Transformer Sizing
By Monte Heppe

What size transformer should I use for my layout? This is a frequently asked question and unless it is a small layout with few switches and only one or two trains, I recommend multiple transformers.

I generally use one transformer for each train, the exception being larger transformers with two controllers such as the Flyer 30B at 300 watts, the MRC Dual 270 watt and similar transformers that are adequate for running two trains. The Flyer 18B at 175 watts is adequate for running two smaller trains.

Switches especially, accessories and lights should be on separate transformers. Lamps present a problem because as they are always on they are a constant load on a transformer. Although each lamp is a small load, they add up quickly. The typical screw base bulb used in lamp posts and buildings are either 100 milliamps, 1.5 watts, or 200 milliamps, 3 watts. To determine the size transformer needed for lights, multiply the number of lamps by the appropriate watts. For example if you have 15, 100 milliamp lamps and 20, 200 milliamp lamps the calculation is: 15 x 1.5 =22.5 watts , 20 x 3= 60 watts, 22.5 plus 60=82.5 watts which would require at least a 100 watt transformer. If your lighting load is greater than 100 watts it is usually cheaper to use several small transformers than one large one.

I recommend a separate transformer for accessories. Since you usually run only one accessory at a time a small transformer, say 75 or 100 watts should be adequate.

Switches present a special problem since in addition to the power needed to throw the switch, each switch has a lamp in the switch and a lamp on the controller that are constantly lit. These lamps are usually 200 milliamp ones. Thus each switch requires 6 watts just for the lamps. The switch coils require 2 to 3 amps or about 45 watts, to throw crisply and reliably. This is a momentary load and usually one switch at a time, so the power requirement is only added in one time. Again, although the lamp load seems small, it adds up fast. One club member recently told me he was using an 18B, 175 watts, to operate 20 switches. This is a load of : 20 x 6 = 120 watts plus 45 watts equal 165 watts. This is pushing the 18B since the 175 watts is the rating without any load.

You can power the lamps in the switch housings from a separate transformer. This is done by using two transformers that are in phase. The base post are connected together. One transformer is connected to the switch controllers in the usual way except the yellow wire from the controllers to the switches is NOT connected to the yellow terminal on the switch. A wire from the variable post on the second transformer is connected to the yellow terminal on each switch. By turning down the voltage on the second transformer to about 9 or ten volts, the lamps on the switches will glow and the life of the bulbs will be extended. There is no easy way to power the lamps on the controllers from a separate transformer so this load is still on the first transformer. I use pushbuttons instead of the Flyer controllers to operate the switches on my layout. This allows me to use a 75 or 100 watt transformer to power the switches. I know, theoretically you only need about 45 watts, but I like to have plenty of power available.

The wattage of older, pre 1980's transformers is rated at no load. Modern transformers are rated at full load. For example the MRC Dual at 270 watts provides more usable power than a Flyer 30B at 300 watts.