TAKE CONTROL OF
HOME SECURITY CAMERAS

by GLENN FLEISHMAN

$14.99
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Welcome to *Take Control of Home Security Cameras*, version 1.0.1, published in March 2020 by alt concepts inc. This book was written by Glenn Fleishman and edited by Joe Kissell.

Learn everything you need to know about home security cameras to plan, purchase, and install the best system for your needs for live access, security monitoring, alerts, privacy concerns, and affordability.

If you want to share this ebook with a friend, we ask that you do so as you would with a physical book: “lend” it for a quick look, but ask your friend to buy a copy for careful reading or reference. Discounted classroom and user group copies are available.

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Click here to buy the full 154-page “Take Control of Home Security Cameras” for only $14.99!
What’s New in Version 1.0.1

This small update to the book fixes a few typos and adds the following information:

• The book now considers avoidance of personal contact due to health concerns, self isolation, or quarantine in several places, but notably in a new section, Maintain Distance During Health Crises.

• Learn more about the dangers of unsecured FTP. See Use FTP Only When It’s SFTP or FTPS.

• Added a little more information about two-factor authentication support, present and upcoming, from specific camera makers. See Enable Two-Factor Authentication.

• Extended details about HomeKit Secure Video’s availability on a camera-by-camera basis. See Use HomeKit to Store Video and Trigger Alerts.
Introduction

A camera or camera system can allow you to let someone into your home when you’re not there, note when packages land on your porch, check in with your child or children when you have a nanny or babysitter watching them (or uncover unauthorized parties when they’re older), avoid personal contact during epidemics or other personal health events, or check in on a rental property.

And you can, of course, provide details to an insurance company when theft or accidental damage occurs, or call the police or hand over video if a burglar or other criminal is caught in the act. Sometimes the mere presence of cameras deters people from breaking in.

In this book, I’ll help you figure out what your intent is for installing video monitoring, determine what it might cost in outright expense and ongoing fees, and plan a deployment. The end of the book features several chapters each devoted to a specific company’s line (or sometimes, multiple lines) of products that are designed to work either solo or together.

Note: Throughout this book I refer to cameras in the plural. Otherwise I would have to consistently write “your camera or cameras,” which you would tire of as fast as I would! Some people start with one camera and may choose to add subsequent ones; from what we can tell with the sale of bundles and systems, two or more appears quite common.

But I’ll also help bring up the ethical and political challenges for each of the scenarios I suggested. Whom do you tell about having camera pointing outwards from your house or inside it (or a rental property)? What access do you offer police routinely or when crimes are believed to have occurred?

Technology is always a two-edged sword, and I hope to help you wield it safely and to your advantage.
This book helps you determine what kind of camera or system you need, narrow down which to purchase, and keep yourself and those around you secure and private.

**Figure out the system that’s right for you:**
- Consider your intent in getting a camera system in the first place; see *Why Do You Want a Camera?*
- Draw a map of your home and where you want to cameras to be placed and what they view; see *Rough Out Your Layout.*
- Decide how you want to interact with live and recorded video (and audio) from your cameras; see *Choose Where Video Lives.*
- Learn about camera features, like resolution and angle of view; see *Consider Physical Parameters.*
- Look into inexpensive multi-camera systems that record video locally; see *Weigh Centralized and Smart Cameras.*
- Consider how cameras fit into a smart home ecosystem; see *Use Smart Home Ecosystems for Control.*
- Discover details about major camera systems; see *Camera Models.*

**Think about privacy, security, and surveillance:**
- Uncover the implications of where your video is stored, locally or remotely; see *Where a Camera Stores Your Video.*
- Who should have access to your camera and stored video? See *Keep Your Cameras and Video Private.*
- Avoid peeping on other people; see *Respect Other People’s Privacy.*
• Consider how law enforcement might use video you record; see Are You Part of the Surveillance State?

• Pick good passwords and lock down access; see Secure Your System.

*Tweak your systems to meet your needs:*
• Determine the alerts you want to receive and control how they’re delivered; see Be Alert!

• Let others share access to your cameras; see Share Access.
Why Do You Want a Camera?

