INSTRUCTION MANUAL

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Installation (Continued)

10. **Ventilation** - Slots and openings in the case are provided for ventilation to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the video equipment on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided and the product manufacturer's instructions have been followed.

11. **Attachments** - Do not use attachments unless recommended by the product manufacturer as they may cause a hazard.

12. **Water and Moisture** - Do not use receivers or video monitors near water — for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, near a swimming pool and the like.

13. **Heat** - The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

14. **Accessories** - Do not place this video equipment on an unstable cart, stand, tripod, or table. The video equipment may fall, causing serious damage to the product. Use this product only with a cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the product. Any mounting of the product should follow the manufacturer's instructions and use a mounting accessory recommended by the manufacturer.

15. **Camera Extension Cables** – Check the rating of your extension cable(s) to verify compliance with your local authority regulations prior to installation.

16. **Mounting** - The cameras provided with this system should be mounted only as instructed in this guide or the instructions that came with your cameras, using the provided mounting brackets.

17. **Camera Installation**- Cameras are not intended for submersion in water. Not all cameras can be installed outdoors. Check your camera environmental rating to confirm if they can be installed outdoors. When installing cameras outdoors, installation in a sheltered area is required.

Service

1. **Servicing** - Do not attempt to service this video equipment yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

2. **Conditions Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

   A. When the power supply cord or plug is damaged.

   B. If liquid has been spilled or objects have fallen into the product.

   C. If the product has been exposed to rain or water.

   D. If the product has been dropped or the cabinet has been damaged.

   E. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.

   F. When the product exhibits a distinct change in performance. This indicates a need for service.

7. **Replacement Parts** - When replacement parts are required, have the service technician verify that the replacements used have the same safety characteristics as the original parts. Use of replacements specified by the product manufacturer can prevent fire, electric shock, or other hazards.

8. **Safety Check** - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks recommended by the manufacturer to determine that the product is in safe operating condition.

Use

1. **Cleaning** - Unplug the product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

2. **Product and Cart Combination** - Product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.

3. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or "short-out" parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

4. **Lightning** - For added protection of this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power line surges.

WARNING

STRANGULATION HAZARD:

Infants have STRANGLED in power cords. Keep power cords more than 3 feet away from cribs, bassinets, play yards and other safe sleep environments for infants.

NOTICES

FCC Notice:

This equipment has been certified and found to comply with the limits regulated by the FCC part 15, subpart C. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment on and off), the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio or television technician for assistance

Warning:

To ensure compliance with the FCC's RF exposure guidelines, this equipment should be installed and operated with minimum distance 20cm (7.87in) between the radiator and nearby persons.

Industry Canada Notice:

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1)This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesirable operation.

This Class B digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

MODIFICATION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.

Toute modification non approuvée explicitement par le fournisseur de licence de l'appareil peut entraîner l'annulation du droit de l'utilsateur à utiliser l'appareil.

RoHS:

This product is fully compliant with the European Union Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment ("RoHS") Directive (2002/95/EC). The RoHS directive prohibits the sale of electronic equipment containing certain hazardous substances such as lead, cadmium, mercury, and hexavalent chromium, PBB, and PBDE in the European Union.

It is imperative that the user follows the guidelines in this manual to avoid improper usage which may result in damage to the product, electrical shock, and fire hazard injury. In order to improve the features, functions, and quality of this product, the specifications are subject to change without notice from time to time.

Features

- Real time wireless video with MPEG-4 compression at 640x480 (VGA) resolution[1].
- Single 2 channel receiver minimizes cable clutter and offers greater value.
- Extended bandwidth delivers smooth high frame rate video.
- SignalGuard™ Technology continuously monitors the wireless signal and automatically reconnects upon detecting low signal strength.
- Next generation adaptive Frequency Hopping Spread Spectrum (FHSS) technology greatly reduces signal interference.
- Simple installation. No video cable required[2].
- Easily connects to any surveillance DVR (BNC).
- Connect multiple receivers to your surveillance recorder (DVR) to create a wireless surveillance solution[3].
- Up to 165ft (50m) indoor / 500ft (152m) outdoor wireless range[4].
- SMA connectors for compatibility with range extension accessories.
- Weatherproof cameras can be installed both indoors and outdoors (IP66 rated)[5].
- Weatherproof power connectors for added protection from the elements[6].
- Night vision range up to 135ft (41m) / 90ft (27m)[7].
- Built-in auto-mechanical infrared camera filter achieves accurate color reproduction in varying lighting conditions.
- Vandal resistant camera design with cable pass-through mounting brackets.
- 2 channel receiver adds 2 separate wireless video channels to your DVR.
- High gain antenna ensures improved long distance operation.

