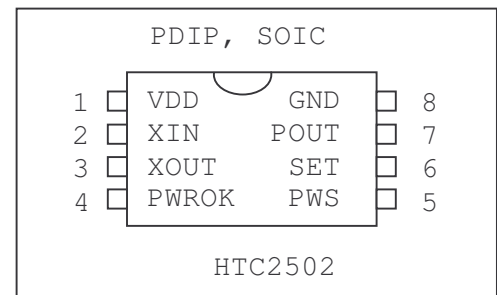


Analog clock motor controller

HTC2503 is an analog clock controller IC. It is designed to replace clock driver chips in wall mount clocks. Its versatile design allows it to be used in a range of clock applications, ranging from simple wall clocks to centralized clock controllers for

distributed clock systems. HTC2503 generates a single pulse every minute for driving a unidirectional stepping motor found in most wall mount clock designs. This stepping motor is mechanically connected to the minute hand of the clock, in such a way that the minute hand will rotate once per sixty rotations of a stepping motor. The hour hand is mechanically coupled with the minute hand in a way that the hour hand makes one rotation per twelve rotations of the minute hand. The similarities with conventional clock controllers end here. HTC2503 will generate an output pulse only if the main power is operational. In case of a main power failure it will accumulate pulses using the backup power to keep time. In this mode HTC2503 consumes the least amount of power. Once the Main power is restored, HTC2503 will perform calculations on the necessary adjustment value and deliver a pulse train to the stepping motor to adjust the time. We utilize our micro RTOS in this design.



Features:

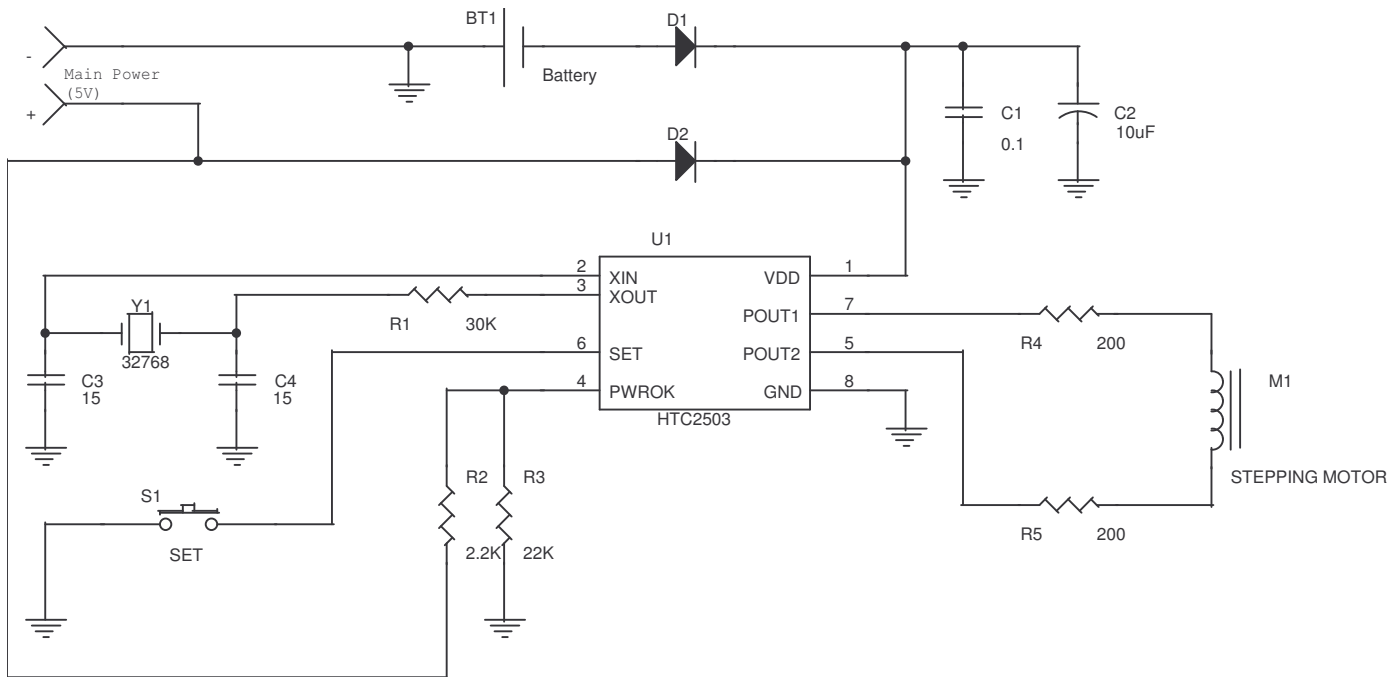
- Operates using a widely available and low power precision 32768Hz crystal
- Supports backup power supply in case of main power failure
- Simple intuitive interface for adjusting clock
- Minimum external components

