

Features

- The PT8A9791 works as the encoder and the PT8A9792 works as the decoder
- Full functions of Forward, Backward, Left, Right, and OP1 and OP2
- 100% and 60% duty cycle pulse output control for Forward/Backward and Left/Right
- 50% duty cycle pulse output control for OP1, OP2
- Wide operation power supply: 3V - 12V
- SO (Serial Output) pin for external RF transmitter (PT8A9791)
- On-chip oscillator with an external resistor
- Few external components needed

General Description

The PT8A9791 and PT8A9792 is a pair of CMOS ICs designed for remote control toy car application. They have full functional keys for motion control of a remote control car, including forward, backward, left, right and 2 additional keys OP1 and OP2. Low Voltage CMOS technology is employed for the PT8A9791 and PT8A9792.

The function of OP1,OP2 is depicted in Table 3. Two additional control pins FBP and LRP of PT8A9791 for pulse effect control are described in Tables 4 and 5.

Ordering Information

Ordering Number	Package
PT8A9791P	14-Pin PDIP
PT8A9791W	14-Pin SOP
PT8A9792P	16-Pin PDIP
PT8A9792W	16-Pin SOP

Block Diagram

Figure 1. Block Diagram of PT8A9791

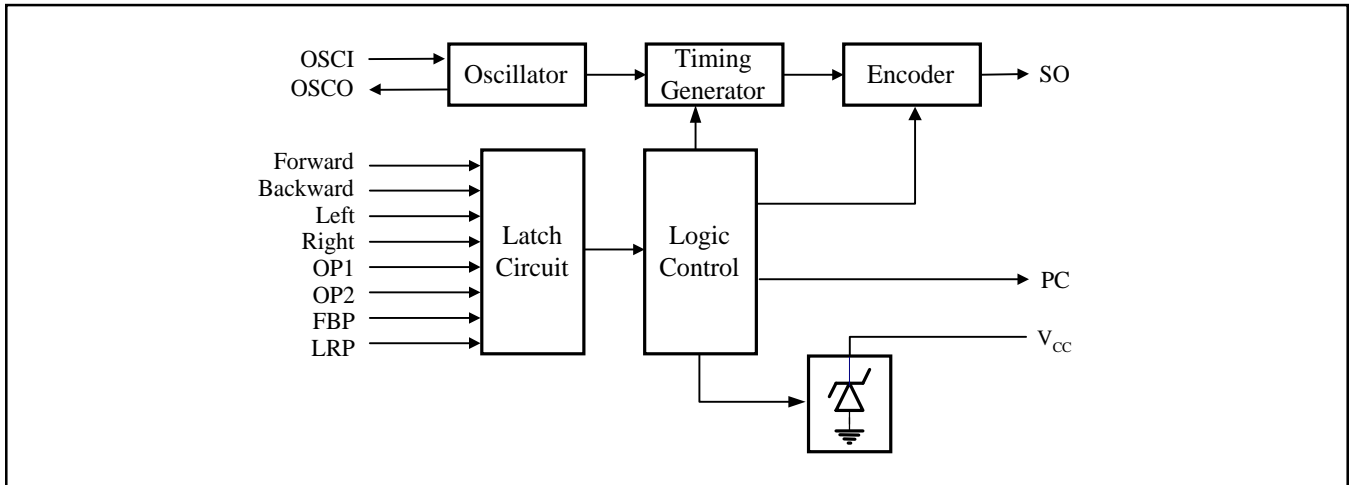
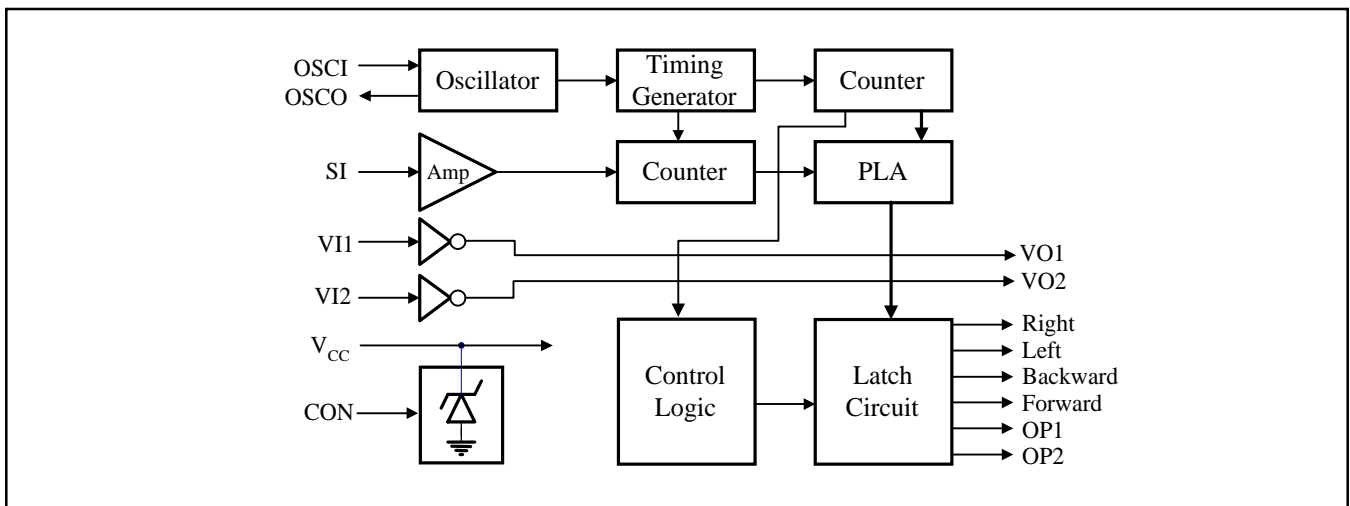
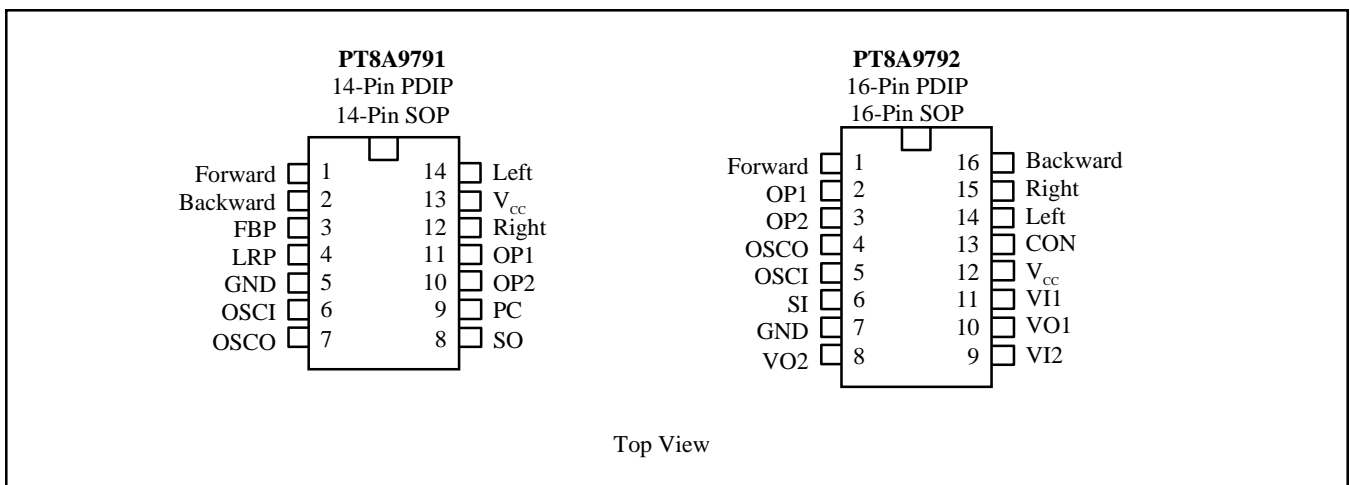


