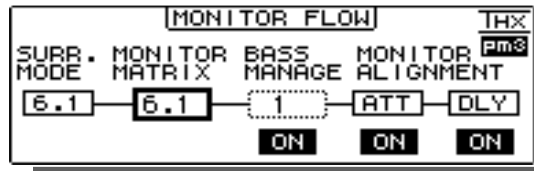


# Yamaha Digital Production Console DM2000 DM1000 O2R96 Version 2 Surround-Monitoring Functions' Quick Reference

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.



**DM 2000**  
DIGITAL PRODUCTION CONSOLE

**DM1000**  
Digital Production Console

**O2R96**  
Digital Mixing Console



**Ver.2**

©2005 Yamaha Corporation

©2005 SONA Corporation

rev. 343



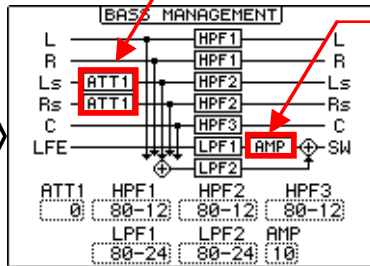
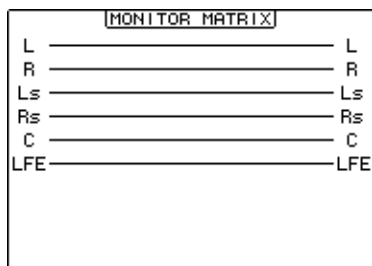
**YAMAHA**

**sona**

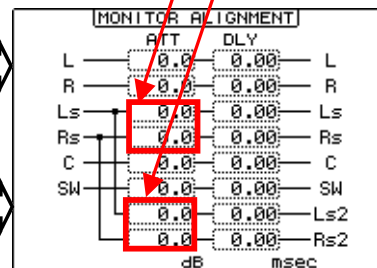
# Outline 1

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

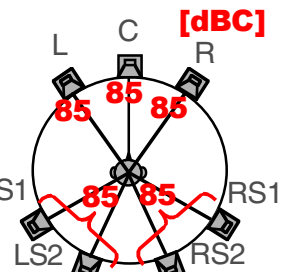
## 5.1



DVD: 0dB, Movie: -3dB  
 DVD-V, Movie: +10dB  
 DVD-A, SACD: 0dB

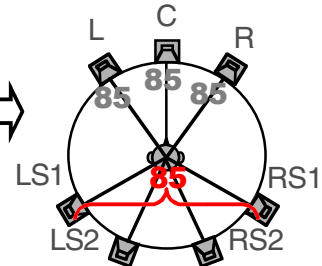
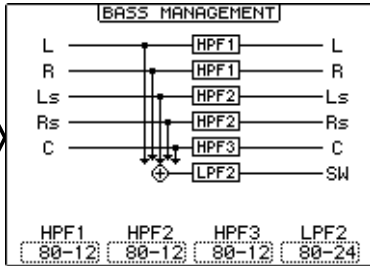
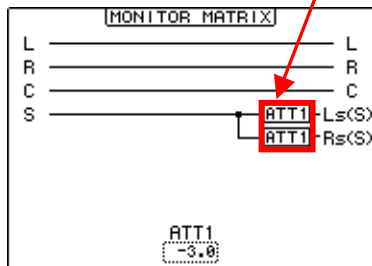


Values for 5.1



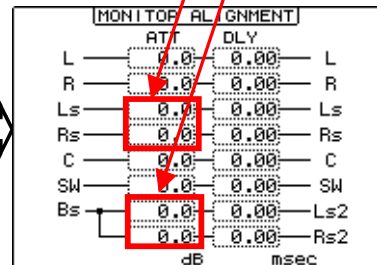
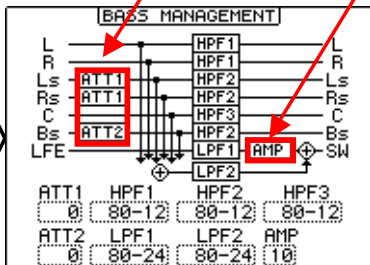
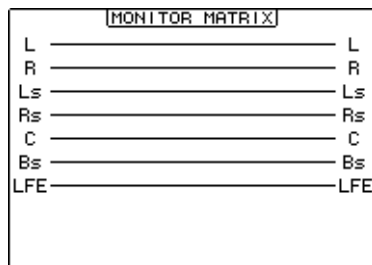
## 3-1

Surround attenuation

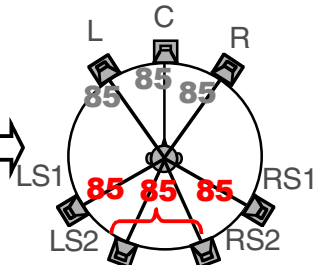


## 6.1

DVD: 0dB, Movie: -3dB  
 DVD-V, Movie: +10dB  
 DVD-A, SACD: 0dB



Values for 6.1



## Outline 2

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

### Setup

- Step 1 for 5.1** Calibrate the 5.1 monitoring environment (5.1=>5.1) using ATTs and DLYs in the "Monitor Alignment" window, and store these values as "**Scene A**"
- Step 2 for 3-1** Calibrate the 3-1 monitoring environment (3-1=>3-1) using **ATT1 of "Monitor Matrix"**, and copy the value to **ATT4** of 5.1=>3-1 Monitor Matrix and **ATT5** of 6.1=>3-1 Monitor Matrix.
- Step 3 for 6.1** Calibrate the 6.1 monitoring environment (6.1=>6.1) using ATTs and DLYs in the "Monitor Alignment" window, and store these values as "**Scene B**".

