

### GENERAL DESCRIPTION

The CM7000 is a monolithic integrated circuit and suitable Dual amplifier for low power.

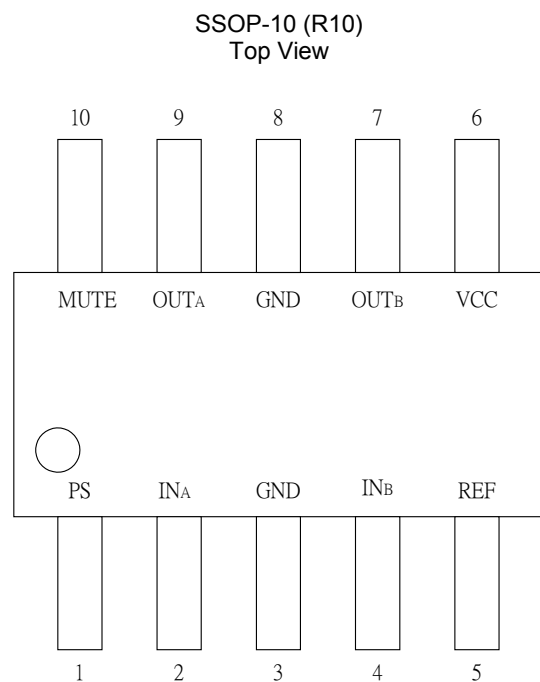
### FEATURES

- ◆ Low Quiescent Current
- ◆ High Power Supply Ripple Rejection
- ◆ Low Voltage Operation
- ◆ A few of External Part Required
- ◆ Built in Power Save Switch & Mute Switch

### APPLICATIONS

- ◆ Portable Compact Disk Player (DISCMAN)
- ◆ Portable Mini Disk Player (MD)
- ◆ Disc-Man
- ◆ MP3 Player
- ◆ CD-ROM
- ◆ Other Portable Compact Disk Media
- ◆ Fan Motor Drive