It sometimes feels like we live in a surveillance state already. Why add yourself into that mix? Reasons abound for wanting to purchase one or more home security cameras to monitor the environment around our home, a cabin or vacation house, or a home or other place we may rent or make available to others.

Let’s look into the two main categories. They’re not exclusive! You may have stuff snatched from your porch and want to try to put a stop to it and enjoy capturing video of hummingbirds paused on a feeder outside your back deck.

Screen Approved Visitors and Workers

While the field emphasizes security and I put it in the title of the book, personally controlled cameras on one’s property can offer many more purposes than deterring or recording burglaries (see Deter and Report Crime, later in this chapter).

This includes a lot of distinct activities, all of which have privacy, security, health, and safety considerations:

- Know when packages are delivered to retrieve them or ask a neighbor to, in an area with a lot of porch-prowling package purloiners.

- Allow a remote face check to allow a contractor or other tradesperson into your house—or even someone delivering a package. You may have given or left them a key or have a smart lock you can use to let them in.

- For personal safety, where you live alone and would prefer not opening your door to anyone, would like to come home without worrying is someone is near your home, and want greater aware-
ness of who is around your house even while there is no current crime involved.

- Confirm a child has left the house or arrived home. Smartphones help with this, too, but not all children own one (shocking, I know).
- Monitor a baby or infant in their room.
- Monitor or communicate with a babysitter or nanny.
- Capturing footage of birds and larger wildlife in your area. This may be for appreciation—you can find hummingbird cams all over—or out of concern. In some areas, homeowners have to monitor for animals they view as pests—munchers of vegetables or potential spreaders of disease—like bunnies, deer, rodents, and other small animals. You might also need to be aware of or beware predators like coyotes, wolves, mountain lions, cougars—oh my!
- Capture people letting their dogs poop on your lawn and not picking it up. Seriously, I imagine that’s a top ten, if not top five purpose.

**Warning!** Privacy considerations abound—and criminal and civil liability issues—when you record people you have invited into your house. Read up on privacy issues of recording other people in and around your home in *Respect Other People’s Privacy*.

There’s no single camera model that’s perfect for all these purposes. But there are four general considerations that overlap, and you may want to fulfill one or more of these:

- **Need to greet someone at the door without being there or opening it:** To this end, you almost always want a doorbell cam with a button someone can press. The camera may be paired with facial recognition, which can even be used to unlock the door for known parties if also paired with a smart lock. But it’s always set to activate an alert on your smartphone or another device, allows two-way audio communication, and is optimized (often with a fish-eye lens) to show the entire area around the door. Long-term storage of video is rarely an issue.
Rough Out Your Layout

This book offers criteria for the kinds of things you want in cameras or an integrated system. But before we dig into the particulars, you should make a rough diagram of your house, condo, apartment, or other setting to figure out exactly what you want to see and hear.

Draw a map by hand or in simple-to-use software—you can use the drawing tools in Word or Pages. It doesn’t have to be to scale at all (Figure 1). The idea is to get you thinking about spaces, directions, and coverage. If you have multiple floors, draw a layout for each one.

**Figure 1:** A rough drawing of a house floor plan with desired cameras and directions sketched in.

If you doubt your basic drawing abilities or want more precision, you can use inexpensive smartphone software that lets you walk around your house and tap on walls to build an amazingly accurate house layout. As one suggestion, RoomScan for iOS and iPad has a basic free tier and a full-featured upgrade for $8.49 a year (Figure 2).

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Figure 2: A precise set of measurements offers more detail than you need, but it’s simple to generate, too.

Now mark up potential locations and directions for cameras, as I did in Figure 1. Don’t limit yourself initially: mark every spot in and around your home you want to capture video (or audio) from.

For a camera capturing views outside, consider whether you’d locate it attached to a window pane or pointed from a location inside that encompasses a window, or mounted somewhere outside (see Indoors and Outdoors). An outside-pointing camera that’s located inside can’t use infrared for night vision of outdoor scenes due to reflection (see Night Mode). Plot out whether you have an outdoor power outlet located nearby, or whether you need to use a battery-powered unit (see Pick a Power Source).