### Bus conditions and alignment scenes

Monitor Matrix			Monitor Alignment
Main BUS	to	Monitor BUS	
2	=>	2	Scene A (or B)
3-1	=>	3-1	Scene A
		2	Scene A (or B)
5.1	=>	5.1	Scene A
		3-1	Scene A
6.1	=>	2	Scene A (or B)
		6.1	<b>Scene B</b>
6.1	=>	5.1	Scene A
		3-1	Scene A
		2	Scene A (or B)

### Presets of bass management

Preset number	target project	LFE		Surround Att.**	Note
		fc	AMP		
1	DVD	80Hz	+10dB	0dB	Parameters can be changed.
2		120Hz			
3	Theatrical movie	80Hz	+10dB	-3dB	
4		120Hz			
5	Completely bypass	THRU	0dB	0dB	
THXD*	DVD	120Hz	+10dB	0dB	Parameters cannot be changed.
THXF*	Theatrical movie			-3dB	
THXM*	Music (DVD-A, SACD)		+10dB/0dB	0dB	

\* THX™ pm3™ Approved.

\*\* not effective on the 3-1 mode.

## CONTENTS

*p.5 - 8*

### Monitoring functions

**Monitor Matrix**

**Bass Management**

**Monitor Alignment**

*p.9 - 12*

### Monitoring flow

**2ch Monitoring**

**3-1ch Monitoring**

**5.1ch Monitoring**

**6.1ch Monitoring**

*p.13 - 17*

### Monitor Adjustment

#### **FAST WAY TO REACH THE TARGET ENVIRONMENT**

#### **APPENDIX 1:**

Playback level balance

#### **APPENDIX 2:**

5.1 playback response

#### **APPENDIX 3:**

Time alignment and Comb filtering effect

## Monitoring functions

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
©2005 Yamaha Corp. & SONA Corp.

