

ELECTRONIC FLASH

The Most Feared Light

Overcoming Flash Phobia



Bad Flashbacks



Bad Flashbacks



Bad Flashbacks



WE ALL HAVE THESE TRAUMATIC MEMORIES

So, Exactly WHY do I want to risk further
trauma?

BECAUSE

There are some photos that you simply cannot take without adding light,

AND

Electronic flash is your most available, transportable and modifiable light.

PHOTO TAKEN WITHOUT FLASH



PHOTO TAKEN WITH FLASH



Don't think just about adding light

Think about reducing the contrast of your photos.

Most camera sensors can capture about 7 stops.

A daylight scene may have a contrast of 11 stops or more.

This is not 4X more contrast, it is 2^4 or 16X more contrast!

Instead of



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You can get



Instead of



You can get



Pros & Cons of Flash

All result from the basic characteristics of the light source:

Small

Powerful

Short duration

Daylight balanced

Obeys all laws of optics

Pros & Cons of Flash

Small Light Source

Pros: mobile
 transportable
 adaptable

Cons: harsh highlights
 sharp shadows
 limited throw, sharp fall off

Pros & Cons of Flash

Powerful

Pros: Overcome ambient light
 Overcome sunlight

Cons: Harsh light if unmodified

Pros & Cons of Flash

Extremely short duration – 1/1000 sec or less.

Pros: Freeze motion
 Relatively cool light source

Cons: Difficult to preview
 Sync speed issues

Pros & Cons of Flash

Daylight White Balanced

Pros: Produced accurate colors

Cons: Can create color temperature problems in mixed lighting situations.

Pros & Cons of Flash

Obeys the laws of optics:

Inverse Square law

Light intensity increases or decreases by the change in distance squared.

Angle of incidence = the angle of reflection

Angle at which the strikes a surface is the same as the angle at which it is reflected.

Pros & Cons of Flash

Obeys the laws of optics:

Inverse Square law

Can use distance to adjust the intensity of the flash but there is also a rapid fall off in intensity

Angle of incidence = the angle of reflection

We can bounce the flash off walls, ceiling and bounce cards but can cause red eye and other unflattering effects.

Anatomy of a Flash

INSIDE A FLASHGUN

Where that intense burst of light comes from

Diffuser screen

A translucent plastic screen in front of the tube is designed to spread the light so that the coverage is as even as it can make it

Flash tube

A glass tube filled with xenon gas, which the high voltage charge passes through to create the flash. An electrical coil around the tube excites the gas particles to give the arcing process a helping hand

Reflector

A silvered surface ensures that as much light as possible is directed towards the subject

Capacitor

A reservoir of electrical charge. A transformer ups the voltage from the batteries to the 300 volts needed for the flash tube



Anatomy of a Flash

EXPLAINED A FLASHGUN'S KEY FEATURES

A dedicated flashgun gives you more power and control than the small unit built into a camera

FLASH HEAD

Most flashguns feature 'tilt and swivel' heads that allow you to angle the flash towards a white ceiling or wall in order to bounce the light for softer illumination

BUILT IN BOUNCE CARD/WIDE-ANGLE ADAPTOR

A small screen to spread the flash beam wider or to add a catchlight in people's eyes when the flash is bounced

MODE SELECTION SWITCH

You can use this switch beside the LCD to choose between your flashgun's TTL, Manual, Stroboscopic and other flash modes

LCD PANEL

Use this simple LCD screen to keep track of flash distance and power, the zoom setting you're using, and Exposure Compensation



AF ASSIST

In dark conditions, the subject can be highlighted by a beam of red light before the exposure, in order to allow the autofocus system to lock on

READY INDICATOR LIGHT

You need to keep an eye on this handy indicator, which tells you whether the flash has fully recharged between shots

ZOOM

The flash head can often be zoomed to match the focal length of your lens, ensuring even coverage at wide angles and greater range with telephotos

HOTSHOE CONTACTS AND LOCK LEVER

Dedicated flashguns communicate lots of information about settings, power and other functions through the hotshoe

Anatomy of a Flash



How it works

- ▣ When the flash is turned on, electricity from the batteries is stored in the capacitor.
- ▣ When the shutter release is depressed, the flash measures the amount of ambient light available.
- ▣ Based on exposure instructions given to the camera and flash, the flash's CPU determines the amount of electricity to release from the capacitor to the flash tube.
- ▣ The flash fires and recycles.

Flash Modes

- ▣ Through the lens
- ▣ Fill flash
- ▣ Manual
- ▣ Repeating
- ▣ Wireless

Why Manual Mode?

- ▣ If you understand how to use manual mode, you will be able to use virtually any flash.
- ▣ Teach you how to control the contributions of the flash and ambient light.

4 Factors Affect Flash Contribution

- ▣ Guide # of the flash
- ▣ Aperture
- ▣ Flash-to-subject distance
- ▣ ISO

Shutter speed plays NO Role

- ▣ Absolute Truth of Photography
- ▣ Shutter speed does not and can not control the effect of your flash!
- ▣ Why?

Shutter speed plays NO Role

- ▣ Flash is of Extremely short duration!
- ▣ Almost never have a situation in which you can control the flash by shutter speed.

Sync Speed Issues

- ▣ Sync speed is a minimum shutter speed that can be used with a flash.
- ▣ Typically $1/250$ or $1/500$ sec.
- ▣ Why, if the flash duration is so short, would you have problems with relatively slow shutter speeds of $1/250$ sec.

Curtain Construction

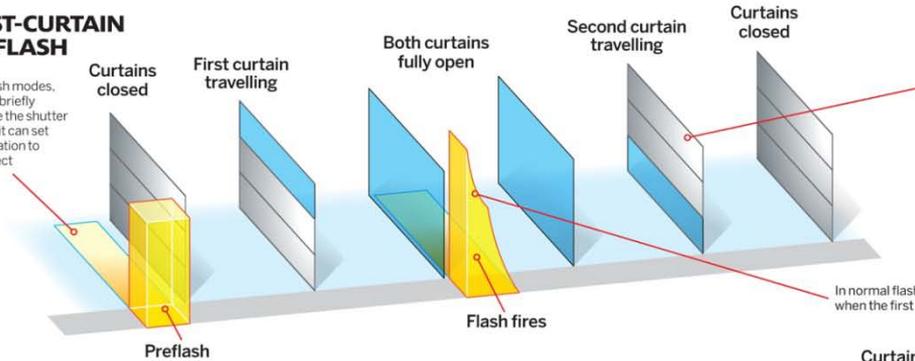


A question of split-second timing

When the flash fires depends on the shutter speed, and on the flash mode used

FIRST-CURTAIN SYNC FLASH

In all auto flash modes, the flashgun briefly pulses before the shutter fires, so that it can set the flash duration to suit the subject

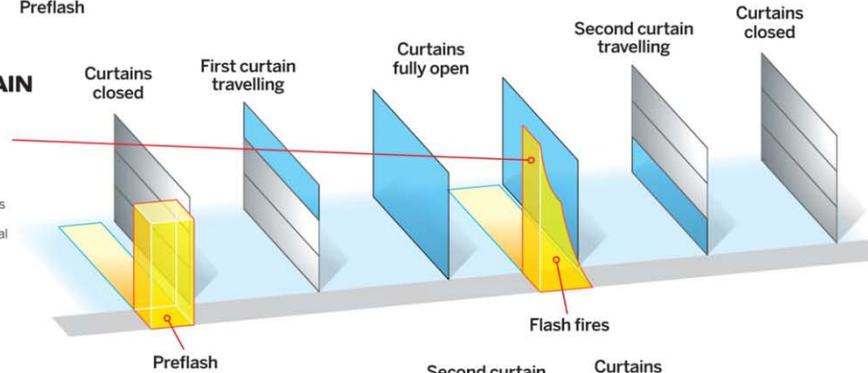


The shutter is made up of two metallic blinds, or curtains. The first opens to start the exposure, the second closes to finish the exposure. The flash needs to fire when the shutter is fully open

