

Ben Clowes  
7,800m up Everest. 2004



## BackUp Everest. HP scales new heights in Extreme Testing.

The story of who came out on top when two brothers and the world's best backup made their second bid for the world's highest peak.



Ben Clowes - Everest Summit. 2006



# Extreme Testing

for 100% data restore - Everest 2006



The motto for HP storage media is “Tested to Extremes” because its big differentiator is that every single batch undergoes extensive testing to assure reliability. What better way to prove our media’s toughness than to send it to one of the most extreme environments on earth?

There’s nothing in the world like climbing that last stretch to the top – exhilaration and exhaustion in equal measures.



*“It just went on and on and on and on. I can honestly say that I wouldn’t ever contemplate doing an 8,000-meter peak again! But I’ve fulfilled a dream. It was fantastic! We could see for miles and miles.*

*It was bloody, bloody cold – but it was also pretty cool to stand on the top. I’m now just looking forward to coming home and enjoying the English summer.”*

In 2004, HP’s storage media business sponsored Tom and Ben Clowes in their bid to become the first pair of brothers from the United Kingdom to stand atop Mount Everest. Everything went to plan on the expedition until a huge storm erupted during their summit bid. For two days they huddled in a tent on a tiny ice shelf at 7,800 meters, while outside, temperatures plummeted to -40°C and winds of up to 100mph tried to blow them off the mountain’s face. With the weather worsening, they decided to retreat...but not surrender.

## HP StorageWorks tape drives accompany the expedition

Earlier this year, HP sponsored Tom and Ben in another bid for the summit of the world’s highest mountain, Sagarmatha, as it’s called in Nepal. This time the brothers were accompanied by a pair of intrepid HP StorageWorks Ultrium 448 and DAT 160 tape drives, as well as hardy HP data cartridges. During the long journey from Kathmandu to the top of Everest, Tom Clowes protected his precious digital photographs by backing up on the HP drives and media. Tom, who makes his living on the speaking circuit, knows that these pictures are his stock-in-trade. Losing them would truly be a disaster.

In early April, the duo sets off for Nepal to join the expedition, flying first to Kathmandu and then taking a small plane to Lukla, which boasts the nearest airstrip to Everest. At 2,850 meters elevation, even Lukla can take one’s breath away, but the group sets off the next morning on the steep and dusty trail to Namche Bazaar, an ancient trading town at 3,400m. After spending a day in Namche to begin acclimatizing to the altitude, the expedition heads up on the 10-day trek to Everest Base Camp, gaining elevation each day. The brothers travel through villages with exotic names – Chukung Ri, Lobuche, Dingboche, and Kala Pathar – and meet the fascinating, friendly people who live here. Ben’s digital video camera enthralled the village children.

At the lower elevations, the expedition’s gear is carried by porters, but as the air gets cooler and the air thinner, the yaks take over. Would the HP tape drives be up to the challenge of travelling on yakback? It’s definitely not in the specs. Apart from the jarring ride, the equipment also has to contend with dust and extremely low humidity. The HP engineers in Bristol, England, keep their fingers crossed.

Life at Everest Base Camp is all about acclimatizing and preparing for the big event. The brothers hone their skills on the Khumbu Icefall, walking across deep crevasses on ladders – or sometimes several tied together – rigged by the “icefall doctors” (Sherpas whose specialty is keeping a route open across the icefall), and forays up to higher elevations help their bodies adjust to less and less oxygen. On days marked by poor weather, however, the Monopoly board comes out instead of the crampons.

## HP tape drives rise to the challenge at lofty levels

At an elevation of 5,340 meters, Base Camp presents challenges even for everyday activities like cooking and bathing. Because most electricity there is generated by solar panels, firing up the computer equipment and doing a backup at Base Camp requires sunshine. Fortunately for Tom and Ben, spring 2006, unlike spring 2004, brings fantastic weather. Tom is able to download his photographs to his HP notebook PC and back them up to both the HP tape drives. The drives seem to work flawlessly even though Base Camp conditions are way outside the drives’ operating specifications, but will they survive the journey back? Will the media stand up to such extremes of temperature, dust, and low humidity?

When their bodies have adjusted sufficiently to the altitude, the team makes longer trips to the camps higher up the mountain, returning to the relative comforts of Base Camp after each sojourn. It’s much colder at Camp 2 (6,400 meters), but the views down Everest’s Western Cwm are stunning.





## Tested at extreme conditions, HP storage solutions survive Mount Everest

There's nothing in the world like climbing that last stretch to the top – exhilaration and exhaustion in equal measures. At 7:50 am on the 18th of May, Tom and Ben reach the summit – the first British brothers to stand together on top of Everest (8,850 meters). At the top of the world, the boys laugh and cry, the flags unfurl, and even the HP data cartridges take advantage of the photo opportunity. Surely, this is another record achievement: the first Ultrium and DAT media to conquer Everest!

Six members of the expedition make it to the summit this day. As they make their way back down to Camp 4, the magnitude of what they've achieved keeps them going. After a night on the South Col, the brothers return to Base Camp, where they telephone their loved ones – and their sponsors – then get some much needed rest. On Tom's call to HP, there are no gung-ho cries of "We did it!" and no whooping, just a very thankful tone, as if he is pleased to be alive. "It was much harder than I imagined," says Tom. "It just went on and on and on and on. I can honestly say that I wouldn't ever contemplate doing an 8,000-meter peak again! But I've fulfilled a dream. It was fantastic! We could see for miles and miles. It was bloody, bloody cold – but it was also pretty cool to stand on the top. I'm now just looking forward to coming home and enjoying the English summer."

Both brothers suffer from frostbite, Tom with some minor damage to his fingers and Ben with a more serious case on his toes. In fact, Ben is in bad enough shape to claim a seat on the helicopter back to Kathmandu. Tom walks back under his own steam, arriving safely in Kathmandu a few days later.

The tape drives, too, make it back safely. Not only did the tapes written at Base Camp and taken to the summit of Everest restore the data faultlessly, but the drives were in perfect condition as well. The HP engineers in Bristol have now analyzed both the hardware and the media, and they survived the hostile conditions with margin to spare. Testing to extremes, it seems, does pay off in ways one would not imagine.

For more information about the Clowes brothers' 2006 Everest expedition, view Tom's website at: [www.tomclowes.com](http://www.tomclowes.com).

At 7,300 meters, Camp 3 is merely a collection of flat spots hacked out of a steep and exposed ice face. While the distance between Camps 2 and 3 is not very far, the steep climb and the lack of oxygen – less than half of what they would have at sea level – makes for slow going. The climbers arrive exhausted and just want to retreat into a tent and sleep. Any time not spent sleeping at Camp 3 is spent melting snow and making drinks because keeping up fluid intake is crucial. In their small crowded tents, they strap on the clumsy oxygen masks that they will need from here on up.

On the 17th of May, the Clowes brothers and their team make the final push to Camp 4 (7,950 meters) on the barren, windswept South Col. If the notoriously changeable weather holds, their summit attempt will take place that night. They will need all their strength in the hours ahead. The team tries to get a few hours rest before the last leg of their journey to the top of the world, but nerves and altitude make sleep elusive. Do they have what it takes to make it to the top?

It takes hours for the climbers to put on all the layers of clothing, and then struggle into their down suits – a feat complicated by having four people in the two-man tent and not much oxygen in the air. Next there are the socks and inner boots, and the outer boots and laces, which have been in their sleeping bags to keep them from freezing, then hats, several layers of gloves and mittens, and the headlamps... eventually they emerge from the tent to put on their crampons and finally the oxygen equipment. They depart from Camp 4 at 9:00 pm with their headlamps lighting the way. It's a clear night with millions of stars and, best of all, no wind.

An experienced Sherpa accompanies each climber from here to the top. Two hours into the climb, Tom's oxygen mask freezes solid. He removes his glove and tries unsuccessfully to get it working again. Topchen, Tom's Sherpa, gives Tom his mask and tells Tom to continue on without him. Determined to reach the top, Tom catches up with Ben and his Sherpa Pasang Dawa, who have stopped to wait for him.

### Back Up Everest featured the following HP products:

- HP Pavilion zd8398EA Notebook PC
- HP StorageWorks Ultrium 448 Tape Drive
- HP LTO2 Ultrium Data Cartridges
- HP StorageWorks DAT 160Tape Drive (prototype)
- HP DAT 160 Data Cartridges
- HP StorageWorks Data Protector Express software

	Industry standard format	HP standard format	The pay off
<b>Standard performance</b>	To guarantee interchange between all Ultrium drives, 30 cartridges must be tested for initial format compliance every year.	To qualify for the HP brand, 600 cartridges from three separate manufacturing batches will be tested, and followed up with routine, quality monitoring. We give the same interchange guarantee, to a minimum consistent level of quality.	Consistent quality is assured for every HP Ultrium data cartridge, regardless of the drive it's used on.
<b>Environmental interchange</b>	Limited interchange tests using one cartridge on one drive under one or more environmental conditions.	HP demands successful interchange in conditions ranging from 10°C to 29°C and 10% to 80% relative humidity.	In passing these tests, we know that the drive and media will stand up to continuous pressure in all conditions, not just the controlled environment of a data centre.
<b>Drop testing</b>	Cartridges can come in for some fairly rough treatment. But there is no drop test specified in the LTO spec.	than their fair share of knocks. We drop them half a metre onto a concrete floor, time and time again, on each of their six faces, 12 sides and eight corners. We test them alone, in the library case and in their packaging.	HP Ultrium data cartridges cope easily with the toughest daily use and transport without sustaining any damage to the casing, tape or mechanism.
<b>Load/unload</b>	Frequent load/unload cycles put both the tape and the drive under pressure. But there is no such test specified in the LTO spec.	We run 20,000 automated mechanism cycles to prove reliability of the leader pin assembly. The tape will not break under expected wear and tear, thus avoiding repeat backup or drive damage.	The cartridge leader mechanism is robust enough to ensure effective, reliable performance when subjected to intensive load/unload activity.
<b>Locate/rewind/append</b>	Two-thirds of the tape is run through the drive 250 times in 29°C and 80% relative humidity.	Even the Ultrium logo's demanding locate/rewind/append test is not challenging enough to qualify the media for HP branding. Our test, in similar conditions, requires 2,000 passes.	Reliable performance is assured even under the most extreme daily conditions.
<b>Thermal aging</b>	Archive tapes are stored at a constant temperature that is often different from the operating environment. The LTO spec has no test for this.	Our test maintains the cartridge at 60°C for at least 100 hours; and conditions it to the operating environment for at least 24 hours before conducting full read/write passes.	The tape and all cartridge components will perform reliably despite continuous exposure to a constant temperature.
<b>Ship and store</b>	A simple test checks whether a cartridge can be shipped, stored and used once. Only one cartridge on one drive will be tested.	We run five test-bed drives in an environmental chamber to test cartridges after they have been stored for two days at 10°C, 10% relative humidity, and a further two days at 49°C, 15% relative humidity.	HP Ultrium data cartridges can tolerate radical changes in environment, including transport to and from climatic extremes.
<b>Shoeshine</b>	A data cartridge is written, rewound and read thousands of times during its life, and yet the industry LTO spec does not verify how many times this can be done before data becomes unreliable.	Our 'shoeshine' test simulates excessive repositioning or error recovery on a short section of tape as happens in libraries where media is in constant use. The data is recorded, the tape is rewound, and the data is read and error checked. 40,000 times on the same 3-metre length of tape.	HP Ultrium data cartridges will withstand very intensive use, even when restricted to a small section of tape. This qualification is particularly important for libraries where media are frequently loaded or unloaded by the operating system.