

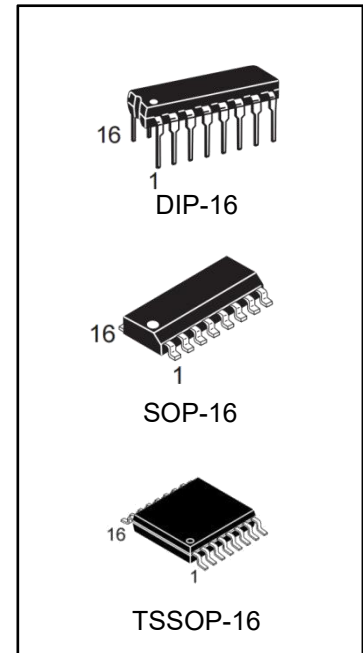
Quad RS-422, RS-423 Line Receiver

General Description

National's quad RS-422, RS-423 receiver features four independent receivers which comply with EIA Standards for the electrical characteristics of balanced/unbalanced voltage digital interface circuits. Receiver outputs are 74LS compatible, TRI-STATE[®] structures which are forced to a high impedance state when the appropriate output control pin reaches a logic zero condition. A PNP device buffers each output control pin to assure minimum loading for either logic one or logic zero inputs. In addition, each receiver has internal hysteresis circuitry to improve noise margin and discourage output instability for slowly changing input waveforms.

Features

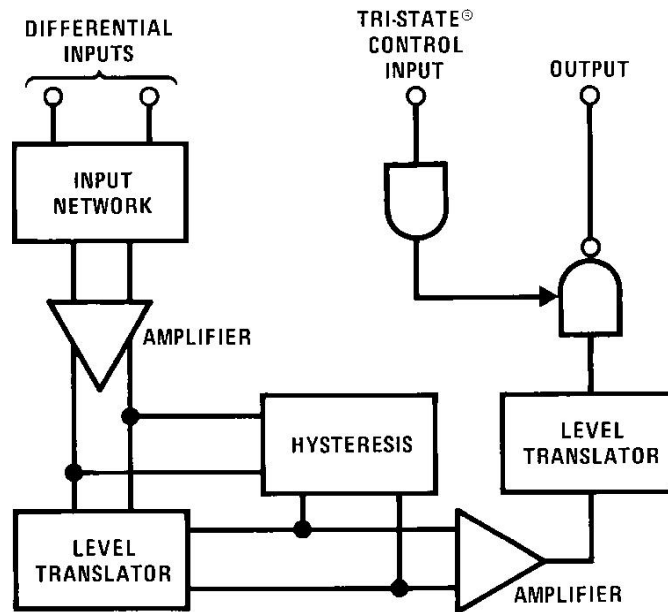
- Four independent receivers
- TRI-STATE outputs
- Internal hysteresis: 140 mV (typ)
- Fast propagation times : 19 ns (typ)
- TTL compatible outputs
- 5V supply
- Pin compatible and interchangeable with MC3486



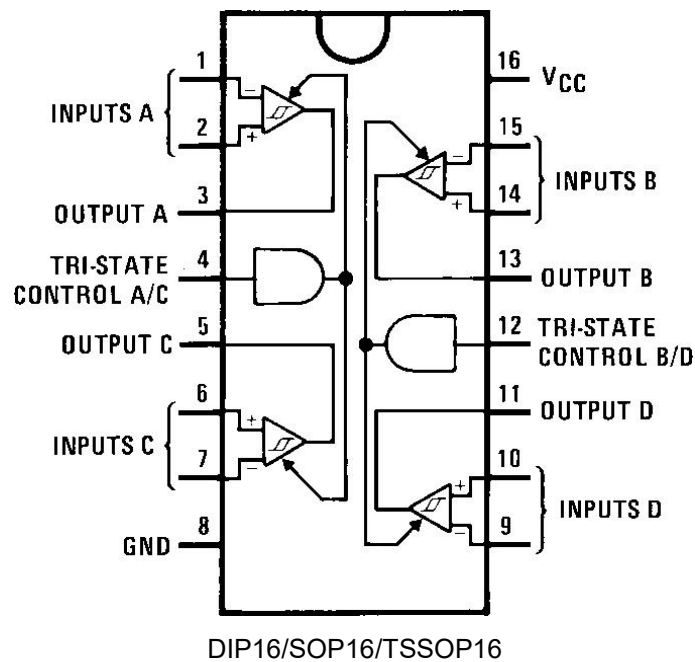
Ordering Information

DEVICE	Package Type	MARKING	Packing	Packing Qty
DS3486N	DIP-16	DS3486	TUBE	1000pcs/box
DS3486M/TR	SOP-16	DS3486	REEL	2500pcs/reel
DS3486MT/TR	TSSOP-16	DS3486	REEL	2500pcs/reel

Block and Connection Diagrams



Pin Assignments



Absolute Maximum Ratings (Note 2)

Parameter	Value	Unit
Power Supply Voltage, V_{CC}	8	V
Input Common-Mode Voltage, V_{ICM}	± 25	V
Input Differential Voltage, V_{ID}	± 25	V
TRI-STATE Control Input Voltage, V_I	8	V
Output Sink Current, I_O	50	mA
Storage Temperature, T_{STG}	-65 to +150	°C
Maximum Power Dissipation (Note 1) at 25°C Molded		
DIP Package	1362	mW
SOP Package	1002	mW
SOP Package Thermal Resistance		
θ_{JA}	+124.5	°C/W
θ_{JC}	+41.2	°C/W
Lead Temperature (Soldering, 10 seconds)	245	°C

Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

Operating Conditions

Parameter	MAX	MIN	Units
Power Supply Voltage, V_{CC}	4.75	5.25	V
Operating Temperature, T_A	0	70	°C
Input Common-Mode Voltage Range, V_{ICR}	-7.0	7.0	V

Note 1: Derate Dip molded package 10.2 mW/°C above 25°C. Derate SOP package 8.01 mW/°C above 25°C.

Electrical Characteristics (Note 3)

(Unless otherwise noted, minimum and maximum limits apply over recommended temperature and power supply voltage ranges. Typical values are for $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$ and $V_{IC} = 0\text{V}$.)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IH}	Input Voltage—High Logic State (TRI-STATE Control)		2.0			V
V_{IL}	Input Voltage—Low Logic State (TRI-STATE Control)				0.8	V
$V_{TH(D)}$	Differential Input Threshold Voltage	$-7\text{V} \leq V_{IC} \leq 7\text{V}$, V_{IH} TRI-STATE = 2V $I_O = -0.4\text{ mA}$, $V_{OH} \geq 2.7\text{V}$		0.070	0.2	V
		$I_O = 8\text{ mA}$, $V_{OL} \geq 0.5\text{V}$		0.070	-0.2	V
$I_{IB(D)}$	Input Bias Current	$V_{CC} = 0\text{V}$ or 5.25V, Other Inputs at 0V				
		$V_I = -10\text{V}$			-3.25	mA
		$V_I = -3\text{V}$			-1.50	mA
		$V_I = 3\text{V}$			1.50	mA
		$V_I = 10\text{V}$			3.25	mA
	Input Balance	$-7\text{V} \leq V_{IC} \leq 7\text{V}$, $V_{IH(3C)} = 2\text{V}$, (Note 5)				
		V_{OH} $I_O = -0.4\text{ mA}$, $V_{ID} = 0.4\text{V}$	2.7			V
		V_{OL} $I_O = 8\text{ mA}$, $V_{ID} = -0.4\text{V}$			0.5	V
I_{OZ}	Output TRI-STATE Leakage Current	$V_{I(D)} = 3\text{V}$, $V_{IL} = 0.8\text{V}$, $V_{OL} = 0.5\text{V}$			-40	μA
		$V_{I(D)} = -3\text{V}$, $V_{IL} = 0.8\text{V}$, $V_{OH} = 2.7\text{V}$			40	μA
I_{OS}	Output Short-Circuit Current	$V_{I(D)} = 3\text{V}$, V_{IH} TRI-STATE = 2V, $V_O = 0\text{V}$, (Note 4)	-15		-100	mA
I_{IL}	Input Current—Low Logic State (TRI-STATE Control)	$V_{IL} = 0.5\text{V}$			-100	μA
I_{IH}	Input Current—High Logic State (TRI-STATE Control)	$V_{IH} = 2.7\text{V}$			20	μA
		$V_{IH} = 5.25\text{V}$			100	μA
V_{IC}	Input Clamp Diode Voltage (TRI-STATE Control)	$I_{IN} = -10\text{ mA}$			-1.5	V
I_{CC}	Power Supply Current	All Inputs $V_{IL} = 0\text{V}$			85	mA

