

# MOVIE CAMERA

# KEY NOTES

- better understanding of exposure
- understanding of incident light
- operate light meter and measure light
- setup camera and record HD movie files
- familiarize tripod and LCD screen eye-loop finder

# EXPOSURE

**ISO:** International Organization of Standards

- exposure **SENSITIVITY** (*how* responsive sensor is to light)
- image structure (quality/video noise)

**aperture:** opening in lens that regulates light to pass to sensor

- exposure **AMOUNT** (*how* much light lands on sensor)
- image focus (foreground/background)

**shutter:** mechanism in camera that regulates light to fall on sensor

- exposure **TIME** (*how* long light falls on sensor)
- image motion (direction, blur)

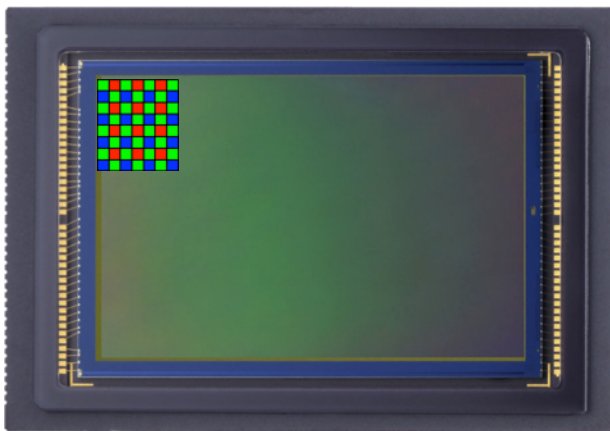
# ISO

## exposure sensitivity

- image/light being absorption
  - video* sensor - Gain control (signal amplification)
  - film* emulsion - Grain (silver halide particle size)
- measured in ISO (International Organization of Standards)

## image structure

- *video* gain increase results in NOISE “noisy”
- *film* grain size increase results in grain visibility “grainy”



video sensor 1.78 aspect ratio



film 1.78 aspect ratio

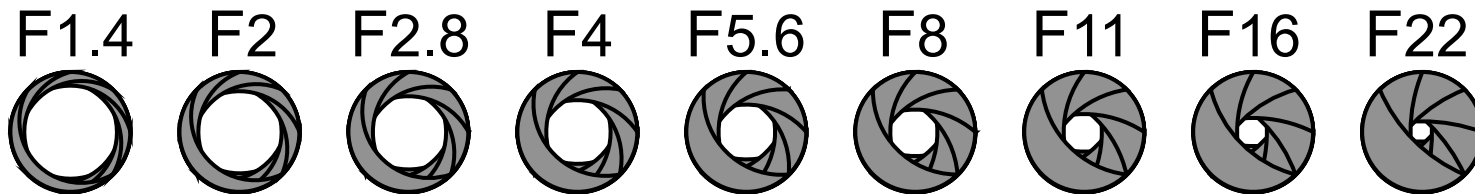
# COMPARED ISO



# APERTURE

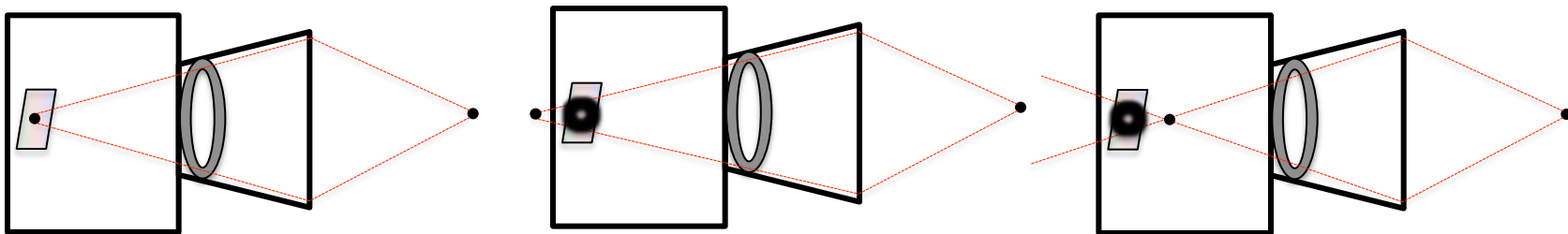
## exposure amount

- opening in lens allowing light to pass (created by blade/leaf)
- measured in F stops



## image focus

- circle of confusion
- depth of field\*: acceptable latitude in **FRONT** of lens
- depth of focus: acceptable latitude **BEHIND** lens



\* Depth of Field also conditional with lens Focal Length and lens Focus Ring (distance of subject/object).



