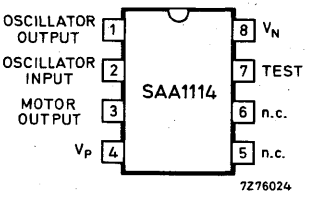
4 MHz CLOCK CIRCUITS

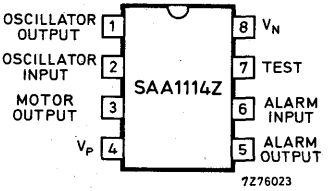
The SAA1114 is a C-MOS integrated circuit, particularly suited for crystal controlled clocks powered by a single battery.
It contains an oscillator, a 22-stage frequency divider and a driver for a unipolar stepper motor.
With an oscillator frequency of 4,1943 MHz, the output is a 1 Hz pulse of 31,25 ms duration with a current sinking capability of minimum 6 mA.
The SAA1114Z is the same circuit, but has in addition an alarm output signal.

Features

- Oscillator frequency: 4 MHz
- Output for unipolar stepper motor
- Single battery power supply
- Current consumption: typ. 50 μA
- Output signal for alarm (SAA1114Z only)

CONNECTION DIAGRAMS



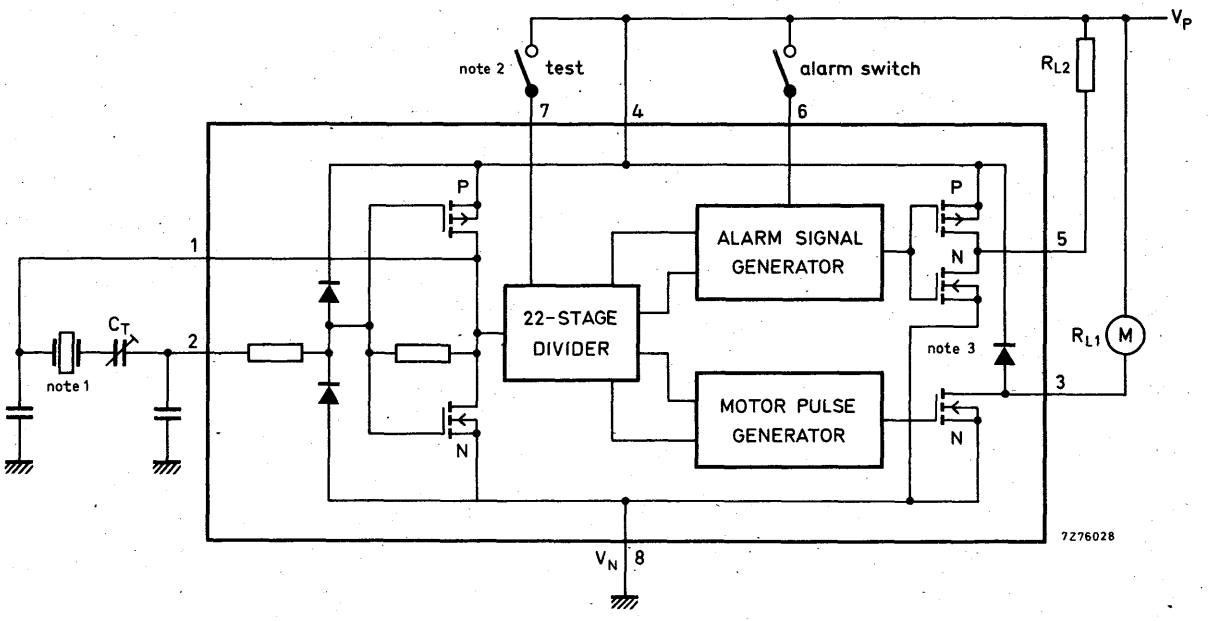


Note

The SAA1114 is internally protected against electrostatic damage. However, to be totally safe, it is desirable to take handling precautions into account.

PACKAGE OUTLINE plastic 8-lead dual in-line (see general section).

BLOCK DIAGRAM



Notes

1. Recommended crystal: 4322 143 03111; trimmer: 2222 808 32409.
2. Connecting the test terminal (pin 7) to V_P speeds up the output by a factor 128 for rapid testing. No connection is necessary for normal operation, due to an internal pull-down.
3. A built-in clamping diode between the motor output and V_P acts as a current by-pass if the induced voltage of the stepper motor exceeds 0,6 V.

RATINGS Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage (V_N = 0)	V_P	max.	3	V
Input voltage (all inputs)			V_N to V_P	
Motor output current (pin 3)	$\pm I_3$	max.	50	mA
Operating ambient temperature	T_{amb}		−20 to +70	°C
Storage temperature	T_{stg}		−30 to +100	°C

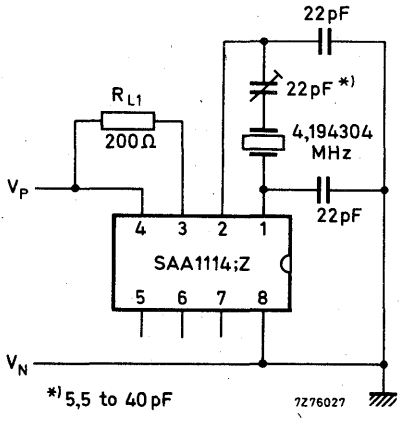
CHARACTERISTICS at V_P = 1,5 V; V_N = 0; f_o = 4,194 MHz; T_{amb} = 25 °C unless otherwise specified

Supply voltage range	V_P	>	1,2 to 1,7	V
		typ.	1,0 to 3,0	V
Supply current at $R_{L1} = \infty$	I_P	typ.	50	μA
		<	120	μA
Motor output frequency (see timing diagram)	f_1	typ.	1	Hz
Pulse width of motor output	t_1	typ.	31,25	ms
Voltage drop across output transistor at R_{L1}=200Ω	V_{o1}	typ.	80	mV
		<	200	mV
Stability of oscillator at ΔV_P = 100 mV	$\Delta f/f_o$	typ.	$0,2 \times 10^{-6}$	

The following characteristics apply to the SAA1114Z only (with additional alarm output).

Duration of alarm signal; pin 6 at V_P	T_3	typ.	4	s
Repetition of alarm signal; pin 6 at V_P	T_2	typ.	32	s
Frequency of alarm signal (50% duty cycle)	f_2	typ.	256	Hz
Voltage drop across alarm output at R_{L2} = 1 kΩ	V_{o2}	typ.	100	mV
		<	250	mV

Test circuit



TIMING DIAGRAMS