Pin out Description

Abbreviations used: O - output, I - input, P – power

Pin number	Name	I / O	Description	Notes
1	VDD	P	Power input	+2.5 to +6V
2	XIN	I	Crystal input	Crystal oscillator input
3	XOUT	O	Crystal output	Crystal oscillator output
4	PWROK	I	Power ok input	Connected to main power via resistor
5	POUT2	I	Pulse output	Can deliver up to 25mA to load, use external driver if more current needed.
6	SET	I	Switch input	De-bounced switch input for time adjustment
7	POUT1	O	Pulse output	Can deliver up to 25mA to load, use external driver if more current is needed.
8	GND	P	Ground	Connects to power ground

2.0 Typical Connection Diagram



Functional Description

HTC2503 will generate a 30mS pulse every minute if the main power is operational. In case of a main power failure, HTC2503 starts accumulating pulses while operating from a backup power supply. Power consumption in this mode is minimal. As soon as the main power is restored, HTC2503 will send a train of pulses (2 pulses per second) to the stepping motor to adjust the time. Please note that before generating each pulse, main power is checked. This insures reliable and worry free operation. The Set key input is provided to setup the time while main power is operational. The Set key input option is ignored if the main power supply is down or during the clock's adjustment after main power is restored.

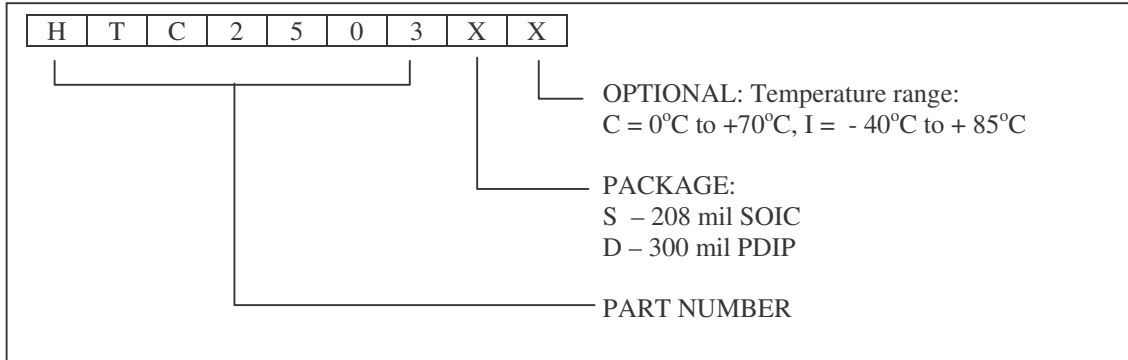
Electrical Characteristics

Power consumption during normal operation is about 0.26mA. This depends on the crystal used and operating voltage. Operational Voltage (Voltage between VDD and GND pin) should be in the range of 3V to 5.5V. Power consumption in the power down mode is about 35uA.



