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Magic Lantern v2.3 - User's Guide

Features

- Audio: disable AGC, audio meters, manual audio controls, selectable input source (internal, internal+external, external stereo, balanced), audio monitoring via A/V cable.
- Exposure helpers: zebras, false color, histogram, waveform, spotmeter, vectorscope.

- Focus tools: focus peaking, zoom while recording, trap focus, rack_focus, follow_focus, stack_focus.
- Movie helpers: Bitrate control, movie logging (Exif-like metadata), auto-restart after buffer overflow or 4 GB limit, HDR video, advanced FPS control.
- LiveView adjustments: contrast, saturation, display gain for using LiveView in darkness.
- Cropmark images: user-editable overlays to assist framing and composition.
- Fine control for ISO, Shutter, Kelvin white balance and other image settings.
- Bracketing: advanced exposure bracketing, focus stacking.
- Remote release with LCD face sensor and audio trigger, without extra hardware.
- Timelapse: intervalometer (for photos and movies), bulb ramping (manual and automatic), recording at very low FPS (down to 0.2 FPS), silent pictures without shutter actuation.
- Astro- and night photography: bulb timer for very long exposures (up to 8h).
- Info displays: focus and DOF info, CMOS temperature, shutter count, clock.
- For strobists: flash exposure compensation, range up to -10 to +3 EV (depends on the camera).
- Power saving: Turn off display or reduce backlight in LiveView during idle times.
- Handy features: Quick zoom in PLAY mode, key shortcuts for commonly-used features, customizable menus.
- And much more!

Important notes

- If you have a bootable SD card and have the `BOOTDISK` flag set in the camera (which the installer does), and you do not have an `AUTOEXEC.BIN` file on the card the camera **WILL NOT BOOT**! It will hang and not wake up until the battery is removed.
- If you encounter a `locked up` camera, **quickly remove the battery**.
- When in doubt, remove the battery and reboot.
- **And, remember that this software can damage or destroy your camera.**

Known issues

- First second of recorded audio may be very loud.
- Sometimes, rack and stack focus simply refuse to work, and you need to restart your camera.
- SD monitors are not completely supported (magic zoom and RGB tools will not work).
- **Magic Lantern has no audio controls for Canon 600D/T3i and newer cameras.** You can disable AGC from Canon menus though.

Common terms

Movie mode

Most cameras have a dedicated movie mode on the mode dial. In this case, it's obvious what movie mode is.

However, the following cameras do not have a dedicated movie mode. For these cameras, Magic Lantern considers the following configurations as `movie mode`:

- For Canon 5D Mark II: in LiveView, with movie recording enabled AND LiveView display set to Movie. Tip: you can change LiveView display type from Expo menu.
- For Canon 50D: in LiveView, with movie recording enabled from ML menu.

When movie mode is active, Magic Lantern will show a `Mv` symbol on the bottom info bar.

The ''Q'' button

Most cameras have a button labeled as `[Q]`. A few cameras don't, so you will have to use some other button:

- 5D Mark II: use the `Picture Style` button.
- 50D: use the `FUNC` button.
- 500D: use the LiveView button.

Liveview screen layout

Magic Lantern uses the available screen space to display operational information in a clear and practical manner. The image shows a screenshot with commonly used ML features enabled.

Some items that may need more details:

- Audio meters: this shows the audio record levels, in dB. The bars become yellow at -12 dB and red at -3 dB.
- FPS: the current FPS value is displayed with 3 decimal places (25.000, 24.000, 23.976 etc).
- Shutter speed: in movie mode, values that maintain a certain amount of filmic motion blur (180 degree shutter) are displayed in green. In photo mode, values that may cause blurry pictures are displayed in red.
- ISO: values with low noise (negative digital gain) are displayed in green.
- Clipping dots on histogram: they appear when the image contains overexposed areas.
- Green/magenta white balance shift: not all cameras let you adjust these in movie mode; fine-tune them from White Balance submenu in ML menu.

Key shortcuts

PLAY mode shortcuts

- `Q` (550D), `UNLOCK` (60D), `DISP` (600D), `LV` (500D), `FUNC` (50D) or `Picture Style` (5D Mark II): show exposure tools (zebra, false color, histogram, waveform, spotmeter) and cropmarks (as configured from Overlay menu).
- `SET` + `Main Dial (Scrollwheel)` in `PLAY` mode: customizable function (preview HDR images, silent pictures, multiple exposures, timelapse playback, image comparison). See SET+MainDial.
- `LV`: create a transparent overlay from current image (when Ghost Image is active). You can use it for panoramas or for repeating shots.
- `LV` on 60D/600D: you can configure it to protect images with a single button press.
- `SET+Erase`: you can configure it to erase images without the confirmation dialog.
- `Zoom In`: quick image magnification: a single click can zoom all the way in, on center point, on AF point etc (configurable).

Arrow key shortcuts

Arrow keys can be used to quickly adjust the following settings:

- Audio gains and input source;
- ISO (in intermediate steps) and Kelvin WB (push-button WB also available);
- Shutter and aperture, in finer steps;
- LCD backlight, saturation and display gain.

You can select what functions you need from Arrow/SET shortcuts submenu, under Prefs.

To enable the shortcut menu, press the following key:

- 550D: the `Av` button (optional: cover the LCD sensor);
- 60D: the `Metering` button (near ISO);
- 600D: the `DISP` button;
- 500D: cover the LCD sensor;
- 50D: the `FUNC` button;
- 5D Mark II: the `Picture Style` button.

Besides the shortcuts, arrow keys can also be used for focusing (see Follow Focus).

See also our Shortcuts article.

Misc shortcuts

- SET pressed at startup: loads vanilla firmware (does not load Magic Lantern).
- INFO/DISP in LiveView: change current display preset, if this feature is enabled.
- Zoom In while recording: it does just that :) (Magic Zoom)
- SET in LiveView: center AF area (the little rectangle).
- Activating *AF mode* dialog when Manual Focus is active will toggle Trap Focus.

Magic Lantern menu

- Press ERASE button to bring up the Magic Lantern menu.
- Use arrow keys, joystick or scrollwheels to navigate.
- Use SET and PLAY to toggle values.
- Use Q to open a submenu with more settings.
- Press INFO or DISP button to get help.
- In LiveView, press Zoom In to preview the image behind ML menu.
- Press MENU to hide items that you don't use (to reduce clutter).

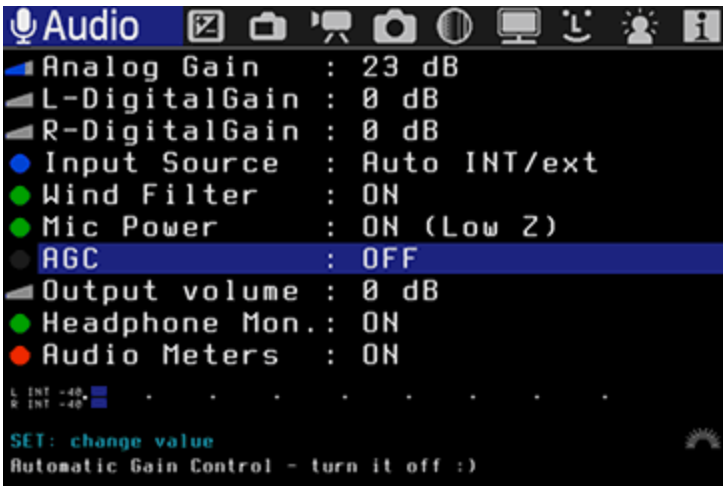
For cameras without Q:

- 5D Mark II: press the Picture Style button.
- 50D: press the FUNC button.
- 500D: press the LiveView button.

One-handed menu navigation for 5D Mark II and 50D (optional):

- Open ML menu and submenus with a long-press on joystick center key;
- Navigate ML menu with scrollwheels;
- Close submenus with a short press of joystick center key (use Left and Right to adjust values);
- Close ML menu with a short half-shutter press.

Audio



Manual audio controls.

This menu is not available on Canon 600D / T3i.

The 600D/T3i already has manual audio control, but right now it's not possible to change audio settings from Magic Lantern. You can only use audio meters during recording.

Analog Gain (dB)

Gain applied to both inputs in the analog domain. If you use an external preamp, set this parameter as low as possible; otherwise, set it as high as possible without clipping (audio meters should be green).

