

## The White Lightning WL 10,000 and WL 5,000 Flash Units Operating Instructions

### **WARNINGS:**

*To avoid potentially lethal conditions, this unit must be connected to a 3-wire grounded outlet. Do not operate with two-wire extension cords or use an adaptor to connect to ungrounded outlets.*

*This unit contains high voltages and internal components that can store dangerous voltages even when the unit is unplugged. The unit contains no user serviceable parts and should not be disassembled, except by a qualified technician.*

*The flashtube and modeling lamp can get extremely hot. To change lamps, turn the unit off, then unplug power cord from the outlet. Allow the unit to cool, and use insulating gloves to remove or replace lamps. Do not allow finger oils to contact the lamps as this can cause excess heating and premature lamp failure.*

*Before attempting to operate the unit, ensure that it is securely mounted to a light stand or other suitable mechanism. Do not allow unattended children around studio flash equipment as potentially dangerous conditions may result. These dangers may include burns and electrical shock hazards as well as the possibility of falling equipment if cords are tripped over.*

*Never operate the unit in wet locations such as near bathtubs, swimming pools or outdoors in wet weather. Common sense should accompany all usage.*

### **PRODUCT DESCRIPTION:**

The White Lightning WL 10,000 and WL 5,000 units are extremely precise, high power electronic photoflashes. They are designed for professional studio use, and are well-suited for demanding location usage due to their very compact, yet highly durable construction.

The WL 10,000 delivers 250 true wattseconds of energy per flash, and the WL 5,000 delivers 130 true wattseconds of energy per flash. The flash units emit light at a color temperature of approximately 5500° Kelvin, balanced for correct "daylight" exposure. The provided 100 watt modeling lamp is intended for scene preview, focusing and aperture calculations rather than for exposure. It emits light in the color temperature range of 2000° to 2800° K. Since the instantaneous flash intensity is some 4000 times brighter than the modeling lamp, the color temperature difference between the modeling lamp and the flashtube is of no consequence to the color balance on the exposed film.

The WL 5,000 and 10,000 units are designed to be used singularly, in multiple unit setups, or in conjunction with battery operated camera flash units. Provisions have been made to mount umbrellas and other accessories commonly used in the professional photo studio. The units are designed to be mounted on standard studio light stands or boom assemblies.

The units should be operated only from standard 120VAC 50/60HZ outlets. The units have circuit protection in the form of a 2A circuit breaker. This relatively low current consumption allows for safe operation with standard (18/3) household extension cords. Typically, up to seven units may be operated from 15A power feed.

### **CHANGING THE MODELING LAMP:**

The WL 5,000 and 10,000 units use standard 100 watt household lamps for modeling. Standard

'Inside Frost' lamps are to be preferred over 'Soft White' types, for optimum light characteristics. While it is permissible to substitute lower wattage lamps, no higher wattage than 100 watts should be used.

While the modeling lamp will normally serve around 100 hours before burnout, it will become slightly dimmer with use to internal blackening. For optimum performance, it is recommended this bulb be changed after each 200 to 300 hours of use. Should it become necessary to replace the modeling lamp, the following safety precautions should be observed first.

1. Unplug the unit from the AC power outlet. Place both power switches in the 'out' position.
2. Wait at least 5 minutes for the internal capacitors to discharge.  
Note: Capacitors will not discharge if either power switch has been left 'in'.
3. Unscrew the old lamp and replace with new lamp.

#### ***CHANGING THE FLASHTUBE:***

The ring flashtube used has a typical life span from 50,000 to 100,000 flashes in normal usage. Except in heavy commercial usage, it is unlikely that replacement will be necessary. The flashtube should be replaced only with direct replacements available from the factory. In normal service, there is little likelihood of a need for replacement. Should replacement be required, the safety precautions above for discharging the unit must be observed. Once the unit has been discharged and the modeling lamp removed, the flashtube may be unplugged, and a replacement tube may be inserted. It is recommended that a tissue paper be used to handle the tube, and that it be held by the metal clamp which holds the center pin in place. **MAKE CERTAIN THE UNIT IS FULLY DISCHARGED AND UNPLUGGED BEFORE ATTEMPTING TO SERVICE FLASHTUBE TO PREVENT SHOCK HAZARD.**

#### ***CIRCUIT BREAKER OPENING FROM MODEL LAMP FAULT:***

It is possible for the circuit breaker to open as a result of the modeling lamp failure, particularly after the unit has been subjected to mechanical abuse. Should the unit fail to operate, push the button in on the circuit breaker until it clicks and holds in the pushed-in position.

