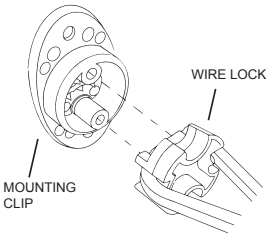
To install the Mounting Clip you should pull the excess wire from the sill hole until taut (see Figure G). Grab one wirelock and run the wire over the wire lock, assuring that the wire lays in the plastic channels (see Figure H). You should note that there are small copper prongs that will peirce the wire to create an electrical connection. Make sure these prongs are on the side of the clip that will pierce the wires when the clip is inserted and tightened into the mounting clip.

Once the wire is seated propery in the wire lock, insert it into the bottom of the mounting clip (Figure I), using the guides to make sure the wire is pierced by the copper prongs. Press the mounting Clip and Wire Lock together with your forefinger and thumb. You should feel the metal clips pierce the wire. While holding the clip with one hand, take two (2) wire lock screws and insert them one at a time into the holes in the wire lock. Using a #1 philips screwdriver bit, tighten the screws clockwise to tighten down the wire clip. Before completely tightening one screw, insert the 2nd screw and tighen it down completely. Then go back to the initial screw and tighten it down fully. Be sure not to overtighten the screw locks. Tighten down enough to assure the the wire has been pierced by the copper prongs and that a good connection is achieved.

Once the run is complete and tested, go back and install each Mounting Clip Assembly into the Sill plate using the #4 stainless steel wood screws provided. Be careful to align the oval Mounting Clip so that the major axis is parallel to the window (see Figure J) Off axis installation will cause the Decorative Base to appear twisted relative to the Window and is sure to cause the homeowner to ask for a return service call.

FIGURE I



Once all Mounting Clip Assemblies are installed for a given run, we recommend you connect the transformer and run a load test. Install a Candle Stick Assembly in each Mounting Clip Assembly on the run and using an ammeter in line at the transformer output, measure and record total line current, along with line voltage. These numbers may come in handy for troubleshooting in the future. We typically record them and place them inside the transformer enclosure for future reference.

Move on to the next run and repeat until all runs in the home are complete. Finally, check the control and supply circuits provided by the electrical contractor and notify them if there are problems or concerns.

8. Final Delivery and System Test – Teaching the homeowner about the system: Typically, the final installation will take place either just before or immediately after the homeowner takes possession of the home. Since the Decorative Bases and Candle Stick Assemblies remove easily from the Mounting Clips and since the Decorative Bases and Candle Stick Assemblies make up 75% of the cost of the system, we recommend scheduling the final installation AFTER the homeowner has taken possession of the home.

At final installation, the Candle Sticks and Decorative Bases are installed, the system is tested and the homeowner is given brief instructions about the product and the controls. As with the Mounting Clip installation, it is a good idea to first do a walk through to check each window, the transformer mounting area and the controls, to insure that nothing has been tampered with, moved or damaged since the Mounting Clip installation visit.

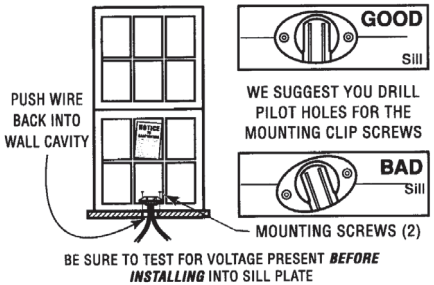
9. Installation and removal of WindowCandles candlesticks and accessories: Installation of the candlestick is simple – align the "tee" on the bottom of the Decorative Candle with the "slot" on the windowsill mounted Mounting Clip and slide the Decorative Candle into position. Once installed, simply slide the Decorative Base over the Decorative Candle and allow the oval recess in the Decorative Base to completely cover the oval shape of the Mounting Clip. That's it – you're done!

