In olden times, when the kids were small, I built my own rockets using paper, index file cards and sugar rocket engines. This was a long time ago.

Presented here, is a simple controller based igniter monitor which will provides rocket igniter basic functions including an igniter ‘fuse’ monitor, audio and single discrete LED display. It is configured with a DeadMan and a FIRE button. While more features are possible, this simple and inexpensive assembly should take some of the risk of a pre-mature ignition and provide a portion of a controlled sequence, from setup to launch.

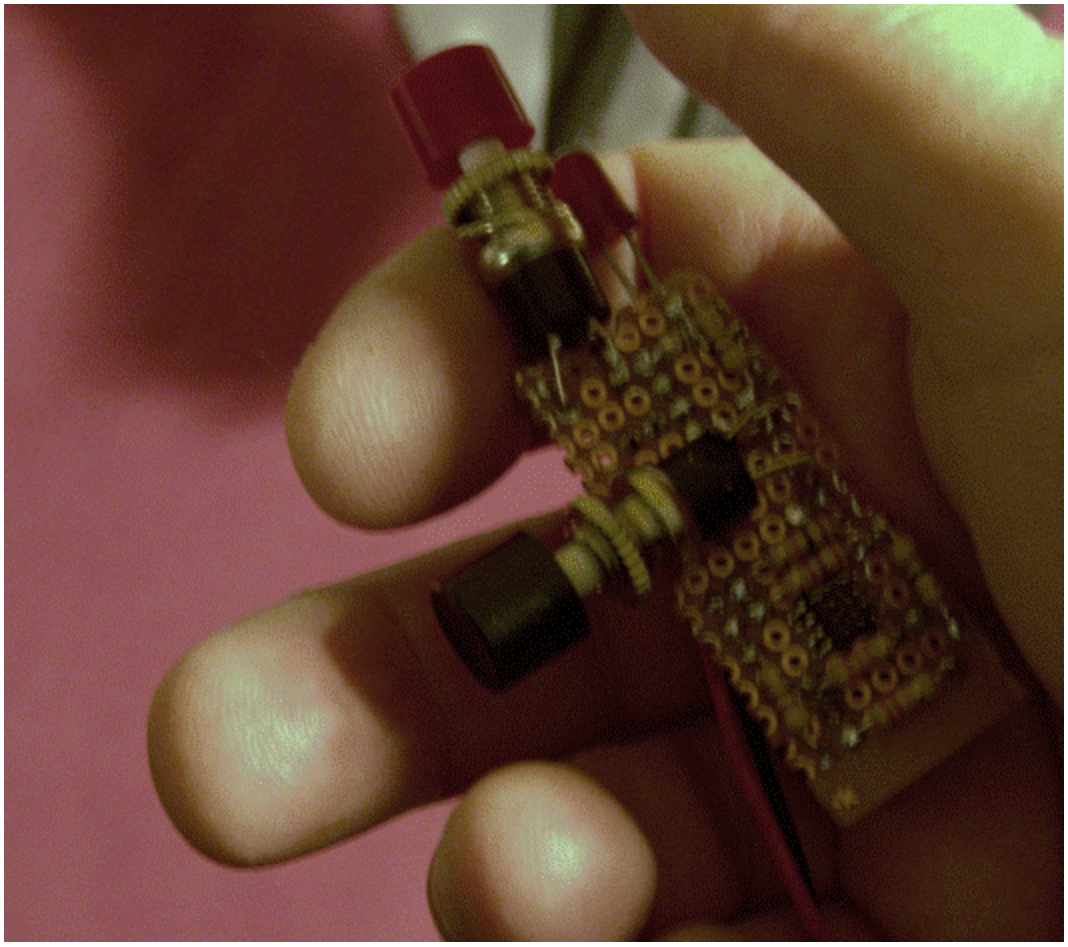
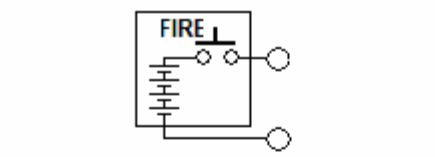


