Installation Guide

3. Connect Daughterboard Alarm Wire- The included blue alarm hardwire must be connected from the “HW” hardwire output located on the daughterboard (use “HW” not “C”) to the “Z1” terminal on the Gateway to enable local alarm activations. Connect a 2kohm resistor from “Z1” to “GND” on the Gateway. The hardwire will be enrolled into the panel in step 6. (Note: The panel LCD will display an alarm on the alarm hardwire regardless of which Image Sensor tripped the alarm. The Alarm.com Website & notifications, and the central station report will indicate the specific Image Sensor that tripped the alarm.)

4. Register Module and Test- Power up the panel and initiate a comm-test to ensure the Alarm.com module is properly installed and communicating with the Alarm.com NOC.

5. Enroll Sensor in Panel-  
   a. Begin with the batteries removed from the sensor and ensure the panel is not in System Programming.  
   b. Press button on IS daughterboard to enter ‘Add Mode.’ The green LED “Z2” will start a 4-blink pattern indicating that the daughterboard is in ‘Add Mode.’  
   c. Reset or insert the batteries into the image sensor. “Z2” will be solid for 60 seconds to indicate that the sensor has been added.

The Image Sensor WILL NOT show in the panel’s sensors menu as occupying a panel zone, but the zone must be reserved for the Image Sensor. It is enrolled starting with zone 92 and counts down. The Alarm.com Dealer Site equipment list will show the Image Sensor in its enrolled zone. By default, the sensors are enrolled in partition 1 and group 17. During step 6, the Image Sensors will be re-assigned to follow the partition and group of the hardwire.

6. Enroll Image Sensor Alarm Hardwire in Panel-  
   a. Enter sensor enrollment menu in System Programming  
   b. Select the partition number, zone number, and sensor group for the hardwire.  
   c. Trip daughterboard hardwire by pressing button on top of daughterboard. The red LED “Z1” on daughterboard will turn off when pressed.  
   d. Exit system programming. The Image Sensors will now be assigned to the group and partition of the hardwire.  
   e. Perform another panel comm-test to be sure that Alarm.com receives the updated device equipment list. This will speed up the sensor initialization process.  

Image Sensors may be enrolled in groups 15, 17, 20, or 25. The Image Sensors must follow the partition and group of the alarm hardwire and cannot be individually configured.

After enrollment, be sure to keep the sensor and panel powered so the sensor can complete an initialization process with the Alarm.com Network Operations Center. This process will take several minutes. Images cannot be captured until initialization is complete.

7. Choose Sensor Location and Mount  
   a. Determine sensor mounting location based on installation scenario and criteria noted in the “Installation Guidelines.” For best image capture, the target capture areas should be centered in the frame. (e.g. If customer wants to capture people coming through door, the doorway should be centered in camera/PIR view.)  
   b. Verify RF communication prior to mounting- Verify RF signal strength through Dealer Site (www.alarm.com/dealer) or the dealer installation mobile app, MobileTech (www.alarm.com/MobileTech).

PRODUCT SUMMARY

The Image Sensor is a pet immune PIR (passive infrared) motion detector with a built-in camera. The sensor is designed to capture images during alarm or non-alarm events when motion is detected. Users can also initiate image capture on-demand to Peek-In on their property. Images are stored locally and uploaded either automatically when motion is captured during alarm events or manually when requested by the user. Once uploaded, images are available for viewing on the Alarm.com Website or an Alarm.com smart phone app. The sensor is battery powered, all wireless and simple to install and operate. Both an Alarm.com module and a subscription to an Alarm.com service plan are required.

Highlighted Features

• Battery operated
• Communicates wirelessly to the security control panel
• 35 feet by 40 feet detection coverage area
• Configurable PIR sensitivity and pet immunity settings
• Image: QVGA 320x240 pixels
• Color Images (except in night vision)
• Night vision image capture with infrared flash (black & white)
• Tamper detection, walk test mode, supervision

Service Plan Options

Image capture features require either an Alarm.com Basic or Advanced Interactive Service Plan and one of the following Image Sensor add-ons:

• Image Sensor Alarm- Includes upload of images from alarm events only.
• Image Sensor Plus- Includes upload of images from alarm events and non-alarm events. Users can configure Daily View schedules to receive images automatically each day or Peek-In to initiate an on-demand image capture immediately, or when the next motion occurs. Users can also request images that are captured automatically while the system is Armed Away or following a Disarm from an Armed Away state. Up to 40 captured events can be uploaded per month. Additional image uploads may be added in increments of 20 at an additional charge. The first five Alarm event images will be uploaded even if the monthly image quota has been achieved.

