

SONY®



OXF-R3



In today's recording studios, producers and engineers constantly face new challenges from projects of ever-increasing sophistication. Multitrack recorders and additional audio sources continue to push up the number of channels needed for tracking and mixdown. Film surround-sound, video, DVD, digital television and other media create new mix formats, while high-performance digital signal processors and other studio devices make ever-greater demands on the sonic fidelity of the entire audio chain.

The need to complete projects to near-impossible deadlines means that studios must be able to move rapidly from one complex set-up to another – without sacrificing flexibility or creative options.

The result of these pressures is that recording engineers and producers face a dilemma. With budgets and time scales continually constrained, how can the demand for recordings that are always more dynamic and more creative be satisfied? For many, the solution has been to rely on available technology as a practical expedient, rather than a matter of considered preference. With little time for evaluation and experimentation, exciting new technologies have remained comparatively under-exploited, with the result that engineers are deprived of the opportunity to exercise their creative talents to the full.

introduction

The Sony OXF-R3 Console represents a solution to this dilemma. **Its development has been an outstanding example of international co-operation, with a team of British console designers based in Oxford, England, working in close partnership with Japanese engineers in Atsugi, Japan.** The OXF-R3 enables studios to make the transition from

the knob-per-function approach of giant analogue consoles to an assignable design that provides major advantages. What is remarkable about the OXF-R3 is the ease with which this transition can be made.

Using proprietary Sony developed digital signal processing throughout, the OXF-R3 is a large-scale console with a compact control surface that puts enormous power and flexibility within easy reach of the engineer. The choice of leading studios around the world, the OXF-R3 has established a formidable reputation for its immaculate sound quality – quality that has been made possible through the achievement of exceptional engineering design standards.

With its ground breaking design founded in traditional concepts and mixing methodology, the OXF-R3 unites an easy-to-learn, ergonomic control surface with radically advanced digital technology. As such it makes all the benefits of ultra-modern technology readily accessible to today's studio professionals.

OXF-R3





contents

2 OXF-R3 IN ACTION

4 THE SONY 24-BIT PRODUCTION
SYSTEM

5 DESIGN PHILOSOPHY

6 SYSTEM OVERVIEW

7 CONSOLE SIGNAL FLOW

9 CHANNEL SIGNAL FLOW

10 CHANNEL ROUTING

11 AUX SENDS

12 DYNAMICS AND FREE ASSIGN

14 EQ AND FILTERS

15 FADER PAGING/SELECTION

16 MASTER FACILITIES
Master and Stereo Monitors
Aux Sends and Group Masters

18 MULTI-FORMAT AND MONITORING
Multi-format Panning

19 SESSION MANAGEMENT
Session Management
Machine Control
Automation
Offline Edit
Audition
Merge
Snapshots
Recalling Mixes and Snapshots
Copy
Link
Jog/Shuttle wheel

21 ABOUT THE SYSTEM
Hardware
Interconnection

23 SPECIFICATIONS

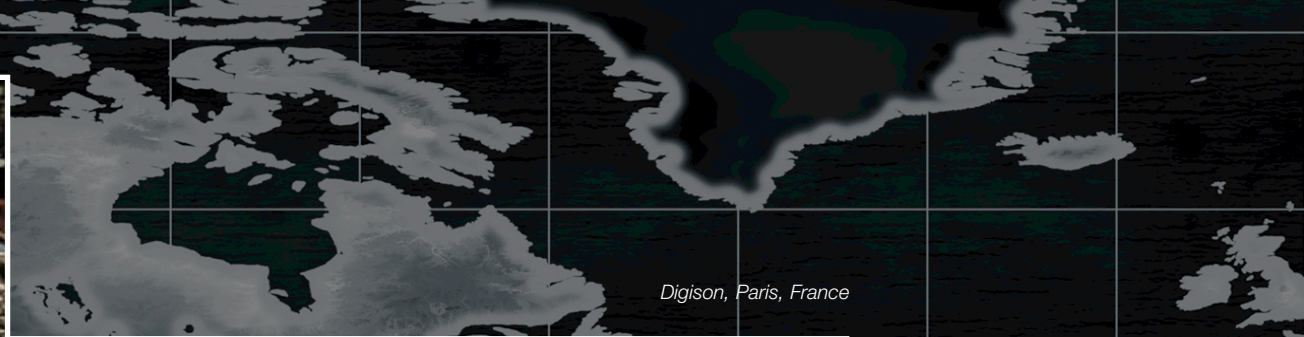
28 OXF-R3 CONVERTER TECHNOLOGY

29 DIAGNOSTICS/SUPPORT

digital audio
mixing console



All Mobile Video – High Definition Truck
NY, USA



Digison, Paris, France

OXF-R3 in action

sound for pictures

The OXF-R3 system is highly flexible, easy to operate and able to deliver vast processing power. Systems are being used for a wide range of audio production applications including music production, film scoring, DVD soundtrack production and live broadcasts. As many studio owners plan to upgrade their facilities to surround sound, the decision to install an OXF-R3 will allow them to extend their business horizons.



Key features for TV/film post production

- Support of all film and TV mixing formats
- Multi-system processing
- Fully dynamic automation
- Time code based snapshot and mix merge
- Off-line editing of automation
- Motorised joystick panners
- Comprehensive monitor management
- Perfect machine mode for machine control
- Cue based machine control

Key features for broadcast production

- Support of all TV sound formats
- Simple and fast to operate
- Comprehensive copy and link function for channel processing
- Compact control surface with large scale processing
- Snapshot recall including internal patch routing
- Remote I/O racks via optional fibre links
- Highly configurable analogue and digital I/O
- Comprehensive broadcast logic

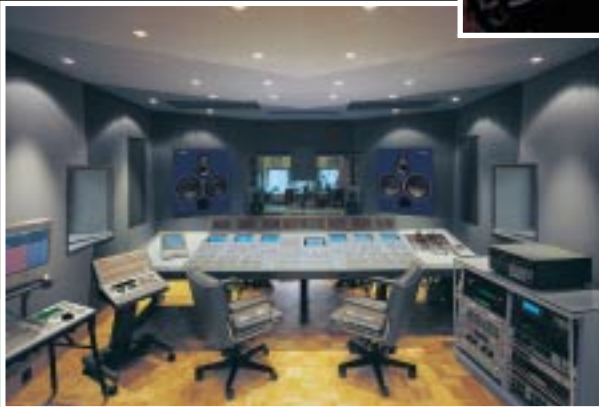


Kansai Telecasting Corporation,
Osaka, Japan

Sony Music, NY, USA



Sound Studio N, Cologne, Germany



Wally World Studios, San Rafael, CA
Photography by Steve Jennings



music production

Key features for music production

- Exemplary sound quality
- 24 Aux sends
- 5 band equaliser, 4 section dynamics section
- 1.2 second programmable delay
- 48 and 96 track mixdown modes
- Simple and fast to operate control surface
- MIDI interfacing to external devices
- MIDI 'Beat and Bars' automation time reference
- 'True' digital varispeed
- GML 8200/8900 emulation (optional)
- Direct interfacing to Sony PCM-3348HR

The Hit Factory,
New York City, NY, USA
Photography by David King



Real World Studios, Box, UK



Guillaume Tell Studios, Paris, France
Photography by François Jannin

Welcome to the Sony 24-bit Production System: a production platform that offers dramatically increased dynamic range and brings the fidelity of digital signals closer still to the original source. Combined with high quality A to D conversion, the Sony full 24-bit system allows studios to capture more of the artist's creative performance. In the production chain, this quality advantage is maintained – the consumer, as well, stands to benefit dramatically. Much of the audio information contained in the extended 24-bit word length can be retained when signals are translated to lower resolution formats (CD, MiniDisc™ etc.) using processes such as Sony Super Bit Mapping. The end result is that listeners in the home can enjoy the many benefits of the Sony 24-bit system.



the sony 24-bit production system



Sony PCM-3348HR
48-track Digital Recorder

< Remote control
World Sync >

< MADI I/F (24-bit) >

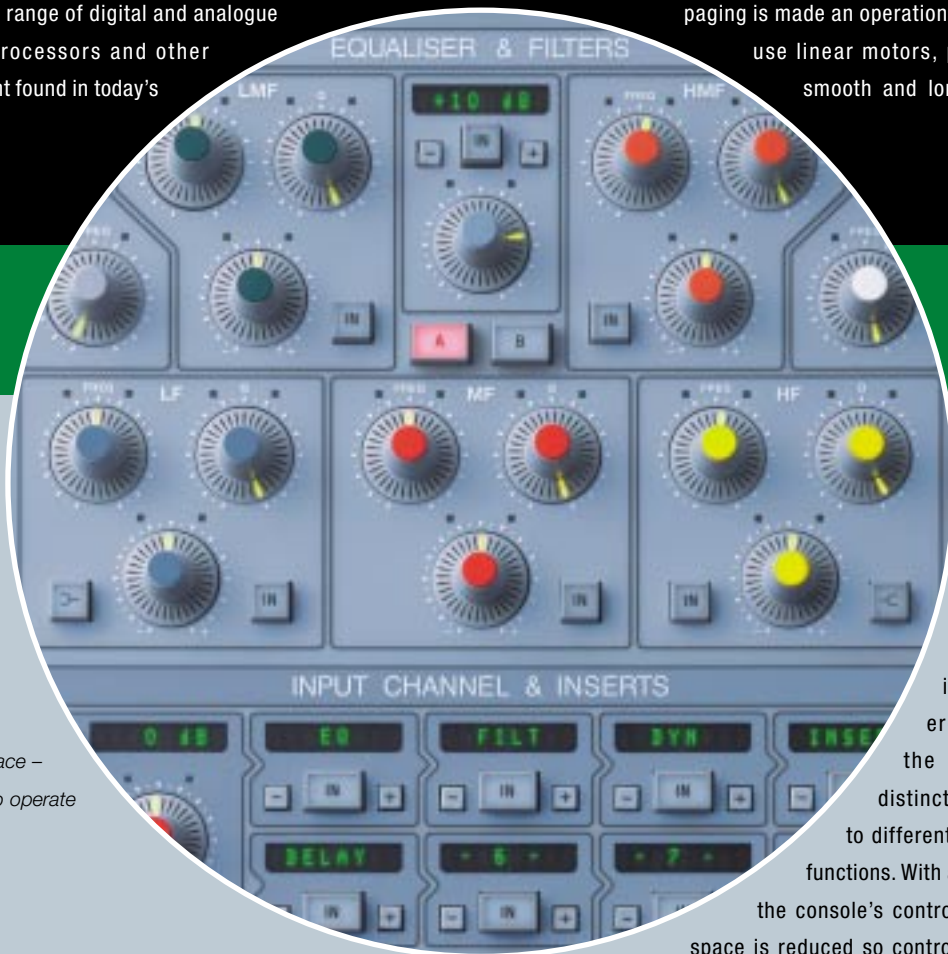


OXF-R3

24-bit family

The OXF-R3 is the realisation of a commitment by Sony to provide a digital console that truly addresses the challenging needs of the contemporary audio production process. Its architecture, which is software defined, provides ample resources for large-scale tracking and mixing sessions and can readily support virtually any digital multitrack recorder, including the Sony PCM-3348HR 48-track. The OXF-R3 operates with analogue 24-track recorders and interfaces to a wide range of digital and analogue outboard signal processors and other peripheral equipment found in today's recording studios.

The OXF-R3 has been created around a philosophy known as 'positive assignability'. This results in a console with a highly compact control surface that places all the controls for a very large number of channels within easy reach of the recording engineer. In addition to making operation intuitive and easy to master, this approach provides the added benefit that the engineer can operate all console functions without having to move outside the critical listening area. Fader paging is made an operational priority – all faders use linear motors, providing extremely smooth and long-lasting operation.



OXF-R3 Control Surface –
simple and intuitive to operate

design philosophy

Simple navigation of the console's control surface is of paramount importance, and the ergonomic design of the OXF-R3 employs a distinctive visual language to differentiate between control functions. With assignability reducing the console's control count, pressure on space is reduced so controls can be larger and tailored for optimal feel and resolution. This overcomes one of the major problems of traditional analogue consoles, where the need for increasing functionality results in an ever more crowded control layout. In the OXF-R3, consistency between types of control sets has been carefully matched to enhance the ease of use.

Full-colour GUIs have been introduced for a number of important reasons. Primarily, they enable large amounts of visual information to be presented unambiguously and controlled by the user without recourse to complex computer-like commands or repetitive mouse moves. Making efficient use of panel space, they enable EQ and dynamics curves to be displayed and adjusted with the aid of associated 'soft keys'. Output routing and the internal patch bay can also be set up quickly and intuitively, with a separate central GUI handling control of overall Session Management functions.

While the overwhelming majority of functions are controlled directly via the console's control surface, a QWERTY keyboard and conveniently placed tracker balls are also provided for text entry and other functions requiring alphanumeric input, such as track and session names.

Its all-digital architecture means that the OXF-R3 requires just two simple cables to connect its control surface to the signal processor rack and the host computer rack. Audio inputs and outputs are connected to the I/O racks which, in turn, are linked to the signal processor rack via industry standard connections. This allows the I/O and processor racks to be placed remotely from the console's control surface, affording additional installation flexibility and allowing the console to be installed even where control room space is at a premium.

The OXF-R3 accepts external SMPTE/EBU time code and external word clock. The console has the important ability to chase the external word clock over the varispeed range of $\pm 12.5\%$.

system overview



*The OXF-R3 '24C' - version
Control Panel*

The control surface configuration featured in this brochure has 48 channel faders (24 on each side), 16 group faders (in the centre) and two complete 'input modules' (one on each side of the console surface). This is referred to as a '24C24'. An alternative configuration has 24 channel faders with only one 'input module'. This is the '24C' (pictured here). This version has all the processing functionality of the bigger version, but is only 1.62 m (63 ⁷/₈ inches) wide.

OXF-R3

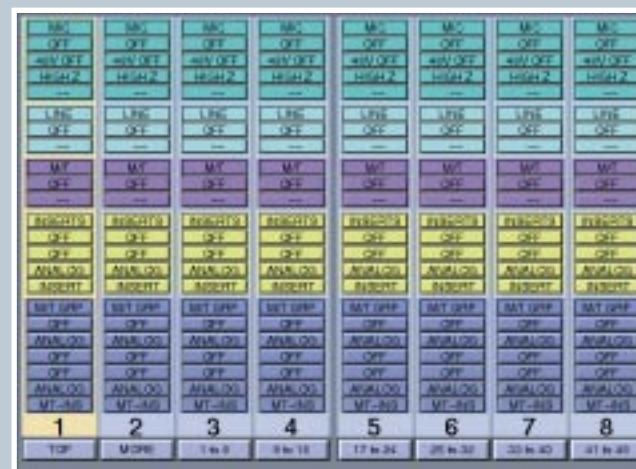
Thanks to its revolutionary all-digital architecture, the processing power of the OXF-R3 is immense, enabling simultaneous EQ and dynamics control of all input channels. The control surface uses traditional function names for ease of use, while the signal paths' incredible flexibility provides the broadest possible palette of creative options.

Studio signals are connected to the console's I/O racks, which can be configured with analogue input cards, analogue output cards and digital I/O cards. The audio from digital multitrack devices can be interfaced using a wide range of audio formats.

console signal flow

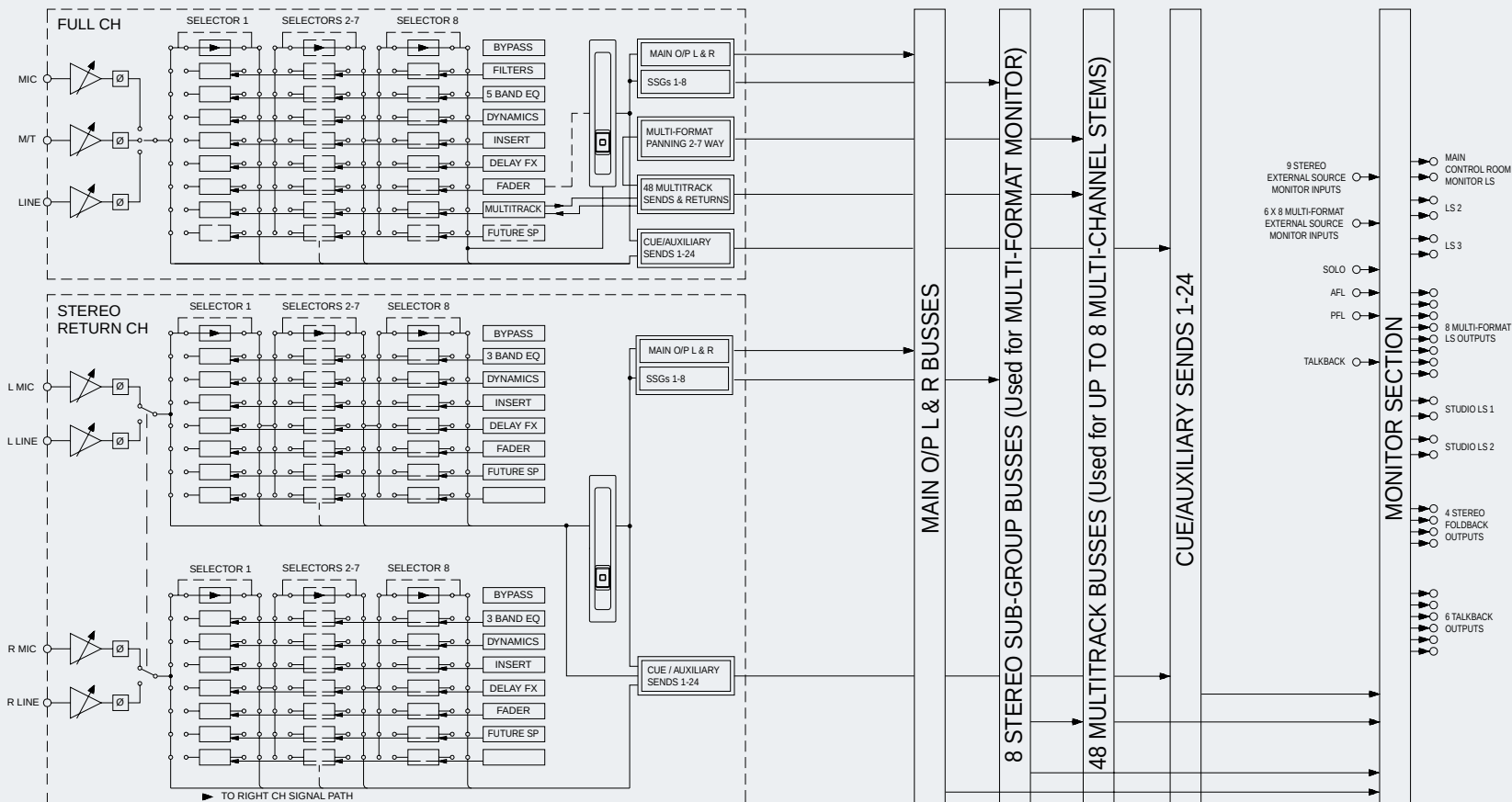
The OXF-R3 includes an internal digital patch bay that allows input and output signals to be assigned flexibly to the console's processing channels. As with all of the routing and control settings, these crosspoints can be saved as snapshots and later recalled.

The console offers a mixdown capability of 120 signals. These comprise 96 Full channels (equivalent to the analogue mixer's 'in-line' module) and 12 Stereo Return channels provided for sound sources such as reverb returns. All input channels can be routed to the 24 Aux Send Busses, 8 Stereo Sub-Groups (SSGs) and the Main Stereo Bus. The Full channels can also be routed to the 48 Multitrack Busses. The phenomenal audio processing power of the OXF-R3 (EQ, dynamics, etc.) is available on all channels and at all times because of the 'Fixed Assignment' allocation of processing resources. The internal processing architecture offers greatly extended dynamic range and headroom due to the use of a 32-bit internal bus structure. Insert points, either analogue or digital, are available on the input channels, Stereo Sub-groups and the Main stereo outputs.



Monitoring options are comprehensive. Separate outputs for three sets of control room speakers, two sets of studio speakers and four sets of stereo foldback feeds are provided for stereo mixing and monitoring. Comprehensive Talkback and Slate functions are available as well as AFL, PFL and in-place Solo Listening modes. In the Multiformat mode, the console uses groups of user-selectable Multitrack Busses as the Master Outputs (or stems), while the Stereo Sub-group Busses become the basis of a comprehensive multiformat monitor system.

signal flow



Mono/Stereo/Main Meters

OXF-R3 signal flow

The console metering bridge allows the metering of input and output signals, as well as the 48 multitrack send and return signals. The meters are referenced to 0 dBfs scale, with a 0 to -60 dBfs scales provided on all meters, with an additional switchable 0 to -90 dBfs scale also available on all mono meters.



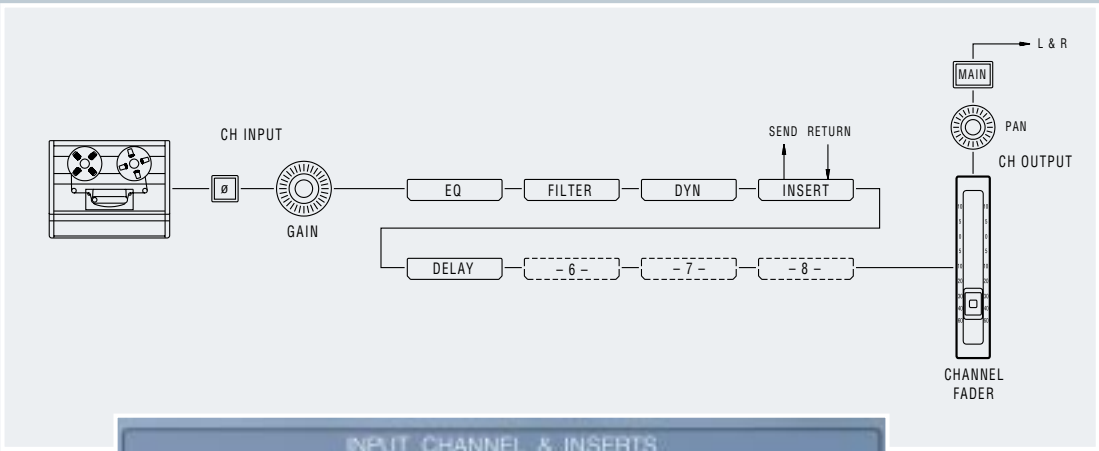
The OXF-R3 uses an 'Input Channel & Inserts' panel to configure the audio processing and signal flow for each of the input channels. Each channel has eight processing boxes that allow the audio processing blocks (e.g. EQ, dynamics, etc.) to be connected in any order. This permits a high level of flexibility, as each channel can be individually set up for a specific task. Comprehensive Copy modes, together with Snapshot Save and Load functions, allow the complete console to be set up in custom configurations simply and quickly.

The following processing blocks are available for the Full and Stereo Return channels:

	EQ	DYN	DELAY	MULTI	FILTER	FADER	INSERT
Full Channels	5 band	*C/L/E/G	Yes	Yes	HP/LP	Yes	Yes
Stereo Returns	3 band	*C/G	Yes			Yes	Yes

*The compressor ratio goes to infinity:1

channel signal flow



Input and Inserts Panel

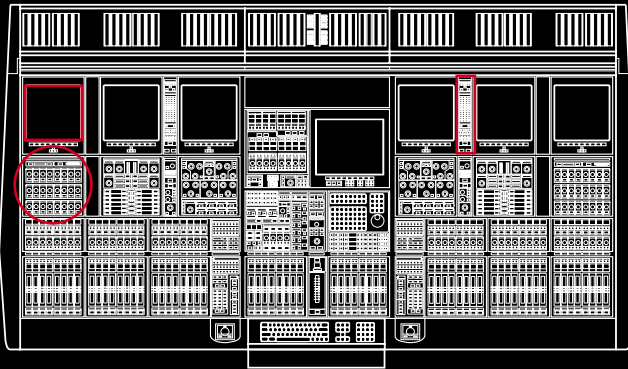
In the table above, Multitracking is achieved with the MULTI block. This provides access to the 48 Multitrack Busses via the multitrack fader, pan and group trim controls. It also activates the Send/Return Monitoring function. The OXF-R3 can also operate in a broadcast mode where it generates a stereo 'on-air' mix along with a parallel multitrack output, with simultaneous provision for a multitrack confidence check.

FADER refers to the channel fader. Normally this is not allocated to one of the boxes, but positioned after it. However it can be positioned in one of the boxes to provide post fader processing (e.g. to facilitate a post fader limiter or other process).

Signal flow mixdown
with processing in
the channel path

The INSERT block is used in conjunction with the system I/O GUIs to route the channels insert send and return signals to selected I/O connectors.

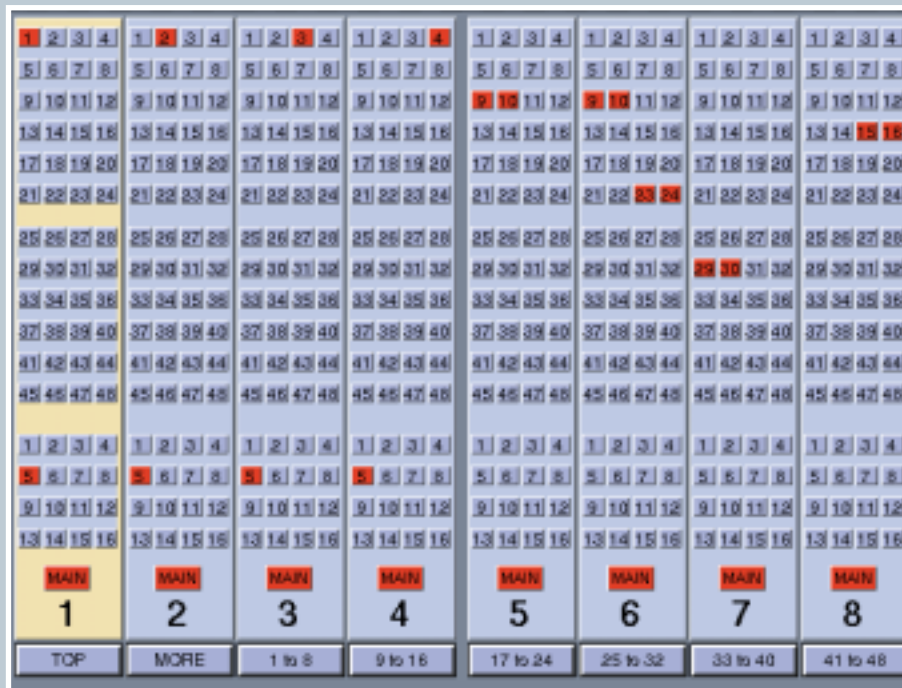
Aux Sends can be selected from the 11 discrete positions in the channel path. These are post the input gain control, post boxes 1 to 8, post the multitrack send level controls and post the channel fader. This provides greatly enhanced functionality compared to the pre/post fader selection on traditional analogue mixers.



Multi-format/Routing Panel

The OXF-R3 has 48 Multitrack Busses with access from all of the 96 Full input channels, as well as the Stereo Sub-Groups and the Main Stereo Bus output. The console distributes the 48 Multitrack Busses to two DASH machines via dual dedicated multitrack MADI outputs. 96-channel, dual-DASH mixdown is also accommodated by two dedicated multitrack MADI return ports.

channel routing



The OXF-R3 has the familiar Send, Return and Record switches above each channel fader for multitrack monitoring and track arming. An Overdub Monitoring mode can also be selected by pressing both Send and Return.

In the Multiformat mode, the operator selects groups of multitrack busses as the multiformat output stems. For speed of operation, the multiformat stems are labeled A to H and output routing is mapped to the eight switches at the top of the Routing panel, which are laid out to reflect the multiformat speaker positions.

Routing mode GUI





Sends 1-24 Panel

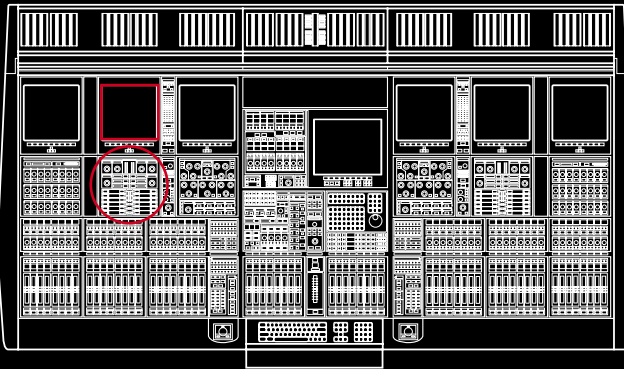
aux sends

The OXF-R3 has 24 Aux Send Busses that are accessible from all of the mono and stereo input channels. Adjacent odd and even Aux Sends can be linked to form stereo pairs for cue or stereo reverb outputs. In the Stereo mode, the even numbered Aux Send level controls function as pan controls.

For each channel, the contribution to each of the 24 Aux Sends can be selected from pre or post any of the channel processing blocks. This gives an option of 11 pick-off points for each Aux Send from each individual channel.

Aux Sends are controlled either from the 'Sends 1-24' panel or by mapping the Aux Send controls to the faders or pan rotary controls. It is also possible to copy the channel fader/pan balance to any Aux Send – an extremely quick way to set up headphone balances. The Aux Send Master controls are located in the centre section.

aux sends



The Dynamics Processors for the Full channels have four, entirely independent, sections – compressor, expander, limiter and gate. These act together at a single point in the channel path. The Stereo Return channels feature the compression and gating sections. The compressor can also act as a limiter by setting its ratio to infinity:1.

Each of these sections has appropriate control of threshold, ratio/range, attack, hold, release and gain make up, variable knee and side-chain EQ. Extensive side-chain linking functions are also provided. This gives unprecedented control over dynamics. All parameters are controlled from the 'Free Assign Area & Dynamics' panel and displayed on the associated colour graphical screen.

*Free Assign Area & Dynamics Panel
– Dynamics setting*

dynamics



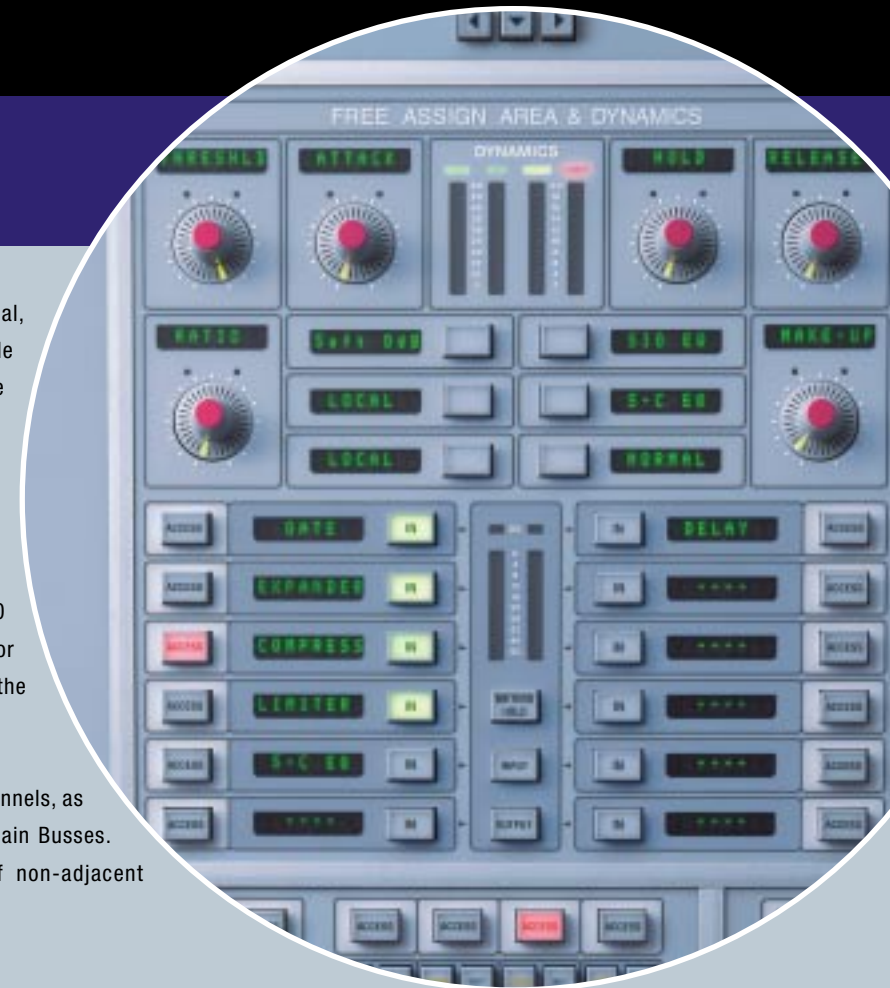
Dynamics mode GUI showing the optional DMSK-R3001 Software

The optional DMSK-R3001 software provides an emulation of the GML 8900 dynamics processor.

Three types of compressor are provided as standard; Normal, Custom, and Classic. Normal and Classic provide comprehensive control of the compression function, while Custom has fewer adjustments and is quicker to set up.

Digital dynamics processing provides highly accurate, repeatable gain reduction and extreme ranges of control parameters. For example, the limiter can be set to zero attack time and the hold time for the gate can be set to 10 seconds. The panel also features gain reduction metering for each section. A stereo compressor is also available on the Main stereo output.

It is easy to link and key dynamics processing between channels, as the OXF-R3 supports both Link to Neighbour and Side-Chain Busses. These Side-Chain Busses allow dynamics grouping of non-adjacent channels, as well as providing keying effects.



Free Assign Area & Dynamics Panel – Side Chain setting

The dynamics section also has a side-chain EQ with two fully parametric bands. This EQ can be used for frequency conscious dynamics processing (de-essing, for example) and/or it can be inserted into the channel signal path, making a total of seven, fully parametric EQ bands available for each Full channel.

MIDI control interface

Recording and mixing complex projects invariably requires extensive use of outboard signal processing devices and many of these devices have MIDI control interfacing. The OXF-R3 can control MIDI devices directly from the Free Assign Panel. This allows the operator to remain in the critical listen area while adjusting external devices. Dynamic adjustments can be saved, recalled and edited along with the rest of the automation data.

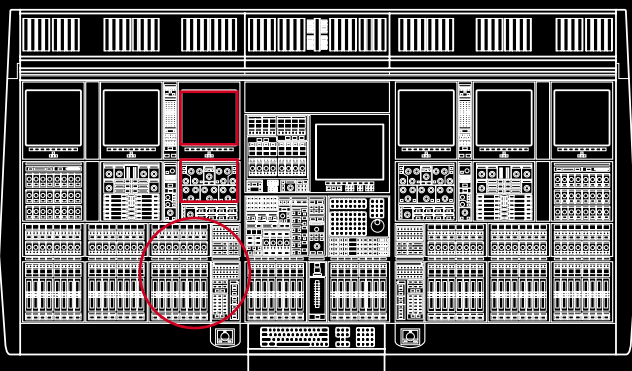
Programmable Delay

One of the major features of the OXF-R3 is its channel delay function that allows highly sophisticated digital delay effects to be created individually for each channel, freeing external processing devices for other tasks. This delay also reduces the time and effort expended in patching devices into the signal chain and assures the maximum possible audio quality. Each channel has a separately programmable delay with adjustment of delay time, direct/effect and regeneration. The maximum delay time for each channel is 1.2 seconds, adjustable with coarse and fine controls with resolution down to a single sample. The delay can be displayed as time, samples, distance (both feet/inches and metres) and beats per minutes. The delay length can also be set using tap tempo, where the system automatically calculates the delay required to match musical periods.

The delay is designed to be used both as a creative effect, for example a slap-back echo or to compensate for timing between different microphone positions.

*Free Assign Area & Dynamics Panel
– Delay setting*

free assign



eq and filters

Equaliser & Filter Panel

As standard, the OXF-R3 offers five-band, fully parametric, EQ with separate HP and LP filter sections on Full input channels. The Stereo Return channels have three-band EQ. Several modes are supported, featuring different relationships between factor and gain. The optional DMSK-R3001 Software emulates the GML 8200 equaliser. The EQ and filters are controlled from the dedicated 'Equaliser & Filters' panel and the resulting frequency curve is displayed on the associated GUI. The panel is designed to be very intuitive and fast to operate, with individual switches and rotaries for every EQ and filter function.



The standard EQ is extremely powerful, with the gain of all bands fully adjustable over a range of ± 20 dB and with Q adjustable between 0.5 and 16. Frequency ranges are carefully selected for each band, creating an extremely 'musical' device equally capable of delivering subtle or radical tonal changes with any source material.

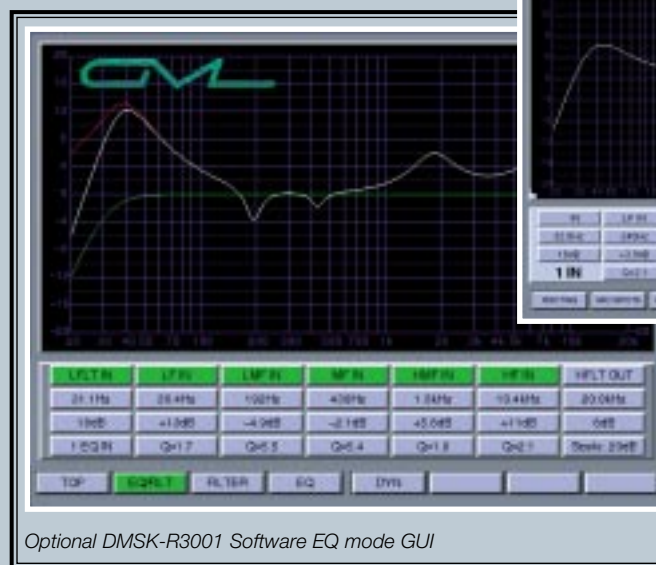
The OXF-R3 permits EQ parameter changes to be made smoothly and evenly with an analogue console-like feel. This glitch-free performance is made possible by real-time parameter interpolation that prevents abrupt 'steps' in the response of the console's EQ sections.

The Low and High bands can switch between Bell and Shelving profiles. In the Shelving mode, the Q control changes to provide an overshoot/undershoot control mimicking the response of popular outboard EQ devices. The console is supplied with two EQ memories for every channel, selected from the A and B switches on the panel. These memories allow the operator to experiment, without losing the previous settings. During mixing an alternate EQ can be recalled either manually or by the console automation.

The EQ Range control allows the limits of cut and boost on each channel to be adjusted between ± 20 dB and 0 dB. As with all other controls on the console, this adjustment is completely glitch-free which permits complete EQ settings to be ramped in and out. The EQ Range control also allows the cut and boost limits to be reduced thereby increasing the resolution for ultra-fine adjustment.

The High and Low Pass filters on the Full channels are also highly versatile. The cut-off frequency is continuously variable and the filter slope can be selected between 6 dB/octave and 36 dB/octave in 6 dB steps.

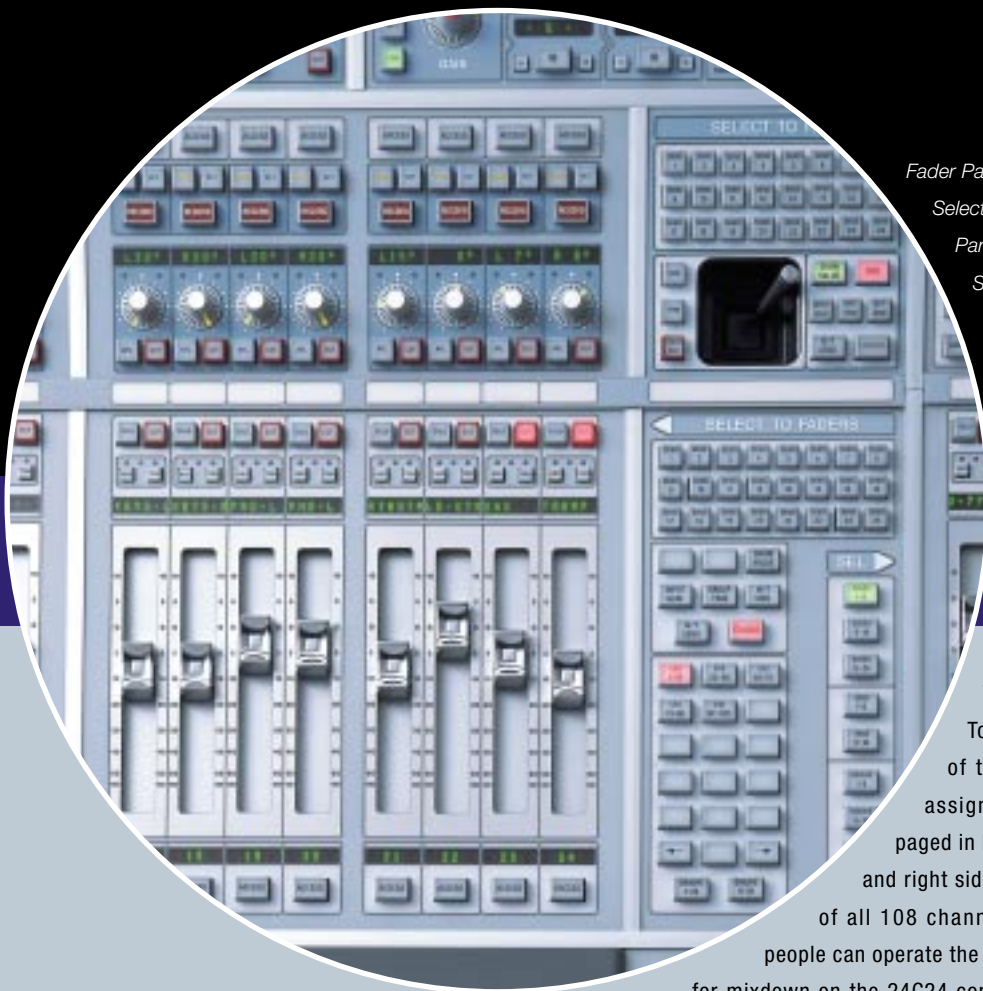
Dynamic automation of the EQ and filters provides new creative tools for the studio. For example, the operator can 'de-ess' a vocal by dynamically automating the high frequency band against time code.



Optional DMSK-R3001 Software EQ mode GUI



Standard EQ mode GUI



Fader Panel

Select to Faders Panel

Pan Panel

Select to Pans Panel

fader paging/selection

The OXF-R3 Fader Paging and Select To Faders functions are essential parts of the console's positive approach to assignability. The channel faders can be paged in banks of 24, independently on the left and right sides of the console. This allows control of all 108 channel faders from either side, so two

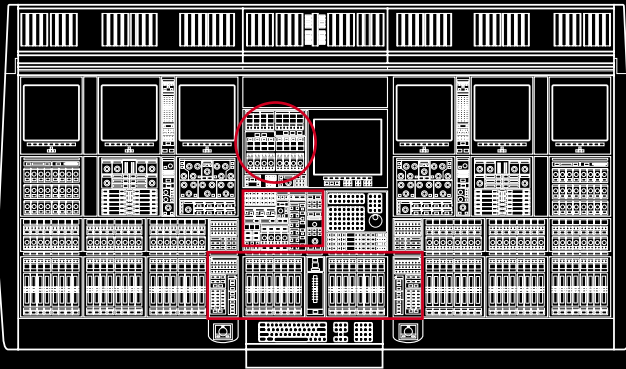
people can operate the console. There are 64 physical faders for mixdown on the 24C24 control surface with the other channels only one button away. The faders and cut switches can control all 30 of the critical level adjustments in the channel path, including input gain, multitrack send, group trim, multitrack monitor, Aux Send levels, sub bass and channel level. These are mapped to the channel faders by the Select to Fader switches. In addition to panning, the Pan rotary can also control all of the above level adjustments, with the exception of sub bass. This allows the console to mimic the style of 'in-line' and split analogue consoles.

The ability to call the Aux Sends to the faders allows headphone balances to be mixed on full-length faders. Pan controls and fader automation switches are also assigned to the Aux Sends. To help make quick headphone balances, the channel fader monitor mix can be quickly copied to any of the Aux Sends. In addition fader balances can be copied to multitrack send faders, allowing stereo mixes to become the basis for multi-format mixes.

Each fader has two, six-character alpha-numeric displays and the pan control has an additional display. These displays have several modes including channel number, programmable channel name and level or pan value.

The primary role of the Access switches above and below the Fader/Pan sections is to call channels on to the assignable 'input module'. However the upper switch can also be used for 'Quick Copy' of channel parameters and the lower switch can be used for linking channel control.

assignability



master facilities

The Master Facilities of the OXF-R3 have been designed to supply comprehensive programme and monitor outputs. These include eight Stereo Sub-groups, 24 Aux Send Masters, Main stereo output, control room monitoring, studio monitor, external meter outputs and four sets of headphone foldback feeds.

The central fader always controls the Main stereo output and can simultaneously act as a master level control for multiformat outputs. Additional processing is available for the Main stereo output, including compression and EQ, as well as routing to an insert point and the ability to route the stereo mix back to the multitrack. The Main stereo output, Stereo Sub-groups and Aux Sends can feed either analogue or AES/EBU signals. And all digital outputs can be individually dithered to different word lengths (16, 20 and 24 bits). The Main stereo output is distributed to four separate analogue and/or digital outputs.



Master Facilities Panel

master and stereo monitors

There are a total of nine stereo monitor outputs, three stereo control room monitors, two stereo studio outputs and four stereo foldback feeds. The control room and studio monitors can be selected between the Main stereo output, the dedicated multitrack monitor bus and nine external stereo sources. The operator can select and/or mix up to six of these signals at any time. It is also possible to listen to different signals in the control room and studio or, for security, the control room monitor can be locked to the Main stereo output.

The four foldback outputs are supplied for headphone feeds and can be sourced from the Aux Sends or the Main stereo output. To assist in setting up headphone balances, the front armrest on the console has convenient headphone jacks that can be wired into the studio's foldback monitoring system.

Comprehensive talkback facilities are provided including slate, talkback to foldbacks and talkback to studio monitors. The OXF-R3 has two programmable talkback groups as well as an auto-cue function that enables the second talkback group whenever the multitrack machine is not in Play or Record.

Three oscillators are provided with fully variable frequency and level. One of these provides tone to internal signal paths. The second provides an external analogue output and the third a digital output.



Select to Faders, Group Faders
and Main Fader Panels

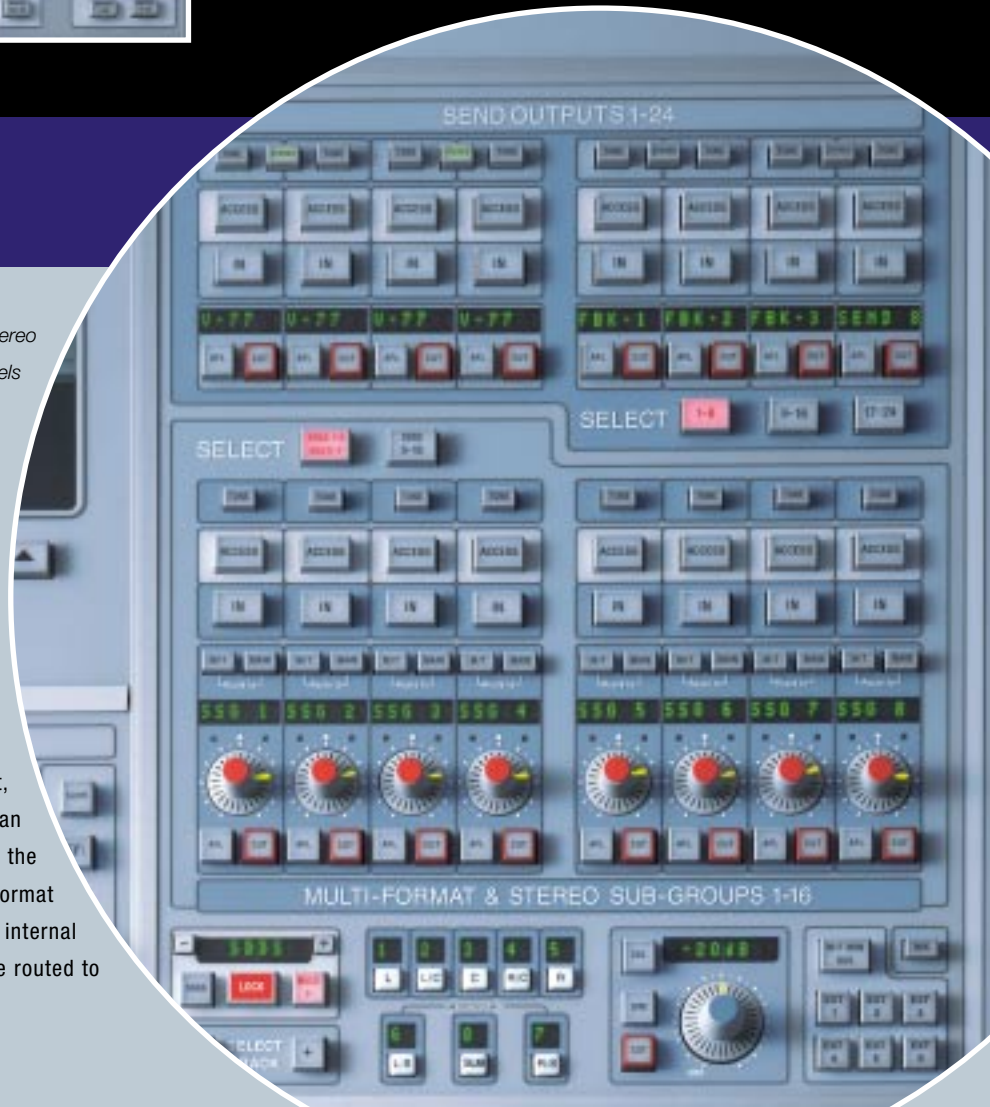
aux sends and group masters

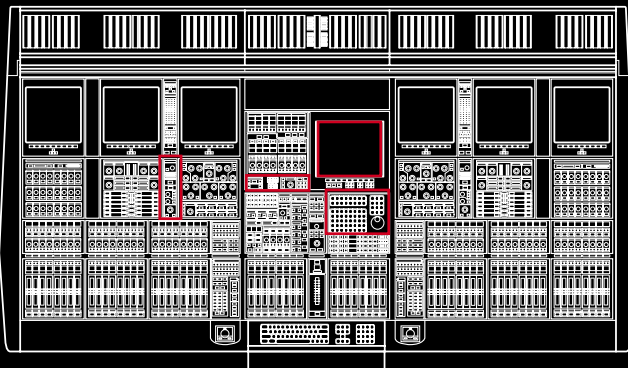
Following the same logical approach as the Select To Faders on the channel faders, the two banks of group faders can be switched to function as the Aux Send Masters, the Stereo Sub-group outputs or the 32 Control Group Masters. Two alpha-numeric displays are provided to show information that includes level, group name and send name. The control groups can manage any combination of channel faders on hidden and non-hidden fader pages. The control groups also provide Cut and Solo functionality.

The 24 Aux Send Masters also have a dedicated control section that provides control of AFL and Cut, as well as the stereo linking of adjacent Aux Sends. While the large number of Aux Send outputs provides ample mixing outputs, the Multitrack Busses are also available for use with additional effects processors.

Below the 'Send Outputs 1-24' panel is the Stereo Sub-groups section with Level, Cut, Solo and AFL. The Stereo Sub-groups can be used to create mix-minus outputs, clean feeds or music-only mixes. The Stereo Sub-groups can be routed separately out of the console, returned to the Main outputs or routed to the Multitrack busses. In the Multiformat mode, the Stereo Sub-groups function as the multiformat Monitor Busses. The internal electronic patching system allows the Aux Send and Stereo Sub-group signals to be routed to either analogue or AES/EBU output connectors.

Send Outputs and Stereo
Sub-group Panels





multi-format and monitoring

Multistem, Surround Sound Processing

The OXF-R3 is capable of sophisticated, multistem surround processing with film-style monitoring control. Multiformat processing is set up on the panel below the Stereo Sub-groups. The operator simply selects the desired mode from LCRS, 5.1 and SDDS and then configures up to eight stems from any combination of the 48 Multitrack Busses. Each of the eight stems is designated by a letter (A to H), for example music stem – 5.1A, effects – 5.1B, dialogue – 5.1C, etc.

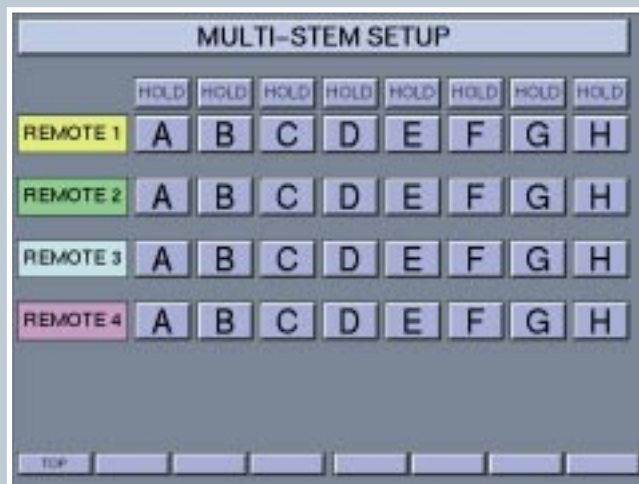
Multitrack Panel



Multi-format Monitoring Panel



Multistem Mode GUI



Panning and Sub Bass Level

The multitrack Send pan control switches to match the selected mode (i.e., 4, 5 or 7-way panner). Panning is controlled by two adjustable assignable controls with separate modes for front pan, front to back pan, surround pan and divergence. Motorised joystick panners add even greater control over multiformat panning. The sub bass level is adjusted from the faders using the Select to Fader function.

Multiformat Monitoring

The multiformat monitor control GUI, in conjunction with the transport control switches, provides comprehensive monitor management of the eight stems. Monitor control of multiple stems can be mapped on to each of the four sets of switches. Functions include Pec/Direct switching (ie, stem based Send/Return), Cut, Solo and Hold. The monitor function can be interfaced to an external monitor control panel using an optional GPI control interface.

Session Management

Session Management is at the heart of the OXF-R3, encompassing machine control, project management, house keeping and automation functions. Session Management is controlled from the central screen, soft keys and associated keyboards. The data is stored on the host computer's internal hard disk drive and backups are stored to the ISO standard, 540 MByte removable MO disk.

The OXF-R3 system uses a powerful database to manage project data and housekeeping functions. Project data is stored in a hierarchical file structure of Projects/Artists, Titles, Mixes and Cues. Session

details and text-based notes can be saved for each Project, Title, Mix and Snapshot. Housekeeping functions include user lists, studio snapshots and password security for client project data.