### PIN CONFIGURATION



**PIN DESCRIPTION**

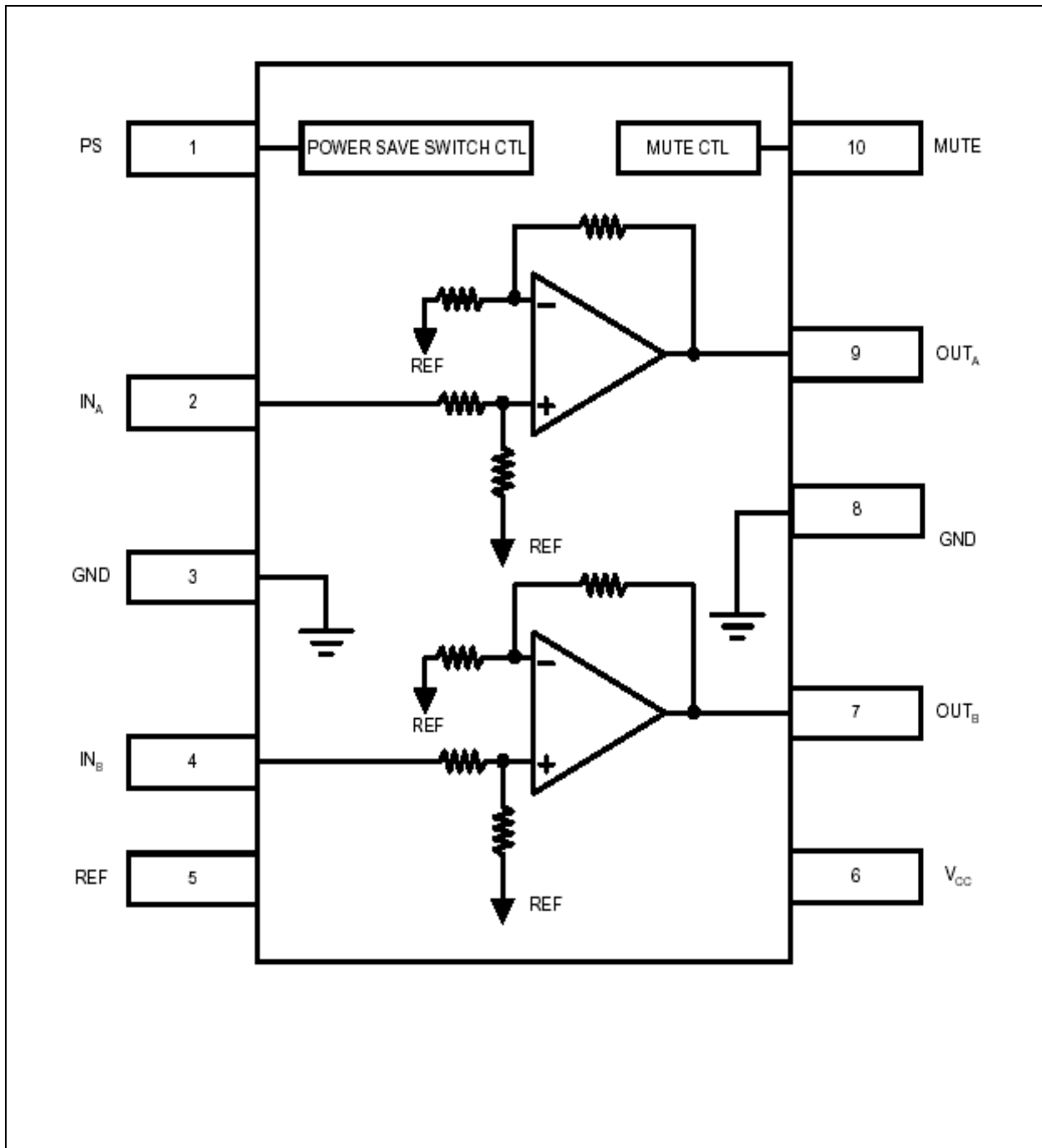
Pin No.	Symbol	Description
1	PS	Power Save Switch
2	IN <sub>A</sub>	Signal Input A
3	GND	Signal Ground
4	IN <sub>B</sub>	Signal Input B
5	REF	Reference Voltage
6	VCC	Supply Voltage
7	OUT <sub>B</sub>	Signal Output B
8	GND	Power Ground
9	OUT <sub>A</sub>	Signal Output A
10	MUTE	Mute On Switch

**ORDERING INFORMATION**

Part Number	Temperature Range	Package
CM7000IR	-20°C to 75°C	10-Pin SSOP (R10)
CM7000GIR*	-20°C to 75°C	10-Pin SSOP (R10)

