Rosendahl Nanoclocks GL

If you're working with lots of digital then you should be finding out about a clock; if your work also includes video then you're probably already on the case. ROB JAMES **introduces a genlock audio masterclock.**

By now, anyone using digital audio devices ought to be aware of the importance of accurate clocking and that when digital video is also involved the plot thickens. German manufacturer Rosendahl Studiotechnik is no stranger to the design and manufacturer of digital audio master clocks. To declare an interest, I have a Rosendahl Nanosyncs audio clock and video reference generator sitting in my rack and it has been there for well over a decade.

Nanoclocks GL is remarkably compact and cased in steel the front panel is alloy. The unit is 1U but only 355mm wide and 110mm deep (excluding the BNC connectors). Rack ears fastened with hex bolts are included and these extend it to the full 19-inch rack width. Screw-on removable feet are also supplied for standalone use. BNC connectors dominate the rear panel — A & B inputs are separated from the 12 Word clock/AES11 DARS (Digital Audio Reference Signal) outputs by a USB type B, device class compliant socket, for firmware updates and MIDI control. At the far right, a four-pin XLR accepts 12V power and an IEC receptacle mains power. All the BNCs expect 75Ohm coaxial cabling (RG59); sources and destinations should be tied down to the same ground potential. With proper grounding 50m cables will not pose a problem. Correct termination is important to avoid unwanted reflections and this is more important at higher frequencies. Nanoclocks GL uses a conventional transformer in its power supply, albeit with a switching regulator, and a consequence of this approach is that there is a voltage setting switch on the left-hand side of the unit, which gives the choice of 115VAC or 230VAC. Power consumption is a miserly 7 watts, ideal for a box likely to be left powered up continually. Also, as befits a mission critical device, there is the possibility of redundant powering via the 4-pin XLR which provides for 12V DC powering. If this is fed from an independent power source and the mains supply fails, then switchover is automatic and seamless.

Front panel controls are divided into four sections — System, Reference, Sample Rate and Connection Status and Output Mode. The power button lights green when mains powered and red if the source

is 12V DC, if the DC voltage falls below 10.6V the button blinks — the primary power is mains. All three buttons in the System section must be held down for three seconds to operate, On/Off, Setup and Save. When Save is activated in this way the current settings are saved to non-volatile memory. In the Reference section four buttons select the four reference modes — Internal, Video, Audio and Distribution Amp. Underneath these, A and B buttons select the reference source in appropriate modes with Auto as the third choice; in Auto mode input A is the default. This can be used to provide redundancy with automatic switchover if one of the reference signals is lost.

The centre section has six big buttons for 44.1kHz, 48kHz, 88.2kHz, 96kHz Vari and -0.1%. When the reference mode is internal the buttons select the sample rate; the relevant button(s) blink until a stable lock is achieved. With external video or audio references the appropriate sample rate button lights when the unit is locked to the selected reference input signal and if no valid source is present the relevant input button blinks. If Vari is lit the sample rate is non-standard.

The final section has 12 buttons that display the termination status of each output and set the output mode — Status and Mode buttons toggle between termination and mode setting. None of the settings can be changed until the Nanoclocks GL is in Setup mode, entered by pressing Setup for three seconds until the button lights red. If you attempt to change a setting when not in Setup mode the Setup button lights while the parameter button is pressed to indicate that Setup mode is required to change the setting. Status shows 75Ohm terminated as green, double terminated as red, and unterminated as unlit. Similarly in Mode, Word clock output is green, AES DARS is red, and User is unlit. In the first firmware version User mutes the output; In version 2 it will be possible to configure each output individually as 2x, 4x SPDIF and other output modes using the Nanoclocks GL setup software via USB.

There are four possible reference modes for the 12 outputs. Internal uses a built-in 2ppm TCXO (Temperature Compensated Crystal Oscillator) as the clock reference source. Video locks the crystal oscillators to external SD video syncs at 23.98, 24,

25 (PAL) or 29.97 (NTSC) fps or HD trilevel syncs at 23.98, 24, 25, 29.97, 50, 59.97 or 60fps. All SD/HD video frame rates and standards are detected automatically. Wherever possible, the audio clock outputs are also phase locked to video v-syncs (this requires a whole-number proportional relationship between sample rate and frame rate). When the reference source is set to Audio the crystal oscillators synchronise to the external Word clock or AES-11 DARS inputs. The 44.1, 48, 88.2, 96kHz and -0.1% pulldown sample rates are followed automatically — lock range is +/-50ppm.

Input signals are used only as a reference for the internal crystal clock generators so output clock quality is not affected by jitter-laden incoming signals. In the final scenario, Distribute, the Nanoclocks GL simply distributes the chosen input to the outputs. Sample rates are detected and displayed. The outputs are switched to Word clock or AES11 levels automatically depending on the current input signal. This mode can also accommodate distribution of all Word clock/AES11 signals at non-standard sample rates, e.g. 50kHz.

Rosendahl has eschewed the use of direct digital synthesis or PLL (Phase Locked Loop) for the standard audio clocks, choosing instead to use 'vintage technology' i.e. VCXOs (Voltage Controlled Crystal Oscillators) to generate them directly. Rosendahl says this technique offers the purest clock quality with the lowest phase noise. -0.1% pulldown sample rates are generated using fractional division and a very high frequency PLL circuit.

Nanoclocks GL is aimed squarely at video environments as is evidenced by the AES 11 BNC connectors. If balanced AES 11 connections are required Rosendahl recommends using the appropriate Neutrik audio impedance transformers.

This unit covers the bases well. It is clear and simple to use and does exactly what is expected. In some scenarios it will just sit in a rack, powered up 24/7 and do whatever it is set up to do. In others it will be used as a versatile source of syncs to suit the job in hand. If you need an audio clock generator/distributor for use in a video environment Nanoclocks GL must be on your list. ∎

PROS Robust reliable technology; simplicity in use; very low power consumption.

CONS The LEDS are a bit bright; not a lot else.

EXTRAS Digital audio workstations as well as lighting and show control software use MTC MIDI timecode for synchronisation. The mif4 provides professional interfacing to standard LTC (SMPTE) timecode while Rosendahl sync algorithms suppress timecode jitter and drop outs.

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