



## UM3252A/62A Series

### Analog Clock With Alarm

#### Features

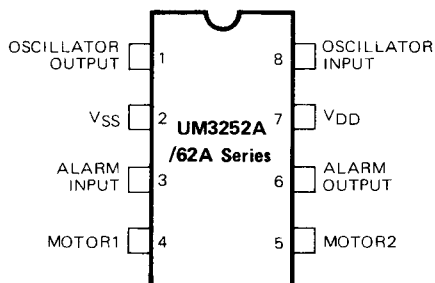
- Single 1.5V battery operation
- Very low current consumption
- Output for 1 Hz stepper motor with three pulse duration options:
  - 48.6ms, 31.2ms & 15.6ms by bonding option
- Alarm outputs determined by mask option
  - UM3252A: 2048 x 8 x 1 Hz
  - UM3262A: 2048 x 8 x ½ x ¼ Hz
- With oscillator input/output capacitance by bonding option

#### General Description

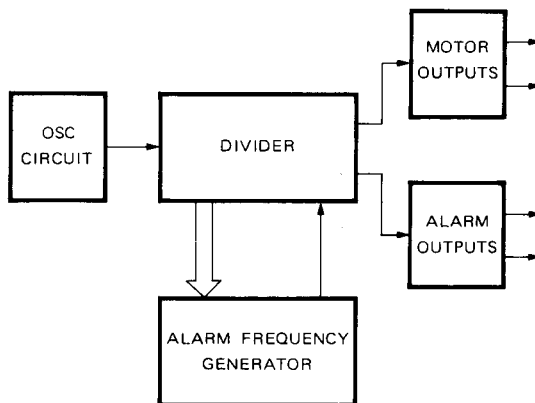
The UM3252A/62A is a CMOS IC for a quartz clock circuit of 32768Hz oscillation frequency. It consists of an oscillator, a divider, an alarm, an output control circuit and output buffers for motor drive. In addition, the UM3252A/

62A is prepared for many variations in motor output pulse duration, oscillator input/output capacitance and alarm output.

#### Pin Configuration



#### Block Diagram



**Absolute Maximum Ratings\***

Supply Voltage,  $V_{DD}$  ..... -1.7V to +3V  
Oscillator Input/Output Voltage,  
 $V_{B-2}$  and  $V_{1-2}$  ..... 0 to  $V_{DD}$   
Output Short Circuit Duration ..... Indefinite  
Operating Ambient Temperature ..... -10°C to 60°C  
Storage Temperature ..... -30°C to 125°C

**\*Comments**

Stresses 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**

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

| Parameter                             | Symbol       | Min. | Typ. | Max. | Unit       | Conditions                                                              |
|---------------------------------------|--------------|------|------|------|------------|-------------------------------------------------------------------------|
| Supply Voltage                        | $V_{DD}$     | 1.1  | —    | 1.8  | V          | $V_{SS} = 0V$                                                           |
| Supply Current                        | $I_{DD}$     | —    | 1.2  | 2.0  | $\mu A$    | No Load                                                                 |
| Motor Output:                         |              |      |      |      |            |                                                                         |
| Cycle Time                            | $t_1$        | —    | 2    | —    | S          | $V_{DD} - V_{SS} = 1.4V$<br>$R_{LOAD} = 200\Omega$<br>$I_{OUT} = 4.5mA$ |
| Pulse Duration                        | $t_{pl}$     | —    | *    | —    | mS         |                                                                         |
| Impedance                             | $R_{OUT}$    | —    | 60   | 100  | $\Omega$   |                                                                         |
| Alarm Output:                         |              |      |      |      |            |                                                                         |
| Sink Current                          | $I_6$        | 0.3  | —    | —    | mA         | $R = 1k\Omega$ $V_{DD} = 1.4V$                                          |
| Driving Current                       | $I_6$        | 0.3  | —    | —    | mA         |                                                                         |
| Alarm Input Debounce                  | $t_A$        | 0    | 70   | —    | ms         | —                                                                       |
| Alarm Input Current                   | $I_3$        | —    | 5    | 10   | $\mu A$    | —                                                                       |
| Oscillator Polarization Resistance    | $R_p$        | 15   | 20   | 50   | M $\Omega$ | —                                                                       |
| Oscillator Output Capacitance (Pin 1) | $C_{OUT}$    | —    | **   | —    | pF         | —                                                                       |
| Oscillator Input Capacitance (Pin 8)  | $C_{IN}$     | —    | **   | —    | pF         | —                                                                       |
| Oscillator Stability                  | $\Delta F/F$ | —    | 0.2  | —    | ppm        | $\Delta V_{DD} = 100mV$                                                 |
| Oscillator Start-up Time              | $T_S$        | —    | —    | 2.0  | sec        | $V_{DD} = 1.2V$                                                         |