Removal of the candlestick is simple. Remove the Decorative Base and slide the Decorative Candle out to disengage. Be sure to utilize the Mounting Clip Covers to keep the Mounting Clips clean and free of dirt. Always remove power from the system by disconnecting the transformer(s) when removing candles for the season.

Installation and removal of the Mounting Clip Covers is just as easy; align the Mounting Clip Cover with the Mounting Clip and snap into place. To remove, simply pinch the Mounting Clip Cover – front to back (thinnest part of the oval) and lift.

The decorative candles used in this system are specially wired to provide consistent decorative illumination at 2 watts per candle. DO NOT use bulbs that draw more than 2 watts – the internal safety circuit will not allow it. If you experience a bulb slowly self-extinguishing immediately after turning the candles on, you probably have installed a bulb that requires more than 2 watts.

FIGURE J



Bulb replacement is simple – just unscrew and remove the old bulb and insert and screw in the new bulb. Only one important thing to remember – use the right bulb! Call us at 1-877-NO-CORDS (662-6737) for fast and easy ordering of the correct low-voltage bulbs for your WindowCandles. Or visit us online at www.windowcandles.com for a complete selection of all of our decorative bulb colors.

10. Troubleshooting and technical support contact information: If you have any questions on installing this system or any part of it please call us toll-free at 1-877-NO-CORDS for step-by-step installation procedures. We want to make sure you fully understand the installation process to ensure an easy, enjoyable installation. If you experience trouble with your system, your first call should be to your professional installer. If you cannot get support from your installer or dealer, then please give us a call and we will provide the assistance directly or recommend an installer in your area.

Form #WCUIG-22

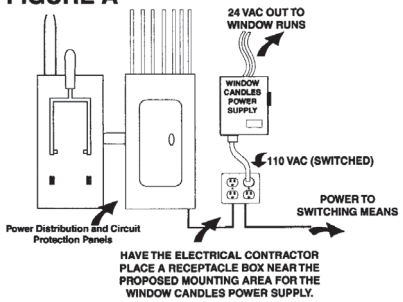
WindowCandles
User & Installer Guide

1. Safety Cautions and Recommendations: This system is an electrical device and as such should be handled with caution. This system was designed to be professionally installed and tested prior to use by the homeowner. Safe installation of this WindowCandles Low-Voltage Lighting System will insure years of enjoyment for the homeowner and their guests. Please read all Safety Cautions in their entirety as well as this entire User and Installer Guide. Should you have any questions about the installation or use of this product, please visit our website at www.windowcandles.com or call us toll-free at 1-877-NO-CORDS.

This is an electrical system; care must be exercised to install this system according to the local electrical codes in the installation jurisdiction. Some areas will require installation by a licensed electrical contractor while other areas will require installation by a licensed low-voltage installer. Check with your local government to insure compliance with all applicable regulations prior to installation.

This electrical system is based on an NEC Class 2 wiring system. All components and methods of wiring used, including the transformer, must by classified as listed Class 2 components. The WindowCandles Low-Voltage Lighting System is designed to be powered through our custom made low-voltage Class 2 UL Listed transformer and our specially designed wire. The use of any other transformer or wire will render our warranty as void and may result in a fire hazard or electrical shock.

FIGURE A



2. Theory of Operation and Installation: The WindowCandles Low-Voltage Lighting System is designed to be simple to install and to operate. Homeowners will enjoy beautiful windowsill mounted accent lighting without the ugly cords, multiple switches and burning hot bulbs normally associated with freestanding 110 VAC electric candles of any kind. Best of all, the system approach allows one control to operate the entire household. You can, of course, wire the home for multiple zones of operation; for example, to allow the children's bedchambers to be switched off independent of the remainder of the home. The system is extremely flexible and since it is a low-voltage system, it is safe to operate.

Installation takes three easy steps for the installer. First, the planning and pre-wiring during construction of the home, before wallboard is hung. Second, installation of the Candle System Mounting Clip in each window to be wired, which happens after the trim carpenter has installed the windowsill and generally before the homeowner takes possession of the home. Third is the final delivery, installation of the candles and decorative bases and instructing the homeowner about the system.

