



CLOCK WITH INDOOR / OUTDOOR TEMPERATURE

THERMOMETER	°F °C
M82370A	

FEATURES

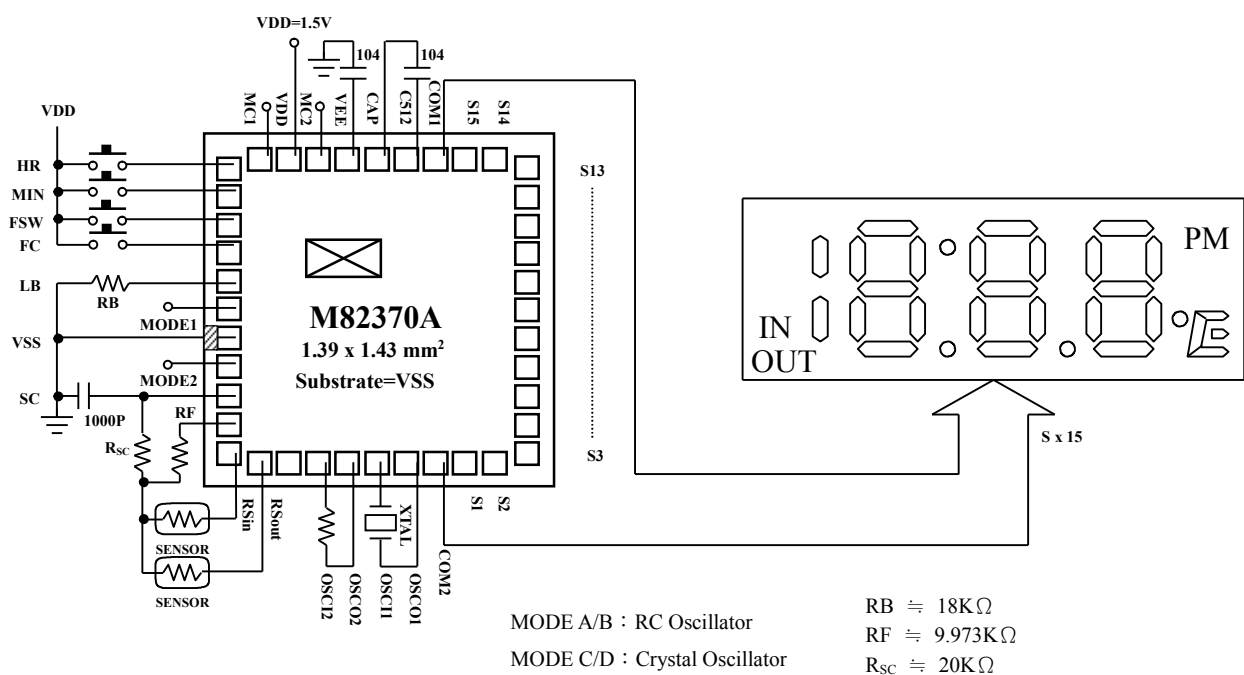
- Temperature Range : $-50.0^{\circ}\text{C} (-58.0^{\circ}\text{F}) \sim 70.0^{\circ}\text{C} (158.0^{\circ}\text{F})$
- Resolution :
 Temperature $> -20^{\circ}\text{C} (^{\circ}\text{F})$ Resolution $0.1^{\circ}\text{C} (^{\circ}\text{F})$
 Temperature $\leq -20^{\circ}\text{C} (^{\circ}\text{F})$ Resolution $1^{\circ}\text{C} (^{\circ}\text{F})$
- Accuracy : $\pm 1^{\circ}\text{C} (\pm 2^{\circ}\text{F})$
- Clock : 12:00~11:59 , 12:00(Pm)~11:59(PM)
- FSW : Select Power On 、 Power Off 、 Outdoor 、 Indoor And Clock
- FC : $^{\circ}\text{C}$ Or $^{\circ}\text{F}$ Function Select , Default $^{\circ}\text{C}$
- Low Voltage Detect : $1.35 \pm 0.05\text{V}$

ELECTRICAL CHARACTERISTICS

(@ $V_{DD}=1.5\text{V}$ unless otherwise specified)

Characteristics	Sym.	Min.	Typ.	Max.	Unit	REMARKS
Operating Voltage	V_{DD}	1.3	1.5	1.65	V	
Operating Current	I_{OP}	—	—	70	μA	Crystal
Quiescent Current	I_{SB}	—	—	1.5	μA	Crystal
Operating Current	I_{OP}	—	—	80	μA	RC
Quiescent Current	I_{SB}	—	—	0.5	μA	RC
Oscillator Frequency	F_{OSC}	—	32	—	KHz	$R_{osc}=620\text{K}\Omega$
Oscillator Frequency	F_{SC}	—	59	—	KHz	$R_F=9.973\text{K}\Omega, C=1000\text{P}, R_{sc}=20\text{K}\Omega$
Oscillator Frequency	F_{XTAL}	—	32,768	—	Hz	Crystal
Operating Temperature	Temp.	0	25	60	$^{\circ}\text{C}$	

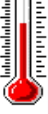
APPLICATION DIAGRAM



* All specs and applications shown above subject to change without prior notice.



