

674 (HH1) PIC CHIP

Always On - Operating Instructions (Revision 1)

HH1 COMPLETE BOARD



This manual is a living document, therefore it will change when needed to clarify and explain the operation of the 674 (HH1) PIC chip and the HH1 Complete Board. Please refer to the revision date to verify if your copy is the latest edition. Any updates will include an update to the revision date.

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The 674 (HH1) PIC chip is a custom programmed micro controller chip. It is one of the PIC chips that can be used in the HH1 Complete Board. The 674 (HH1) PIC chips are **not** reprogrammable, but the programs can be altered if custom settings are desired. Replacement PIC chips with custom settings are available for \$10 per chip. The standard programmed settings will be described in this document with notation at possible alteration points.

The 674 (HH1) PIC chip and HH1 Complete Board control the following cameras:

[Olympus D370 / D380 Digital Camera modification](#)

[Canon Sure Shot Owl PF 35mm Camera modification](#)

674 (HH1) PIC Chip Features:

1. Initial Delay: The **On-Off Slide Switch** control features listed below.

The initial delay will last approximately 1 minute.

After you have installed the HH1 Complete Board per the installation instructions, and added a 9-volt battery to the battery holder, turn the On-Off Slide Switch to on and you will see the LED blink once as a signal the board started it's initial delay and everything is okay. If you do not see a blink then cycle the power again. When the initial delay is complete, the LED will blink again to signal the board is now in **standby mode**. The built in initial delay allows the sensor to stabilize, and avoid a false picture from an errant trigger pulse.

2. Standby Mode: After initial delay the 674 (HH1) PIC chip automatically goes to the "standby mode" which holds the HH1 Complete Board in a "push button command only" state for 5 minutes. During this 5-minute period only the Test and Delay push button switches work. Any press of the buttons will respond immediately with a LED signal as outlined in the operating instructions below. **Once any button is pressed the 674 (HH1) PIC chip is out of standby mode for good, and is in either test mode or normal operating mode depending on which button you just pressed.** (See instructions below) You do not have to wait 5 minutes for the standby mode to time out, the 5 minutes is just the length of time the board stays in standby mode before it automatically returns to **normal operating mode**.
3. Test Function: The **Test Button** control features listed below.

Walk Test Mode - **You cannot activate the walk test mode until the initial delay has timed out.**

In **standby mode** or **normal operating mode**, activate the walk test mode by pressing the Test Button and releasing it. The LED will light solid and then go off. The HH1 Complete Board is now in walk test mode. Every time the sensor is triggered, the LED will blink. It will continue to do so until you press and release the Test Button again. When you do press and release the Test Button again you will see eight short blinks from the LED signaling return to normal operating mode. The walk test mode is a visual confirmation of the distance and area the sensor is detecting from its current position. Simply walking in front of the sensor will trigger the 674 (HH1) PIC chip to activate the LED. The 674 (HH1) PIC chip is programmed to return to normal operating mode from walk test mode after 5 minutes of inactivity. The 5-minute countdown is reset after each trigger in walk test mode.

NOTE: There is approx. an 8 second delay after the sensor is triggered before it can be triggered again. This delay is the time needed for the sensor to reset itself and may vary slightly.

4. Delay Function: The **Delay Button** control features listed below.

Delay Mode - **You cannot activate the delay mode until the initial delay has timed out.**

There are nine different time delay modes you can access with the delay button. The different delay modes set the delay time between possible pictures. The LED will blink the respective number for each delay mode below. Example: Delay 1 would blink once, delay two would blink twice and so forth.

1. Delay 1 - 10 Seconds (minimum)	1 blink
2. Delay 2 - 30 Seconds	2 blinks
3. Delay 3 - 1 Minute	3 blinks
4. Delay 4 - 3 Minute	4 blinks
5. Delay 5 - 5 Minute	5 blinks
6. Delay 6 - 10 Minute	6 blinks
7. Delay 7 - 20 Minute	7 blinks
8. Delay 8 - 30 Minute	8 blinks
9. Delay 9 - 1 Hour	9 blinks

In **standby mode** or **normal operating mode**, press the Delay Button. The LED will blink according to the new delay mode it is in. Consecutive press of the Delay Button, **with a 3 second delay between the presses**, will advance the delay mode to the next level. After delay 9 the sequence returns to delay 1.

* **NOTE:** Alternate delay times are available with custom programming.