In normal flash mode, the flash fires when the first curtain is fully open

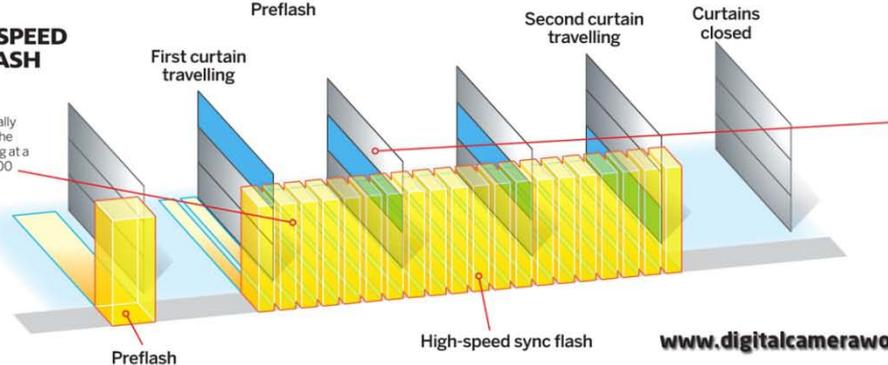
SECOND-CURTAIN SYNC FLASH

If the camera or flash is set to second-curtain sync, the flash will fire at the end of the period where the shutter blinds are fully open – rather than at the beginning of this period. This is useful with moving subjects, and with slower-than-usual shutter speeds



HIGH-SPEED SYNC FLASH

The flash continually fires throughout the exposure – pulsing at a rate of up to 50,000 times a second (see below)



At shutter speeds above the SLR's normal 'sync speed', the shutter is never fully open. At shutter speeds above approximately 1/200 sec, the exposure is therefore made by a moving slit, created by the two shutter curtains

Manual Mode: Flash Tables

- ▣ Determine exposure from Guide #, Aperture, Flash-to-Substance distance and ISO
- ▣ Allow you to select either your aperture or your flash-to-subject distance depending on what is most important to the shot.
- ▣ Aperture – then you would use the table to determine the proper flash-to-subject distance.
- ▣ Distance – then you use the table to determine the proper aperture.

Manual Mode: Flash Tables

| EXPOSURE | | | TABLE | | | |
|----------|-----|-----|-------|-----|-----|-------|
| ASA▶ | 25 | 50 | 100 | 200 | 400 | m. |
| 3 | 8 | 11 | 16 | 22 | 32 | 1 |
| 5 | 5.6 | 8 | 11 | 16 | 22 | 1.5 |
| 7 | 4 | 5.6 | 8 | 11 | 16 | 2 |
| 10 | 2.8 | 4 | 5.6 | 8 | 11 | 3 |
| 15 | 2 | 2.8 | 4 | 5.6 | 8 | 4.5 |
| 20 | 1.4 | 2 | 2.8 | 4 | 5.6 | 6 |
| ▲ ft. | 15 | 18 | 21 | 24 | 27 | ◀ DIN |

