

TIME MACHINES

Using the Relay on the TimeMachines Clocks

1. INTRODUCTION

All of the TimeMachines clocks have a relay connection available. This relay, when coupled with the alarm schedule can be used to sound break bells, end of count-downs, passing periods, turn on and off lights, and anything else that can be scheduled to a time and day of the week. The small relay built into the clocks is really only suited to small signals. This document will describe what it can be used for directly, but also how to use it to drive larger loads without damaging the clock.

2. RELAY SPECIFICATIONS

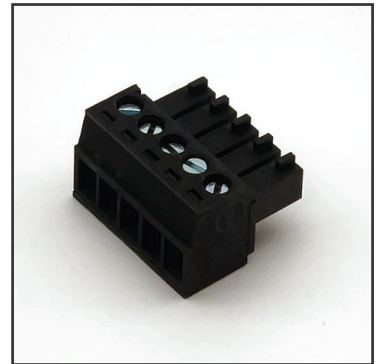
The relay used is a double pole, double throw relay by Omron, G6K-2F-DC12. Both sets of poles are tied together to double the current capacity. The ratings of the relay contacts are 0.3 Amps at 125 VAC, and 1 Amp at 30VDC. TimeMachines doesn't recommend exceeding the single pole specs.

Three contacts are provided from the relay: Common, Normally Open, and Normally Closed. Continuity is present between Common and Normally Closed when the relay is not energized, and between Common and Normally Open when the relay is energized.

In addition to the three relay contacts, there is a +12V and Ground connection. These pins can be used to power small devices directly from the power of the clock. The output is current limited at 0.5A +/- 20%. In practice, TimeMachines doesn't recommend getting anywhere near that limit, especially on the POE models where power is being pulled through small gauge wire.

The 5 pin connector looks like the picture at the right. It is a Molex 39500 0005 part number, and is available from TimeMachines, or from numerous electronics components vendors. It is not included with the clock. The pinout goes from 1 to 5. Pin 1 is on the left edge of the connector when viewed from the side that the wires are inserted into.

The pin functions are as follows:
1- 12V, 2- Normally Open, 3- Common, 4- Normally Closed, 5- Ground



3. BASIC WIRING

3.1 Device Powered by the Clock

TimeMachines offers a small Piezo buzzer (3.5kHz tone, 99dB @ 12V, 8mA at 10cm) that is suitable for a relatively quiet, noise-controlled room as in an office environment or school classroom. This buzzer, powered by the clock, will sound a single pitch tone and comes pre-wired and ready to connect to the clocks. The wiring is straight forward. The positive lead of the buzzer is connected to pin 1 of the connector. The ground wire from the buzzer is connected to Pin 2 (Normally Open) of the relay. An additional jumper wire is also required between Pin 3 (Common) and Pin 5 (Ground). This has the effect of connecting ground to the other side of the buzzer when the relay closes through the Common<-->Normally Open relay path.

TimeMachines has also tested a much louder buzzer (3kHz tone, 125dB @ 12V, 200mA, at 10cm) that is available from various electronic components vendors, MPN: X-5735-LW350-S-2-R. This buzzer is loud enough to be heard in a significantly noisier environment, like an exercise class. It can be wired in the same way as the smaller buzzer offered by TimeMachines, and can be powered through the clock as well.

Using the clock's power to run the buzzer directly is the most convenient method. It requires the least wiring and external components.



3.2 Using Existing Building Bell System

If a facility's integrated bell/PA system can be activated by simply closing a switch (like connecting a pair of wires together), then it can be wired to the clock's Pin 2 (Normally Open) and Pin 3 (Common). When the relay is closed under the clock's control, then the integrated bell system will be triggered to sound.

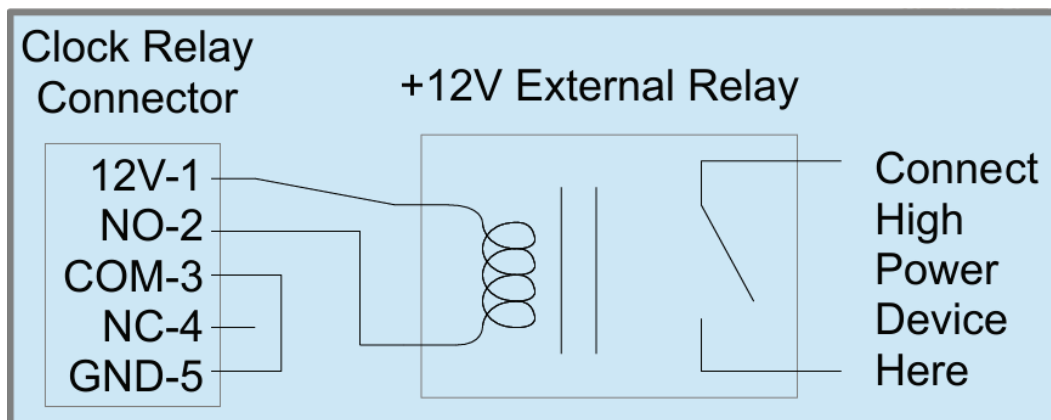
3.3 Switching Higher Current Loads

When a higher current load needs to be switched, which certainly means that the clock is not providing power to the device, then the internal relay of the clock can be used to drive an external relay which is in turn used to control the higher power device. Frequently, if the external high power relay chosen has a 12V coil, then the clock can be used to drive that relay. If the external high power relay is not 12V, then external power can be routed through the clocks relay contacts to energize the external relay. The relay contacts of the clock are completely isolated from the power of the clock.

NOTE:

**DO NOT CONNECT AN EXTERNAL POWER SOURCE TO PINS 1 AND/OR 5 OF THE CLOCK.
DAMAGE WILL LIKELY RESULT.**

The high power relay connection diagram, where the high power external relay is 12V and powered by the clock looks like this:



An externally powered relay diagram looks more like this:

