Can you really shoot HD video on a digital SLR?

Nigel Cooper sets out to see just how practical it is to capture HD video on the Canon EOS 5D MK2

You can't have failed to notice the buzz surrounding the Canon EOS 5D MK2 digital stills camera and the stunning HD video images it is capable of producing. Everyone seems to be talking about how fantastic it is for HD video ... even those who haven't actually seen or used one yet. All and sundry are jumping on the bandwagon. But don't be under too many illusions.

Some of you may have seen Vincent Laforet's beautifully crafted video *Reverie* on the web; this short film would be enough to inspire anyone to take a closer look at this camera for HD video work. But does it really allow you to produce professional looking HD footage? Sure, it has super depth of field that's even shallower than that of 35mm film motion cameras, but are there other issues with image quality?

▲ *Andrew Rodger with editor Caroline Maine*

Canon UK were kind enough to send me an EOS 5D MK2 for a 10-day loan. During this time I struggled to get a decent image out of the camera and found trying to shoot HD video very frustrating. To start with, I was disappointed that the camera only shoots video in full auto mode; that the images contained more aliasing and moiré than you can shake a stick at; that the camera only shoots at 30fps which created major headaches when trying to do frame-rate conversions to 25fps; and that there is no viewfinder, only a tiny LCD screen on the back of the camera, making composition difficult. However, as I spent more time with the camera, I gradually began to find workarounds for these limitations.

Then I heard about a director and DoP who had just successfully shot a whole music video on this very camera. So I figured I would jump in my car and drive down to Arqiva Studios in Gerrards Cross to interview them. I was hopeful they would be able to answer some of my unanswered questions as regards the workarounds I hadn't been able to figure out myself. I was not disappointed. Since then Canon has also released a free firmware update allowing full manual control over aperture, shutter speed and ISO.

Andrew Rodger is a professional DoP who runs his own production company, Dead Duck Productions, and Chris Murray is a professional stills photographer and director with his own company Mangaduck. The promo video they had just finished was for Copro Records, the band was Even Flowers Kill and the track 'Ruth Has Information that Will Destroy You' from their new album 'Smile for the Camera'.

What follows is a transcript of the interview followed by a summary of my findings regarding shooting HD video on the EOS 5D MK2. To see the finished music video visit: www.dvuser.co.uk/misc/even-flowers-kill.mov. The file is 475mb in size, but at least the QuickTime movie is high-def and clear – hope you have broadband. Or you can view the entire video interview on the DVuser i-Net TV channel at: www.dvuser.co.uk

N: How did you overcome the frame-rate conversion problem and the judder issues it can cause when converting from 30fps to 25fps?

A & C: This was a major concern for us at the beginning, as the camera will only shoot at 30fps. So what we decided to do was to treat it in the same way that you would over-cranking a film camera. We simply told the editing software to play back the 30fps footage at 25fps hence slowing down the speed by around 20% as opposed to getting it to play back 30fps at 25fps but keeping the speed the same, which can cause some jitter and flashing issues due to its removing every sixth frame. There is no 'pull-down', we simply played it back slower so 30fps was played back

▲ *Chris Murray adjusting critical focus*

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at just 25fps, which then syncs with PAL. This gives a slight slow-motion effect, but we liked it.

N: Do you think footage shot this way looks more 'filmic' and 'pleasing' with this slight slow-motion (over-cranked) effect?

A & C: Oh yes, it's beautiful, we really like it. If I can go off on a slight tangent for a moment, Andrew and I have a bit of a dislike for the new 100Hz TVs because they produce a strange effect that doesn't appear natural; then when you go back to 25p, although more basic and low-tec, there is something nice about it. The thing with video is that if you are not shooting news or sport, most of us are trying to simulate film. We were trying to simulate film in this video, which is what the EOS MK2 does so well, and for this we needed 25p. 30p is heading towards the 50fps end and looks a lot less filmic, so pushing (slowing) the EOS 5D MK2's 30p down to a UK 25p is a good thing as well.

N: So even if Canon did a firmware update in the future allowing native 25fps shooting, do you think you would continue to shoot at 30fps anyway?

A & C: For some things, yes. It's a pain to sync, but yes we would because this is something that you do in film anyway, you over-crank certain scenes to create an emotional 'feel', it gives scenes a bit more grace. I think this is partly why the video looks so good because all the motion has a very graceful feel due to the subtle slow-motion effect.

N: How did you manage to overcome the sound-syncing issues when converting, or should I say slowing down, your over-cranked footage from 30fps to 25fps? Surely the soundtrack slowed down with the knock-on effect of the 'pitch' coming down a semi-tone or so?