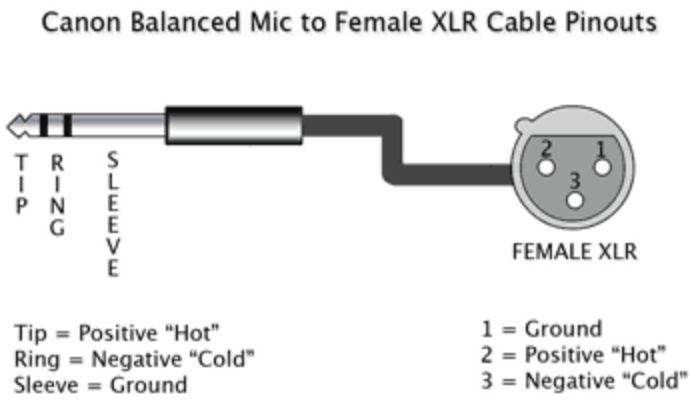
L-DigitalGain and R-DigitalGain (dB)

Digital gain applied to left and right channel. Recommended setting: 0.

Input source

Audio input source for recording:

- **internal mic**
- **L:int R:ext**
- **external stereo**
- **L:int R:balanced** (internal mic on Left, external mic on Right from both external pins as balanced audio)
- **Auto int/ext**: camera detects if a mic is plugged in. Int is dual mono, ext is stereo.



`Balanced audio allows for very long cable runs without interference. Usually balanced mics have three pin XLR connectors and it is very easy to out together an XLR to Canon mic input cable. Balanced allows us to use such pro mics with our little Canons and this is a very welcome surprise for audio guys.` (source)

Wind Filter

Digital high-pass filter. See AK4646 datasheet p.34.

Mic Power

This is required for internal mic and certain types of external mics, but it reduces input impedance. See AK4646 datasheet p.31 and the Mic power control thread.

- `ON`: input impedance is 2 kOhm;
- `OFF`: input impedance is 30 kOhm.

This setting is always `ON` when input source is either `internal mic` or `L:int R:ext`.

AGC

Enable/disable Automatic Gain Control. AGC is applied only in digital domain (i.e. it overrides digital gains, but you can still adjust analog gain).

Recommended setting: OFF.

Headphone Monitoring

Audio monitoring with headphones, using the A/V cable.

Disable this setting if you are using a SD monitor!

This feature is not available on 600D/T3i.

To use audio monitoring, you need a special cable:

- your Canon A/V cable with a RCA - 3.5mm jack adapter
- a dedicated cable from Sescom
- or you may solder it yourself (you will have to cut your A/V cable).

Warning: mobile phone cables **will not work**; even if the connector looks similar, it's not identical. You must use the original cable which came with your camera.

For details, see Audio monitoring HOWTO on Vimeo group.

Output volume (dB)

Digital output gain for audio monitoring. It does not have any effect on the internal camera speaker.

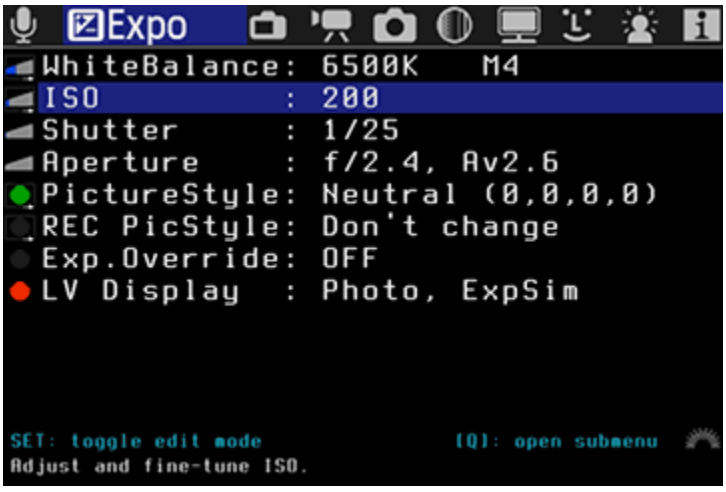
For best results, you should a pair of low impedance headphones, for example Audio Technica ATH-M50 (38 ohms). With high-impedance headphones, you may have to use a headphone amplifier like FiiO E5.

Audio Meters

Display the input audio level, from -40dB to 0dB; meters become yellow at -12 dB and red at -3 dB.

Audio meters are only displayed in movie mode.

Expo



Adjusting the exposure parameters. Most of these settings only work in Manual (photo and video), and some of them work in P, Av and Tv too.

WhiteBalance

Advanced white balance control. The preferred method is Kelvin white balance (range: 1500…15000K).

Submenu options:

- Kelvin white balance;
- WBShift G/M: Green-Magenta white balance shift. Useful for fluorescent lighting;
- WBShift B/A: Blue-Amber white balance shift. 1 unit = 5 mireks on Kelvin axis, according to this post;
- Custom RGB multipliers: fine-tune custom white balance;
- Black level: this parameter is applied on RAW data, before applying white balance. Adjust it if you have problems with green or magenta shadows;
- Auto adjust Kelvin + G/M: in LiveView, ML will compute the white balance for the current scene, using the center (200×200 pixels rectangle) as reference gray.

ISO

Advanced ISO control.

Color coding:

- orange = Canon ISO with good noise or dynamic range characteristics (100, 160, 200, 320 … 3200).
- green = ISO with negative digital gain applied via DIGIC (80, 90, 160, 320 - obtained by setting ML digital ISO to a negative value). These can have lower noise or better highlight rolloff than their Canon counterparts.
- red = ISO with positive digital gain (avoid these values).

Submenu options:

- Equivalent ISO;
- Analog ISO;
- Canon digital ISO;
- ML digital ISO (DIGIC) - in movie mode: negative values will reduce noise, but may cause color issues in highlights. This feature enables ISO 50, ISO 51200 and many other intermediate or astronomical ISOs.
- Display Gain (night vision) - in photo mode, for previewing night scenes;
- Highlight Tone Priority (which increases dynamic range by 1 stop in movie mode);
- ISO selection (Canon ISOs or ML ISOs) - only used in movie mode;

Shutter

Fine-tune shutter speed.

- In photo mode, Magic Lantern displays shutter values rounded to 2 significant digits (e.g. 1/50 may be displayed by ML as 1/48). This is not a bug.
- In movie mode, shutter values are displayed with 3 decimal places (for example, in PAL mode, Canon uses 1/33.333 to avoid flicker).
- To use shutter speeds normally not available in Canon firmware (like 1/25 or 1/8000 in movie mode), enable exposure override.

Aperture

Adjust aperture. When exposure override is enabled, you can adjust it in 1/8-stop increments.

PictureStyle

Change picture style or adjust its parameters.

REC PicStyle

You can use a different picture style when recording (toggled automagically). May be useful with flat picture styles.

Exp.Override

This mode bypasses Canon exposure limitations (for ISO, Tv, Av). It enables:

- Manual video exposure controls in cameras without it (500D, 50D, 1100D).
- 1/25s in movie mode (24p/25p) → 1/3 stops better in low light.
- 1/8000s in movie mode, useful for slow motion.
- ISO 12800 is allowed in movie mode on 60D and 600D.
- Full-time DOF preview in photo mode, without blocking certain keys.

Settings:

- OFF: Canon default exposure mode.
- ON: ML overrides exposure values (change them from Expo menu).
- Auto: ML enables it only when needed:
    - For 500D, 50D, 1100D: in movie mode, to enable manual exposure controls.
    - For 60D: in Manual mode with a manual lens, to fix the LiveView underexposure bug.
    - For 550D/60D/600D/5D2: when you select a shutter speed, aperture or ISO value which is not available in standard firmware (e.g. 1/25s or 1/8000s in movie mode).