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SPECIFICATION

- M82370A Is For Indoor And Outdoor Thermometer And Clock Display IC.

Temperature Range : -50.0°C (-58.0°F) ~ 70.0°C (158.0°F)

Clock : 12:00~11:59, 12:00(PM) ~11:59(PM)

- 2 Set Sensor (103 AT) , For Both Indoor And Outdoor Temperature Measurement.
- Pad Option , Select Indoor , Outdoor Temperature Display Function :

MODE	MODE 1	MODE 2	FUNCTION
A	1	1	INDOOR (DEFAULT) (RC Oscillator)
B	1	0	INDOOR , OUTDOOR (RC Oscillator)
C	0	1	INDOOR , CLOCK (CRYSTAL Oscillator)
D	0	0	INDOOR , OUTDOOR , CLOCK (CRYSTAL Oscillator)

MODE A : Power Off →LCD Full Display → Indoor

MODE B : Power Off →LCD Full Display → Indoor → Outdoor

MODE C : Power Off →LCD Full Display → Indoor → Clock

MODE D : Power Off →LCD Full Display → Indoor → Outdoor → Clock

- Power On , LCD Full Display 2 Seconds , Displays The Current Indoor Temperature , LCD Full Display 2 Seconds Press FSW Not Change MODE.
- Low-Voltage Detection : Low Voltage LCD Display 1 Hz Blinking Battery voltage Is Lower , Measurements May Be Inaccurate. Unless Power Off Again After Power On.
- °C Or °F Function Select Pad , Connect To VDD : °C , Connect To VSS : LCD Display °F Function
- Select The Thermistor Sample Cycle

MC1	MC2	Sample Cycle(Sec)
0	0	10
1	0	5
0	1	2
1	1	1

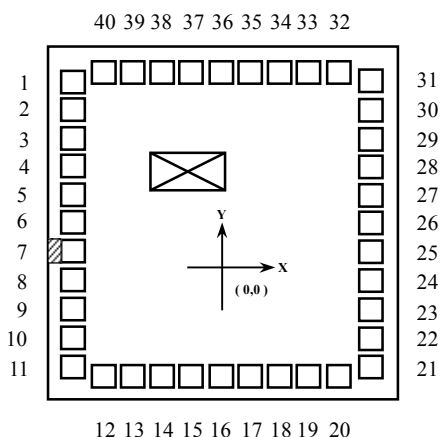
- If Press FSW More Than 4 Seconds Then Power Off , In Which Case LCD Do Not Display , Temperature Is Not Measured Clock Time To Count.
- If The Temperature During The Measurement $\geq 70^{\circ}\text{C}$ (158°F) , LCD Display H °C (°F).
- If The Temperature During The Measurement $< -50^{\circ}\text{C}$ (-58°F) , LCD Display L °C (°F).
- Clock Display : “ HR : MIN ” And ” : ” 1 Hz Flash.
- Clock Setting: MODE Toggle The Display To Clock
 - Hour Setting (HR) : Press A Time LCD Displays Increase 1 Hours , More Than 12 Displays ” PM ” And From The 1 Continue Counting .
 - Minutes Setting (MIN) : Press A Time LCD Display Increase 1 Minutes , More Than 59 From 0 Continue Counting.
 - Press And Hold The HR Or MIN SW More Than 2 Seconds , LCD Display 4 Hz Continuous Frequency To Add 1 Until Release SW.



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PAD ASSIGNMENT & POSITION

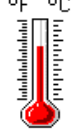


PAD DESCRIPTION

NO.	Pin Name	Type	Description
1	HR	I	Pull Low is Used For Setting HOURS
2	MIN	I	Pull Low Is Used For Setting Minutes
3	FSW	I	Pull Low ,Push Switch To Select The LCD Display Function
4	FC	I	LCD Display °C Or °F Function Select Pad ,Connect To VDD Or VSS Connect To VDD : LCD Display °C Function Connect To VSS : LCD Display °F Function
5	LB	I	For The Low Voltage Detected
6	MODE1	I	Select Indoor, Outdoor Temperature And Clock Display Function Of Pin 6, 8.
7	VSS	I	VSS Power Pin
8	MODE2	I	Select Indoor, Outdoor Temperature. Display Function
9	SC	I	Reference And Sensor Frequency Input Pin. The Reference And Sensor Frequency Generator Consists Of Pin 9,10,11,12.
10	RF	I	Nmos Open Drain ,Connect To The Reference Resistance
11	RSIN	I	Nmos Open Drain ,Connect To The Indoor Sensor
12	RSOUT	I	Nmos Open Drain, Connect To The Outdoor Sensor.
13	TEST	I	Test Pin, For Ic Test Only.
14	OSCI2	I	The System Frequency Input Pin For Mode A, B.
15	OSCO2	O	The System Frequency Output Pin For Mode A, B.
16	OSCI1	I	He System Frequency Input Pin For Mode C, D.
17	OSCO1	O	The System Frequency Output Pin For Mode C, D.
18	COM2	O	Output Pin, Connect To LCD Com2 Pin
19~33	S1~S15	O	Connect To LCD Seg1~ Seg15 Pin.
34	COM1	O	Connect To LCD Com1 Pin.
35	C512	I	For LCD Double Voltage To 3V.
36	CAP	I	For LCD Double Voltage To 3V.
37	VEE	I	For LCD Double Voltage To 3V.
38	MC2	I	Select The Thermistor Sample Cycle Consists Of Pin 38,40
39	VDD		VDD Power Pin ,VDD Is 1.5 V
40	MC1	I	Select The Thermistor Sample Cycle



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PAD COORDINATES

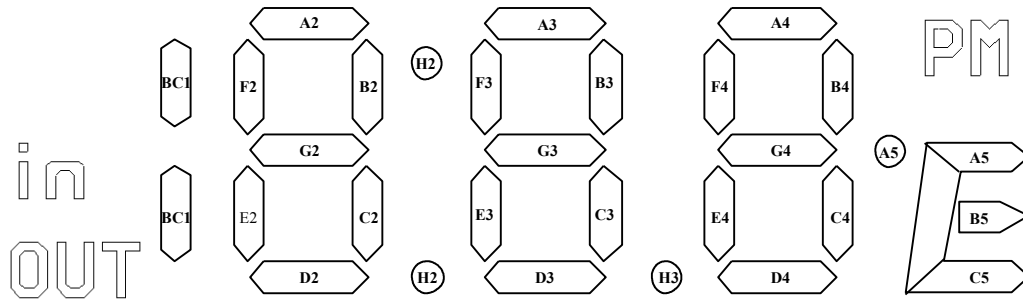
No.	PAD Name	X	Y	No.	PAD Name	X	Y
1	HR	-575	571.25	21	S3	575	-578.8
2	MIN	-575	456.3	22	S4	575	-463.8
3	FSW	-575	341.3	23	S5	575	-348.8
4	FC	-575	226.3	24	S6	575	-233.8
5	LB	-575	111.3	25	S7	575	-118.8
6	MODE1	-575	-3.75	26	S8	575	-3.75
7	VSS	-575	-118.8	27	S9	575	111.3
8	MODE2	-575	-233.8	28	S10	575	226.3
9	SC	-575	-348.8	29	S11	575	341.3
10	RF	-575	-463.8	30	S12	575	456.3
11	RSIN	-575	-578.8	31	S13	575	571.3
12	RSOUT	-460	-595.5	32	S14	460	588
13	TEST	-345	-595.5	33	S15	345	588
14	OSCI2	-230	-595.5	34	COM1	230	588
15	OSCO2	-115	-595.5	35	C512	115	588
16	OSCI1	0	-595.5	36	CAP	0	588
17	OSCO1	115	-595.5	37	VEE	-115	588
18	COM2	230	-595.5	38	MC2	-230	588
19	S1	345	-595.5	39	VDD	-345	588
20	S2	460	-595.5	40	MC1	-460	588



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LCD ASSIGNMENT



	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
COM2	IN	BC1	F2	A2	B2	H2	F3	A3	B3	H3	F4	A4	B4	A5	B5	COM1
COM1	OUT	D2	E2	G2	C2	D4	E3	G3	C3	D3	E4	G4	C4	PM	C5	

SPEC : A, 1/2 duty 1/2 bias, Vth=1.5V