Broadcast Project Research Smartlips

With all the technology involved in modern delivery it's perhaps not surprising that lipsync — that most rudimentary of qualifications for watching enjoyment — remains as rubbish as it is. ROB JAMES says that it is hardly progress but you can at least measure it.

Picture synchronisation with sound has been a problem since the 'talkies' were invented. Analogue television experiences the same sources of error with the addition of possible transmission errors when sound and vision are sent via different routes. Digital TV, especially HD, has brought several new and exciting ways of losing sync to the party. The accepted standard for film has long been: 'up to 1 frame early and up to 2 frames late', reflecting the fact that sound is never heard before the visible event in nature.

First, it is important to remember that 'real-world' sound is often out of sync to the observer. Light moves obscenely quickly while sound is positively sluggish in comparison, and if you watch a roofer hammering from 100 meters away the sound is disconnected from the image. So, at both ends of the process, shooting and projection, there is scope for static sync 'errors' due to distance. Film the roofer in close up with a long lens and record the sound from the camera position and the result is obviously unacceptable although technically in sync. Similarly, in a big cinema someone sitting at the back of the auditorium will hear the sound from the front speakers a frame or three later than the front row.

Film is shot with separate sound so there are two main problems, static and dynamic. In editing, the picture may be incorrectly positioned in relation to the sound or the sound may be running at a different speed resulting in a dynamic error. Judicious use of a clapper-board and meticulous logging, rubber numbering, etc. dealt with static errors in traditional film workflows while dynamic errors required calculation and time-stretching.

Digital video is a different matter. The camera is

often the sound recorder so you might think that the sound and picture would be in perfect sync. In practice, because of signal processing delays it is unsafe to assume that this is the case. That's only the beginning of the story. Each stage in the digital production chain can and frequently does introduce sync errors thanks to frame stores, video synchronisers, digital video effects, format convertors and the vision switcher itself, not to mention the transmission systems. Even more annoying is the fact that many of these delays are variable, especially in the case of vision switchers/mixers.

Then there are the displays. All LCD and plasma screens introduce video delay, HD ones more so and video projectors are similarly afflicted. I visited one regional production centre where, in the early days of all digital SD production, the only reliable method of checking sync on broadcast transmissions was an off-air monitor. For months, programmes were frequently miles out of sync on transmission until they finally found solutions.

As an axiom for sync, 'When in doubt make the audio late' has a lot to commend it.

HD makes it even easier for the viewer to perceive sync errors. The EBU and SMPTE have tightened up their recommended 'in-production' tolerances to 5mS early and up to 15mS late for each stage in the chain. A number of clever and complex solutions have been proposed and developed over the years, many involving embedded metadata. However, these can cause more problems if marks are incorrectly applied or correction is made without altering the metadata. In truth, the simplest devices are likely to produce the best results. The clapper-board is still with us as is the flash frame and blip on VT Clocks. These help deal with detecting production sync deviation but something else is needed to check displays.

John Emmett of Broadcast Project Research has produced a compact and ingenious device called 'Smartlips' to do the job. As a bonus it also has a sound-level meter covering 60 to 130dBA and dBC (slow) and a photometer reading from 0-1999 Candelas per m2 (nits) for display luminance set-up.

Smartlips is a neat and compact pocketable unit powered by a couple of AA batteries. There is only one button on the membrane front panel, six indicator LEDs and a three-digit LCD numeric display. One press switches the unit on in photometer mode, the next switches to the C-weighted sound level meter. A third press gives you A-weighting and a fourth

takes you to the A/V sync check mode, one more turns Smartlips off. (There is also auto-power off if you leave it on)

I had the complete UK£722 (+ VAT) Smartlips kit including the Smartlips Sync Generator and the excellent TSG (Test Signal Generator) DVD. Produced in association with the ITFC, this includes a raft of 625-line video test material, including a zone plate, with multichannel audio tests in Dolby Digital and DTS formats.

Smartlips Sync Generator is another compact hand-held unit with just an on/off switch. It produces a regular Peak Luminance flash of over 1k Cd per sqm on the integral screen and a synchronous 80dB SPL 2kHz audio blip. The extra cost SC version adds a 1kHz -10dB tone output on a 3.5mm stereo jack socket. Inserting a plug mutes the acoustic bleeper, and it comes with a phantom-power safe XLR microphone adapter. Used on location it can serve as a Rosetta Stone to establish sync from that point onwards.

Among the plethora of audio and video test signals on the TSG DVD there is one called 'AV Sync Check'. This is simply tone blips and full screen white flashes. I tried it out using a Toshiba domestic LCD TV and Panasonic LCD projector. With Smartlips set to AV Sync, one of two LEDs light to indicate whether the audio is early or late with a numeric display of the milliseconds.

The results were revealing. Via a SCART the sound was 30ms early and via component, 50ms. On the projector the advance was 60ms, one and a half frames in PAL land. Obviously, for any screen with pretensions to professional credentials, this is unacceptable and an audio delay must be inserted.

Smartlips does exactly what it sets out to do. It provides the tools required to set-up a screen and 5.1 monitoring system in the field, in one tiny unit. Used with the Sync Generator it is possible to analyse entire programme chains and each individual stage.

There are plenty of other audio level meters, photometers and even one or two sync analysers on the market but Smartlips gives you all three in one highly convenient package. ■

PROS	3-in-1; quick and ridiculously simple; compact.
CONS	Photometer has 10 degree acceptance angle so not a substitute for a 2 degree spotmeter; needs quiet to work at its best.

Contact
BROADCAST PROJECT RESEARCH, UK:
Website: www.bpr.org.uk