1. At full signal strength. Limit number of obstructions to ensure best performance.
2. Camera and receiver require a wired connection to a power outlet. Power adapters included.
3. Using multiple receivers in close proximity to each other may cause a slight slowdown in frame rate performance. Maintain at least 4 inches / 10cm of space between each receiver. Limit number of receivers used to 2 (4 channels total).
4. Maximum wireless transmission range. Actual range dependent upon building materials and other obstructions in path of wireless signal.
5. Not intended for submersion in water. Installation in a sheltered area is recommended.
6. Power cables are only weatherproof when fully inserted at the connection point. Power cables may not be submerged in water.
7. Stated IR illumination ranges are based on ideal conditions in typical outdoor night time ambient lighting and in total darkness. Actual range and image clarity depends on installation location, viewing area, and light reflection / absorption level of object.

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1. Getting Started

The system comes with the following components:

2 X WIRELESS CAMERAS

1 X WIRELESS RECEIVER

3 X POWER ADAPTERS (FOR CAMERAS & RECEIVER)

2 X MOUNTING KITS

(Mounting kit contents may differ from image)

2 X WHITE CAMERA ANTENNAS (PRE-ATTACHED)

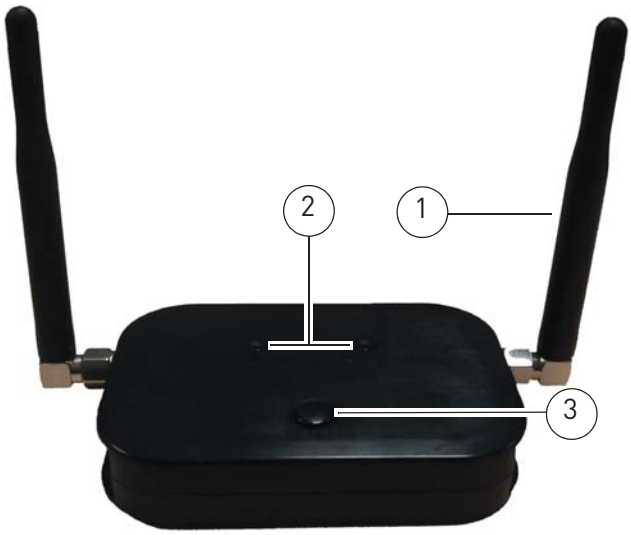
2 X BLACK RECEIVER ANTENNAS (PRE-ATTACHED)

2 X DOUBLE-SIDED TAPE

INSTRUCTION MANUAL
QUICK START GUIDE

CHECK YOUR PACKAGE TO CONFIRM THAT YOU HAVE RECEIVED THE COMPLETE SYSTEM, INCLUDING ALL COMPONENTS SHOWN ABOVE.

2. Wireless Receiver



1 **Removable Antennas (SMA Type):** Pre-attached to the receiver.

2 **Channel Indicator LEDs**: Glow green to indicate which channel is selected for pairing.

