SM20 Typical Specifications

Frequency Response		XLR Input to any Output ..... +0/-0.5dB, 20Hz - 20kHz
T. H. D. (All measurements at +20dBu)		Line In to Group or Mix Out ..... Less than 0.005% @ 1kHz Less than 0.025% @ 10kHz
Noise (22Hz - 22kHz, unweighted)		Mic Input E. I. N. ..... Less than -127.5dBu (200Ω source) Group Output Noise ..... Less than -80dBu (40ch routed) Mix Output Noise ..... Less than -80dBu (40ch routed)
Crosstalk (All measurements at 1kHz)		Input Channel Muting ..... Greater than 100dB Input Channel Send Pot Isolation ..... Greater than 100dB Group Fader Isolation ..... Greater than 95dB Group to Group Crosstalk ..... Less than -90dB Group to LR Crosstalk ..... Less than -90dB
Input and Output Impedances		Input ..... 2kΩ balanced All Insert Sends ..... Less than 75Ω balanced All Insert Returns ..... Greater than 10kΩ balanced Outputs ..... Less than 75Ω balanced
Input/Output Capability		Maximum Input Level ..... +30dBu All Insert Sends ..... +20dBu into 2kΩ All Insert Returns ..... +26dBu All Balanced Outputs ..... +26dBu into 1kΩ Headphone Output ..... +20dBu into 600Ω, 1W into 8Ω
Input and Output Levels		Input Sensitivity (XLR) ..... -2dBu to -70dBu, +10dBu to -20dBu Input Insert Send/Return ..... -2dBu nominal Output Insert Send/Return ..... +4dBu nominal Outputs ..... +4dBu for 0VU
Oscillator		63Hz to 10kHz / pink noise, variable level
Filters		20-400Hz high-pass
EQ	HF	1 - 20kHz, +/-15dB, bell or shelf
	Hi-Mid	450 - 12kHz, +/-15dB, Q = 0.5 - 3.0
	Lo-Mid	70 - 1.5kHz, +/-15dB, Q = 0.5 - 3.0
	LF	30 - 480Hz, +/-15dB, bell or shelf
Metering		Optional VU Meterbridge with 20 VU meters for the main outputs and 2 VU meters for the main wedge outputs. Each meter has a peak LED set to 3dB below clipping level. Input Module ..... 10-LED bargraph incl. peak LED
Power Consumption		48ch console: each 17V rail draws 8.14A (nominal, without Littlites™) 8V rail draws 0.5A (nominal)
Weight		32ch - 68 kg (149.6 lbs), 40ch - 91 kg (200.2 lbs), 48ch - 106 kg (233.20 lbs), 56ch - 121 kg (266.2 lbs), incl. meterbridge
Operating Conditions		-10°C to +30°C, 0% to 80% humidity
Power Supply Unit CPS800		Input Voltage Range ..... 230/115/100/85V AC +10%/-15% @ 50/60Hz Rated Input Power ..... 650 Watts Mains Fuse Rating ..... T16A/250V (slow-blow) Outputs: DC Voltage Rail — Max Output Current +17V ..... 11A -17V ..... 11A +48V ..... 0.5A +8V ..... 1.0A Temperature Range ..... -10°C to +40°C Humidity ..... 0% to 90% (non-condensing ±5% relative humidity @40°C for 16 Hours, load switched between 20% and 100% at regular intervals) Dimensions: Height ..... 133mm (3U) Width (chassis) ..... 434mm Width (front panel) ..... 482.6mm Depth ..... 346mm Weight 20kg

SM 20

COMPACT MONITORING CONSOLE

Soundcraft

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E&OE 04/02

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CE

H A Harman International Company

Note: These figures are typical of performance in a normal electromagnetic environment. Performance may be degraded in severe conditions

Soundcraft

Flexible. Compact. Dependable.

SM 20
COMPACT MONITORING CONSOLE



With 20 configurable output busses, Soundcraft's SM20 is designed to handle the complexities of today's live gig. In-ear monitoring, conventional wedges, or any mixture of the two.

As all live sound engineers know, in-ear monitoring is falling in cost and rising in quality. So much so that it's no longer the exclusive domain of major stadium acts. Nowadays, many more foldback mixes are required in stereo; in short, half a dozen mono aux sends is simply no longer sufficient, even in smaller clubs and theatres.