Figure 2. Block Diagram of PT8A9792



Package and Pin Assignment



Pin Description

Table 1. Pin Description of PT8A9791

Pin No	Pin Name	Type	Description
1	Forward	I	Forward function input, active high, built-in pull-down resistor
2	Backward	I	Backward function input, active high, built-in pull-down resistor
3	FBP	I	Pulse Mode Control input for PT8A9792's Forward and Backward, active high, built-in pull-down resistor (Details see Table 4)
4	LRP	I	Pulse Mode Control input for PT8A9792's Left and Right, active high, built-in pull-down resistor (Details see Table 5)
5	GND	GND	Ground
6	OSCI	I	Oscillator input pin
7	OSCO	O	Oscillator output pin
8	SO	O	Serial Data Output
9	PC	O	Power control output pin, active high
10	OP2	I	Option 2 Function input, active high, built-in pull-down resistor (See Table 3)
11	OP1	I	Option 1 Function input, active high, built-in pull-down resistor (See Table 3)
12	Right	I	Right function input, active high, built-in pull-down resistor
13	V _{CC}	Power	Power supply
14	Left	I	Left function input, active high, built-in pull-down resistor

Table 2. Pin Description of PT8A9792

Pin No	Pin Name	Type	Description
1	Forward	O	Forward output, active high or pulse output (Details see Table 4)
2	OP1	O	Option 1 Open Drain output, pulse output (Details see Table 3)
3	OP2	O	Option 2 Open Drain output, pulse output (Details see Table 3)
4	OSCO	O	Oscillator output
5	OSCI	I	Oscillator input
6	SI	I	Serial Data Input
7	GND	GND	Ground
8	VO2	O	Inverse Amplifier 2 output
9	VI2	I	Inverse Amplifier 2 input
10	VO1	O	Inverse Amplifier 1 output
11	VI1	I	Inverse Amplifier 1 input
12	V _{CC}	Power	Power Supply
13	CON	I	Shunt Regulator Control, enabled when high voltage, disabled when low voltage
14	Left	O	Turn Left output, active high or pulse output (Details see Table 5)
15	Right	O	Turn Right output, active high or pulse output (Details see Table 5)
16	Backward	O	Backward Output, active high or pulse output (Details see Table 4)

Table 3. OP1 and OP2 Functions

Input to PT8A9791		Output from PT8A9792	
OP1	OP2	OP1	OP2
High	Open	Pulse	Open
Open	High	Open	Pulse
High	High	Pulse	Pulse
Open	Open	Open	Open

Notes:

1. OP1 and OP2 are open drain.
2. Pulse = 125Hz ($f_{osc} / 1024$) in 50% duty cycle
3. When OP1 and OP2 are both active, the output pulse is opposite phase.

Table 4. FBP Functions

Input to PT8A9791			Output from PT8A9792	
FBP	Forward	Backward	Forward	Backward
Open	Open	Open	Low	Low
Open	High	Open	High	Low
Open	Open	High	Low	High
High	Open	Open	Low	Low
High	High	Open	Pulse	Low
High	Open	High	Low	Pulse

Table 5. LRP Functions

Input to PT8A9791			Output from PT8A9792	
LRP	Right	Left	Right	Left
Open	Open	Open	Low	Low
Open	High	Open	High	Low
Open	Open	High	Low	High
High	Open	Open	Low	Low
High	High	Open	Pulse	Low
High	Open	High	Low	Pulse

Maximum Ratings

(Above which the useful life may be impaired. For user guidelines, not tested)

Storage Temperature	-20°C to +85°C
Ambient Temperature with Power Applied	-10°C to +70°C
Supply Voltage to Ground Potential (Inputs & V _{CC} Only)	-0.5 to +12V
Supply Voltage to Ground Potential (Outputs & D/O Only)	-0.5 to +12V
DC Input Voltage	-0.5 to +12V
DC Output Current	20mA
Power Dissipation	500mW