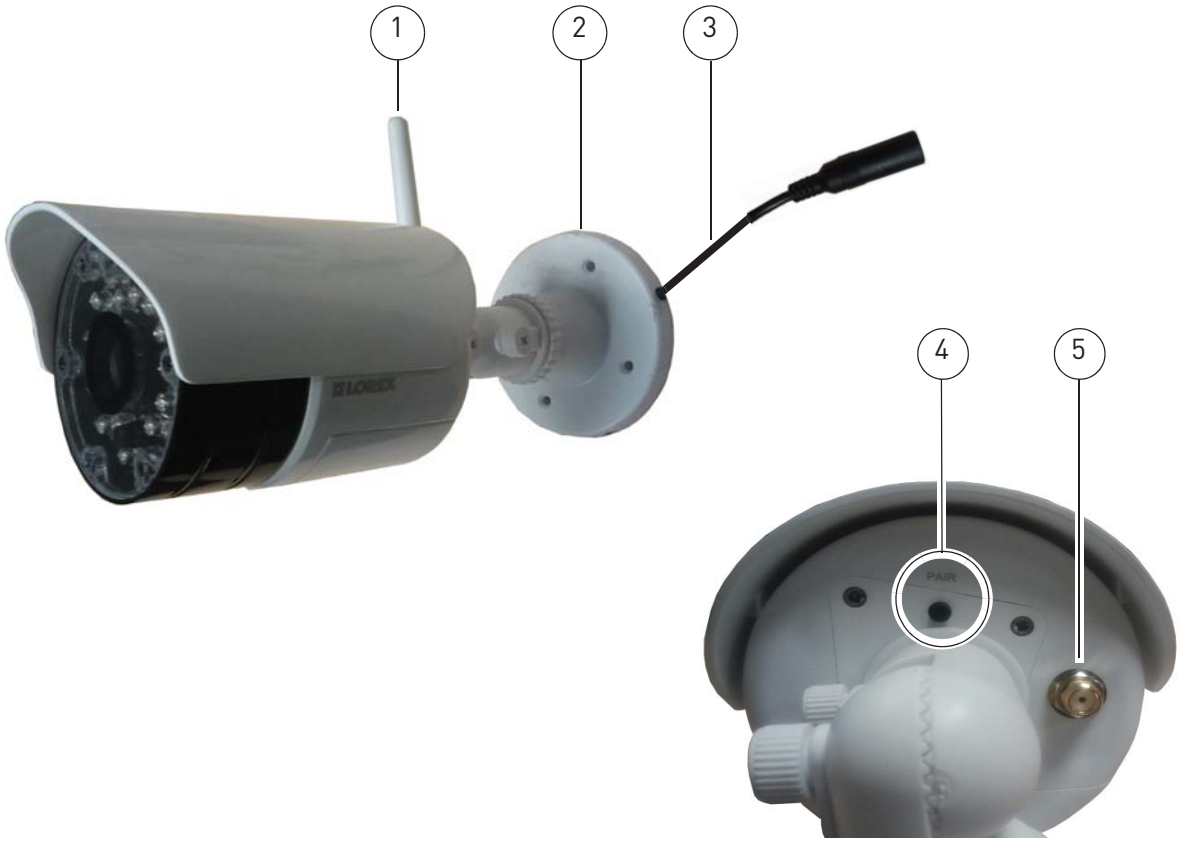
3 **Pairing Button:** For details, see "Pairing Cameras" on page 8.

4 **DC Power:** Connect power adapter to power on the receiver.

5 **Termination Cable**: Includes 2 BNC video output cables to connect cameras to a DVR.

6 **Antenna Jacks**: One on each side of the receiver.

3. Wireless Camera



1 **Removable Antenna (SMA Type)**: Pre-attached to the back of camera.

2 **Camera Stand**

3 **DC Power:** Connect power adapter to power on the camera.

4 **Pairing Button**: For details, see "Pairing Cameras" on page 8.

5 **Antenna Jack**

ATTENTION - This camera includes an Auto Mechanical IR Cut Filter. When the camera changes between Day/Night viewing modes, an audible clicking noise may be heard from the camera. This clicking is normal and indicates that the camera filter is working.

4. Installing the Camera

Cameras are suitable for outdoor installation. **Installation in a sheltered location is recommended.** For example, install under shelter protected from the elements, such as beneath roof eaves. The diagram to the right shows an example of an ideal location for outdoor placement.

4.1 Installation Warnings

- Aim the cameras to optimize the viewing area: select locations that provide a clear view of the area you want to monitor, that is free from dust, and that is not facing a strong light source or direct sunlight.
- Avoid installing the cameras where there are thick walls or obstructions between the cameras and the receiver.
- Avoid installing in a location which requires the wireless signal to pass through cement, concrete, and metal structures. This will reduce the range of transmission. For details, see "Appendix B: Frequently Asked Questions" on page 10.
- Select locations for the cameras that have an ambient temperature between 14°F~122°F (-10°C~50°C)
- Not intended for submersion in water. For outdoor use, installation in a sheltered location is recommended.

4.2 Mounting Positions

You may mount your cameras on a wall, ceiling, or counter. See the images below for recommended configurations of the camera stand and antenna.

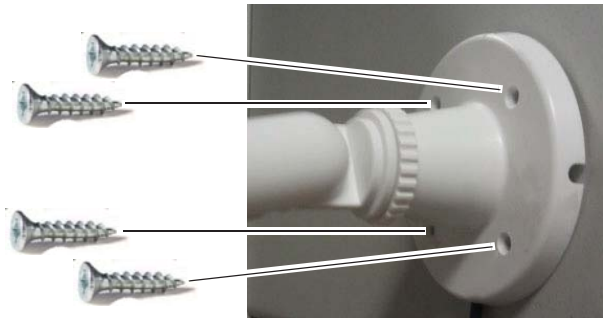
Wall **Ceiling** **Counter**

NOTE: For ceiling installation, position the antenna as high as the ceiling allows. See the "Ceiling" mounting position in the figure above.