In addition to maps for outdoor cameras, consider taking still photos from potential locations. Then print them out to consider the portion of the view you want to capture and how it will be framed (see A Lens Sets the View).

For indoor cameras, think about the best placement to capture the largest expanse, so you can use the fewest cameras. In some locations, a fixed camera with a broad field of view is best; in others, you might
Choose Where Video Lives

It might seem odd to start the book by considering where you want to store video recorded by the cameras you install. And yet, it’s a critical choice compared to all others, because different manufacturers and models offer widely varying sets of choices.

In this chapter, I lay out the options for storage and the tradeoffs for each from storage, cost, and accessibility viewpoints, including live streaming.

Note: Privacy is a paramount consideration for many people. I have an entire chapter devoted to this: see Protect Privacy.

Where a Camera Stores Your Video

The currency of home security cameras is capturing video—either continuously or for short periods in response to triggers—that may be either available for view via live streaming or stored for later retrieval, and often both. This would seem to be such a trivial thing, but it’s the pivot point around which all other decisions are made, and which affects your privacy and the privacy of others.

Let’s look through all the alternatives and how they stand out in several regards:

- **Capacity:** How much video can you store before the chosen method fills up or starts deleting older video; or what is the duration of video (in hours, events, or days) it can store?

- **Capture kind:** Some cameras can be set to record continuously. Others only have an option to store clips, which are typically triggered by detected movement in a camera.

- **Cost:** Is there an initial one-time cost, a setup charge, a lifetime fee, monthly or year subscription fees, or storage and access fees?
• **Bandwidth requirements:** What kind of internet connection is needed? (Also see the sidebar below.)

• **Protection:** Can the storage be stolen or destroyed?

• **Privacy:** Who has access? Who could gain access?

• **Quality:** Does the medium of storage limit video quality captured?

• **Access:** Are your options for remote access or later retrieval constrained by the storage method?

**Proprietary Cloud**

The most popular option among the most popular and well-known camera systems is what I call the “proprietary cloud.” In this scenario, your cameras stream video in real time to internet-hosted storage entirely under the control of the camera maker.

**What’s the Cloud, Anyway?**

While you will hear the term “cloud” quite a lot these days, it’s rarely defined. I like to think of the cloud as any online storage or system in which I don’t have to manage physical hardware directly or connect to a specific server by name or number.

For cloud storage, that means having a pool of internet-reachable data that you have no idea where in the world it is or how it’s configured. With camera-based proprietary clouds, it’s just an amorphous blob of data that your cameras talk to and you can access via apps. You never manage or provision it.

Cloud storage can be proprietary, as described in this section, where a company runs it and it’s entirely a black box to you; or you can find your own, discussed in Personal Cloud/Internet Storage, such as Google Cloud, Amazon S3, or Backblaze B2.

Here are the characteristics of proprietary cloud storage for cameras:

• **Capacity:** It’s a large range, from 24 hours of free storage of motion-triggered clips up to weeks or months of video storage.
Consider Physical Parameters

Cameras and camera ecosystems that link them together have a huge array of choices. You can buy a no-name brand with a super-cheap price tag—and then worry if its security is up to snuff, and whether flaws will be fixed in software updates. You can spend a fortune and find that ongoing costs aren’t worth what you get out of it.

Pick a Brand Name?

I do not want to be the kind of technology person who tells you to trust brand names. As I am writing this book, the latest of several controversies and security issues is erupting with the Amazon-owned Ring camera system, which should put the lie to big brand names being the solution to worries about products.

But the converse is that what I might uncharitably call “no-name” products have their own set of problems. Because of the simplicity and low cost of creating new electronic products in China and some other Asian nations, the number of options for consumer products has exploded. Many are identical or nearly identical, relying on mass-produced hardware that is lightly customized for a particular buyer. I suspect if I wanted to, I could go to the Alibaba marketplace and create a GlennCam line of hardware to sell to you.

These products from small companies with no history or reputation by which to judge their performance often rarely update firmware for their cameras and apps used to access them after an initial sales period that can be less than a year. Security problems or updates to mobile operating systems render your cameras hobbled or unusable.