The system can use either Time Code or MIDI tempo maps as the timing reference. Cue lists can be created for each title, with either time stamps or 'Beats and Bars' displayed. MIDI tempo maps can be created by loading MIDI.ARR files via the host computer's floppy drive, a tap tempo function or programmed directly from the Session Management keyboard.

session management



Session Management command keyboard

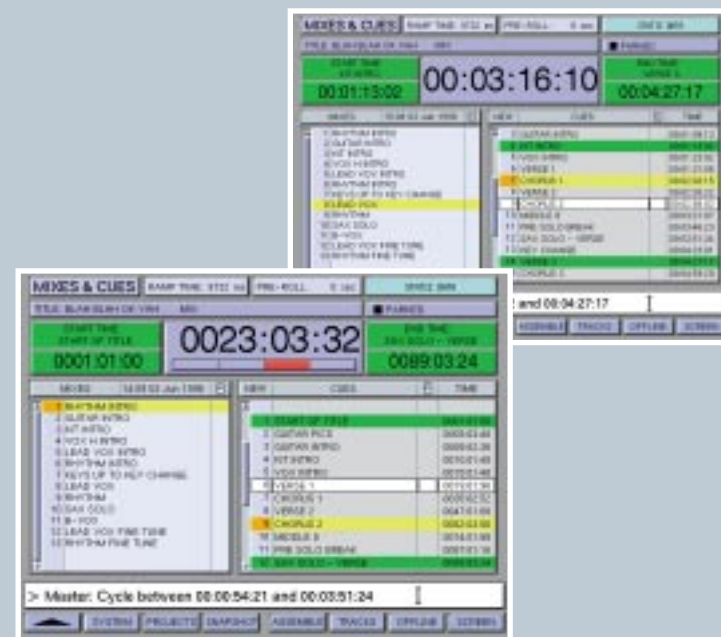
Machine Control

The OXF-R3 provides multi-machine synchronisation, and offsets for the master and slave machines can be set using the Remotes GUI of the Session Manager screen. The Command keyboard provides a fast method for controlling regularly used transport functions, for example Locate Title, Cycle Cue 2 to Cue 4, etc.

Automation

As would be expected from a console of such power and flexibility, the OXF-R3 gives the user the power to automate all useful controls dynamically at any time during the session. Using the familiar Absolute and Trim modes, each control can be dropped into Automation Write mode. The Absolute mode allows new dynamic data to be written, while the Trim mode allows previously recorded movements to be modified. The operator can also select various Drop In and Drop Out modes, including Touch Write, Global In/Out, Butt, Ramp, Auto Take, To Front and To End modes. To display automation modes, every rotary control and fader has two LED indicators, red for Absolute and green for Trim.

Each new Mix Pass is recorded into RAM (Random Access Memory), enabling multiple Undo's and Redo's of all the Passes back to the last saved Mix. The data in RAM can be saved at any time to the host computer's hard disk drive, either as a new Mix or as an update over an existing Mix. Each Mix includes a complete console snapshot of current control settings as well as all dynamic control movements.



Session Management Mix & Cues GUIs, showing alternative timing references (Time Code and MIDI)

Offline edit

Faders and Cut switches can be edited on the Offline GUI, either creating new absolute data or trimming existing data. The offline edited data is added to the current Pass in RAM so allowing Undo and Redo facilities.

Audition

The Audition mode enables individual automated controls to be adjusted from their automated playback state to a new setting. Once a new position is found, the settings can be dropped in from the desired point.

session management

Recalling Mixes and Snapshots

Snapshots and Mixes can be recalled for the entire console, or partial Mixes and Snapshots can be loaded for a range of channels and controls. This allows new Mixes to be created from the combination of previous Mixes. For example in film soundtrack production, a new dialogue mix can be combined with the music and effects Mixes. The Automation Isolate mode temporarily disables dynamic automation for selected channels.

Copy

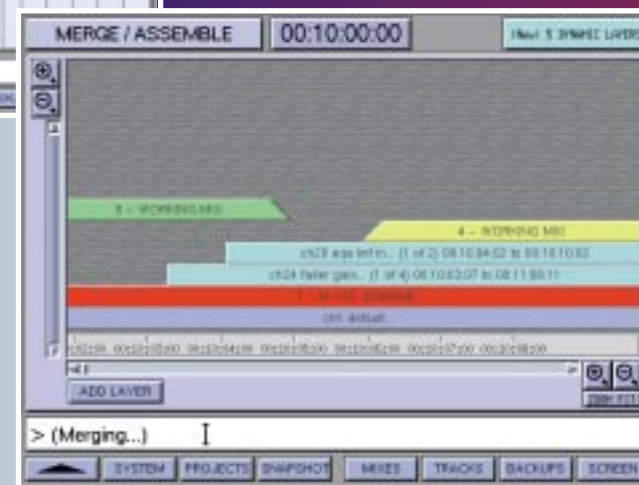
With all the possible parameter settings and changes supported within each channel path of the OXF-R3, the Copy function is invaluable, removing the need to make time-consuming settings to several channels individually. It allows control parameters to be copied between selected channels and is further enhanced by a copy mask that selects the types of controls to be copied. The Access switch above the faders is used for the quick copy function. Copy is also supported on the Session Management GUI.

Merge

The Merge function enables new automation Passes to be created by 'cutting and pasting' other Mixes or Snapshots, this is edited on the Merge GUI. Time code points for the edit can either be entered manually or selected from the cue list. Cross fades and butt joins are available for each of the edited in and out points. The result becomes a new Mix Pass, again allowing for Undo and Redo facilities.



Snapshot Mode GUI



Merge Mode GUI

Jog/Shuttle wheel

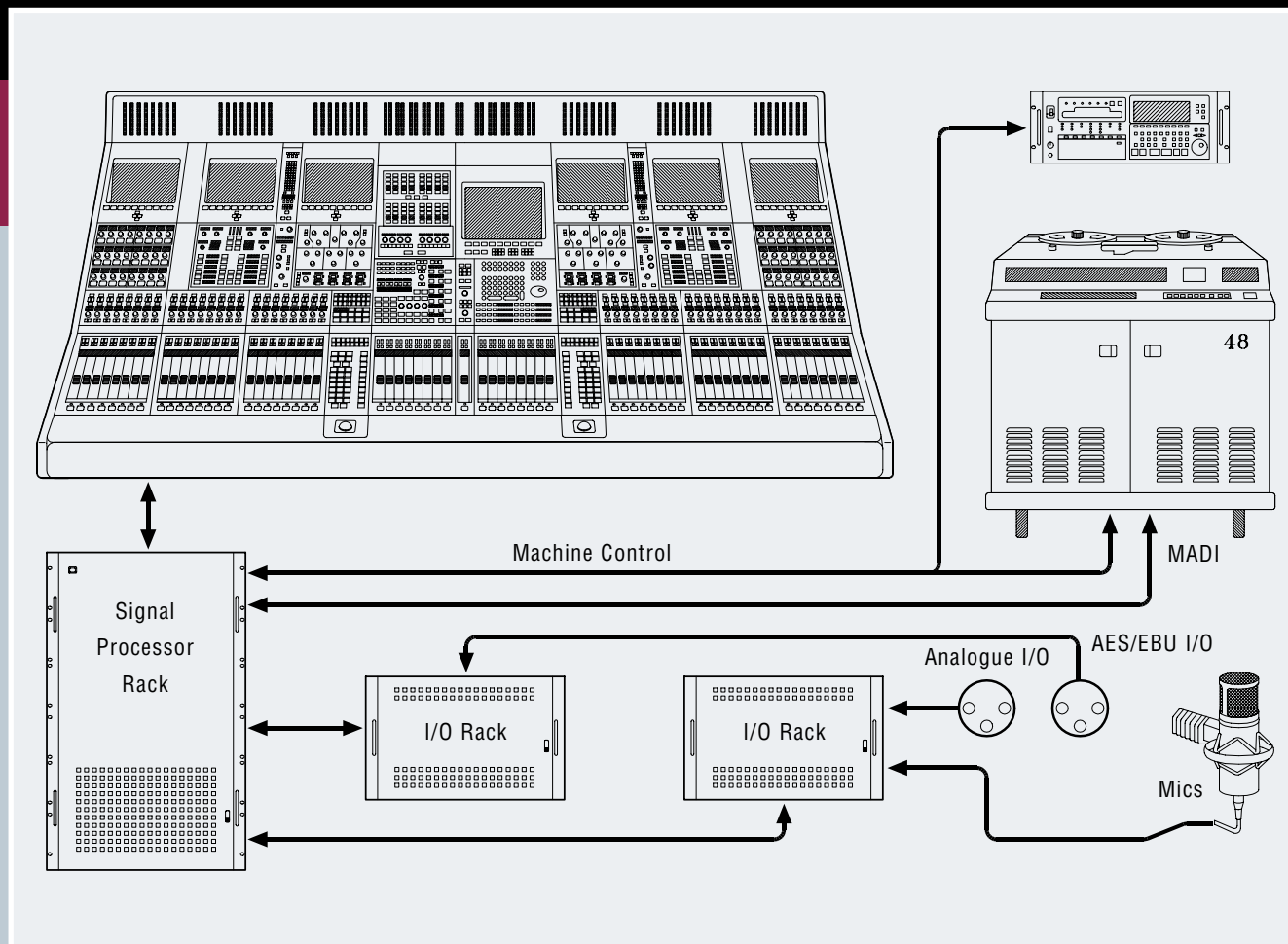
The Jog/Shuttle wheel can be used for a range of functions that includes transport control, data entry and list scrolling. Its default function is transport control and it can be selected to Jog, Shuttle and Crawl (slow speed shuttle). The wheel can also adjust parameters in selected fields on session management GUIs.

The OXF-R3 consists of five main hardware components:

- control surface
- SP (Signal Processing) rack
- I/O racks
- host computer
- machine control peripherals

Actual processing of digital audio signals takes place exclusively within the I/O and SP racks of the OXF-R3. This approach means that the audio signals are handled with maximum precision and are totally immune to external interference. The console's control surface thus acts purely as an interface between the user, the host computer and processing sub-systems. The talkback output is the only audio signal that passes through the control surface. The system racks are connected to the control surface by just two cables.

Compared to traditional analogue consoles, the OXF-R3 is significantly easier to install as it is around 50% of the weight of traditional analogue designs and the control surface is delivered in three sections for ease of transportation and installation. (The 24C version is delivered in only two sections). Power consumption is also dramatically lower than most analogue designs, affording additional cost savings and low heat dissipation.



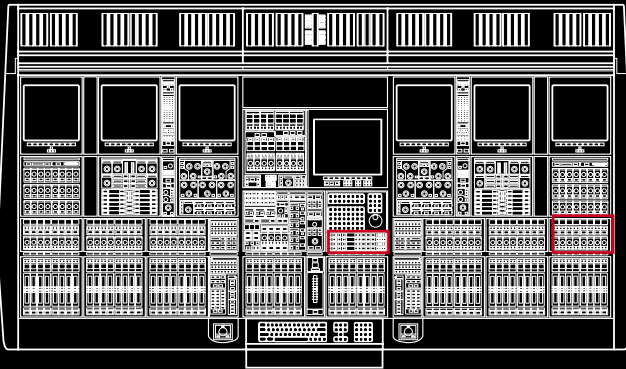
about the system

hardware

Normally the SP rack and host computer are located in the machine room. This reduces operational noise and thermal dissipation, and minimises the console's 'footprint' where space in the control room is at a premium. The SP rack contains 16 signal processing cards, delivering a total of 10 GOPS (Giga Operations Per Second) of audio processing power. The system can be configured with eight MADI loops for interfacing with I/O racks and recorders.

Each I/O rack contains 10 I/O card slots that can accept analogue input, analogue output, AES/EBU and SDIF I/O cards. Each system also includes a time code card and a GPI card. The configuration of the I/O racks depends on the particular requirements of the studio, with most systems employing at least four racks with appropriate cards installed. MADI is used to interface the I/O racks to the SP rack; this can be either via a cost saving 75 ohm coaxial cable or optical fibre.