Notes: \* 46.8ms, 31.2ms & 15.6ms by bonding option

\*\*  $C_{IN}$ : 2pF or 18pF by bonding option

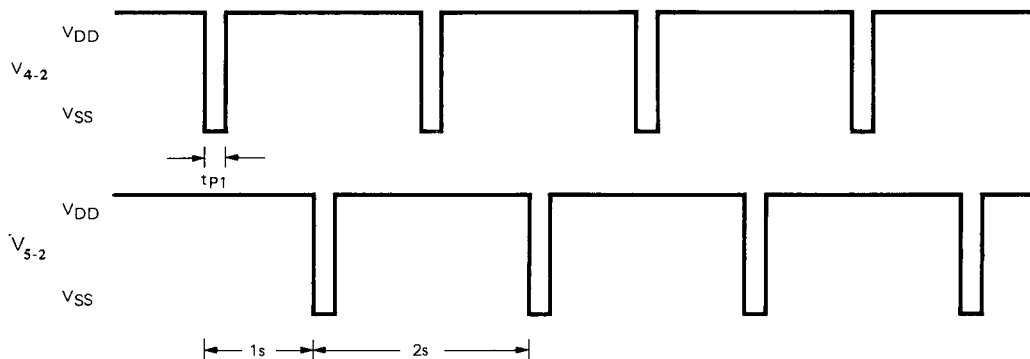
$C_{OUT}$ : 2pF or 18pF by bonding option

\*\*\* All pins are designed to withstand electro-static discharge (ESD) levels in excess of 1200V

### Motor Output Waveforms

The UM3252A/62A series is used to generate a pulse per second to drive bipolar stepper motors. It also provides

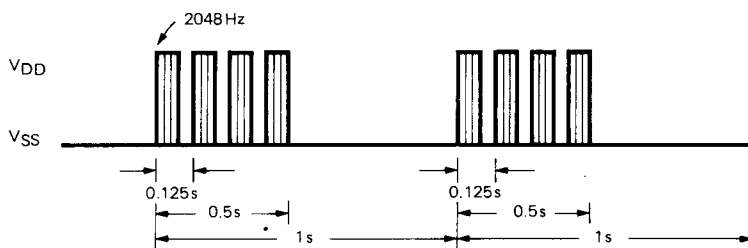
the alarm output pin which is activated when the alarm input pin is pulled to  $V_{SS}$ .



