Digital Audio Console

OXF-R3

- High-end digital recording and mix-down console
- Provides exemplary sound quality and greater functionality than current high-end analog consoles
- Flexible architecture including a modular control surface, expandable signal processing array, and separate input/output units
- Accommodates up to 120 input sources for mix-down, and full dynamic automation of all parameters is provided
- The control surface uses the concept of assignability to allow the operation of large systems from a compact, easy to learn surface
- Remote racks for Mic amp, ADCs, DACs & Digital I/O
- Modular control surface
- Integrates with PCM-3348 & PCM-3348HR Multitrack machines
- Vari-speed operation of ±12.5% is supported
- Equalization and dynamics processing with extraordinary flexibility
- Fully integrated dynamic automation, machine control, and session management
- Multitrack routing to 48 buses
- 24 cue/auxiliary send buses, which can be linked for stereo
- 1 master and 8 independent stereo subgroup outputs
- 3 stereo control room outputs, 1 stereo studio output
- 8 speaker monitor outputs for multi-format monitoring
- 4 stereo headphone/foldback group outputs
- Up to 26 stereo input external source monitoring switcher
- Addition of 6 multi-format external sources
- 2 talkback groups
- Omni and individual talkback to each foldback output and studio LS
- 48 channel faders (2 banks of 24) and 16 multi-purpose master faders (all motorized)
- Microphone amplifiers with gain remotely controlled are integrated with ADCs
- MADI, AES/EBU digital I/O

OXF-R3

The OXF-R3 system consists of three main sections; the control surface, the processor rack, and the I/O racks.

● Control Surface

The concept of assignability is used to allow very powerful signal processing features to be operated from a compact surface.Channel paging is used to increase the number of audio channels which can be controlled from a given surface size, and channel controls (e.g. equalizers) are selected to a particular channel using “ACCESS” buttons. In addition to familiar knobs, switches, and motorized faders, color LCD screens are used to provide additional information and control functions such as the I/O routing.

Color TFT LCD graphics screens are fitted, one per 8 faders in channel sections and one for a system control display in the center section. These allow high quality visual feedback with regard to many functions of the R3. They include input/output routing, EQ and dynamics curves etc. on the channel screens, automation/session management and master statuses on the central display.

● Processor Rack

The processor rack is installed remotely from the surface(e.g. in a machine room). It includes a host computer and an array of signal processor cards. The host computer is used for system initialization, diagnostics, and storage of automation data. The signal processor array is general-purpose in the sense that it has no fixed relationship to the console signal path. The console bus structure and features are entirely defined in software, and thus the system can be expanded by adding processing cards.

● I/O Racks

The I/O racks are installed separately from the processor rack, and can be positioned as close as possible to the equipment to which they relate. For example, the combined microphone amplifier/ADC units can be installed in the the studio close to the microphones, with digital I/O connections mounted adjacent multitrack and master recorders. All connections between I/O racks and processor rack use either standard 75-ohm coaxial cable or fiber optic cable to minimize wiring.

Specifications

OXF-R3

General

Temperature range:	Temperature for complete system performance: 10˚C to 35˚C (50˚F to 95˚F)
Operating temperature:	5 ˚C to 40 ˚C (41 ˚F to 104 ˚F)
AC input power requirements:	OXF-CP3048 Control Panel AC 100 to 240 V, 50/60 Hz, 500 W x 2, 7.5 A x 2 OXF-CP3024 Control Panel AC 100 to 240 V, 50/60 Hz, 500 W, 7.5 A OXF-SP3000 SP Rack Japan: AC 100 V, 50/60 Hz, 750 W USA/Canada: AC 120 V, 50/60 Hz, 750 W, 10 A Other countries: AC 220 to 240 V, 50/60 Hz, 700 W, 5 A OXF-IO3000 I/O Rack Japan: AC 100 V, 50/60 Hz, 240 W USA/Canada: AC 120 V, 50/60 Hz, 240 W, 3 A Other countries: AC 220 to 240 V, 50/60 Hz, 240 W, 2 A
Input channels:	96 Full Mono Channels 12 Stereo Return Channels
Busses, master inputs & outputs:	Main Stereo Bus Outputs 8 Stereo Sub-Group Bus Outputs 24 Send Bus Outputs (Switchable to up to 12 stereos) 48 Multitrack Busses 3 Stereo Control Room Monitor LS Outputs 2 Studio LS Outputs with Individual Talkbacks 4 Stereo Foldback Group Outputs Up to 9 Stereo External Source Inputs
Session management system:	Control and storage of data for Projects, Titles, Mixes, Snapshots & Cue points Fully integrated dynamic automation including machine control Mix & set-up data easily transferred between systems using ISO 540 MByte MO
Analog I/O : (2 types - 4 or 8 chs per module):	4 ADCs per module with separate Mic & Line inputs 8 ADCs per module with single combined Mic/Line inputs 4 DACs per module ideal for main output & monitor applications 8 DACs per module ideal for effect sends, etc
Digital I/O:	MADI for 2 MTRs to be connected directly to the SP Rack AES/EBU, 4 stereo inputs and outputs per module Timecode, 9-pin and DASH/DASH PLUS REC Ready
Sample rates:	44.1 kHz to 48 kHz ± 12.5 % (The OXF-R3 always requires an external BNC audio word clock)

