

# Power - Digital Timers

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## Digital Timers

### Purpose

Digital timers and other similar devices can be used to:

- Power devices (such as cellular phones, modems, computers, etc.) on and off at remote sites to control power usage.
- Control phone line access for data modems, particularly in situations where any of the following may apply:
  - phones must be shared and operation time or access must be limited
  - minimal possibility of interference with other phone line equipment or activities must be guaranteed
  - phone lines may incur power surges and the equipment should remain physically disconnected for minimal exposure time during data transmission.

### Solution

Use a modification of an off-the-shelf digital timer with an LCD clock display. These devices are originally intended to provide power to household appliances (lamps, radios, and so on) for specific time intervals at certain times during a day. The digital timer must have an internal battery backup which can maintain the clock and timing program during power outages that may total a hundred hours or more summed over the course of one year. The battery should be easy to change on a yearly basis, i.e., a standard AA battery. This approach was successfully used by McCallum and Meertens in 1988 for the shared phone line at the Platteville site. Conquest and Ruud built a recent version with an improved case modification.

UNAVCO staff modify the digital timer case to provide two standard, modular RJ11 phone connectors, clearly labeled "IN" and "OUT." The digital timer is also modified to remove the internal 110-volt AC power control wires and replace them with two wires from the IN phone connector. The other side of the relay is connected to the OUT or "controlled line" phone connector. An appropriate digital timer is selected that has sufficient internal space and internal configuration to allow these modifications.

The digital timer is made operational by programming its time control using its standard mechanism and by connecting it to phone lines and AC power. Future modifications under consideration include low power relays that can draw power from the phone lines themselves and eliminate the need for a 110V AC power supply.

### Options

Appliance timers are commodity items that have three main configurations:

- Digital control with a clock control precision of about one minute.
- Motor driven with about 15 minutes precision.
- Photo controlled with intentions of using with natural diurnal cycles (on at night, off during the day).

We exclude the latter category since it is primarily designed for security and not for accurate time control. The motor-driven option is excluded because the motor control itself will allow the clock to "stop" during a power outage, and also the clocks are not sufficiently precise (15 minutes) enough for some operations.

A telephone controller called a "line manager" is popular today for home offices where an incoming line, a fax machine and an answering machine may be attached to the same line. They are appropriate for some sites where there is no guaranteed phone access time period. However, these devices are twice the cost of the modified digital timer, do not provide time control or physically isolate wires, and do have a more complex interface that requires some attention either at the installation site or from remote control (with access codes).

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