Note 2: “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The table of “Electrical Characteristics” provides conditions for actual device operation.

Note 3: All currents into device pins are shown as positive, out of device pins are negative. All voltages referenced to ground unless otherwise noted.

Note 4: Only one output at a time should be shorted.

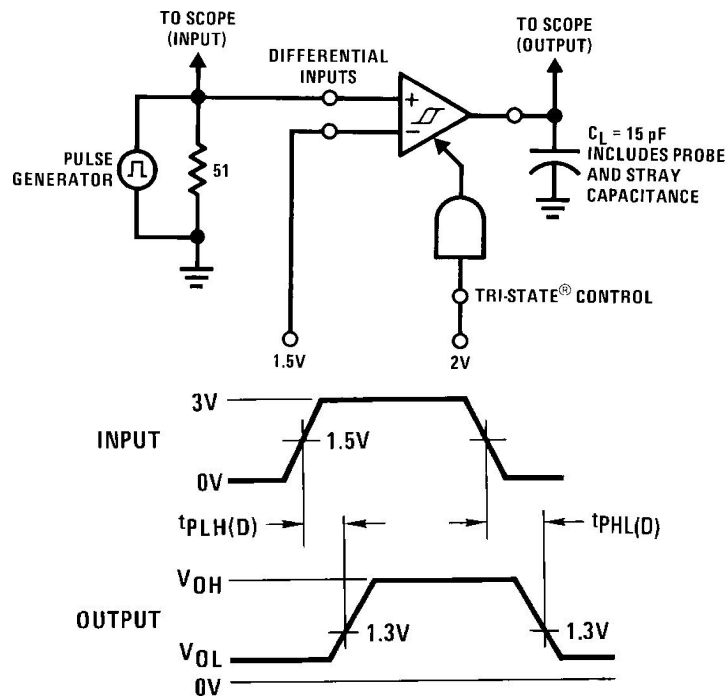
Note 5: Refer to EIA RS-422/3 for exact conditions.

Switching Characteristics

(Unless otherwise noted, $V_{CC} = 5V$ and $T_A = 25^\circ C$.)

Symbol	Parameter	Min	Typ	Max	Units
$t_{PHL(D)}$	Propagation Delay Time—Differential Inputs to Output Output High to Low		19	35	ns
$t_{PLH(D)}$	Output Low to High		19	30	ns
t_{PLZ}	TRI-STATE Control to Output Output Low to TRI-STATE		23	35	ns
t_{PHZ}	Output High to TRI-STATE		25	35	ns
t_{PZH}	Output TRI-STATE to High		18	30	ns
t_{PZL}	Output TRI-STATE to Low		20	30	ns