4.3 To Install the Cameras

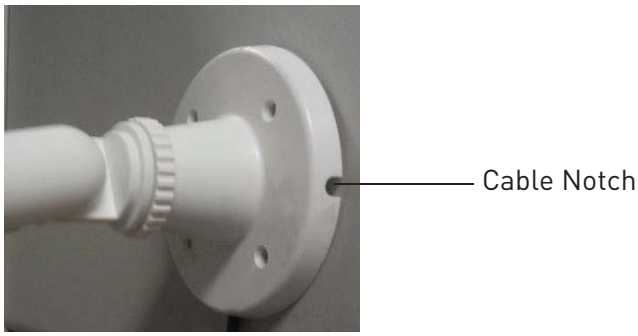
1 Use the included mounting screws to mount the cameras to the mounting surface:

- Mark the positions of the screw holes on the mounting surface.
- Drill holes and insert the drywall plugs (included) as needed.
- Firmly attach the cameras to the mounting surface using the included screws.

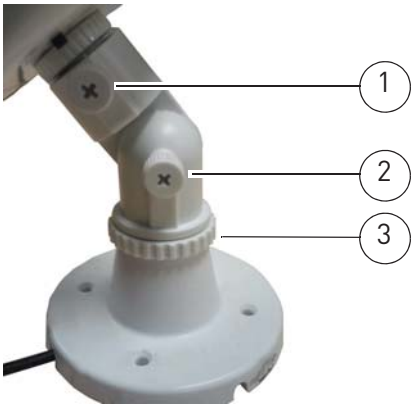


NOTE: If you run the power cable through the mounting surface, connect power before attaching the camera to the wall.

NOTE: If you run the power cable along the mounting surface, the cable must go through the cable notch on the camera base. This will keep the camera base flush to the mounting surface

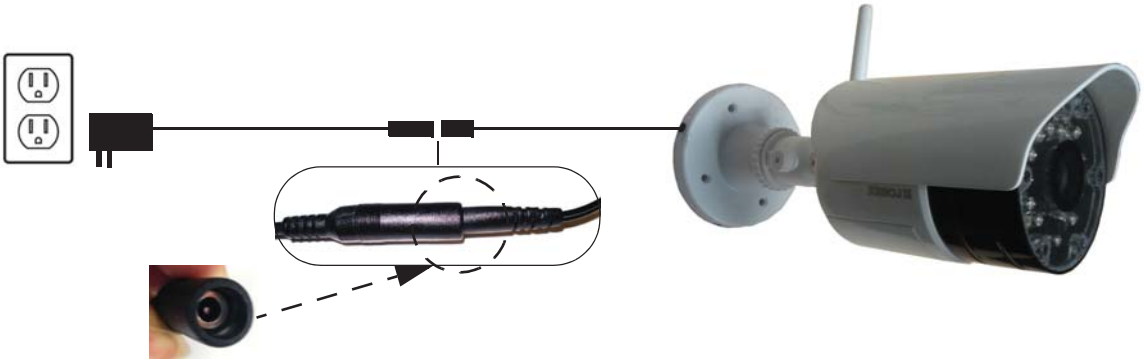


2 Loosen the thumbscrews **(1, 2)** and the adjustment ring **(3)** by turning them counter clockwise.



3 Adjust the angle of the cameras until the desired view is set. Tighten the thumbscrews and the adjustment ring to secure each camera's position.

