

Korg MR-1 + MR-1000

Korg is expanding its portable recorder range, aiming at the location recordist — these two can even record in 1-bit if you want them to. ROB JAMES takes them away...

ALTHOUGH IT WON'T happen tomorrow or even in the next few months, there is an interesting battle brewing that could develop into yet another format war — and these two new products from Korg may well come to be seen as the Trojan horse of one faction. I am of course referring to PCM multi-bit versus one-bit recording. You might be under the impression that this contest has already been decided, since SACD has singularly failed to make a serious impression on the mass market. However, there is more to 1-bit than just SACD.

The notion behind 1-bit signal processing first appeared in the 1940s. In the mid 1970s, Dr Yoshio Yamasaki proposed practical applications for audio. First developed in the late 1980s at Waseda University in Japan, the 1-bit process was patented in 1992. The technology was later licensed to Sony/Philips with the first SACD machines appearing in 1999. Mainly due to marketing stupidity and an obsession with copy protection SACD has not succeeded in setting the world on fire and replacing CD. (It could also have something to do with the fact that in real-world conditions the majority of people cannot tell the difference and care more about the convenience of MP3 than they do about quality, although independent record labels are still pushing SACD, so there is some life in the old dog yet.) Sonic Studio is now responsible for future development of DSD and SACD having bought the entire portfolio of products and services from Philips subsidiary, ProTECH. Ignoring SACD for a moment, 1-bit techniques are far from dead. However, one barrier to widening the debate has been the cost of suitable origination recorders.

Korg has changed all that at a stroke with the release of two new portable stereo machines. The £424.68 MR-1 and the £765.11 MR-1000 (both + VAT) bring 1-bit origination and mastering within the grasp of anyone who is likely to be interested. To help introduce the idea to a wider audience, Korg has published a document rather optimistically titled *Future Proof Recording Explained*, which sets out the case for 1-bit in some detail. 1-bit is supposed to overcome many of the limitations imposed by multi-bit. For example, if the sample rate is sufficiently high (5.6448MHz: twice the rate used in SACD), noise problems can be mitigated and there is no longer the need for steep filters. D-A conversion can be carried out with a simple low-pass analogue filter. The upshot is that Korg is able to demonstrate some very impressive square wave results. Perhaps unsurprisingly, the document does not explore the downsides of 1-bit, such as the problems of increased distortion. Nonetheless, it is a good read.

Despite all the hype, 1-bit has a load of technical problems to overcome, as does multi-bit. I do not pretend to understand the maths involved in any of this and I am certainly not going to get into it here. Whatever the truth of the claims and counterclaims 1-bit is certainly one possible technique for making very high-quality audio recordings. The question is how to mix and manipulate them. It is possible to edit 1-bit recordings in their native format, but that is the limit. Any mixing or change in level, EQ or dynamics results in more than one bit and requires dithering.

Therefore processing must currently be done in either the analogue or multi-bit domains. For SACD, Sony and Philips acknowledged a new recording and editing format suitable for the purpose called Digital eXtreme Definition or DXD. This is defined as a 24-bit signal sampled at 352.8kHz. However, only a few workstations can use DXD.

Korg's solution is the inclusion of a free piece of software for PC and Mac named AudioGate. The software can only be run if you have an MR-series recorder which acts as a giant dongle, at least on the first occasion the software is run. AudioGate allows 1-bit files from Korg recorders to be auditioned and/or converted to WAV, BWF or AIFF formats at sample rates up to 192kHz at bit depths of 16, 24 or 32-bit (float). It will also convert in the opposite direction to either 2.8MHz (64fs) or 5.6MHz (128fs) 1-bit. The software installs without problems and is easy to use. The only caveat is that it requires a fairly powerful processor to play back 1-bit recordings in real time. (A 1.8GHz P4 couldn't hack it, although this does not affect the non-real-time transcoding process.)

The recorders have a lot in common, as you might expect. The monochrome backlit displays are identical. The backlight isn't especially bright but due to the contrast the display remains visible in bright sunlight. Both recorders use the Burr-Brown PCM4202 for A-D conversion, and the Cirrus Logic CS4398 for D-A conversion.

As something of a 1-bit sceptic, I was rather unenthusiastic before I got my hands on these machines, but found them much more impressive in use. The only significant omission is the absence of any digital I-O, but given their intended purpose as location recorders, with the idea being that you transfer the files to a DAW for postproduction, this is not a showstopper. If you work in multi-bit the AudioGate software will convert back to 1-bit or if you want to mix in analogue the final mix can be recorded back onto the Korg.

Of the two, I actually prefer the baby, the MR-1; it could finally be a suitable replacement for the legendary recording Sony Walkman. Partnered with a couple of decent mics (probably costing double the price of the MR-1) and an in-line powering and bass-cut module, I think you would have a very serious stereo recording set-up indeed.

MR-1

The most obvious application I can see for this one is high-quality bootlegs! Seriously though, looking like a fat iPod and with similar construction it is light and portable and will be ideally suited to wildlife recording or indeed anything that needs a light and compact high-quality recording package. Strangely there is no belt clip on the smart leather case. The mic included isn't wonderful, but I've heard a lot worse. It uses the 'plug-in power' standard and there is a small slide switch on top of the MR-1 to turn this on. Predictably, it is badly affected by wind (*Aren't we all. Ed*), highlighting the absence of bass cut on either mic or recorder, and it also sounds a little harsh. The supplied mic stand adapter is reminiscent of an RSJ (Rolled Steel Joist that is!) and seems much too butch for the tiny mic.

Although there is no limiter available in manual mode, there is an AGC/automatic record level mode if you select it. This has useful independent settings for threshold and slope of both gain increase and decrease. This is a vast improvement over the usual 'one size fits all' AGC switch. In manual mode, the gain range is vast: -95.5dB to +31.5dB. There are three DSD filter options for the on-board D-A converters. All adjustments and menu navigation are made using the so-called P-dial, a combined encoder wheel and switch. Annoyingly, there is no way to link the left and right gain when making manual adjustments. Transport controls below the LCD screen are small but positive. Power for the MR-1 comes from a built-in LiPol battery pack or from the in-line mains adapter. You get between two and two and a half





hours' depending on the record format. Power-saving features, such as adjustable timed auto-shutdown, backlight off and record LED off are available in the System menu. If battery life is a real concern it shouldn't be too difficult to sort out external battery packs. Markers can be added during recording or playback by simply pressing the record button. The power switch is a sliding button that must be held for two seconds or so to initiate shutdown. Sliding the switch in the opposite direction to Hold locks out the various buttons and the P-dial to prevent inadvertent changes. The recording medium is a 20Gb hard drive; at 44.1kHz, you get 90 minutes per gigabyte, and at the other extreme, the 1-bit 64fs formats provide 22 minutes' recording time per Gb. The maximum file size for a single recording is 4Gb. Audio connections are on 3.5mm jacks, balanced in the case of the inputs, with a mic-line switch, and the USB 2.0 socket is the common mini version. The machine appears as a conventional USB mass-storage device.

Despite its diminutive size the MR-1 packs a lot of power and features, many of which you'll probably never use. For example, a number of play modes available would seem better suited to an MP3 player and include playlists and a Shuffle mode. However, the menu system is intuitive, and I was able to make my first recordings without recourse to the comprehensive manual.

Niggles aside, this is a surprisingly good little device. On a purely subjective level the analogue circuitry and the converters are a lot better than the price implies. With a decent microphone this is far from a toy. Thanks to its WAV recording options, the MR-1 is still well worthy of consideration as a high-quality pocket digital recorder, even if you have no interest in 1-bit recording.

PROS Low price for what it offers; easy to use; the results.

CONS Fixed rechargeable battery; no L-R gain linking and no limiter in manual mode; the mic supplied isn't great.

MR-1000

As the more grown-up sibling, the MR-1000 is much larger although still reasonably compact. This time the carrying case is nylon and well thought-out with Velcro flaps in all the right places and a capacious pocket for all your odds and ends. A shoulder strap is supplied.

Most of the menu entries and navigation are exactly the same as the MR-1. The main casing is a smart alloy extrusion with end mouldings that look like alloy but are actually plastic. More to the point, the battery compartment cover is also plastic and rather flimsy, especially the catch. This seems to be a disappointing common factor among reasonably priced recorders and while the MR-1000 isn't the worst offender by any means this really should be improved for the few pence it would cost. Eight AA-sized batteries are required. Alkaline, the new Oxyride (Oxy-Nickel-Hydroxide) or NiMh. Assuming you use high-capacity versions, any of these should be good for around four hours' operation, depending on the chosen record format. Incidentally, the MR-1000 has three extra record modes, the 128fs 5.6MHz 1-bit variant and multi-bit at 176.4kHz and 192kHz. Inputs are Combi XLR/jacks and there are switches for high/low gain, phantom power and limiter. Both XLR and phono analogue outputs are provided, and the USB connector is a full-size B type. Record gain is on a pair of concentric pots with the phones level just below. Although the gain range is not quite as extensive as that of the MR-1 it is still more than adequate and wider than many others. However, the headphone output level could be more generous. Record level control is manual-only, as befits a more professionally oriented machine, and there is a switched limiter, although the parameters are fixed and it can be a bit brutal. The front-panel transport controls and P-dial are all sensibly sized and very positive in operation. 1-bit 5.6Mhz chews through hard disk space at a rate of 1Gb every 11 minutes so it is just as well that the MR-1000 hard drive is double the size of the MR-1 at 40Gb.

Like its little brother, the MR-1000 is a pleasant

surprise. As a stereo acquisition recorder, whether in 1-bit or PCM modes, it has a lot going for it. It feels fairly substantial and, with the exception of the battery compartment cover, it's well up to careful professional use. In operation, it is commendably simple and while it may have a lot of options you'll never use, they don't get in the way. If you're shopping for a no-frills stereo recorder and like the idea of 1-bit recording as a bonus, check it out. ■

PROS Low price; good performance; 1-bit if you need or want it.

CONS No limiter adjustments; battery compartment lid flimsy; headphone output a bit weedy.

Contact

KORG, JAPAN:
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Formats

Both recorders can record in PCM as well as 1-bit.

The supported formats are as follows: **MULTI-BIT:** 16 or 24-bit WAV (BWF) at 44.1 or 48kHz; 24-bit WAV (BWF) at 88.2 or 96kHz; 24-bit WAV (BWF) at 176.4 or 192kHz (MR-1000 only). **1-BIT:** 2.8MHz (64fs) (MR-1); 2.8MHz (64fs) or 5.6MHz (128fs) (MR-1000); **DSDIFF** (Direct Stream Digital Interchange File Format). The original DSD production format widely used for SACD production. **DSF (DSD STREAM FILE):** A Direct Stream Digital, DSD file format supported by some Sony VAIO PCs (models with the Sound Reality engine). This format is supported by software such as SonicStage Mastering Studio and DSD Direct. **WSD (WIDEBAND SINGLE-BIT DATA):** A 1-bit audio file format created by the 1-bit Audio Consortium. It can accommodate all formats of 1-bit audio data without a limit on the number of channels or sample rate. Sharp, Pioneer and Waseda University established the 1-bit Audio Consortium in 2001. It currently lists more than 60 members.