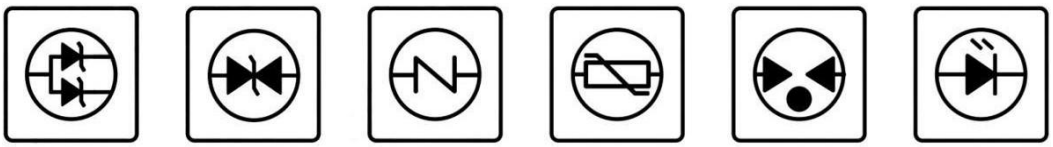
MSKSEMI 美森科
SEMICONDUCTOR



LM224DR(MS)

产品规格手册

概述

本电路为高性能、具有四个独立的运 算放大器， 内含相位补偿电路，适用于收 录机和音调系统作音调均衡网络，也用于 其他场合。采用 14 引线双列贴片式塑料封 装 SOP-14 ， 功耗 600mW。

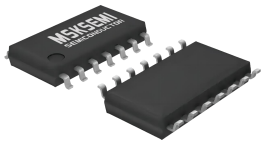
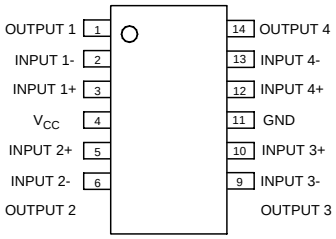
产品特点

- 无需外接相位补偿电路
- 电源电压范围宽：单电源时， Vcc=3~32V，双电源时，Vcc=±1.5V~16V
- 功耗电流小:Icc=0.6mA（典型）（RL=∞）
- 输入电压范围可接近地电平

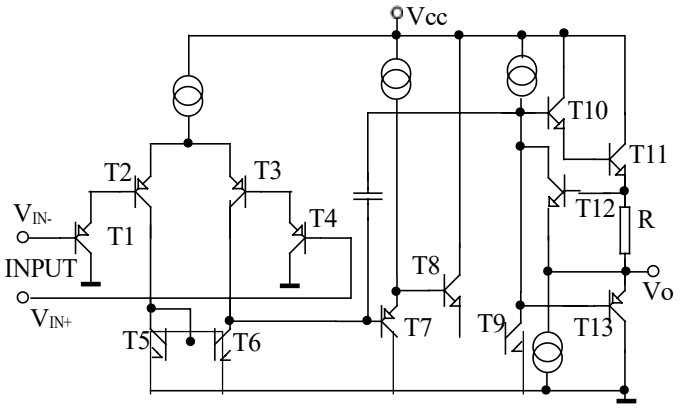
原理简介

LM224DR(MS) 由四个完全相同的运算放大器组成，单元电路如图所示,其工作原理简要说明如下：输入信号加到 T1 、T4 基极，经差分放大后；T8 、T9 于复合放大构成中间级；输 出级由 T10~T13 组成。其中 T12 为保护管，当输出电流过大时，R 上压降增大使 T12 饱和导通，T12 集电极电位下降，接近 1/2Vcc，使得推挽管 T10 、T11 和 T13 截止，从而起到保护作用。电容 C 为相位补偿电容。

封装形式和管脚功能定义

封装图	脚位信息	丝印
		
SOP-14		

内部线路图



引脚端功能符号

引出端序号	功 能	符 号	引出端序号	功 能	符 号
1	输出 1	OUT1	8	输出 3	OUT3
2	反向输入 1	IN-（1）	9	反向输入 3	IN-（3）
3	正向输入 1	IN+（1）	10	正向输入 3	IN+（3）
4	电源	Vcc	11	地	GND
5	正向输入 2	IN+（2）	12	正向输入 4	IN+（4）
6	反向输入 2	IN-（2）	13	反向输入 4	IN-（4）
7	输出 2	OUT2	14	输出 4	OUT4