**Monitor Matrix**



**! Down-mix**  
**! Surround level adjustment (3-1)**

**Bass Management**



**! Bass redirection (DVD-V)**  
**! DVD or Movie (Surr -3dB)**  
**! LFE+10dB or 0dB**

**Monitor Alignment**

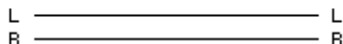


**! Delay**  
**! Attenuator**  
**! Surround routing**

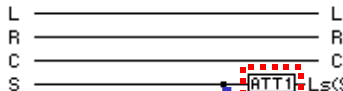
**Featuring...**

**2ch, 3-1ch, 5.1ch, 6.1ch**

## MONITOR MATRIX



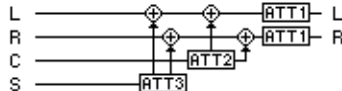
## MONITOR MATRIX



ATT1  
 -3.0

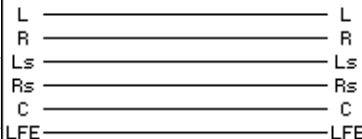
## Down-mix

## MONITOR MATRIX

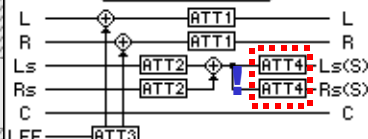


ATT1 ATT2 ATT3  
 0.0 -3.0 -3.0

## MONITOR MATRIX

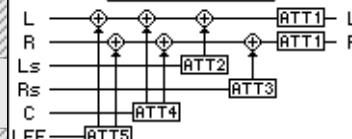


## MONITOR MATRIX



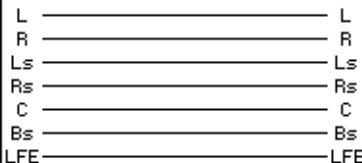
ATT1 ATT2 ATT3 ATT4  
 0.0 -3.0 -∞ -3.0

## MONITOR MATRIX

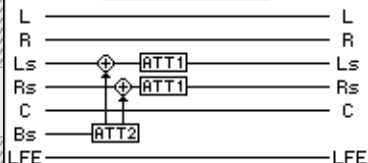


ATT1 ATT2 ATT3 ATT4 ATT5  
 0.0 -3.0 -3.0 -3.0 -∞

## MONITOR MATRIX

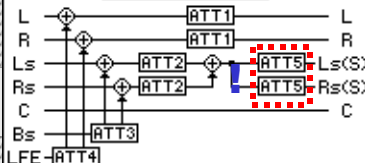


## MONITOR MATRIX



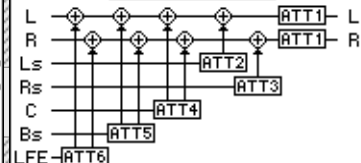
ATT1 ATT2  
 0.0 -3.0

## MONITOR MATRIX



ATT1 ATT2 ATT3 ATT4 ATT5  
 0.0 -3.0 -3.0 -∞ -3.0

## MONITOR MATRIX



ATT1 ATT2 ATT3 ATT4 ATT5 ATT6  
 0.0 -3.0 -3.0 -3.0 -3.0 -∞

## Monitor Matrix

PARAM	RANGE	STEP
ATT	0~-12.0dB, -inf, (0.1dB step)	142

PARAM	RANGE	STEP
ATT	+12.0~-12.0dB, -inf, (0.1dB step)	242

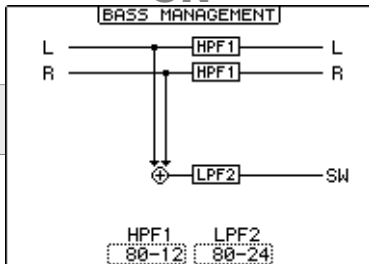
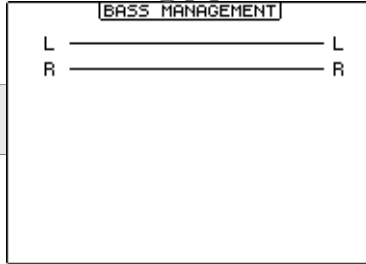
Same value should be used

2

3-1

5.1

6.1

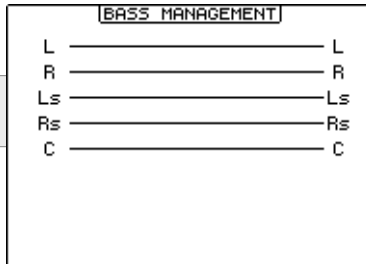
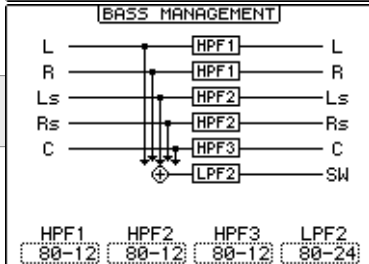
**ON****OFF**

2

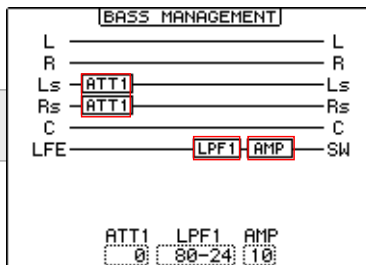
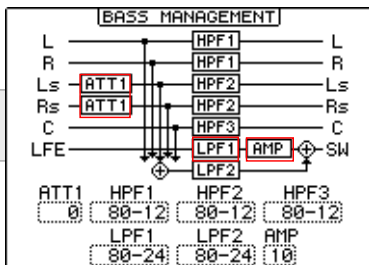
## Bass Management

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

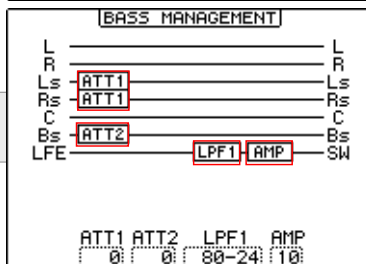
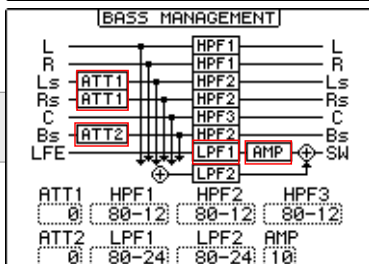
3-1



5.1



6.1



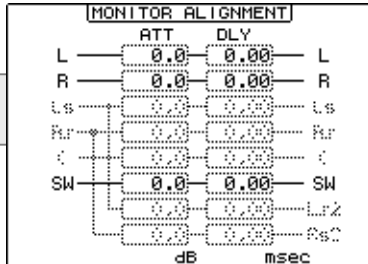
	1	2	3	4	5
	DVD : LFE80Hz	DVD : LFE120Hz	Movie : LFE80Hz	Movie : LFE120Hz	Bypass
HPF1	80-12	80-12	80-12	80-12	THRU
HPF2	80-12	80-12	80-12	80-12	THRU
HPF3	80-12	80-12	80-12	80-12	THRU
LPF1	80-24	120-42	80-24	120-42	THRU
LPF2	80-24	80-24	80-24	80-24	MUTE
ATT1	0dB	0dB	-3dB	-3dB	0dB
ATT2	0dB	0dB	-3dB	-3dB	0dB
AMP	10dB	10dB	10dB	10dB	0dB

	THXD	THXF	THXM
	THXpm3 : DVD	THXpm3 : Film	THXpm3 : Music
HPF1	80-12 (Fixed)	80-12 (Fixed)	80-12 (Fixed)
HPF2	80-12 (Fixed)	80-12 (Fixed)	80-12 (Fixed)
HPF3	80-12 (Fixed)	80-12 (Fixed)	80-12 (Fixed)
LPF1	120-42 (Fixed)	120-42 (Fixed)	120-42 (Fixed)
LPF2	80-24L (Fixed)	80-24L (Fixed)	80-24L (Fixed)
ATT1	0dB (Fixed)	-3dB (Fixed)	0dB (Fixed)
ATT2	0dB (Fixed)	-3dB (Fixed)	0dB (Fixed)
AMP	10dB (Fixed)	10dB (Fixed)	10dB (default) / 0dB (option)

