



## Drawmer M-Clock Plus & M-Clock Lite

We're at the stage where most users understand that they need some sort of clock in their setups even if they don't necessarily understand why they do. **ROB JAMES** explains the implications with reference to these two smart boxes from the North of England.

Along with the ubiquity of digital audio comes the risk of complacency. The basic principles are now sufficiently well understood such that most people involved in audio production are at least vaguely aware that some form of sample rate synchronisation between various bits of kit is a prerequisite. In the simplest form this can mean just a daisy chain with the first device providing the clock for all subsequent bits of kit. This can work well enough with domestic equipment and, indeed, where there is no provision for slaving to external sync, for example cheap flash recorders, CD players and many sound cards, the only alternative to this approach is to use a sample rate convertor/synchroniser on the input of the next device.

Every interface card, source and mixer has an

internal clock and it is often tempting to just use what is there without considering the effect this might be having on audio quality. It is reasonable to assume that most people will notice if there is a big sync problem since this usually gives rise to obvious and objectionable clicks. However, internal clock sources are frequently prone to jitter. If you consider the price of the entire item this should not be surprising. Internal Word clock generators are rarely specified to AES 11 Grade 1 — i.e. 1ppm accuracy — which really should be the minimum for serious work. Achieving such stability requires careful design, selection of components and good engineering, none of which comes cheap. In any event, once the number of devices increases to three or more and timecode and video are involved, something more robust is

a much better idea. Apart from clicks, the effects of using lesser-specified sync sources vary from subtle degradation of imaging to unpleasant granularity. Converter noise floor goes up and THD deteriorates (read: if you have ears, you'll hear it).

In most cases the obvious answer is to install a single point source for master sync. Ideally this will have multiple outputs and the option of a synchronised expander for yet more outputs. Following this approach enables every piece of suitably equipped audio kit to have its own, dedicated sync feed in a star topology. In bigger facilities and broadcast, the generator itself will be jam synced to a 'house' Word clock or video syncs source. For the seriously anal, keeping cable lengths similar and short is supposed to retain more of the inherent 'goodness' of a high quality clock

**M-CLOCK PLUS** — At the heart of the master clock generator are two temperature-compensated crystal oscillators running at 24.5760MHz and 22.6792MHz. The output of these is divided down to give the familiar 48kHz and 44.1kHz basic rates and their multiples up to 192kHz. Eight Word clock BNC outputs are provided on the rear panel together with two XLR and two phonos that supply AES 11 standard blank frame (DARS) in AES and SPDIF formats. Two further BNCs on the front panel are Word clock outputs 9&10. All outputs take the same sample rate. Two buttons increment and decrement the sample rate selection — 44.1kHz, 48kHz, 88kHz, 96kHz, 176kHz and 192kHz are the internally generated options along with Ext. If the last of these is selected then the choice made with the adjacent Ext Source button comes into play. The choice is between AES and Word clock with indicator LEDs and Lock LEDs. The Word clock input BNC and XLR are on the rear.



The other half of the unit offers two independent stereo channels of sample rate conversion. Sample rate convertor One and Two outputs are available on the rear panel in AES and SPDIF coaxial and there is also a Toslink optical SPDIF output. Note that this is not ADAT compatible. The SRC Inputs are available in the same formats as the outputs with SRC Two inputs on the rear while SRC One inputs are on the left of the front panel along with the controls for both convertors. Said controls are simply Input select and the choice of 16 or 24 bits. The outputs are all locked to either one of the internal clock generators or one of the external Word clock inputs — i.e. the same as the current Word clock outputs. Sample Rate Convertor Inputs with higher or lower rates are automatically converted to this rate.



**M-CLOCK-LITE** — In performance terms the DMS-4 gives nothing away to its big brother. The published performance figures are identical. It uses exactly the same clock generators and also offers a total of 10 BNC Word clock outputs, 8 on the rear panel and two on the front. The BNC Word clock input is on the rear. The front panel controls are reduced to a pair of increment, decrement frequency buttons with the same options as the DSM-5 and the addition of 352.8kHz and 384kHz DXD rates. Since there is only one external input there is no need for an input selector.

source. In reality this approach works very well with professional kit but there is the remaining problem of devices that cannot slave to external sync. The answer here is a synchroniser or sample rate convertor. An asynchronous SRC is the ideal since it can deal with asynchronous sources at the same sampling rate and can also convert between rates while removing

excessive jitter in both circumstances.

