Sonic Studios™ SDHC Flash Portable Recorder Review

MODEL: Olympus LS-10

This is a brief *technical* review/commentary based on bench testing of the LS-10 with newest firmware version 1.04

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This review is narrowly focused *ONLY on deck operational features, ease of use, consistent .wav file recording ability/quality, and design fault issues related to stereo-surround field recordists with direct connected external mics/Preamp; issues not usually discussed in commercial magazine / Internet reviews.*

In other words, *how suitable is the OLYMPUS LS-10 as an 'all-in-one' 2-channel stereo deck solution for both amateur / professional field recordist? And if connected to a full featured external preamplifier, how well does it handle the LINE input levels?*

Introduction:

After several decades of refining analog/digital dictation gear, this is the first time I know of OLYMPUS has produced a serious professional quality audio recorder.

From the look, feel, refinement in digital menu logistics, ergonomic ease of most functions, and audio quality performance it seems significant previous dictation (and camera) product experience culminated in a very well designed metal jacketed recording device most typical of portable decks produced by Sony. Most all other pocket-size digital decks recently appearing on the market still seem quite a bit behind the engineering refinement/audio performance learning curve demonstrated by Sony, just recently by Edirol/Roland and now Olympus.

One of the most compact devices available for amateur, professional, and musician recording purposes!

The very slim (definitely a bit too slippery) case seems very weighty for its size giving a sense of holding a finely made camera and not the typical very light weight plastic cases of most other flash decks in this price range.

I'm happy to report the backlit LCD display is easily visible in daylight not requiring a light-blocking viewing case like the Edirol R-09/HR and

PMD-620 decks with OLED display.

A unique feature front panel "Fn" function button allows a *single* choice of instant menu selection setting including recording modes, internal/external memory, and other useful recording functions without resorting to drilling into the menu; found this very useful!

Summary: In my opinion, an excellent recorder valued priced with much to like, and no found fatal flaws.

One hitch is NO AUTO spanning of 2 GIG file size maximum *when using larger 4+ GIG capacity external* memory, so while the deck stops, saving the recorded file, the recordist must manually re-start the next file recording. Possibly this is fixable in a firmware update?

Quiet internal MIC preamplifier input has shortcoming lacking deep <100 cycle bass response. This has issues for acoustic and natural sound recordists to consider using LINE input with an external preamplifier, or requiring additional post edit work to recover the rolled-off lower two octaves. However, with that said, LS-10 mic input bass rolloff seems like 1-pole 6 dB/octave type benefiting those recording dialog/voice interview, and typical excessively bassy pop/rock type venues, and might be *considered a deck feature* when used solely for these purposes.

INPUTS

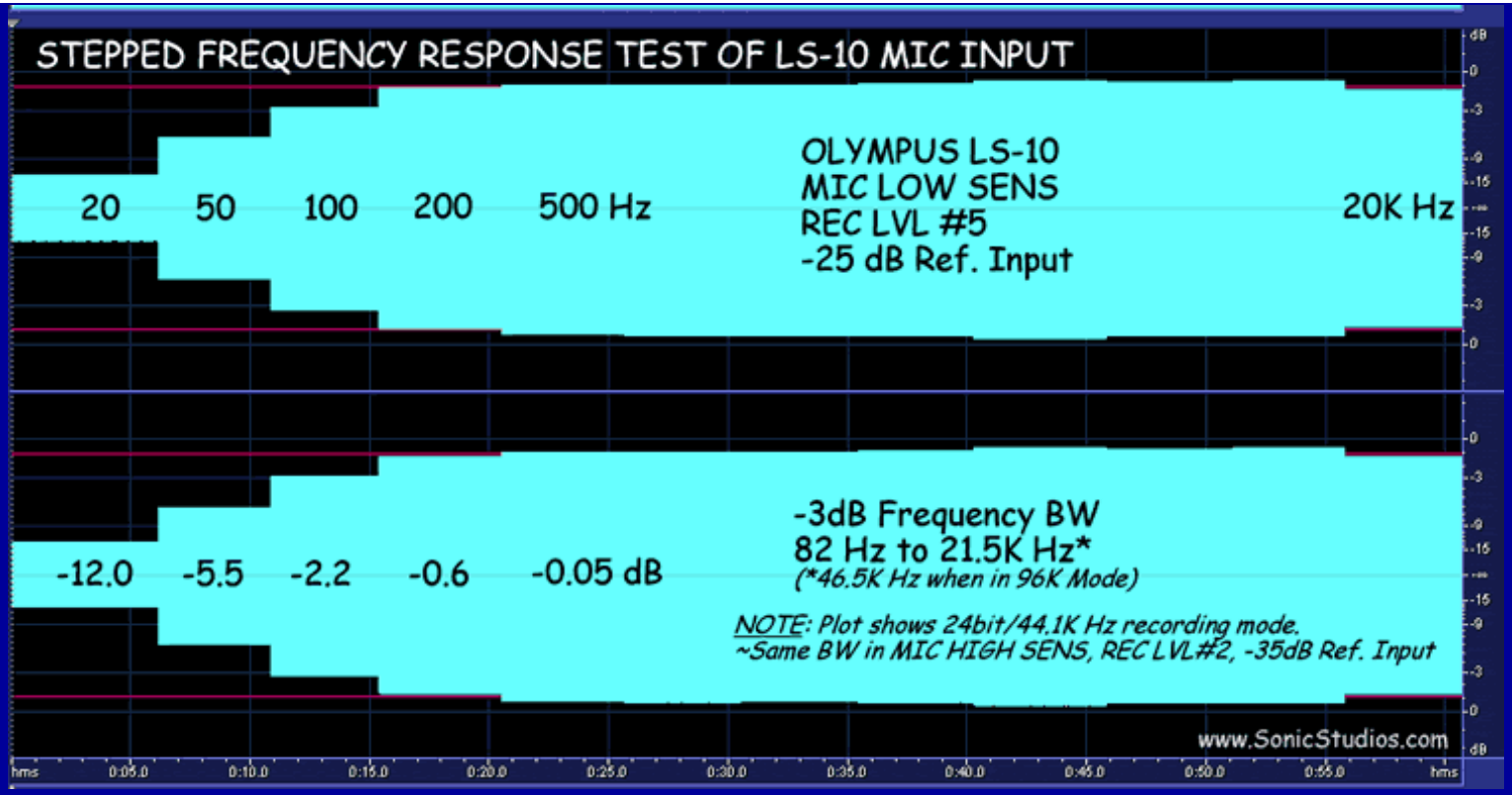
Two 3.5mm stereo jacks serve for analog MIC/LINE input. These inputs are automatically selected by simply inserting a mini-stereo plug into either jack. A single well placed knurled thumb-wheel marked from #0-to-#10 adjusts the REC level.

While the REC adjustment knob goes to (#0) zero removing *all* audio signal from reaching the second amplifier stage, the *useful* range for keeping (first stage) clipping distortion from occurring is #1.5 to full maximum #10, with #2 suggested as minimum practical setting that keeps stereo *channel balance* within measured 0.7 dB at this low adjustment setting. Channel balance is most precision with knob at >#5 positions measured at up to 0.1 dB channel match; very good for a *mechanical* analog control.

MIC input low/high sensitivity is set with a slide switch *always* active even with 'HOLD' active and when recording; a good feature from my experience. MIC power (PIP) on/off function is menu driven supplying up to +2.9 volts for powering external mics. Unfortunately, as usual for current *stock* flash deck models, LS-10's PIP feature will NOT power my own DSM microphones; exception (so far) is Sony PCM-D50

INPUT MODES	REC ADJUST KNOB vs. SIGNAL INPUT FOR 0dB VU FS				COMMENTS
	#1.5	#5	#10	96K -3 dB BW	
MIC HIGH	-30 dBu	-45 dBu	-56 dBu	83 - 46.5K Hz	INPUT modes seem to have ~ 6 dB NON-overlapping dead zones. Not a problem with 24bit depth resolution for effect-free edit boost adjusts.
MIC LOW	-8.8 dBu	-25 dBu	-36 dBu		MIC input 83 Hz bass rolloff benefits loud pop/rock live venue and voice type recording.
LINE	+24 dBu	+8.0 dBu	-2.0 dBu	10 - 46.5K Hz	

MIC INPUT BANDWIDTH PLOT



LS-10 uses (2) AA alkaline or NiMH type cells for estimated 8-12 or 10-16 hours recording time.

BATTERY

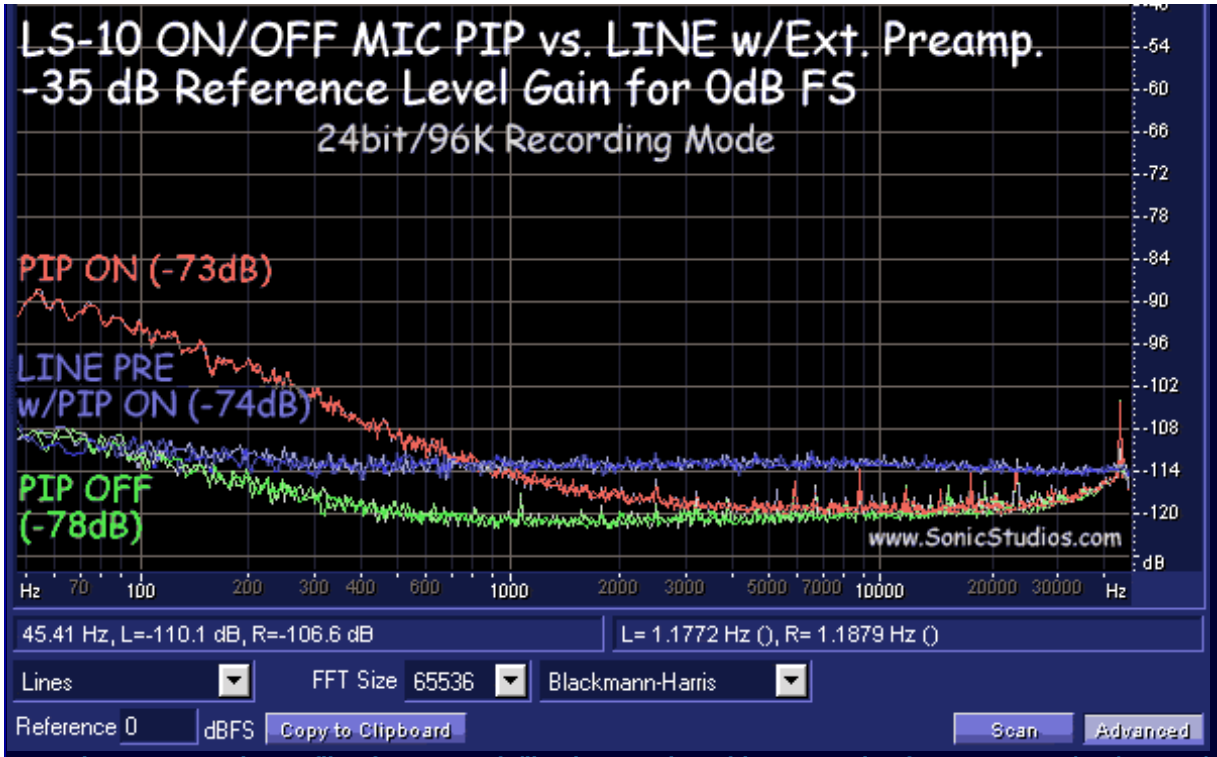
Advanced 'Oxy nickel' Alkaline Batteries now offered by Sony and Panasonic lasting *maybe* **12-16+ hours, same estimated runtime using NiMH 2600+ ma capacity rechargeable cells, and** *longest* **possible 18-22+ hours** *(especially if recording continuously in warm ambient)* **with Energizer L91 or equivalent 2900 ma. capacity photo lithium type cells.**

All noise tests done with 1000 ohm input resistor load to ground.

THE -35 dBu gain referenced input noise of the LS-10 is graphically shown at left with MIC PIP on/off, and with external LINE inputted PA-3SX preamplifier.

ONLY the MIC PIP mode verses LINE input showed any noise performance differences.

Using internal/external flash



HERE is a 15 second .wav file of LS-10's mic/line input noise with 5 seconds of MIC PIP=OFF/ON/LINE w/PREAMP having PIP as depicted in the noise graph above, but amplified by 35 dB so very audible.

memory mode, LCD backlight on/off, or 24bit 44.1K verses 96K recording modes had NO effect on measured noise performance. So feel confident using these LS-10 deck features with no liability on noise performance whatsoever.