HARDWARE COMPATIBILITY

• Security Control Panel: Interlogix Concord 4.0 & Up  
• Alarm.com Module: Concord CDMA module with firmware version 177 & up or any Concord HSPA module (Will show as firmware 173 & up)  
• Required Daughterboard: Image Sensor daughterboard v104.0 & up (attached to compatible Alarm.com module)  
• Available Zones: One zone per Image Sensor installed. One additional zone is required for the required daughterboard. Up to three Image Sensors may be added per system. All the Image Sensors can only be enrolled in one partition.

*For compatibility information and requirements for other platforms, visit www.alarm.com/Dealer

HARDWARE INSTALLATION

2. Install Image Sensor Daughterboard: Locate the connector on the back of the daughterboard. Remove the green backing from the daughterboard mounting adhesive. While the module is powered down, align the daughterboard and module connector. Press to secure. Route the white daughterboard antenna down off the module into the bottom of the gateway. (NOTE: Verify module compatibility before attaching. Once attached, daughterboard is difficult to remove and removing may damage hardware.)
The sensor performs best when the signal strength is above 40%. The signal strength must be greater than 30% for sensor to function properly. Signal strength can fluctuate depending on environmental conditions and interference, so be sure that the signal is consistently in range.

c. **Determine desired mounting angle** for customer scenario; attach mounting arm to sensor-back and re-attach sensor to sensor-back. The mounting arm attaches to the back of the sensor enabling the sensor angle to vary based on the application. To obtain the full 35° x 40° coverage area, the sensor should be mounted the sensor at a 6° downward angle. This corresponds to a “teeth up” orientation of the mounting arm. For most smaller areas in residential installations, mount the arm with the “teeth down” for a deeper angle (18°). Secure the back of the sensor to the mounting arm with the provided screw. If the camera will be mounted perpendicular to the wall, mount the sensor without the mounting arm/bracket directly on the wall, at a 12° angle.

d. **Choose applicable mounting bracket** for customer scenario. The sensor hardware packet contains 2 mounting brackets for different mounting scenarios. Use the provided large screws and anchors to attach the bracket to the wall.

![Mounting Arm Orientation](image1.png)

Mounting Arm Orientation
(Top: Teeth Up, Bottom: Teeth Down)

![Attach Mounting Arm to Sensor-Back](image2.png)

Attach Mounting Arm to Sensor-Back

![Attach Sensor to Sensor-Back](image3.png)

Attach Sensor to Sensor-Back

Flat Wall Mount

Corner Wall Mount

Mark location of bracket holes on mounting surface at a height of 8 feet for maximum coverage area. (Leave at least 3 inches of clearance above the sensor to allow for battery replacement without uninstalling the mounting bracket.)

e. **Place sensor with arm on mounting bracket.** Adjust the horizontal positioning of the sensor to point towards the desired coverage area. To adjust positioning, lift the mounting arm at least 1/3 of the way off the bracket and rotate the arm.

f. **Secure the mounting arm location** by sliding lock pin into the hole. Use the washer and remaining small screw to secure the lock pin by screwing upwards through the bottom of the hole in the mounting bracket. (Note: To make it easier to adjust PIR/camera field of view in step 10, complete this step after horizontal sensor positioning is finalized.)

![Screw](image4.png)

Screw

![Mounting Arm Orientation](image5.png)

Mounting Arm Orientation
(Top: Teeth Up, Bottom: Teeth Down)

![Attach Mounting Arm to Sensor-Back](image6.png)

Attach Mounting Arm to Sensor-Back

![Attach Sensor to Sensor-Back](image7.png)

Attach Sensor to Sensor-Back

![Flat Wall Mount](image8.png)

Flat Wall Mount

![Corner Wall Mount](image9.png)

Corner Wall Mount

![Washer & Screw](image10.png)

Washer & Screw

9. **Complete PIR Testing & Verify RF Coverage**

Verify that PIR coverage adequately covers area by performing a walk test. (See “Programming” section for more details.) Verify that the sensor signal strength is strong while mounted. The signal strength must be above 30% for sensor to function properly.

10. **Test Image Capture**

To conserve the customer’s monthly image upload quota, automatic alarm uploads are disabled for the first four hours after any new sensor (Image Sensor or other) is installed into the system. Installers can verify sensor positioning and test image captures on installed sensors via MobileTech, without having to access the customer’s account or deducting from the customer’s monthly upload quota. If possible, installers should also test night vision captures to ensure sensor infrared flash will not be reflecting off surfaces and washing out images. While on-site, visit http://www.alarm.com/mobiletech or search for “Alarm.com MobileTech” in the Apple App Store or Google Play.

