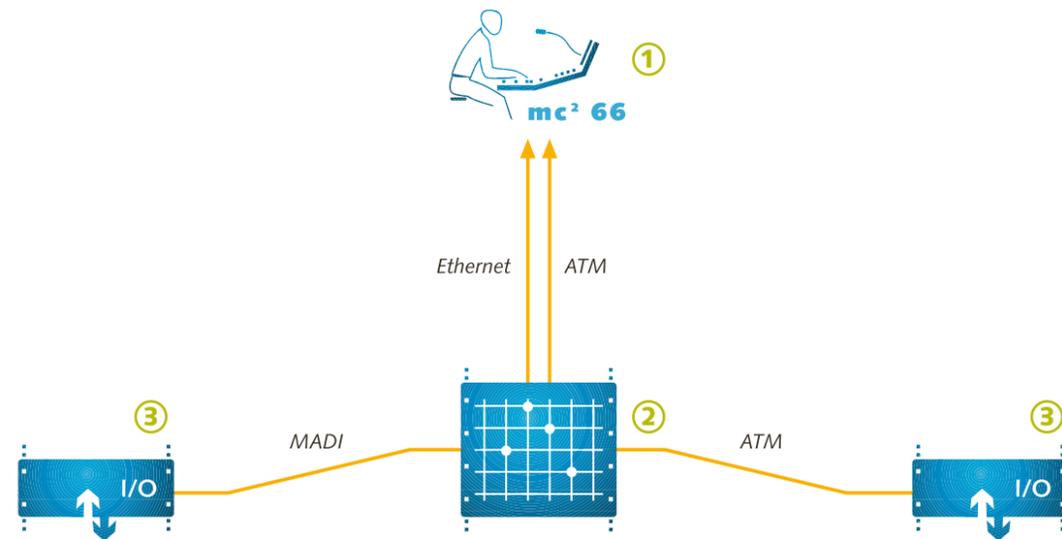
In the professional broadcast and live domains, maximum system availability and resilience are paramount. To this end, the mc²66 offers the highest redundancy and reliability from mic input, through the entire system to the programme output. Because of this supreme availability, the mc²66 has established itself as the de-facto reference console in Europe, be it at Danmarks Radio, Westdeutscher Rundfunk, the BBC or for World Cup Football.

More Know-how:

High quality production practices and the use of innovative materials (as used in the aerospace industry) combine to guarantee the highest stability and smallest weight. The proof: an mc²66 with 56 faders weighs just 125 kg and is only 2.35 metres wide. Consequently, the mc²66 is your first choice where weight, dimensions and power consumption are important: in the OB van, the studio, the theatre and conference centre.



Structure mc²66



The **system** consists of three parts:

- ① Mixing console surface with integrated control system
- ② DSP and routing matrix (HD core)
- ③ DALLIS I/O interfaces

Control system and HD core communicate via an Ethernet link and an ATM link, both with redundant design.

The DALLIS stage boxes are connected by multimode optical fibre. This allows distances of up to 2 km.

Optionally available is a monomode link that allows distances of up to 8 km.



New:
Surround Channel
with Hyperpanning and
Multichannel Metering



The **audio processing** is performed on the DSP boards in the core. They work optionally at 48 or 96 kHz at a 24-bit-resolution and an internal processing of 40 bits floating point. This results in an internal dynamic range of 1,000 dB.