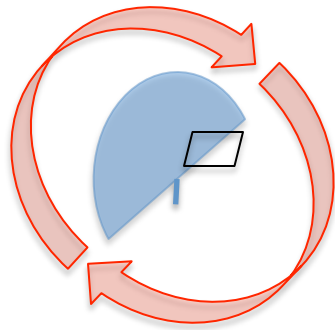
# COMPARED APERTURE



# SHUTTER

## exposure time

- 1/50 closest to 1/48\* sec at 24 fps



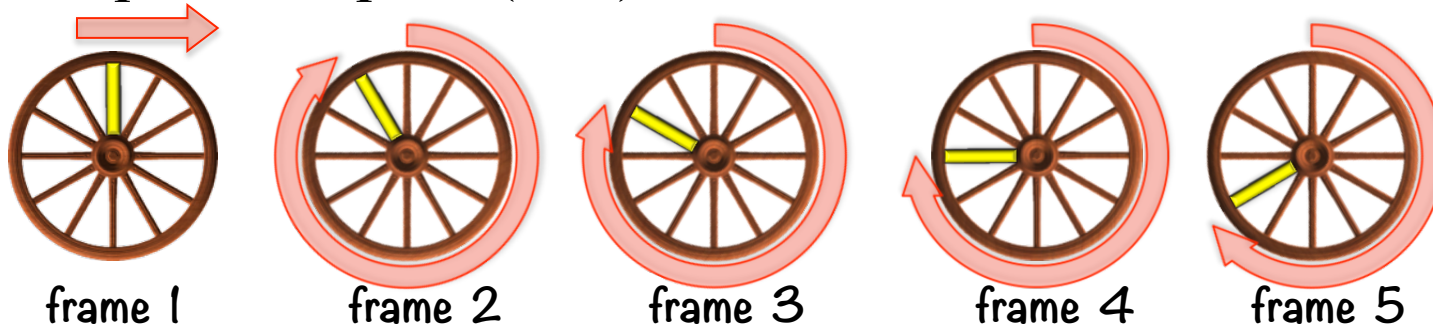
◁180 shutter (angle of open space)

shutter spins 24 revolutions a second (1/24 sec)

exposure time is  $\frac{1}{2}$  of each revolution (1/48 sec)

## image motion

- perception of movement/direction (stroboscopic effect)
- perception of speed (blur)



frame 1

frame 2

frame 3

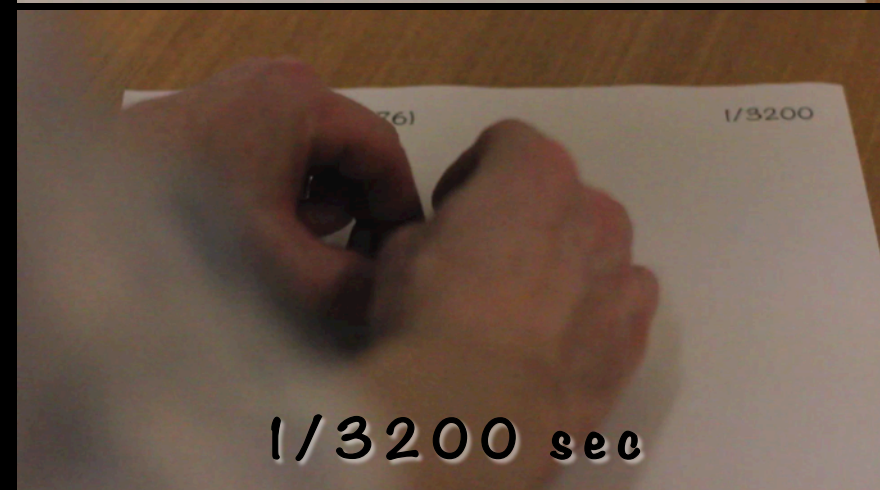
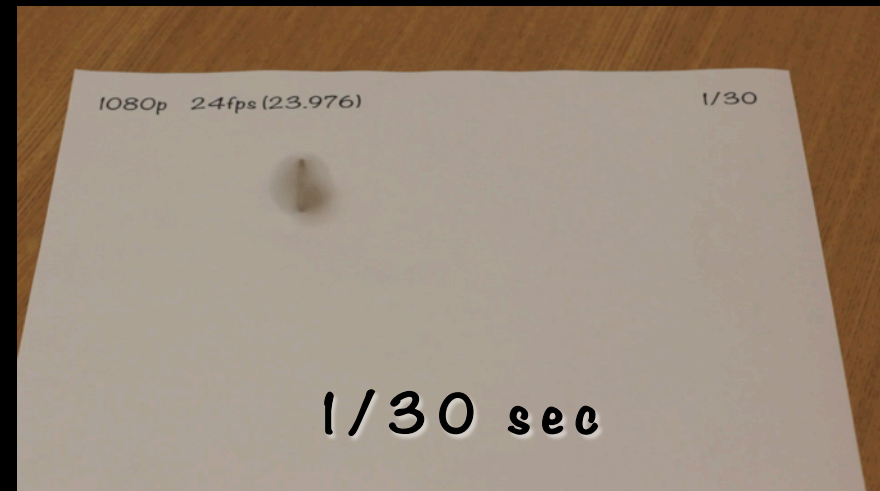
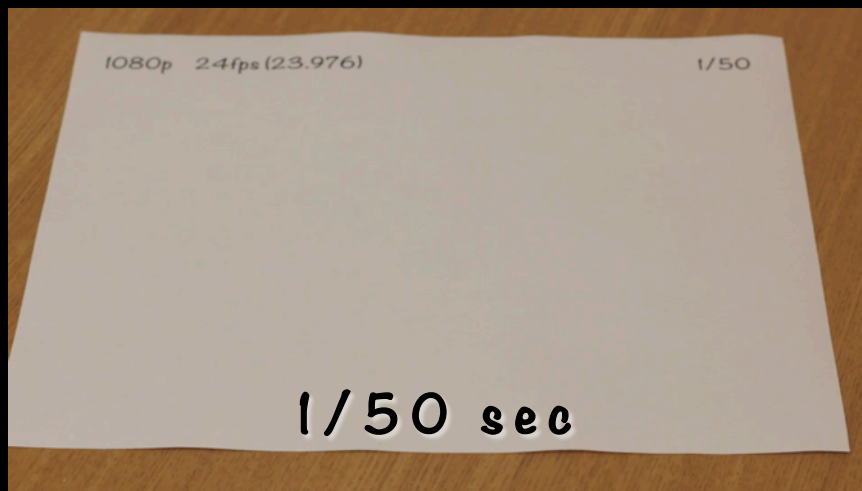
frame 4

