Consoles 101

There's nothing more impressive (or intimidating) than the massive consoles that are featured prominently in Magazine ads and studio brochures. After working with the more modest Mackies we've used so far, you should have an idea what's going on, but there are still some questions about what all of this is for. Big consoles are designed with certain goals in mind, factors that are determined not so much by the needs of audio, but by the working methods that have been proven efficient in an industrial setting. These are the principles that shape the boards:

Avoid patching

The patchbay in a commercial studio is setup with the default (normalled patch). patching is only made when unusual situations occur, or when extra gear is brought in. This implies the console will have lots of inputs - at least one for every track of the multitrack and mastering machines, plus enough to accommodate the greatest number of mics that may be in use.

Different phases of producing need different consoles

The usual production process consists or four phases, each with different equipment needs.

Tracking - the recording of the initial tracks, which may be one instrument at a time, small sections or the entire group. For this the engineer needs to concentrate on the mic levels, and has to have easy communication with the studio floor. He will do minimal processing and only needs to hear the multitrack for test mixes.

Overdubs and comping - bringing in additional material such as vocals, and finding the best versions of alternate takes. This requires a more modest mic setup (probably in a second room) and a lot of control over track playback. Before automation, switching from track to track may have required extra operators, so the board would need room for two or three engineers to work. Complex fades may be laid down on a spare track to simplify the final mix (at the cost of lowered quality-- every generation on analog tape ads 3 dB of noise)

Mixdown -- here the recorded tracks are combined to the stereo format. At this stage most processing is added, and there's a lot of fader action to execute comps and tweak phrasing.

Mastering -- Any final tweaking of the stereo mix. This hardly requires a console at all, but needs a really fine set of monitors and some specialized processors.

Big controls are easy to use

The engineer needs to be able to hit the marks consistently and repeatedly. Long faders and wide knobs are more accurate and not as physically tiring as the tiny controls often seen on cheap boards. (Let alone what you get with a mouse on a screen.)

Big controls are reliable

Not only that, but they are easy to repair. Duplicate controls means a malfunction is less likely to stop a session. All of this translates into cost savings.

The more meters the merrier

Metering is vital in a complex project. The engineer needs to see the level of each mic and track, with extra indicators for overloads and special functions. In mixing and mastering you will see meters that show phase and bit usage, and some engineers even like to see the spectrum of the output.

Automation is Key

Any serious console will feature some level of automation, sometimes built in, sometimes via an external computer. This is a huge money saver, because without automation it can take an hour or so just to set a board up for a session-- someone has to write everything down and reset the controls each time. Mixing also goes easier if a mistake can be rectified on the next try (with every good move repeated exactly) or just be edited out.

Console Architectures

A big board is typically set up using one of three patterns: the "Front of House" design, the "Production" design, and the "Multi-layer" design. Of course this sentence is obsolete now that I've written it, but understanding these will give you a start in coping with whatever you find.

Front of House Console

These consoles are designed primarily for sound reinforcement. These are really two consoles-- one providing the house sound heard by the audience, the other provides a monitor mix for the performers. The input modules are therefore quite elaborate, with separate EQ for each function and sometimes two faders, (one is the usual fader, the other controls what is sent to the stage). The monitor mix can be routed through any of many outputs so that each performer hears a unique combination of instruments. These boards use voltage controlled amplifiers for automation, and have elaborate mute grouping- each channel is connected to any of a dozen or so master mute buttons. Usually only setups are recorded, with a preset transition time from one to another. The engineer can easily jump from setup to setup during the show.

Production Consoles

Traditional recording studios feature large production consoles. These can be monstrous - over a hundred inputs are not unusual. The size results from the need to have an input channel for every possible microphone and channels for each track of a 24 or 48 track recording system. This allows the producer to listen to any combination of inputs and

tracks at any time, facilitates sending already recorded tracks to the musicians for overdubs, and generally avoids stopping the work to change patching. They are often designed with the master section in the center, mic inputs on the left and track inputs on the right. A popular alternative to this is the "inline" design, which combines input and track controls on the same input module (again, often with two faders). A "flip" mechanism changes the function of the big fader from track recording to mixdown. Since voltage controlled amplifiers are a source of distortion, automation is provided by motors on the faders and even some knobs. The automation is slaved to time code (recorded on a track or otherwise produced by the multitrack) so every move of a complex mix can be recorded and repeated.

Multi-layer Consoles

Most digital consoles get maximum use out of a (relatively) few controls by redefining the function of the faders according to what is going on. Pushing buttons may choose inputs 1-16, 17-32, masters, or MIDI controls, for instance. Further reduction is accomplished by having only one set of EQ and compression knobs, with buttons choosing which channel these apply to at any moment. for things like pan and send there is one knob above each fader with a function defined by yet more buttons. This is hard for those used to traditional designs to get used to, but has many advantages-- for one thing, the cost savings are substantial ($8,000 vs. $80,000), and the smaller boards are easier for a single engineer to handle. In addition, extra features like compression and gating can easily be provided for each channel, and the board can be updated by a change of software.

Further study

To find out about the features and capabilities of these big boards, I suggest you look at the web sites of some of the manufacturers.

www.ams-neve.com www.oram.co.uk www.midasconsoles.com
www.soundcraft.com www.yamaha.co