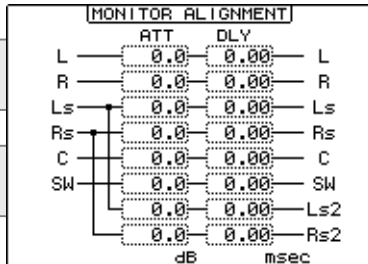
	OFF	PARAM	RANGE
	HPF1	THRU	HPF1
HPF2	THRU	HPF2	THRU, 80-12, 80-12L, 80-24, 80-24L
HPF3	THRU	HPF3	THRU, 80-12, 80-12L, 80-24, 80-24L
LPF1	No action (Variable)	LPF1	THRU, 80-24, 80-24L, 120-42
LPF2	MUTE	LPF2	THRU, 80-24, 80-24L, MUTE
ATT1	No action (Variable)	ATT1	0~-12dB(1dB step)
ATT2	No action (Variable)	ATT2	0~-12dB(1dB step)
AMP	No action (Variable)	AMP	0~-12dB(1dB step)

e.g., 80-12 ; Butterworth  $f_c=80\text{Hz}$ , 12dB/oct.  
 80-12L ; Linkwitz-Riley  $f_c=80\text{Hz}$ , 12dB/oct.

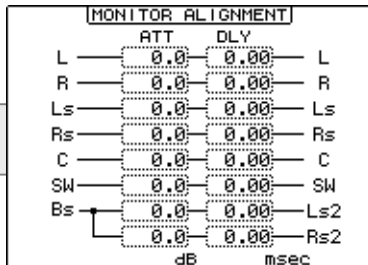
2



3-1



5.1



6.1

## Monitor Alignment

	ATT	DLY
DEFAULT	0dB	0.00msec
RANGE	-12.0~+12.0	0.00~30.00msec
STEP	242(0.1dB step)	1501(0.02msec step)



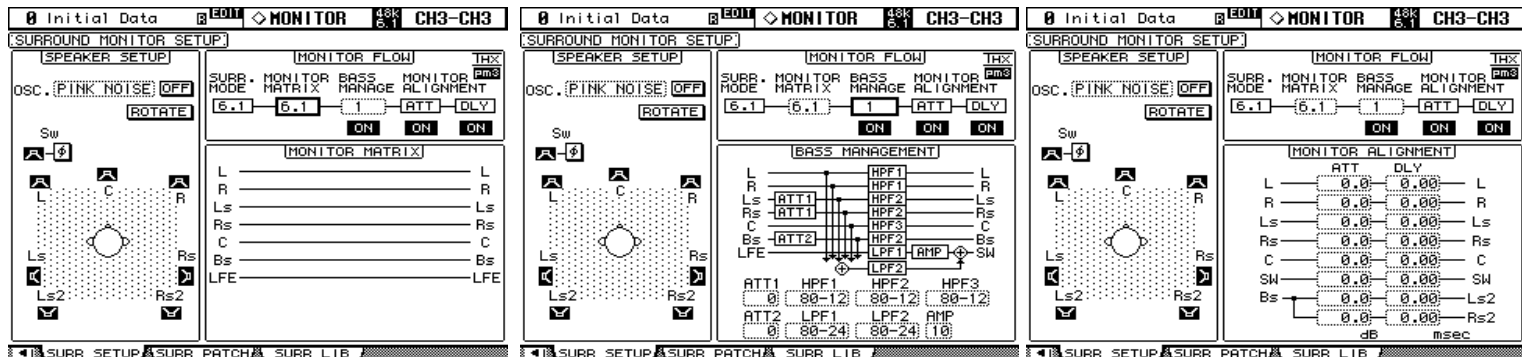
# Monitoring flow

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

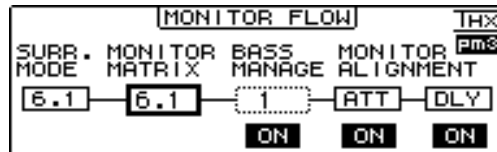
## Monitor Matrix

## Bass Management

## Monitor Alignment



2ch  
3-1ch  
5.1ch  
6.1ch

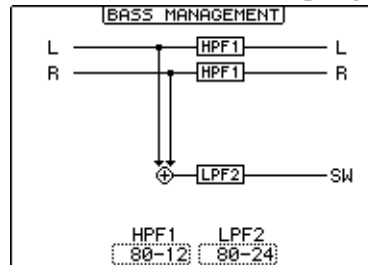
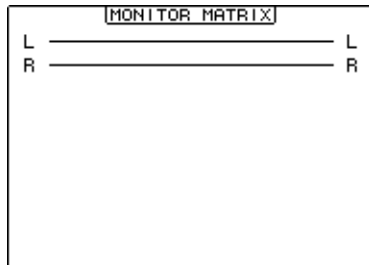