That's why Soundcraft built the SM20; a compact, fully featured monitoring console that handles a smaller gig without blowing the budget.

The SM20's flexible output structure is immediately configurable to the way you work. If you're mixing for wedges, you can set the SM20 to provide 20 mono monitor sends. Alternatively, if you're mixing for a stereo in-ear system, you can configure up to 7 stereo mixes along with 6 mono sends. Each pair of output channels is individually configurable.

As with Soundcraft's monitor consoles of the past, the SM20 is also strong on innovation. Integral MIDI control of the BSS FPC-900 Varicurve™ remote enables all outboard EQ settings associated with an output to be displayed when that output is soloed. With individual outboard EQ parameters adjustable from the remote, there's rarely a need to leave the console's central mixing position.



And as is the case with all Soundcraft consoles, sound quality can be taken for granted. The 4-band, sweepable EQ with 2 parametric mid-ranges is sweet and musical, while the advanced mic input stages feature Soundcraft's proprietary 'range' switches to ensure signal integrity.

With 4 frame sizes ranging from 32 to 56 channels and an optional VU meterbridge, there's an SM20 to match every size of application.

If you thought your show needed more outputs than a monitor console could offer you, think again.
Think Soundcraft SM20.

Input Module



The SM20's input module is designed for flexibility; so whatever the configuration of equipment you're mixing for in terms of wedges, in-ear or front-of-house speakers, the console will be able to handle the job. And the user friendly control surface pioneered on earlier Soundcraft SM Series consoles ensures instant familiarity with the SM20.

INPUT STAGE

The SM20's mic input stage uses identical circuitry to that developed for Soundcraft's highly successful Series FIVE front-of-house console, which in turn was developed in response to customer feedback. Soundcraft's proprietary RNGE function switches the range of the input stage between –2dBu to –70dBu and +10dBu to –20dBu, before the signal is routed through the SENS (sensitivity pot) for further input gain refinement. This is a much more efficient way of controlling input stage levels than the traditional pad control found on many other consoles. Amplifying a signal after it has already been attenuated by a pad control results in a much degraded signal being fed into the input channel. Also, since a pad control works principally upon the application of resistors, this affects the amplifier's common mode rejection properties. This is crucial in live applications which often involve long microphone cables and multicores, where effective interference rejection is crucial. The SM20's RNGE controlled input stage solves this problem by using two distinct gain stages which are toggled by the RNGE switch. The phase (ø) switch can be used to reverse the phase of the input, should cancellation or feedback become a problem, and phantom power can be applied by pressing the 48V button.



FILTERING

Live engineers know the importance of good filtering; it can help to correct problems immediately, minimising the amount of corrective EQ required. The SM20's input channel features a sweepable high-pass filter which covers the range 20-400Hz. At the far left of the pot's travel is a click stop which switches the filter out of circuit completely when it is not required.

EQ

No monitor console in the SM20's class can boast such a comprehensive EQ section. All four bands are sweepable and offer ±15dB of cut or boost, and the mid-ranges are fully parametric. The LF section covers 30-480Hz, while the HF section covers 1-20kHz; either of these bands can be set to act as shelf or bell via the SHLF switch. The low-mid covers 70-1500Hz, and the hi-mid covers 450Hz-12kHz; both mid bands have variable Q, between 0.5 and 3.0. The entire EQ section can be switched in and out of circuit via the EQ switch.

MONITOR SENDS

The SM20 has 20 output busses, which are fully configurable to allow a combination of mono and stereo sends. This design feature is in response to today's working environment, which often includes both conventional wedges and in-ear systems. Sends 1-6 are dedicated mono sends, each pre or post-fade switchable. Sends 7-20 are designated 7A, 7B, 8A, 8B, 9A, 9B, 10A, 10B, 11A, 11B, 12A, 12B, L and R. These can be used as mono sends as well; or, by pressing the Global Mode STE switch on the corresponding output module, these become pairs of stereo sends, where the dual-concentric control affects level and pan rather than individual output levels. Since each individual output module can be selected as stereo, any combination of mono / stereo outputs can be configured.