A & C: I'll need to take a deep breath to explain this one. In the case of this video, because we were recording at 30fps and playing it back slower at 25fps, what we did was speed up the audio backing track that the band were miming to so the band members were actually playing along to a track that was 20% faster than usual. We then told the edit suite to play back the footage at 25fps, i.e. slower, and simply replaced the audio track with the original speed CD recording and everything then synced up nicely with no semitone pitch issue ... but the entire video has a slight slow-motion effect which gives it grace and emotion. I hope that makes sense. Originally we had to do the maths to work out how much we needed to speed up the backing track so it would be the correct speed when the video footage was slowed down. This is not a new idea.

"it's not all about resolution guys ... there are more important things such as dynamic range, colour depth and a whole lot more"

N: How did you manage to work with just the EOS's 'live view' mode on the small LCD screen? Not having a proper video viewfinder must have made the composition of certain shots difficult?

A & C: Originally we were going to plug the AV out on the camera into a separate monitor, but the problem with this is it kills the 'live view' mode and transmits it to just the monitor. In this instance it was a large grade 1 CRT monitor that could not be moved around easily with the camera. Also, the camera's mirror locks up which means you can't use the optical viewfinder either. In hindsight, and for future productions, we would use a portable 7" LCD screen plugged into the AV out or HDMI out and mounted on top of the camera's hotshoe.

N: Until recently, the EOS 5D MK2 only worked in full auto mode when shooting HD video. Canon has now (as from 2 June 2009) released a free firmware update allowing you to shoot HD video with full manual control over shutter speed, ISO and aperture. This must make life a bit easier?

A & C: Yes, before the firmware update we had to use some rather

▲ *Still grab from the video 'Ruth has informatiion that can kill you'*

"the RED is a camera that puts out incredible pictures, but the EOS 5D MK2 is a very cheap camera that puts out incredible pictures"

unorthodox workarounds by using the depth of field preview button and half undoing the lens to break the electronic contact between the body and lens, forcing the camera's aperture to stay in a fixed position. We no longer have to worry about forcing the camera into a 180-degree shutter angle either, which was a nightmare. The new firmware update has made all these awkward workarounds a thing of the past.

persevere with it, all the shortcomings of the camera can easily be overcome. If you are going to shoot a drama or a music video this is the best thing for the money you can possibly buy. However, if you are going to shoot news footage or do stringer work it's not ideal because it is fiddly. You have to treat this camera like a full 35mm motion picture camera. Instead of having mag changes you change CF cards. We'd recommend trying

"the video looks so good because all the motion has a very graceful feel due to the subtle slow-motion effect"

N: What advice would you give to anyone who is thinking of buying a Canon EOS 5D MK2 for video work?

A & C: Horses for courses. It's a stills camera, a very good stills camera. That's why I bought it in the first place. It just has the added bonus that it shoots really good HD video. We wouldn't have even considered using this camera if I hadn't gone out and shot a bit of video on it and come back and said, "Hey Andrew, look at this, is this video supposed to be this good? My 5D MK2 still images are moving." The stills images from the 5D MK2 are pretty amazing and the HD video is just like the stills – only moving at 30fps. It's a £2000 camera. I honestly don't think you can get anywhere near this quality for anywhere near this price. Sure you lose the convenience of video camera functionality, but this is so much cheaper. The video images it produces punch well above its weight and it has a great 'film stock look'. If you

to have as full a crew as you can for the best production results. We had a great crew and the final result is just as much down to their skill and hard work. We should mention lighting director John Randall, sound supervisor Clint Nurse, and 1st AC Olivia Vergnon for their outstanding contributions. If you have a crew that know what they are doing it will feel like an effortless shoot.

N: Can you explain about the 'larger than 35mm motion picture gate'?

A & C: Yes, the shallow depth of field on the EOS 5D MK2 is even better/shallower than on a 35mm motion picture camera. Although both the EOS 5D MK2 camera and, say, a Panavision 35mm motion film camera have a 35mm sized 'gate', on a stills camera the film passes through the gate horizontally, whereas on a motion picture camera it passes vertically so the image size on the motion picture camera is just 24x16mm as it goes across the width of the film, as opposed to a stills camera, which has a lot more celluloid real estate as it goes lengthways across at 36x24mm.

N: What difference did the shallower depth of field make to your final video images?

