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## Medium Format Digital Back Shoot Out - August 2007

Phase One P45+ (39 megapixel)  
Phase One P30+ (31 megapixel)  
Phase One P25+ (22 megapixel)  
Hasselblad H3D39 (39 megapixel)

Leaf Aptus 75S (33 megapixel)  
Leaf Aptus 54S (22 megapixel)  
Leaf Aptus 22 (22 megapixel)

# Intro

**We set out on this test to break everything.** The purpose was to stress all the backs under heavy shooting loads. We want to know what each digital back is going to do when a photographer hammers on it & never lets up. So what better thing to do than break them at home first?? **Watch them break down, then fix them, under pressure, on set, when everyone is staring at you... That's what we do.**

We gathered all the newly released backs available to us. The Phase + backs have just begun to hit the streets & we were lucky enough to get all three large file backs for the test. **P45+ is 39MP** (Thanks David Westphal), **P30+ is 31MP** with a smaller sensor (Thanks Spectrum Digital), **P25+ is 22MP** (Thanks DPi). The new S Leaf backs are near to market & our local Leaf rep was able to get us the **A75S (33MP)** & a pre-production **A54S (22MP)** for the test (Thanks Bill Gemberling). We rented the **H3D39 (39MP)** & the H1/80mm cameras from Samys Camera in Los Angeles. Unfortunately, neither the H3D22, Aptus 65S, or Sinar backs were available for the test. If we get our hands on them, we'll happily hammer on them & add the data to this report. We chose not to test any backs less than 22 megapixels.

These speed tests are not important to everyone. If you are a still life shooter & don't burn thru pixels, you will likely not encounter many of the issues we discovered in this test. However, **if you need to shoot when you want & as fast as you want, then these numbers mean something to your shooting style.** We hammered on these digital backs because that is exactly what many of our clients do. **This test is about stress & how it was handled. Simple as that.**

**We pushed the cameras thru 30 second & 1 minute bursts. All backs were tested tethered to a tower, to a laptop & selfpowered to CF card.**

We ran each test three times in a row. If errors occurred we kept running the test until the camera made it thru 3 times in a row. Manufacturer software was used for all tethered tests. Hasselblad H1 bodies were set to Continuous drive with 80mm lenses (with the exception of the H3D which has its own body & aftermarket backs cannot mount to it). All cameras were shot at 1/60s for these speed tests & the trigger/fire button was locked down via a cable release. The camera would fire as soon as the digital back was ready for another capture.

Take a good look at the following tables. The backs acted very differently in the tests, altho all results were very consistent. Some backs hammered thru 30 sec and then hit a hard buffer. Others were slower between shots but never really hit a noticeable buffer. Faster CF card write speed helped some backs, where it made no difference to others. CF card tests showed this workflow to be the most reliable (altho not always the fastest) & most errors were found shooting tethered.

Running Pixels would like to thank the following companies for their assistance with this test: DPi, Samy's Camera, Spectrum Digital, David Westphal Photography & Leaf America. We could not have done this test without our excellent crew of digital techs. A huge thanks to Meike Bergmann, Tuan Tran, Matthew Frary, David Westphal, Chris Benoe, & Erik Hillard.

## **Compact Flash Card - SanDisk Extreme III 4GB**

<b>Digital Back</b>	<b>MP</b>	<b>RAW</b>	<b>Max</b>	<b>in 30s</b>	<b>30s/SPF</b>	<b>in 1 min</b>	<b>1min/SPF</b>	<b>Notes/Commentary</b>
H3D39	39	<b>81mb</b>	76	<b>15 shots</b>	<b>2.0s</b>	26 shots	2.3s	Buffer @ 10th frame. Faster than A22 Std.
P45+ IIQ Raw L	39	37mb	89	18 shots	1.7s	26 shots	2.3s	Buffer @ 20th frame
A75S	33	71mb	<b>58</b>	16 shots	1.9s	22 shots	2.7s	Buffer @ 12th frame.
A75S Lossless	33	40mb	84	24 shots	1.3s	<b>46 shots</b>	<b>1.3s</b>	Buffer @ 44th frame (55s). Faster than P30+
P30+ IIQ Raw L	31	30mb	110	22 shots	1.4s	32 shots	1.9s	Buffer @ 26th. Slower @ buffer than P25+
P25+ IIQ Raw L	22	<b>21mb</b>	<b>154</b>	18 shots	1.7s	35 shots	1.7s	No buffer to 1 min, did "surge" tho.
A54S	22	50mb	91	<b>28 shots</b>	<b>1.1s</b>	37 shots	1.6s	Buffer @ 26th frame. Super fast 30s runs.
A54S Lossless	22	25mb	<b>130</b>	<b>32 shots</b>	<b>0.94s</b>	<b>63 shots</b>	<b>0.95s</b>	No buffer. No "wait for card" download.
A22	22	49mb	91	12 shots	1.4s	<b>21 shots</b>	<b>2.8s</b>	Buffer @ 6th. P25+ kills it @ 1 min. SLOWEST.
A22 Lossless	22	25mb	130	22 shots	1.4s	42 shots	1.4s	No buffer to 1 min. Catches P25+ w/Lossless

## **Compact Flash Card - SanDisk Extreme IV 2GB**

<b>Digital Back</b>	<b>MP</b>	<b>RAW</b>	<b>Max</b>	<b>in 30s</b>	<b>30s/SPF</b>	<b>in 1 min</b>	<b>1min/SPF</b>	<b>Notes/Commentary</b>
H3D39	39	<b>81mb</b>	37	20 shots	1.5s	35 shots	1.7s	Buffer @ 19th frame. FASTER than Extreme III.
P45+ IIQ Raw L	39	37mb	44	18 shots	<b>1.7s</b>	34 shots	1.8s	No buffer, did "surge" tho.
A75S	33	71mb	<b>28</b>	23 shots	1.3s	n/a	n/a	Faster 30s than Ext III. Card full @ 46s w/27 shots
A75S Lossless	33	40mb	41	24 shots	1.2s	<b>48 shots</b>	<b>1.3s</b>	No buffer. No "wait for card" download.
P30+ IIQ Raw L	31	30mb	55	21 shots	1.4s	41 shots	1.5s	No buffer, did "surge" tho.
P25+ IIQ Raw L	22	<b>21mb</b>	<b>77</b>	18 shots	1.7s	35 shots	1.7s	No buffer, did "surge" tho.
A54S	22	50mb	44	<b>31 shots</b>	<b>1.0s</b>	44 shots	1.4s	Buffer at 30th frame. Faster 30s than Ext. III
A54S Lossless	22	25mb	<b>65</b>	<b>32 shots</b>	<b>0.94s</b>	<b>63 shots</b>	<b>0.95s</b>	No buffer. No wait. No gain over Ext. III
A22	22	49mb	44	<b>12 shots</b>	1.4s	<b>22 shots</b>	<b>2.7s</b>	Buffer at 6th frame. SLOWEST.
A22 Lossless	22	25mb	65	22 shots	1.4s	43 shots	1.4s	No buffer to 1 min. Faster than all Phase.

**MP = Megapixel**

**SPF = Seconds Per Frame**

**RAW = Approximate RAW File Size in Finder (changes per ISO/exposure)**

**Max = Maximum Captures Per Card (Estimate after format in back)**

All exposures at 1/60s on Continuous drive. Buffers were tested to 1 min +.

All backs tested error-free to CF card. Max frames per card noted after card was formatted in back. (Not exact)

**Unless noted otherwise, all backs had a long "write to card" wait time (45s+) before card could be ejected.**

Phase backs "surged" or slowed down/sped up, but overall number of captures per 30s/1min were very consistent.

## Tethered Tower - MacPro

(Intel Quad, 5GB RAM, 7200rpm 500GB shoot drive, Mac OS X 10.4.10)

Digital Back	MP	RAW	FW	in 30s	30s/SPF	in 1 min	1min/SPF	Notes/Commentary
H3D39	39	<b>81mb</b>	800	16 shots	1.9s	28 shots	2.1s	No previews after 1st shots. No crashes.
			400	<b>14 shots</b>	<b>2.1s</b>	<b>25 shots</b>	<b>2.4s</b>	Slower. Easily 2-5 min preview waits. SLOWEST.
P45+	39	37mb	400	18 shots	1.7s	34 shots	1.8s	Same as P25+, "RLD" errors, see summary.
	A75S	33	71mb	800	<b>24 shots</b>	<b>1.3s</b>	<b>49 shots</b>	<b>1.2s</b>
			400	24 shots	1.3s	49 shots	1.2s	Previews bit slower than 54S but still fast.
P30+	31	30mb	400	21 shots	1.4s	39 shots	1.5s	Still our favorite Phase back, "RLD" errors.
P25+	22	<b>21mb</b>	400	18 shots	1.7s	34 shots	1.8s	Same speed as P45+, "RLD" errors.
A54S	22	50mb	800	<b>32 shots</b>	<b>0.94s</b>	<b>65 shots</b>	<b>0.92s</b>	Memory error after 5 min heavy shooting.
			400	32 shots	0.94s	63 shots	0.95s	Better instant previews, fw400 bit slower.
A22	22	49mb	400	22 shots	1.4s	43 shots	1.4s	Still faster tethered than all Phase+ backs.

## Tethered Laptop - MacBook Pro 15"

(Intel MacBookPro, 2GB RAM, 5400rpm 120GB drive, Mac OS X 10.4.8, AC powered)

Digital Back	MP	RAW	FW	in 30s	30s/SPF	in 1 min	1min/SPF	Notes/Commentary
H3D39	39	<b>81mb</b>	800	<b>16 shots</b>	<b>1.9s</b>	28 shots	2.1s	LONG download. No crashes/errors.
			400	16 shots	1.9s	<b>25 shots</b>	<b>2.4s</b>	Same speeds as with the Tower. SLOWEST.
P45+ IIQ Raw L	39	37mb	400	19 shots	1.6s	36 shots	1.7s	30s previews, 1 corrupt file, No Errors.
	A75S	33	71mb	800	<b>25 shots</b>	<b>1.2s</b>	<b>49 shots</b>	<b>1.2s</b>
			400	25 shots	1.2s	49 shots	1.2s	Same speed, bit slower previews.
P30+ IIQ Raw L	31	30mb	400	22 shots	1.4s	42 shots	1.4s	20s previews, "RLD" errors, see summary.
P25+ IIQ Raw L	22	<b>21mb</b>	400	18 shots	1.7s	35 shots	1.7s	30s previews, 1 "black" frame, No Errors.
A54S	22	50mb	800	<b>33 shots</b>	<b>0.90s</b>	<b>67 shots</b>	<b>0.89s</b>	~1 min to previews, somehow faster than Tower?
			400	33 shots	0.90s	67 shots	0.89s	Bit longer for previews
A22	22	49mb	400	23 shots	1.3s	43 shots	1.4s	~1min to previews

**MP = Megapixel**

**RAW = Approximate RAW File Size in Finder (changes per ISO/exposure)**

**SPF = Seconds Per Frame**

All exposures shot at 1/60s on Continuous drive. Buffers were tested to 1 min +. All backs gave very consistent numbers when no errors occurred.

FW800 backs were tested with both 800 to 800 and 800 to 400 cables. Generally, FW cable type didn't effect number of frames, only the download/preview time.

All tethered cables were 15' in length. Manufacturers do not recommend 30' cables. Next time we'd like to test longer cables.



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# Summary

The H3D39 was slow & steady but never had an error. It'd be good to test the H3D22 as well for a better comparison. The Phase + backs were very consistent but did not speed up as much as we hoped. We did have issues tethered to tower. Leaf's backs are groundbreaking with their newfound speed. **No MF digital back we have seen comes close to the speed of the Aptus 54S.** We have heard the Phase P21+ is as fast, but it is less than 22mp & has a smaller chip size.

**In the future we would like to test 30' cables & 5 minute bursts to see how they react to that extreme.** Basically, we just didn't have time to do so during this shoot out. In one test, we shot the Leaf Aptus 54S for ~15 minutes straight (a few pauses for name changes), tethered to a tower, never hit a buffer, & it fired off 826 frames into one folder before the software finally crashed due to a memory error. Pretty amazing. **We were surprised to see that shooting to a 5400rpm laptop drive was just about as fast as the 7200rpm tower drive. However, the tower did pummel the laptop rendering previews.** Most of the backs had excellent performance shooting to CF card. Although most of them also had lengthy "write to card" wait times before the cards could be pulled for download into a computer. With the exception of the Leaf Aptus S backs shot with their Lossless compression, all backs had at least a 45sec "write to card" wait time. **Many of the backs saw performance gains with the faster writing Extreme IV CF cards.**

**H3D39** - Tethered previews halt downloading after 2-3 shots. Software freezes until shooting stops & all buffered previews download. Extremely long wait for buffer to download, anywhere from 2 to 5 min. Major issue for high volume shooters. Previews a bit faster with the 800/800 cable versus the 800/400 cable. However, no errors whatsoever. Never crashed. One of the slower backs shooting to CF card; however, large speed gains were observed using the faster writing Extreme IV card.

**Phase One + Backs** - Not the speed gain over the previous backs we were expecting. Rock solid shooting to card & very consistent speed. Buffer was hit shooting to Extreme III cards, but no buffer when we shot to Extreme IV cards. IIQ RAW L files have excellent compression, build quick previews & save hard drive space while shooting. Fatal "Retransmitting Lost Data" freeze with all 3 backs on Day 1 with Intel Mac Pro. Per Phase One online support forum advice, shot IIQ RAW L files, powered via battery, & tethered with 15' cables. 3.7.7 DB used for all tests & is required for + backs. After extensive troubleshooting (+1.5 hours), we swapped to a Quad G5 & were able to complete the test without error. The next day, we ran the tests again with the SAME MacPro & had no issues. Very intermittent. We have commonly experienced this "freeze" on set with all Phase backs tethered with 3.7.7. New session files, running DB from battery, deleting .plist files &/or restart of software &/or machine "sometimes" exorcises the demon. Error does not occur while shooting to card or to our Quad G5 machines. We hope Phase fixes this intermittent issue with CI 4.0 or a 3.7 update. Still need to check how files behave in Adobe Camera Raw & CS3. (Phase One references = <http://www.phaseone.com/HOME/Content/Support/Article.aspx?articleid=1449> & <http://forum.phaseone.com/viewtopic.php?t=3665>)

**Leaf Aptus S Backs**- 54S sets a new speed standard. Lightning fast & no buffer when shooting tethered or to Extreme IV cards. Fast write time to Extreme IV cards allows the card to be pulled nearly immediately for download. 75S was solid. No errors at all. Pre-production 54S did have errors under heavy tethered testing. Software gave "Not Enough Memory" error after over 4 minutes of combined testing. Memory error did not occur with the 75S. Restarting the software cleared the problem. Didn't happen every time, as we did marathon shoot for ~15min/+800 frames before an error. We were able to force the error both on tower & laptop. We expect this issue to be fixed with production 54S backs. Leaf Capture v1.1 RC2 was used for tethered testing. Previews did backup under heavy shooting but only needed a short time to fully load. Preview load time was longer with the 800/400 cable. v1.1 is the best Leaf Capture software seen to date. Tethered RAW files are large as they are not heavily compressed. Leaf's "Lossless" compression (available only when shooting to CF card) is comparable to Phase One's IIQ RAW L format. Still need to check how files behave in Adobe Camera Raw & CS3.

**Leaf Aptus 22** - Last generation back is still faster than most Phase backs while tethered. However, without "Lossless" compression, it is the slowest to CF card.