2.0ch  
2.1ch  
3-1ch  
5.1ch  
6.1ch

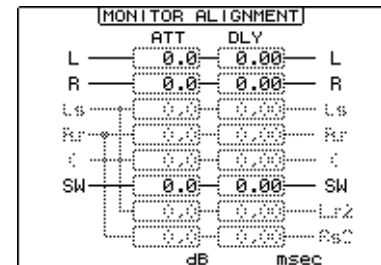
## 2ch Monitoring

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
 quick reference [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

2

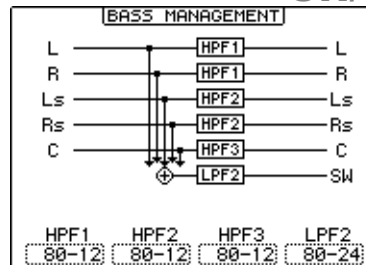
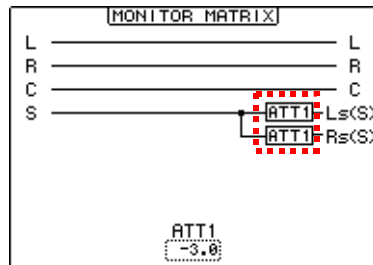


ON/OFF

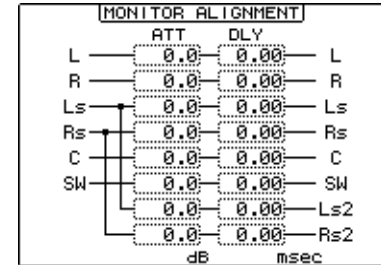


## 3-1ch Monitoring

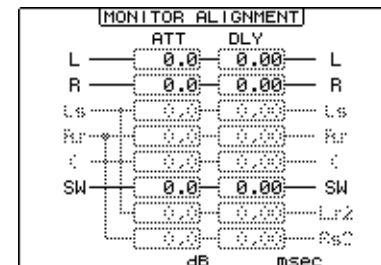
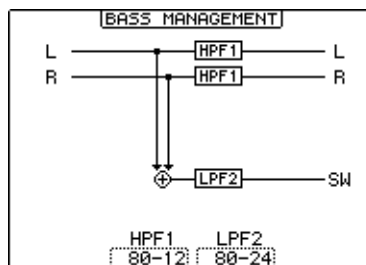
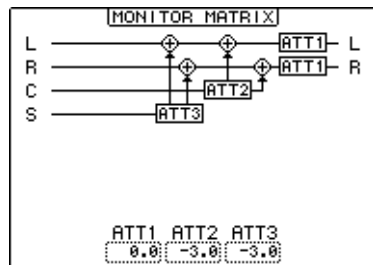
3-1



ON/OFF

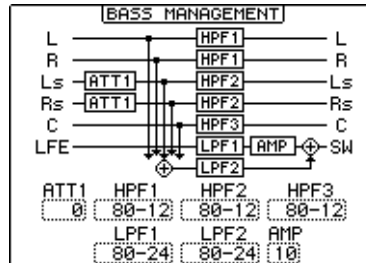
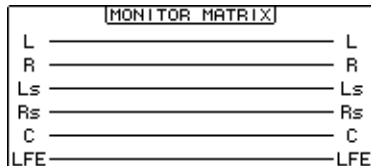


3-1 &gt; 2



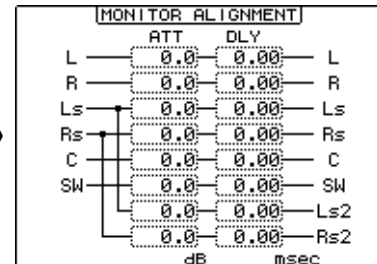
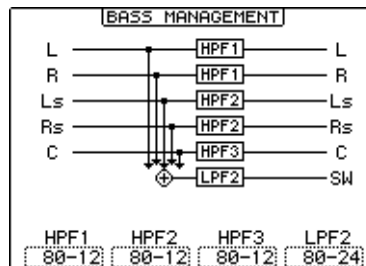
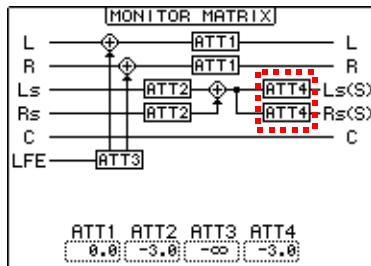
# 5.1ch Monitoring

## 5.1



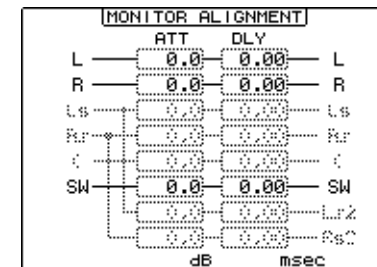
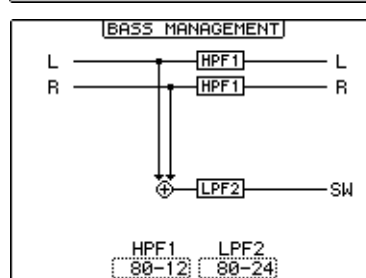
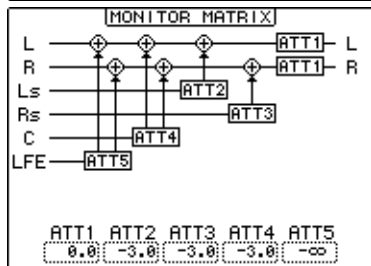
## ON/OFF