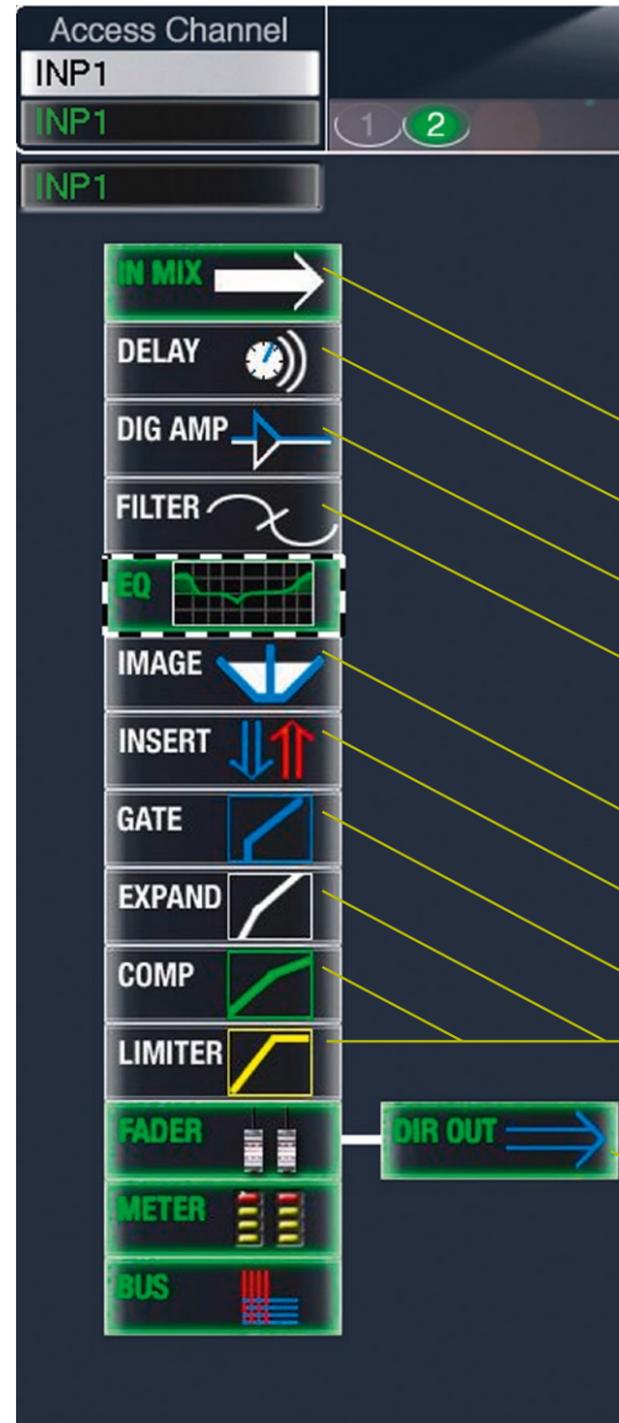
In case of a DSP-board failure a redundant DSP board takes over all crosspoints and DSP parameters within a few milliseconds.

High-quality algorithms guarantee high-quality audio processing. Naturally, every setting of the DSP is noiseless so that also the delay can be set during runtime without clicks.

Up to 384 full DSP channels offer all audio modules like input mixing, filter, EQ, dynamics, delay, stereo image and surround panning at any time. From every channel it is always possible to collect 32 aux/sends.

Different DSP configurations facilitate to categorise the DSP resources for different production requirements. Changing the configuration is possible anytime while the system is in operation without the loss of production data and without unpleasant noises. Even the parameters of no longer existing channels remain stored so that after a further change of the DSP configuration the settings are available again.

DSP Channel



Every one of the 384 full **DSP channels** includes always all audio modules no matter whether it is an input, group, sum, monitor or aux channel.

- **INMIX** controls the pre-amplification in the stage box for analogue sources
- **DELAY** allows a delay of up to 1800 ms represented as frames, ms or m
- The **DIGIAMP** changes the amplification within the channel
- Both the 4-band **EQ** and the 2-band **FILTER** offer bell, shelving, notch EQ as well as high and low pass – so the channel offers a flexible sound design
- The stereo **IMAGE** allows to enlarge your stereo image or position it precisely without losing the stereo effect
- The **INSERT** can be activated anytime without affecting the channel's delay
- The four dynamic units (**EXP, GATE, COMP, LIM**) with the advanced "Look Ahead" function create pleasant sound characteristics even at large dynamic changes. The limiter can be used as high-quality final broadcast limiter
- **DIR OUT** with mute and adjustable output
- Up to 48 groups, 32 sums and 96 tracks can be assigned via bus assign
- The **AUX** monitoring point for 32 aux sends is AF, PF or PEQ
- For every channel, every module can be moved individually to any position within the channel structure

Central Control Section

Clearly designed Central Control Section

Every module within the DSP channel can be controlled directly via dedicated operating units in the central control section, in a clear order following the typical signal flow.

This facilitates the clear and fast setting of the audio parameters for every channel. The graphic of the Main Display supports by a perfect overview. On- and off states are represented in different colours; all parameters are visualised either numerically or in characteristic curves.

An access fader in the central control section completes the channel handling.



Screen Control

The **Screen Control** module operates all GUI pages.



Dedicated GUI buttons lead you to the pages:

- Signal List, Matrix List
- Snapshot
- Sequence
- Channel Configuration
- Metering
- System Settings
- Bus Assignment
- Automation

“Access” and “Assign” configure the assignment of channels to faders.