The (-dBu) number shown in parenthesis for each recorded mode is the total RMS power over entire measurement frequency.

The LS-10 mic input in LOW sensitivity with REC adjust knob set at #9 was used, while the LINE input was measured adjusted to #8 with external PA-3SX at highest #3 gain.

Up to 16 GIG external SDHC type memory card now LS-10 compatible with newest v1.04 firmware upgrade.

Although NO AUTO spanning between the two memories, internal 2 GIG/external memory is most quickly *manually* selected with the 'Fn' button assigned to internal/external memory function.

Photo of both newer Edirol/Roland R-09HR and reviewed Olympus LS-10 flash decks with the PA-3SX preamplifier.

The small size of the preamp is *exactly* same width/depth as the slim LS-10 attaching very nicely *(with adhesive Velcro)* to the back of either of these decks.

While the LS-10 internal preamplifier is adequate for many common recording requirements, using an external preamp has advantage for extended low bass response, much less low frequency noise, for powering my own DSM mics, and useful for some other PIP type electret or self-powered mics giving lowest possible distortion with improved 24bit

depth audio detail.

External LS-10 SDHC memory can now be up to 16 GIG SDHC card capacity with newest 1.04 firmware upgrade.

SanDisk ULTRA II SDHC

Most everyone using this type for audio recording has good experiences.

Kingston Elite Pro SDHC

Most everyone using this type for audio recording has good experiences.

Kingston 8 GIG SDHC (type 6)

Used this type for R-09HR/LS-10 deck reviewing and bench testing so far with good experience.

Transcend SDHC

NOT *everyone* using this type for audio recording has good experiences.

ADVISORY: As with most memory products, most consistent performance is with purchasing name brand showing suitable specifications for your application, AND verified reports from satisfied users of same deck model/firmware who are ALSO recording at the exact same file rates you intend to use.

Also be aware that manufacturers of flash memory sometimes change internal controller IC that may not work as previously made same model cards.

This has most *recently* happened with Transcend made flash with many buyers disappointed using same model cards working flawlessly for most with same model deck/firmware, but using *previous* Transcend production runs of *same* model card.

Might be BEST TO NOT USE ACCELERATED super speed flash memory technology for audio recording purposes.

Advanced flash with acceleration write/read modes using data burst techniques might be speedier for writing/reading *non-continuous* written camera files. Non-continuous burst protocol modes sometimes disrupt reliable continuous mode audio recording on some decks/firmware versions, and certainly offer NO advantages for continuous written audio recording.

Memory with best chance of satisfaction for audio purposes have *published* continuous write speeds in *excess* of 2 Mbytes/sec. Best to avoid buying memory cards showing *only* (number)X BURST write/read ratings.

TIP: Freshly format the flash card INSIDE the deck after all needed recordings have been successfully transferred leaving no wanted files for best card performance with each new use. ALWAYS format new cards, format after deck firmware upgrades, and whenever cards are removed from the deck for purpose of transferring files with a separate card reader. NEVER computer format flash as deck adds specific *required* LS-10 file folders to the card.

What's on Sonic Studios Web Site: *(Click underlined text, and navigation photos)*

Home Page

DSM™ Patented Stereo-Surround Microphone Technology

Eyegear/Headband/HRTF Baffle mountable matched omni mics

Stops wind blast noise; transparent acoustic design; records real wind sounds

for MD, DAT, CF, HD, and Video Field/Event/Studio Recording

Passive DSM™ Mic Powering/Bass Filters

Battery Powered-Portable Mic Preamplifiers

High-definition, low noise, very wide bandwidth preamp designs to fit any field/event/studio application using DSM™ stereo-surround recording mics.

HRTF RECORDING

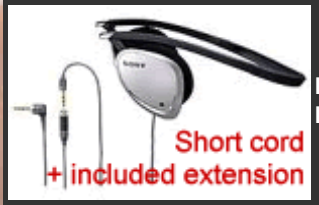
MONO ONLY 'Lombardo' Lapel Mic for interview, Narration, Lecture, and clip-on acoustic instrument Recording

Stereo-Surround Omni Mic Baffle for Stand, Fishpole, Studio Boom, and Ceiling

RECORDING ACCESSORIES

Patch/Adapter Cables

Portable Deck Power Solutions



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Sample DSM™ Recordings Page

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