#### ***MOUNTING:***

Each WL 5,000 and 10,000 unit is fitted with a two-way mounting block to mate with standard 3/8 to 5/8 inch light stands. The units should always be securely mounted when in use, and cords should be routed where they won't be tripped over. Units should not be left 'On' unattended. The built-in swivel bracket allows for aiming the unit conveniently.

#### ***OVERHEAT CONSIDERATIONS:***

The units are designed to be used in typical studio setups, with accessories such as umbrellas and softboxes. As with any studio flash system, there are two potential causes of overheating and subsequent damage: excess heat from the modeling lamp, and overheating from firing in too rapid a sequence over an extended time period.

The WL 5,000 units may be fired as soon as recycled from 10 to 15 shots approximately, but double the recycle time is appropriate for more extended shooting sessions, such as school photography. It is not recommended that the unit be fired more often than once per 10 seconds at Full Power.

It is safe to continuously fire the WL 10,000 units as soon as they recycle for periods up to one minute (i.e. 20 consecutive flashes at Full Power, 20 at 2/3 Power, or 60 at 1/3 Power). For extended shooting, it is recommended that triple the recycle time be allowed between shots to

prevent potential damage from overheating. Thus, 9 seconds at Full, 6 seconds at 2/3 and 3 seconds at 1/3 would be indicated for long sessions.

Care should be taken to prevent modeling lamp heat from building up in the electronics section. Long term operation in face-down positions, and restrictions on airflow around the reflector may result in this hazard. If the shooting situation demands long term operation under these conditions, a lower wattage modeling lamp should be installed (i.e. 60 watts), or the unit should be turned off after 15 minutes or so of shooting and allowed to cool.

#### ***TESTING AND FAMILIARITY ROUTINE:***

1. Plug the unit into a standard 120VAC 50/60 HZ outlet. Press in the '1/3 Power' switch. After a few seconds, the modeling lamp should come on somewhat dimmed. When the unit is first operated after long periods of non-use, initial charging and recycle times will be relatively long. Charging times will decrease after a few minutes of operation.
2. Leaving the '1/3 Power' switch in, press the '2/3 Power' switch in, thus selecting Full Power. The modeling lamp should momentarily go out, then return on brighter, indicating charge to Full Power. Press 'Test/Flash'. The unit should flash and the modeling lamp should go out, then return on after about 3 seconds. Recycle times will be longer when unit is operated with 50HZ power.
3. Leaving the '2/3 Power' switch in, release the '1/3 Power' switch to the 'Out' position, thus selecting 2/3 Power. The modeling lamp should dim slightly. Now, test-flash once more. The modeling lamp should go out, then return on in about 2 seconds.
4. Notice that the modeling lamp always serves as a positive indicator of flash and recycle. Whenever it is on, the unit is charged within 1/2 f-stop of selected power, and is ready to flash.

#### ***BASIC USE PROCEDURE:***

Once the parameters and the controls are understood, using the WL 5,000 and 10,000 units is simple and straightforward. The units should be plugged in and placed at positions, with accessories, which yield the desired illumination patterns, while the power settings should be adjusted for pleasing light ratios. If the modeling lamps are to provide an accurate preview of the illumination, it is important that extraneous ambient light be removed by darkening the room such that only light from the modeling lamps illuminates the scene.

1. Place the unit(s) as desired for the lighting effect you wish to achieve. A darkened room is suggested so that only light from the modeling lamps illuminates the scene. This will allow an accurate preview of how the final exposure will appear on film.
2. Adjust the individual power levels for pleasing light balance if multiple units are being used.
3. Establish and verify the system Sync Loop. While in most setups, the flash from any one unit will trigger a flash in all other units via the built-in slave trippers, some sort of electronic flash must be triggered by direct wire to the camera to initiate the process. Usually, one unit will be wired to the camera using the sync cord provided, thus serving as a "master," from which other units will trigger. With the units positioned as desired, press the TEST button on the most conveniently located unit to the camera. It is probable that all units in the system will then fire, as verified by the momentary absence of any modeling light. That unit may be used as the master. Should this fail to fire all units, selectively press TEST on each other unit, designating any other unit that will fire all other units as the master. Essentially, any unit that will cause all other units to fire is suitable to be connected to the camera with a sync cord. Remember, once a sync cord is connected to a unit, its built-in slave tripper is disabled, and it will not fire except with the TEST button, by activating the camera shutter, or by momentarily shorting the sync cord terminals at the camera end of the sync cord. Should a unit not fire from its slave tripper due to a location receiving insufficient light from other units, the accessory RSTI slave tripper may be plugged into the sync jack on that unit to increase its slave sensitivity.