But to play devil’s advocate with myself, a number of well-known electronics companies have also been challenged in recent years with
not updating firmware on hardware they sold that’s not very old and which has gaping security problems. For example, flaws a few years ago in implementations of Wi-Fi security that required updates in the firmware in Wi-Fi gateways revealed that several well-known firms weren’t that interested in producing updates for recent or even current products very quickly.

With internet-connected devices, it’s critical that security exploits in account management and firmware are dealt with right away. You need to trust the company to run a tight ship on security, to guard your privacy according to the promises they make (see Protect Privacy for more on that), and to release software and firmware updates quickly when exploits are uncovered.

I wish I had a magic formula to tell you which companies to trust, but I can offer this general advice:

- Check that the company has a history. If you’ve never heard of the company, can’t find a trace of them on the internet, and they’re not operating offices in a country you live in or outside of China, you should likely not purchase a product from them.

  **Note:** There’s nothing wrong with China, but a lack of regulatory and business oversight in the country on international sales in particular sets a higher bar for companies that exclusively operate there. Many larger Chinese firms have offices in the United States, Europe, and other nations, however.

- Determine whether the company has a *bad* history. If they’ve faced similar problems in the past, no matter how large or long established they are, their response to those situations should be a guide.

- See how well they provide answers on Amazon.com and other online forums. While reviews may be faked, user questions about problems and a lack of answers (or a hostile answer!) are generally true.

- While reviews on product and retail sites are unreliable, it’s still worth looking through them and disregarding those that don’t
Be Alert!

Video is obviously the key aspect of a home security camera. But alerts are a close second! Without a system of alerts that you specify and moderate to get just what you need, when you need it, your camera has little value as a security tool.

Now, you may be recording for later review and relying on scanning through motion-triggered events or watching a system-generated summary—some systems are limited to just that kind of recording, too. But even then, I can’t imagine that you wouldn’t have certain kinds of events that would rise to a level of immediate texting, push notification, or email.

Every system offers different kinds, quantities, and intensities of triggers, as well as varying delivery methods of sending you alerts.

I separate the series of events that happens into this sequence:

- A trigger, called on some cameras an “activity”
- An action of some kind, typically recording a video snippet or marking that a trigger happened at a particular point or during a particular period
- An alert, optional, which might be a sound or light on a camera or a message or notification sent by the camera or a central system to the camera’s owner or people with shared access

Let’s look at triggers, actions, and alerts, next.
Configure Triggers

Depending on the system, you should have some of the following choices for setting up event triggers:

- **Motion**: Whenever motion is detected, an event is triggered. This is found on nearly every camera. You usually can set a degree of sensitivity so that every flutter of a leaf doesn’t set off a recording or alert.

- **Person**: For cameras that have computer-vision (CV) support, as described in Motion Triggers, you can set up triggers that only go off if the device detects a person in frame.

- **Identified person**: In a system that has both CV and facial detection, you may be able to set a trigger whenever someone programmed into the system appears, as well as when an unknown face comes into view (Figure 24).

![Figure 24: Dun-nuh dun-nuh dun-nuh dun-nuh, Batman!](image)

- **Zone**: If you can set up zones of motion, for either passive infrared (PIR) or CV, you can typically have custom triggers based on behav-
Secure Your System

It does you little good to install a system that tries to protect yourself, your home, and your family if an outsider can easily break in—whether while parked outside or from 10,000 miles away.

The default security of a system out of the box varies incredibly among manufacturers, making it critical that you follow your own security protocol in setting up new accounts and devices.

In this chapter, I explain the risks you face, how to secure your device with good general account and password hygiene, and how to keep your devices safe on the internet and up to date. I conclude with what is necessary to share access to your cameras and stored video safely.

You Face Real Risk

One reason to take this so seriously is that criminals and trolls are constantly scanning the entire internet—yes, really, the entire internet—to find devices that are improperly secured or that let them test endless combinations of things to break in. If you have an improperly secured directly connected internet device or a poorly secured online account, you almost certainly will be compromised.

This is no academic exercise. As I was writing this edition of the book, several news outlets reported on crackers gaining access to Ring accounts, going so far as to create podcasts in which they pranked Ring owners. In one case, someone started yelling at an 8-year-old girl from the camera.