When Drawmer introduced the M-Clock DMS-1 in 2003 it addressed exactly these requirements. It was a 'one box' solution to two problems at a price within the reach of smaller studios as well as major facilities. The first subject of this article is the new UK£875 (+ VAT) M-Clock Plus, or DMS-5 to its friends. This

follows the same formula as the original M-Clock but adds some convenient and useful extras while removing a few other features at the same time.

The M-Clock Plus is a smart looking unit with flat alloy front panel, very bright LEDs and a 16-character blue LCD alphanumeric display set into the Drawmer logo.

Operation is ludicrously easy. The left-hand side of the front panel is concerned with the rate convertors and the right-hand side handles the clocks. All the front panel buttons are internally illuminated with additional status and indicator LEDs above relating to their function. Each rate convertor will take an asynchronous or different sample rate input stream and output it at the rate set by the generator. This brings us to the first major difference between the DMS-5 and its predecessor. The DMS-1 had four SRCs, this unit only has two. These convertors operate without drama, fuss or complex settings and sound excellent subjectively.

In the absence of very expensive digital measurement equipment it is impossible to verify the manufacturer's claims regarding stability and accuracy but a reasonable judgement can be made by just listening and comparing. My house sync generator is a Rosendahl Nanosyncs and I can't really say I noticed any audible difference, but it was a different story when I made a comparison with a sound card I-shall-not-name's internal generator. This time the change was subtle but audible and pretty easy to discern. If pushed, I would say the imaging was slightly superior and there might be a bit less midrange crunch.

It is worth pointing out that there are at least two approaches to dealing with external references. The simple version just takes the input, strips it from an AES stream if necessary, buffers it and uses it as the source for the distribution amplifier. The complex approach uses the external source as a reference for the clock generator's internal frequency synthesis. Here, if the block diagrams are to be believed, the former approach is used. The advantage with the more complex approach is probably of more benefit in multimedia and video studios. For example, with some generators you can give them a sniff of



some weird sampling rate and they will continue to 'flywheel' i.e. synthesise and output it exactly and for protracted periods, up to a year in some cases.

There are some omissions. This device is aimed squarely at music production so, although it can deal with and display the pull-ups and pull-downs associated with video and film production, when fed from an external source, it cannot generate them. There is no video sync provision, either generation or reference input. Also the Superclock option, i.e. 256x the nominal sync rate, while present on the DMS-1 is missing from the DMS-5. Superclock is commonly used with Digidesign equipment.

Turning to the baby of the family, the £545 (+VAT) M-Clock Lite, or DMS-4 if we are being informal, you will find that it offers exactly the same Grade 1 generator performance and adds the 352.8kHz and 384kHz rates used for DXD in SACD production by the Merging Technologies Pyramix workstation and others, but drops the sample rate convertors, the LCD

display and only has a Word clock input.

The M-Clock Plus does everything you would expect. The addition of external sync reference inputs broaden its appeal and the +/-2ppm accuracy of the ppm and percentage pull-up/pull-down display options are useful and increase confidence. The M-Clock Lite scores over its big brother with extreme simplicity of operation and the inclusion of the two extra rates it offers. Performance is not compromised.

Much the same comments apply to both units. The quality is high and operation is simple. Ten BNC outputs should be plenty for most people but if they are insufficient then Drawmer has the answer in the shape of the D-Clock distribution amplifier. High quality cables and connectors are a must. There is no point in spending the time and money installing a proper studio master clock if you use wet string for the interconnects. The Plus has the not inconsiderable bonus of SRCs and some ability to cope with external references, but if video is part of your daily life you should probably look elsewhere. A wide choice of master sync generators is now available with widely varying feature sets. Surprisingly few of these use AES grade one standard crystal generators and those that do tend to be expensive. Drawmer is offering the required stability at something of a bargain price. If you major on music, the M-Clocks will provide a firm basis for your studio at a sensible price. ■

**PROS** Cost effective; simple to use; accurate.

**CONS** No Superclock; no pull-up or pull-down from internal generator; no flywheel.

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