4. Once you are satisfied with the positioning and power levels, determine the correct camera aperture using either a flashmeter, a hand-held exposure meter, or the internal exposure meter in your camera.

5. You are now ready to begin shooting. Each time you shoot, the brief period of darkness that follows serves as a positive indication that all units in the system did, indeed, flash. When all modeling lamps return on, you will have an equally positive indication that the system is ready for another shot. You may want to introduce a small amount of ambient light from, say, a table lamp so there won't be total darkness during the recycle period.

6. If you are using the WL 5,000 or 10,000 in conjunction with a portable flash unit not having a modeling lamp, keep in mind that the effect of this light source will not be seen in the viewfinder, and composition must be made by estimating the additional light effect caused by the portable flash.

7. If you mix White Lightning units with other professional flash systems having modeling lamps, you must remember that it is improbable that these units will exhibit the same exacting ratio of modeling illumination to flash intensity as the White Lightning unit. In many professional studio flash systems, the ratio of modeling vs. flash intensity is neither accurate nor specified, and may vary from version to version within the manufacturer's line, or within various configurations of power supplies and flash heads. Thus, in a mixed system, it is folly to expect the modeling illumination to provide an exact preview of the illumination that actually exposed the film. It is further not possible to accurately determine correct aperture setting without a flashmeter.

#### ***POWER SWITCHES:***

The two switches marked '1/3' and '2/3' Power are used to turn the unit on or off, as well as to select flash power and tracking modeling lamp intensity. The "Off" condition results when both switches are 'out'. For safety in servicing, the internal capacitors are discharged when the "Off" mode is selected. Complete discharge of these capacitors requires approximately 3 minutes.

#### ***UMBRELLA HOLDER:***

A tube runs through the reflector in such a manner as to allow attachment of umbrellas or other accessories in the optimum position near the axis of illumination. Shafts up to 1/2" in diameter may be inserted in this tube, and secured using the hand-nut on the top surface on the unit. When fastened, umbrellas will maintain their axial relationship to the light as adjustments are made using the swivel mounting bracket. Once positioned, the light unit may be secured by tightening two swivel bracket hand-nuts on either side of the unit.

#### ***SYNC JACK AND SYNC CORDS:***

The camera sync jack located on the rear panel of each unit serves to hard-wire the unit to the camera shutter, using the sync cord supplied. In multiple unit setups, at least one of the units must be connected to the camera, unless the system is triggered in a fully wireless fashion using a small portable flash mounted on the camera. In all cases, the camera should be set on "X" sync for electronic flash.

The rear panel sync jack provides a connection point for the hard-wired sync to the camera via cords supplied. Multiple units may be wired to a common sync line by connecting all "Tips" together and all "Rings" together. It may be necessary to selectively reverse the individual power cord orientations to secure reliable tripping in a hard-wired system. Wrong or reversed connections to the sync jack circuit cannot cause any damage to the unit.

Sync cords are shipped with each unit. The large diameter plug should be inserted in the rear sync jack of the unit, while the small PC connector mates with standard camera sync terminals. If your camera does not have a standard PC sync terminal, you can use a Hot Shoe to PC Adaptor,

available from White Lightning.

Your unit is supplied with a two-piece sync cord set. The longer cord will have a household AC receptacle, while the shorter cord will have an AC two-prong plug.

Sync polarity may be reversed by reorienting the AC male/AC female pair. Certain flashmeters may operate with only one orientation, and it is possible that reversed polarity may cause false tripping when the camera body is touched with metal objects. Should this be the case, simply reverse the orientation of the AC/AC pair.

