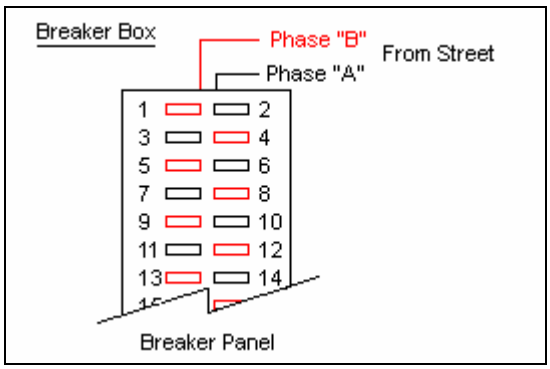
CONTROLSCAPE

landscape lighting control system

Phase Coupling 101

Phase Coupling is a very simple concept that can get complicated. It is simply the process of making sure that transmission signals have an easy path of communication. Landscape lighting people understand the concept of loss of power over long lengths of cable. This is why they use multi-tap transformers. We are concerned about the same thing here. The best idea is to try to shorten the path of travel the best you can. In small single or dual panel homes, this is pretty simple, but those big homes with 6 panels can get tough. So, here are some concepts to understand that may help make it easy.

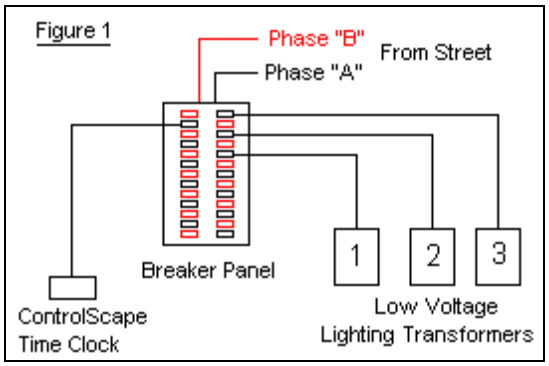
A Basic Concept…



This may seem fundamental to some, but it is critical to understanding Phase Coupling. The diagram to the left shows a portion of a breaker box. The breakers in Red are on the "B" Phase and the breakers in Black are on "A". All panels are the same. Every other breaker in each column is on the same phase. For example, in the left column, breakers 1, 5, 9, 13…. are on the same phase. This is evident from a 220 breaker, which takes up two consecutive spaces so to get power from both phases.

Fundamental …. but just wanted to be sure.

OK , here we go…



In Figure 1, there is a single panel. The two phases from the street are illustrated in Black and Red. In this scenario, all devices, including the Time Clock, are connected to the "A" Phase (Black). Clearly, the use of a Phase Coupler would not be required.
Problem is: How often will the electrician leave you 2 or 3 circuits on every other breaker. He will usually leave them next to each other in the column. Oops, they will be on different phases.

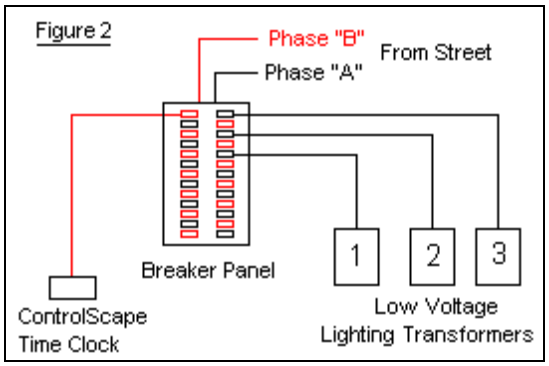
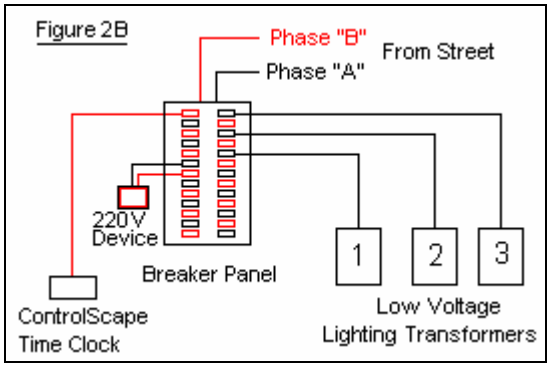