Even though Ring cameras are new and frequently updated, the biggest problem is from outdated gear.
Avoid Earlier Generations of Cameras

Not very long ago, most affordable home security cameras had very few of the features we now look for in such a device. They were really webcams, designed for videoconferencing and recording at one’s desk, and some were repurposed with features that made them more generally useful.

They lacked robust triggering, had low resolution, had a small field of view, and didn’t have options to stream to cloud storage or come with storage plans.

Most importantly, they weren’t well secured against internet-based attacks. Manufacturers used inexpensive embedded operating systems that were quite similar to that used for home network routers, and lightly customized them, but didn’t harden them against attack.

Those are the cameras you typically see on the kind of site I just mentioned above. I would not purchase nor can I recommend any of these older models, which are still readily available—often very cheaply. Generally avoid camera models released before 2017; specifically, search on any model and “hacked” if you’re looking at any older system or one that isn’t optimized with high-quality versions of features described in this book.

Tip: I noted earlier in the section Pick a Brand Name? that you should lean towards equipment make by major manufacturers. However, that’s not good advice in bypassing the risk of older gear, because some of the biggest electronics makers, like Linksys and Foscom, had vulnerable products.

Can You Trust Any Camera Maker?

I’d be remiss if I moved on without noting the frequent coverage in technical and mainstream media of hacking of various kinds that allows access to stored data, account information, or live feeds. As I was writing part of this book on December 30, 2019, a story broke about Wyze, a well-liked inexpensive maker of cameras.
Protect Privacy

Privacy isn’t so much a double-edged sword as a pointy mace without a handle that’s very hard to pick up. In the modern era, you have to consider your own privacy and whether you’re invading other people’s. You also need to think about whether police or government agents will have an interest in what you’re recording—live or archived.

In this chapter, I look at these three issues: your privacy, that of others, and the surveillance state and your role in it.

Keep Your Cameras and Video Private

Video is intimate, even when you’re fully clothed and reading Bleak House on a couch in your living room. It’s worse if you have children or other people who live with you who are vulnerable or naïve.

The basis of installing any home security camera system, whether it points outward or inward or both, is that you must be able to control who has access to it and prevent everyone else from viewing it.

Note: At least some camera systems can be set up to stop recording video when they detect you’re at home, have a setting that lets you easily turn recording on and off, or have a privacy cover for the lens you can manually engage.

You will have noticed that throughout this book so far, I have emphasized features that let you understand how, where, and how securely your video is accessible, transmitted, and stored. Before we move on, let me summarize what you should demand and configure to ensure the privacy of your cameras and video captured from them:

- **Limit access to the device and account.** This includes:
  - A strong password is required (or at least allowed) for all accounts and direct device access.
There is no configuration access to the device or account without knowing the password (and account name, if required).

Cameras should reject all unnecessary connections or let you make a settings change to turn them all off—that is, any inbound networking attempt except for desired remote access.

Devices that can only send video continuously or as clips to a proprietary service shouldn’t allow any inbound access, and they should include a mechanism (typically cryptographically based) to ensure they can’t be fooled into streaming video elsewhere.

- **Limit access to the video.** Only authorized parties can view live video or stored video, whether through a direct connection to the camera, a locally based NVR, or cloud storage of any kind.

- **Encryption must always be used.** The surest way for your video to be accessible is by it passing over a local network (even one with a Wi-Fi password) or over the broader internet. Encryption aids privacy by an extraordinarily large degree.

- **All changes to access must be approved.** Some camera makers have changed their privacy rules since their introduction. Each of these changes should be opt-in, and allow you to maintain your previous personal privacy stance.

- **Deleting video.** You should have the ability to know when your stored video is deleted and the right to insist all video is deleted if you cancel an account. Optionally, you may want or be able to purge video manually from a cloud-based or local storage system.

Consider these points in what system you buy, how a company changes its software and options over time, and how you configure hardware you already own.
Weigh Centralized and Smart Cameras

The newer form of home security cameras described in this book are fresh enough that not everything around them has coalesced. Generally, these cameras are *smart*: they record video and compress it on-board, make decisions about recording based on triggers they interpret directly, and stream clips or continuous video to an integral storage card or over the internet to cloud storage.

