

9325812 UNITED MICROELECTRONICS

92D 00682

D T-49-15-02



UM3219A

5 Functions 3½-Digit Multiplexed LCD Watch

Features

- 5 Functions (MONTH, DATE, HOUR, MINUTE and SECOND)
- Direct drives a standard 3½-digit multiplexed LCD
- 32768Hz quartz crystal controlled oscillator
- Normal display and alternate display
- Set rate by depression or at automatic 1 Hz rate
- Single 1.5V battery operation
- Power on reset
- 12-hour format
- 4-year calendar
- 2 push-button controls
- High speed test capability

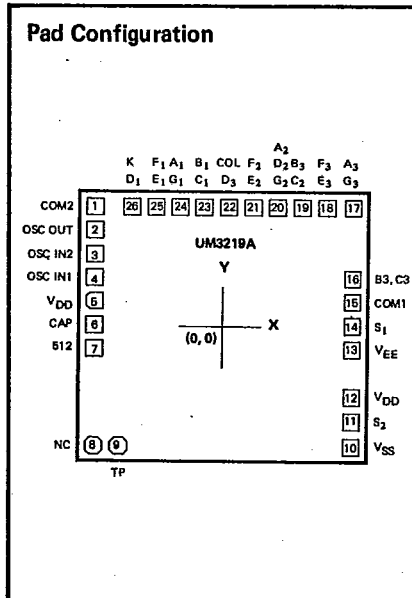
General Description

The UM3219A is a single chip, CMOS IC for use in 5 function watches with alternate displays. It is designed to drive a standard 3½-digit multiplexed liquid crystal display. The watch circuit is based on a 32768Hz quartz crystal controlled oscillator. Subsequent countdown logic and a display section provide the HOUR/MINUTE, the MONTH/DATE, and the SECOND readout with normal and alternating modes.

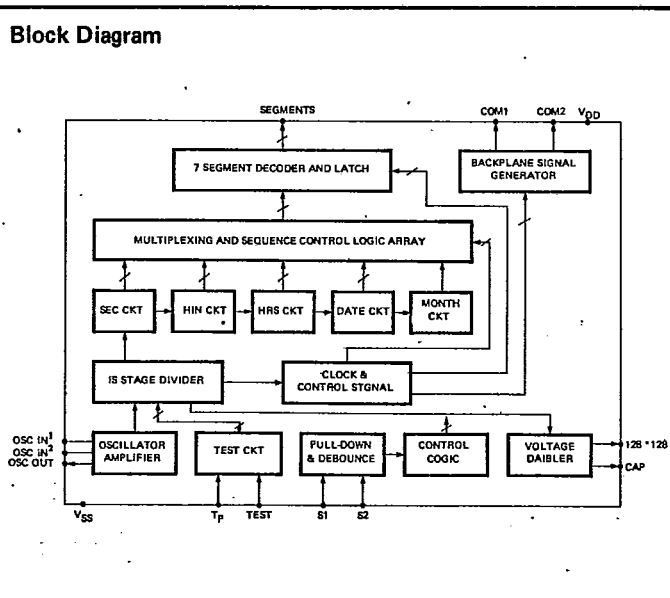
An oscillator amplifier with a feed back resistor and an

output capacitor is integrated on the chip for use with a 32768Hz quartz crystal. A built-in crystal oscillator π -network input capacitor is provided in a bond-pad option. The display and setting operations are controlled via two switches. These are two bond-pads for fast-test. The circuit has a built-in voltage doubler (for standard 3½-digit multiplexed LCD driving) which requires two external capacitors. Only a single 1.5 V battery is needed to power the entire circuit. The UM3219A is applied in chip form.

Pad Configuration



Block Diagram



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Absolute Maximum Ratings*

Supply Voltage $V_{DD} - V_{SS}$ 0V to 6V
 Supply Voltage $V_{DD} - V_{EE}$ 0V to 6V
 Input Voltage V_{SS} to V_{DD}
 Operating Temperature 0°C to 70°C
 Storage Temperature -20°C to 70°C

***Comments**

Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any other conditions above those indicated in the operational sections of this specification is not implied and exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Electrical Characteristics

($T_A = 25^\circ\text{C}$, $V_{SS} = 0\text{V}$, $V_{DD} = 1.5\text{V}$, $F_{OSC} = 32768\text{Hz}$, unless otherwise specified.)