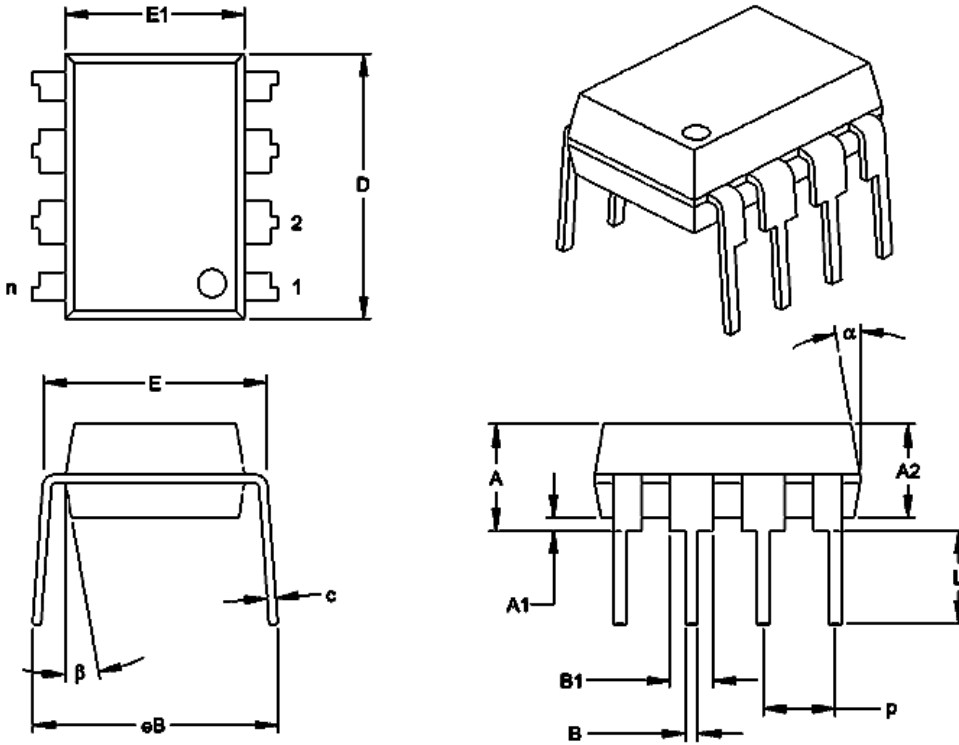
Ordering Information

When ordering, please use the part numbering scheme below.



Mechanical Information

8-Lead Plastic Dual In-line (P) – 300 mil (PDIP)



Units		INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Number of Pins	n		8		8		
Pitch	p		.100		2.54		
Top to Seating Plane	A	.140	.155	.170	3.56	3.94	4.32
Molded Package Thickness	A2	.115	.130	.145	2.92	3.30	3.68
Base to Seating Plane	A1	.015			0.38		
Shoulder to Shoulder Width	E	.300	.313	.325	7.62	7.94	8.26
Molded Package Width	E1	.240	.250	.260	6.10	6.35	6.60
Overall Length	D	.360	.373	.385	9.14	9.46	9.78
Tip to Seating Plane	L	.125	.130	.135	3.18	3.30	3.43
Lead Thickness	c	.008	.012	.015	0.20	0.29	0.38
Upper Lead Width	B1	.045	.058	.070	1.14	1.46	1.78
Lower Lead Width	B	.014	.018	.022	0.36	0.46	0.56
Overall Row Spacing	eB	.310	.370	.430	7.87	9.40	10.92
Mold Draft Angle Top	α	5	10	15	5	10	15
Mold Draft Angle Bottom	β	5	10	15	5	10	15