6 banks per 2 layers can be allocated individually and copied to each other.

- Comprehensive copy functions allow to assign every parameter of the DSP channel as well as the free control assignments fast and individually to any channel. Parameters of different DSP types can be copied. Individual modules can be reset to default.
- With the fader control it is possible to set elements directly, like digital amp, aux send gain and input gain.
- Individual faders can be isolated from the snapshot management as well as from the surface assignment.

Decentral Control Section

Every **channel strip** includes:

- Fader with select and mute
- PFL/AFL
- Four freely programmable softkeys
- Module activating for EQ, PAN, DELAY and COMPRESSOR
- 4 free controls
- Local input mixer with 48V activation, PAD, high-pass filter and A/B input
- Graphic PPM in different scales with bus assignments
- Parameter display with automated switching to the parameter activated by the sense-function
- Name and label for two layers
- Isolated bank and layer switching for every 8-fader bay. Optionally with 2nd PFL/AFL; optionally with isolated SEL-button
- Detailed Fader-Haptic Modes with fader notch, fader brake and fader “rubber band” as well as PFL backstop



Production/Snapshot

Comprehensive **snapshot** options store control panel assignment, DSP settings, matrix connects and I/O parameters. Filter functions facilitate the recall of individual parts.

All functions can be recalled directly on the snapshot page as well as on a specific snapshot/sequence operating unit.

Sequences are compiled from snapshots whose order can be changed anytime. There is no limit of the number of snapshots per sequence.

All data can be imported and exported via network or USB.

The screenshot displays the software interface for sequence and snapshot management. At the top, it shows 'Page' information including 'INP1', 'Mod B.01', a large time display '17:04:53:15', and 'Sequences'. Below this, the 'ACTIVE SEQUENCE' is identified as 'Hamburg/Hamburg'. A table lists the sequence items:

State	Name	Date Time	FadeTime(ms)	At Start	Memo1
	00_Start	10/20/06 22:48:34	0	✓	
	03_Nina Hagen_Opening	06/03/08 16:45:32	1000	✓	
	08_Nena_Caravan of Love	10/20/06 22:07:00	1000	✓	
	20_Sasha_Wouldn't It Be Good	10/20/06 12:35:32	1000	✓	!! Reverb, 1.6 sec
	49_Jeanette_Like A Vergin	10/19/06 21:42:10	1000	✓	Coming from behind!
	53_Olm_Stand Up	06/03/08 16:43:20	2000	✓	
	73_Silbermond_Blaue Augen	10/20/06 17:39:38	1000	✓	
	91_Fanta 4_Sie ist weg	10/20/06 20:18:34	0	✓	
	85_Peter Maffav_Heartbeat	10/20/06 16:44:24	0	✓	

Below the table are control buttons: skip, back, next, save, move, Select, Current. A 'Snapshots' table is also visible:

S	Name	Memo1	Memo2	Date Time
(1)				06/03/08
S	00_Start			10/20/06
S	03_Nina Hagen_Opening			06/03/08
S	08_Nena_Caravan of Love			10/20/06
S	20_Sasha_Wouldn't It Be Good	!! Reverb, 1.6 sec		10/20/06
S	49_Jeanette_Like A Vergin	Coming from behind!		10/19/06
S	53_Olm_Stand Up			06/03/08

Automation/Sequences

The concept behind our completely new **Dynamic Automation** system was developed especially for use in modern production studios and mobile control rooms. The automation system follows the operating philosophy of the mc²66, providing fast and easy access with maximum flexibility. Great importance was attached to the parameters being directly set using an 'Assign at Destination' philosophy, which allows an engineer to meet the client's demands immediately and precisely.

A mix pass tree graphic enables you to resume work on any pass, at any time.

The Dynamic Automation system facilitates the comprehensive timecode-based backup of all signal processing parameters. Individual processing modules or module groups can be stored dynamically or in snapshots. Different stepout modes, absolute and relative trim modes, copy, preview, and bypass functions allow for convenient and individual mixing.

The mc²66 **Sequence Automation** offers the option to manage several snapshot sequences without the necessity to export data. Functions such as the fading of individual parameters between two snapshots, and the ability to output MIDI commands at the same time, complete the functionality of the Sequence Automation system.