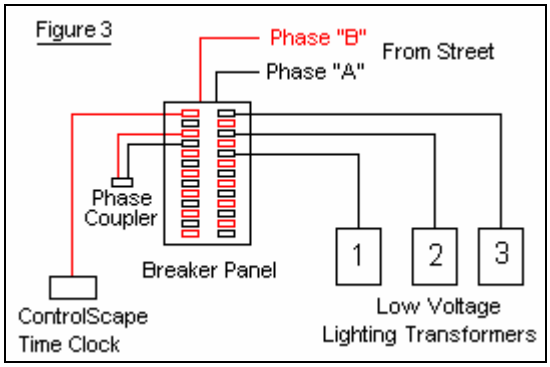
Figure 2 is the same simple setup as Figure 1, EXCEPT the Time Clock is now plugged into the "B" Phase. How will the signal travel from the "B" to the "A" Phase?
Without a Phase Coupler, it will need to travel out to the transformer at the street and back into the house on the "A" Phase, then out to the Lighting Transformers. This may work, depending on how far the transformer is away from the house, and a number of other factors.

Sometimes you get lucky…



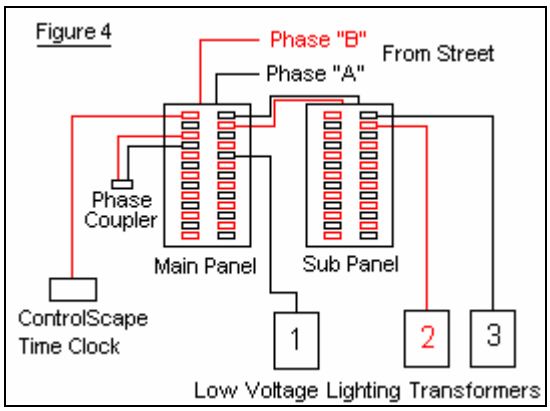
There are many times when there is a 220V device in the house, such as a dryer, oven, etc., that provides phase coupling for you. You just plug in, test signal, …looks good, away you go.

Fortunately, this happens quite often. But when it doesn't, we need a Phase Coupler.



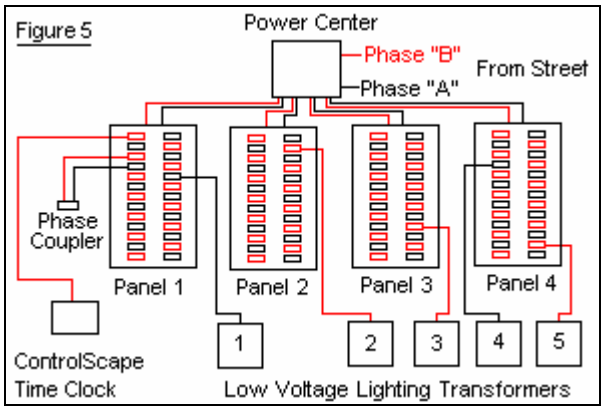
In Figure 3, a Phase Coupler is inserted. The signal no longer needs to travel out to the street to find the other Phase. It simply joins at the Phase Coupler.

Important: The Time Clock is what sends and receives the signals. It just makes sense to place the Phase Coupler as close to the Time Clock as possible.



In Figure 4, things got a bit more complicated, but still pretty simple. This signal path is fairly direct. The Sub Panel is a direct feed from the Main Panel, and a single Phase Coupler should be all you need. You may not even require that.

Note: My personal home has a Main Panel and a Sub Panel from it. There are 50+ UPB devices and no Phase Coupler. Go figure. The two panels are fairly close and signal attenuation between panels would not be an issue.



OK ….here is the potential nightmare! If the panels were all close together, it would not be too difficult. However, chances are that it is a big house and the panels are very spread out. The best approach is to wire up, test and start adding Phase Couplers. Always start where the Time Clock is plugged in. You may need to go so far as to add a Phase Coupler to each panel.
The obvious answer is planning, if possible. Try to limit the number of panels you are tied to. In a house this big, a landscape lighting sub panel would be ideal.

Remember: All signals originate from the Timer or a Keypad in the house. Start there, where the signal is the strongest. Most all big scenarios will work. Understanding the process is a big help.