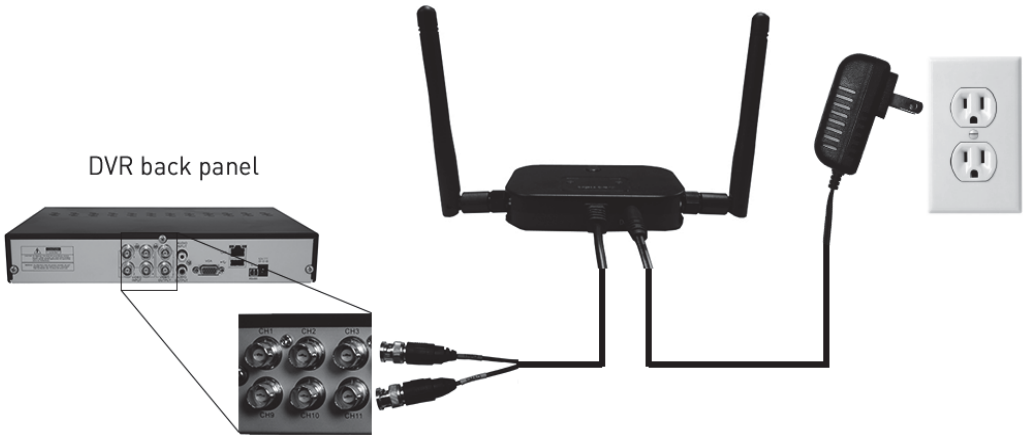
4 Connect the power cable from the cameras to the weatherproof power connector. Plug the power adapter into a power outlet or surge protector.



NOTE: Power cables are only weatherproof when fully inserted at the connection point. Power cables may not be submerged in water.

5. Installing the Wireless Receiver

Before powering on the receiver, make sure to first connect and power on the cameras. This will ensure a proper connection.



1 Connect the BNC cables labelled **CAM1** and **CAM2** to your DVR.

Channel Indicator LED's

2 Connect the power cable to the power adapter. Plug the power adapter into a power outlet or surge protector.

3 Place the receiver in a place that will have clear reception to your cameras[1].

OPTIONAL: Use the included double-sided tape to secure the receiver to a surface (e.g. wall).

1. Avoid installing in a location which requires the wireless signal to pass through cement, concrete, and metal structures. This will reduce the range of transmission.

6. Pairing Cameras

IMPORTANT

The cameras and the receiver have already been paired out of the box, which means that they are exclusively communicating with each other. If for some reason the pairing is lost, follow these steps to pair the cameras and receiver.

To pair the cameras to the receiver:

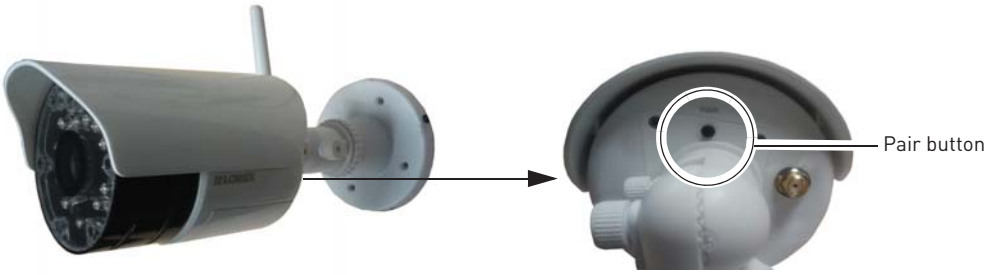
1 Make sure that the cameras and receiver are both powered up and all antennas are properly attached.

2 Press the **Pair** button on the receiver to toggle between channels. Use CAM1 when pairing the first camera and CAM2 for the second.

3 On the receiver, press and hold the **Pair** button for 5 seconds to activate pairing mode.

4 On the back of the camera, press the **Pair** button. This must be done within 30 seconds of pressing the **Pair** button on the receiver.

- If pairing is successful, live video from the camera will appear on the monitor.



7. Appendix A: System Specifications

7.1 General Specifications

TX Frequency Range	2.400GHz~2.480GHz
TX Power	16dBm
Unobstructed Effective Range	165ft (50m) indoor 500ft (152m) outdoor[1]
Data Rate	4 Mb/s
Modulation	GFSK
Spread Spectrum	FHSS
Operating Temperature Range	14°F ~ 122°F / -10°C ~ 40°C

1. Maximum wireless transmission range. Actual range dependent upon building materials and other obstructions in path of wireless signal.

7.2 Receiver Specifications

RX Sensitivity	-81dBm
Demodulation	GFSK
Supported Resolution	VGA (640x480) up to 25 frames per second
Termination	2x BNC video
Power Requirement	9V DC +/- 5%
Power Consumption	270mA Max
Dimensions (W x D x H)	53 x 137 x 86mm / 2.1 x 5.4 x 3.4" (with antenna attached)
Weight	0.1kg / 0.3lbs