A & C: It makes the image more beautiful. If you are going for a shallow depth of field, the EOS 5D MK2 is better than a RED camera because the gate of the chip on the EOS is so much bigger. As any professional stills photographer will tell you, this is why a full-frame digital stills camera is better than a cropped-frame one. The full-frame sensor on the EOS sees more of the lens and you get a much better, more natural vignette if you want that from any given lens. With one of the lenses I used, a 50mm f1.4 stills lens, I actually stopped it down a little to prevent chromatic aberration and to utilise the 'sweet spot' of the lens - so we could have made the images even shallower if we'd wanted to.

N: I understand you were going to hire a RED camera for this video, why did you change your mind and go for the Canon instead?

A & C: The RED One was one of the things we looked at. I've worked with a RED camera on a production a while ago. It's a great camera, but it's got its own problems, especially in post. It's true that a lot of these have been overcome, but after talking to various editors recently, there are still a ton of post problems there. The record company didn't have a very large budget for this shoot, but we wanted it to look expensive and we didn't want the camera to let us down. So we could have either spent the money hiring a RED and all the paraphernalia that goes with it, or we could spend that money on locations, lighting and good people (crew); so we decided to go for the latter. I like the way the footage from the RED looks, but I've always liked the look of the stills pictures from the Canon EOS 5D MK 1; there is a real quality to them. You get a very sensitive reproduction of colour in a 5D still picture and this translates very well into motion video. The tonal range and shape of the curve and how it records colour is just very nice. It probably isn't as good as the RED on paper, but there's something about the images the EOS 5D MK2 puts out that is lovely, moving, and really beautiful; it just has a unique 'look'.

N: I expect the cost factor came into play also, with the Canon costing just a fraction of the hire fees of a complete working RED kit?

A & C: Oh completely, yes, but also Chris bought the 5D MK2 which helped. But yes, if you hire one, it's going to cost way less per day than a RED. REDs are cheap for what they do, they are incredible, but by the time you've got the RED rails, hired the lenses and the hard drives, and grown it into a working camera you are talking about a lot more money than the £2000 the 5D MK2 body costs; and to buy a RED you could spend £30,000–40,000. So yes, the 5D MK2 is what the RED ... sorry RED ... should have been. The RED is a camera that puts out incredible pictures, but the EOS 5D MK2 is a **very cheap** camera that puts out incredible pictures. I remember the very first time Andrew introduced me to the RED. He said, "Basically it's your 5D MK1, but it does motion." Then a year trundles past

and it's like, "Hey, look what I've just bought. Look at my 5D MK2, it does HD video!!"

N: You've shot productions on the RED in the past, how does the image quality compare to that of the EOS 5D MK2?

A & C: Obviously the RED will do 4K, which the EOS won't, and probably never will because of its processor. It probably could, but at full-frame 4K it would only output about 13fps, which obviously isn't enough. Because the RED can put out a much higher res image it would be better for theatre projection, but the 5D MK2's HD resolution of 1920x1080 is pretty good, and it's not far off 2K. Don't forget, it's not all about resolution guys. There are more important things such as dynamic range, colour depth and a whole lot more. Resolution has become something of a buzzword. The EOS 5D MK2 does 1080p, which is great for TV drama and Blu-Ray HD DVD releases, and even film-outs and projection in theatres if need be. Another important thing is that this camera allows you to use Canon glass; I love Canon stills lenses. Once I was talking to Andrew and I asked why stills lenses are so much better than video lenses? I can't understand why the video guys spend loads more money for what I consider to be inferior glass. Canon stills lenses are lovely and better priced. It's like you would choose a certain film stock because it looks a certain way, or you would choose an early Zeiss lens because it has an 'emotion' about it, or a 'look' about it that you like. The 5D MK2 is the right choice for some things, the RED might be better for other productions. The 5D MK2 was the right choice for us with this video. It is amazingly sharp on playback and has more than enough resolution.

N: How does the Canon EOS 5D MK2 compare in image quality to regular HDV and HD camcorders such as the Sony EX3, Canon XLH1 etc?

A & C: Again, it's horses for courses. If you are going to shoot a documentary, a short drama, or a music video, the EOS will be spot-on. A Sony EX1 with a Letus or Red Rock adaptor on the front, compared to the EOS 5D MK2, which is doing this natively with a stills lens, is no comparison at all; it's just not the same thing. The chip on the EOS and the processing has such a lot of colour depth (probably not on paper but visually it looks so much better). The images out of an EX1 are just 'flat' compared to the EOS, which has a sort of 3D quality to it with a lot of range. Cameras like the EX1 just don't look as good. The 5D MK2 is kind of comparable to a film motion camera, but a video camera is just a video camera.

▲ *Chris Murray making adjustments*