AC Test Circuit and Switching Time Waveforms

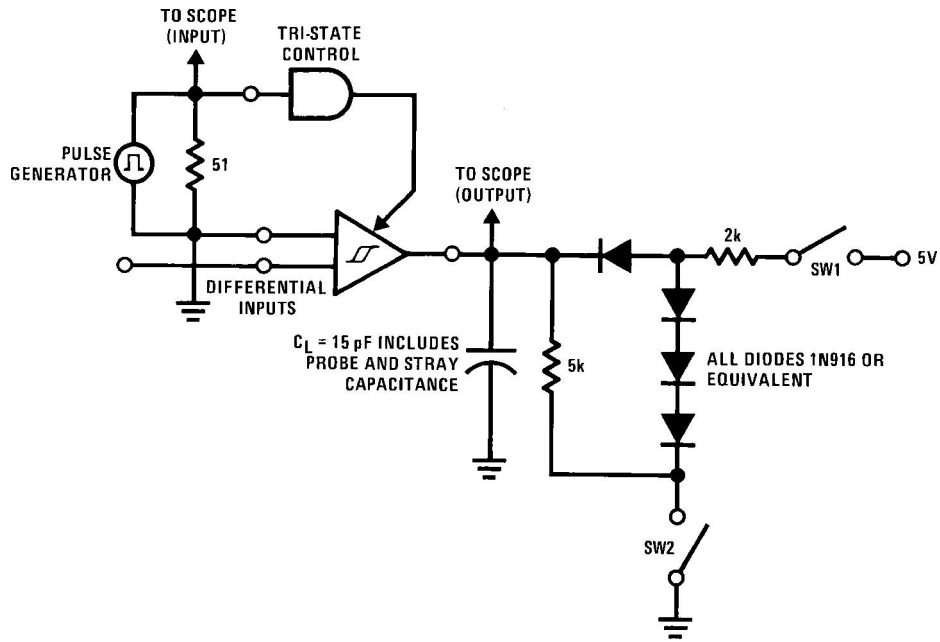


Input pulse characteristics:

$t_{TLH} = t_{THL} = 6 \text{ ns}$ (10% to 90%)

PRR = 1 MHz, 50% duty cycle

FIGURE 1. Propagation Delay Differential Input to Output



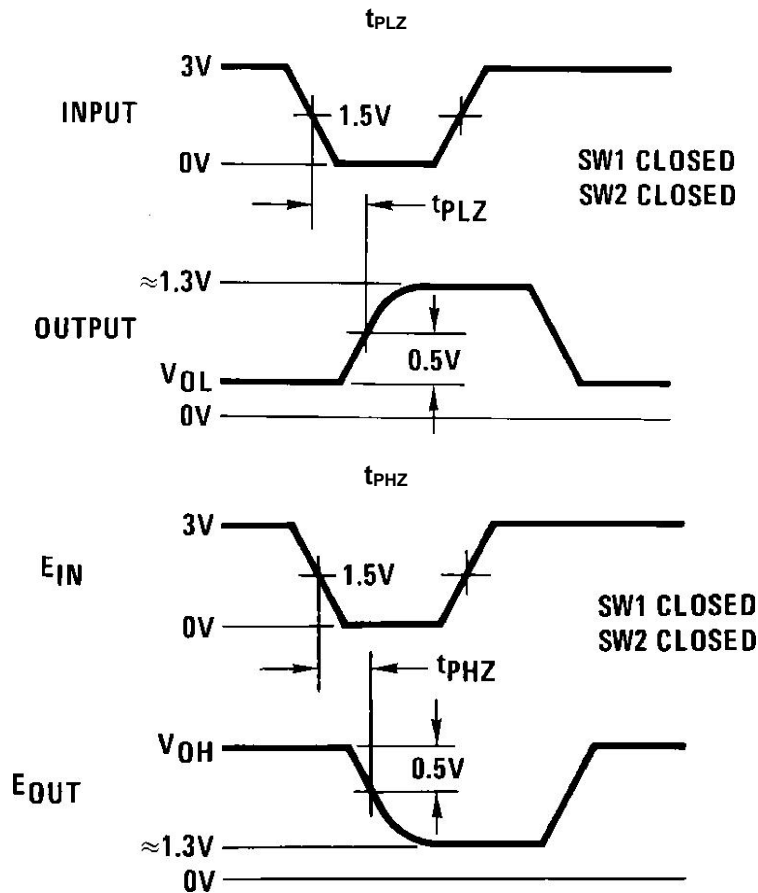
1.5V for t_{PHZ} and t_{PLZ}

1.5V for t_{PLZ} and t_{PZL}

Input pulse characteristics:

$t_{TLH} = t_{THL} = 6 \text{ ns}$ (10% to 90%)