## 5.1 > 3-1

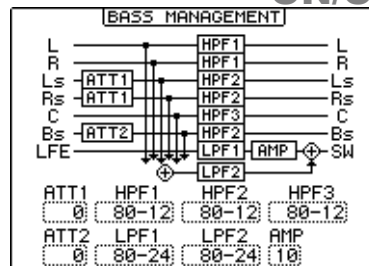
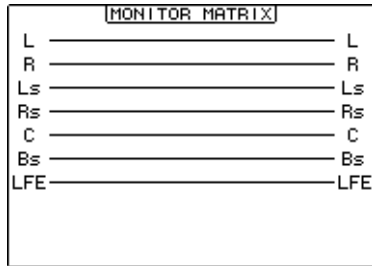


Same value

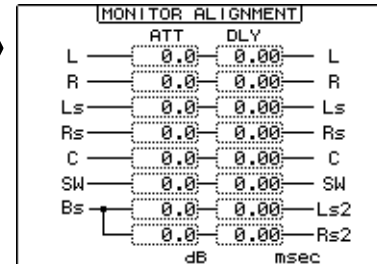
## 5.1 > 2



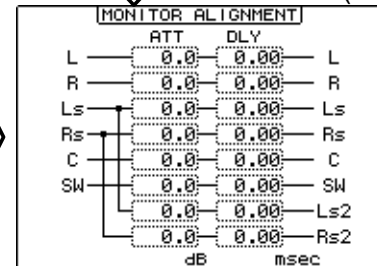
6.1



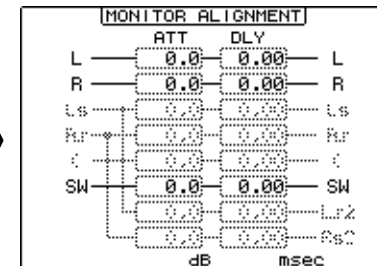
## 6.1ch Monitoring



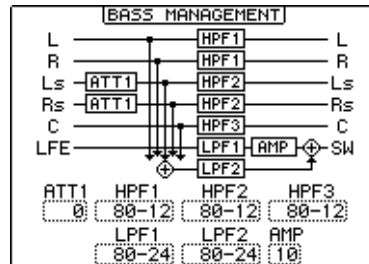
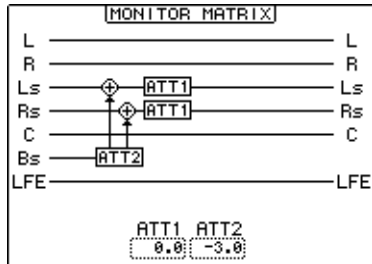
↕ Different value (LS, RS)



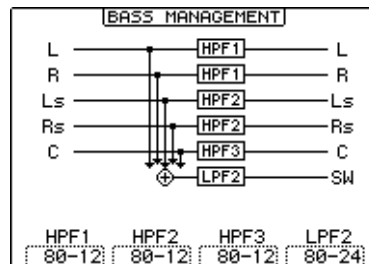
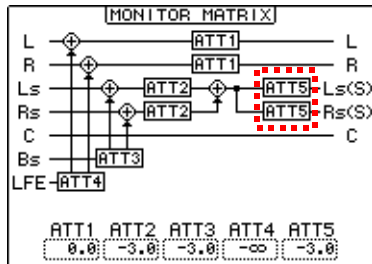
↕ Same value



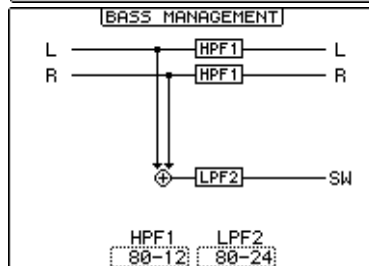
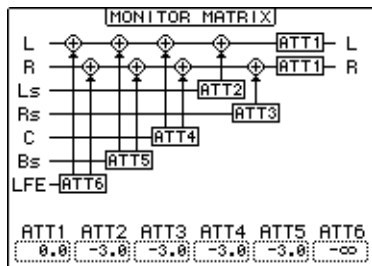
6.1 &gt; 5.1



6.1 &gt; 3-1



6.1 &gt; 2



**Surround mode (Main Bus)**

0 Initial Data 0 0011 PAN/SURR 48% CH3-CH3  
SURROUND MODE

SURROUND MODE STEREO [3-1] [5.1] [6.1]

BUS7 LFE BUS1 L BUS5 C BUS2 R

Ls Bs Rs

BUS3 BUS6 BUS4

SURR/BUS SETUP

SURR. MODE CH EDIT SURR1-24 SURR25-48

**Bus Mute/Solo**

0 Initial Data 0 0011 MONITOR 48% CH1-CH1  
SURROUND MONITOR

SETTING

ASSIGN1 [1] [2] [3] [4] [5] [6]