Early involvement with the builder/general contractor and trim carpenter is essential to easy implementation. Proper use of the WindowCandles Installation Sticker on each window where a candle is to be installed will help to insure cooperation of the wallboard installers and the trim carpenter. Both are essential for successful installation!

3. Location of WindowCandles Transformer and Controls: Typically, one would like to locate the transformer(s) near the electrical distribution panel (basement or garage). This allows for a central location for the homeowner to access all household controls (electric, phone, alarm and WindowCandles). Secondarily, the distribution panel is typically located in an area which is easy to access with the wire runs (since the electrician had to pull the power lines there as well). Each of our large WindowCandles transformers is fused on the 110 VAC input and each tap off the secondary output has a current limited circuit breaker (automatically resets once load is removed and power is again restored to the primary), and comes with a 6 foot long grounded plug cord. Hence, have the electrician put an outlet nearby and you simply plug it in **(see figure A)**.

Different control means can be applied depending on the homeowner's desires. We have seen use of an outdoor mounted photocell for dusk to dawn operation, use of the photocell with a timer (time delay relay) for timed operation triggered by dusk, a simple switch operation with the switch mounted in the foyer closet next to the alarm system switch, or combinations of the aforementioned such as a dusk to dawn with an in-line switch for a manual override **(see figures B and C)**. Please consult with the electrical contractor on the jobsite for assis-

FIGURE B

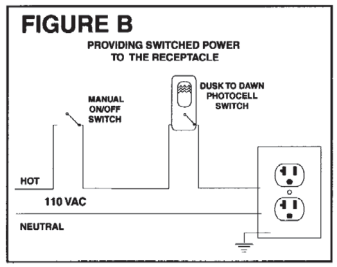


FIGURE C

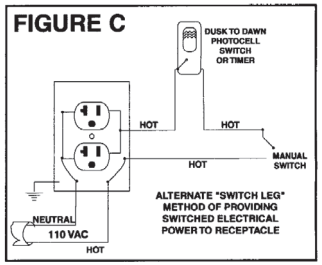
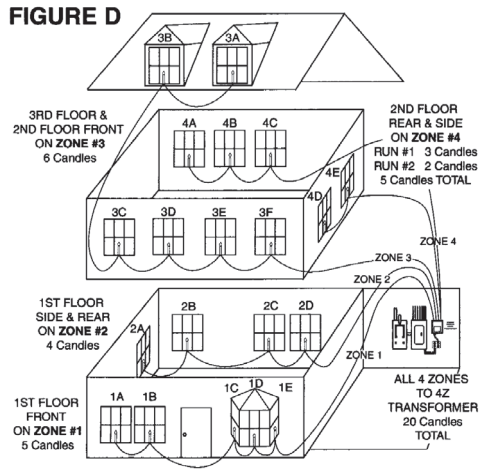


FIGURE D



tance in planning and implementing any 110 VAC switching and controls to be used. Most electrical contractors will install a switched (or photocell controlled) outlet box at your preferred location for mounting the WindowCandles transformers.

The simplest control means is to have a switched outlet placed near your preferred WindowCandles transformer location and use an off-the-shelf 24 hour timer to switch 110 VAC power to the transformers. A manual override switch can be installed in an accessible spot (foyer closet, top of basement stairwell, mud room, etc.). Discuss this to make sure the electrical contractor is aware of the requirement. You should double check the control and 110 VAC power availability during rough-in and before the wallboard is installed.