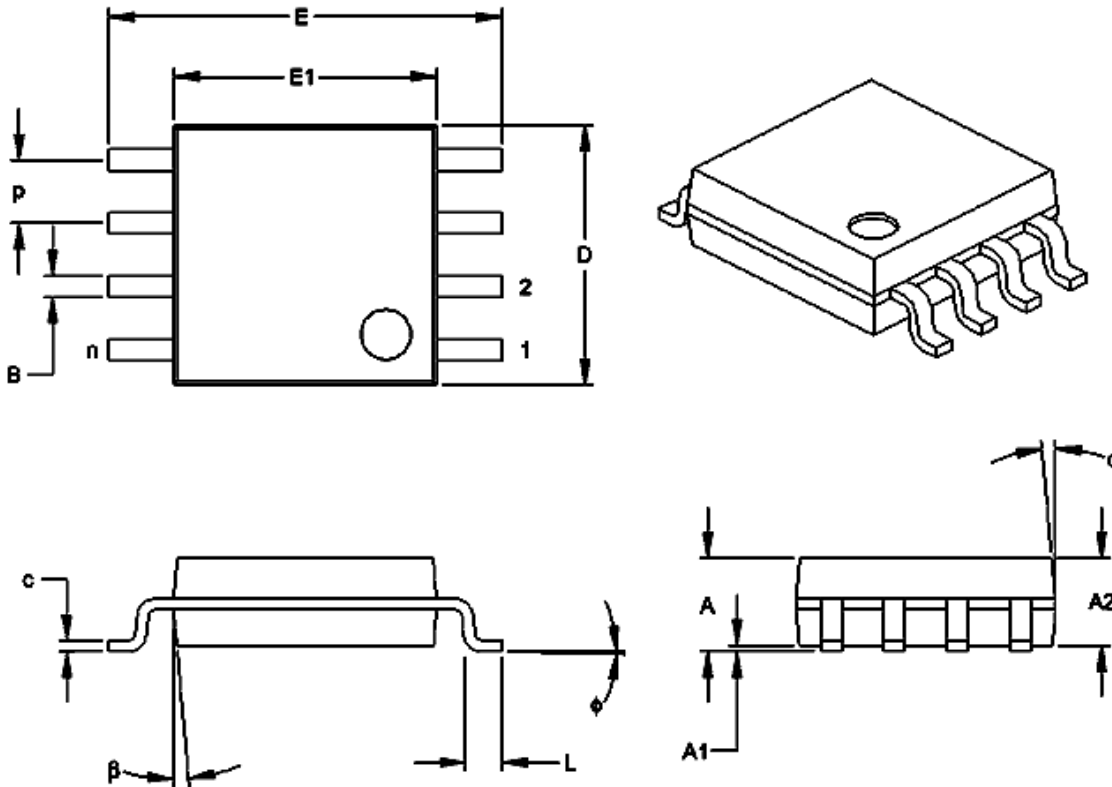
*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shall not exceed .010" (0.254mm) per side.

JEDEC Equivalent:MS-001

8-Lead Plastic Small Outline (SM) – Medium, 208 mil (SOIC)



Units		INCHES*			MILLIMETERS		
		MIN	NOM	MAX	MIN	NOM	MAX
Dimension Limits							
Number of Pins	n		8			8	
Pitch	P		.050			1.27	
Overall Height	A	.070	.075	.080	1.78	1.97	2.03
Molded Package Thickness	A2	.069	.074	.078	1.75	1.88	1.98
Standoff	A1	.002	.005	.010	0.05	0.13	0.25
Overall Width	E	.300	.313	.325	7.62	7.95	8.26
Molded Package Width	E1	.201	.208	.212	5.11	5.28	5.38
Overall Length	D	.202	.205	.210	5.13	5.21	5.33
Foot Length	L	.020	.025	.030	0.51	0.64	0.76
Foot Angle	ϕ	0	4	8	0	4	8
Lead Thickness	c	.008	.009	.010	0.20	0.23	0.25
Lead Width	B	.014	.017	.020	0.36	0.43	0.51
Mold Draft Angle Top	α	0	12	15	0	12	15
Mold Draft Angle Bottom	β	0	12	15	0	12	15

*Controlling Parameter

Notes:

Dimensions D and E1 do not include mold flash protrusions. Mold flash or protrusions shell should not exceed .010" (0.254mm) per side.



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