FADER AND MUTING

A high quality 100mm fader controls the level to all post-fade busses. The MUTE switch mutes all feeds from the input channel; a semi-recessed mute SAFE switch protects the channel against muting from the mute groups, while still allowing local muting. A bank of eight mute assign buttons select which of the eight mute groups will govern the mute status of the channel. A 10-segment LED meter registers the signal level at the mic amp output.

BACK PANEL CONNECTIONS

The SM20's input stage features a mic split facility. Every input XLR has a throughput XLR which carries the identical signal back out of the desk again. This removes the need to buy or hire costly microphone splitter units. To combat earth loop problems, a switch is provided to isolate pin 1 of the Mic Split XLR from the console chassis. A channel insert is provided, with individual balanced jack send and return, and a DIR O/P is provided on balanced XLR.

Output Module



The output section of the SM20 follows the established layout of previous Soundcraft SM Series consoles. In a discipline which is all about speed under pressure, the control surface of the SM20 is designed for fast and accurate operation.

The upper section of the output module controls monitor outputs 7-18 via pairs of 100mm faders which are switchable to behave as stereo sends. The lower section, with a single 100mm fader, controls mono monitor sends 1-6. Hence there are six output modules on an SM20 console, each of which contains three sets of identical controls – two on the top section for the dual mono / stereo send, and one on the bottom section for the mono send. Outputs 19 and 20 are controlled from the master module.

OUTPUT LED METERING

16-segment LEDs constantly display the outgoing level from the monitor send output XLRs on the back panel of the console. These are arranged as twin meters for busses 7-18, and single meters for the permanently mono busses 1-6.

GLOBAL MODE STE SWITCH

As described earlier, 14 of the SM20's 20 output busses can be configured to act as stereo sends. The GLOBAL MODE STE switch configures them. A red LED inside the white scribble strip under the faders indicates that STE mode has been selected.

EXTERNAL INPUTS

Each of the 20 output busses features an external input which can be mixed into the output bus. These are all ON/OFF switchable so that levels can be left preset and then the external input can be switched in and out as required. The external inputs feature is useful as a bus input when linking two consoles together.

GROUPS TO L/R

Another element of the SM20's flexibility is that it can be used as a front-of-house console if required. The GRP to L/R switches feed the monitor busses into the master L/R outputs (outputs 19 and 20), allowing you to manufacture a front-of-house mix. Each monitor output can be switched into either L or R, regardless of which side of a stereo send it occupies.



OUTPUT CONTROLS

Each monitor output has a balanced insert point which can be switched in and out via the INS OUT button. The phase (ø) switch reverses the phase of the signal, and the TB OSC button sets the output channel to receive talkback, tone or pink noise from the oscillator and talkback sections within the master module.

FADER AND MUTING

Each of the monitor outputs has a high quality 100mm fader controlling the level sent to the XLR output on the console's back panel. Each ouput is also equipped with AFL solo with ±10dB trim, and a MUTE switch which is positioned alongside each fader.

OPTIONAL VU METERBRIDGE

An optional VU meterbridge can be installed which contains 22 VU meters, 20 of which monitor the output busses. The additional 2 meters are dedicated to the wedge output, which will meter any output on the console which is currently set to solo. All VU meters are illuminated using LED backlighting, not filament based lamps which would be unreliable and prone to failure. Also, each VU meter incorporates a peak LED which lights when output rises to within 3dB of clipping level.

BSS VARICURVE™ REMOTE CONTROL

When the BSS FPC-900 is inserted into the MIDI loop of the SM20, the AFL solo keys on the output modules will automatically select the appropriate page on the FPC-900's screen. Outboard settings which apply to that particular output channel can then be edited direct from the FPC-900, quickly and accurately. This feature saves a great deal of time, as in a matter of seconds the operator can flick through all the outboard settings on every channel, and make any necessary adjustments without leaving the console's central mixing position. There is also less chance of adjusting the wrong output's EQ by mistake.

BACK PANEL CONNECTIONS

Each monitor output has a fully balanced insert point, with sends and returns on separate 1/4" jacks. There are therefore 20 sets of jack sockets, designated 1-6, 7A thru 12B, L and R. There are also balanced XLRs for the main outputs and external inputs.