4. Rough-in runs or pre-wires: Since this is a low-voltage system, the wire used to feed the candles will, to some degree, act as a resistive element in the system. Hence, the voltage (potential) available will diminish as the run becomes longer. However, a run would have to be over 400' for a reduction of voltage to the candles to apply. It is recommended that the installer carefully survey the subject dwelling before choosing the WindowCandles transformer mounting area. Likewise, the selection of the supply runs are important. The planner should strive to balance the runs so that all runs carry approximately the same number of fixtures. Six fixtures per run (not zone) are recommended and this number should be de-rated to two or three when the run is over 400' long. We find it helpful to plan runs in a logical fashion. For example: Zone 1 might be first floor front (as you face the home), Zone 2 might be first floor rear and left side Zone 3 might be the second floor front and third floor dormers, with Zone 4 being second floor rear and right, with both runs coming together down to the first floor and joining at the transformer location **(see figure D)**. Wires for all four zones are then connected at the transformer. *Note: You can also have a run with 2 WindowCandles, a run with 3 WindowCandles and a run with 1 WindowCandle for a total of 6 WindowCandles. This would be zone 1, for example.*

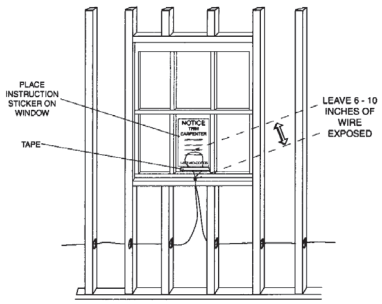
In the estimating and planning stages, it is easy to note the run configuration. Proper recording of the runs will help immensely when trying to debug an installation after the wallboard is in place. Likewise proper marking of the runs or wires at the transformer will ease the final installation process as well.

Our custom Mounting Clip and Wire Lock components make installation simple and safe provided you use our specially made and designed top quality Class 2 UL recognized wire from WindowCandles and its approved suppliers.

Make all runs in accordance with NEC wiring guidelines and in accordance with any local regulations in force. Do not run this low-voltage wire through any conduit or bored hole alongside any high voltage (110 VAC or higher) current carrying wire or cable. Also, do not run this wire through any junction box, receptacle box or switch box which contains any conductor carrying 110 VAC or higher. All low-voltage runs must be kept clear and independent of any high voltage (110 VAC or higher) current carrying wires or cables.
Run wire from either end of the planned run to each window sequentially using the shortest possible distance that is reasonable. Leave a small

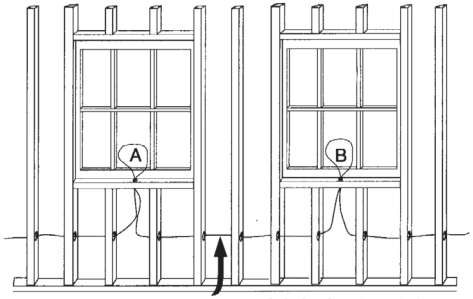
FIGURE E

ROUGH IN & STICKER PLACEMENT
(before wallboard installation)



DO NOT STAPLE OR OTHERWISE IMPEAD
WIRE MOVEMENT DIRECTLY BENEATH
SILL PLATE IN WALL CAVITY.
YOU MUST EVENTUALLY PUSH WIRE
BACK INTO THE WALL CAVITY.

FIGURE F



IF THIS SECTION IS BROKEN, REPLACE ENTIRE SECTION - CUT AT "A" AND "B" & REPLACE ENTIRE SECTION. **DO NOT REPAIR WIRE IN THE WALL CAVITY!! ALL WIRE INSULATION MUST BE CONTINUOUS WITHIN WALL CAVITY.**

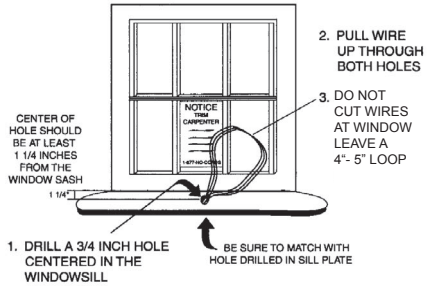
coiled up loop at each window nearest where the mounting clip is to be mounted. The loop should have at least 6 to 10 inches of each wire exposed after threading through the sill plate **(see figure E)**. Leave the wire in a coiled loop uncut, so that when you return to install the mounting clips you can check the run continuity first. This will help to avoid unnecessary troubleshooting – see section 8 for more tips on Mounting Clip installation.