ASSIGN2 [1] [2] [3] [4] [5] [6]

MONITOR L/R TO C-R

STATUS

SURROUND MODE [6.1]

MONITOR LEVEL [85.0] dB

SET SPL85

SNAP TO SPL85

SOLO C-R TALKBACK SURROUND

**Noise Generator**

0 Initial Data 0 0011 MONITOR 48% CH3-CH3  
SURROUND MONITOR SETUP

SPEAKER SETUP

SURR. MONITOR: [6.1] MONITOR: [6.1]

OSC. [PINK NOISE] [OFF]

ROTATE: [0]

MONITOR FLUX

MONITOR MATRIX

L L R L

Ls Ls Rs Rs

C C Bs Bs

LFE LFE

SURR. SETUP SURR. PATCHA SURR. LIB

**Monitor Bass Att. Bus Mng. Dly.**

[BASS MANAGEMENT]

L HPF1 L

R HPF1 R

Ls HPF2 Ls

Rs HPF2 Rs

C HPF3 C

Bs HPF2 Bs

LFE LPF1 LPF2 AMP SW

ATT1 HPF1 HPF2 HPF3

[0] [80-12] [80-12] [80-12]

ATT2 LPF1 LPF2 AMP

[0] [80-24] [80-24] [10]

[MONITOR ALIGNMENT]

ATT DLY

L [0.0] [0.00] L

R [0.0] [0.00] R

Ls [0.0] [0.00] Ls

Rs [0.0] [0.00] Rs

C [0.0] [0.00] C

SW [0.0] [0.00] SW

Bs [0.0] [0.00] Ls2

[0.0] [0.00] Rs2

dB msec

**Monitor Adjustment**

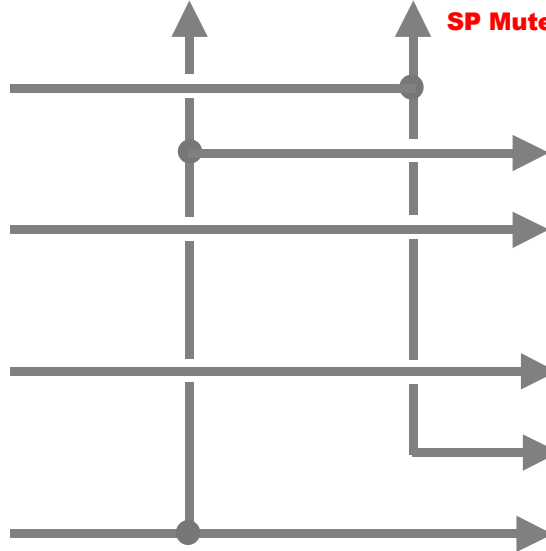
**Level Balance**

**LFE gain**

**Time alignment**

**SUB phase**

**X-over [Main, SUB]**



# FAST WAY TO REACH THE TARGET ENVIRONMENT

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

## 1) First of all, “5.1ch DVD-V” environment should be adjusted using bass management .

1. X-over [SUB, Main], SUB Phase
2. Master Vol., Level Balance
3. Time Alignment

## 2) If necessary, turn the bass management OFF.

Check the SUB phase again.

## 3) For Movie program, reduce the Surround level -3dB.

Use the Bass Management function ; ATT1, ATT2 -> -3dB

## 4) For DVD-A / SACD, change the LFE level from +10dB to 0dB.

Bass management function ; AMP -> 0dB

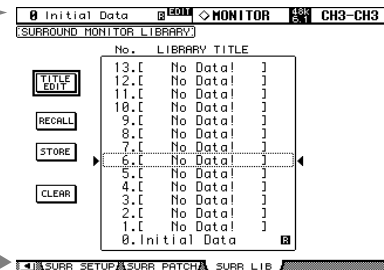
## 5) For 3-1, adjust the surround level again.

1. Switch the surround mode to 3-1.
2. Play the pink noise from the S channel.
3. Adjust the playback level to 85dBC using ATT1 of “3-1=>3-1” monitor matrix.  
ATT1 will be adjusted to -3dB ~ -6dB.
4. Copy the value of ATT1 to ATT4 of “5.1=>3-1” and ATT5 of “6.1=>3.1” monitor matrix.

## 6) Finally, store adjustment data into “SURR LIB”.

## 7) For 6.1, adjust the LS, RS, BS level again.

1. Switch the surround mode to 6.1.
2. Play the pink noise from the LS, RS, BS channel.
3. Adjust the each playback level to 85dBC  
using ATTs of LS1, LS2, RS1 and RS2 on the “monitor alignment”.
4. Store the adjustment data into “SURR LIB” as another scene.



