A Computer System Power Controller

(with Surge-Spike Protection)

Lets you individually turn on/off your computer and peripherals from one central location

By Paul M. Spannbauer

Are you tired of reaching around to the back of your computer, the side of your printer and the back of your modem to turn each on or off? Or wonder if you should add more surge and spike protection devices? You can overcome these irritants by buying a bunch of commercially available devices, of course, but at considerable cost. My solution to this problem was to build my own ac-line power controller with built in surge/spike suppressors. Cost was about $62, including a fancy cabinet for the project.

Everything fits inside a handsome shielded metal box. The ac outlets into which the system equipment plug are located on the rear panel, while all switches and their status indicators mount on the front panel. If you examine the photos, you can see that my Controller was designed to have four outlet/switch/indicator combinations to suit the needs of my computer system, plus a master POWER switch and panel lamp. You can add more outlet/switch/indicator sections as needed to customize your Controller for the needs of your system. You can also use this device for other electronic systems, such as stereo and video setups, of course.

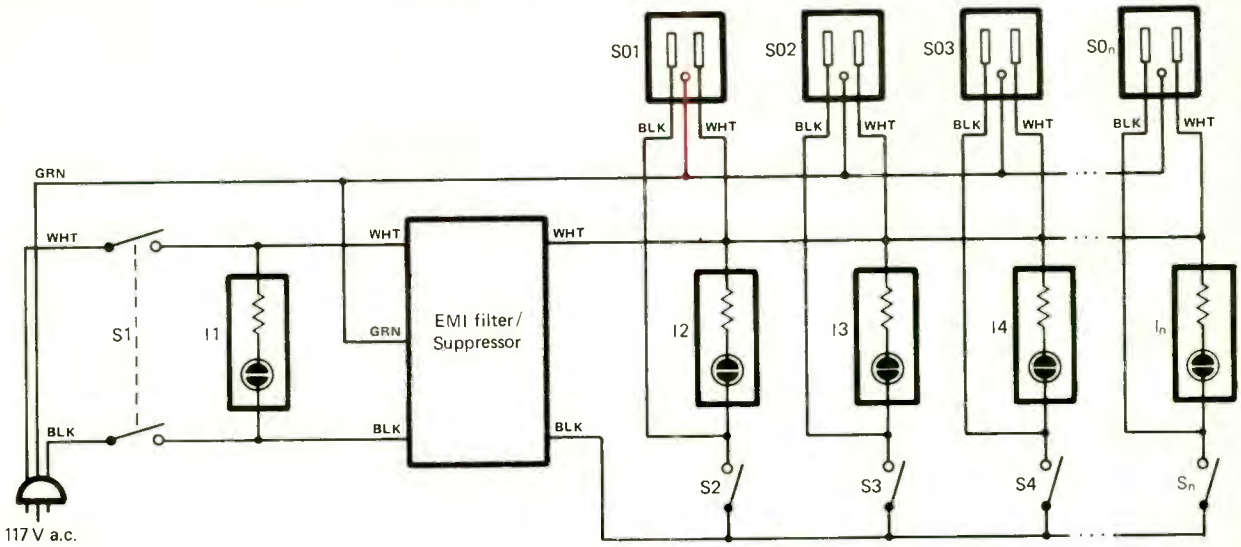
About The Circuit

The complete schematic diagram of the Controller is shown in Fig. 1. The circuit is really quite simple in design. Note that throughout the circuit the standard white/black/green three-conductor wiring scheme is used. It is highly recommended that you maintain this scheme exactly and do not attempt to change it to a two-conductor system. All computer products use this wiring scheme for ac line operation, though most consumer video and audio products don't. Even if you want to control power to only two-conductor wired products, you'll find that they are compatible with this Controller.

Items in your system you want to control plug into ac receptacles *SO1* through SO_n. (The subscript *n* here and below simply indicates that you can have four or more of each components in your Controller.) Power to these receptacles are individually controlled by switches *S2* through S_n, while the neon lamps in *I2* through I_n, respectively, will light whenever the switch in a given circuit is closed and power is being delivered from the ac line. You can add receptacle/switch/lamp combinations as needed by your system, the only limit being the amount of power the EMI filter/suppressor can handle.

Main power switch *S1* determines whether or not ac line power is available for switching to the individual ac receptacles. With *S1* closed this power is available and can be selectively fed to the receptacles. With *S1* open, no power is available, regardless of the status of the other switches in the Controller.

The circuit shown in Fig. 1 is a minimum Controller system. There are, of course a few modifications you can make to it to further custom-



PARTS LIST

I1 thru I_n—Panel-mount neon-lamp assembly
S1—Dpdt miniature toggle switch
S2 thru S_n—Spst miniature toggle switch
SO1 thru SO_n—Chassis-mount, three-conductor ac receptacle
Misc.—EMI filter/suppressor module (Corcom Model 8109 or similar); suitble metal enclosure (5⅞"W × 5¼"D × 3"H Radio Shack No. 270-253 accommodates a four-receptacle system; adjust size accordingly for more than this); heavy-duty, three-conductor ac line cord with plug and strain relief; 12- or 14-gauge stranded white, black and green wire; wire nuts (5); spade lugs (optional); rubber feet (4); dry-transfer lettering kit; clear acrylic spray; etc.

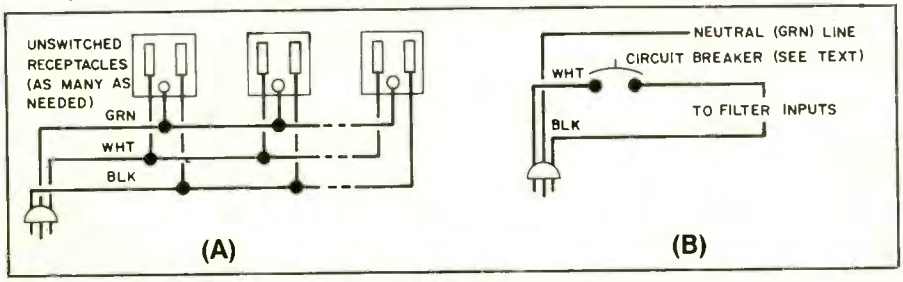
Note: You can substitute illuminated push-on/push-off illuminated switches (Radio Shack No. 275-676) for I2/S2 through I_n/S_n combinations.

Fig. 1. Overall schematic of a minimum controller system.

ize and enhance it. For example, in hi-fi and video systems, there are items you never want unpowered. These include timers, turntables, videocassette recorders and the like. Therefore, you can incorporate into your Controller one or more ac receptacles that are unswitched. Connect these directly across the ac line where the line cord enters the Controller box, ahead of *S1* (see Fig. 2A).

Another modification you might wish to make is the addition of a circuit breaker. You can obtain push-button-reset circuit breakers in a wide variety of load ratings. Determine what the maximum load would normally be for your system and select an appropriately rated breaker. Install the breaker in the line between the point where the ac line cord enters the Controller box and *S1* (Fig. 2B).

Fig. 2. Options that can be added to a basic controller system include series of unswitched receptacles (A) and circuit-breaker protection (B).



Putting it Together

The most difficult step in building this project is making the cutouts in which the receptacles mount on the rear panel. These must be cut square and uniform in size and location. Depending on the tools you have, there are several ways to make these cutouts. The easiest, of course, is with a chassis punch. Second best is to use a nibbling tool. If neither tool is available, you're stuck with drilling holes and working like mad with a file to make the cutouts the proper size and shape. Be careful to make the cutouts just the right size.

Once you've finished making the receptacles cutouts, drill the entry

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Computer System Power Controller *(from page 43)*

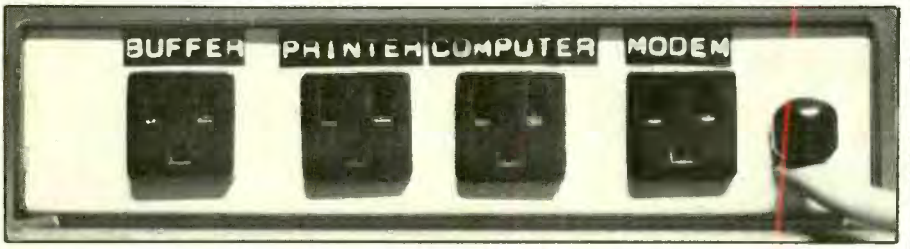

Photo shows details of controller's rear panel. Ac power cord enters through and ac receptacles mount on panel. So, too, does a circuit breaker.

hole for the ac line cord at one end of the rear panel. (If you plan on using a circuit breaker, drill its mounting and reset button holes in the rear panel, too. Then work on the front panel. Here, you need two holes for each lamp/switch combination, unless you opt for the more expensive lighted push/push switches mentioned in the Note at the end of the Parts List, in which case you need only one hole for each *S2/I2* through S_n/I_n combination.

Determine where to mount the EMI filter/suppressor module. Make sure that it is completely isolated from all other components. Then drill its mounting holes. This done, deburr all holes.

Label all switch/lamp pairs on the front panel and all ac receptacles on the rear panel with their appropriate legends, using a dry-transfer lettering kit. Then spray two or more light coats of clear acrylic over all exterior surfaces of the front and rear panels. Allow each coat to dry before spraying on the next.

When the acrylic has completely dried, mount the components in their respective locations. Then, referring back to Fig. 1, wire the circuit exactly as shown. Use only heavy-duty (12- or 14-gauge) stranded wire throughout, and maintain the white (WHT), black (BLK) and green (GRN) color-code scheme throughout. Connections to all filter/suppressor module leads are made with wire nuts; all other connections are soldered.

Double check all your wiring. Then plug the Controller's line cord into an ac outlet. Flip master POWER switch *S1* to on and note that *I1* lights. Leave *S1* set to on and toggle on then off and then on the other switches on the front panel, observing that their respective neon lamps come on then go off and then come on again. Flip the POWER switch to off; *all* neon lamps should extinguish, indicating that all is well.

Disconnect the ac line cord from the wall outlet and finish assembling the enclosure. Your Power Controller is now ready to be put into service. **ME**

"Absolute Reset" *(from page 55)*

possibly damage it. Apple clones and Hong Kong knockoffs normally do not need this inverter.

One prompt and low-cost source of EPROM burning services is E-TECH Services (Box 2061, Everett, WA 98203; 206-337-2370). Be aware, however, that no legal EPROM burning service can directly drop ship you a ready-to-use EPROM. Instead, you must furnish them with an exact image of the code you wish to have burned. Only after they receive your code image can they burn and ship the EPROM.

If you experience any difficulties in implementing either of the Absolute Resets detailed in the boxes, please contact me immediately.

You can get further information on any of the IIe and IIc (not the II+) stuff by calling me at (602) 428-4073 or writing me at Synergetics, Box 809, Thatcher, AZ 85552. **ME**

—Don Lancaster