Before images can be captured, the Image Sensor must complete rules initialization process. Verify “Rules Confirmed” or re-send rules through Dealer Site or MobileTech. In order to request images from the sensors, installers must perform a panel comm-test. The images requested via MobileTech can be viewed from MobileTech and will also be displayed in the customer’s Image Gallery on the Customer Website.

(Note: If the installer needs to continue testing beyond the 4 hour window, disable alarm auto-uploads first from the Alarm.com Dealer Website or the image uploads will be deducted from the customer’s monthly quota.)

**PIR Lens and Camera Coverage Diagrams**

![Figure 1: Side View: PIR Lens Coverage](image11.png)

Camera Angle

8 ft. (2.4m)

5.9 ft. (1.6 m)

16.5 ft. (4.7 m)

40 ft. (12 m)

![Figure 2: Top View: PIR Lens Coverage](image12.png)

As indicated in Figure 2, the camera coverage area is narrower than the PIR coverage area. When installing, mount sensor where subjects are likely to be centered in or across PIR and camera field of view.

**INSTALLATION GUIDELINES**

Before permanently mounting the Image Sensor, evaluate potential locations and consider the following factors to ensure optimal performance and false alarm protection:

**Range: **Is the location close enough to the security panel to ensure adequate signal strength?

**False Alarm Immunity:** Is installation location false alarm prone? Reduce the risk of motion-triggered false alarms by making sure the location is free of vibration and the device does not face a local heat source, window, or areas with high pet activity. (Also, make sure area is free of elevated surfaces where pets may climb.)

**Capture Orientation:** Is the location ideally suited for detecting motion and capturing images when there is an intruder or activity? Consider where the subject is likely to enter the area and whether or not they will be facing the sensor.

**Lighting Conditions:** How good is the artificial and natural light? Will daytime and nighttime lighting conditions ensure adequate image quality?

- If possible, locate sensor within 100 ft of the panel especially if there are many walls between the sensor & panel, or if the panel and sensor are located on different floors. While the transmitter may have an open air range of 400 ft, installation site conditions can reduce range considerably.
- Avoid facing the sensor toward or close to areas that may affect communication such as metallic objects or electronics likely to produce interference. Verify sensor RF communication at panel, even if within recommended distance.
- For optimal detection capabilities, mount the sensor where someone will most likely walk across the sensor coverage area as opposed to directly towards the sensor.
- By default, the Image Sensor is set to “Normal” sensitivity. A more sensitive motion profile (“High”) and a less sensitive profile providing pet immunity for pets up to 40 lbs (“Low”) can be selected at the control panel or through the Alarm.com Dealer Website.
- The Image Sensor is designed for indoor use only and should not be installed outdoors. For proper operation in pet immune applications, the room should be kept between 60° and 110°F.
- To maximize night vision image quality, do not orient sensor towards surfaces that will create glare when infrared flash occurs. Avoid orienting the sensor such that the ceiling or adjacent walls are in the camera field of view.
- The sensor must be mounted on a flat wall surface (do not set on shelf) free of vibrations.
PROGRAMMING
The Image Sensor is enrolled into the control panel via the Interactive Services menu, which is visible when the Alarm.com Image Sensor compatible module and daughterboard are used. Additional programming options available for configuring and testing include:

A. PIR Sensitivity Settings
By default, the Image Sensor is configured with a standard motion sensitivity profile ("Normal"). The sensor can also be set to a more sensitive motion profile ("High") and a less sensitive profile with pet immunity for pets up to 40 lbs ("Low"). The sensitivity can be configured through MobileTech or Alarm.com Dealer Website.

(Note: Using the high sensitivity profile increases the risk of false alarms, especially if the sensor is facing windows or sources of heat. When mounting the sensor near windows or heat sources use caution and select the "Low" PIR sensitivity setting.)

B. PIR Activation and Test Mode
During normal operation, the PIR can be activated at most once every three minutes while the system is disarmed. There is a 30-second delay after powering before PIR detection is active. For the first 3 minutes after a sensor is enrolled in a network, the sensor will enter PIR test mode and the sensor LED will illuminate for 3 seconds upon each motion activation (at most every 8 seconds). For additional testing time, put the sensor into test mode by tampering the sensor.

C. Tamper and Malfunction Reports
Trouble conditions (malfunction, tamper & low battery) are not displayed on the panel LCD but are always reported to the Alarm.com Customer Website. Customers will receive tamper/low battery/malfunction notifications if they are subscribed, regardless of the panel setting.