**Note:** Some may require a proprietary smart hub that handles some aspects of coordination, like relaying video to cloud storage, but doesn’t storage video itself, and is more like an Wi-Fi switch for the camera than anything else.

These smart cameras build on earlier standalone webcams by offering higher quality video recording and continuous-monitoring features, and often cloud-based control and video playback.

They stand in contrast to another category I have only discussed in passing in the book: groups of cameras that connect to a single cloud-based account or capture video directly to a networked device, usually including a network video recorder (NVR) for local storage.

If your interest is in having many cameras, no recurring fees, all local storage, and no required remote access, multi-camera systems may be a winner. You can also store continuous video for days, weeks, or months, depending on included drive size or additional drives you add—some systems accept 10 TB or larger drives.

**Note:** These systems can be set up to allow remote access to the NVR, but it’s not required to operate.

But there are a host of downsides, too, including wiring, cloud-based access, and a centralized point of failure.
Because I’ve focused mostly in this book on cloud-connected or stand-alone cameras, let’s first dig into how multi-camera systems work before looking at the tradeoffs between the two categories.

Centralize for Greater Control

One of the big draws for these multi-camera systems is that they tend to be much more affordable to deploy multiple cameras. That’s almost always because the cameras are “dumb,” having few onboard features.

The least-expensive systems rely on analog cameras, which send raw video signals back along cables to a central hub or NVR. That hub handles all the video digitization. More-expensive but still affordable configurations use digital cameras that handle compression in the camera, but otherwise rely on entirely on the central hub.

As one example, a wired system from Lorex that comes with four 1080p analog cameras weatherproofed for outdoor use (with infrared night vision), and a 1 TB drive in the included NVR, costs just $279.99, and includes a two-year warranty. Want 16 cameras? That’s $699.99! A four-camera system with nearly identical specs from Zosi is even cheaper—$189.99!

Lorex has higher-end offerings, too. Its wired four-camera 4K system, which uses digital cameras and Power over Ethernet wiring and includes an NVR with 2 TB of storage and the capacity for up to eight 4K cameras is $699.99.

Neither Lorex or Zosi offers cloud-based storage, almost always the case with multi-camera systems. However, the centralized NVR approach allows for massively more storage and at no recurring fee.

Contrast the purchase price and evergreen costs for a Google Nest Cam Outdoor with night mode and weatherproofing, which is $199 for a single unit or four for $586. Google simplified and reduced cloud storage pricing in 2020: a single Nest Aware subscription now covers all cameras. It’s $60 a year for 30 days of event history or $120 a year for 10 days of 24-hour-a-day footage and 60 days worth of events.
Use Smart Home Ecosystems for Control

Many cameras work within an ecosystem of devices, like smart switches, bulbs, sensors, alarms, and more. There are ever more of these systems, some of which are particular to one company and some open to all hardware manufacturers.

These systems typically let you not just control devices individually, such as turning a switch off and on with a tap or viewing the streaming feed from a camera, but also group devices together and schedule them. This can let you create a living room group to turn lights and your A/V system on or off with one virtual switch.

You might also want your furnace to kick in at 5 P.M. if it’s below 68° F (20° C), have the front light and front walk’s lights turn on, and start music playing. Or you might want a trigger from a camera system to flip on flood lights and play Cher’s “Believe” at high volume through exterior speakers. (“Do you believe in life after love!”)

There are also ecosystems that allow voice control of cameras and other smart-home items via apps, smart speakers, smartphones, tablets, and computers. This chapter looks at all kinds.

What Kind of Systems Exist

In nearly every case, you have access to a camera’s functions via dedicated apps on multiple platforms and a web app. The ecosystem support is typically on top of that. A few manufacturers use a single app for all their devices, whether or not you are controlling them in groups or via timed or triggered actions.
Cameras can be found that also work within several kinds of ecosystems, which break out roughly into three categories:

- **Proprietary company standard:** The company has its own ecosystem, but it’s not open to third parties. You can use smartphone/tablet apps and a web app (and sometimes desktop apps) to manage cameras along with all the other devices. In some cases, the company works with a few partners, but most gear that works within the ecosystem is made by the company and there’s no general program for other companies’ to add their hardware, although other companies’ products may be able to control devices that conform to these standards (see One Hub Rules Them All, below). This includes TP-Link Kasa, Logitech Harmony, and Lutron ClearConnect. These systems sometimes involve proprietary networking or wireless standards.