Figure 1, Pre-wired mounted assembled

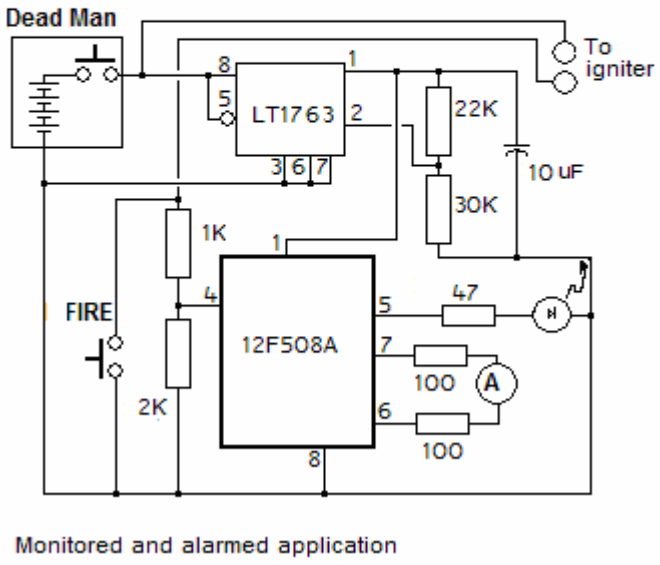
Using a purchased rocket igniter battery pack you will have basically a battery holder with a FIRE button and some length wired lines out to your lunch pad. These 4 or 5 serially stacked battery packs provide a 6 to 8 volt source. For common Estes igniter fuses this battery pack then sources the, up to, 2 amps specified, when the button on the battery package is asserted.

Estes Igniters

This application may exploit the basic battery pack convenience and adds a small and inexpensive controller to provide those additional features, described above. Referring to the schematic there is a 12F508 controller, a low dropout regulator, a second momentary 'FIRE' button switch and host of supporting several discrete parts.



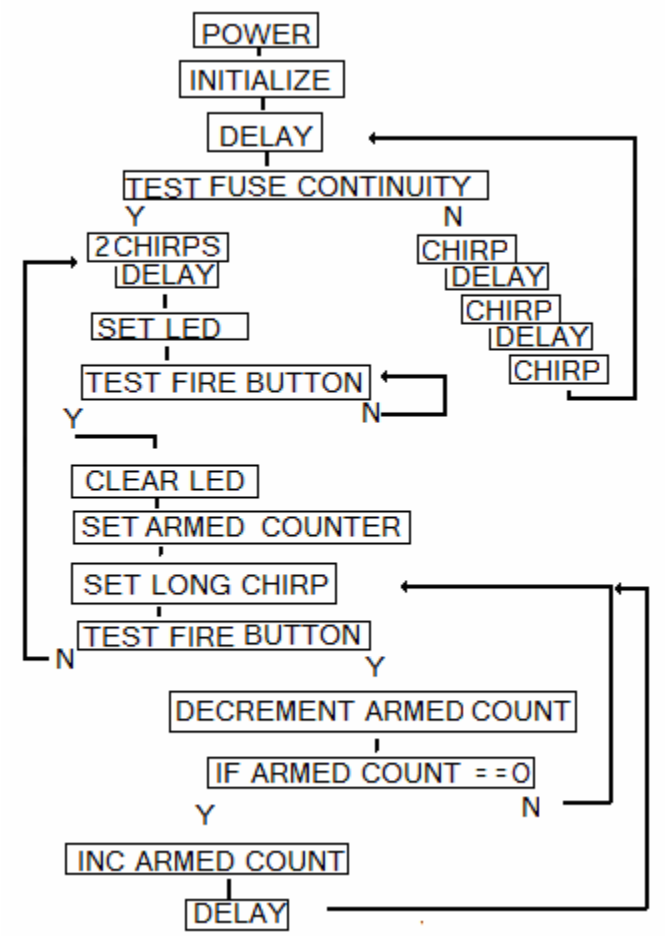
Basic battery pack and switch igniter



Monitored and alarmed application

Although the existing battery pack switch may now be used to provide the DeadMan button function, I have opted for my own 4-AA battery package and included the second pushbutton for this function. Applying power through the DeadMan switch, power for the controller is provided through a small LT1763 regulator to power the controller. This low dropout regulator is set to provide the controller's minimum operating of ~2.0 volts.