Parameter	Symbol	Limits			Unit	Test Condition
		Min.	Typ.	Max.		
Supply Voltage	V_{DD}	1.35	1.5	1.65	V	—
Supply Current	I_{DD}	—	—	2	μA	no load
Generated Display	$-V_{EE}$	1.4	—	—	V	$I_{EE} = 1\mu\text{A}$
Switch Input Current	I_{IN}	1	—	100	μA	$V_{IN} = V_{DD}$
Switch Input Debounce Time	T_{DB}	—	62.5	—	mS	—
Oscillator Starting Voltage	V_{START}	1.35	—	—	V	—
Oscillator Input Stray Capacitance	C_{INS}	—	—	5.00	PF	—
Oscillator Input Built-in Capacitance	C_{INB}	—	20.00	—	PF	—
Oscillator Output Built-in Capacitance	C_{OUT}	—	20.00	—	PF	—

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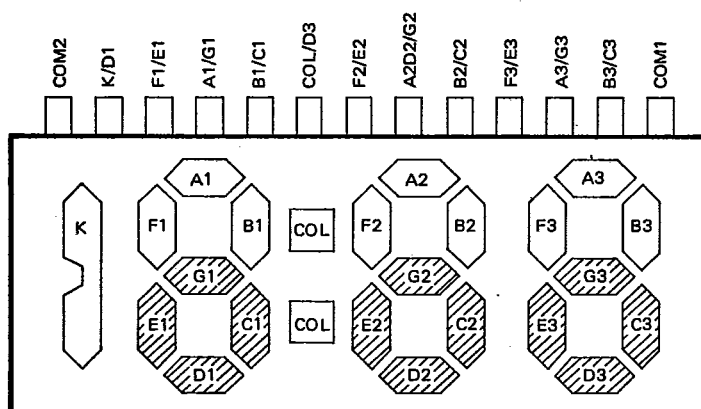


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Pad Description

Pad No.	Designation	Description
1	COM2	Backplane common 2
2	OSC OUT	Oscillator π -network output port
3	OSC IN 2	Oscillator π -network input port
4	OSC IN 1	
5	V _{DD}	Ground
6	CAP	For voltage doubler capacitor positive pin
7	512	
8	NC	
9	TP	Fast-test control, internal pull-down
10	V _{SS}	Negative low voltage supply
11	S2	Switch for updating mode
12	V _{DD}	Ground
13	V _{EE}	Negative high voltage supply
14	S1	Switch for timekeeping
15	COM1	Backplane common 1
16	B3, C3	Segment drive
17	A3, G3	
18	F3, E3	
19	B2, C2	
20	A2D2, G2	
21	F2, E2	
22	COL, D3	
23	B1, C1	
24	A1, G1	
25	F1, E1	
26	K, D1	

LCD Format



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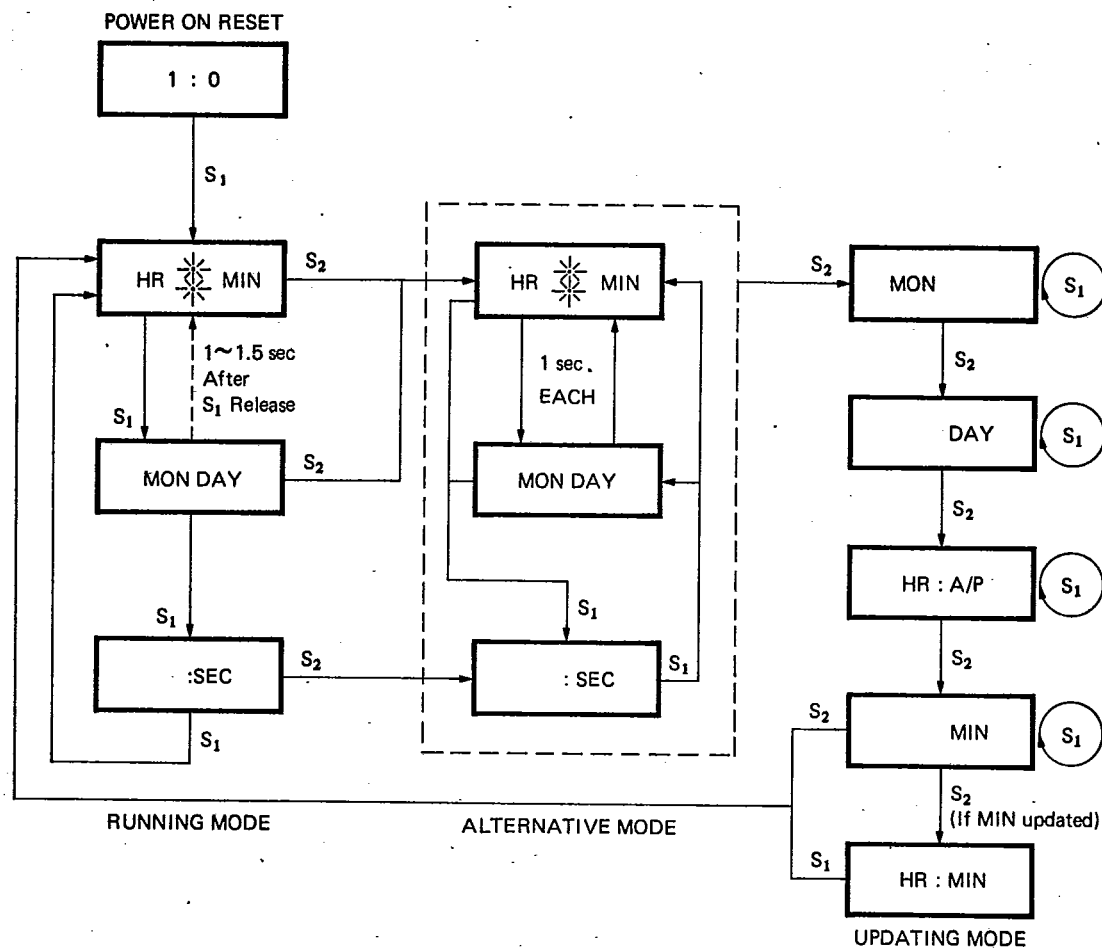
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Operation Flow Chart