Master Section (1)



The SM20's master section is two modules wide and controls console functions such as the master L and R outputs, the wedge monitor outputs, lamp illumination, talkback and oscillation settings, and mute group master switching. The layout of the module is in keeping with Soundcraft's monitor consoles of the past, which have consistently proved so successful in terms of their operational design.

MASTER L/R OUTPUTS

The final pair of bus outputs, 19 and 20, are designated master L and R, and are controlled from the master module. In fact, an identical range of controls exists for them as is provided in the output section for monitor outputs 7-18.

A twin 16-segment LED meter displays the output signal from the L and R outputs. A stereo external input is provided, with level controls and on/off switches for each leg of the signal. The L and R busses can, just as with the other monitor outputs, be used as two distinct mono busses; the status of the GLOBAL MODE STE switch will determine this, with its setting reflected by the red LED inside the module's scribble strip. Phase reverse and insert switching work in an identical fashion to the output section. The TB OSC button allows the L and R busses to receive talkback, tone or pink noise from the oscillator and talkback sections on the right hand side of the master section.

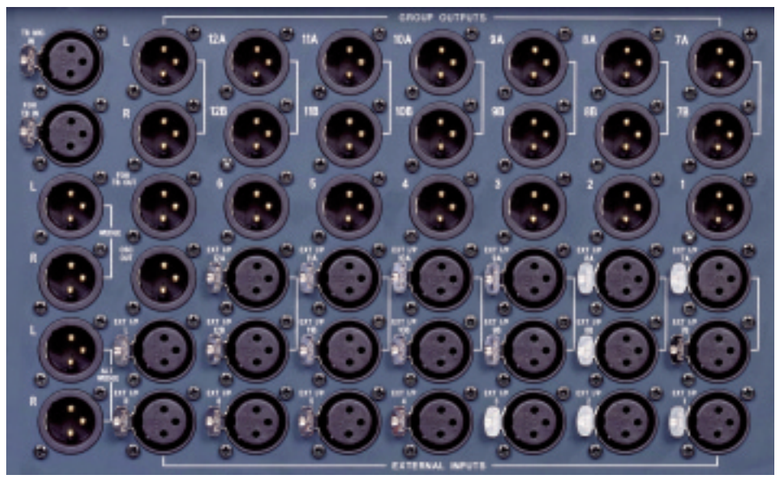
WEDGE MONITOR SECTION

In addition to the 20 output busses of the SM20 console, another four outputs are provided, which are designated wedge and alt wedge, in two stereo pairs. The wedge output normally outputs any PFL or AFL signals caused by an input or output solo being pressed, and when no solos are selected, the wedge output would normally be silent. However, the L/R TO WEDGE button allows you to listen to the L/R mix through the wedge output as the default monitoring state.

An alternate wedge output is also provided, to allow you to monitor your outputs on another system, e.g. you could have the wedge output feeding conventional wedges and the alt wedge output feeding an in-ear system. Switching alt wedge on automatically mutes wedge. Alt wedge can be sourced PRE or post the main wedge fader.

The MONO SOURCE L & R buttons allow you to send the left or right monitor, or solo signals, to both sides of the wedge output if you're monitoring in mono. If both buttons are pressed, a mono sum of both sides of the signal is heard.

The headphone volume control is also situated within the wedge monitor section. The headphone socket itself is recessed and positioned at an angle to the console's control surface, and is driven by a high-power (1W into 8Ω) headphone amplifier.



Master Section (2)



LAMP ILLUMINATION

The LAMP DIMMER control affects the brightness of the Littlite™ connected to the adjacent XLR socket, and also of any connected to the back of the console. Another feature of the SM20 is the Clear-Com™ loop-through connection on the console's back panel (two XLRs: one male and one female). When this is connected to an intercom loop, it will detect a call signal and the console lamps will flash, making it easy for your front-of-house engineer to attract your attention.

PSU TALLIES

Three LEDs offer constant visual confirmation that the 48V, ±17V and +5V rails on the console's power supply unit are running correctly. The SM20's power supply is the CPS800, which shares many design characteristics with the high-powered CPS2000, as used on the Series FIVE front-of-house and FIVE Monitor consoles. Central to its design is a structure of linear circuitry which uses industry standard components, and fewer voltage rails for a simple but reliable system. (The CPS2000 can also be used to power the SM20 if required.)

TALKBACK AND OSCILLATOR

The talkback and oscillator sections can access any of the console's monitor outputs, depending on whether the individual output is set to accept the signal. A talkback mic can be connected to either the front or rear panels, and 48V phantom power is available if required. You can then send your talkback to the SM20's monitor outputs (TALK TO OUTPUTS), or the front-of-house engineer (TALK TO FOH) if a compatible console such as Soundcraft's Series FIVE is connected via the proprietary intercom connector on the SM20's back panel. Incoming talkback from the front-of-house engineer will dim the headphone's programme signal, and can also be sent to the monitor outputs via the FOH TO BUSSES button. This allows the front-of-house engineer to talk directly to the performers, should you have to leave your console during the soundcheck.

The oscillator is selectable to generate either tone (from 63Hz to 10kHz) or pink noise. It can be routed to the back panel XLR (OSC TO XLR O/P), to all busses (OSC TO ALL BUSSES) or to those outputs which are set up to accept it (OSC TO OUTPUTS).

THE SOLO SYSTEM

Soundcraft's highly flexible solo system from the SM12, SM16 and SM24 is reproduced here on the SM20. The large illuminated SOLO CLEAR key cancels any solo on the console at the touch of a button. With AUTO CANCEL on, each solo will cancel the previous one. Otherwise, solos are combined as they are selected. INPUT PRIORITY causes any input solo (PFL) to temporarily override any output solo (AFL) which is active. The PFL TRIM control gives ±10dB of adjustment to the input solo level heard in the headphone and via the wedge outputs. Output AFL solos have their own individual trim controls on their associated output modules.

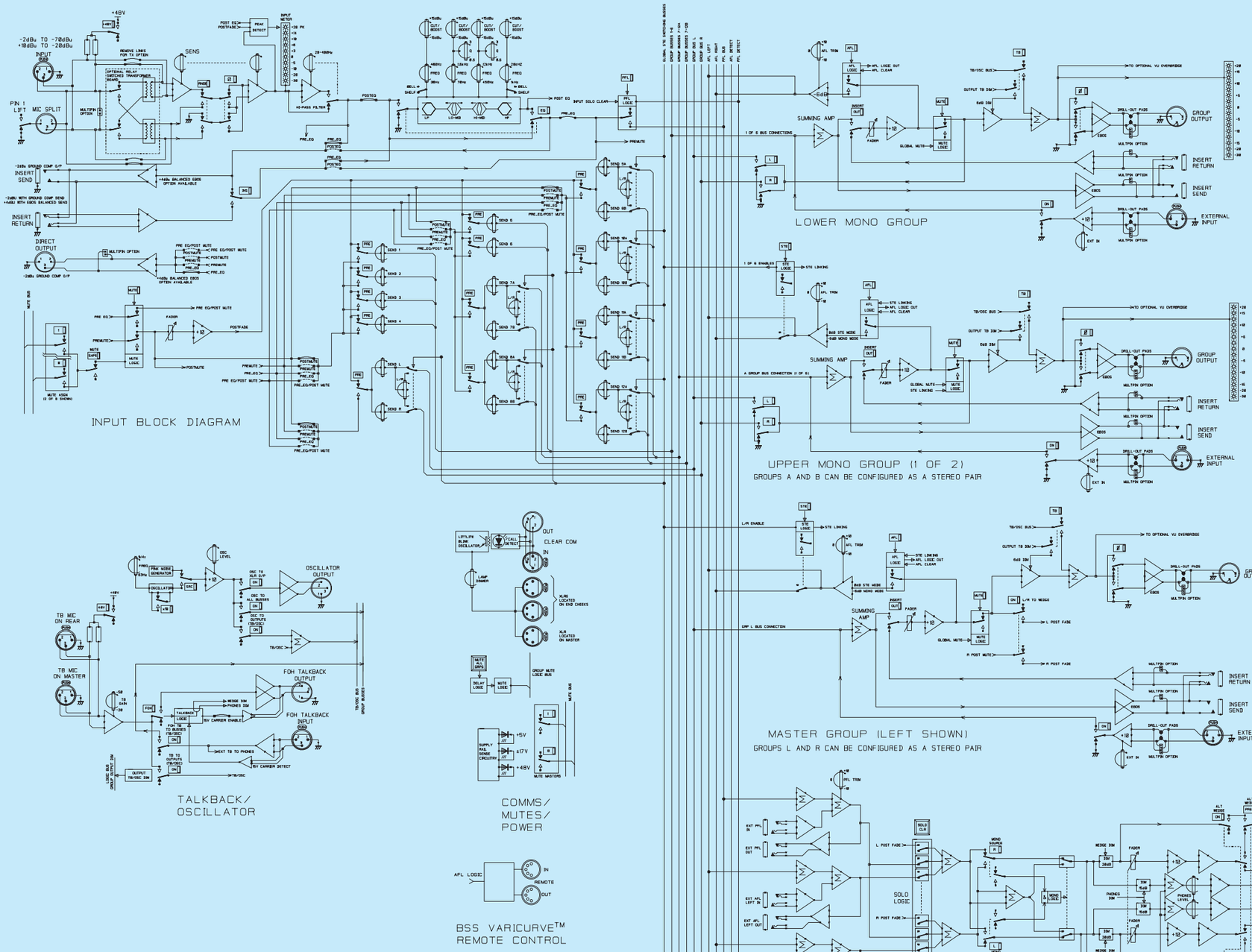
MUTING

8 large recessed latching buttons control the muting of any input channels assigned to the 8 mute groups. An illuminated MUTE ALL O/Ps button is provided; to prevent accidental operation, this button must be held down for two seconds before it will activate. Inputs are not muted even when MUTE ALL O/Ps is active, so direct outputs will still function as normal, and soloing to the wedge outputs can still take place.

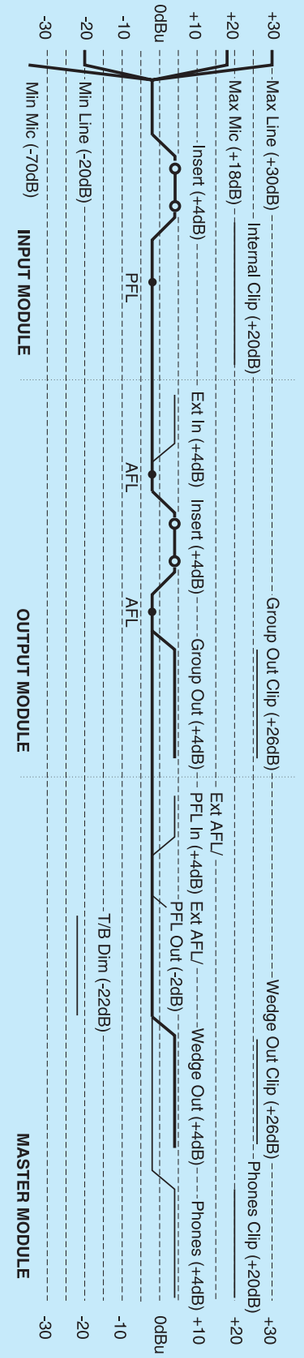
BACK PANEL CONNECTIONS

The master connectors panel on the rear of the SM20 contains eight columns of six XLRs. At the top left are the TB MIC IN and FOH TB IN. The TB MIC IN is simply another talkback mic input XLR, which is coupled to the identical socket on the master module itself. The FOH TB IN allows you to link the SM20's talkback system with that of a front-of-house engineer. Below these are the wedge outputs - two pairs of male XLRs, for wedge out L/R and alt wedge out L/R. To the right of these are the master L/R outputs, the front-of-house talkback out XLR, and the OSC out which carries the oscillator's signal out of the console for external use. Below this are the external inputs for the L and R busses. Next is a bank of 18 XLRs which provides the balanced monitor outputs. These are designated 1-6 and 7A-12B, but will function as sends 1-18 if the console is configured for mono. Below this is a bank of another 18 XLRs, female this time, which provides the external inputs to each of the output modules. PFL/AFL linking is possible via a set of six 1/4" jack connections; four for AFL L and AFL R in and out, and two for PFL in and out.