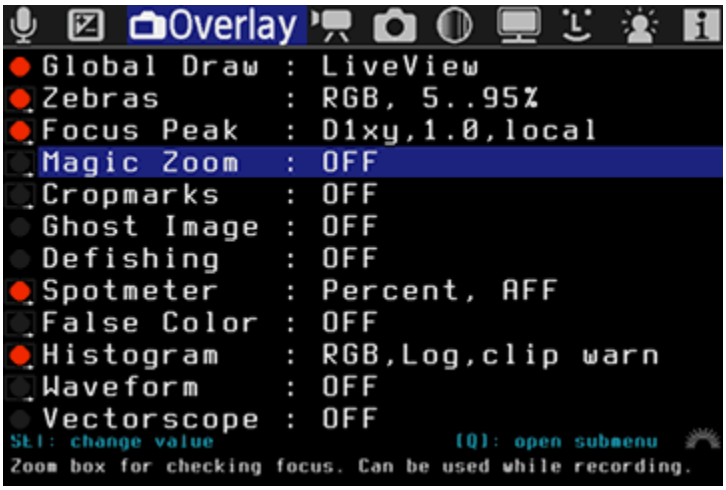
Side effect: in photo mode, anything slower than 1/25 seconds will be underexposed in LiveView.

LV Display

Selects or displays LiveView display type:

- Photo display, with exposure simulation
- Photo display, without exposure simulation (for framing and for flash photography)
- Movie display.

Overlay



Graphics overlays that can be used in LiveView or in image review mode: histogram, zebras, cropmarks, spotmeter, focus peaking, false color…

Global Draw

Choose when to enable Magic Lantern overlay graphics: (zebra, cropmarks, histograms, audio meters, ML shooting info…):

- in LiveView only
- in QuickReview (photo mode outside LiveView) only
- Both modes
- Disabled

If you used display presets, press Q on this item to switch the presets while you are in ML menu.

Zebras

Enable/disable zebra stripes, which indicate overexposed or underexposed areas.

Color spaces:

- `Luma`: zebras are computed from Y channel only.
- `RGB`: check overexposure for each RGB channel. Clipped channels are displayed in the opposite color (i.e. clipped red shown as cyan, underexposed as white and so on).

You may adjust thresholds for underexposure and overexposure, or you can disable zebras while recording.

Note: when using the Technicolor CineStyle picture style, luma will have values between 16 and 255; therefore, you will have to set the underexposure threshold to 16 or greater.

Focus Peak

Focus assist function. High-contrast lines will be marked by blinking dots showing which part of the image is in focus.

Methods:

- `D1xy`: computes first image derivative on X and Y and takes the max value. May work better in low light or on noisy sensors.
- `D2xy`: approximates second image derivative with a 3×3 Laplacian kernel. May be more accurate in good light.

Other parameters:

- `Threshold`: how many pixels are considered in focus (percentage).
- `Color`: either fixed color, or a color coding according to focus intensity.
- `Grayscale img`: if enabled, LiveView will displayed as grayscale (but still recorded as color).

To see how it works, check this article from Luminous Landscape.

Magic Zoom

Displays a zoom box for focus assist. Can be used while recording.

Trigger modes (not all modes are available on all cameras):

- `HalfShutter`: triggered when you press the shutter button halfway.
- `Focus Ring`: triggered by turning the focus ring.
- `Zoom.REC`: triggered by pressing `Zoom In` button while recording. If your camera has a LCD sensor, you may also cover it and press `Zoom In`.
- `FocusR+HalfS`: triggered by turning the focus ring, or by pressing shutter halfway.
- `Focus+ZREC`: triggered by turning the focus ring, or by pressing `Zoom In` while recording.
- `Zoom In (*)`: triggered by `Zoom In` button (overrides Canon's default zoom modes). To bypass magic zoom, press both zoom buttons at the same time or cover the LCD sensor.
- `Always On`: no trigger key needed. You can use both Canon's 5x/10x zoom and Magic Zoom.

When ML believes you have achieved perfect focus, Magic Zoom will display a focus confirmation (customizable):

- `Green Bars`
- `Split Screen`: when the image is out of focus, the zoom box looks like a split focusing screen from old film cameras.
- `Split Screen with ZeroCross`: will reverse the split direction whenever you achieve perfect focus.

Other parameters: size, position, magnification.

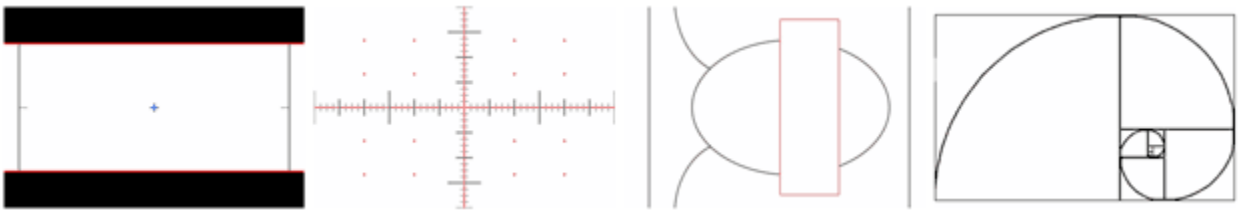
Notes:

- Zebras, focus peaking and false color are disabled automatically when the zoom overlay is active.
- Focus triggering **only** works with lenses that report Focus distance, or when you use follow focus / rack focus.
- In some modes, half-pressing the shutter may temporarily hide the zoom overlay.

Original implementation: Magic Circles by AJ.

Cropmarks

Cropmarks or custom grids for framing and composition.



Notes:

- If you use custom cropmarks, place them in `ML/CROPMKS` folder on your SD card and give them short 8.3 names. You can place at most 9 cropmarks on the card.
- Get more cropmarks from the ML cropmark repository or draw your own (see Cropmarks).

Ghost image

Shows a transparent overlay which can be created from any image in Play mode.

Usage:

- To select the image, go to Play mode and press the `LiveView` button.
- Move the ghost image in LiveView with arrow keys; center or hide it with `SET` or joystick press.

Defishing

Preview the rectified (defished) image from Samyang 8mm fisheye lens, using rectilinear projection.

This feature works best in photo mode (outside LiveView).

Defishing uses a pre-computed look-up table (LUT). It is possible to create LUT files for any other lens or projection by defishing `vram/xy.png` with your favorite defishing software, and then running `vram/defish-lut.m` to get the LUT file. All the required files are found in the ML

source tree. Project files (`*.PTO`) for nona (hugin) are provided for both rectilinear and Panini projections.

Spotmeter

Measure brightness from a small spot in the frame.

Possible measurement units:

- Percent (0..100%)
- Raw 8-bit levels (0..255)
- IRE -1..101 (formula used by AJ, which maps 0-255 luma levels to approx. -1..101 IRE)
- IRE 0..108 (formula proposed by Piers, which maps 16-235 luma levels to 7.5-100 IRE)
- RGB (displays HTML-like color codes)

False color

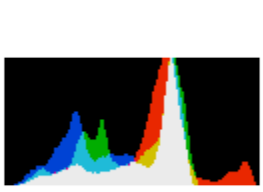
This is a tool for evaluating the exposure. It shows different luma (Y) levels using a color map. You may select one of the following color maps:

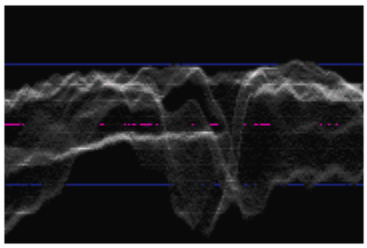
Tips:

- you may configure a display preset with False Color and toggle it with a single button press.
- you may also use false colors to highlight 50% and 70% brightness levels, or to reveal color banding, or to check for uniform green screen lighting.

Histogram and Waveform

These exposure tools will show the distribution of image brightness levels.





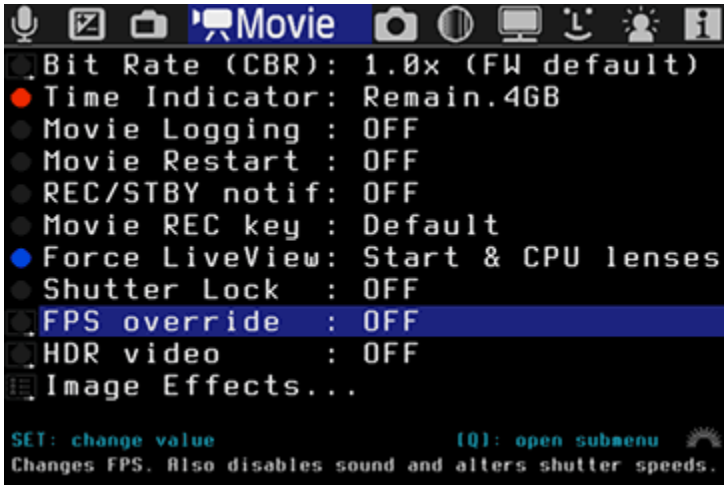
To learn how to read these graphs, see Understanding Histograms and Final Cut Waveform Monitor.

Vectorscope

This tool shows the color distribution with an U-V plot. Useful for color grading.

To learn how to read it, see Introducing Color Scopes: The Vectorscope.

Movie



Functions specific to movie mode.

Bit Rate

Controls H.264 bitrate used for video recording.

Possible modes:

- `CBR`: constant bitrate. You specify a factor for multiplying default video bitrate, between 0.1x and 3x. CBR 1x is the firmware default setting.
- `QScale`: constant quality, variable bitrate (VBR). Available values: -16 … +16. Lower numbers mean higher bitrates.
- `Firmware default`: completely disable bitrate control.

Notes:

- Increasing the bitrate **may cause recording to stop**. You need a fast card.
- CBR actually works by adjusting QScale on the fly; the instant value is displayed near the recording dot.
- In QScale mode, bitrate is completely out of control (don't use it!).
- In CBR mode, QScale will not go outside [-16…+16]. When QScale reaches the extreme values (-16 or +16), bitrate **will be different** than your CBR setting. Watch the bitrate indicators. This is not a bug, please do not report it.

- You can push the bitrate higher if you record without sound, then use Audio RemoteShot to sync the video with an external audio track.
- You can't change this setting during recording.
- If buffer usage gets too high, ML will pause all CPU-intensive graphics. Change the `BuffWarnLevel` setting to customize this.

Time Indicator

When recording a movie, ML will display a small time counter in the upper right corner, which can be:

- `Elapsed`: duration of the current clip
- `Remain.Card`: estimated amount of recording time remaining on the card.
- `Remain.4GB`: estimated amount of recording time until reaching 4GB (or until filling the card, whichever comes first).

Unlike Canon's timer which assumes constant bitrate, ML timer assumes variable bitrate and works even if QScale is enabled. However, due to variations in bitrate, the estimated value will fluctuate a lot, and **this is normal**.

Movie Logging

If this setting is `ON`, Magic Lantern will write out a metadata file for the each movie to `MVI_1234.LOG` (numbered after the movie). The log file contains lens and exposure info, as well as a timestamp every time any of the parameters is changed during recording.

Log files are placed in the same folder as the movies: `DCIM/100CANON/`, `101CANON` etc.

Tip: you can rename `LOG` files to `CSV` and import them in MS Excel.

Movie Restart

While this setting is on, movie recording will restart automatically, unless you stop it. There will be a few seconds skipped during restarting.

REC/STBY notify

Custom notifications for recording or standby:

- Red Crossout (highly recommended if you forget to press record)
- Message (it shows `STBY` or `REC`)
- Beeps (it will beep when recording starts or stops)
- Blue LED (obvious if your camera has it)

Movie REC key

This option enables you to start/stop movie recording by half-pressing the shutter button.

Tip: with this, you can use a wired remote to start/stop recording.

Force LiveView

Force LiveView in Movie mode (bypass the dialog saying *Press LV button to activate movie shooting*).

- Always: force LiveView even if you use an unchipped lens, or no lens at all. Be careful, you may get dust on the sensor while changing lenses.
- Start & CPU lenses: it will force LiveView at startup, regardless of the lens used. After this, it will only bypass the dialog when a chipped lens is attached (i.e. it will enter LiveView as soon as you attach a chipped lens).

Shutter Lock

This option locks the shutter value in movie mode (you will be able to change it only from ML menu).

FPS override

This setting alters FPS for all video modes. Only undercranking works well.

FPS is changed by altering two timer values (let's call them Timer A and Timer B). Increasing any of these values results in lower FPS. Aside from FPS, changing these timers may alter shutter speed and rolling shutter.

Options:

- Desired FPS: choose a value from 0.2 fps to 65 fps. If the desired value is not possible, ML will choose the closest safe option (look at 'Actual FPS' below).
- Optimize for:
    - Low light: use this option for recording timelapse with shutter speed set to 1/fps (360 degrees); at high FPS values, you may be able to use other shutter speed values.
    - Exact FPS: try to achieve an exact FPS value, such as 24.000 or 30.000 or 12.500. If more exact solutions are found, ML will choose the one with lowest jello effect.
    - High FPS: changes FPS without altering shutter speed and allows a slight overcranking (60D, 600D).
    - LowJello, 180d: try to minimize the jello effect (caused by rolling shutter), while allowing you to expose at 180 degrees (0.5/fps) if possible.
    - High Jello: maximize the jello effect and enable fast shutter speeds. You can use this mode for recording slit-scan frames (distorted images like these, which use the extreme jello effect in creative ways).

- Shutter range: displays the available shutter speed range with current settings. When you use FPS override, Canon menu will still display 1/30 … 1/4000, but the actual shutter speed will be different; read it from ML displays. You can alter shutter speed range by changing the ratio between the two timer values (decreasing timer B will result in faster shutter speeds available).
- Timer A: displays the value of timer A and lets you fine-tune it. ML will re-adjust timer B to match your FPS choice.
- Timer B: displays the value of timer B and lets you fine-tune it. ML will not re-adjust timer A, so this option will let you fine-tune the exact FPS value.
- TG Frequency: displays the crystal oscillator frequency of the FPS circuit driver (read-only, depends on your camera).
- Actual FPS: this displays the current FPS, computed as TG_FREQ / timerA / timerB (read-only).
- Sound Record: by default, ML will disable sound recording when FPS override is enabled; otherwise, audio will go out of sync and recording will stop. Only enable sound if you know what you are doing.

Notes and tips:

- This function will **not** change the frame rate from the video header; the video will playback at the setting from Canon menu.
- Recommended usage: set FPS to a very low value (for example, 3fps) to record a timelapse.
- Tip: this feature also works in photo mode, making LiveView usable in dark environments. Combine it with display gain.
- To get 180-degree shutter speed at very low FPS, simply discard half of the frames in post.
- If 0.2 FPS is not enough, use Frame Merger (a VirtualDub plugin).
- Exact frame rate may be `rounded` to be an exact multiple of PAL/NTSC frame rates.
    - PAL modes: 25p/50p. Rounded frame rates: 33.333fps, 12.5fps, 11.111fps and so on.
    - NTSC modes: 30p/60p/24p. Rounded frame rates: 29.97fps, 23.976fps, 11.988fps and so on.
- For fine-tuning and calibrating custom frame rates, use EOSTimerGen.

HDR video

This feature allows you to shoot a high dynamic range video by alternating ISO every other frame. Select the two ISO values from the submenu.

Possible postprocessing workflows:

- Interframe script: user-friendly version and bare-bone version;
- GingerHDR (plugin for Adobe After Effects and Premiere)
- Magic Lantern HDR Compose generator for FCP X
- HDR Glogger Web Service

- etc (please help me filling the list!)

Discussion thread, postprocessing workflow, FAQ...

Image Effects

Custom image effects found by investigating DIGIC registers:

- Desaturate (lets you record grayscale with any picture style);
- Negative image;
- Swap U-V (red becomes blue);
- Cartoon look (for this to work, set sharpness in your picture style to any nonzero value).

Movie Record (50D)

Enable movie recording on 50D (1920×1080, 30fps, without sound). To start recording, go to LiveView (P/Tv/Av/M) and press SET.

WARNING: Canon 50D was **NOT** designed to record movies. Keep in mind:

- This feature was not thoroughly tested by Canon and may be unstable (even if you record without ML).
- Always disable movie recording when you don't use it.
- Battery will drain quickly when recording; also, the camera may overheat.

Limitations:

- The camera will not record sound. You can use an external recorder (for example, Zoom H1, H2 or H4n) and sync the sound in post with a clapperboard.
- You can't play back movies in the camera.

This setting remains active even if you start the camera with standard firmware (until you clear your settings).