A built-in accelerometer detects movement or re-positioning of the Image Sensor and will initiate a tamper whenever a change in sensor orientation is detected. This occurs even if the sensor back plate remains in place. The tamper automatically clears after the sensor is returned to the upright position and no movement has been detected for 5 minutes. A tamper can also be cleared by resetting the sensor.

D. Sensor LED
By default, the image sensor LED does not illuminate when activated by motion unless the sensor is in test mode. The LED can be enabled via the Alarm.com Dealer Website for each Image Sensor on a customer’s account. When enabled, the LED illuminates for 3 seconds upon motion activations (at most every 3 minutes while disarmed).

E. Image Capture Settings
Capture settings are configured automatically for each sensor based upon the customer’s Image Sensor service plan so it is important to subscribe the customer to a service plan before enrolling the sensor.

Alarms & Image Sensor Plus Plan:
• Captures motion-activated images while the system is Armed Away to catch potential intruders before the alarm sounds. Continues to capture images until the system is Disarmed. On the Alarms Plan, these images are not sent or available to the customer unless there is an alarm event. On the Plus Plan, the customer has an option of requesting any images captured, even if an alarm is not triggered.
• Captures motion-activated images on an instant alarm (panic, etc.) or an alarm from Armed Stay after an initialization period (up to a 30 second delay). The sensor automatically transmits up to 5 motion-activated image events (with 2 images/event) to Alarm.com and sends images to recipients as selected by the customer. Images are automatically selected for transmission, which begins when the panel issues an alarm locally (pending alarm) and ends when the panel is Disarmed, or after 5 minutes (whichever comes first).

Plus Plan Only:
• Captures the first motion event after the panel is Disarmed from Armed Away.
• Customer’s have the ability to request non-alarm images (such as entry delay or post-dismantle) to be uploaded and sent to them (up to their monthly upload quota).
• Customers can request property Peek-In images to be taken and sent to them right away or on the next motion activity (up to their monthly upload quota).
• Customers can configure Daily View rules that automatically capture and upload the first motion event during a specific time period each day.

SENSOR RESET BUTTON
Insert a paperclip into the hole on the front of the sensor to access the reset button. Press and hold for 3 seconds to power cycle the sensor. Press and hold a full 10 seconds until the sensor LED flashes rapidly to reset the sensor and clear it from its network. The sensor must be reset prior to enrolling in a new network.

(Note: The sensor can only be cleared from its network using the reset button if it is currently not communicating with its network. If the sensor is still communicating with its network, clear sensor by deleting it from the system it is enrolled in.)

Figure 3. Sensor Reset Button

BATTERY REPLACEMENT
When a sensor’s batteries are low, the panel will display a low battery alert for the sensor (unless this trouble condition has been disabled for the panel display). Notifications are also issued via the Alarm.com platform if the customer has subscribed to this notification type.

(Note: Low battery messages are only active at the panel between 7:00am and 10:00pm.)

To replace the sensor batteries, slide the front of the sensor up off the sensor-back. (No need to remove or mount entire sensor-back and mounting arm.) To maximize battery life, replace the sensor batteries with 2 AA 1.5v Energizer Ultimate Lithium batteries.

Dispose of used batteries according to the battery manufacturer instructions and following local regulations.

Figure 4. Removing Sensor for Battery Replacement

(Note: The operation of the sensor with alkaline batteries has not been verified for compliance with UL standards.)

OTHER FEATURE COMPATIBILITY
Two-Way Voice Compatibility
Images cannot be transmitted while a Two-Way Voice call is in session. When the Image Sensor is installed on a system with Two-Way Voice over the cellular network, image transmission during an alarm may be interrupted by the two-way session. Image transmission resumes once the call has terminated.

TROUBLESHOOTING
General Troubleshooting Steps
✓ Verify Module Signal Strength: If the Alarm.com module is having a problem signaling, motion activations and image transmission may be delayed or cancelled.
✓ Verify Image Sensor RF Signal Strength: The signal strength must be above 30% for the sensor to function properly.
✓ Verify Image Sensor Service Plan: Image capture functionality depends on the customer’s service plan. Be sure the proper Image Sensor add-on is selected; delete sensor and re-enroll.

Sensor Not Enrolling
✓ Verify Sensor is Receiving Power: After inserting batteries, the sensor LED should illuminate or flash within 10 seconds.
✓ Verify Sensor is Not Communicating with Another Network: If the sensor has been previously enrolled in a different system or daughterboard, delete the sensor from the system and hold the sensor reset button for 10 seconds to clear the sensor before attempting to enroll the sensor in a new network. The sensor cannot be cleared if it is currently communicating with its network. In this case the sensor must be deleted from the system first through the control panel or remote command.