5. Prepare for wallboard and trim installers: At each window to be outfitted with a Mounting Clip Assembly, place one WindowCandles Installation Window Sticker directly above the center of the sill where the Mounting Clip will be located **(see figure E)**. This Window Sticker will help the wallboard installer and the trim carpenter know how they are to proceed with their specialties and aid in the finished installation of the WindowCandles Low-Voltage Lighting System. This is extremely important – one unwired window will totally mess up your day at final installation and cause you a tremendous amount of expensive rework. Hence, use the stickers – they work! They cause the tradesmen to pay attention and not to forget their part in delivering an excellent finished product for the homeowner.

At each window provide an ample loop of wire for the trim carpenter to thread through the sill plate during trim out. We find it easy to loop the wire, make a small coil and tape it to the window frame **(see figure E)** at the location of the mounting clip (center of the window). It is important not to staple the wire near the feed-thru – once you connect the Mounting Clip you will need to push the excess wire back down into the wall cavity. Staples near the feed-thru cause trouble when back feeding the excess wire.

FIGURE G

AFTER INSTALLATION OF WINDOWSILL



6. Testing for run continuity at rough in: Once the runs are complete, strip and twist the far end of each run to short the pair together. At the transformer mounting location all runs should be neatly wound and stowed to prevent damage by other trades during the construction process. Using an ohmmeter, test the continuity for each run – all runs should be continuous. If you have an open run, find out why right now – once the wallboard is in place you will have great difficulty fixing a torn or cut piece of wire. If you do have a cut or tear, DO NOT repair the wire in line, rather remove and replace the section of wire from the nearest window loop on each side of the break **(see figure F)**. In this manner, all concealed wire will have a continuous insulation jacket that is UL recognized. We tag and mark each wire run at the Transformer end with the run location and the number of fixtures on the run.

7. Trimming out Windowsill: Once the windowsill has been installed, the final installation of the window candle can begin. Pull the wire back through the hole drilled in the sill plate. Drill a 3/4 inch hole in the center of the sill at least 1 1/4 inches away from the window sash or the surface that is the farthest out onto the sill. Make certain that this hole meets the hole previously drilled in the sill plate. Now feed the wire back through both holes so that 6-10 inches of wire is exposed. Make sure that the wire, once pulled through the 3/4 inch hole, can be easily pushed back into the wall cavity. It is critical that the wire can befreely pushed back into the hole. Leave wire hanging out of the hole, do not push back into wall. Do not use use foam insulation in or around the wire or 3/4 inch hole **(see figure G)**.

8. Mounting Clip Installation and pre-testing the system: When you return to the site to do the Mounting Clip installation, you should first do a complete walk through to check each window for proper preparation by the trim out tradesmen. Also, do a double check to make sure the number of windows on each run matches your rough-in notes. In addition, check the transformer location to insure the runs are not relocated, damaged or otherwise tampered with. In most cases, you will find everything to be in proper order. If not, do not proceed without first checking with the general contractor or homeowner to establish clear lines of responsibility and authority for correcting the problem.
With the walk through complete, use an ohmmeter and recheck continuity through each run to insure no additional damage was inflicted during insulation installation or wallboard installation. This continuity check will only tell you if there is a break in the line – it will not tell you if a nail or staple has pierced the line and is shorting the pair together. For this reason, when you begin to install the Mounting Clips, we recommend using a very loud continuity meter to check each location as you go. Attach the test meter at the run terminal end nearest the location of the permanent transformer. Start with the window on the run nearest to the power supply and work down the run towards the last window on the run, checking each Mounting Clip before moving to the next window. If you get a non-working condition, first check the termination in the Mounting Clip being tested and in the Mounting Clip immediately preceding the test location. If these are both good then you most likely have a nail or staple shorting the wire in between the two locations.

FIGURE H