PRR = 1 MHz, 50% duty cycle



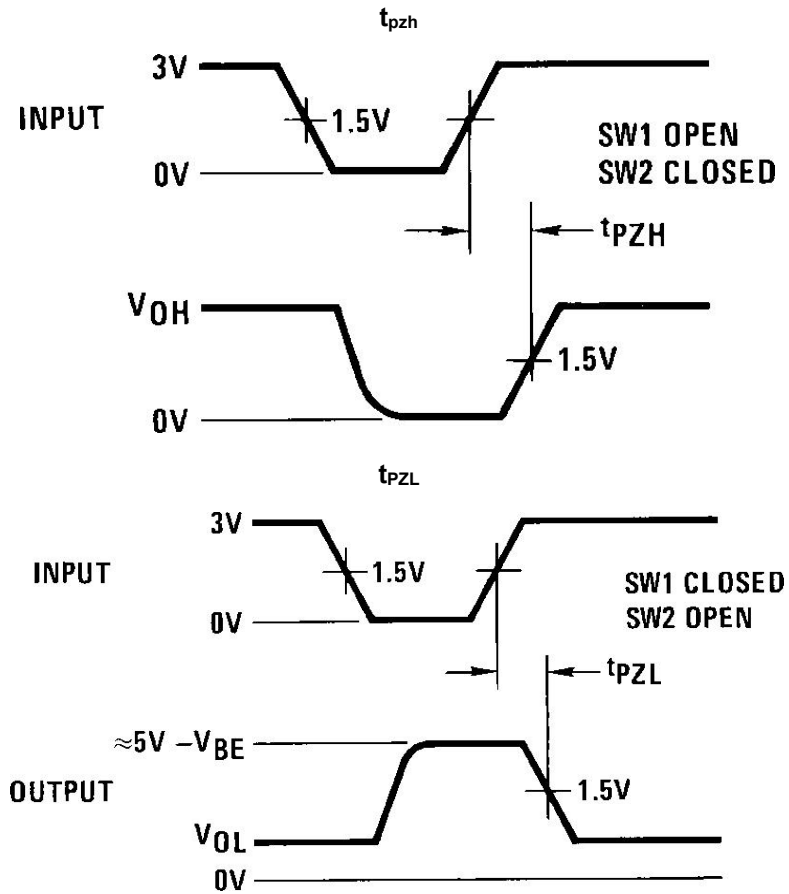
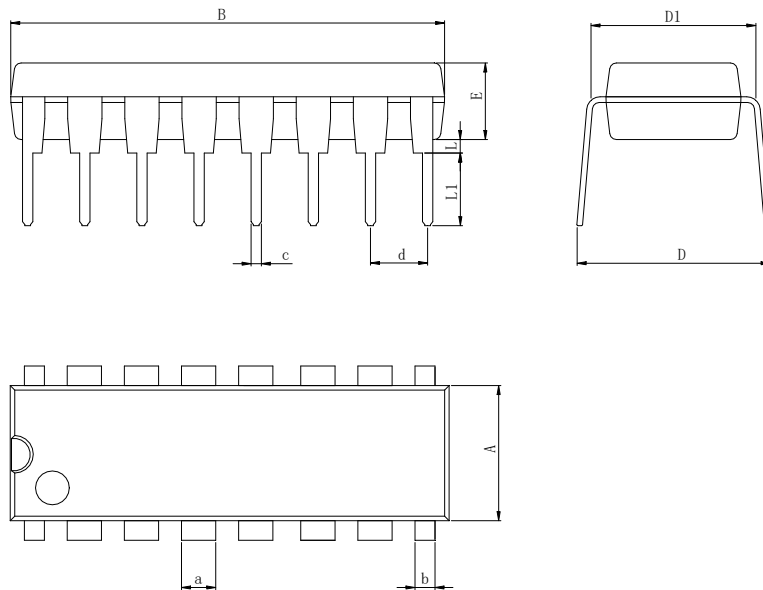