### Alarm Output Waveforms

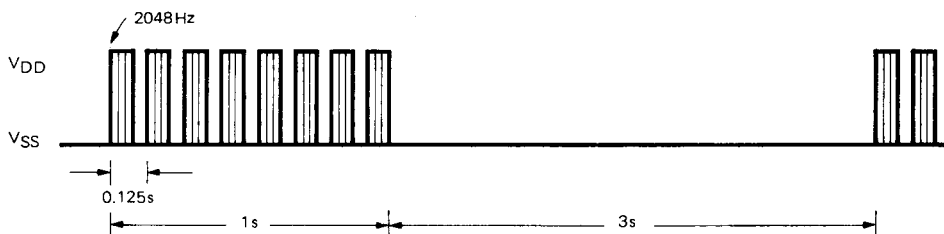
UM3252A

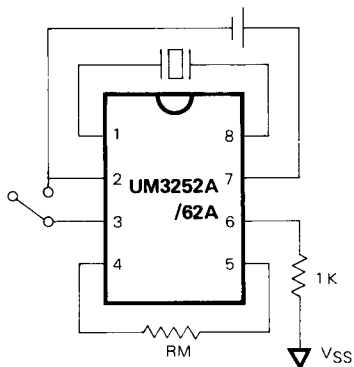
2048 x 8 x 1 Hz



UM3262A

2048 x 8 x 1/2 x 1/4 Hz



**Test Circuit**


$$V_{DD} - V_{SS} = 1.4V$$

Pin 3 Connected to  $V_{SS}$  when in Alarm mode

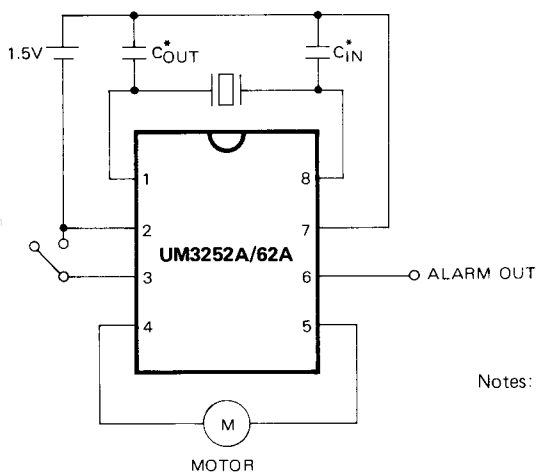
$$R_M = 200\Omega \quad f = 32,768\text{Hz}$$

Crystal Parameter:  $C_1 = 2.5\text{fF}$

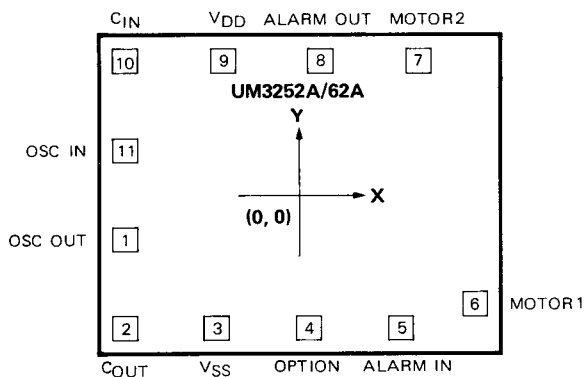
$$C_0 = 1.5\text{pF}$$

$$R_s = 30\text{k}\Omega$$

$$\text{Built-in } C_{IN} = C_{OUT} = 18\text{pF}$$

**Package Application Circuit**


Notes: External  $C_{IN}$  or  $C_{OUT}$  is not necessary for  $C_{IN}$  or  $C_{OUT}$  built-in versions.  
 $C_{IN}$  May be a trimmer capacitor for precision adjustment.  
 $C_{trim} = 5-20\text{pF}$  is adequate.  
 $C_{OUT}$  is the same function as  $C_{IN}$ .

**Bonding Diagram**


| Pad No. | Designation | unit: $\mu\text{m}$ |         |
|---------|-------------|---------------------|---------|
|         |             | X                   | Y       |
| 1       | OSC OUT     | -858.52             | -172.72 |
| 2       | COUT        | -857.25             | -574.04 |
| 3       | VSS         | -144.78             | -571.5  |
| 4       | OPTION      | 58.42               | -571.5  |
| 5       | ALM-IN      | 255.27              | -571.5  |
| 6       | MOTOR1      | 461.01              | -510.54 |
| 7       | MOTOR2      | 850.9               | 568.96  |
| 8       | ALM-OUT     | 85.09               | 571.5   |
| 9       | VDD         | -143.51             | 571.5   |
| 10      | CIN         | -858.52             | 570.23  |
| 11      | OSC IN      | -858.52             | 367.03  |