frame 5

\* DSLR does not have 1/48 shutter setting.



# COMPARED SHUTTER



# LIGHT METER SETUP

[blogs.bu.edu/jamie](http://blogs.bu.edu/jamie)

· TechSheet\_LGHTMTR

## SEKONIC L-358

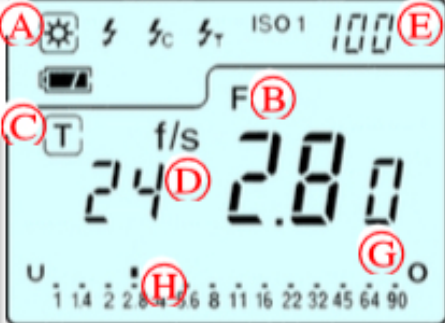
Incident Meter: measures light falling on lumi-sphere globe  
frame rate (f/s): **24**

### OPERATION CONFIGURE

1. POWER on ①      ▶ press/hold POWER off
2. SET Cine Mode
  - ▶ press/hold MODE ② ▶ rotate Jog Wheel ④
  - ▶ boxed ambient icon (A) · "F" **NOT** boxed (B)
3. SET frame rate f/s **24**
  - ▶ rotate Jog Wheel ④
  - if* boxed "T" (C) visible, rotate Jog Wheel ④ Counter-Clockwise
4. SET desired ISO
  - ▶ press/hold ISO 1 ③ ▶ rotate Jog Wheel ④


### MEASURE LIGHT

1. EXTEND lumi-sphere globe ⑥
2. PRESS ⑤
3. aperture F-stop for NORMAL\* exposure
  - ▶ F-stop (F) measured in 1/10 increments (G)



### BUTTON / DISPLAY

① POWER	
② MODE	set to Cine
③ ISO 1	default ISO
④ Jog Wheel	toggle settings
⑤ MEASURE	measure light
⑥ Lumni-Sphere	extend/retract
(A) AMBIENT light	
(B) F-stop (priority)	<b>NOT</b> boxed
(C) Shutter (priority)	<b>NOT</b> visible
(D) Frame Rate	24 f/s
(E) ISO	user set ISO value
(F) F-stop (measured)	measured
(G) 10 <sup>th</sup> stop	10 <sup>th</sup> stop increment
(H) F-stop (scale)	measured



# NORMAL EXPOSURE

tonal gradations

## Zone System

0	I	II	III	IV	V	VI	VII	VIII	IX	X
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# INCIDENT LIGHT

## incident metering

- light falling **ON** an object
- Normal exposure maintains **NATURAL** tonal perception (highlights, shadow, detail, brightness, contrast, color, shades)