7.3 Camera Specifications

Image Sensor Type	1/4" Color CMOS Image Sensor
Effective Pixels	H: 640 V: 480
Image Compression	MPEG4
Image Resolution	VGA (640x480)
Lens	3.6mm F2.0
Field of View (Diagonal)	55°
AGC	On
Power Requirement	9V DC +/- 5%
Power Consumption	430mA Max with IR LED 220mA Max without IR LED
Environmental Rating[1]	IP66
IR LED Quantity / Type	24 pieces / 850nm
Night Vision Range[2]	90ft (27m) / 135ft (41m)
Built in Auto IR Turn On / Off	CdS Drive Auto IR LED turn On/Off Circuit
Dimensions (W x D x H)	79 x 203 x 117mm / 3.1 x 8.0 x 4.6" (with antenna and sun-shade)
Weight	0.3kg / 0.6lbs

1. Not intended for submersion in water. Installation in a sheltered area is recommended.
2. Stated IR illumination ranges are based on ideal conditions in typical outdoor night time ambient lighting and in total darkness. Actual range and image clarity depends on installation location, viewing area, and light reflection / absorption level of object.

8. Appendix B: Frequently Asked Questions

8.1 Wired vs. Wireless Cameras

A **wired camera** has a video cable that transmits the video signal from the camera to a recording or viewing device.

A **wireless camera** does not use a video cable. Instead, it wirelessly transmits the video signal to a wireless receiver that is connected to your DVR. Wireless cameras do not require video cabling to be run between the camera and the DVR, which reduces installation time and cost.

8.2 Does a wireless camera require power?

Yes. Wireless cameras require two power sources: one connected to the camera, and the other to the receiver. The term "wireless" refers to the lack of a video cable between the camera and the receiver.

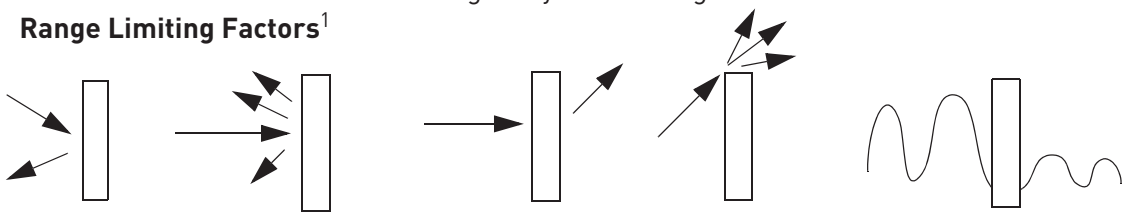
8.3 How far can a wireless camera transmit a video signal?

In an open field (with line of sight), a typical wireless camera has a range between 250 - 500 feet. 'Line-of-sight' means that there are no obstructions between the camera and receiver. Obstructions include walls, buildings, trees, and certain electronic devices. Materials containing moisture (for example, leaves) may also act as an obstruction. Cubical walls, drywall, glass, and windows generally do not degrade wireless signal strength.

In a closed environment—such as the interior of a house—the wireless camera range is between 100 - 165 feet. The signal range varies depending on the type of building materials or objects the wireless signal must pass through.

The signal range also depends on whether there are competing signals using the same frequency as the camera. For example, signals from cordless phones or routers may affect signal strength. Adaptive Frequency Hopping Spread Spectrum (FHSS) technology featured in the latest Lorex models greatly reduces signal interference.

Range Limiting Factors[1]



Reflection	Scattering	Refraction	Diffraction	Attenuation
The signal reflects back	The signal scatters back into multiple new signals	The signal bends as it travels through an object (e.g. glass window)	The signal changes direction as it passes around an object	The signal strength weakens as it passes through an object

[1]**Source:** Xirrus (2010). "Wi-Fi Range Dynamics".
Retrieved online at http://xirrus.gcsmarket.com/pdfs/Xirrus_Wi-Fi_Range.pdf

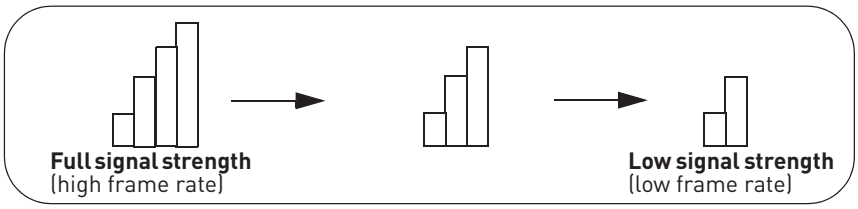
Signal Reduction Through Materials

Signal strength decreases as it passes through different types of material. The table below shows how signals become reduced when passing through different materials:

Material	Signal Reduction (%)
Plaster & Wood	10 - 30%
Brick	30 - 50%
Concrete Cinder Blocks	50 - 70%
Metal & Metal Cladding	70 - 90%

NOTE: Signals that must pass through wet or moist materials (e.g. shrubs and trees) may be significantly reduced.