Checking Delay Without Changing It - In **walk test mode**, push the DELAY Button and the LED will blink the delay mode you are currently in without changing it. When the last blink for which delay you are in has finished, the HH1 Complete Board returns to walk test mode and a trigger from the sensor will blink the LED just like before.

Double Picture Mode - To change from single picture mode to double picture mode you have to press the delay button right after the blink indicating which delay mode you're in. **Do not wait the 3 seconds between the button presses.** From delay mode 1, when you press the button you will see two blinks telling you that you went from delay mode one to delay mode two. Right after the last blink, which indicated delay mode two, you have a two second window in which to press the delay button again. The LED will now flash eight times indicating that you are now in delay mode two and double picture mode. Another press of the Delay Button will advance the delay setting to delay three and back to single picture mode. You would only see three LED blinks. Another press of the Delay Button, within 3 seconds of the last LED blink, would yield another 8 short blinks from the LED indicating double picture mode in delay 3. The double picture mode is set the same way through all 9 delays.

The double picture mode setting automatically activates the camera to take a second picture 10 seconds after the initial picture, with or without a second trigger pulse from the sensor itself. The 674 (HH1) PIC chip will activate the delay countdown after the second picture. The HH1 Complete Board has to be manually set to Double Picture Mode each time the board is powered up. This prevents accidentally leaving the board in Double Picture Mode.

Adjustable Refresh Mode - **You cannot activate the adjustable refresh until the initial delay has timed out.**

In **standby mode** or **normal operating mode**, hold the Delay Button in until the LED comes on solid, then release. The LED will stay on solid for 4 seconds and then blink 8 times. By pressing and releasing the Delay Button you can toggle through the three refresh delay settings indicated by LED blinks.

- 1 LED blink indicates 2.5 minute refresh setting
- 2 LED blinks indicates 2.5 hour refresh setting
- 3 LED blinks indicates 7 minute refresh setting

Pressing and releasing the Test Button will take the PIC chip out of adjustable refresh mode. You will see 8 short blinks to indicate return to normal operating mode.

Refresh is a timed interval pulse to the camera to keep it in a "ready" mode. The refresh recharges the flash capacitor in 35mm cameras and shortens the delay between the trigger of the HH1 Complete Board and the actual picture. The 7-minute refresh is the preferred setting for 35mm cameras.

In appropriate digital cameras the refresh keeps the camera awake, and does not allow the camera's auto shut down to occur. The digital is able to reach "sleep mode" with the 2.5-hour refresh setting, which in turn uses less power and still refreshes soon enough so the digital does not auto shut down.

The digitals do not reach "sleep mode" with the 2.5-minute refresh. The 2.5-minute refresh uses more camera power, but faster shutter response is evident after the HH1 Complete Board is triggered, which will capture faster moving animals.

* **NOTE:** Alternate refresh settings are available with custom programming.

5. Day / Night / Both Selections: The **D/N/B Toggle Switch** control features listed below.



There are 3 selectable setting to control the trigger pulse of the HH1 Complete Board to the camera.

- The (center) position is marked (B) for both and the HH1 Complete Board will trigger the camera in both daylight and dark.
- The (up) position is marked (N) for night, and the HH1 Complete Board will only trigger the camera during the dark.
- The (down) position is marked (D) for day, and the HH1 Complete Board will only trigger the camera during daylight.

6. Event Counter w/Reset: The **Count Reset Button** control features listed below.



The HH1 Complete Board features a LCD event counter to track the total number of trigger events from the IR sensor.

- The Count Reset Button must be pressed after power up to clear the count. This can be done during the initial delay.
- The LCD event counter will erase the count if power is turned off.
- The event counter will not record any events during walk test mode.
- The event counter will not record any events when the D/N/B Toggle Switch has disabled the IR sensor.
- The event counter will record events after the camera's film has been used up.
- The event counter will record two events when the HH1 Complete board is in double picture mode.

7. Sensitivity Adjust: The **Sensitivity Potentiometer** control features listed below.



- Clockwise turn till the knob stops is the highest sensitivity setting.
- Counterclockwise turn till the knob stops is the lowest sensitivity setting.
- At full counterclockwise the sensor will detect no motion.
- At full clockwise the sensor will detect out to 70'. (With proper lens alignment)
- A mid point setting that detects to the range of the camera's flash is recommended.