The screenshot displays the software interface for pass tree management. At the top, it shows 'Page' information including 'IN13', 'G.O.V.', a large time display '0:00:27:21', and 'Automationtest Tommy'. Below this, a 'Passes' table is visible:

Play Pass	Record Pass	Selected Pass
pass032	pass032	pass032

Below the table is a 'Pass tree' section showing a hierarchical list of passes:

- pass000
- pass001
- pass002
- pass004
- pass005
- pass020
- pass031
- pass032
- pass020
- pass021
- pass022
- pass024
- pass026
- pass027

Audio-follow-Video

The mc²66 offers a flexible and comprehensive **Audio-follow-Video** function for every DSP channel. An event is assigned to every camera. This event can be selected in either one or several channels. The console provides 128 events. Adjusting the parameter Rise Time, On Time, and Fall Time controls the envelope. This function allows a smooth fade from one camera to another. Advanced parameters provide the possibility of starting short sequences event-controlled.

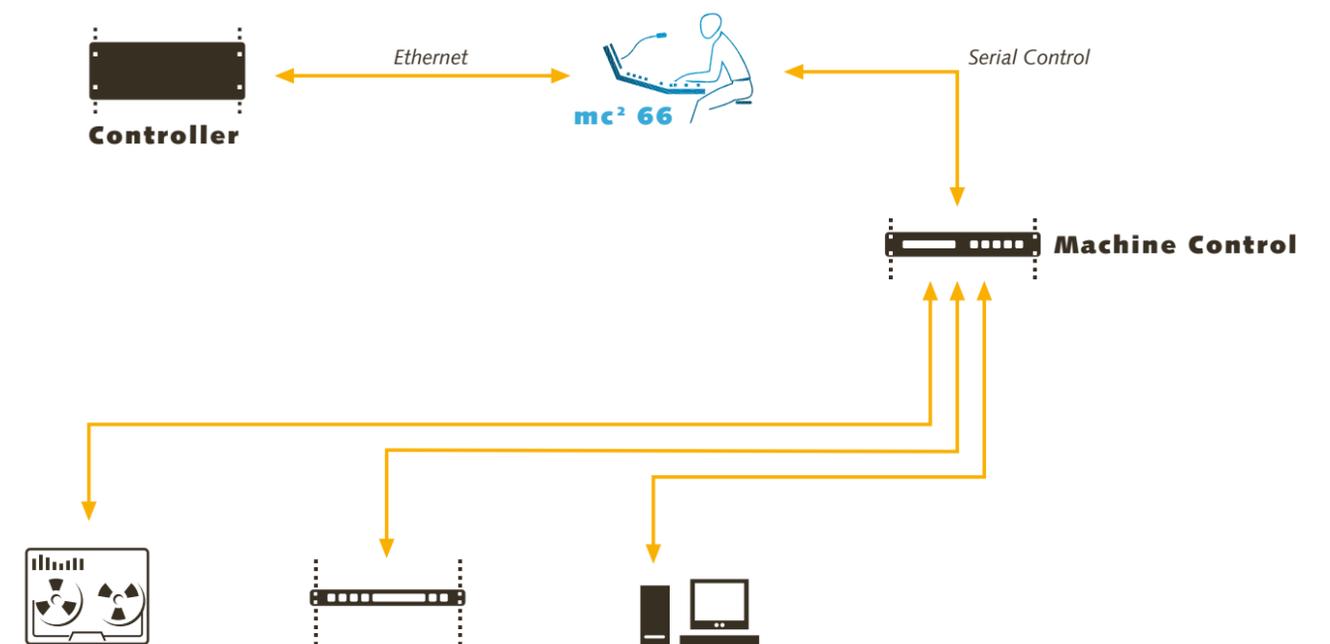


Audio-follow-Video visualisation with the new parameters "Holdtime" and "MaxTime"

Control

In modern production environments, **communication** between the individual components in an audio system takes on more and more importance. Using our Remote MNOPL protocol, the mc²66 communicates with a highly flexible language that offers a range of all-encompassing control options. Apart from simple crosspoints, you can also control DSP parameters in the matrix as well as in the console. Whether it be an Audio-follow-Video event or the most recent change on an HD SDI board, almost every parameter in the system can be remotely controlled using an external control device. We support, amongst others, VSM, BFE and Jupiter control protocols.

Whenever many independent devices must work together, smoothly and dependably, the mc²66 is always the right choice.