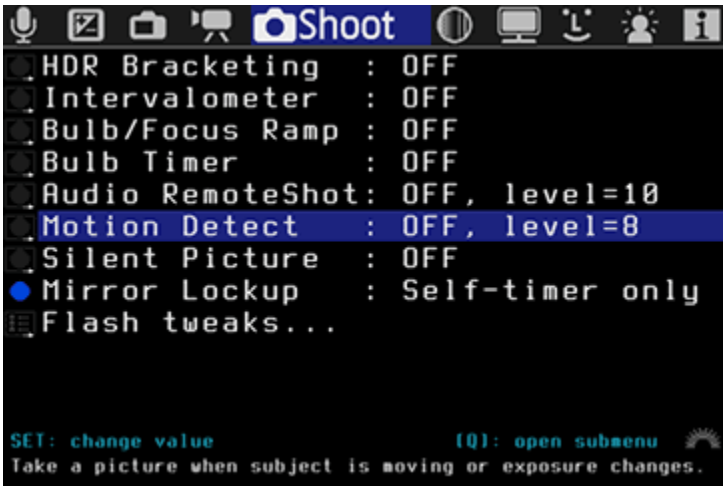
Shutter Button (50D)

- `Leave unchanged`: obvious :)
- `Block during REC`: blocks the shutter and related (AF, `*`) buttons while recording. In 50D, taking pictures while recording would result in ERR99; with this option, you can avoid taking pictures while recording by mistake. Side effect: this will disable image stabilization during recording.
- `Hold during REC (IS)`: ML will keep the shutter button pressed half-way during recording, which will enable image stabilization (IS). Side effect: you need to press the shutter button half way to turn IS off before the camera will let you stop recording.

Exposure Lock (50D)

Locks the exposure in movie mode. You can also use the `*` button (you don't have to hold it pressed).

Shoot



Functions for stills shooting (some of them work for movies, too).

HDR Bracketing

Exposure bracketing for HDR images and timelapses.

- In `M` mode, this function does shutter and/or ISO bracketing. In the other modes it does exposure compensation bracketing.
- To start bracketing, **take only the first picture** and ML will continue the sequence.
- To preview HDR images in camera, set SET+MainDial: ExposureFusion from Prefs menu, Image review settings, then go to playback mode, hold `SET` and turn the main dial (wheel).
- For each HDR picture set, Magic Lantern may also write a bash script for stacking the exposures with enfuse (version 4.x), with optional alignment (align_image_stack). More info: Exposure Fusion: What is it? How does it Compare to HDR? How Do I Do It?.

Intervalometer

Take pictures or movies at fixed intervals.

You can stop the intervalometer by rotating the mode dial, by pressing `MENU` or `PLAY`, or by turning off the camera.

Settings (in submenu):

- Duration between two shots.
- Start delay (up to 8 hours).
- Stop after X pictures.
- In movie mode only: duration of a movie clip.

Tips:

- To avoid flicker, shoot in **manual** mode, use **manual white balance**, **avoid short exposure** times and **use a manual lens** (if you use an EF lens, lock the aperture and **unscrew** it).
- To make a timelapse without increasing shutter count, do not use the intervalometer; instead, set FPS override to a very low value (for example, 3fps) and start recording.
- When using the intervalometer in LiveView with `noisy` mode, your shutter will wear twice as fast than outside LiveView.
- If the intervalometer can't be stopped (it may happen in `crazy` mode), turn the camera off or open the card door.
- Adjust your auto-off setting to longer than your timelapse interval the camera will turn off before the second shot.

Power Saving:

- When not in LiveView, press `DISP` or `INFO` to turn the display off.
- In LiveView, ML will turn the display and the sensor off during idle times if you enable this option from `Powersave` menu.
- While the intervalometer is running, the card led will blink once per second to let you know it's alive and kicking.

Bulb/Focus Ramping

Bulb Ramping allows the capture of a timelapse that gradually changes exposure, compensating for the transition from day to night.

Options:

- Auto exposure ramping: this option will adjust shutter and ISO automatically, by looking at image brightness of previous shots.
- Manual exposure ramping: this option will adjust shutter and ISO to follow a fixed exposure ramp (a fixed amount of EV change per shot). Can be used as standalone or combined with auto ramping.
- Manual focus ramping: this lets you adjust focus gradually while shooting the timelapse. It requires a lens with autofocus and it can only work in LiveView.

Settings for auto ramping:

- Mode: sunset / sunrise / auto. In sunset mode, the exposure will always increase. In sunrise mode, the exposure will always decrease. This idea was suggested by Tom Lowe on RedUser.net forum.
- Maximum ramping speed: this parameter is used for computing the optimal smoothness factor. A lower value will reduce flicker, but if the value is twice as low as the real rate of brightness change, ML will lose the ability to ramp correctly. For example, if you set a maximum ramping speed of 0.1 EV / shot, and the scene requires a ramping of 0.2 EV / shot, ML will start flickering heavily.

Quick start guide for auto ramping:

1. Take a picture of your scene. You will use it to say: `I want my timelapse to be exposed like this picture`.

2. Enable Bulb Ramping and Intervalometer.

3. Leave the camera still while ML runs a calibration step:

- Make sure you have a static and well-lit scene (any static scene which does not require long exposure should be fine).
- After calibration, you should get a nice S-curve on the screen.

4. Now you will have to say what tone range to meter for (i.e. highlights, midtones…). Follow the wizard:

- Use arrow keys to select your reference picture (which you just took).
- Use the main dial to select the tone range to meter for. You can't perfectly match two images just by varying one parameter (exposure), so you have to choose what's important for you in this picture.
- For lowest flicker, meter for midtones (choose the 50th percentile, i.e. median, because it's a robust estimation, unlike simple averaging). Leave some headroom for highlights (underexpose a bit).
- If highlights are important, meter for them (choose 80th percentile for example). You will have to shoot RAW and remove flicker when you develop the RAW files.

- The algorithm works best when brightness is close to 50% (try not to choose extreme values for it).
- When you are ready to start, press `SET`.

5. Sit back and relax :)

Limits:

- ISO is chosen between 100 and maximum auto ISO value from Canon menu.
- Shutter speed is chosen between 1/8000 (lower limit) and the delay between two shots minus two seconds (upper limit). Example: for 10-second intervals, shutter speed will be between 1/8000 and 8 seconds.
- Aperture is fixed (you can change it manually).

Tips:

- Don't adjust ISO and shutter before the timelapse, they are fully automatic.
- Use a ND filter to reduce flicker during daylight.
- Reduce flicker in post. We recommend VirtualDub with MSU Deflicker plugin (free, works with Windows and Wine). See also Timelapse workflow using free software tutorial.

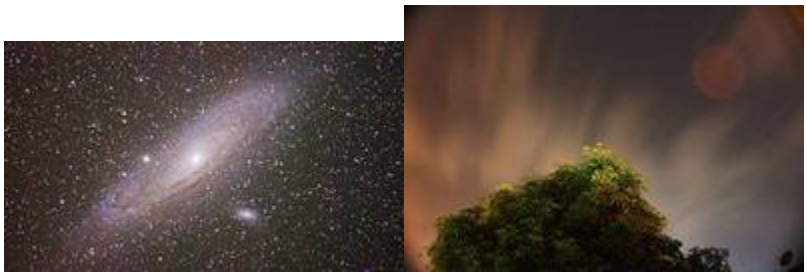
Technical notes:

- Exposure is metered using a condition like this (for example): *70% of pixels should be below 50% brightness*.
- Exposure for every shot is computed from previous shots, using a feedback controller algorithm with a smoothing factor.
- ISO is chosen using the 180 degree rule, so the resulting shutter speed stays between 90 and 270 degrees (that is, between 1/4 and 3/4 of the delay between two shots).
- Only full-stop ISOs (100, 200, 400 etc) are used (because you are supposed to shoot RAW).
- Shutter speed can be adjusted with a resolution of 10ms.
- Frames with fast shutter speeds (less than 1 second in Rebel cameras, less 0.1 seconds in 60D) are taken in Manual mode. You will get flicker.
- It can go from 1/8000s @ ISO 100 (daylight) to several minutes of exposure time @ ISO 6400 (complete darkness).
- Exposure algorithm is a feedback controller designed with pole placement - the closed loop response will have two real poles placed at the smoothing factor value. Smoothing factor is computed in such a way that, when scene ramping speed matches the speed selected in menu, ramp is followed at exactly 1 EV behind it.
- If the lighting changes suddenly a few stops between two shots (for example, you change the ND filters or the aperture), the algorithm should recover completely after 2 or 3 shots. A sudden exposure change is considered when the exposure difference is greater than 2 stops.