Manual Mode: Flash Tables

Sigma w/ Umbrella Softbox

| Power | Guide Number @ ISO | | | | |
|-------|--------------------|------|------|------|-------|
| | 100 | 200 | 400 | 800 | 1600 |
| 1/1 | 28.8 | 40.3 | 57.6 | 80.6 | 115.2 |
| 1/2 | 20.3 | 28.4 | 40.6 | 56.8 | 81.2 |
| 1/4 | 14.4 | 20.2 | 28.8 | 40.3 | 57.6 |
| 1/8 | 10.2 | 14.2 | 20.3 | 28.4 | 40.6 |
| 1/16 | 7.2 | 10.1 | 14.4 | 20.2 | 28.8 |
| 1/32 | 5.1 | 7.1 | 10.2 | 14.2 | 20.3 |
| 1/64 | 3.6 | 5.0 | 7.2 | 10.1 | 14.4 |
| 1/128 | 2.5 | 3.6 | 5.1 | 7.1 | 10.2 |

| f-stop | Flash Power @ Distance (ft) for ISO 400 | | | | | | |
|--------|---|------|------|------|------|------|------|
| | 3.5 | 4 | 5 | 5.5 | 6 | 7 | 7.5 |
| 1.4 | 1/128 | | 1/64 | | | | 1/32 |
| 1.8 | | 1/64 | | 1/32 | 1/32 | | 1/16 |
| 2 | 1/64 | | 1/32 | | | 1/16 | |
| 2.8 | 1/32 | | 1/16 | 1/16 | | | 1/8 |
| 3.5 | | 1/16 | | | | | |
| 4 | 1/16 | | 1/8 | | | 1/4 | |
| 5.6 | 1/8 | | 1/4 | | | | 1/2 |
| 8 | 1/4 | | 1/2 | | | 1/1 | |
| 11 | 1/2 | | 1/1 | | | | |
| 16 | 1/1 | | | | | | |
| 22 | | | | | | | |

Manual Mode: Flash Tables



Manual Mode Calculation

At 100 ISO

Aperture = Guide Number / Distance in Ft

Manual Mode Calculation

Aperture = Guide Number / Distance in Ft

GN = 100

D = 10

Aperture = $100/10 = 10$

A change of 4 stops – predicted by the Inverse Square Law

Manual Mode Calculation

Aperture = Guide Number / Distance in Ft

GN = 100

D = 20

Aperture = $20/10 = 2.0$

Calculation Variations

At 100 ISO

$$\text{Aperture} = \text{Guide Number} / \text{Distance}$$

$$\text{Distance} \times \text{Aperture} = \text{Guide Number}$$

$$\text{Distance} = \text{Guide Number} / \text{Aperture}$$

Calculation Variations

Distance = Guide Number / Aperture

GN = 100

A = 4

Distance = $100 / 4 = 25$ ft

Calculation Variations

Distance = Guide Number / Aperture

GN = 100

A = 8

Distance = $100/8 = 12.5$ ft

Calculation Variations

At 150 ISO

1.5 X (Aperture = Guide Number/Distance)

At 200 ISO

2 X (Aperture = Guide Number/Distance)

At 300 ISO, 3X; At 400 ISO, 4X; etc.

Manual Mode

- ▣ Current flash units have CPUs but the calculation is the same.
- ▣ Guide #, Aperture, Flash-to-Substance distance and ISO
- ▣ Modern flash units do the calculations for you.
- ▣ Depending on the level of sophistication, the flash may be able to obtain these parameters directly from the camera.

Manual Mode: Hands On

- ▣ Set an ISO of 200, an aperture of 8. What is the proper flash-to-subject distance?
- ▣ Change to an aperture 11. What happens to the flash-to-subject distance?
- ▣ Change to an aperture of 4. What is the flash-to-substance distance
- ▣ If you want your flash to have a longer throw, what do you do with your aperture?
- ▣ If you want to reduce the effect of you flash, what do you do?

Manual Mode: Hands On

- ▣ Set an ISO of 200, a subject-to-flash distance of 10 feet. What is the proper aperture?
- ▣ Change to 15 feet. What is the proper aperture?
- ▣ Change to 5 feet. What is the aperture?
- ▣ Using flash-to-subject distance, how do you increase the effect of your flash?
- ▣ How do you decrease the effect of your flash?

PRACTICE! PRACTICE!

PRACTICE!