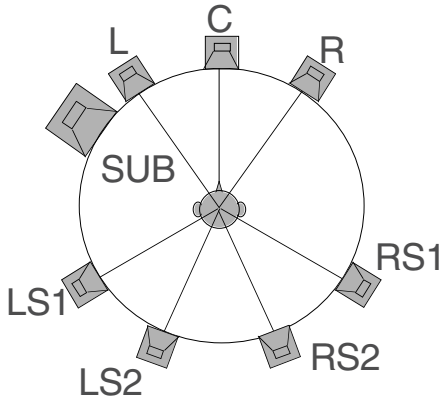
# APPENDIX 1:

## Playback level balance

**DM2000 DM1000 O2R96 Ver2**  
**Surround-monitoring functions**  
**quick reference** [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

### Monitor Assign

	L	R	C	SUB	LS1	RS1	LS2
<b>2</b>	L	R	-	(SUB)	-	-	-
<b>3-1</b>	L	R	C	(SUB)	S	S	(S)
<b>5.1</b>	L	R	C	LFE (SUB)	LS	RS	(LS)
<b>6.1</b>	L	R	C	LFE (SUB)	LS	RS	BS



### Playback levels

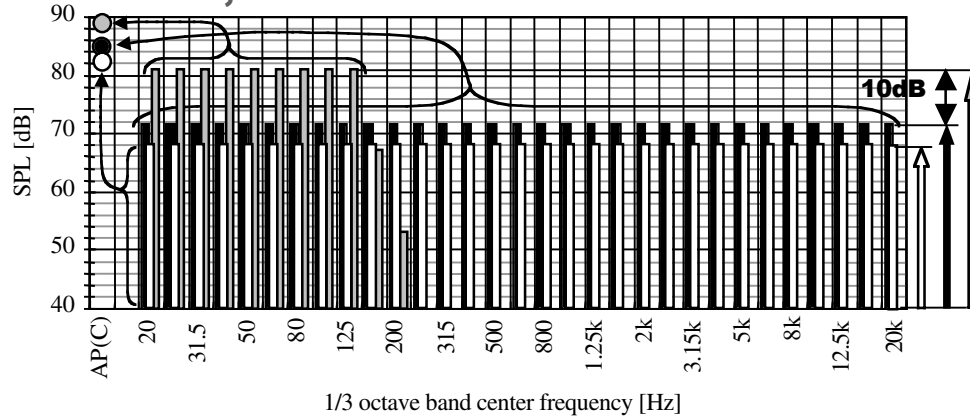
CH	Target	L	C	R	LS	RS	BS	LFE
3-1	DVD-V	85dBC	85dBC	85dBC	S=LS+RS=85dBC		-	-
	Movie				(LS=RS=82dBC)			
5.1	DVD-V	85dBC	85dBC	85dBC	85dBC	85dBC	-	+10dB* (89dBC**)
	Movie				82dBC	82dBC		
	DVD-A				85dBC	85dBC		
	SACD				85dBC	85dBC		
6.1	DVD-V	85dBC	85dBC	85dBC	85dBC	85dBC	85dBC	+10dB* (89dBC**)
	Movie				82dBC	82dBC	82dBC	

\*in-band gain, \*\*All-pass level

# APPENDIX 2:

## 5.1 playback response

### DVD-V, Movie



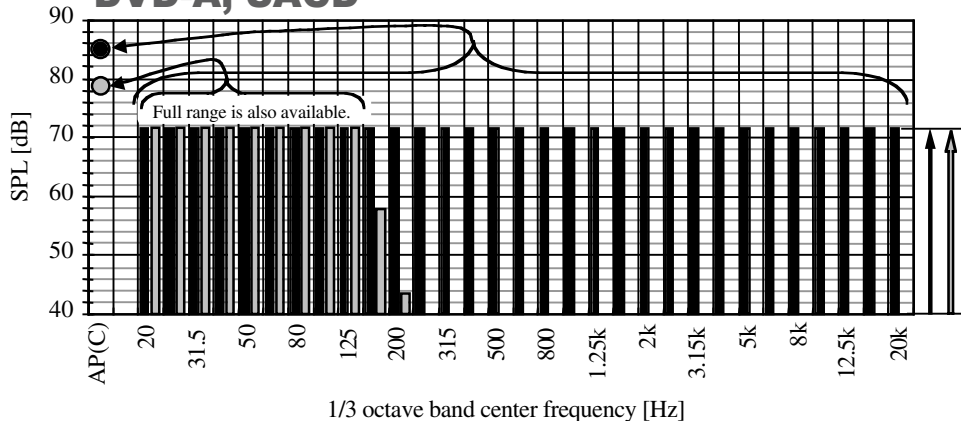
#### Main channels

- All pass level : 85dBC
  - ↑ 1/3 octave band level : approx.71dB
- LS / RS for 3-1 and Movie program
- All pass level : 82dBC
  - ↑ 1/3 octave band level : approx.68dB

#### LFE channel

- All pass level : approx.89dBC
- ↑ 1/3 octave band level : approx.81dB

### DVD-A, SACD



#### Main channels

- All pass level : 85dBC
- ↑ 1/3 octave band level : approx.71dB

#### LFE channel

- All pass level : approx.79dBC
- ↑ 1/3 octave band level : approx.71dB



# APPENDIX 3:

## Time alignment and Comb filtering effect

DM2000 DM1000 O2R96 Ver2  
 Surround-monitoring functions  
 quick reference [March '05, r343]  
 ©2005 Yamaha Corp. & SONA Corp.