The stronger the signal strength, the higher the video frame rate. The lower the signal strength, the lower the video frame rate.



8.4 Are digital wireless camera signals secure?

Yes. Lorex digital wireless products feature a wireless transmission method called Frequency Hopping Spread Spectrum (FHSS). This type of signal is highly resistant to eavesdropping as it generates a channel hopping sequence using an algorithm generated by the receiver, which only the camera can follow through the "pairing" function.

Pairing is an electronic handshake between digital wireless devices. Digital wireless cameras can only be paired to one receiver. This is to prevent interception by third parties, and prevents any other device from picking up the signal—this also means that you cannot pair one camera to multiple receivers.

8.5 How many frames per second should I expect from a digital wireless camera?

Current Lorex digital wireless cameras offer 10 - 30 FPS (Frames Per Second) performance. Actual frame rate depends mainly on signal strength (see the chart in section above).

For details on supported resolutions and frame rates for this model, see "Appendix A: System Specifications" on page 9.

8.6 How many wireless cameras can I install?

It is recommended to install a maximum of 4 wireless cameras per system (2 receivers and 4 cameras). Minimum space between receivers should be 4 inches / 10cm and minimum space between cameras should be 6.5ft/2m to minimize potential signal strength degradation.

9. Appendix C: Troubleshooting

If you have problems with your system, there is often a quick and simple solution. Please try the following:

Problem	Solution
There is no picture from the camera(s)	• Make sure that the camera is plugged into a power outlet and that the power adapter is plugged in properly. • Make sure receiver is plugged into a power outlet. • Move the camera closer to the receiver. • Make sure video output cables are connected to your DVR.
The picture is dropping	• Move the camera closer to the receiver. • Try repositioning the camera, receiver, or both to improve the reception.
The picture is or has become choppy	• The picture may become choppy when experiencing a lower frame rate (e.g. 6 frames per second vs. a higher 20 frames per second). • Try moving the camera closer to the receiver. • Remove obstructions between the receiver and camera.
The picture is white	• "Washout" or "white wash" can occur when a strong light source is pointed at the camera lens. The camera lens is not harmed during a white wash. • Do not point your camera towards a bright light source.
The picture is too dark	• If using during the day, the camera may not be getting enough light. Reconsider the position of your camera.
The picture is too bright	• If using during the day, the camera may be getting too much light. Reconsider the position of your camera.
Night vision is not working	• Night vision activates when light levels drop. The area may have too much light.
Bright spot in video when viewing camera at night	• Night vision reflects when pointing a camera at a window. Move the camera to a different location.

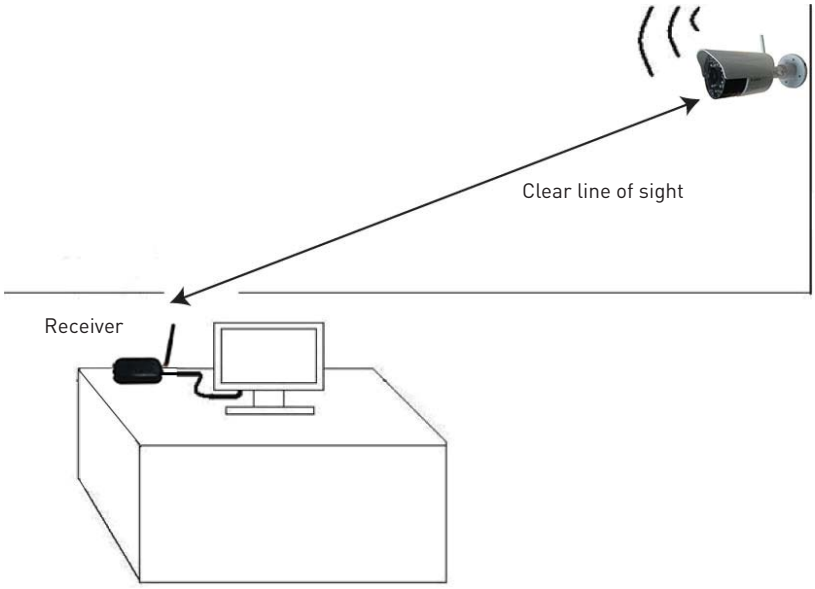
10. Appendix D: Extending Wireless Signal Range

DISCLAIMER: Certain accessories are not available in all markets.

