

# UNIVERSAL SYNC BOX OPERATING INSTRUCTIONS

## INTRODUCTION

The Universal Sync Box is designed as a universal electronic interface between lenses/shutters and a digital back when utilizing a camera that doesn't communicate directly with the back. The Sync Box can automatically wake up backs that require a wakeup signal milliseconds before an exposure to simplify operation and speed, makes *any* shutter from the history of photography easy to use with your back, even if it has no sync port, a broken sync port, or a non-digiback-compliant sync port (very common on older shutters). In conjunction with the Mercury Shutter Actuator, the Sync Box can electronically actuate purely manual shutters at the precise time in the exposure sequence. It can fully control the exposure on your digiback, or it can pass exposure control to a connected shutter. It can even trigger electronic shutters as part of its sequence.

All of these features can be mixed and matched to meet your needs for a given camera, back, lens, and shooting style combination. Thus the sync box can eliminate many partial solutions such as finicky “one-shot” cables, high-battery drain “zero latency” modes, and manually timing multiple remotes using “B” modes. There is no reason that shooting on a fully manual camera should be a punishing experience! Similarly, there is no reason not to be able to use old and non-compliant shutters, opening up many new possibilities for vintage lens use.



## COMPATIBILITY

The Sync Box is compatible with all Phase One and Leaf digital backs from 1998 to the present. It is untested but likely to work on other brands.

The Sync Box is compatible, using various modes, with any controllable shutter.

The Shutter Actuator is compatible with any properly working “set-and-release” shutter that uses a standard remote release port. It is not compatible with “self-cocking” or “press” shutters (though those shutters still work fine with the Sync Box—they just can't be electronically actuated).

## MOUNTING AND POWERING

The Sync Box can be mounted on any standard cold/hot shoe. It can be powered with an AC adapter, the Slim Battery Pack, the Actuator Battery Pack, or a rechargeable battery bank of your choice. For basic operations not involving the Shutter Actuator, any of these power sources will work, including the Slim Battery Pack, which takes a single 9V battery (we recommend a rechargeable one).

In order to use the Shutter Actuator, you must use the Actuator Battery Pack or an AC adapter. The Actuator Battery Pack takes two 9V batteries and uses a large capacitance system (similar to a camera flash) to send high amperage pulses to power the Shutter Actuator. Any 18V or 19V AC adapter can be used to power the Sync Box, with or without the Shutter Actuator. For maximum power, and for Actuator T-Mode, a 19V 6A power supply is recommended.

The Actuator Battery Pack has its own power switch, and should be switched off when not in use, even if the Sync Box is switched off, or it will slowly drain your batteries. We recommend alkaline batteries for maximum power in the Actuator Battery Pack.

The Slim Battery Pack and Actuator Battery Pack both contain bottom cold shoe feet and top cold shoes, enabling you to mount them directly to your camera and then stack your Sync Box on top of the battery pack. They can also be mounted in other orientations with the use of a 2.1x5.5mm extension cable.



## INTERFACING WITH YOUR DIGITAL BACK

The Sync Box connects to all digital backs via a standard PC Sync port. You will need the basic cable required by your back to interface with a PC port. On older backs this was often a generic PC-to-2.5mm cable; on newer backs it is a proprietary cable.

If you wish to use the Wakeup function of the Sync Box, you may also need to set your latency to match your back. Latency is controlled through two DIP switches on the top of the Sync Box. These are the possible switch positions:



|  |                |  |
|--|----------------|--|
|  | Normal Latency | Use with most digital backs. Default. This is the fastest setting.           |
|  | Medium Latency | Use with backs if Normal Latency doesn't work.                               |
|  | Long Latency   | Use with Phase One P-series backs set to "Long Latency" for battery savings. |
|  | IQ4 Backs      | Use with Phase One IQ4 series backs.   |

## INTERFACING WITH YOUR SHUTTER

If your shutter has a working, digiback-compatible sync port, connect it to the Sync Box's "Shutter Sync" port (2.5mm jack) on the front of the Sync Box. If you will be controlling your back's exposure directly with the Sync Box, this port is not used.

If you wish to trigger your digiback directly from a shutter, but that shutter has a non-digiback-compatible sync port, or you need to add a wakeup pulse, etc., you can make the shutter the trigger for the Sync Box. In that case, connect your shutter's sync port to the "Trigger" port on the front of your Sync Box. If you will be adding a wakeup signal to your exposures, you will need to shoot at somewhat slower shutter speeds, as the wakeup pulse will delay the start of your exposure slightly.



### ***Shutter Actuator***

If your shutter is compatible with the Mercury Shutter Actuator and you wish to automatically trigger the shutter, screw the Shutter Actuator into the shutter's cable release socket, then connect the Actuator's 3.5mm cable to the "Shutter Actuator" port on the front of the Sync Box.






### **Experimental: Actuator T-Mode**

If you have a shutter with T mode and wish to produce electronically actuated exposures longer than 1 sec (the longest timed setting on most mechanical shutters), you can activate T-Mode using the DIP switch on the top of the Sync Box. T-Mode automatically actuates your shutter at the beginning of the exposure and then again at the end of it (to close the shutter). This only happens if (a) “Shutter Actuate” is switched on, (b) “Expose” is switched on, (c) the Actuator Mode DIP switch is set to “T-Mode” and (d) the Timing knob is set to 2, 4, or 8 seconds. Note that actuator T-Mode will also work with Trigger B-Mode (see Expose section below for details about Trigger B-Mode). Note that Actuator T-Mode draws a lot of amperage from your power supply, and can sometimes cause errors if the power supply isn’t up to the task. It is not required, but recommended that you use the optional 6 amp AC adapter if using Actuator T-Mode repeatedly or if you need absolute stability.

### **Experimental: Actuator B-Mode**

This highly experimental mode operates just like Actuator T-Mode, except that instead of actuating the shutter twice, it simply keeps the shutter open for the duration of your set exposure time. Exposures over 4 seconds in duration will cause your Shutter Actuator to begin to overheat. This mode should only be used if you have no other choice (you need a precisely timed exposure above 1 second and your shutter doesn’t possess a T setting), and at your own risk.

|   |               |   |
|---|---------------|---|
|   | Standard Mode | Actuator fires once to start exposure.  |
|  | T-Mode        | Actuator fires once at beginning of exposure and once at end.                 |
|  | B-Mode        | Actuator continually actuates until end of timed exposure. Experimental only. |

### **Electronic Shutters**

If your shutter is electronic and can be activated via a “dry contact” or “remote” port, connect your shutter’s trigger port to the “Elec. Shutter” port on the front of the Sync Box. You will need a 2.5mm cable that terminates in whatever interface port your electronic shutter utilizes. Set your shutter’s interface to “Ext. Trigger” if required. “Shutter Actuator” must be turned on, even though you won’t actually connect anything to the Shutter Actuator port. The Sync Box, when triggered, will now automatically trigger your electronic shutter as part of its sequence.

## **TRIGGERING YOUR SYNC BOX**

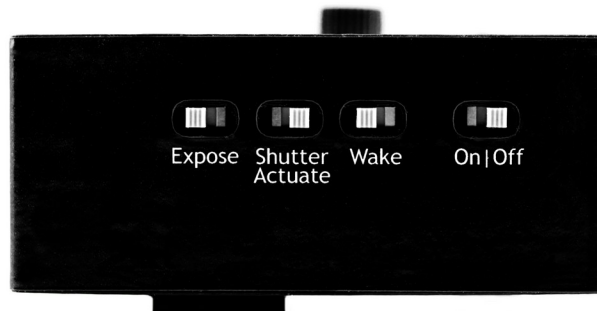
Your Sync Box can be triggered with a handheld, wired remote (the most common solution), via a wireless flash trigger such as a Pocketwizard, or directly by a shutter (as described in the section above). In all cases, your trigger must be connected via a 2.5mm cable to the “Trigger” port on the

front of your Sync Box. Whenever your triggering device is activated, the Sync Box will activate a sequence that includes whichever functions you have selected it to perform.

For readily available, inexpensive handheld remotes, you can use any one designed for the Canon Rebel series of SLRs.

## ELECTRONIC FUNCTIONS

There are three main functions that the Sync Box can perform electronically. Each is independently switched on or off via a switch on the left side of the Sync Box.



### **Wake**

When switched on, this function will add a wakeup signal to the Box's sequence. The first thing that will happen when the Sync Box is triggered is the sending of this signal to your digiback to wake up its sensor. Make sure that the latency of this signal has been properly selected for your back, as described above (Interfacing With Your Digital Back).

### **Shutter Actuate**

When switched on, the Sync Box will, as part of its triggered routine, activate a connected Shutter Actuator, automatically triggering a connected shutter at the correct moment in the sequence. For this to work properly, make sure that you are using a compatible shutter type (set-and-release), that the Shutter Actuator is properly connected to the shutter and to the Sync Box, that you are powering the Sync Box with either an adequate AC adapter or the Shutter Actuator Battery Pack, and that your shutter has been cocked/set.

If you wish to trigger an *electronic* shutter connected through the "Elec. Shutter" port, you must switch this function on, but there is no need to connect a Shutter Actuator, and any power source will be adequate.

### **Expose**

If this function is switched on, the Sync Box will take over from your shutter and send the main exposure signal to your digital back. The duration of the exposure is determined by the position of the rotary switch on the top of the Sync Box. For the Expose function to work properly, this setting must

be *longer* than the exposure time set on the shutter. This is because the exposure must begin before the shutter is opened and end after the shutter is closed. If you will be manually activating your shutter, you will need even more time to do so. In most cases, there is no penalty to setting a long exposure time, giving you plenty of working time with the shutter once you've triggered the Sync Box.

The "8/B" setting on the rotary switch will continue the exposure for as long as the Sync Box's trigger is activated/pressed. If that duration is less than 8 seconds, it will continue the exposure until a total of 8 seconds has elapsed.

If you have a shutter directly connected to the Shutter Sync port of the Sync Box *and* you activate the Expose function, the Sync Box will send an exposure signal to your digiback that is the longer of the two settings (shutter vs. Sync Box).



### **Combining Electronic Functions**

These functions can be switched on in any combination. The Sync Box will automatically time its activation sequence such that the various functions occur in the proper order and with the proper timing.

## **MANUAL FUNCTIONS**

Any shutter connected to the "Shutter Sync" port on the Sync Box will be able to activate your digiback in the usual way, even if your Sync Box is turned off.

The "Manual Wake" button on the top of the Sync Box can be used to manually send a wakeup pulse to your digiback. This too will work even if your Sync Box is turned off.

Thus, if you wish to interface a shutter with your digital back the "old fashioned" way, with a manual wakeup button press and shutter trigger, you can do so without changing any connections. Similarly, if your Sync Box power source dies, you can still shoot manually without any re-configuration.

These manual functions can be combined with any of the electronic functions described in the above section.

## **LED STATUS INDICATOR**

**Green:** Ready to trigger.

**Red:** Currently activating an exposure sequence.

**Rapidly flashing Green and Red:** Either starting up or recovering from a battery under-amperage error. If encountered during an exposure sequence, it is an error. Try again, or upgrade your power source.

## APPENDIX I: EXAMPLE SCENARIOS

While nearly limitless different setups are possible, here are some examples of the most common scenarios and the proper Sync Box connections and settings. All require your digital back to be connected via PC Sync cable to the back of the Sync Box.

### **1: Manual shutter with sync port, passthrough (everything manual):**

Shutter's flash sync to "Shutter Sync" jack  
Optional: Remote to "Trigger," Wake switch On, Expose switch Off

*Press Wake button or remote to wakeup back if necessary, fire shutter normally to expose.*

### **2: Manual shutter with sync port, automatic triggering (set and release shutters only):**

Shutter's flash sync to "Shutter Sync" jack.  
Shutter Actuator screwed into shutter's release socket.  
Shutter Actuator plugged into "Trigger" jack.  
Remote to "Trigger" jack.  
Shutter Actuate switch On.  
Expose switch Off.  
Wake switch On if back needs wakeup, Off it is doesn't.

*Press remote's trigger to automatically initiate wakeup, exposure, and triggering.*

### **3: Manual shutter with sync port, not compatible with Shutter Actuator:**

Shutter's flash sync to "Shutter Sync" jack.  
Remote to "Trigger" jack.  
Expose switch On.  
Wake switch On if back needs wakeup, Off it is doesn't.  
Rotary dial set to longer exposure than shutter, plus extra time for shutter triggering.

*Press remote's button to initiate wakeup and exposure, then trigger shutter manually.*

### **4: Manual shutter without functional sync port, automatic triggering (set and release shutters only):**

Shutter Actuator screwed into shutter's release socket.  
Shutter Actuator plugged into "Trigger" jack.  
Remote to "Trigger" jack.  
Expose switch On.  
Shutter Actuate switch On.  
Wake switch On if back needs wakeup, Off it is doesn't.

Rotary dial set to longer exposure than shutter.

*Press remote's trigger to automatically initiate wakeup, exposure, and triggering.*

#### **5: Manual shutter without functional sync port, not compatible with Shutter Actuator:**

Remote to "Trigger" jack.

Expose switch On.

Wake switch On if back needs wakeup, Off it is doesn't.

Rotary dial set to longer exposure than shutter, plus extra time for shutter triggering.

*Press remote's button to initiate wakeup and exposure, then trigger shutter manually.*

#### **6: Electronic shutter (with dry contact trigger):**

Electronic shutter trigger jack to "Elec. Shutter" jack.

Electronic shutter flash sync to "Shutter Sync" jack.

Remote to "Trigger" jack.

Shutter Actuator switch On.

Wake switch On if back needs wakeup, Off it is doesn't.

Rotary dial set to similar or shorter exposure than shutter.

Press remote's button to automatically initiate wakeup, trigger, and exposure.

*Less likely:*

#### **7: Manual Shutter with flash sync using exclusively 1/10 or longer shutter speeds (press or other shutter that can't be triggered with the Shutter Actuator):**

Shutter's flash sync to "Trigger" jack.

Expose switch On.

Wake switch On if back needs wakeup, Off it is doesn't.

Rotary dial set to longer exposure than shutter.

Trigger shutter manually to automatically wakeup back and expose shot.



## APPENDIX II: VINTAGE LEAF SHUTTER CAPABILITIES

**Copal:** All Copal shutters use PC sync ports and, when in good repair, are compatible with digital backs and all Sync Box functions. Any non-Press variety in proper working condition is compatible with the Shutter Actuator.

**Compur Synchro:** These generally have the same characteristics and compatibility as Copal shutters.

**Seiko:** These generally behave like Copals and Compurs; however, they usually lack onboard sync and shutter release ports. Mercury Works makes simple kits to remount these from their original cameras/boards to new mounts.

**Wollensak/Graflex/Century:** These popular vintage shutters use a bi-post connector for sync. They tend to be highly unreliable when used to trigger a digital back. They work well with the Sync Box, though poorly maintained and self-cocking ones won't work with the Shutter Actuator. A bi-post to 2.5mm sync cable is necessary if you wish to use their onboard sync, but in most cases, we recommend using the Expose function of the Sync Box instead.

**Kodak:** Another popular vintage shutter brand, especially for Kodak's highly regarded vintage lenses, these shutters send an incompatible expose signal to digital backs, leading to errors or improper exposures. Their sync signals can, however, be used to trigger the Sync Box if you wish. All other functions also tend to be highly compatible with the Sync Box.

**Ilex Universal:** These are common shutters for large vintage lenses. They send unreliable signals for proper exposure on a digital back, and many lack sync ports at all. We recommend using the Expose function for these shutters. Because these are self-cocking shutters, the Shutter Actuator is not compatible.

**Ilex Acme:** These are not directly compatible with digital backs, but work well with the Sync Box. They can be used to trigger the Sync Box (using a bi-post to 2.5mm cable), and the Shutter Actuator is often compatible with them.

**Ilex Electronic:** These usually have bi-post sync connectors, but they are fully compatible with digital backs. We recommend connecting their sync ports directly to the Shutter Sync port on the Sync Box. Their control units can be modified with an isolated (relay) input to add dry-contact triggering, which is then compatible with the Sync Box, for fully automated control.