**Note:** G : Suffix for Pb Free Product

**INTERNAL BLOCK DIAGRAM**

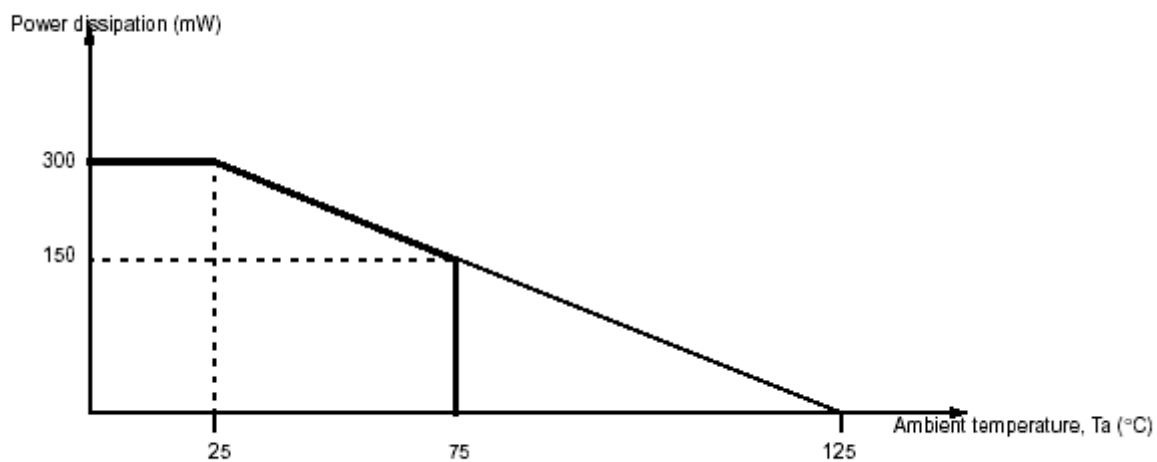


### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Absolute Maximum ratings are those values beyond which the device could be permanently damaged.

- Maximum Supply Voltage (V<sub>CC</sub>)..... +4.5V
- Storage Temperature (T<sub>S</sub>) ..... -55°C to +125°C
- Operating Temperature (T<sub>O</sub>)..... -20°C to + 75°C
- Power Dissipation (P<sub>D</sub>) .....300mW
- Thermal Resistance(θ<sub>Jc</sub>).....150°C/W

### Power Dissipation Curve



### RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Supply Voltage	V <sub>CC</sub>	1.8	3.0	4.0	V
Recommended Load	R <sub>L</sub>	16		32	Ω

### ELECTRICAL CHARACTERISTICS ( $R_L=16\Omega, R_g=600\Omega, T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Conditions	CM7000			Unit
			Min.	Typ.	Max.	
ICC1	Quiescent Current 1	VCC=2.4V		5.5	10.0	mA
ICC2	Quiescent Current 2	VCC=4.5V, Mute=GND		1.0	2.0	mA
ICC3	Quiescent Current 3	VCC=4.5V, PS=GND			1.0	$\mu\text{A}$
GVC1	Close Loop Voltage Gain 1	VCC=2.4V, f=1KHz, VO=-10dBm	30	32	34	dB
GVC2	Close Loop Voltage Gain 2	VCC=1.8V, f=1KHz, VO=-20dBm	29	32	34	dB
$\Delta\text{GV1}$	Channel Balance 1	VCC=2.4V, f=1Hz VO=-10dBm			1.0	dB
$\Delta\text{GV2}$	Channel Balance 2	VCC=1.8V, f=1Hz VO=-20dBm			1.0	dB
THD	Total Harmonic Distortion	VCC=2.0V, f=1Hz PO=1mW		0.5	1.5	%
RR	Ripple Rejection Ratio	VCC=1.8V, f=100Hz Rg=1k $\Omega$ , VR=-20dBm, BPF=100Hz	43	60		dB
CT	Crosstalk	VCC=2.4V, f=100Hz Rg=1k $\Omega$ , VR=-10dBm,	43	50		dB
VNOISE	Output Noise Voltage	VCC=4.5V, Rg=1k $\Omega$ , BPF=20Hz~20kHz		60	100	$\mu\text{Vrms}$
POUT	Output Power	VCC=3.0V, f=1kHz THD=10%	20	40		mW
ATTPS	PS Attenuation Ratio	VCC=1.8V, f=100Hz PS=GND, VIN=-10dBm,			-80	dB
ATTMU	MUTE Attenuation Ratio	VCC=1.8V, f=100Hz MUTE=GND, VIN=-10dBm,			-80	dB
IPSON	PS ON Input Current	VCC=1.5V, VREF $\geq$ 0.85V		0.2	1.0	$\mu\text{A}$
IMOFF	MUTE OFF Input Current	VCC=1.5V, VREF $\geq$ 0.85V		0.2	1.0	$\mu\text{A}$
VHPS	PS ON High Level	VCC=1.5V, VREF $\geq$ 0.85V	0.5	0.65		V
VHMU	MUTE OFF High Level	VCC=1.5V, VREF $\geq$ 0.85V	0.5	0.65		V

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## APPLICATION INFORMATION

### 1. PS Block

This block diagram describes the power save switch circuits.