Logging:

- When you use bulb ramping, Magic Lantern will save a log file with the exposure parameters, metered values and so on. Please send this file to developers.
- These log files can be used to see how well the ramping went and to fine-tune the algorithm.

Bulb Timer



Very long exposures with Bulb mode and ML timer. This feature is useful for night shots and astrophotography.

Bulb timer is started by holdin the shutter pressed halfway for one second, or by remote triggers / intervalometer.

Tip: you can cancel the exposure earlier by half-pressing the shutter button.

LCDsensor Remote

Start/stop remote shutter release mode with the LCD sensor.

- ⊗ **Near**: To take a picture, put your hand near the LCD sensor.
- ⊙ **Away**: Picture is taken when you get your hand away from the sensor. You may combine this setting with Mirror Lockup.
- 〰 **Wave**: Picture is taken after you wave your hand 3 times near the sensor. You can leave it on without interfering (too much) with normal shooting.

This feature is useful for avoiding camera shake.

In Movie mode, the `Wave` 〰 setting is able to start and stop recording movies. The other modes can only start recording (because it's too easy to stop recording by mistake).

While recording, the `Near` and `Away` modes can trigger the rack focus operation.

Audio RemoteShot

Start/stop remote audio trigger. To take a picture (or start recording a movie), make some loud noise, for example, clap your hands or pop a balloon.

Tip: with the audio trigger you can sync a video *recorded without sound* with an *external audio track* (see this topic)

Be careful: this may trigger the shutter from the sounds made by camera (like focus beep or noise from operating the buttons).

Motion Detect

Motion detection in LiveView.

Trigger modes:

- `Exposure change`: it only reacts to brightness changes. Detects large moving subjects which cause significant change in exposure.
- `Frame difference`: it computes the difference between last two frames A and B (luma channel only); this detects smaller movements which do not change exposure.

Detection time is somewhere between 200 and 300 ms according to DataGhost's speed test; it's faster with silent pictures.

Silent Pictures

This feature is reserved to very advanced users. It can take pictures in LiveView mode without moving the mirror. When enabled, it saves uncompressed YUV422 frames from the LiveView image buffer when you press the shutter halfway.

- Make sure you don't have autofocus assigned to half-shutter press (put it on `*` or turn it off)

Modes:

- `Silent Picture`: simple, low-resolution. Image resolution is usually around 1 or 2 MPix, and depends on the current mode (zoom or not, recording or not, and movie

resolution). For almost-FullHD resolution (1720×974), choose `FullHD` to record a dummy movie.
- `Silent Pic Hi-Res`: emulates high-resolution by taking a matrix of small silent pics, in zoom `x5` mode. You need to have the camera on a tripod and the subject should be static (a picture is taken in a few seconds). Could be useful for focus stacking or for timelapse without increasing shutter count.

Silent picture setting is applied to intervalometer and remote triggers. It will also go to LiveView when you press the shutter half-way. Therefore, you should only enable this setting when you actually use it.

Images are saved in `DCIM/1xxCANON/` after the following rules:

- If intervalometer is `OFF`, silent pics are named after last picture/movie taken without this function (e.g. `12340001.422`). You are limited to 10000 silent pictures for each `noisy` picture.
- If intervalometer is `ON`, silent pics have names like `12345678.422`. Tip: use `File Numbering → Manual Reset` from Canon menu to increase folder number (to sort them easier).

To convert a 422 image to JPEG on the PC, use one of the following programs:

- 422-jpg.py (command-line tool, runs on all platforms, you need to install Python, PIL and numpy).
- 422toimage (Windows only, source code available).
- YUV422 Convertor (Windows only, closed source).

Mirror Lockup

Mirror lockup. See Canon user guide for details.

`Timer+Remote` will auto-enable MLU under one of the following conditions (and disable it otherwise):

- self-timer mode is on (either 2 second or 10 second, but not continuous)
- LCDsensor Remote is in `Away` mode.

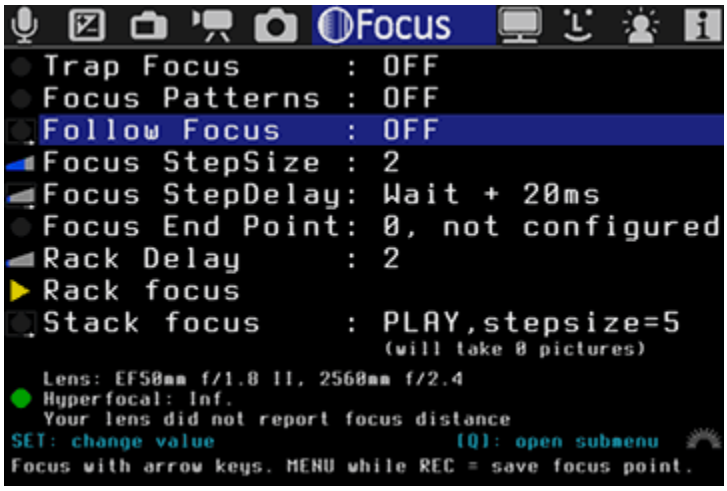
Flash tweaks

A few tweaks for flash users:

- Flash expo compensation (-10..+3 EV). Tip: you may use -10EV to trigger an external flash without putting light on the scene coming from the onboard flash.
- Flash / No flash: use this when you are not sure whether to use flash or not. Odd pictures (by file number) will be taken with flash, even pictures without flash.

- 3rd party flash in LV: a trick for using a non-Canon flash in LiveView on Rebel cameras, which disables LiveView on half-shutter press. **DISABLE this option when you don't use it!!!**

Focus



Trap Focus

For MF users: takes a picture when the subject comes into focus.

Modes:

- Hold AF button: you need to hold the autofocus button (half-shutter, `*` or `AF-ON`, depending on your settings).
- Continuous: you don't need to hold any button; ML will `hold` the half-shutter pressed for you. This will also block most buttons; press the shutter halfway to unlock them for two seconds.

Notes:

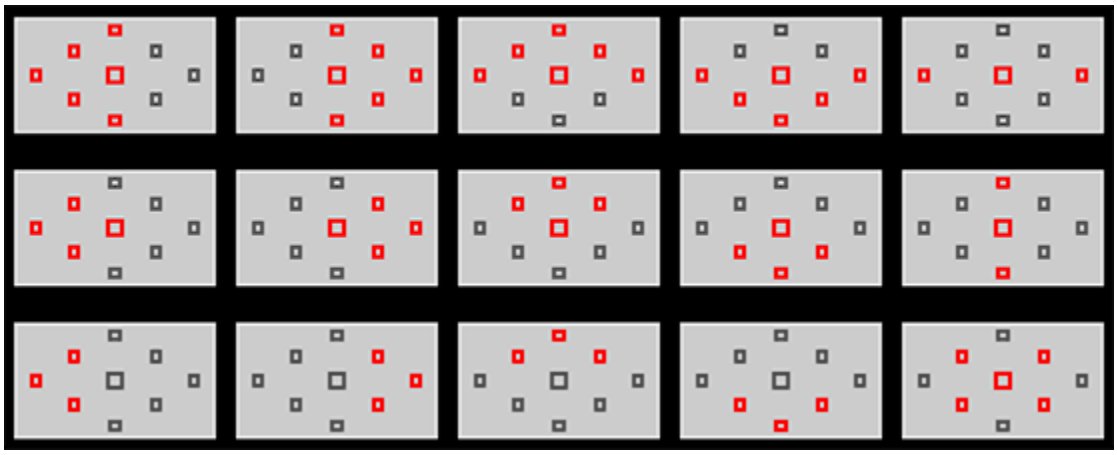
- Outside LiveView, it only works with lenses with chip.
- In LiveView it only works for photos, and it will take a picture when the focus indicator has (almost) maximum value on the focus graph.

Notes for LiveView trap focus:

- You may have to turn the lens back and forth a few times in order to let ML compute the correct focus scaling factor for the current scene.
- If you move from a high-contrast scene to a low-contrast one, you will also have to wait a bit until the high-contrast data disappears from the focus graph.
- Press `SET` to temporarily disable automatic scaling of focus magnitude.