FIGURE 2. Propagation Delay TRI-STATE Control Input to Output

Physical Dimensions

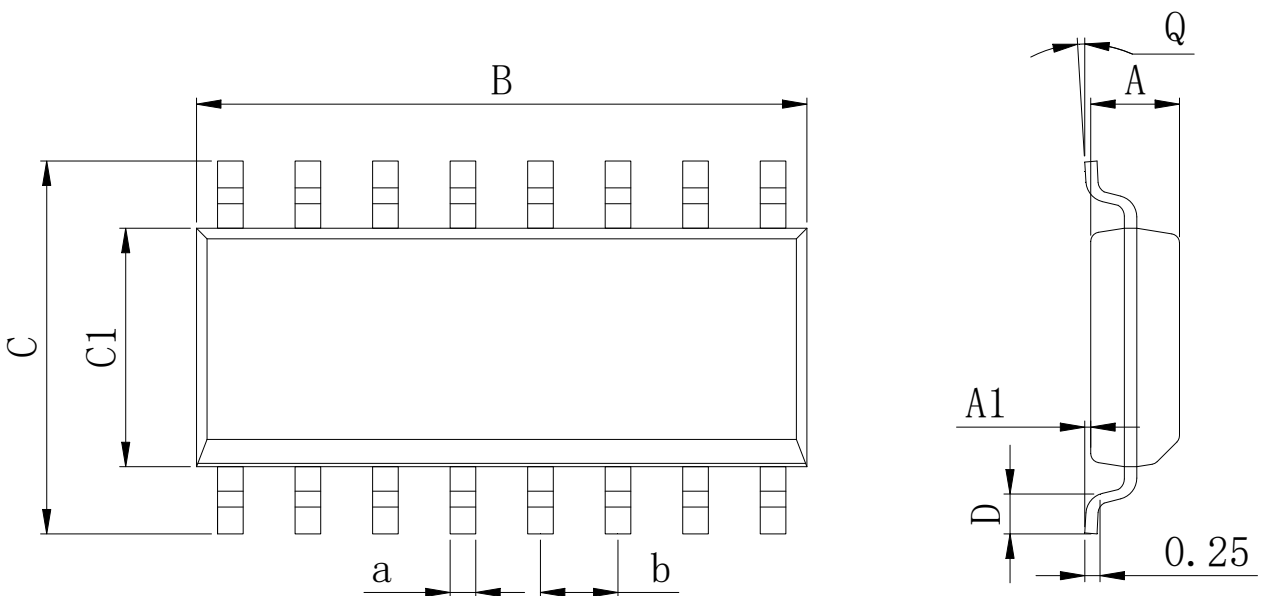
DIP-16



Dimensions In Millimeters(DIP-16)

Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

SOP-16

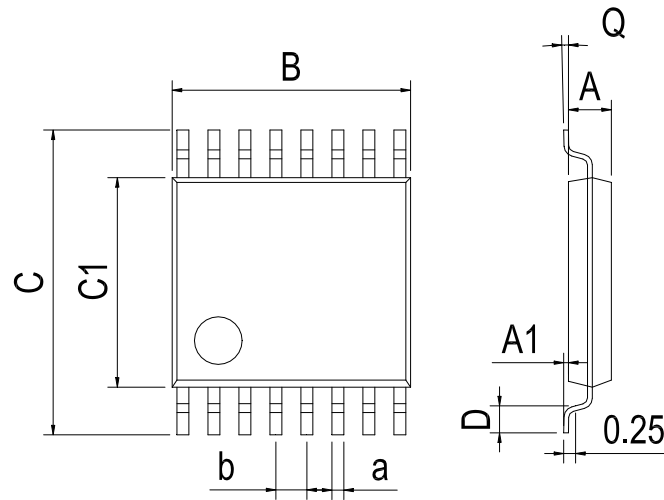


Dimensions In Millimeters(SOP-16)

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

Physical Dimensions

TSSOP-16



Dimensions In Millimeters(TSSOP-16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	

Revision History

DATE	REVISION	PAGE
2015-1-5	New	1-11
2023-9-11	Modify the package dimension diagram TSSOP-16、 Update encapsulation type、 Update Lead Temperature、 Updated DIP-16 dimension、 Add annotation for Maximum Ratings.	1、 3、 8、 9

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