Since the AC type sync connection method, while common among professional flash systems, is compatible with household power outlets, caution is advised to prevent inadvertent insertion of AC type sync cords into household outlets. In particular, do not leave your camera around with the AC end of the sync cord exposed, especially around children, as a severe shock hazard and camera damage potential will then be present.

#### ***BUILT-IN SLAVE TRIPPER:***

Each unit contains a built-in flash sensitive slave tripper, located behind a small hole in the reflector. Because of its position, the tripper always "looks" in the same direction the unit is aimed. In most studio setups, sufficient flash illumination from other units will be bounced from the subject area, even with umbrellas in place, to cause reliable tripping. The built-in slave tripper is automatically disabled whenever anything is plugged into the rear sync jack. Thus, when hard-wired sync is used, the flash from other flash units will not fire your White Lightning setup.

#### ***TRIGGERING FROM CAMERA FLASH:***

In some cases, it might be desirable to trigger the system from a small battery-operated camera flash. When this method is used, it must be remembered that the camera flash does not have a modeling lamp and may contribute scene illumination not seen in the viewfinder. By using a low power setting on the camera flash and bouncing it off the ceiling, its effect on the exposure can be made minimal.

At times, the photographer may wish to use a portable flash as a significant source of scene illumination, in conjunction with one or more White Lightning units. Again, it is paramount to remember that the lack of a modeling lamp will tend to negate the capability to visually preview the scene. Thus, it is usually wise to use the White Lightning as the main source of light, with the portable flash being used as a bounce or umbrella fill. In this sort of use, the light ratios will have to be estimated and some experimentation will be in order.

#### ***DETERMINING CORRECT EXPOSURE:***

Professional flash systems such as White Lightning are inherently manual, requiring the photographer to determine and preset the proper camera aperture and shutter speed. With respect to shutter speed, as long as the shutter is fully open during the duration of the flash, the use of slower shutter speeds will not add to the exposure from flash illumination. However, slower shutter speeds will begin to allow unwanted ambient light to add to the exposure. Thus, the shutter speed should be held to that minimum which is consistent with the shutter being fully open during the duration of the flash.

#### **1. The Flashmeter Method**

The most direct method of determining correct camera aperture is by use of a flash meter. The speed of the film being used is dialed into such a meter and a test flash is made. The meter reads the total flash illumination falling on the subject, regardless of the number or type of flash units

used, and directly indicates the appropriate aperture to which the camera lens should be set.

When purchasing a flash meter, the user is cautioned to specify one that integrates the total flash illumination, as opposed to cheaper models that simply measure peak flash intensity. Further, the user should verify the accuracy of the flashmeter with test shots. It should be noted that many commercially available flashmeters are calibrated to under-read by as much as one f-stop, leading to overexposure.

## **2. The Guide Number Method**

The Guide Numbers printed on the back of the units have been derived by exposure and lab testing of professional transparency films. Guide Numbers were devised to allow setting the camera aperture without metering, when a flash unit is used directly (without diffusion), in relatively small rooms with light colored walls and ceilings. When larger or darker environments are used, slightly lower aperture settings than those indicated by the Guide Number calculation (1/4 to 1/2 stop) should be used.

To use the Guide Number method on a single unit (used directly), measure the distance from the subject to the center of the unit, in feet. Refer to the GN chart on the unit, under the column listing the ASA/ISO film speed you are using and under the power you have selected. Divide the indicated Guide Number by the number of feet from the light to subject, and set the camera aperture to the result. For example, If ASA100 film was being used and the White Lightning 5,000 unit was set to Full Power, a GN of 160 would be found on the chart. If the light were 10 feet from the subject, you would divide 160 by 10, for a correct aperture of f16.

If umbrellas, diffusers, bounce techniques or multiple units are being used, the Guide Number method can only serve as an approximation of correct exposure apertures. It is typical to expect a loss of from 1 to 2 f-stops from diffusion techniques. When bounce light is being used, it is important to measure the total light travel, from light to bounce surface to subject. When multiple light sources are being used, it is difficult to calculate how the light will "add". In all of these cases, you should bracket the exposures over a 2 or 3 f-stop range, and make notes for future projects.