Referring to the diagram below, when the DEADMan button is asserted, power is provided to the controller and the fuse is tested for continuity at pin 4. A double audio chirp made up of a series of 2.2KHz pulses and a solid LED display, indicate the fuse is connected and system is 'armed'. With the DeadMan asserted multiple chirps are continuously generated if the fuse is NOT detected. In this case the coded sequence also, repeatedly, re-tests for fuse continuity.



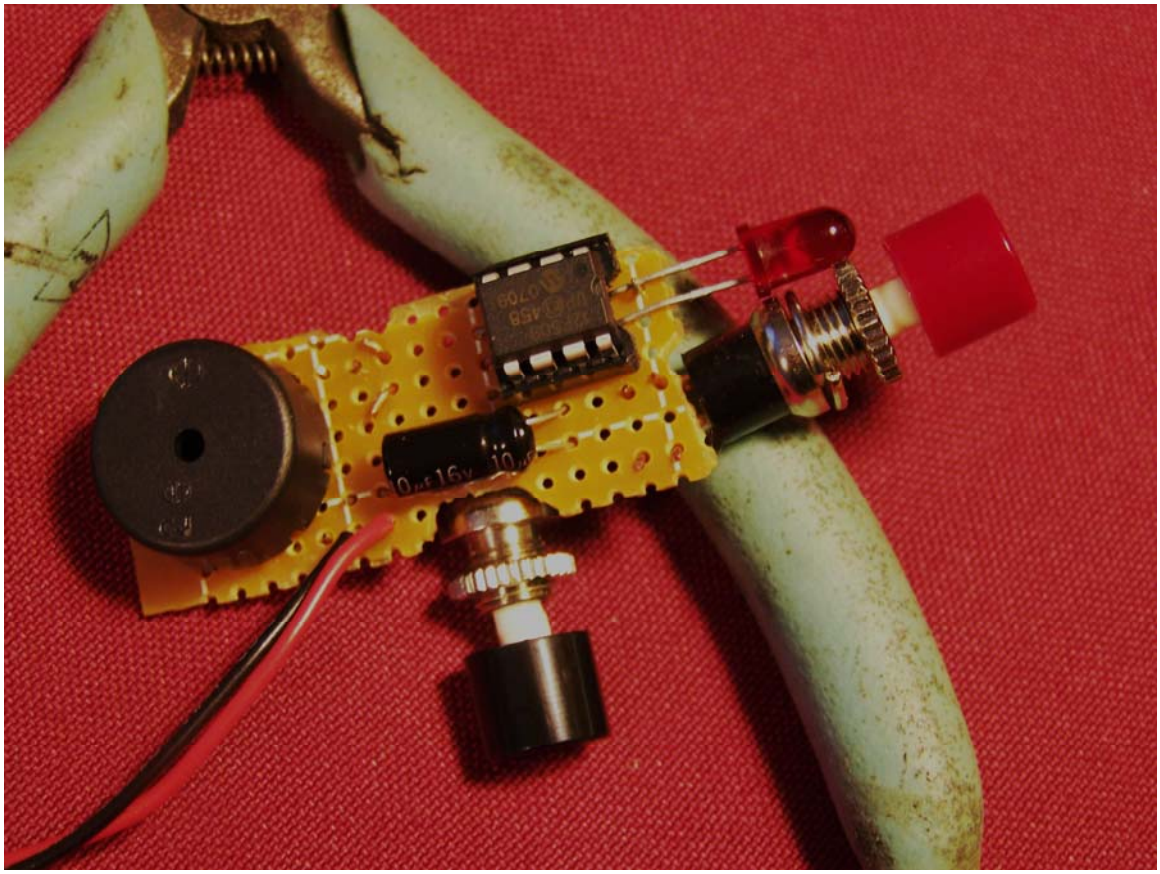
Regardless of how the battery pack is implemented when the DeadMan button is released power to everything is removed.