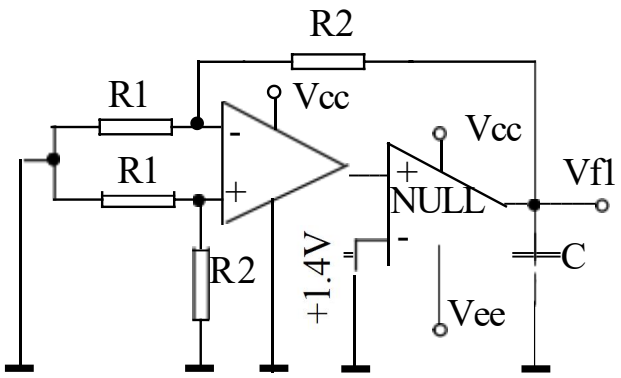
极限参数（绝对最大额定值，若无其它规定， Tamb=25℃）

参 数	符 号	测 试 条 件	额 定 值	单 位
电源电压	Vcc		32	V
差动输入电压	V_{ID}		32	V
最大输入电压	V_{IN}		-0.3~24	V
允许功耗	P_D		600	mW
工作温度	Topr		0~+70	℃
贮存温度	Tstg		-55~+125	℃

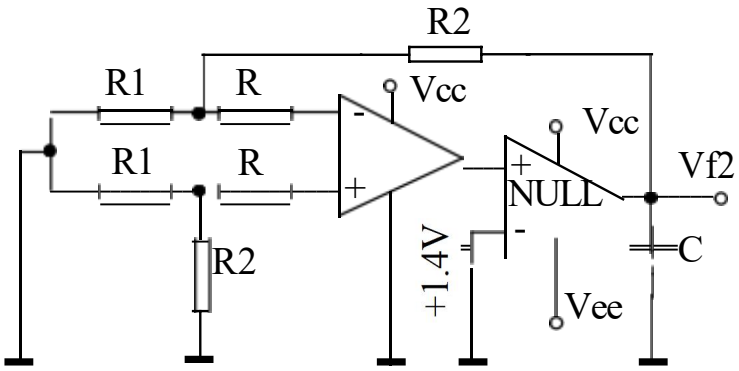
电特性（若无其它规定， Vcc=5V，Tamb=25℃）

参数	符号	测试条件	最小值	典型值	最大值	单位
失调输入电压	V_{IO}			±2	±7	mV
输入失调电流	I_{IO}	Iin(+)/Iin(-)		±5	±50	nA
输入偏置电流	I_{BA}			45	250	nA
共模输入电压范围	V_{ICM}		0		Vcc-1.5	V
共模抑制比	K_{CMR}		56			dB
强信号电压增益	Gv	Vcc=15V, R_L ≥2 kΩ	25	100		V/mV
输出电压范围	Vo		0		Vcc-1.5	V
电源纹波抑制比	PSRR		65			dB
通 道 分 离	Cs	f=1kHz~20kHz		120		dB
静态消耗电流（1）	Icc			0.6	2	mA
静态消耗电流（2）	Icc	Vcc=20V		1.5	3	mA
输出拉电流	Io	Vin+=1V, Vin⁻=0V	20	40		mA
输出灌电流	Io	Vin+=0V, Vin⁻=1V	10	20		mA

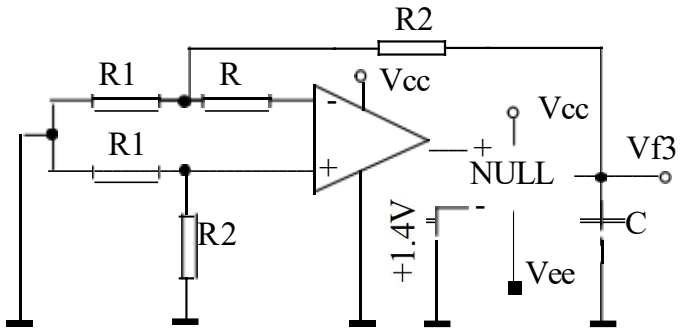
测试原理图（注： NULL 指零放大器）

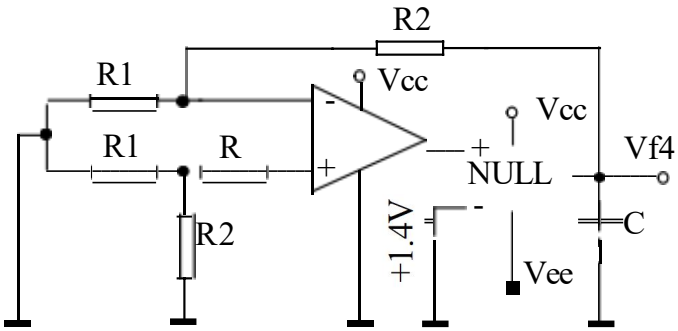


Vio=Vf1/（1+R2/R1）
输入失调电压 Vio 测试图

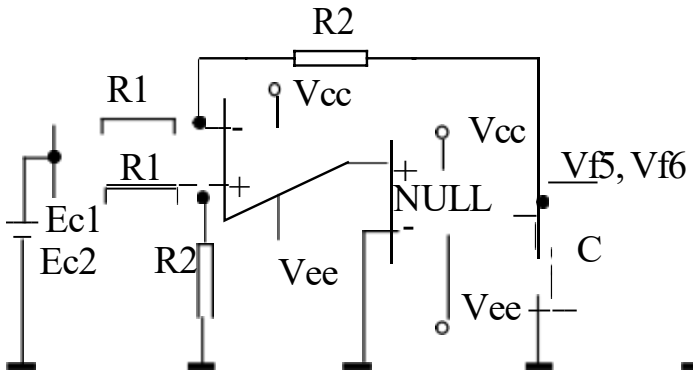


Iio=（Vf2-Vf1）/R（1+R2/R1）
输入失调电流 Iio 测试图

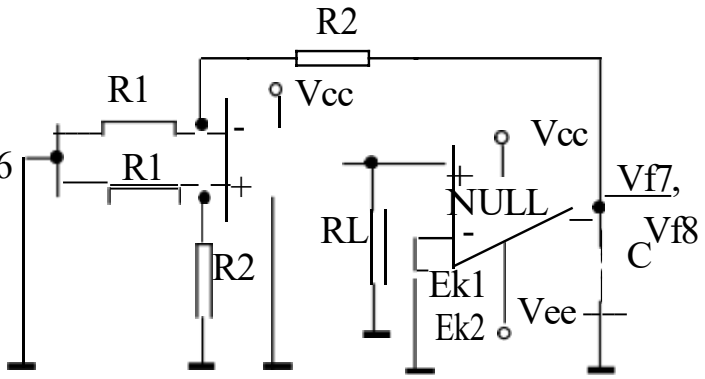




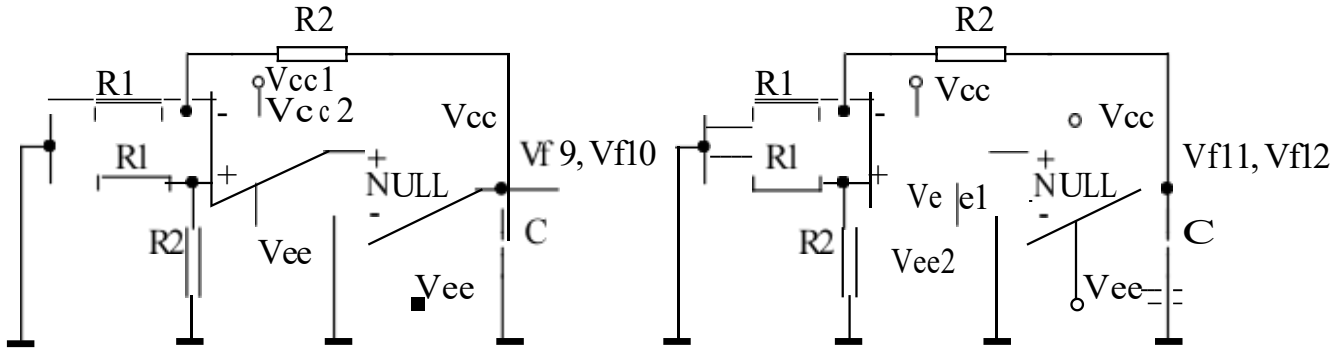
IBA=（Vf4-Vf3）/2R（1+R2/R1）
输入偏置电流 IBA 测试图



CMR=20log （Ec1-Ec2）(1+R2/R1）/（Vf5-Vf6
共模抑制比 CMR 及共模输入电压范围 VICM 测试图

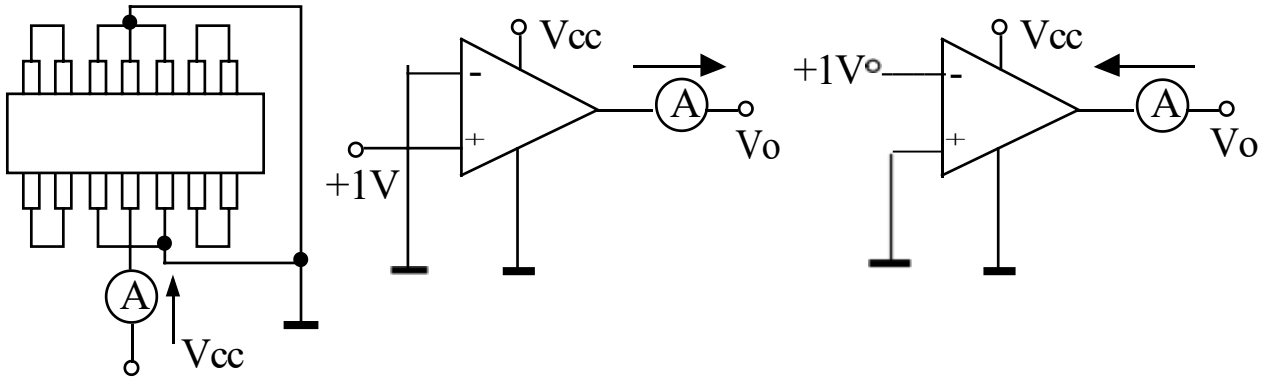


Gv=（Ek1-Ek2）(1+R2/R1）/（Vf8-Vf7）
电压增益 Gv 测试图

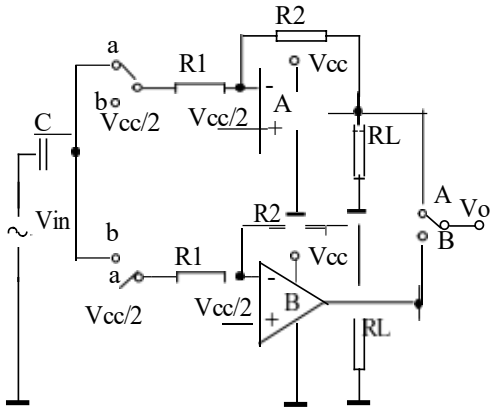


PSRR（+）=20log （Vcc1-Vcc2）(1+R2/R1）/（Vf9-Vf10） PSRR（-）=20log （Vee1-Vee2）(1+R2/R1）/（Vf11-Vf12

电源纹波抑制比 PSRR 测试图



消耗电流 Icc 及输出电流 Io 测试图



通道分离度 Cs 测试图

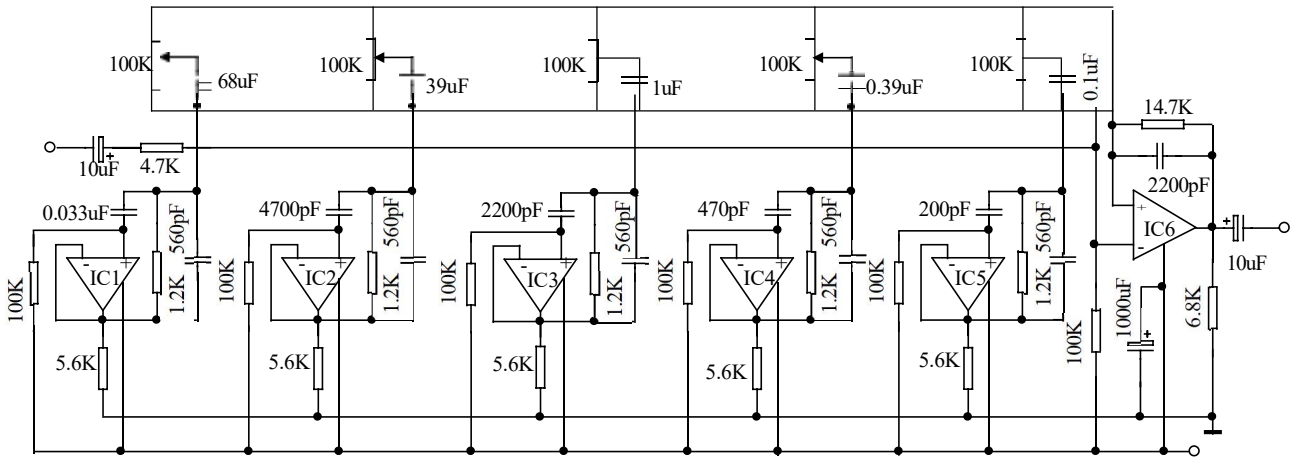
SW：A

Cs（A ）=20log（R2*VOA）/（R1*VOB）

SW：B

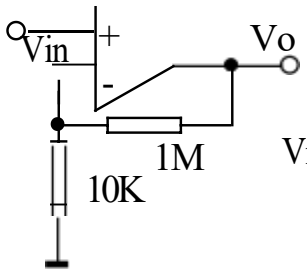
Cs（B ）=20log（R2*VOB）/（R1*VOA）

应用图

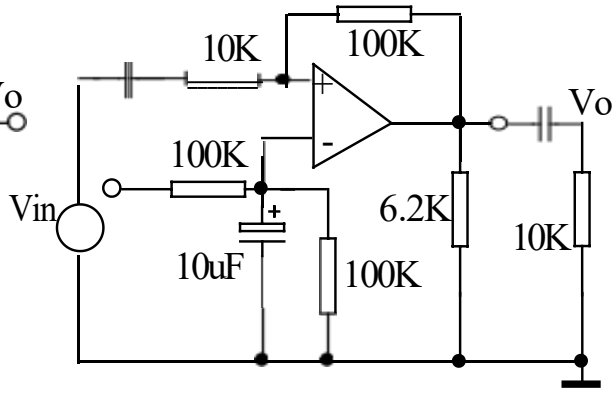


LM224用于五频率音调控制电路

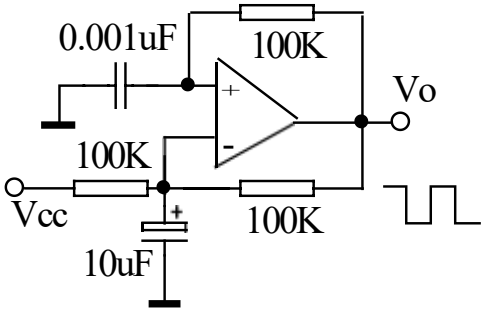
直流放大器



倒相放大器

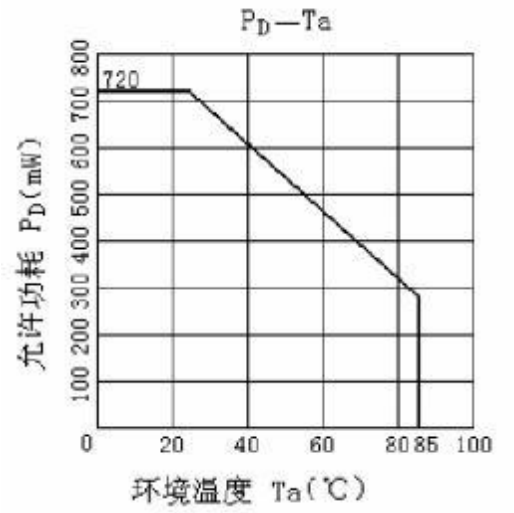


矩形波发生器

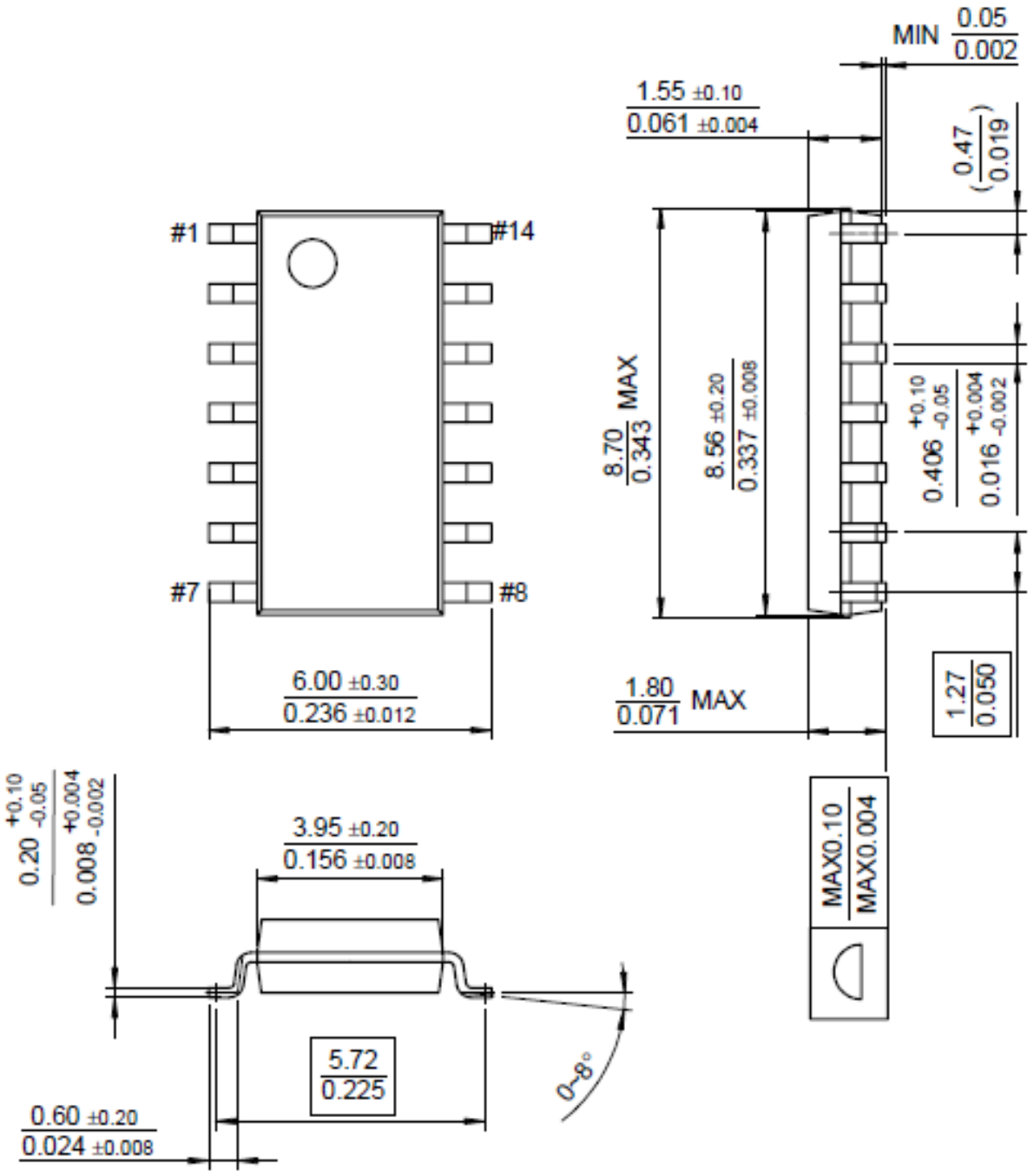


LM224的其它应用

特性曲线



SOP14



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P/N	PKG	QTY
LM224DR(MS)	SOP-14	2500

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