There are several ways to boost your wireless signal as well as options to help you extend the range of the wireless signal.

Clear Line-of-Sight

You should always try to ensure there is a clear line-of-sight between the camera and the receiver.



Extending Your Wireless Signal

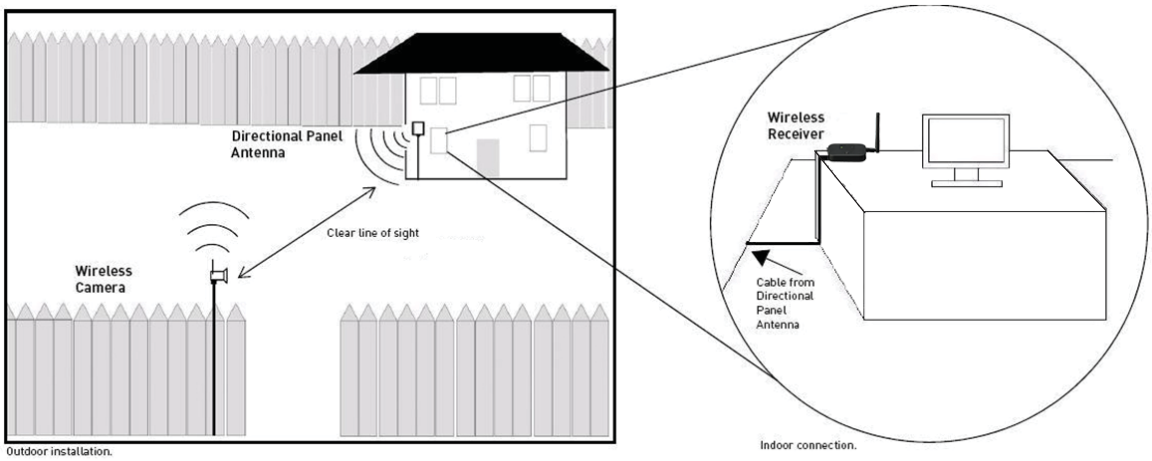
Even with a clear line-of-sight between your camera(s) and your receiver(s), you may experience a lower video frame rate simply due to the distance between your wireless devices.

Accessory antennas are available that can help extend the range of your wireless signal.

2.4 GHZ Directional Wireless Panel Antenna

Use the 2.4GHz Directional Wireless Panel Antenna (model #: **ACCANTD9**) to focus a wireless signal onto one specific camera in order to increase the range of transmission (clear line-of-sight between the camera and the antenna is required). A 20ft extension cable is included to help to properly position the antenna.

Directional Wireless Panel Antenna



Scenario 1: Single Receiver Installation

Attach a directional antenna to the one or both cameras and/or the receiver. It is recommended to attach the antenna to the receiver and place it in a location that has clear line-of-sight to the camera. Ensure that the directional antenna is pointing toward the other antenna. For example, if the directional antenna is connected to your receiver, the directional antenna should point at the camera (see figure above). During the installation, check the reception on your DVR.

Scenario 2: Multiple Camera / Receiver Installation

If you are using multiple wireless cameras and receivers in your installation, attach directional antennas to the camera(s) and receiver(s) that are farthest away from each other. Follow these guidelines to increase the signal strength between your cameras and receivers:

- Point directional antennas towards the receiver for each camera.
- Keep as much space as possible between each receiver.
- Keep as much space as possible between directional antennas if using more than one.
- Minimize the amount of obstructions (e.g. walls or trees) between the antennas and receivers.
- During the installation, check the reception of each camera on your DVR.

Visit www.lorextechnology.com for more details on wireless antennas and accessories.

Caution:
IC Note : Cet appareil est conforme à la Partie 15 des règlements de la FCC et aux normes RSS de l'Industrie du Canada. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer des interférences nuisibles, et (2) cet appareil doit accepter toute interférence reçue, y compris les interférences qui peuvent provoquer un fonctionnement indésirable.

Le fabricant n'est pas responsable des toutes interférences radio ou télévision causées par des modifications non autorisées apportées à cet appareil. De telles modifications peuvent empêcher l'utilisateur d'utiliser l'appareil.

FCC Note:
This device complies with Part 15 of the FCC rules and Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications or change to this equipment. Such modifications or change could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.