The drive block is controlled by PS pin, which can be derived from micro controller.

It controls bias of the internal circuits of CM7000, so that it makes CM7000 operate when input voltage level reaches high level.

### 2. Mute Block

The block diagram describes the mute on switch circuits.

The drive block is controlled by MUTE pin, which can be derived from micro controller.

When the pin of mute turns on, it makes reference voltage of internal circuits approximately 0V, so that it keeps the device of CM7000 off.

### 3. AMP Block

This block diagram describes the AMP block with resistances, which control gain of CM7000.

The gain of CM7000 is  $\frac{V_{OUT}}{V_{IN}} \cong 40 \cong 32 \text{ [ dB ]}$

Output voltage of CM7000 can be 40 times as much as input voltage, so it eliminates the number of external circuits and offers headphone input.

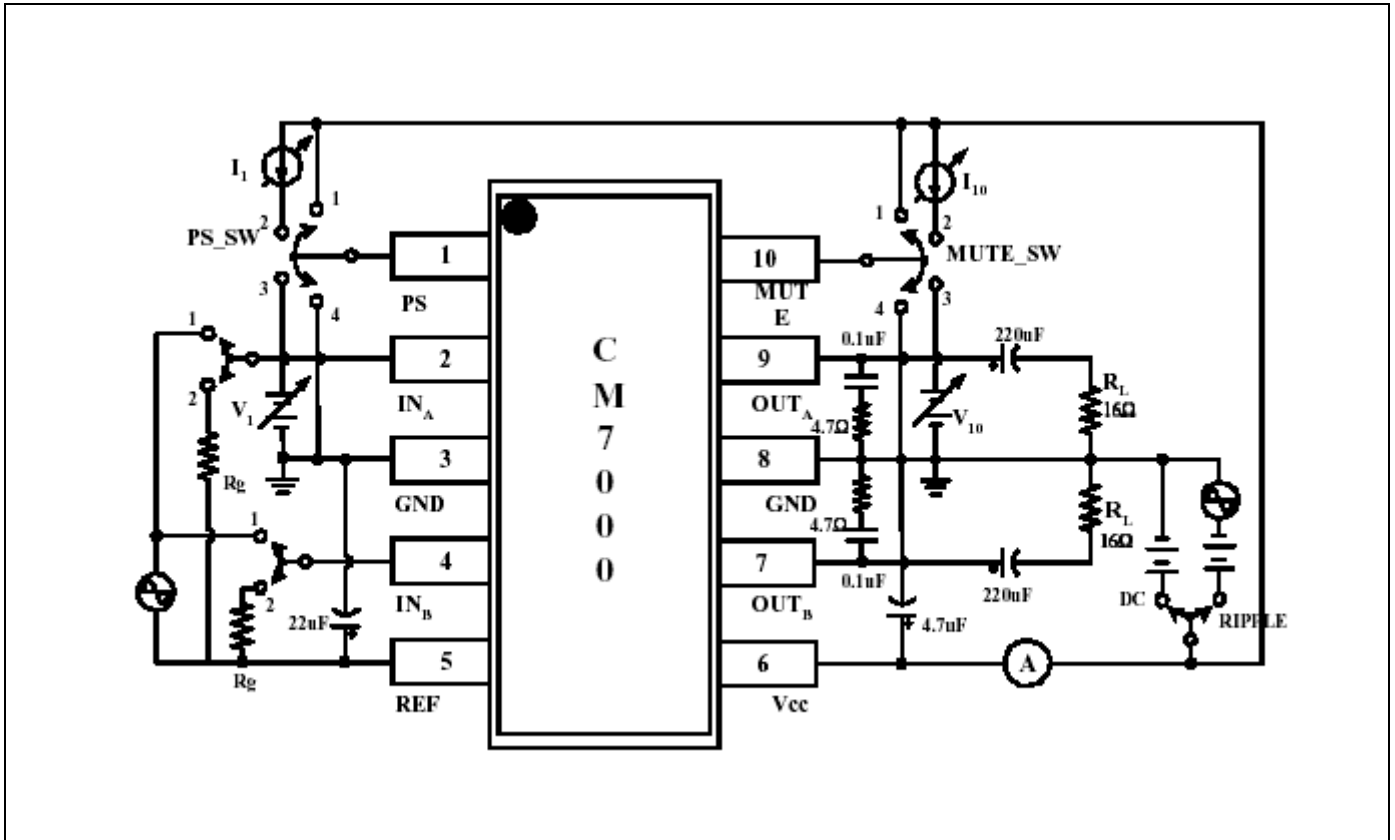
### 4. Popping Noise Reduction

If PS pin ( Pin1 , Power save switch) connect the micro controller, the micro controller must follow the same sequence 1 in order to reduce popping noise on mute mode.

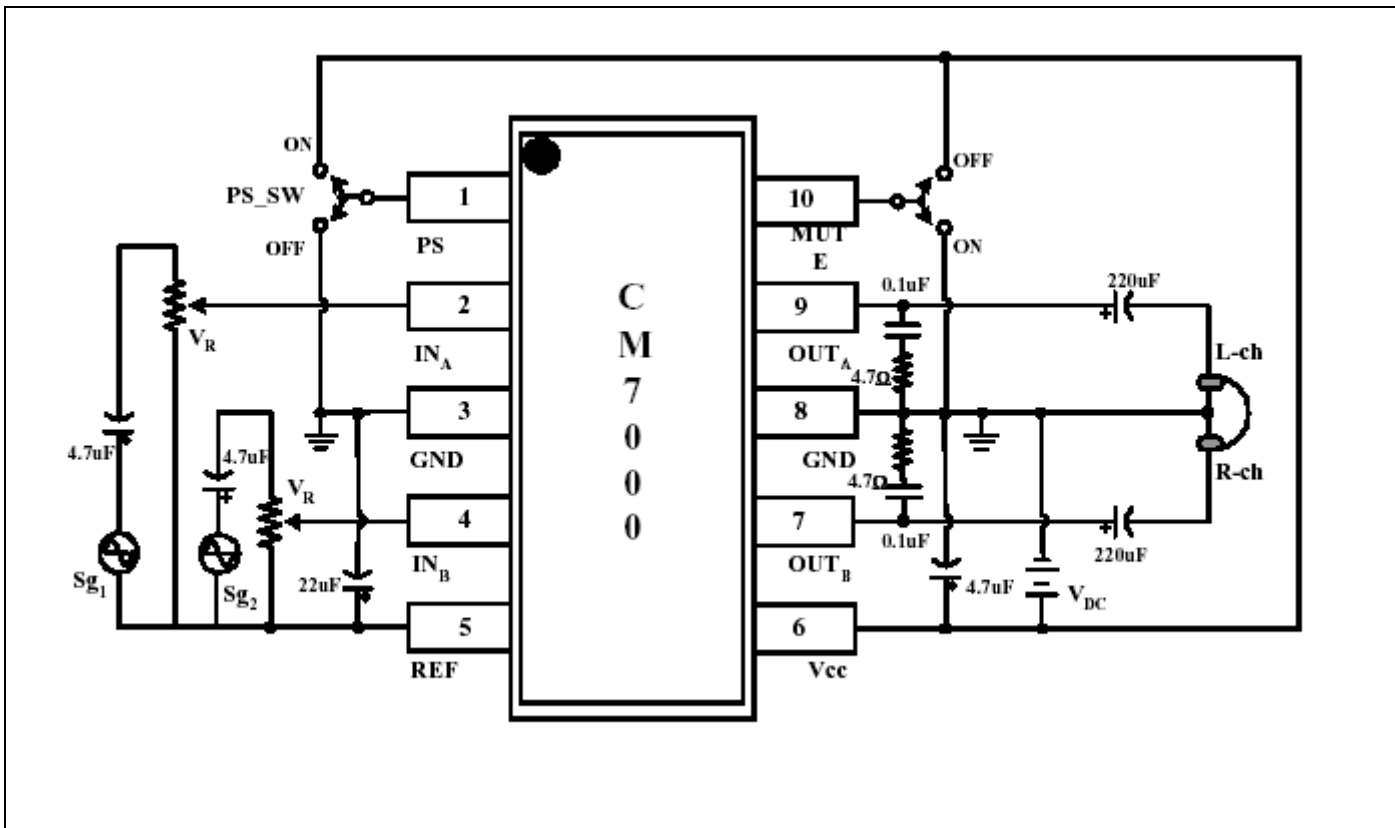
PS on → Mute on → PS off → Mute operation → PS on → Mute off → Normal operation (Sequence 1) If PS connect  $V_{CC}$  , the micro controller follow the sequence 2.