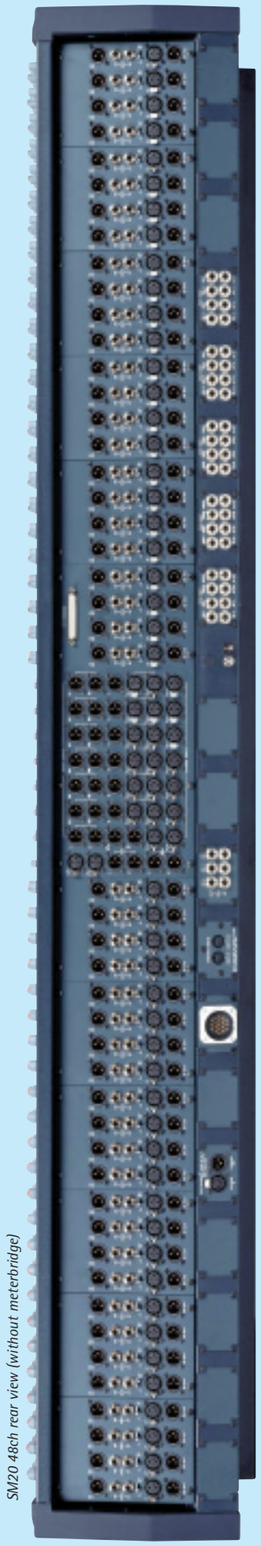
System Block Diagram



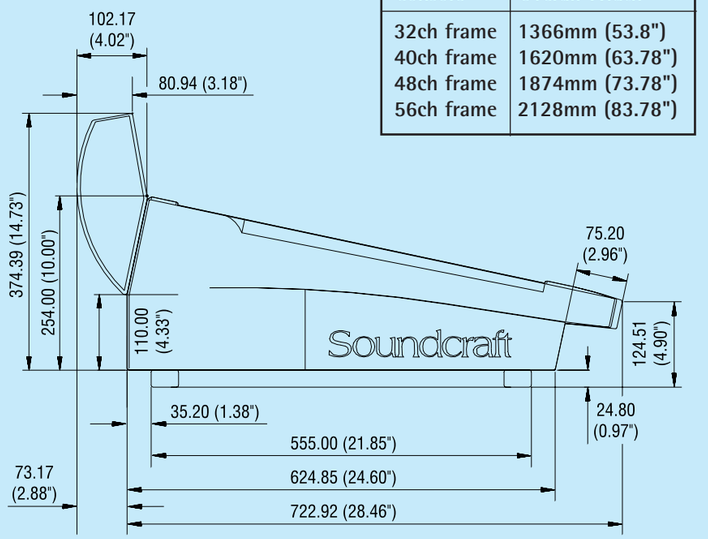
Level Diagram

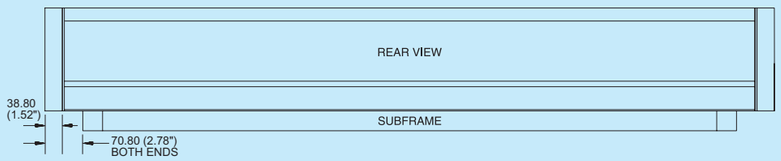


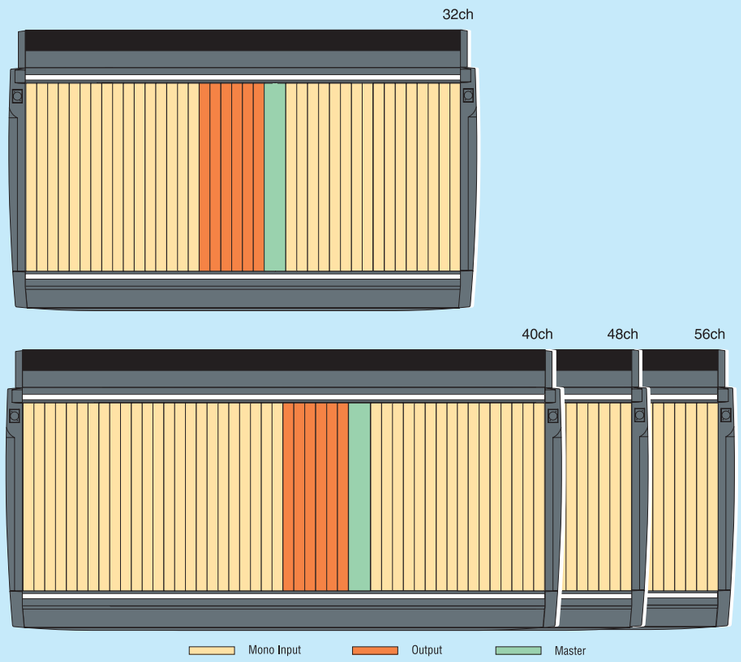
Dimensions & Configs


SM20 48ch rear view (without meterbridge)

Console	Overall Width
32ch frame	1366mm (53.8")
40ch frame	1620mm (63.78")
48ch frame	1874mm (73.78")
56ch frame	2128mm (83.78")







Architect's Specification

The Mixing Console shall be of a fully modular construction, available in 32, 40, 48 and 56 input frames. The mixing console shall provide a combination of between 20 mono and up to 7 stereo and 6 mono sends, depending on global switching. As standard, the console shall be provided with 6 triple group output modules and 1 double-width master module. All frames will be supplied with a separate CPS800 19 inch rack-mounting power supply. There shall be an optional VU output meterbridge for all sizes except the 32ch.

The input module shall have the following features; an electronically balanced low impedance input via an XLR socket with parallel connection to a passive mic split output, continuously variable gain giving a sensitivity range of -2dBu to -70dBu (high gain range) and -20dBu to +10dBu for high level inputs, switchable 48V phantom power, a variable 20-400Hz high-pass filter, phase reverse switch, by-passable 4-band sweep equaliser 1kHz to 20kHz (HF) 450Hz to 12kHz (HMF), 70Hz-1.5kHz (LMF) and 30Hz to 480Hz (LF). The Q of the two mid bands shall be variable from 0.5-3.0 and the HF and LF bands shall be switchable bell/shelving. All bands shall have a cut and boost of 15dB (centre detented). 20 sends shall be provided via 6 single pots and 7 dual concentrics, with individual pre/post fader switching (in pairs on dual concentrics) with internal selection to pre or post-mute / EQ. The dual-concentric sends act either as two mono level controls or stereo level and pan, determined by global switching. Illuminated SOLO and MUTE switches shall control the main signal path and allow the prefade signal to be monitored at all times. A 10-segment pre-EQ LED meter shall be provided, plus a separate peak LED to