  **Note:** Equipment that works with a company ecosystem often supports some or all of the feature available in a big-company environment.

- **Licensed big-company ecosystem:** Amazon, Apple, and Google each have an ecosystem that supports all the gear they make, but also encourage third parties to make compatible smart-home and other equipment through a licensing and certification program. Apps or interfaces made by each company across multiple platforms, including smart speakers (Amazon Echo, Apple HomePod, and Google Home, to name three), allow controlling devices. Things with screens allowing streaming video from camera. Third parties may support from one to three ecosystems in the same device.

- **Industry standard for interoperability:** Devices work according to a single standard, and a variety of apps or even company-controlled standards can manage and interact with standards-based devices. Some think the consumer-electronics industry is ultimately headed this way, at least for certain categories. This includes well-known trade standards, like Bluetooth, Wi-Fi, and ZigBee.
Camera Models

In this final chapter, I take you through the approaches used by each of several major camera makers’ systems, and apply a standard rubric against each of them that combines elements discussed across the rest of the book.

The rubric is as follows:

- **Models:** What options are available for cameras?

- **Capture and Storage:** Where is video stored, how much can you retain, how do you access it, and what one-time or ongoing costs are involved? Does a camera let you capture only motion-triggered clips, continuous video, or some mix of both?

- **System price:** What does each camera or bundle of cameras cost, as well as any add-on optional or required hardware?

- **Privacy:** What measures does the maker take to preserve your own privacy and that of others, and do they work with law enforcement to hand over stored video?

- **Platforms and integration:** Which software is required to configure cameras and access the system? Which smart-home systems does it work with, like Amazon Alexa, Apple HomeKit, and Google Home?

- **Bottom line:** Each rundown ends with a summary of for whom the system is useful and in what circumstances it shines.

Because smart cameras and multi-camera systems have such distinct use cases and tradeoffs, I break those out into two categories. For more on that topic, see the entire chapter dedicated to it, *Weigh Centralized and Smart Cameras.*
Pick a Smart Camera

Smart cameras offer onboard features, can be uniquely configured, typically connect directly to the internet (although some may require a proprietary wireless hub), and offer either local memory card storage or an option for proprietary cloud storage. This category continues to grow as more existing and new companies enter the market.

In this section, you can find detailed write-ups of:

- Amazon Blink
- Amazon Ring
- Canary
- D-Link mydlink
- Google Nest
- Logitech Circle
- NETGEAR Arlo
- TP-Link Kasa
- Wyze

Amazon Blink

Amazon’s Blink cameras stand in contrast to the Ring lineup by existing in just two models: a first-generation Blink and the more recently introduced Blink XT. Both are characterized by offering extremely short motion-triggered clips sent to free cloud storage while relying on replaceable (but not rechargeable) lithium metal batteries (see Lithium-Metal Battery Warning) rated for two years of use.

**Note:** Amazon bought the company, Blink, and removed integration from its first-generation product with Samsung’s SmartThings ecosystem. You can find oodles of 1-star reviews on the Amazon product page complaining about the withdrawal of that feature.
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About the Author

Glenn Fleishman never stops writing about technology and its implications. He’s in his third decade of writing for publications as varied as *American History*, *Fast Company*, the *Economist*, *Wired*, *Smithsonian* magazine, Ars Technica, Atlas Obscura, the *New York Times*, *Macworld*, and TidBITS, among many others. In 2012, he won on Jeopardy—twice!

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Thank you to my wife, Lynn, who is both creeped out by security cameras and other surveillance, and who suggested this title—hoping I would explain, among other options, how someone could choose to keep all their video within their personal control. How did I do?

Shameless Plug

My passion is type and printing history—and present. I’ve written for many publications and for patrons of my work at Patreon about the origins of printing, specific aspects of it, and how it relates to the present. This often includes language, as in the case of my historical dive into the earliest use of SHOUTY CAPS.

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