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**Pulse Duration by Bonding Option**

| <div> <div>Pad No.</div> <div>Pulse Duration</div> </div> | Pad 3 | Pad 4 |
|-----------------------------------------------------------|-------|-------|
| 31.2ms                                                    | YES   | NO    |
| 15.6ms or 46.8ms                                          | YES   | YES   |

\* YES: Pad is connected to  $V_{SS}$

NO: Pad is open

**Oscillator Input/Output Capacitance Option**

| <div> <div>Type</div> <div>Items</div> </div> | Input Capacitance |        | Output Capacitance |       |
|-----------------------------------------------|-------------------|--------|--------------------|-------|
| Pad No.                                       | Pad 10            | Pad 11 | Pad 1              | Pad 2 |
| 2pF                                           | NO                | YES    | YES                | NO    |
| 18pF                                          | YES               | YES    | YES                | YES   |

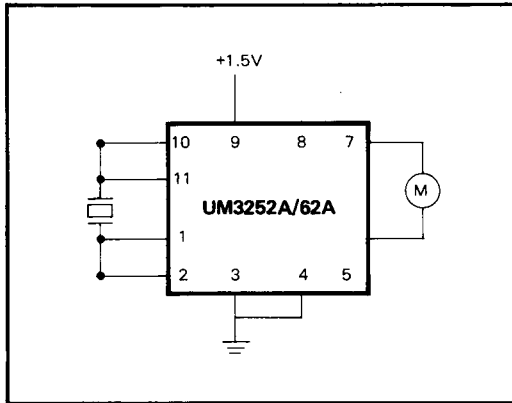
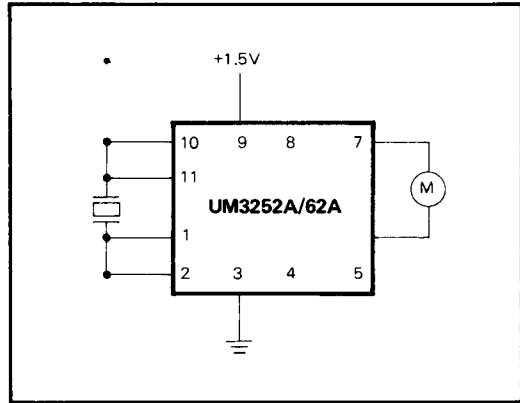
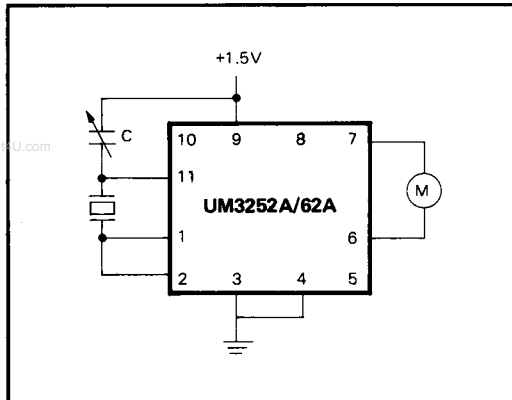
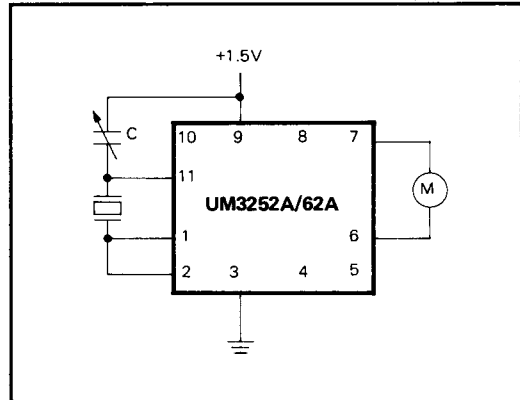
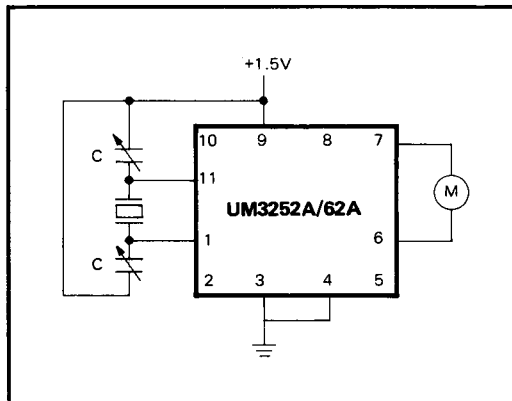
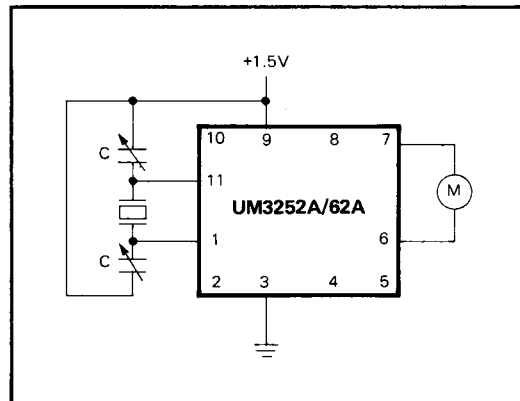
\* YES: Pad is connected to crystal