## **3. The Modeling Lamp Method**

The degree of success using this method depends up the accuracy of the light system. If a known and accurate ratio of modeling lamp intensity vs. flash power exists, together with well-correlated polar patterns from the two sources, flash aperture determination may be arrived at by simply measuring the illumination from the modeling lamp(s), using a conventional hand-held exposure meter or the meter built into the camera. Most studio flash systems do not exhibit the criteria necessary for such measurement. White Lightning however has been specifically designed to accommodate this measurement technique, yielding accuracies comparable to those obtained with quality flash meters.

When the recommended 100 watt modeling lamp is used, the White Lightning 5,000 yields a constant ratio of 8 flash Candle Power Seconds for each modeling lamp Candle Power, accurate to 1/2 f-stop at all power settings and under all conditions of use (including when umbrellas, diffusers and bounce techniques are employed). The primary requirement for making accurate measurements by this method is to ascertain that the scene illumination being measured is, indeed, coming from the modeling lamps, and not from error sources such as sunlight leakage or ambient room light. If there is doubt regarding the level of error illumination, it is recommended that a first reading be taken with the modeling lamps off, to determine the level of ambient light, and a second reading be taken with modeling lamps on. As long as the difference between the two measurements exceeds 3 f-stops, you can be confident that error light will not significantly degrade the accuracy of the reading.

The WL 5,000 and 10,000 units both use a 100 watt modeling lamp. Since, however the WL 10,000 produces twice the flash power, the ratio is 16 Candle Power Seconds of flash per Candle Power Second of flash per Candle Power of modeling lamp intensity. Hence, if the Modeling

Lamp Method of determining flash aperture setting is to be used, the aperture should read 3.5 f-stops higher than the meter. The same is true with an in-camera meter. In order to maintain accurate previewing of lighting ratios, it is necessary that all units in a system exhibit the same ratio of modeling intensity to flash ratio. Thus, in a mixed system, it is recommended that the modeling lamps in the WL 5,000 units be replaced with 60 watt bulbs. Thus configured, both the WL 5,000 and WL 10,000 units will produce 16 Flash CPS per Modeling Lamp CP, and accurate previewing will result.

#### **USING A HAND-HELD EXPOSURE METER:**

1. With a hand-held exposure meter, take a reading from the subject position in exactly the manner you would if you were planning to expose from the incandescent modeling lamps alone.
2. Set the light meter to measure for a one second period.
3. Set the camera aperture 2 1/3 f-stops higher than the meter reads.
4. If filters are used on the camera lens, their light attenuation must be manually compensated for, as they would be with any other external metering method.

#### **USING AN IN-CAMERA EXPOSURE METER:**

1. Set the film speed dial to correspond to the film being used.
2. Set the shutter speed to 1 second, compose and focus.
3. Turn aperture ring for correct exposure indication on camera meter. Notate this aperture setting, then add 2 1/2 full f-stops. This is the correct aperture for actual flash exposure.
4. Make absolutely certain that you return the camera to flash sync speed before you actually shoot with flash.
5. Using this method will automatically compensate for any filter use, as well as for bellows compensation on close ups.

#### **SPECIFICATIONS:**

**Powering:** 120VAC, 50/60HZ, 2A

**Maximum Power:** 250 wattseconds in the WL 10,000 units, and 130 wattseconds in the WL 5,000 units

**Controls:** Full Power, 2/3 Power, 1/3 Power, and Test/Discharge

**Modeling Lamp:** 100w household max. (indicates recycle status)

**Recycle Time:** 3/2/1 seconds in the WL 10,000 units, and 1.5/1/0.5 seconds in the WL 5,000 units

**Flash Durations (@100% Power):** 1/300 second in the WL 10,000 units, and 1/600 second in the WL 5,000 units

**Flashtube:** 300 wattseconds plug-in ring flash

**Flashtube Life:** 50,000 to 100,000 flashes in typical usage

**Size:** 7" diameter x 6" (excluding bracket)

**Weight:** 3.25 pounds for the WL 10,000 and 2.5 pounds for the WL 5,000

**Mount:** 3/8" to 5/8" two-way mount

**Umbrella Mounting:** 0.5" diameter, 1.5" off axis

**Coverage:** 60°

**AC Isolation:** 50uA max. leakage to AC line

**Thermal:** convection cooled with built-in thermal barrier

For any comments, questions, or repair needs, please contact Paul C. Buff Inc. by phone or e-mail.

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