Mute on → Mute Operation → Mute off → Normal operation (Sequence 2)

### TEST CIRCUITS

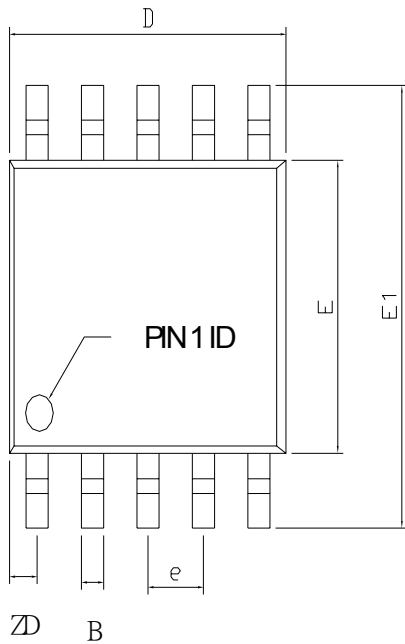


### TYPICAL APPLICATION CIRCUITS

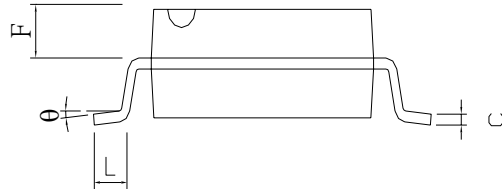
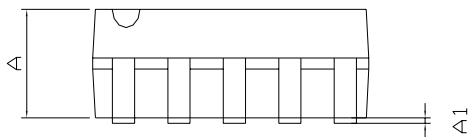


### PACKAGE DIMENSION

#### 10-PIN SSOP (R10)



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.800			0.071		
A1	0.100	0.175	0.250	0.004	0.007	0.010
B	0.250	0.350	0.450	0.010	0.014	0.018
C	0.150	0.225	0.300	0.006	0.009	0.012
D	4.800	4.900	5.000	0.189	0.193	0.197
E	3.750	3.950	4.150	0.148	0.156	0.163
E1	5.100	5.700	6.300	0.201	0.225	0.248
F	0.680			0.027		
L	0.300	0.500	0.700	0.012	0.023	0.028
ZD	0.460			0.018		
e	1.000TYP			0.039TYP		
θ	0°	4°	8°	0°	4°	8°





**NUMBERING SCHEME****Ordering Number: CM7000XY (note1)****Ordering Number: CM7000GXY (note2)****note1:**X: Suffix for Temperature Range (note 3)Y: Suffix for Package Type (note 4)**note2:**G: Suffix for Pb Free ProductX: Suffix for Temperature Range (note 3)Y: Suffix for Package Type (note 4)**note 3:**

X= I : -20°C~+75°C

**note 4:**

R: SSOP-10

## **IMPORTANT NOTICE**

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