Taking a Picture:

When the HH1 Complete Board sensor senses motion, it triggers the 674 (HH1) PIC chip, which will turn both the Refresh and Shutter relays on simultaneously and the camera takes a picture immediately. Another picture cannot be taken again until the Time Delay determined by the Delay Modes expires.

Double picture mode is a little different. Once the HH1 Complete Board sensor triggers the 674 (HH1) PIC chip, it will energize the shutter and refresh relays and take a picture, then when the shutter time has timed out (4seconds) it will wait (6 seconds) for the flash to recharge and then take another picture. Once this 2nd picture has been taken and the shutter time has expired, the 674 (HH1) PIC chip starts the delay between pictures, depending on the selected delay mode.

PIC Chip Explanation of Terms:

674 (HH1) PIC Chip - Programmable Integrated Circuit Chip (the IC Chip itself)

INITIAL DELAY - This is the 1-minute startup period of time from when the power is initially turned on to the HH1 Complete Board to when the 674 (HH1) PIC chip automatically switches to standby mode. The sensor and the push buttons are inactive during initial delay.

STANDBY MODE - This is the 5-minute period of time after initial delay in which only the push button switches are active. Once a push button is pressed, the standby mode is cancelled and the 674 (HH1) PIC chip is in either walk test mode or normal operating mode depending on which push button was selected. This 5-minute period will time out and the 674 (HH1) PIC chip returns the HH1 Complete Board to normal operating mode. Standby mode is only accessible by going thru initial delay.

WALK TEST MODE - This is when the 674 (HH1) PIC chip signals all the sensor's activity by lighting the onboard LED of the HH1 Complete Board. There is approx. an 8 second delay after the sensor is triggered before it can be triggered again. This delay is the time needed for the sensor to reset itself and may vary slightly. The walk test mode will time out after 5 minutes of inactivity and the 674 (HH1) PIC chip returns the HH1 Complete Board to normal operating mode. Walk test mode is only accessible after initial delay times out.

DELAY MODE - This is the time delay configured by you using the delay settings 1- 9. It is the time measured from when the relay for taking a picture turns off to when you can take another picture. Delay mode is only accessible after initial delay times out.

DOUBLE PICTURE MODE - This is when the 674 (HH1) PIC Chip automatically signals the camera to take a second picture 10 seconds after an initial sensor triggered picture was taken. Double picture mode is only accessible from within delay mode and after initial delay times out.

ADJUSTABLE REFRESH MODE - This is a 500millisecond pulse generated at a set time by the 674 (HH1) PIC chip to help the camera remain in a "ready" mode. In appropriate digital cameras the refresh keeps the digital camera awake, and does not allow auto shut down to occur. The digitals are able to reach the camera's sleep mode setting with the 2.5-hour refresh, which in turn uses less power and still refreshes soon enough so the digital does not automatically shut off. The digitals do not reach sleep mode with the 2.5-minute refresh, which in turn uses more power, but faster shutter speeds are realized to capture faster moving animals. Adjustable refresh mode is only accessible after initial delay times out.

NORMAL OPERATING MODE - This is when nothing is happening except the refresh countdown of the set refresh time. The 674 (HH1) PIC chip is ready to be triggered by the HH1 Complete Board's sensor so it can take a picture. It is also ready to receive any button commands from the test button or the delay button. Normal operating mode is only accessible after initial delay times out and time expires in either standby mode or walk test mode. Normal operating mode is the default mode the 674 (HH1) PIC chip will return the HH1 Complete Board to, when all time outs expire. Normal operating mode is only accessible after initial delay times out.

SLEEP MODE - This is when the 674 (HH1) PIC chip is shutdown except for a low power internal oscillator, which keeps up with the timing or interrupts generated for the 674 (HH1) PIC chip. By shutting down the main oscillator the 674 (HH1) PIC chip draws less current. (4 to 5uA in sleep mode.) Sleep mode is inaccessible and automatically switched to by the 674 (HH1) PIC chip.

"ALWAYS ON" - This refers to the state of the camera itself while operating as a trail camera. The camera itself is always on and controlled by the programming of the 674 (HH1) PIC chip.

8. Troubleshooting:

If the LED does not signal during a walk test check the following.