Sensor Non-Responsive
✓ Verify Range: Verify that the sensor is registering a strong signal. If signal strength is low, move non-responsive sensor closer to control panel, verify signal strength and see if communication resumes. Be sure that Image Sensor daughterboard antenna is correctly routed as indicated in step 5 of the installation procedure.
✓ Replace Batteries: Check battery level at the panel (under “Image Sensor Settings”) and install fresh sensor batteries.

False Motion Activations
✓ Check Environmental Elements: Heating or cooling elements may adversely affect sensor performance. Test sensor with and without these elements to determine interference.
✓ Check Sensor Positioning: The sensor may not be properly positioned to capture the desired motion. Check horizontal positioning of sensor and re-mount as necessary.
✓ Check PIR Sensitivity Setting: Verify that the proper sensor motion profile has been selected through the setup menu or select a less sensitive profile.

Sensor Tamper
✓ The sensor detects changes in sensor orientation and can register a tamper regardless of the sensor-back being removed. A tamper will automatically be cleared after the sensor has returned to the upright position and has not detected any tamper activity for 5 minutes. With the sensor mounted, the tamper may also be cleared by holding the sensor reset button for 3 seconds to initiate a power cycle.

Images Not Captured
✓ Check Service Plan: Make sure the account has the proper Image Sensor add-on. Images cannot be captured without an Image Sensor service plan. For alarm functionality, add the “Image Sensor Alarms” plan. For alarms and enhanced functionality, add the “Image Sensor Plus” plan.
✓ Verify Sensor Rules: Make sure the sensor initialization process has been completed. On the Dealer Website, make sure that the sensor rules have been confirmed using the “Rules Confirmed” column.
✓ Enable Auto Uploads: During the first four hours after any sensor is enrolled onto the system, alarm images will not automatically be uploaded to Alarm.com. Automatic uploads are automatically enabled after four hours. Enable uploads sooner from the Dealer Website. On the Image Sensor Plus plan, view and request captured images
from any test alarms from the Customer Website.

### If the daughterboard LED is blinking, refer to this chart for LED trouble diagnostics.

<table>
<thead>
<tr>
<th>Device Status or Error</th>
<th>Duration of LED Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z1 LED</td>
<td>Z2 LED</td>
</tr>
<tr>
<td>Solid Red</td>
<td>Off</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
</tr>
<tr>
<td>Fast Blinks</td>
<td>Fast Blinks</td>
</tr>
<tr>
<td>Solid Red</td>
<td>4-blink</td>
</tr>
<tr>
<td>Solid Red</td>
<td>Solid Green</td>
</tr>
<tr>
<td>Off on Button Press</td>
<td>Off</td>
</tr>
</tbody>
</table>

### If the camera LED is blinking, refer to this chart for LED trouble diagnostics.

<table>
<thead>
<tr>
<th>Image Sensor Status LED Activity Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Status or Error</td>
</tr>
<tr>
<td>Sensor Power-Up</td>
</tr>
<tr>
<td>Sensor Joins or Rejoins Network</td>
</tr>
<tr>
<td>Searching for Network to Join</td>
</tr>
<tr>
<td>Attempting to Rejoin Network</td>
</tr>
<tr>
<td>Motion Test Mode</td>
</tr>
<tr>
<td>Network Communication Problem</td>
</tr>
</tbody>
</table>

**Technical Specifications**

**Alarm.com Model Number:** ADC-IS-221-LP

**Interlogix Part Numbers:** Image Sensor: 600-9400-IMAG Image Sensor Kit (Image Sensor w/ daughterboard): 600-9400-IMAG-KIT

**Power Source:** Optimal: 2 AA 1.5v Energizer Ultimate Lithium Batteries. Acceptable: 2 AA 1.5v alkaline batteries (battery life may be reduced significantly).

**Expected Battery Life:** Approximately 3 years for lithium batteries. Battery life varies by use case depending on certain factors such as weak signal strength and frequency of motion activations, image captures, and IR flashes.

**Voltage Thresholds:** With lithium batteries, low battery alarms are issued at 3.05V. The sensor cannot operate when the voltage reads below 1.95V.

**Operating Temperature Range:** 32° to 110°F for non-pet applications, 60° to 110°F for pet applications. Alkaline batteries are not suitable for temperatures below 50° F.

**Weight:** 3.1 oz. (with batteries, without mounting accessories)

**Dimensions:** 3.1” h x 1.8” w x 2.3” d