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operation Conditions

Table 6. Recommended Operation Conditions

Sym	Description	Min	Typ	Max	Units
V _{BAT}	Battery Pack Voltage	2.0	-	9.6	V
I _{VR}	Shunt Regulator Operating Current	0.5	-	20	mA
V _{IH}	Input HIGH Voltage	0.7V _{CC}	-	V _{CC}	V
V _{IL}	Input LOW Voltage	0	-	0.3V _{CC}	V
f _{OSC}	Oscillator Frequency	-	128	-	kHz
T _A	Operation Temperature	-10	-	55	°C

DC Electrical Characteristics

Table 5. DC Electrical Characteristics of PT8A9791

Sym	Description	Test Conditions	Min	Typ	Max	Units
V_R	Shunt Regulator Voltage	$T_A = 25^\circ\text{C}$, $I_{VR} = 0.5 - 20\text{mA}$	2.7	-	3.3	V
I_{OH}	Output HIGH Current - PC Pin	$V_{OH} = 2.5\text{V}$	-1.5	-	-	mA
	Output HIGH Currentl - SO Pin		-2.0	-	-	mA
	Output HIGH Current - OSCO Pin		-0.5	-	-	mA
I_{OL}	Output LOW Current - PC Pin	$V_{OL} = 0.5\text{V}$	0.5	-	-	mA
	Output LOW Current - SO Pin		1.5	-	-	mA
	Output LOW Current - OSCO Pin		0.3	-	-	mA
I_{IH}	Input HIGH Current - OSCI Pin	$V_{IH} = V_{CC}$	-	-	10	uA
	Input HIGH Current - Forward, Backward, Left, Right, OP1, OP2, FBP and LRP Pins		-	-	35	uA
I_{IL}	Input LOW Current - Forw, Back, Left, Right, FBP, LRP, OP1 and OP2 Pins	$V_{IL} = 0\text{V}$	-	-	± 1	uA
	Input LOW Current - OSCI Pin		-	-	-10	uA

Note: These specifications apply for $V_{CC} = 3.0\text{V}$ and $T_A = 25^\circ\text{C}$, unless otherwise specified.

Table 6. DC Electrical Characteristics of PT8A9792

Sym	Description	Test Conditions	Min	Typ	Max	Units
V_R	Shunt Regulator Voltage	$T_A = 25^\circ\text{C}$, $I_{VR} = 0.5 - 20\text{mA}$	2.7	-	3.3	V
I_{OH}	Output HIGH Current - VO1 and VO2 Pins	$V_{OH} = 2.5\text{V}$	-0.1	-	-	mA
	Output HIGH Current - OSCO Pin		-0.5	-	-	mA
	Output HIGH Current - Forw, Back, Left and Right Pins		-1.5	-	-	mA
I_{OL}	Output LOW Current - VO1 and VO2 Pins	$V_{OL} = 0.5\text{V}$	0.1	-	-	mA
	Output LOW Current - Forw, Back, Left, Right, OP1 and OP2 Pins		0.5	-	-	mA
	Output LOW Current - OSCO pin		0.3	-	-	mA
I_{IH}	Input HIGH Current - SI Pin	$V_I = V_{CC}$	-	-	35	μA
	Input HIGH Current - OSCI, VI1 and VI2 Pins		-	-	10	μA
	Input HIGH Current - CON Pin		-	-	± 1	μA
I_{IL}	Input LOW Current - SI Pin	$V_I = 0\text{V}$	-	-	-35	μA
	Input LOW Current - OSCI, VI1 and VI2 Pins		-	-	-10	μA
	Input LOW Current - CON Pin		-	-	± 1	μA

Note: These specifications apply for $V_{CC} = 3.0\text{V}$ and $T_A = 25^\circ\text{C}$, unless otherwise specified.