GPC

The **General Purpose Channel**, also known as a 'GPC', is an mc²66 system control channel. It provides all the facilities on a typical input channel (input mixer, EQ, dynamics, panning, fader level, auxes, Audio-follow-Video, etc.). The mc²66 console offers 256 General Purpose Channels.

A GPC is not linked to the console's signal processing but is connected to the mc²66's MIDI and Ethernet interfaces. The system provides different mapping tables to allow control of digital audio workstations or a variety of other MIDI-based devices.

For example, a typical application is the external control of digital audio workstations, such as Pro Tools or Sequoia, using faders and rotary controls on the mc²66. In this application, the HUI protocol is employed.

Naturally, all the parameter settings can be stored in snapshots and recalled anytime. In addition, the mc²66 allows you to use dynamic automation, as well as the Audio-follow-Video function, with the GPC parameters.

Another GPC application is the direct control of camera mics from the mc²66 console. The benefit: you can set up the camera mic amps remotely and store the settings in snapshots. In this way, you are able to store and recall all the audio parameters of all the cameras used in the production.

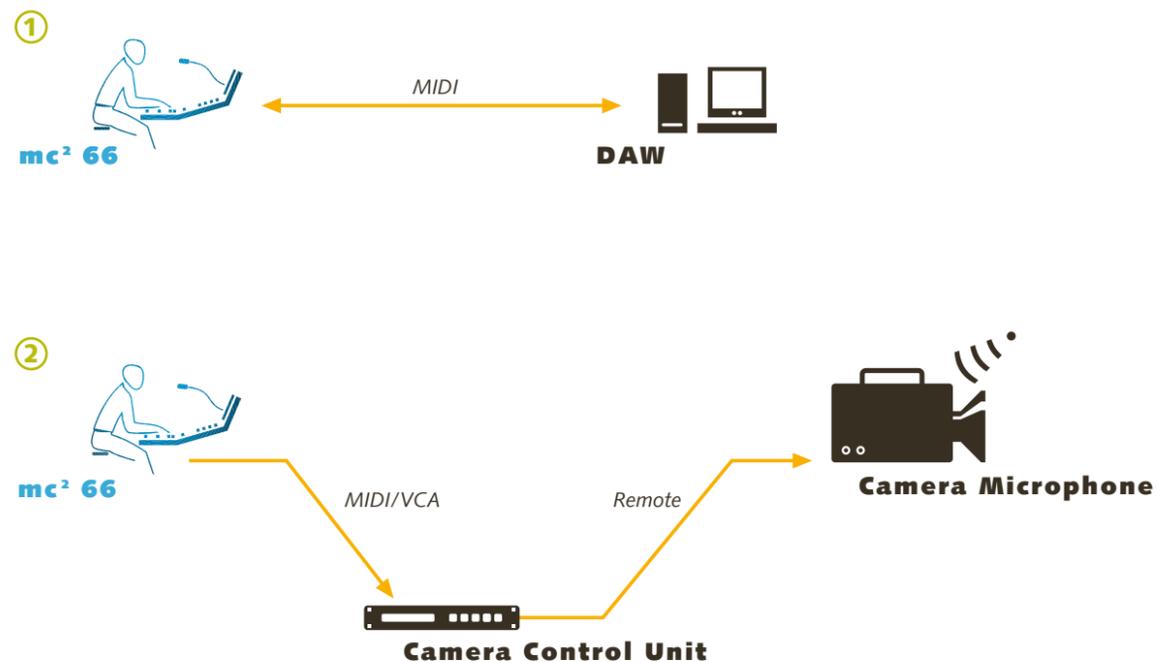
Monitoring

The mc²66 includes two **monitoring systems** that can be operated at the same time. Control Room Monitoring is prepared for up to 7.1 monitoring, Monitoring 2 is designed as stereo.

The monitoring is processed directly in the HD core. Thus, more monitoring units, e. g. for video control rooms, can be realised also in the HD core and can be trimmed from the operating surface. With a further unit, they can be controlled from the User Panel.

Extensive trim functions allow the setting of every single loudspeaker, the dim level and the mono attenuation in the range between -128 and +15 dB. These settings are stored with the production.

Examples of GPC applications



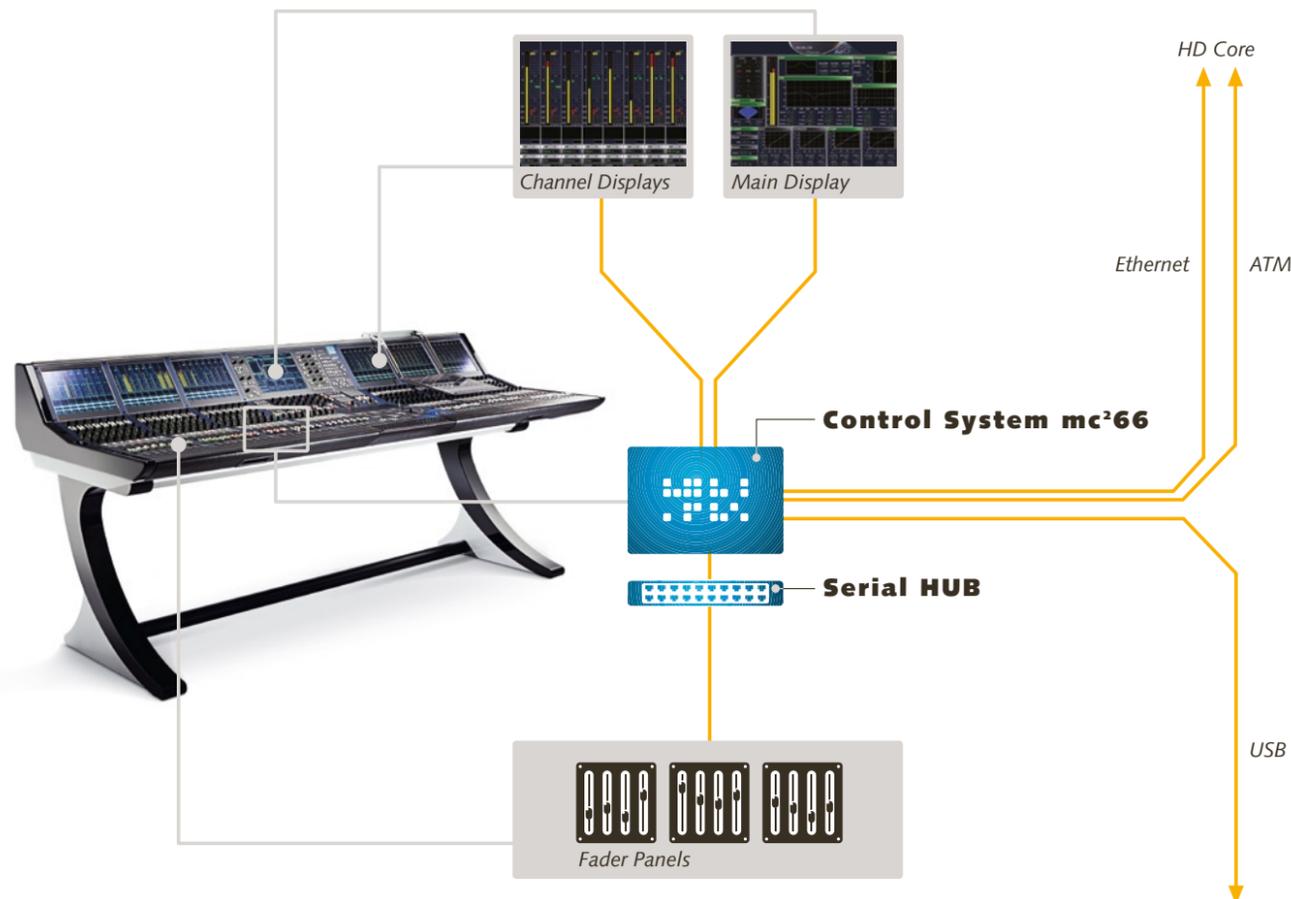
Mixing Console Surface

All **console surface modules** are directly linked with the control system. They are star-connected individually so that the modules are completely independent from each other. This allows to add or remove individual panels anytime while the system is running. No audio signals flow via the mixing console surface – it is only the remote control of the DSP core and the routing matrix.

The surface size can be configured individually within the 8-fader pattern from 16 + 8 faders to up to 48 + 8 faders.

An additional user module allows to integrate keys for specific functions, machine remote control or talkback keys into the surface.

The HD core is controlled via an Ethernet as well as an ATM link. Both control connections can be designed redundantly.



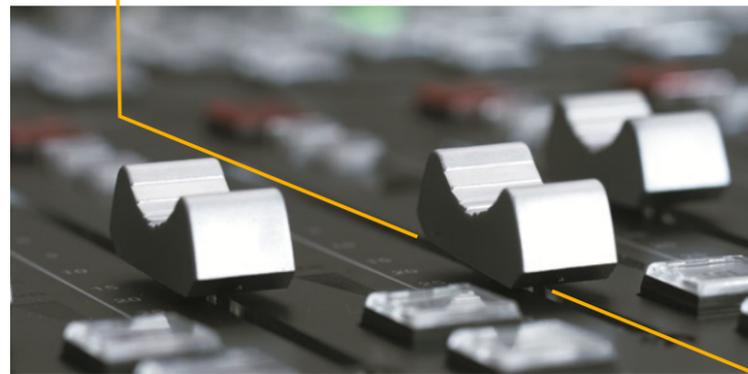
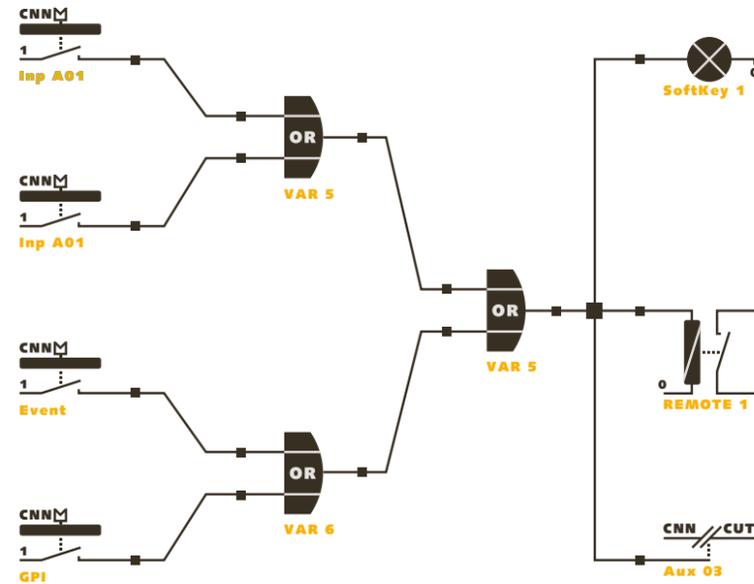
HD Core

In combination with the **integrated routing matrix** the **mixing console** allows maximum flexibility for I/O interfaces and DSP resources.



- Maximum of 8 DSP boards with up to 384 full DSP channels, up to 96 kHz
- Up to 144 summing buses
- MADI, ATM or AES interfaces directly at the core
- All common analogue and digital I/Os and control interfaces via DALLIS
- Matrix capacity: from 3072 x 3072 to 8192 x 8192 mono channels

TCL



By using the TCL (**Tool Command Language**) functions can be configured individually. Tally states, automated input allocation and faderstarts can be programmed freely in a boolean matrix. This allows the logical interlinking of GPIs, softkeys and events. Customised adaptations can thus be created fast and flexibly.

Up to 100 softkeys in the control surface as well as four freely assignable buttons in every channel strip can serve as logic source.

Console Dimensions/Frame Sizes

The console surface is available in a number of different frame sizes.

Five variations can be configured from 48 faders plus 8 main faders, down to a small console with 16 decentralised faders. In addition, we offer a special variant with 24 + 8 + 16 + 8 faders for installation in an OB truck. The frame takes up the full width inside the truck, allowing consoles of up to 56 faders to be accommodated without the need for special coachwork.