DMBK-R3001 (4-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 Input Impedance: MIC: 1.5 kΩ or 100 kΩ switchable LINE: 16 kΩ Frequency Response: 20 Hz to 20 kHz ±0.2 dB Distortion: 0 dBfs: < -96 dBfs (0.005 % THD + N) -20 dBfs: Harmonic content < -115 dBfs Noise Floor: MIC: < -125 dBu Equivalent Input Noise (Zin = 200 Ω, Gain = 80 dB) LINE: -108 dBfs Gain Control at 0 dB Crosstalk: < -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) External power supply: MIC: DC 48V individually switched
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 Input Impedance: MIC: 100 kΩ LINE: 16 kΩ Frequency Response: 20 Hz to 20 kHz ± 0.2 dB Distortion: 0 dBfs: < -96 dBfs (0.005% THD+N) -20 dBfs: Harmonic content < -115 dBfs Noise Floor: MIC: < -125 dBu Equivalent Input Noise (Zin = 200 Ω, Gain = 80 dB) LINE: -105 dBfs Gain Control at 0 dB Crosstalk: < -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) External Power Supply: MIC: DC 48V individually switched

OXF-R3 Specifications Continued

DMBK-R3002
(4-ch DAC):

Output Type:
ELECTRONIC Floating type, performance identical in balanced and unbalanced modes

Maximum Output:
+24 dBu

Output Level Control:
-16 dBu to +24 dBu set by console menu

Equivalent Source Impedance:
< 10 Ω

Output Balance:
20 Hz to 20 kHz, 60 dB (0.1 %)

Minimum Load:
300 Ω

Frequency Response @ Fs 48 kHz
20 Hz to 20 kHz ±0.2 dB

Distortion:
0 dBfs: < -96 dBfs (0.005 % THD+N)
- 50 dBfs: Harmonic content < -135 dBfs

Output Noise :
< 109 dB (ref +24 dBu)

Crosstalk:
< -100 dBfs, 20 Hz to 20 kHz

DMBK-R3004
(8-ch DAC)

Output Type :
Electronically balanced

Maximum Output:
+24 dBu into balanced load
+20 dBu into unbalanced load

Output Level Control:
+14 dBu to +24 dBu set by trimmer on module

Equivalent Source Impedance:
< 100 Ω

Output Balance:
20 Hz to 20 kHz, 46 dB (0.5 %)

Minimum Load:
300 Ω

Frequency Response @ Fs 48 kHz:
20 Hz to 20 kHz ±0.2 dB

Distortion:
0 dBfs:< -90 dBfs (0.005 % THD+N)
-50 dBfs: Harmonic content < -120 dBfs

Output Noise:
< 104 dB (ref +24 dBu)

Crosstalk:
< -100 dBfs, 20 Hz to 20 kHz

System signal to noise performance:

Since the internal architecture of the OXF-R3 is 32 bit, with a dynamic range of greater than 190 dB in general, the system signal to noise ratio is almost entirely dependent upon the noise performance of its sources.

At this point in time, the conversions from analog to digital and back are the most critical stages.

The OXF-R3 system has two types of converter modules, 4 and 8 channel units.

The more comprehensive 4 channel type have slightly better performance than the 8 channel units.

One further relevant factor is calibration of dBfs, i.e. what is the highest analog level just before clip point.

Although the gain control resolution is 1 dB, the analog stages are switched in 6 dB steps.

The 1 dB steps are achieved in the digital domain, thereby amplifying the noise of the analog stages accordingly.

This means that the greatest dynamic range is achieved where no digital amplification takes place, i.e. where dBr is set at levels which are divisable by 6: +24 dBu, +18 dBu, +12 dBu and so on.

4 Ch ADC Noise Performance:
< -105 dBr, 20 Hz to 20 kHz

8 Ch ADC Noise Performance:
< -100 dBr, 20 Hz to 20 kHz

SECTION 8

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 600Ω
dBfs = referenced to digital full scale
dBr = referenced to max. analog operating level
dB = referenced to unity gain

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

OXF-R3 Specifications Continued

Channel Equalizer & 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	0 to 36 dB/Oct	—

Dynamics Gain Reduction:
All levels in the table below 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 ms (1 sample).

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
Compressor	-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
Limiter	-20 to 0 dB	—	100 µs to 500 ms	50 ms to 30 s	100 ms to 10 s
Compressor	Gain Make-up		Soft Curves		
	0 to 24 dB		5 dB, 10 dB, 15 dB, 20 dB across Threshold		

Dynamics Side-Chain EQ: 2 band side-chain EQ can be inserted
– The Dynamics Side-Chain alone
– The Signal Path alone
– Both the Side-Chain and the Signal Path

Section	Gain	Frequency	Q/Slope	Overshoot
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	—

Dimensions & 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

OXF-R3 Specifications Continued

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
100-pin ↔ 50-pin Split Cable (2) for DMBK-R3010

Optional accessories:
DMBK-R3011 Producer's Desk
DMBK-R3012 Speaker Stand

Product identities:

Product Number	Model Name
OXF-R3	Sony Digital Audio Mixing Console
DMSK-R3096	Sony Digital Console Software
OXF-CP3048	Sony Control Panel
OXF-CP3024	Sony Control Panel
OXF-SP3000	Sony SP Rack
OXF-I03000	Sony I/O Rack
DMBK-R3001	Sony Mic/Line A/D Converter
DMBK-R3002	Sony Monitor D/A Converter
DMBK-R3003	Sony Line A/D Converter
DMBK-R3004	Sony Line D/A Converter
DMBK-R3005	Sony SP Board
DMBK-R3006	Sony SP Link Board
DMBK-R3008	Sony AES/EBU D I/O Board
DMBK-R3009	Sony Timecode Board
DMBK-R3010	Sony GPI Control Board
DMBK-R3011	Sony Producer's Desk
DMBK-R3012	Sony Speaker Stand