Focus Patterns

Custom focus patterns which can be used either with autofocus or trap focus.



To change the focus pattern:

- Set your camera in photo mode, non-LiveView;
- Look through the viewfinder and make sure the main display is off;
- Change the focus pattern with the arrow keys and `SET`; you may or may not receive visual feedback.
- Press the `Zoom In` button twice to see the current selection.

You can use the custom focus patterns in LiveView Quick Focus mode, too, but the pattern won't be displayed on the screen.

This feature was ported from 400plus.

Follow Focus

Very simple follow focus (like a rack focus controlled manually).

- `Arrows`: you will be able to focus with the arrow keys.
- `LCD Sensor`: on 550D/500D, focus by placing your hand near the LCD sensor (avoiding shake). To use this, you may need to disable LCDsensor Remote.

Recommended focus step settings:

- Focus StepSize: 1 or 2
- Focus StepDelay: small values, without `Wait` flag.
- If the motion is not smooth, try larger delays (100ms)

Quick rack focus **while recording**:

- Press `MENU` to save current focus point (this means `I want to return here`);
- Use follow focus to change focus point (focus somewhere else);
- Press `PLAY` to go to saved focus point;
- Press `PLAY` again to go back.

Focus StepSize

Step size for one focus command, as used by EOS Utility.

Focus StepDelay

Delay between two successive focus commands, with an optional waiting flag.

- If `Wait` is not active, ML will only wait a for fixed delay before sending next focus command. This will reduce stutter, but may affect rack focus accuracy. This setting is recommended if you only use follow focus.
- If `Wait` is active, ML will wait until each focus command is completed, and then it will wait for a fixed delay, as configured here. This will increase rack focus accuracy, but may cause stutter with certain lenses.

Focus End Point

This is end point of rack focus (X focus steps from the start point, i.e. from current focus point).

First you have to set the end point. Focus the lens, then press `SET` on this menu item.

After pressing SET, ML will display `Focus End Point: 0 steps from here.`. This means the end point is now assigned to current focus position.

At this point, you will see the LiveView image and set the start point using left and right keys (just like with follow focus) or the main dial (scrollwheel). The start point will be always the current focus point (which you are changing); the end point will remain fixed.

Rack Delay

Sets the number of seconds before starting a rack focus. This lets you film the start point first, then initialise the rack focus without touching the camera.

Rack Focus

Triggers the rack focus operation that moves between the start and end focus points. After the move is complete pressing again reverses the move.

- `SET`: rack focus will start after 2 seconds;
- `Q`: rack focus will start immediately;
- `PLAY`: ML will automatically record a short clip with the rack focus operation.

Step-by-step:

1. Pick the end point of rack focus by focusing on it (manually or with AF).
2. Configure focus parameters (step size and delay). Different lenses may require different parameters.
3. Open the `Focus` menu, go to `Focus End Point` and press `Set` to zero it out.
4. Pick the start point by focusing on it with the `LEFT/RIGHT` buttons while the Focus menu is active. Make sure the number from `Focus End Point` is changing as you focus. Fine-tune the position with scrollwheel.
5. Go to `Rack Focus` and press `SET` or `PLAY` to start rack focus.
6. To return to the starting point, run rack focus again.

Tip: when LCDsensor Remote is set on `Near` or `Away`, you can trigger rack focus from the LCD sensor, avoiding camera shake.

Recommended focus step settings:

- Focus StepSize: 1 or 2
- Focus StepDelay: - without `Wait` flag: large delays (around 100 ms) ⇒ will ignore small position errors - with `Wait` flag: small delays (only lens is in very good mechanical condition)

Stack focus

This selection will shoot a series of photographs with varying focus points. It is used in macro photography to assemble sharper final images by merging photos where each has a different focus point.

This function can also create scripts named like named `FST_1234.SH`, which can be used for stacking the images with enfuse. See Exposure bracketing for details on how to use these scripts, and the focus stacking section from Enfuse reference manual. To enable (or disable) the post-processing scripts, go to HDR bracketing submenu.

Usage:

1. Configure rack focus and use it to preview the focus range.

2. Select the number of focus steps to skip. This will determine the number of pictures to be taken.
3. Press PLAY to start the focus sequence (PLAY mode) or take the first picture (SNAP mode).

You can also combine this function with HDR bracketing and silent pictures.

Recommended focus step settings: same as for rack focus.

The following items are display only:

Focus Dist

The distance to the focal point. Value is returned by most newer Canon lenses. If the lens does not report any distance information, 0 will be displayed and the DOF calculations will not be correct.

See also Focus distance.

Hyperfocal

The hyperfocal distance is the point of focus where everything from half that distance to infinity falls within the depth of field. This is the largest depth of field possible for the current f-number.

DOF Near

The nearest distance in which objects appear in focus.

DOF Far

The farthest distance in which objects appear in focus.

Display

Options for display (most of them are for LiveView).

LV contrast

Adjusts the contrast in LiveView. It doesn't affect recording. This helps when focusing with very flat picture styles.

Values: Normal (no effect), High, Very high, Zero, Very low, Low.

LV saturation

Adjusts the saturation in LiveView. It doesn't affect recording. This helps you focus without being distracted by color.

Values: Normal (no effect), High, Very high, Zero (grayscale).

LV display gain

Photo mode only: this feature increases the brightness in LiveView, making it usable in very dark scenes (where Canon's LiveView would be pitch black). Combine this with FPS override for better low-light performance.

For movie mode, use ML digital ISOs for a similar effect.

Color Scheme

This affects the colors and brightness of the on-screen information (including LiveView overlays, Canon menus and ML menus). Range from: Bright (default), Dark, Bright Gray, Dark Gray, Dark Red. Tip: dark themes may reduce the eye strain during night shooting.

Clear Overlays

Clear bitmap overlays from LiveView display.

- `HalfShutter`: Hold the shutter half-pressed, or the `*` button, or DOF preview for around 1 second to clear all the overlays from the Live View display (audio, zebra, crops, shutter speeds…).Tip: assign autofocus to `*` button (from Custom Functions, set `Shutter/AE lock button` = `AE lock/AF`).
- `WhenIdle`: In this mode, all the overlays are erased from the screen (100% clean display) when the camera is idle (i.e. you don't press any buttons).
- `Always`: In this mode, all the overlays are erased from the screen; you will have to change shooting settings blindly. You can still use the menus.Tip: this feature may be useful with External Recorders, since it removes the focus box and other graphics from the display.

Focus box (LV)

With this setting you can choose to show the Focus box in liveview or hide it when not needed.

Force HDMI-VGA

This option will force a low-resolution mode on HDMI displays (720×480), which avoids black screen when you start/stop recording.

Screen layout settings...

Screen orientation, positioning fine tuning, adjustments for external monitors…

Screen Layout

Choose screen layout (position of ML top and bottom bars), for different cameras or for external monitors.

Top/bottom layouts:

- Inside 3:2: default layout for 3:2-screen cameras (550D and newer).
- Inside 16:10: for 16:10 HDMI monitors.
- Inside 16:9: for 16:9 HDMI monitors.
- 4:3 movie (for 5D Mark II, 500D and 50D in movie mode).

Bottom-only layouts:

- Under 3:2: useful for 4:3-screen cameras (500D, 50D, 5D Mark 2) in photo mode.
- Under 16:9: suitable for low-resolution external monitors and for 4:3-screen cameras in movie mode.

Image position

This may make the image better visible from different angles (especially on cameras without flip-out screen).

UpsideDown mode

This mode is useful if you want to mount your camera upside-down.

Auto Mirroring

For cameras with flip-out LCD, this options prevents mirroring the display when you open it at 180 degrees.

Display: Normal/Reverse/Mirror

For cameras with flip-out LCD, you may select a different flipping/mirroring option.

Level Indicator (60D)

Shows if the picture levels with the horizon. Can be used while recording.

Kill Canon GUI

For 50D only: disable Canon graphics elements to avoid conflicts with ML graphics in LiveView.

- `Idle/Menus`: only enable Canon graphics when some transparent menu from LiveView is active.
- `Idle/Menus+Keys`: only enable Canon graphics when you press some keys or navigate the transparent menus from LiveView.

Prefs

Image review settings...