## reflected metering

- light reflected **OFF** an object
- Normal exposure reproduces tonal perception of **MIDDLE GRAY** (highlights, shadow, detail, brightness, contrast, color, shades)

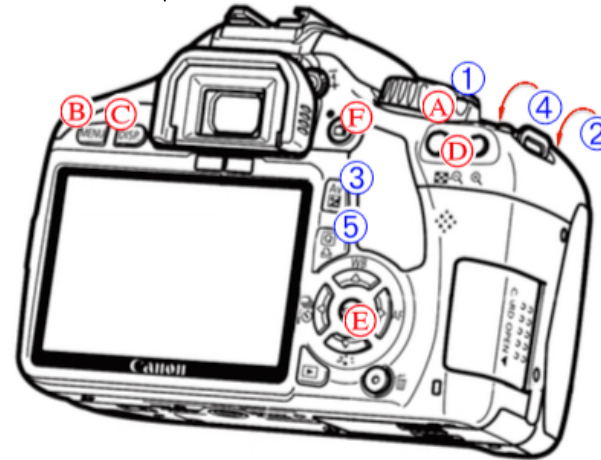


\* images from Sekonic <http://www.sekonic.com/classroom/meteringtechniques/incidentvsreflected.aspx>

# CAMERA SETUP

[blogs.bu.edu/jamie](http://blogs.bu.edu/jamie)

· TechSheet\_T2i



## settings to MANUAL control

RECORD SETTINGS			
Record Size:	1920x1080 24 <sub>(23.976)</sub>	Picture Style:	Neutral
Shutter:	50	Sound:	OFF
Video System:	NTSC	Light Optimizer:	OFF

QUICK SET-UP			
<b>SWITCH SET</b>			
① SET to Movie Mode			
MODE DIAL		▶ Movie Mode	
② SET shutter exposure time			
Main Dial "Toggle Wheel"		▶ 1/50	
<b>MENU SET</b>			
1. SET record size			
▶ Movie Set Up 1	▶ Movie rec. size	▶ 1920x1080 24	
2. SET manual exposure			
▶ Movie Set Up 2	▶ Movie exposure	▶ Manual	
3. SET sound recording			
▶ Movie Set Up 2	▶ Sound recording	▶ Off	
4. SET tone priority			
▶ Movie Set Up 2	▶ Highlight tone priority	▶ Disable	
5. SET auto light optimizer			
▶ Camera Set Up 2	▶ Auto Lighting Optimizer	▶ Disable	
6. SET picture style			
▶ Camera Set Up 2	▶ Picture Style	▶ Neutral	
7. SET video system			
Set-up 2	▶ Video system	▶ NTSC	
8. FORMAT media			
Set-up 1	▶ Format	▶ OK	

ADDITIONAL FUNCTIONS			
<b>ISO</b>			
SELECT iso accordingly			
a. ISO			
b. "Toggle Wheel" Main Dial	▶ 100 · 200 · 400 · 800		
		▶ 1600 · 3200 · 6400	
<b>COLOR TEMPERATURE</b>			
SELECT white balance accordingly			
a. Quick Control			
b. "Toggle Wheel" Main Dial	▶ Tungsten	▶ 3200K	
	▶ Daylight	▶ 5200K-5600K	
	▶ Custom		
SET Custom WB			
a. set Mode Dial ① to Full Auto Mode			
b. full frame of evenly lit white card			
c. capture still image			
d. set Mode Dial ① to Movie Mode			
e. enter MENU			
▶ Camera Set Up 2	▶ Custom White Balance	▶ select white still	
<b>FOCUS ASSIST</b>			
Focus Assist <sup>®</sup> (zoom in x5 · x10)		▶ Re-center <u>PUSH</u> Trashcan	
<b>GRID FRAME</b>			
MENU		▶ Movie Set Up 2	▶ Grid display



# TECHNICAL TERMS

**ISO<sup>2</sup>**: *how* responsive sensor is to light

**aperture<sup>2</sup>**: opening created in lens allowing light to pass

**shutter<sup>2</sup>**: exposure time ( $1/50 \approx 1/48$  @ 24fps)

**depth of field**: in focus latitude of foreground and background

**color temp.<sup>2</sup>**: measured (Tungsten-3200°K Daylight-5600°K)

**incident light**: light falling **ON** an object

**normal exposure(incident light)**: **NATURAL** tonal perception

**23.976fps**: NTSC video frame rate for 24p

**aspect ratio**: FOV<sup>2</sup> field of view size (1920x1080 or **1.78**)