AC Electrical Characteristics

Sym	Description	Test Conditions	Min	Typ	Max	Units
f_{osc} (PT8A9791)	Oscillator Frequency	$V_{CC} = 3.0\text{V}$, $T_A = 0 - 70^\circ\text{C}$, $R_f = 200\text{k}\Omega$	102	128	154	kHz
f_{osc} (PT8A9792)	Oscillator Frequency	$V_{CC} = 3.0\text{V}$, $T_A = 0 - 70^\circ\text{C}$, $R_f = 200\text{k}\Omega$	102	128	154	kHz

Figure 5. Typical Application Circuit 1 of PT8A9791

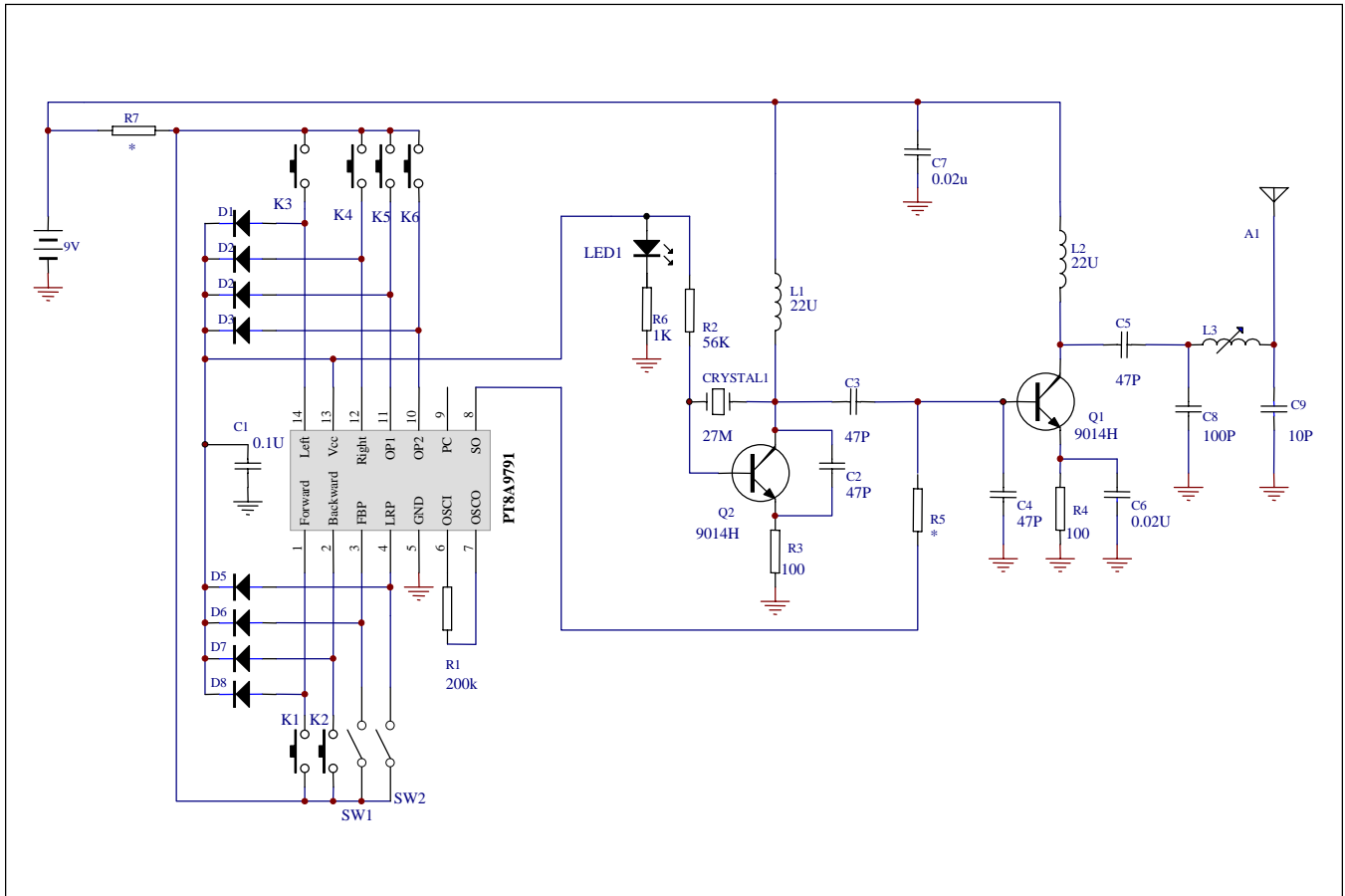
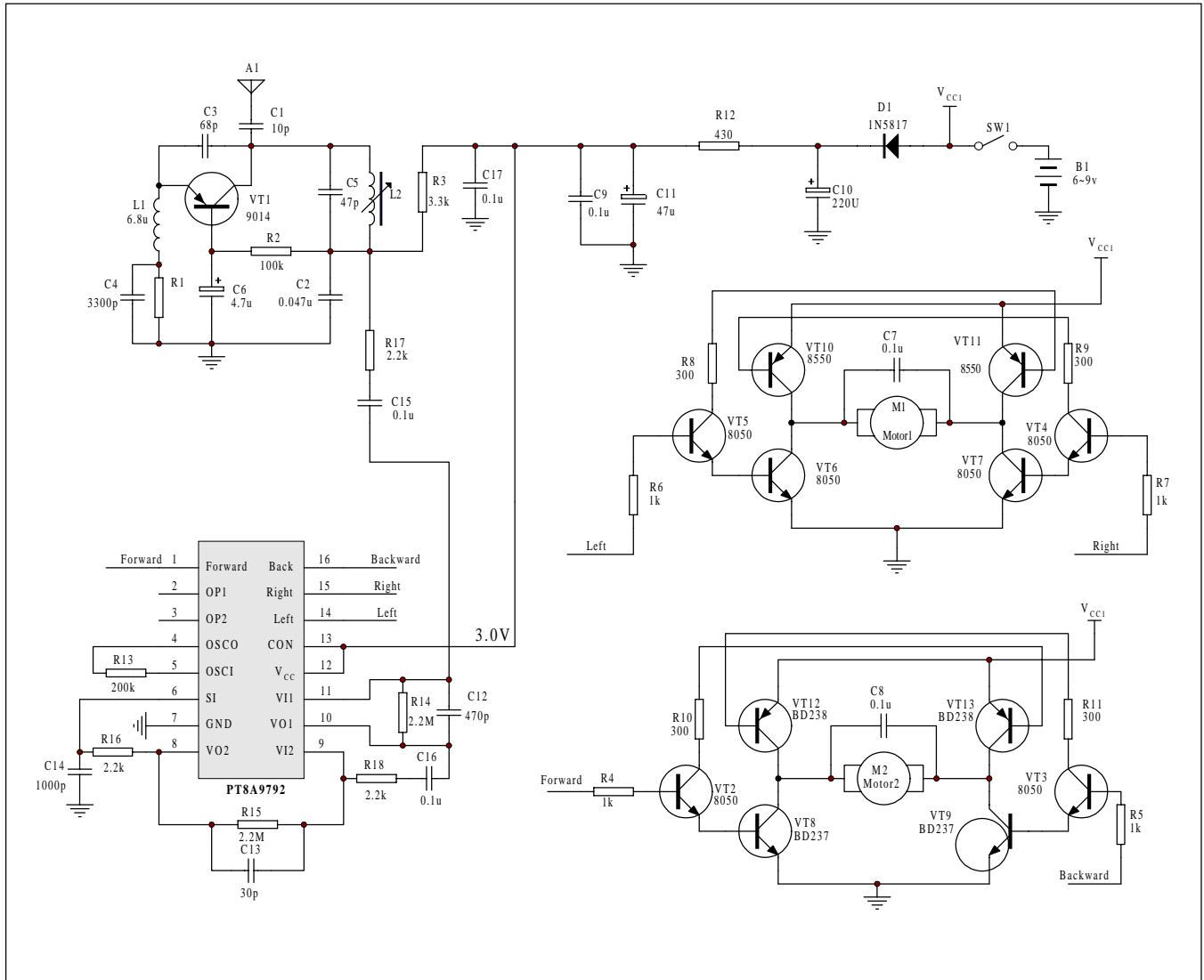


Figure 6. Typical Application Circuit of PT8A9792



Notes

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