With both the FIRE and DeadMan buttons asserted, power from the battery, through the fuse is routed through the FIRE button switch to the battery return. The controller has no

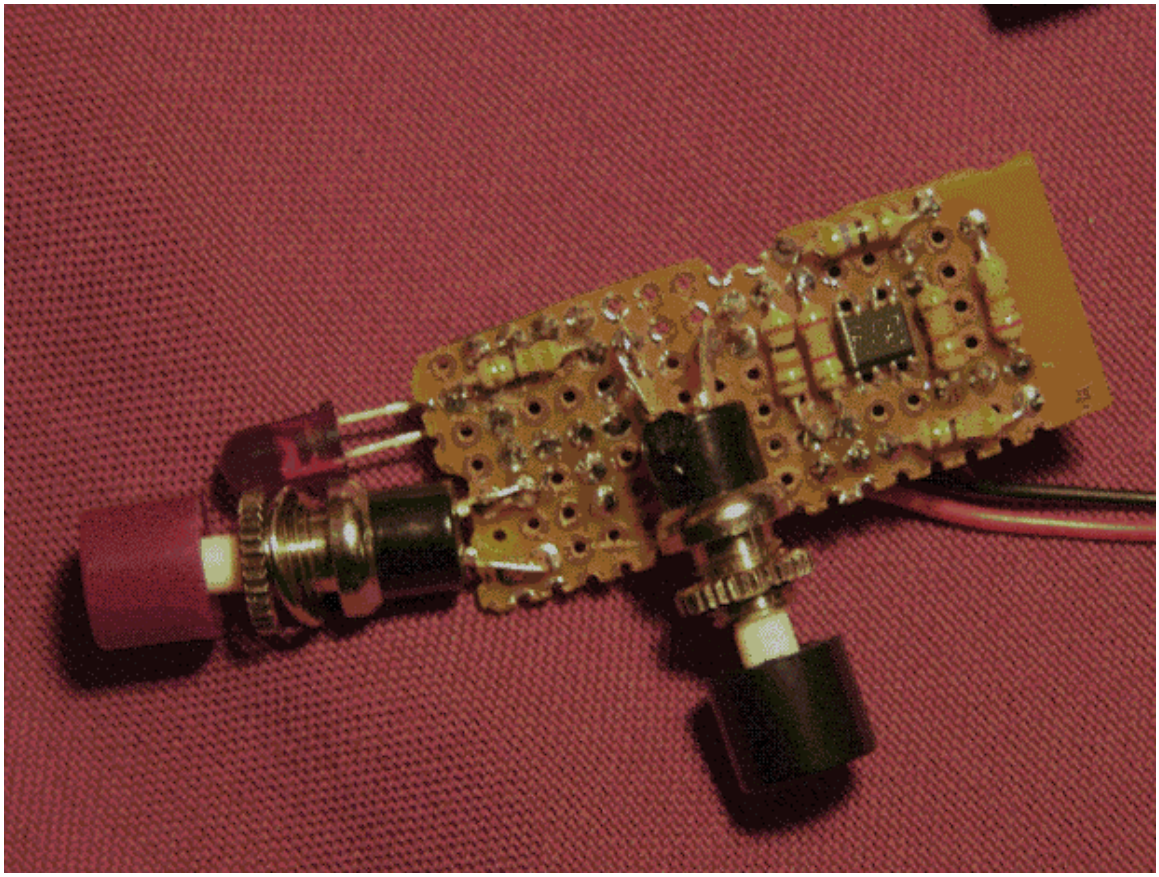
control over the resulting power delivered to the fuse. The controller detects that the FIRE button is now grounded and, in this mode, provides a series of longer chirps until the DeadMan button is released. A ~3 second, controller based timer, is also initiated when both switches are closed. When this timer is reduced to zero the controller changes the audio sequence to an interrupted series of chirps.

If the FIRE button is release and the fuse is still intact and has continuity, the audio resets to its armed mode, generating the 2 chirps and asserts the LED. With the FIRE button released, without fuse continuity, which is often the case, the controller will continue to behave like power through the fuse is still applied and maintain the interrupted series of chirps until the DEADman button release and power is removed.

The small parts count resulted in it fitting into this small footprint. I have assembled this with normally open momentary buttons mounted on my board and I have used a handle grip like layout for these Dead Man and FIRE buttons. Details of the board's layout are shown in the pictures below.



Controller, alarm and LED



Pre-wired part layout, regulator, FIRE and DEADMan buttons, and discrete resistors

I had slightly sloped the (red) FIRE button, assuming a right hand grip. After wiring it was mounted it in a small tube providing mechanical structure for the buttons. Layout is not critical, footprint and packaging could be more easily done on a larger board and mounted in a small enclosure.

Other information of interest may be found at the authors web site found at: Riverheadsystems.com