Customize the image review (playback) mode:

SET+MainDial

When you hold `SET` pressed and turn the main dial (scrollwheel), ML may perform one of these functions:

- `Play 422`: display silent pictures from `DCIM/100CANON` (low-res only).
- `Exposure Fusion`: combine two or more images, useful for previewing HDR images or multiple exposures.
- `Compare Images`: compare two images with a diagonal split view. The current image will always end up in the top half.
- `Timelapse Play`: scroll through all your pictures quickly.

Image review

- `QuickReview default`: just like in standard firmware.
- `CanonMnu:Hold→PLAY`: if you set `Image Review: Hold` in Canon menu, it will go to `PLAY` mode instead. This allows you to zoom in as soon as you take the picture (without having to press `PLAY`). Credits goto Ken Rockwell for suggesting this.

Quick Zoom

Faster zoom in PLAY mode, for checking critical focus:

- OFF
- ON - zooms faster than Canon firmware.
- SinglePress → 100%: a single press of `Zoom In` will zoom all the way in (to 100%) - on center point. Next press will zoom out (full screen image).
- Full zoom on AF point: similar, but it will zoom on currently selected autofocus point.
- Full zoom on last position: similar, but it will remember the last position of the zoom box.

LV button

Customize the LiveView button in `PLAY` mode:

- Default (enter LiveView)
- Protect image

Quick Erase

Shortcut for erasing images without confirmation (hold SET and press ERASE). Be careful!

Arrow/SET shortcuts...

Select the features you want to adjust quickly with arrow keys: * Audio gain * ISO/Kelvin * Shutter/Aperture * LCD Brightness/Saturation

You can also enable quick functions for the SET button, coupled with the corresponding arrow adjustments:

- Audio input (internal mic, external mic, balanced…)
- Push-button white balance
- 180-degree shutter speed
- Reset LCD brightness to 5 and saturation to Normal.

Misc key settings...

LCD Sensor Shortcuts

Use the LCD face sensor as an extra key in ML (e.g. for triggering arrow keys, for blocking follow focus or for bypassing magic zoom key).

To fully disable the LCD sensor in Magic Lantern, disable `LCD auto off` from Canon menu (Wrench 1). You need to do this if you are using a device which covers the LCD sensor (e.g. a loupe).

Sticky DOF Preview

This will make the DOF preview button sticky (so you no longer have to hold it pressed).

Note: enabling DOF preview will block certain buttons.

Tip: enable Exposure Override to preview DOF without blocking the buttons.

Sticky HalfShutter

This will make the half-shutter press sticky (so you no longer have to hold it pressed).

Tip: use this to prevent the camera from turning off LiveView after 30 minutes.

Swap MENU <-> ERASE (60D)

Swaps `MENU` and `ERASE` buttons. This feature allows one-handed navigation in ML menu on 60D, but will have to use `MENU` button to delete the pictures.

DigitalZoom Shortcut (600D)

On 600D/T3i, this lets you customize the behavior of `DISP` + `Zoom In / Zoom Out` shortcut key in movie mode:

- `1x,3x` : toggle between 1x and 3x digital zoom modes (FullHD)
- `3x…10x`: default Canon setting (change digital zoom value between 3x and 10x).

Note: by default, Magic Lantern disables digital zoom values greater than 3x in order to avoid image quality degradation.

Auto BurstPicQuality

When enabled, it will temporarily reduce picture quality in burst mode in order to maintain a decent frame rate even when the buffer becomes almost full.

This function will reduce picture quality if the buffer has space for less than 4 pictures:

- `RAW+JPG` → `JPG Large Fine` → `JPG Medium Fine`
- `RAW` → `JPG Large Fine` → `JPG Medium Fine`

- `JPG Large Coarse` → `JPG Medium Coarse`

Possible results (550D, Transcend Class 10, your mileage may vary):

- `RAW+JPG`, `JPG-L`, all others `JPG-M`
- `RAW`, `RAW`, all others `JPG-M`

Powersave in LiveView...

Options for maximizing battery life when using LiveView.

- Enable power saving: on Standby, during Recording, or always.
- Use LCD sensor: you can use it to wake up from powersave (wave your hand near it), or to force powersave mode (cover the sensor for a few seconds).
- Dim display: In LiveView, if the camera is idle, Magic Lantern will reduce the LCD backlight level to minimum in order to save power.
- Turn off LCD and LV: this will turn off the display and the sensor activity in LiveView. Mirror will not be moved. If the camera is recording or motion detection is enabled, only the display will be turned off (so recording will not stop).
- Turn off GlobalDraw: if the camera is idle, ML overlay graphics will be disabled to reduce CPU usage.

Config file...

Magic Lantern saves its settings in a configuration file named `MAGIC.CFG`, located under `ML/SETTINGS` directory on your card. This submenu lets you customize how these settings are saved.

- Config Autosave: If enabled, settings are saved automatically to `magic.cfg` whenever you change a setting in ML menu. Config saving process will take place as soon as you close the menu.
- Save config now: Save ML settings to `ML/SETTINGS/MAGIC.CFG`.
- Delete config file: use this to restore ML default settings. After deleting the config file, restart the camera.

LV Display Presets

This feature lets you use up to 4 display presets for the settings in the Overlay menu.

On the top bar, you will see `DISP` 0, 1, 2 or 3. Each of those is a preset for the settings in `Overlay` menu. So you can, for example, configure `DISP 1` with false colors, `DISP 2` with zebras and focus peaking, and `DISP 3` with clear display.

This menu item sets the maximum number of available DISP presets. To disable this feature, set the number of presets to 1.

To change the current display preset, press `INFO/DISP` in LiveView, or `[Q]` on the GlobalDraw entry in the Overlay menu.

Crop Factor Display

If enabled, ML bottom bar will display the 35mm equivalent focal length, including crop factor (1.6x).

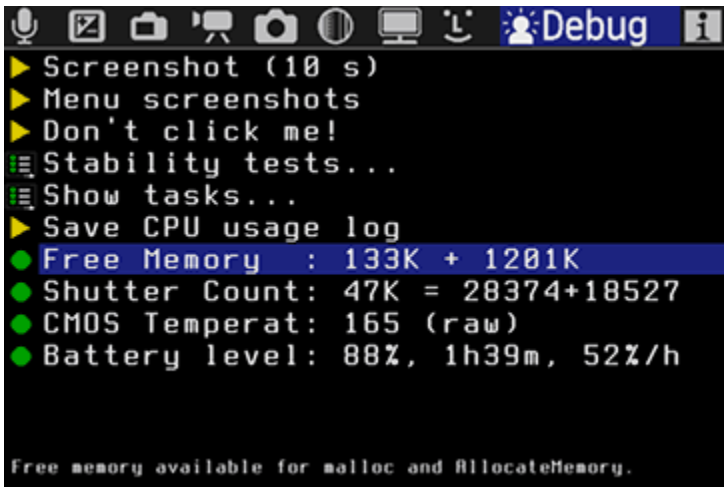
For example, a 50mm lens at f1.8 will be displayed as:

- `50mm f/1.8` with this option disabled;
- `80eq f/1.8` with this option enabled.

Display hidden menus

To reduce menu clutter, Magic Lantern allows you to hide unused menu items. Enable this to display the hidden items, so you can re-enable them.

Debug



Functions for troubleshooting, development, and possibly unstable features.

Screenshot (10 s)

Print screen after 10 seconds. This option saves a BMP file for the overlays and a 422 file (silent picture) for the LiveView image. The BMP does not contain transparency data. You can combine the two files in GIMP or other image editing programs.

The card LED will blink every second, until the screenshot is taken.

Menu screenshots

Create screenshots of all main menus at once.

Don't click me!

Don't click it :)

Stability tests

This option runs various tests to make sure Magic Lantern is stable and will not crash. You can use it to test your particular configuration.

If it crashes, report an issue.

Show tasks...

Displays the tasks started by Canon and Magic Lantern.

Save CPU usage log

Saves a log with the CPU usage for all tasks.

Free Memory

Displays the amount of available RAM.

Shutter Count

Displays the number of shutter actuations.

CMOS temperature

Displays the internal CMOS temperature, in raw units.

Battery remaining

60D and 5D Mark II only: displays battery percentage, estimated time remaining and battery discharging rate.

For accurate readings, wait until the percentage indicator decreases by at least 2% since powering on.