NO: Pad is open

\*\* If the chip is UM3252BH, the  $C_{OUT} = 18\text{pF}$  binds either Pad 1 or Pad 2, and the  $C_{IN} = 18\text{pF}$  binds either Pad 10 or Pad 11.

**Ordering Information**

| Pad No.    | Package | Alarm Output                                | $C_{IN}$ | $C_{OUT}$ | Pulse Duration           |
|------------|---------|---------------------------------------------|----------|-----------|--------------------------|
| UM3252A    | Dip 8   | 2048 x 8 x 1 Hz                             | 2pF      | 18pF      | 46.8ms                   |
| UM3252B    | Dip 8   | 2048 x 8 x 1 Hz                             | 18pF     | 18pF      | 46.8ms                   |
| UM3252C-1  | Dip 8   | 2048 x 8 x 1 Hz                             | 2pF      | 2pF       | 31.2ms                   |
| UM3262A    | Dip 8   | 2048 x 8 x $\frac{1}{2}$ x $\frac{1}{4}$ Hz | 2pF      | 18pF      | 46.8ms                   |
| UM3262B    | Dip 8   | 2048 x 8 x $\frac{1}{2}$ x $\frac{1}{4}$ Hz | 18pF     | 18pF      | 46.8ms                   |
| UM3252AH   | Chip    | 2048 x 8 x 1 Hz                             | Option   | Option    | Option(31.2 ms, 46.8 ms) |
| UM3252BH   | Chip    | 2048 x 8 x 1 Hz                             | 18pF     | 18pF      | Option(31.2 ms, 46.8 ms) |
| UM3262AH   | Chip    | 2048 x 8 x $\frac{1}{2}$ x $\frac{1}{4}$ Hz | Option   | Option    | Option(31.2 ms, 46.8 ms) |
| UM3262A-2H | Chip    | 2048 x 8 x $\frac{1}{2}$ x $\frac{1}{4}$ Hz | Option   | Option    | Option(15.6 ms, 31.2 ms) |

**UM3252A/62A Chip Application Circuits**
**A-1. WITHOUT TRIM CAP. AND 46.8ms DURATION**

**A-2. WITHOUT TRIM CAP. AND 31.2ms DURATION**

**B-1. WITH ONE TRIM CAP. AND 46.8ms DURATION**

**B-2. WITH ONE TRIM CAP. AND 31.2ms DURATION**

**C-1. WITH TWO TRIM CAP. AND 46.8ms DURATION**

**C-2. WITH TWO TRIM CAP. AND 31.2ms DURATION**


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