24+8+24

Studio (w x h): 2395 mm x 403,72 mm
OB Van (w x h): 2325 mm x 363,72 mm



24+8+16+8

OB Van (w x h): 2339 mm x 363,72 mm



24+8+16

Studio (w x h): 2115 mm x 403,72 mm
OB Van (w x h): 2045 mm x 363,72 mm



16+8+16

Studio (w x h): 1835 mm x 403,72 mm
OB Van (w x h): 1765 mm x 363,72 mm



16+8+8

Studio (w x h): 1555 mm x 403,72 mm
OB Van (w x h): 1485 mm x 363,72 mm



8+8+8

Studio (w x h): 1275 mm x 403,72 mm
OB Van (w x h): 1205 mm x 363,72 mm



TECHNICAL DATA

Control Panel

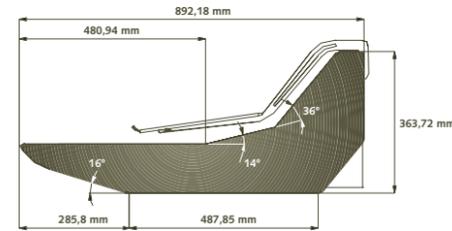
- Frames from 16 + 8 faders to 48 + 8 faders
- 6 banks per 2 layers
- 100 mm faders + 4 rotary controls + Input Gain Controller
- Channel display for every fader with sense-triggered change of module display in the Channel Display
- TFT metering mono, stereo or 7.1 including bus assignment, gain reduction for dynamics, AfV status, VCA assignment
- External display of GUI pages e.g. metering
- Optional: script tray, user panels for machine control, theatre application, talkback or 80-push-button module
- 19 inch integration, 2 RU

Signal Processing

- 512 channels and 144 summing buses, 40 bit floating point
- Up to 376 inputs with A/B input, 48 sub groups, 32 aux sends, 96 track buses, 48 main sums, change on the fly from mono to stereo to surround channel and bus
- Up to 64 surround channels, 128 VCA groups with metering, 256 GPC channels
- Surround formats: DTS/Dolby Digital 5.1, Dolby Pro Logic 4.0, DTS ES / Dolby EX 6.1, SDDS 7.1, Lawo 7.1, diverse panning characteristics, surround aux buses
- 2* AFL: 1* surround 8-channel, 1* stereo
- 2* PFL stereo
- Audio-follow-Video with 128 events, control either via Remote MNOPL, GPI or Matrix Connect, adjustable envelope up to 10 s fade time
- Solo In Place
- Permanent input measuring point in the fader, adjustable measuring points INPUT, PF, AF, DIROUT in the Channel Display
- Modules: Inmix with MS-Decoder, Digital Amp, 2-band fully parametric Filter, 4-band fully parametric EQ, 2-band fully parametric Sidechain Filter, Insert, Delay up to 1800 ms, units in frm, ms and m, 4 independent Dynamics: Expander, Gate, Compressor, Limiter; Image, Meter, Direct Out
- Inline configuration with send/return switching - at the channel or global
- Fully equipped surround channel with coupling of all channel parameters and Hyper Panning

Routing Matrix

- Up to 8192 crosspoints, non-blocking
- 96 kHz, 24 bit
- Fully redundant signal path
- Level adjustment for all inputs and outputs
- Downsizing up to 7.1 to Stereo
- Integrated monitoring devices for remote positions e. g. Director's Room
- Full networking of up to 16 HD Cores, share and import of sources and destinations, studio arbitration
- Full snapshot and production portability independent of matrix or DSP size



Plugin Server

- Full VST plugin integration with storing of plugin parameters in snapshots and productions

Interfaces

- Mic/Line, with up to 127 dB dynamic range, subsonic filter 40, 80, 140 Hz Line Out, ADAT® (ADAT® is a registered trademark of Alesis, LLC and is used here under license.)
- AES with input and output SRC, transparent Dolby E routing, balanced and unbalanced
- HD-SDI with up to 270 ms delay on board, MADI 64 & 56 with fibre or coax, ATM, GPIO, Serial, MIDI
- Direct intercom connection,
- All interfaces with 24 bit, 96 kHz (for details see DALLIS product information)
- Monitoring systems stereo and surround

Synchronisation

- 2 redundant inputs with automatic detection of Blackburst, Wordclock, AES3, MADI

Redundancies

- PSUs, DSP boards, router board
- Fully redundant signal path
- PSU for control system and control panel

Control

- Bay-Iso with separate layer and bank switching as well as 2nd PFL/AFL bus
- Global A/B input switching
- Enhanced mix-minus (N-M) control with independent off-air conference
- Fader control of all level parameters
- Diverse tally- and faderstart modes
- Program switch
- Machine control
- Audio-follow-Video, up to 128 camera tallies, Ethernet or GPI-controlled
- Manifold T/B integration
- Camera microphone remote via GPI or voltage control

External Control Systems

- Remote control of all routing parameters via network
- Remote control of monitoring units of remote positions
- Online configuration with AdminHD, graphical configuration of HD Core components
- External matrix controller: VSM, Jupiter, ProBel and others

Remote Maintenance

- Connection via Internet Remote Software
- Software updates, error diagnostics, remote



These are only some of our customers. For a full reference list please contact our headquarters in Germany,



our subsidiaries or our representative offices. You find the contact details on the back cover.



Lawo is "Supplier of the mixing console for Formula One host production" in the season 2008



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