Notes:

- S₁** → Momentary S₁ closure advances counter once. Holding S₁ closed beings 1 Hz advance rate.
- A/P** → 12-hour format (1: A → 2: A ——— 12: P → 1: P)
12: P → 11: P ——— 2: P
- Flashes** → Flashes at 1 Hz rate. (50% duty cycle)
- Lights** → Lights continuously.

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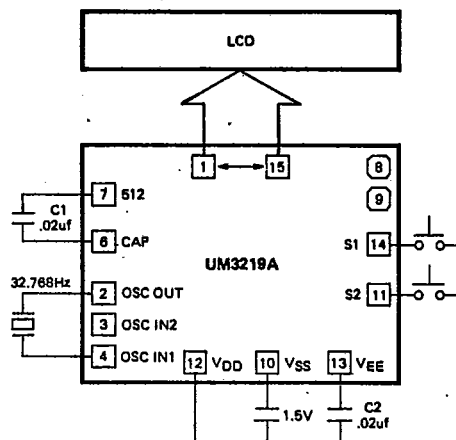
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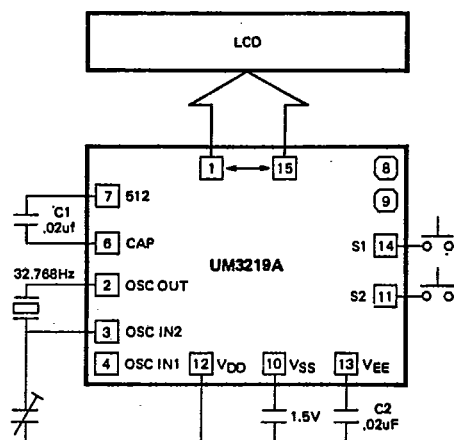
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Typical Application

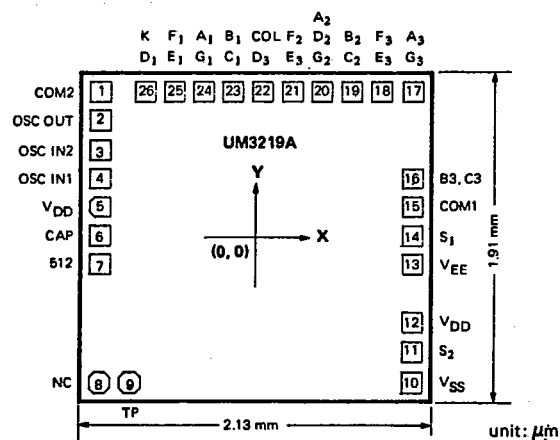
1. WITHOUT TRIMMER



2. WITH TRIMMER



Bonding Diagram



Pad No.	Designation	X	Y	Pad No.	Designation	X	Y
1	COM2	-910.34	805.18	14	S1	904.24	62.48
2	OSC OUT	-910.34	650.75	15	COM1	904.24	225.04
3	OSC IN 2	-910.34	496.32	16	B3, C3	904.24	387.60
4	OSC IN 1	-910.34	358.14	17	A3, G3	904.24	805.18
5	VDD	-910.34	203.71	18	F3, E3	741.68	805.18
6	CAP	-910.34	49.28	19	B2, C2	579.12	805.18
7	512	-910.34	-105.16	20	A2D2, G2	416.56	805.18
8	NC	-910.34	-797.05	21	F2, E2	254.00	805.18
9	TP	-755.90	-797.05	22	COL, D3	91.44	805.18
10	VSS	907.29	-784.86	23	B1, C1	-71.12	805.18
11	S2	907.29	-622.30	24	A1, G1	-233.68	805.18
12	VDD	907.29	-459.74	25	F1, E1	-396.24	805.18
13	VFF	904.24	-100.08	26	K, D1	-558.80	805.18

Notes:

1. All dimensions are in μm .
2. All bond pad dimensions are $102 \times 102 \mu\text{m}_2$ except pads 5.8 and 9.
3. Pad 5 and pad 12 are both V_{DD} function. Users can chose any for V_{DD} .