indicate internal levels within 6dB of clipping. Eight mute assign switches shall be fitted, with an additional SAFE switch for protecting the channel from the 8 mute groups. There shall be a link-selectable pre or post-EQ insert point using separate balanced send and return jacks. All connectors shall be integral with the main module.

The output module shall contain 3 identical output sections as follows; 100mm fader with 16-segment peak-reading LED meter, balanced by-passable insert point, illuminated MUTE switch and AFL switch, Group L/R routing switches, talkback switch and phase reverse. An external line input shall be provided to allow console linking, with rotary level control and ON switch. An AFL trim control shall be provided with a range of +/-10dB. External inputs shall be connected via balanced XLRs; main outputs shall use electronically balanced XLRs with a transformer option. A global mono / stereo mode switch allows the upper two output sections to be used as a stereo pair, with automatic linked stereo AFL, and will switch the input send pots between mono and stereo operation. The AFL switches shall be able to send a MIDI signal to an external BSS Varicurve™ system, to allow the remote selection of EQ pages on the BSS remote controller. The master module shall have a dual Grp L/R output section with identical facilities to those of the upper Output module, but not the Grp L/R routing switches.

The master module shall also contain a talkback mic socket with routing to internal busses, FOH and external output, variable frequency oscillator / pink noise generator, solo clear, input priority and intercancel selection with PFL trim control, stereo/mono engineer's wedge fader, main / alt wedge output selection, independent headphone socket and level control , 8 mute group master switches and 2 x 16-segment LED L and R master meters. A lamp dimmer control shall vary the brightness of three console-mounted 4-pin XLR lamp sockets; one on each side cheek and one on the master module. The dimensions and specifications shall be as published elsewhere in this information.

The console shall be the Soundcraft SM20.

EQ Curves