Machine control peripherals are supplied with the OXF-R3, facilitating straightforward interfacing with the console and virtually any recording transport.



about the system

interconnection

Transport Control Panel



*Pans Panel showing SEND RET(urn) and
RECORD multitrack interface buttons*

The OXF-R3 supports a powerful interface to Sony DASH/DASH PLUS machines, including the PCM-3348 and PCM-3348HR 48-track recorders. The multitrack busses can be dithered to 16, 20 or 24 bits depending on the resolution of the recorder.

Sony has used industry-standard interfacing protocols for audio and control signals, so almost any professional audio device can be simply connected to the console.

The OXF-R3 can be referenced to an external word clock supplied directly from a Sony DASH machine or virtually any other appropriate device, and can stay locked to an external reference even if it is varispeeded.

specifications

audio performance

Note

Wherever dB values are specified, the following conventions apply:

0 dBu 0.775 V r.m.s. reference

0 dBm 1 mW (0.775 V r.m.s.) into 600 Ω

dBfs referenced to digital full scale

dB_r referenced to max. analogue operating level

dB referenced to unity gain

* Noise figures are measured with a bandwidth from 20 Hz to 20 kHz

Sample Rates

44.1 kHz to 48 kHz $\pm$ 12.5%

(The OXF-R3 always requires an external BNC audio word clock)

DMBK-R3001/R3002/R3003/R3004

	DMBK-R3001 (4-ch ADC)	DMBK-R3003 (8-ch ADC)
Gain Control	Mic: -20 dB to +80 dB relative to op level in 1 dB steps Line: -30 dB to +20 dB relative to op level in 1 dB steps	Mic: -20 dB to +80 dB relative to op level in 1 dB steps Line: -30 dB to +20 dB relative to op level in 1 dB steps
Input Impedance	Mic: 1.5 k Ω or 100 k switchable Line: 16 k Ω	Mic: 100 k Ω Line: 16 k Ω
Frequency Response	20 Hz to 20 kHz $\pm$ 0.2 dB	20 Hz to 20 kHz $\pm$ 0.2 dB
Distortion	0 dBfs: <-96 dBfs (0.005% THD+N) -20 dBfs: Harmonic content -115 dBfs -50 dBfs: Harmonic content <-135 dBfs	0 dBfs: <-96 dBfs (0.005% THD+N) -20 dBfs: Harmonic content -115 dBfs -50 dBfs: Harmonic content <-120 dBfs
Noise Floor	Mic: <-125 dBu Equivalent Input Noise (Z _{in} = 200 Ω , Gain = 80 dB) Line: -108 dBfs Gain Control at 0 dB	Mic: <-125 dBu Equivalent Input Noise (Z _{in} = 200 Ω , Gain = 80 dB) Line: -105 dBfs Gain Control at 0 dB
Crosstalk	<-90 dBfs, 20 Hz to 20 kHz	<-90 dBfs, 20 Hz to 20 kHz
CMRR	Mic: 45 dB, 20 Hz to 20 kHz (Gain = 0 dB) 110 dB, 20 Hz to 20 kHz (Gain = 80 dB) Line: 50 dB, 20 Hz to 20 kHz (Gain = 0 dB)	Mic: 45 dB, 20 Hz to 20 kHz (Gain = 0 dB) 110 dB, 20 Hz to 20 kHz (Gain = 80 dB) Line: 50 dB, 20 Hz to 20 kHz (Gain = 0 dB)
Phantom Power Supply	Mic: DC 48 V individually switched	Mic: DC 48 V individually switched
	DMBK-R3002 (4-ch DAC)	DMBK-R3004 (8-ch DAC)
Output Type	Electronically floating Performance identical in bal. and unbal. modes	Electronically balanced
Maximum Output	+24 dBu	+24 dBu into balanced load +20 dBu into unbalanced load
Output Level Control	-16 dBu to +24 dBu set by console menu	+14 dBu to +24 dBu set by trimmer on module
Equivalent Source Impedance	<10 Ω	<100 Ω
Output Balance	20 Hz to 20 kHz, 60 dB (0.1%)	20 Hz to 20 kHz, 46dB (0.5%)
Minimum Load	300 Ω	300 Ω
Frequency Response @ Fs 48 kHz	20 Hz to 20 kHz $\pm$ 0.2 dB	20 Hz to 20 kHz $\pm$ 0.2 dB
Output Noise	<109 dB (ref +24 dBu)	<104 dB (ref +24 dBu)
Crosstalk	<-100 dBfs, 20 Hz to 20 kHz	<-100 dBfs, 20 Hz to 20 kHz

DMSK-R3001 – GML 8200 Emulation Software

SECTION	GAIN	FREQUENCY	Q/SLOPE
LF Peak/Shelf	±20 dB	15 to 800 Hz	0.4 to 10
LMF	±20 dB	16 to 800 Hz	0.4 to 10
MF	±20 dB	120 Hz to 8 kHz	0.4 to 10
HMF	±20 dB	400 Hz to 26 kHz*	0.1 to 10
HF Peak/Shelf	±20 dB	400 Hz to 26 kHz*	0.4 to 10

*simulated

Channel Equaliser and Filters

SECTION	GAIN	FREQUENCY	Q/SLOPE	OVERSHOOT
LF Filter	-6 dB steps	20 to 200 Hz	0 to 36 dB/Oct	–
LF Peak/Shelf	±20 dB	20 to 400 Hz	0.5 to 16	0 to 50% (Q adjust:Shelf)
LMF	±20 dB	30 to 600 Hz	0.5 to 16	–
MF	±20 dB	100 Hz to 6 kHz	0.5 to 16	–
HMF	±20 dB	600 Hz to 18 kHz	0.5 to 16	–
HF Peak/Shelf	±20 dB	2 to 20 kHz	0.5 to 16	0 to 50% (Q adjust:Shelf)
HF Filter	-6 dB steps	2 to 20 kHz	6 to 36 dB/Oct	–

Dynamics Gain Reduction:

All levels in this table are referenced to full scale and time constants apply to a 10 dB gain change. The time constant marked * denotes a calculated value for 10 dB gain change since the true figure is 40 dB gain change in 20.8 µs (1 sample).

Dynamics

SECTION	THRESHOLD	RATIO/RANGE	ATTACK	HOLD	RELEASE
Gate	-80 to 0 dB	0 to -80 dB	5 µs* to 26 ms	10 ms to 10 s	7.8 to 519 ms
Expander	-60 to 0 dB	1:1 to 1:16, 0 to -80 dB	260 µs to 104 ms	10 ms to 20 s	5.2 to 519 ms
Limiter	-60 to 0 dB	1:1 to 1000:1	519 µs to 52 ms	10 ms to 30 s	52 ms to 3.1 s
Compressor	-20 to 0 dB	–	100 µs to 500 ms	50 ms to 30 s	100 ms to 10 s

GAIN MAKE-UP

Compressor 0 to 24 dB

SOFT CURVES

5 dB, 10 dB, 15 dB, 20 dB across Threshold

Dynamics Side-Chain EQ: 2-band side-chain EQ can be inserted into

- the Dynamics Side-Chain alone
- the Signal Path alone
- both the Side-Chain and the Signal Path

SECTION	GAIN	FREQUENCY	Q/SLOPE
LF Peak	±20 dB	20 Hz to 1 kHz	0.5 to 16
HF Peak	±20 dB	500 Hz to 20 kHz	0.5 to 16

I/O Rack System

I/O MODULE	INPUTS	OUTPUTS	CON. TYPE	NOTES
4-ch ADC (DMBK-R3001)	4 Mic, 4 Line*		8 XLR-3-31	112 dB Dynamic Range**
8-ch ADC (DMBK-R3003)	8 Mic/Line		8 XLR-3-31	107 dB Dynamic Range**
4-ch DAC (DMBK-R3002)		4 Line	4 XLR-3-32	110 dB Dynamic Range**
8-ch DAC (DMBK-R3004)		8 Line	8 XLR-3-32	104 dB Dynamic Range**
AES/EBU I/O (DMBK-R3008)	4 Stereo	4 Stereo	4 XLR-3-31/4 XLR-3-32	
SDIF-2 I/O (DMBK-R3007)	24 Mono	24 Mono	D-type	
TC I/O (DMBK-R3009)	Time code	Time code	1 XLR-3-31/1 XLR-3-32	
GPI (DMBK-R3010)	REC Tally In (opto-isolator)	REC Ready Relay closure	2 Half-pitch 100-pin 1 D-sub 25-pin	Relay (30 mA) Opto (Max. 30 V)

*Mic and Line In cannot be used simultaneously **Best case signal to noise performance

Dimensions and Mass

EQUIPMENT	WIDTH	HEIGHT	DEPTH	MASS
OXF-CP3048 Control Panel	2516 mm 99 1/8 inches	1045.5 mm 41 1/4 inches	1215.2 mm 47 7/8 inches	382 kg 842 lb 3 oz
OXF-CP3024 Control Panel	1620 mm 63 7/8 inches	1045.5 mm 41 1/4 inches	1215.2 mm 47 7/8 inches	221 kg 487 lb 4 oz
OXF-SP3000 SP Rack	482.2 mm 19 inches	666 mm 26 1/4 inches (15 U)	604 mm 23 7/8 inches	60 kg 132 lb 4 oz
OXF-IO3000 I/O Rack	482 mm 19 inches	310 mm 12 1/4 inches (7 U)	494.5 mm 19 1/2 inches	25 kg 55 lb 2 oz

The I/O system for the OXF-R3 utilises a universal rack design to house both analogue and digital I/O. Each rack requires AC mains power. Each I/O rack contains 1 I/O link card module and up to 10 device card modules such as ADCs, DACs etc.

MADI Connections

MADI connections are made directly to the SP Rack without the need for I/O Racks.

MADI IN	56
MADI OUT	56
Con. Type	2 BNC 75 Ω (2 Optical)

Max. I/O Configurations

Figures shown are the maximum for each I/O module type per system (in version 2.1 software). It should be noted that the total number of audio connections (analogue or digital) should not exceed:

I/O TYPE	MAXIMUM	MAXIMUM NO. OF MODULES BY TYPE
Analogue In	312	60 4-ch ADC, 39 8-ch ADC
Analogue Out	312	60 4-ch DAC, 39 8-ch DAC
AES/EBU I/O	312 IN/80 OUT	39 (IN & OUT on the same module)
GPIO	64	1 (IN & OUT on the same module)
MADI I/O	112 IN/96 OUT	2 Connections (Direct to SP Rack)

Each I/O Rack can have up to a maximum of 56 Audio Inputs and Outputs, analogue or digital.

Supplied Accessories

- Operation Manual (1)
- Installation Manual (1)
- IF-581A for Host Computer (1)
- AC Power Cord (2) for OXF-CP3048 AC
- Power Cord (1) for OXF-CP3024
- PCI Cable (1) for OXF-SP3000 AC
- Power Cord (1) for OXF-SP3000 AC
- Power Cord (1) for OXF-IO3000
- DASH format breakout cables for DMBS-R3010

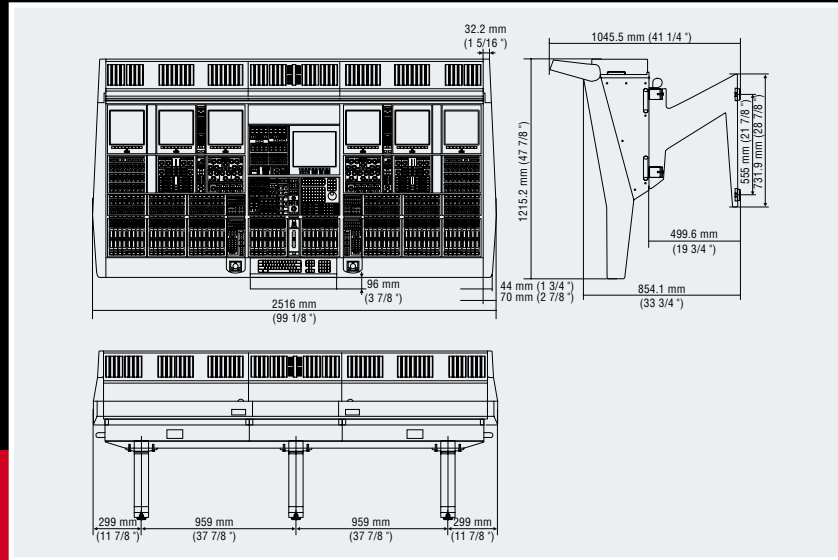
Optional Accessories

- DMBS-R3011 Producer's Desk
- DMBS-R3012 Speaker Stand

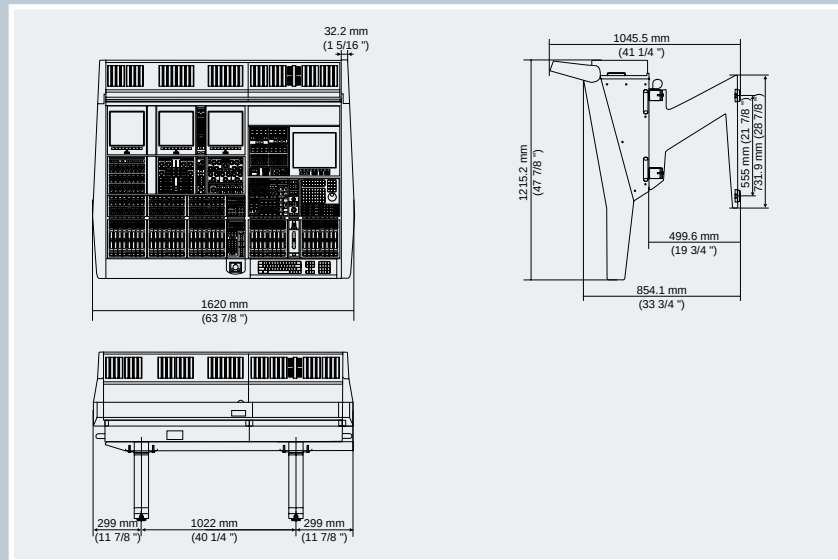
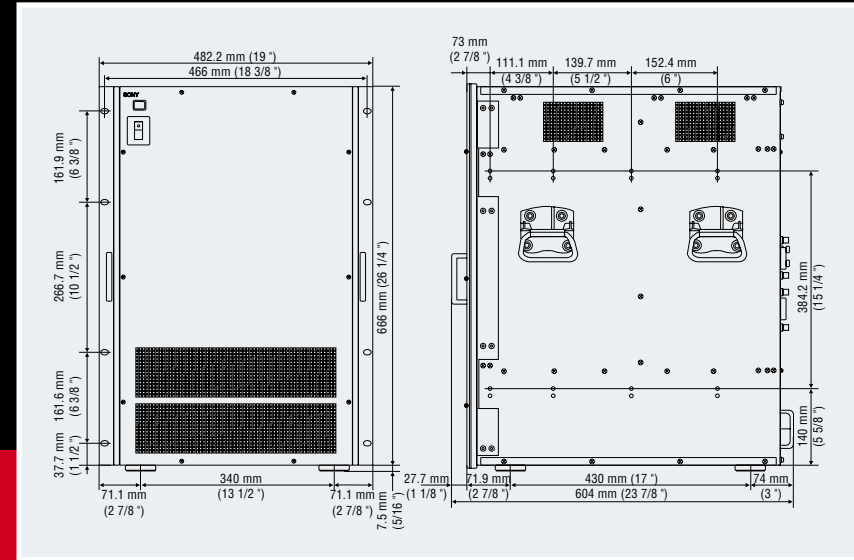
Product Identities

Product Number	Model Name
DMBS-R3096	Digital Console Software
DMBS-R3001	GML 8200/8900 Emulation Software
OXF-CP3048	Control Panel
OXF-CP3024	Control Panel
OXF-SP3000	SP Rack
OXF-IO3000	I/O Rack
DMBK-R3001	Mic/Line A/D Converter
DMBK-R3002	Monitor D/A Converter
DMBK-R3003	Line A/D Converter
DMBK-R3004	Line D/A Converter
DMBK-R3005	SP Board
DMBK-R3006	SP Link Board
DMBK-R3007	SDIF-2 Board
DMBK-R3008	AES/EBU D I/O Board
DMBK-R3009	Time code Board
DMBK-R3010	GPI Control Board
DMBK-R3011	Producer's Desk
DMBK-R3012	Speaker Stand

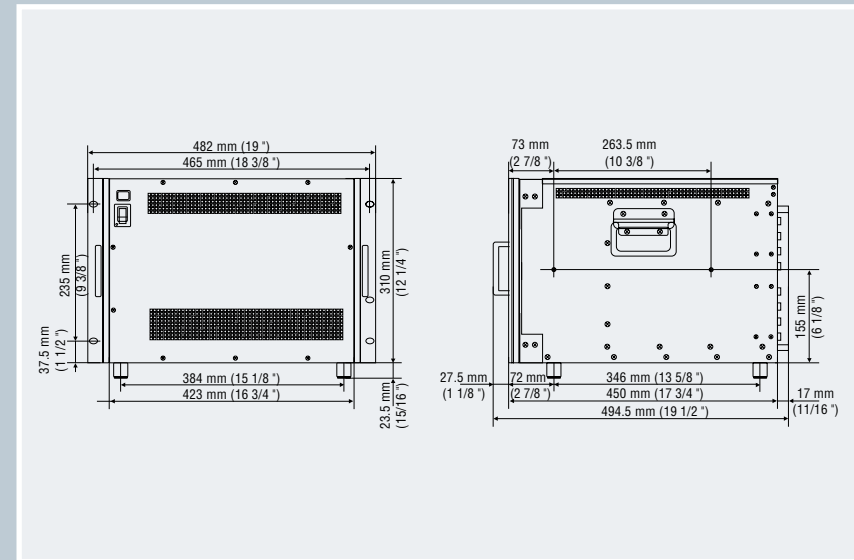
24C24 (OXF-CP3048) Control Surface



OXF-SP3000 SP Rack



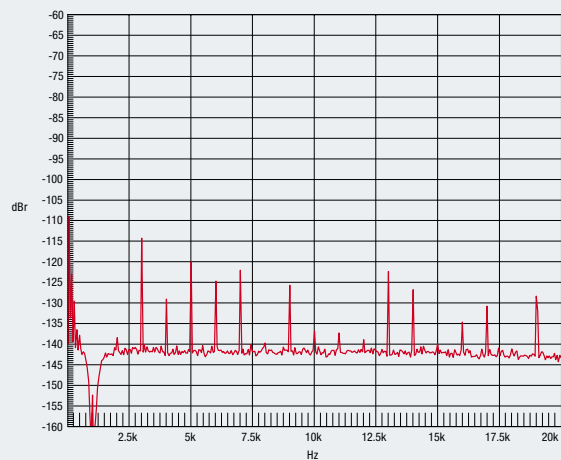
24C (OXC-CP3024) Control Surface



OXF-IO3000 I/O Rack

OXF-R3 converter technology

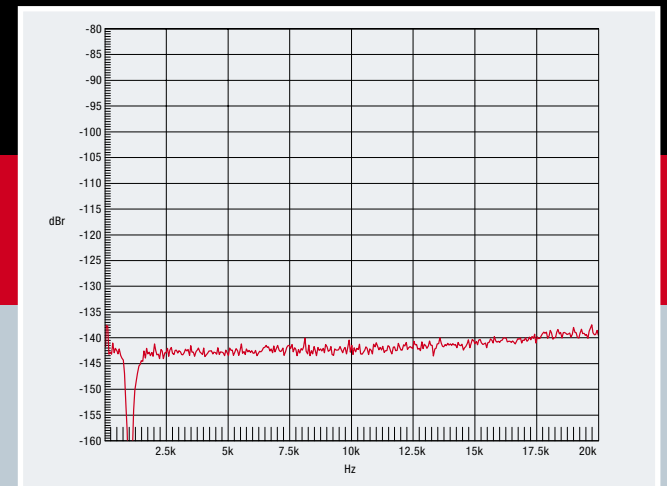
The analogue converters are the most crucial link in the digital audio production chain, and above all else, it is the quality of the converters that defines its sonic capabilities. Considerable attention is frequently given to the most fundamental measures of converter performance, such as the number of bits or the optimised signal to noise performance. However, it is important to realise that these simple specifications do not give any guarantee of the actual sound quality of converters.



Distortion performance is extremely important in the subjective assessment of sound quality because the ear is capable of hearing signal components at levels well below system noise. The ear can also detect changes in the ratio of signal to distortion levels as well as the harmonic content of distortion. There are some important differences between the type of distortion created by an analogue system compared with that of a typical digital system.

In an analogue system, distortion is normally limited to the 2nd and 3rd harmonics and the distortion level changes in proportion to signal level. However, a typical distortion in a digital system is due to the sampling process, known as 'quantisation noise'. The level of quantisation noise remains virtually the same for all signal levels, so the proportion of distortion increases as the signal level falls and the distortion is spread across higher order harmonics. An example of the difference between analogue and digital distortion can be observed in the decay of reverbs. In an analogue system, the reverb tail normally

*FFT plot of a typical 20-bit converter
showing harmonically related distortion*



*FFT plot of the OXF-R3 D/A converter
showing extremely low level of distortion*

disappears gradually into the background noise floor, whereas in many digital systems there is an abrupt 'cut-off point', where the signal degrades rapidly below a level where it can be represented meaningfully in the digital domain.

The design of the OXF-R3 converters is highly specialised to provide extremely high sound quality with superlative distortion control. As a result, the distortion specifications for ADC and DAC are given for both full scale and lower level signals.

Diagnostics

The OXF-R3 has been developed to perform with outstanding reliability in the demanding environment of the recording studio. This reliability is in part a result of the UNIX operating system and underlying system design of the console. Built-in diagnostics can deal with many minor service issues, and owners can connect the console via a telephone line so that Sony engineers can monitor the system remotely and even supply minor software updates. In addition, all major hardware components are equipped with serial computer diagnostic ports.

diagnostics and support



Support

The Sony OXF-R3 offers a support package that includes on-site commissioning, operator and maintenance training and advice on system design. Operator training takes an experienced engineer through all aspects of using the OXF-R3 for recording and mixing sessions.

SONY

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