- You have installed the HH1 Complete Board with the IR sensor located behind the fresnel lens. The IR sensor is the ¼" round component with the rectangular glass window on top. The fresnel lens focuses the detection field into the IR sensor, so the sensor must be behind the fresnel lens.
- You have the fresnel lens at the correct focal distance from the IR sensor. The distance between the IR sensor and fresnel lens is critical in that the focus of the lens is determined by the distance it is located from the IR sensor. Changing the distance from what the lens is designed for will affect the focus to the IR sensor.
- The fresnel lens is in the right orientation and centered. The fresnel lens is designed to be installed with the groove side of the lens facing the IR sensor and the lens centered over the IR sensor. Double check alignment of the fresnel lens to the IR sensor.
- The sensitivity setting on the HH1 Complete Board is at its highest sensitivity. Locate the sensitivity potentiometer and turn the sensitivity to the highest sensitivity setting. Full clockwise turn till the knob stops is the highest sensitivity setting. Counterclockwise turn of the knob to the other stop is the lowest sensitivity. At full counterclockwise the sensor will detect no motion. At full clockwise the sensor will detect out to 70'. A mid point setting that detects to the range of the cameras flash is recommended.
- The Day / Night / Both switch is set incorrect. Locate the day / night / both switch and set switch to middle (both) position. The HH1 Complete Board will not trigger if the switch is set to night (up) and the walk test is performed in daylight. The HH1 Complete Board will not trigger if the switch is set to day (down) and the walk test is performed in the dark. The HH1 Complete Board will trigger during the walk test in both daylight and dark if the switch is set to center (both).
- The 674 (HH1) PIC chip has returned to normal operating mode. Check to make sure the walk test time hasn't expired. Inactivity of 5 minutes returns the HH1 Complete Board back to normal operating mode. This is a precaution so the sensor is never left in test mode. Press and release the test button and reactivate the test mode.

Why don't my push button switches respond when I press them?

- The Initial Delay has not timed out yet. Wait the appropriate time for initial delay to time out and try again. (Approx 1 minute)
- The IR sensor was triggered. The push button switches are inactive after the HH1 Complete Board sensor is triggered. This inactive stage last until the sensor resets itself. (Approx. 8 seconds) Operating the push button switches from behind the sensor will help to eliminate errant triggering.

<p><u>Initial Delay</u> (Start from Power Up)</p> <p>Turn Power ON –1 LED blink (initial delay started) 1 Minute Delay – 1 LED blink (initial delay complete) (HH1 Complete Board in Standby Mode after initial delay)</p> <p><u>Walk Test Mode</u> (Start from Standby Mode)</p> <p>Press Test Button & Release - LED lights for 3 seconds (HH1 Complete Board now in Walk Test Mode) (LED will blink with each motion trigger)</p> <p>Press Test Button & Release - LED blinks 8 times (HH1 Complete Board returns to Normal Operating Mode)</p> <p><u>Adjust Refresh Setting</u> (Start from Normal Operating Mode)</p> <p>Press & Hold Delay Button –LED lights solid Release button – LED solid then blinks 8 times (HH1 Complete Board now in Refresh Adjust Mode)</p> <p>Press Delay Button & Release –LED will indicate refresh setting by blink count (1 blink – 2.5 min. refresh) – fast shutter – digital camera setting (2 blink – 2.5 hour refresh) – regular shutter –digital camera setting (3 blink – 7 minute refresh) –35mm camera setting</p> <p>Press Test Button & Release – LED blinks 8 times (HH1 Complete Board returns to Normal Operating Mode)</p>	<p><u>Change Delay</u> (Start from Normal Operating Mode)</p> <p>Press Delay Button & Release -LED will indicate new delay with blink count (Delay setting will advance by 1) Wait 3 seconds Press Delay Button & Release -LED will indicate new delay with blink count (Delay setting will advance by 1) (1 thru 9 total delay settings present)</p> <p><u>Check Current Delay</u> (Start from Walk Test Mode)</p> <p>Press Delay Button & Release –LED will indicate current delay setting by blink count (1 thru 9) Press Test Button & Release – LED blinks 8 times (HH1 Complete Board returns to Normal Operating Mode)</p> <p><u>Double Picture Mode</u> (Start from Normal Operating Mode)</p> <p>Press Delay Button & Release -LED will indicate new delay with blink count (Delay setting will advance by 1) Within 2 seconds press Delay Button & Release again -LED blinks 8 times (Denotes double picture mode in present delay mode)</p>
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Cut around outside border and fold over, place in camera enclosure for quick reference.

Additional Notes: