Here's a tiny HD camcorder that has impressed me no end

How dare anything this small and this cheap be so good? How can something weighing 104 grams perform so well when shooting high definition movies and taking 5-mp stills? How can its microphone be so good? Read on - we shall find out.

There's a huge array of action cameras on the market today, most of which I think are eBay rubbish. They're sold as car cameras, helmet cameras, as under-water cameras and all compete with the established leader of the pack, the GoPro. But beware; read the specs and you'll often find that Lo-Def is the order of the day or that there's no internal battery or LCD screen. Worse, some record at 15fps, many charge high prices and a lot give VHS quality images that aren't worth bothering with.

Do I need another camera? Probably not, but I've been looking for an HD camera that I could take swimming, that would automatically film every journey I make once stuck to my car windscreen and, as a bonus, one that would take passable stills. A good built-in microphone would be a plus, as would an LCD screen. I wanted a built-in battery and an array of accessories to enable me to use it in a variety of locations. I didn't want to pay GoPro Hero 3 prices and then have to pay £70 extra for the LCD viewfinder, so, after much internet searching and reading, I came across this Chinese made SJ1000. It ticks all of my wish-list boxes and was delivered to my door for £55.65 from an eBay seller in Hong Kong.

The camera

Take a look at my photo 'What's in the Box?' I opened it and out fell about 21 components, consisting of a vast array of brackets, stands, clamps, straps, cables, ties, the camera itself, an under-water housing (UWH), instructions, a car and mains charger. The camera itself is about 2¾" high and somewhat resembles a smooth rounded pebble, with a very wide-angle lens sitting in a small protrusion. I chose a black one, but prettier versions are available in various colours. It has an impressive specification and will shoot full high definition mov files using the H264 codec (1920 x 1080p/30) all the way down to a miserable 640 x 480. It uses a single 1/3" CMOS chip and will shoot 5mp 4:3 images, with electronic image stabilisation should you wish. It comes with a rechargeable Li-ion battery that runs the camera for a solid 2 hours 12 minutes in full HD mode and it has control buttons dotted all over it.

There's a comprehensive menu that allows you to set the camera up in various guises. You can loop-record so that when the class 4 Micro SDHC card is full (a 16gb card will hold just over 2 hours of full HD) the camera will then over-write the earliest segment and continue

recording. You can set the camera up to film 3, 5 or 10 minute clips and lock any one of them with a single button push to prevent it being over-recorded. Each recorded clip repeats the last second of the previous clip, unlike many such cameras that leave gaps in the recording. There's a gravity sensor (you choose a 2G, 4G or 8G setting) to automatically lock a particular clip if the camera detects a bump or a crash of that magnitude. As a security camera it can be set to record for 10 seconds whenever it senses motion, and if the motion persists it'll continue recording. Clever, huh? I don't know how it does this.

There's auto or manual control available for the white balance and the ISO, yet the camera always shoots at its maximum aperture of f/1.8. The front element is very vulnerable, protruding very slightly from its surrounding bezel making me feel nervous whenever I pick this pebble up. Exposures are controlled by the shutter speeds and ISO in combination. They vary from 1/33rd sec up to 1/10,000th and the ISO from 50 to 900, such that you get grainier pictures with more motion blur the lower the light levels you shoot in. Don't bother with the useless anti-shake. The exposure bias – in third stop intervals up/down to 2 stops - works well, but the meta-data has the + and the - reversed. For most daytime car shooting the best results are at +2/3 stop because with such wide-angle coverage the sky can unduly affect the overall exposure. It works well in low light - noticeably better than my Crocolis (FVM April 2012) with its f/3.4 max aperture. The front panel of the camcorder gets very warm - it's an alloy pressing and forms the camera's heat sink.

Results

This is a camera that gives sharp images corner-to-corner. The multi-coating is very impressive indeed and you have to shoot right into the sun to get any flare in your shot at all. The video bit-rate is a high 15.25 mbps in full HD mode, so video blocking is very hard to spot. Exposure changes are imperceptible, nothing like the Spanish Steps that other cameras think is acceptable. All the frame grabs you see here are straight off the timeline, no tom-tweaks at all.

The camera is shooting at 30 fps which will be interpolated to 25 fps by your (PAL) timeline. Individual frames are therefore a mix of adjacent frames (every 5th frame is pin-sharp) but even so, car registration plates can be clearly read in pause. There are no dropped frames and unbelievably the camera will play back these hi-def files at up to +/- 8x speed (my big black desktop PC won't). You can set it to show all your stills as a slide show, choosing the on-screen time. It will also show the first frame of every movie clip as a slide show too, so that you can find the clip you want to see and immediately set it in motion.

The audio recorded by the pin-prick of a mic is staggeringly good. I recorded some rock music from my car radio and couldn't believe how well the (mono) replay sounded through my desktop speakers + sub. On another occasion rear seat passengers are clearly recorded chatting as I drive. I've put up a short test video up on YouTube to show this camera's capabilities. **http://tinyurl.com/lj8b35d**

The JPEGs are pretty sharp using camera menu defaults. Leave the w/bal on auto - it's far better than any of the presets though can wander somewhat. The len's focal length isn't given (probably in the region of 2.5 mm). It has a very wide angle of view, easily seeing both my A pillars when stuck to the top of my car's windscreen. It's sharp all right, but the barrel distortion is severe and Photoshop can only partially remove it. Mercalli's Prodrenalin (about £46) will stabilse your wobbles and remove the barrel distortion should you wish. The supplied cable from your car's 12v power socket is fairly short and has to go 'direct' to the camera, somewhat advertising its presence.

The under-water housing

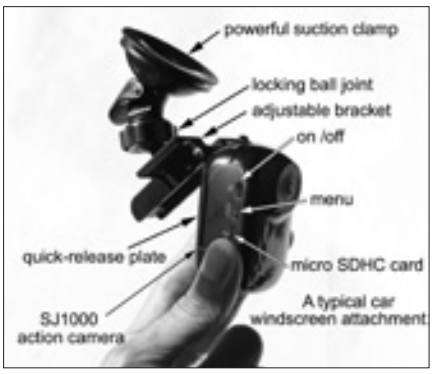
There's no tripod socket on the camera body, but there is one fitted to the supplied UWH, making it easy to attach the camera to any of the supplied brackets and clamps, or a conventional tripod or monopod of course. The UWH has a flat plastic front window that gives sharp footage under water yet (rather oddly) slightly vignettes the video and stills. Under water this vignetting is reduced, but even so the image needs timeline enlargement (8 per cent in air, 3 per cent in water) to remove it, and I was pleased to note that I couldn't spot any increase in flare when filming against the light with the camera inside the housing.

Another oddity is that although the UWH has five buttons that operate the camera's various controls, there's no button for turning the camera on/off. I had to turn the camera on, pop it into the UWH, and when the battery was exhausted take the camera out for recharging. Not a big deal, and I see the latest UWH has rectified this omission. The over-centre catch tightens the rear door against the silicon seal to make the contraption waterproof but only so long as you don't operate the control buttons under water. I suspect one of the spring-loaded buttons is letting in tiny amounts of water on my sample.

Using the camera

It's quite difficult to hand-hold this little pebble of a camera but the fact that it's always opting for the highest shutter speed possible means I never once experienced camera shake, even in low light.

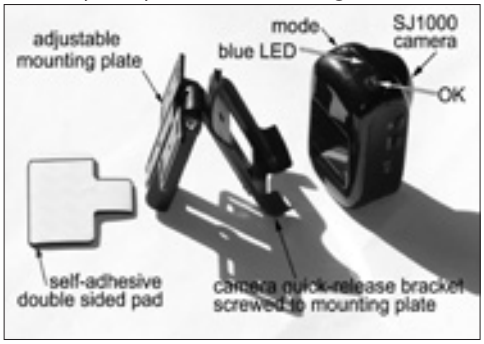
The lens sees so wide it's pretty easy to inadvertently get one's fingers included in the frame. The vast array of mounting options in combination with the supplied tool kit means you can attach it to almost anything once it's inside its UWH, but it is a shame that the UWH's front window is just too small a diameter and causes the slight vignetting. The 480 x 240 LCD may not sound much and you'll need pretty good eyesight to pick out all the icons, but it's clearly visible in daylight, and useable in direct sunlight. Are the Big Guns listening?



The camera is ideal when used in the car to record journeys because it's a fit-and-forget device. When permanently connected to the car's 12v cigar lighter socket it starts recording the second the ignition is turned on and takes a moment to save the last file to the card when the ignition's turned off. The card is constantly over-written from the beginning yet you can save any number of 3 / 6 10 minute takes by pushing the mode button at any time – a key symbol on the LCD screen shows that file won't be over-written. Any file can be erased manually of course, and will disappear when the card's formatted.

The camera is pretty discreet as you can see, and I've bought a longer power cable (3 metres, £1.99 delivered) to run invisibly up the A pillar and under the roof lining. The camera is held by a neat quick-release plate, and this plate can be suction cupped anywhere to the windscreen or dash panel. Alternatively one of the supplied self-adhesive pads can be used; I prefer this as it holds the camera rock steady. The suction cup allows slight vibrations to reach the camera and with a CMOS chip, quite noticeable jelly-wobble is the result.

In the 4:3 still camera mode it shoots 5mp images, it's sharp from 4" to infinity so my windscreen heating wires are sometimes visible. There's a 4x digital zoom and a variety of delayed action times. Photoshop can go a long way to removing the barrel distortion should you wish, but under water it's near-on invisible. Any straight lines that pass through the centre of the image aren't distorted at all, of course.



Conclusions

I'll say it again – how can a camcorder this cheap and this tiny be so good? It's far better than we have any right to expect, and if we take away the vast array of clamps, straps, the UWH, two power chargers and interconnect cables, what's left over to pay for the camera? £40 tops I'd say. The camera works well on roads lit only by my headlamps and this is important as most car accidents occur at night or in poor weather and low visibility. I want visible and audible proof that the accident I'm involved in wasn't my fault.

OK, there are one or two problems. The barrel distortion is there to keep the images sharp at a realistic price-point, but it will upset purists. A firmware upgrade might enable you to have the date displayed as dd/mm/yy rather than always yy/mm/dd but it's a minor point. I like my viewfinder to stay on all the time, yet the camera always reverts to the LCD screen saver mode after switch off - a bit of a pain. The vignetting inside the UWH is just a silly design flaw, but some Mercalli smoothing removes it at a stroke. As delivered the camera rather over-sharpens the image, but that's menu tweakable as are a lot of other things. The colour fidelity, exposure tolerance and image sharpness from that tiny lens (working wide open all the time don't forget) is remarkable, and using the supplied HDMI cable the image fills a 55" LCD telly with ease, and no apologies are needed.