Sonic Studios™ SD Flash Portable Recorder NON-Review Commentary

MODEL: Samson Zoom H4

This is a brief *non*-review/commentary based on initial bench testing of the H4 with as-shipped firmware version 1.10

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Samson INPUTS REC TIME BATTERY TIPS MEMORY NOISE ADD-ON PRE

This is not a complete review of the Zoom H4 as initial testing was done to verify analog input noise/frequency performance. Noise/frequency response measurements were so poor, I stopped more thorough testing and canceled doing a full review. This deck was NOT going to be suitable for most recordists requiring adequate audio quality.

Introduction:

I admit to having a bad feeling about the H4 when a few customers asked about it last year. And one kind taper on www.taperssection.com newsgroup offered me a loan a few months back that I passed on because of this feeling, and having ability to do a quick evaluation/return was questionable.

But one musician customer previously using a Sharp MD was motivated to buy the H4 for having 4-track mix features felt useful for her purposes, so I agreed to test the unit.

The 'Swiss Army Knife' Recording Deck for Musicians !

Seems just about everyone, and especially musicians, is awed by the H4's very low cost and features. H4 has dual balanced XLR mic/unbalanced 1/4" TS mic/line input, 48 volt mic phantom power, 16/24bit depth, VBR MP3 and 44.1/48/96K .wav file recording modes, and unique 4 channel recording mixer mode allowing mulitrack session with inside-the-deck editing. On deck mics, instrument tuner, metronome, many types of instrument/editing effects. Easy powering is accomplished using just (2) AA alkaline or NiCAD/NiMH type cells

H4 is also unique in ability to become USB recording soundcard output directly into a PC or MAC computer.

Some noted feature shortfalls is limited up-to-2GIG SD card storage (some reports of 4 GIG cards working OK), and buried menu REC level control not ganged for stereo 2-track mode. This means limited 24 bit depth recording time, and awkward time consuming REC level adjustments during live session.

Summary: Bottom line in my opinion is unless deck gets a complete redesign, only hope for H4 is restoring flat bandwidth to >40K cycles AND using external mic pre to overcome switching power supply noise. Redesign is NOT likely at this point as H4 model seems to have been around for going on 2 years with Samson saying everything is fine in their opinion.

NOTES TO THE WISE: Sans needing H4's high frequency bandwidth restoration, using an external preamp seems a necessary upgrade for virtually ALL low cost flash decks used for at least acoustic recording purposes with moderately low output mics. In perspective, it took Sony 2 1/2 generations of DAT deck refinement for mic preamp to start to get really usable, and the best was 4.5 generation M1 model. More realistic to expect low costing flash deck refinement in 2 more generations where switching power supply noise is not such an issue, and external mic preamp is not so needed for acoustic recording with most microphones.

INPUTS

Most owners of H4 experience severe overload clipping distortions while trying using this deck, even though VU levels seem well below clipping. Testing found the cause to be the REC level adjustment that ONLY APPEARS to have 0-127 steps for setting record level, or so it seems until my tests.

In reality, out of the 127 steps, ONLY #100 - #127 range works to control actual REC level; a somewhat limited 10 dB range of adjustment. Setting REC level below #100 *will* lower VU level indication, but 1st mic/line INPUT STAGE IS THEN CLIP DISTORTING!!! This was tested true in ALL sensitivity switch settings, but tested only the dual unbalanced TS inputs.. Findings *should* hold true for dual XLR inputs as well.

It seems odd to me that no one has mentioned this deck's limited ~12 dB ~27 step analog recording input adjustment range!

In other words, using full 127 step signal adjustment range for level control is ONLY NOT A PROBLEM when using the deck's mixer function that works on ALREADY RECORDED mix-track FILE levels, and this (4 track mode) does have full 127 step range without overload distortion liability.

SWITCH SETTING	TS Input REC Level #102		TS Input REC Level #127	
	Signals needed for producing 0 dB FULL SCALE VU Maximum			
L	+6.9 dBu	1.717 Vrms	-3.2 dBu	.536 Vrms
M	-18 dBu	.098 Vrms	-28 dBu	.031 Vrms
H	-26 dB	.037 Vrms	-35 dBu	.013 Vrms

Chart shows maximum 1/4" TS unbalanced signal input with deck set in *fully useful* #102 - and - #127 (~ 11 dB range) REC level adj. setting.

Notice M/H settings change the input sensitivity by ~ 10 dB, but L/H is ~25 dB range!

NOTE: On/Off deck power cycle defaults REC level to #100 adjustment setting on both channels in STEREO mode. Obviously, this deck forgets some user input and recording quality settings like infamous Sony MD decks.

TIP: When using external preamplifier with H4, ALWAYS upon turning on for recording manually set each channel recording level to #115. This will allow about +/- 5.5 dB (~11 dB total) #100 - #127 adjustment range, and when set to #115, my PA-3SX preamp's clip light is EXACTLY the same for deck input near-clip condition.

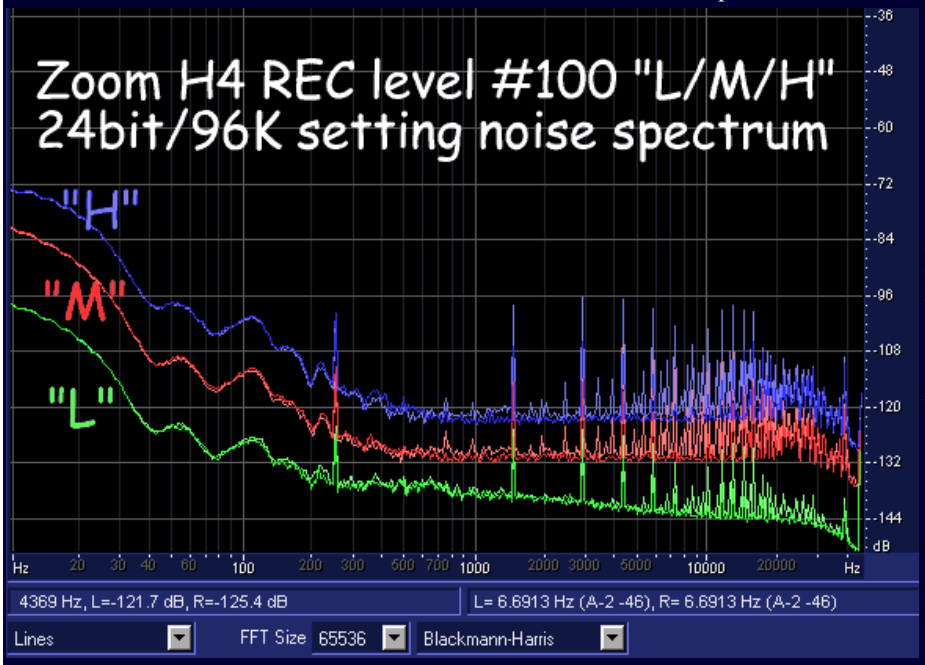
Findings like the above is exactly why it's so important to bench test new decks for function.

BATTERY

Advanced 'Oxy nickel' Alkaline Batteries seem to last no more than 3-4 hours before flashing low battery shows, which is OK, but likely less time on regular lower costing Alkaline.

Longest battery runtime likely with NiMH 2500+ ma rechargable cells, and definitely with Energizer L91 photo lithium type cells.

All noise tests, unless noted, used the H4's dual 1/4" unbalanced TS inputs, these loaded to ground with 1000 ohm resistor



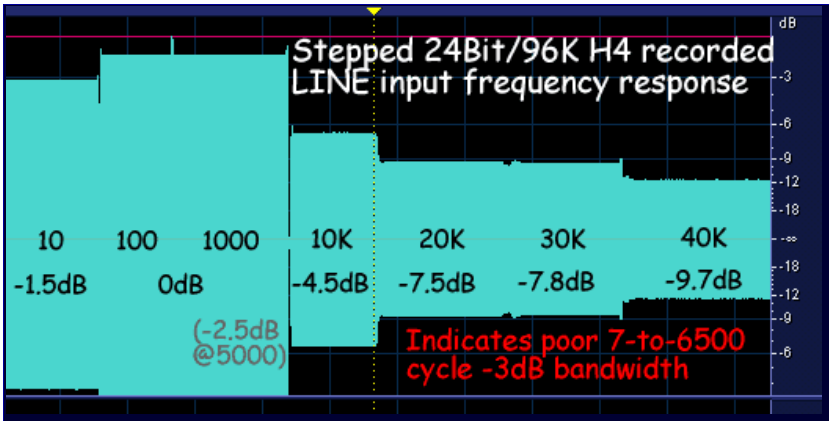
Initially found the H4's preamp full of high frequency switching noise (see spectrum at left), and the Line/phones output was severely bandwidth limited as noted in the post so tested noise/bandwidth ONLY with external preamp.

I reasoned if H4 is going to be usable at all for mic recording, it had to be in the lowest sensitivity 'line level' setting using the unbalanced dual TS input. As the graph previously posted shows, with external PA-3SX preamp the H4 is acceptably quiet enough for serious consideration.

However, the limited high frequency bandwidth (which was measured several times because I couldn't believe it to be that bad) was the showstopper removing any hope of serious use as a recorder.

Doubtful the "M/H" input settings have more available bandwidth. This is moot because noise is way excessive on all input settings on this deck.

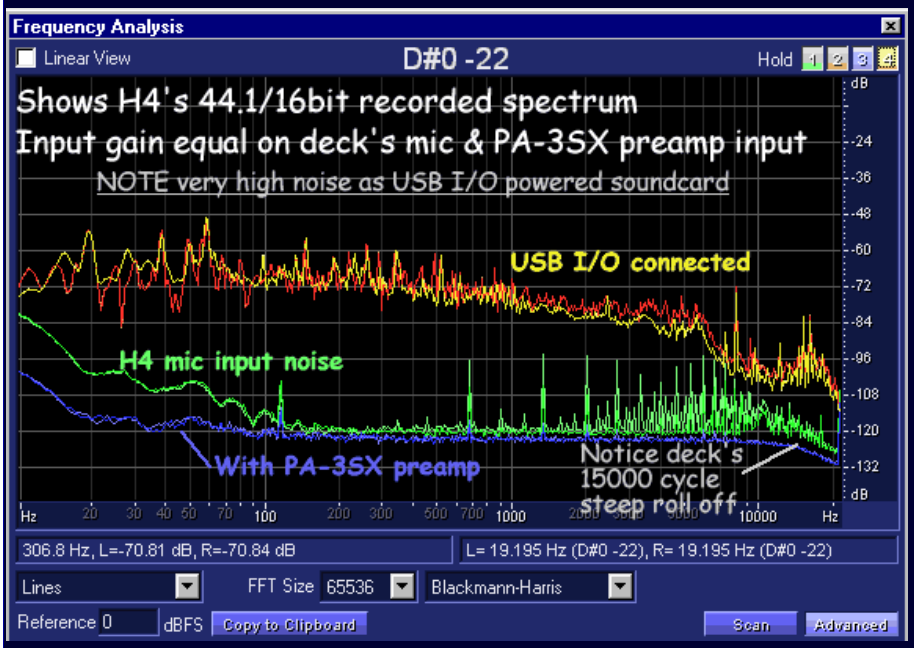
Using this deck with AC adapter to reduce noise to acceptable level is a possibility, but makes this deck useless



WORST NEWS is this deck DOES NOT HAVE smooth frequency response. Two reductions of 6000 cycles and another roll-off at 15000 cycles (see below). Highest quality 96K sample rate shows another serious reduction knee at 35000 cycles. There is little excuse for the declining high frequency that looks like the mediocre audio performance of a prosumer camcorder.

for the purposes of versatile portable recording, so not a "fix' option unless only interest is AC powered computer-connected recording where lower noise is claimed 'not-a-problem.'

Less troublesome is the LINE and Headphones output frequency rolls off even more severe, sounding to me more like an AM radio with <5000 cycles bandwidth!



Also consider all noise, including switching noise, at output of audio circuits is ALWAYS reduced by rolling off the high frequency audio bandwidth response like was found. So I feel the limited bandwidth is a 'noise fix' done with firmware same as the 'mic modeling' feature operating with the internal mics?

If the bandwidth is being limited (at the three 'knee' frequencies noted) to reduce the noise with 'modeling' process firmware, then possibility to remove this when in 'LINE' level mode so external preamp gives H4 a chance of decent quality recording not yet possible in the (defective?) unit tested.

Of course, if full bandwidth flat to 45k cycles is established like it should have, high frequency noise in the graph is going to rise, and if not already noticing, the low frequency noise in the H4 is quite high.

More BAD NEWS is H4 DOES NOT naturally work well as external computer soundcard recording function. Reason is horrendous noise *(see above USB I/O connected spectrum)*, at least while running on USB power directly. Research indicates Zoom engineers know this, and there's evidence that connecting H4 up to the AC adapter reduces this noise, allowing more useful, less noisy external soundcard function?

WAV Recording Time in Seconds

Media Capacity (MB)	16 bit depth 44100	48000 (sample rate)	88200	96000	24 bit depth 44100	48000 (sample rate)	88200 (/96K)
64	380	350	190	175	254	233	127
128	761	699	380	350	507	466	254
256	1522	1398	761	699	1014	932	507
512	3043	2796	1522	1398	2029	1864	1014
1024	6087	5592	3043 **1 GIG**	2796	4058	3728	2029 **1 GIG**
2048	12174	11185	6087	5592	8116	7457	4058
4096	24348	22370	12174	11185	16232	14913	8116
6144	36522	33554	18261	16777	24348	22370	12174
8192	48696	44739	24348	22370	32464	29826	16232

WAV Recording Time in H:M:S

Media Capacity (MB)	16 bit depth				24 bit depth		
64	0:06:20	0:05:50	0:03:10	0:02:55	0:04:14	0:03:53	0:02:07
128	0:12:41	0:11:39	0:06:20	0:05:50	0:08:27	0:07:46	0:04:14
256	0:25:22	0:23:18	0:12:41	0:11:39	0:16:54	0:15:32	0:08:27
512	0:50:43	0:46:36	0:25:22	0:23:18	0:33:49	0:31:04	0:16:54
1024	1:41:27	1:33:12	0:50:43 **1 GIG**	0:46:36	1:07:38	1:02:08	0:33:49 **1 GI**
2048	3:22:54	3:06:25	1:41:27	1:33:12	2:15:16	2:04:17	1:07:38
4096	6:45:48	6:12:50	3:22:54	3:06:25	4:30:32	4:08:33	2:15:16
6144	10:08:42	9:19:14	5:04:21	4:39:37	6:45:48	6:12:50	3:22:54
8192	13:31:36	12:25:39	6:45:48	6:12:50	9:01:04	8:17:06	4:30:32

MP3 Recording Time in Seconds

Media Capacity (MB)	MP3 bit rate 96000	128000	160000 Hi-Quality	192000	224000	320000
64	5592	4194	3355	2796	2397	1678
128	11185	8389	6711	5592	4793	3355
256	22370	16777	13422	11185	9587	6711
512	44739	33554	26844	22370	19174	13422
1024	89478	67109 **1 GIG**	53687	44739	38348	26844 **1 GIG**
2048	178957	134218	107374	89478	76696	53687
4096	357914	268435	214748	178957	153392	107374
6144	536871	402653	322123	268435	230088	161061
8192	715828	536871	429497	357914	306783	214748

MP3 Recording Time in [Days]:H:M:S

Media Capacity (MB)						
64	[0]:1:33:12	[0]:1:9:54	[0]:0:55:55	[0]:0:46:36	[0]:0:39:57	[0]:0:27:58
128	[0]:3:6:25	[0]:2:19:49	[0]:1:51:51	[0]:1:33:12	[0]:1:19:53	[0]:0:55:55
256	[0]:6:12:50	[0]:4:39:37	[0]:3:43:42	[0]:3:6:25	[0]:2:39:47	[0]:1:51:51
512	[0]:12:25:39	[0]:9:19:14	[0]:7:27:24	[0]:6:12:50	[0]:5:19:34	[0]:3:43:42
1024	[1]:0:51:18 **1 GIG**	[0]:18:38:29	[0]:14:54:47	[0]:12:25:39	[0]:10:39:8	[0]:7:27:24 **1 GIG**
2048	[2]:1:42:37	[1]:13:16:58	[1]:5:49:34	[1]:0:51:18	[0]:21:18:16	[0]:14:54:47
4096	[4]:3:25:14	[3]:2:33:55	[2]:11:39:8	[2]:1:42:37	[1]:18:36:32	[1]:5:49:34
6144	[6]:5:7:51	[4]:15:50:53	[3]:17:28:43	[3]:2:33:55	[2]:15:54:48	[1]:20:44:21
8192	[8]:6:50:28	[6]:5:7:51	[4]:23:18:17	[4]:3:25:14	[3]:13:13:3	[2]:11:39:8

Suggestions for SD memory cards likely to work reliably in the Samson Zoom H4 flash recorder:

SanDisk ULTRA II 2GB SD

NOTE: Tested OK for all audio recording purposes. This type SD flash have minimum +9 MB/SEC SEQUENTIAL write speed, and available in *2 GIG size. Recommended for consistent reliability and excellent unlimited lifetime warranty.

Kingston Elite Pro 2GB SD

Kingston brand is highly regarded for quality + excellent unlimited lifetime warranty. +50x rated. Available in *2 GIG

Transcend 2GB SD

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.

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

Advanced flash with acceleration write 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 and certainly offer NO advantages for audio recording.

AVOID newer SDHC cards that DO NOT WORK in H4 deck

TIP: ALWAYS freshly format the flash card INSIDE the deck whenever removed from the deck for purpose of transferring files with a separate card reader. Do NOT computer format H4 flash as deck adds specific H4 required file folders to the card.

Also a very good idea to freshly format the card even if left always inside the deck. Do this every time all needed files have been safely transferred and all remaining files are to be deleted. Reformatting flash card erases ALL stored files and allows most reliable new file creation by the deck.

3/18/2007 posted commentary of Samson Zoom H4 deck is finished unless new version of H4 model is released.

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

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

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