



iZ Technology RADAR 24 Multitrack Recorder

Reviews : Multitrack Recorder

Published in SOS August 2001
Print article : [Close window](#)

The new third-generation RADAR hard disk recorder is the most affordable version yet, and offers 24-bit recording over 24 tracks at sampling rates of up to 192kHz. **Hugh Robjohns** puts it through its paces.

When digital audio recording was still in its spotty adolescence, the only viable 24-track recorders were open-reel digital tape machines such as the Sony PCM3324. Until Otari's Random Access Digital Audio Recorder (RADAR) arrived, that is. At a time when even eight tracks replayed off a single drive was a very big deal, the RADAR became the first dedicated digital 24-track to employ hard drives, and was hailed as one of the best-sounding machines of the time. While computer-based hard disk audio recorders were already well established, none had a significant market in music recording studios, being generally geared up for post-production and mastering applications.

The RADAR quickly established a reputation for excellence, and a good many top studios and musicians invested in the format, even though it cost in the region of £20,000 at the time. Many of these customers were doubtless won over by the familiar tape machine-style ergonomics and the compact physical size. However, the audio editing capabilities which were provided were also a big point in the machine's favour — powerful enough to allow the typical moving and copying operations normally required in the studio, but simple enough to present no serious learning curve.

Today, the sector of the market originally dominated by the RADAR is a very competitive one, with the likes of Tascam's MX2424 and Mackie's HDR24/96 fighting tooth and claw at the lower end of the price scale, while the Euphonix R1 redefines the high ground. Therefore, the RADAR's newest incarnation, the iZ Technology RADAR 24, has been priced ruthlessly in order to retain its market-leading position.



RADAR 24

The RADAR 24 is contained in a 4U rackmounting case, which houses a PC hardware platform running a BeOS operating system with proprietary analogue and digital I/O facilities. The machine is fan cooled and, given the fans and hard drives, is far too noisy to be used in the same room as the recording microphones. Personally, I found it too noisy to be a happy companion in the monitoring room either, and would suggest it is best located in a soundproofed machine room. However, I suspect many users will tolerate the noise, as it is not substantially worse than many equivalent desktop PC or Mac computers.

IZ TECHNOLOGY RADAR 24 £4694

pros

- Can be used with or without an SVGA monitor.
- Basic but effective editing facilities.
- Custom I/O configurations.
- Excellent analogue converters.
- Attractive Price.

cons

- Noisy drives.

The front panel of the machine carries a mains power switch, a floppy disk drive (principally for software updates), and two 5.25-inch drive bays configured, by default, with one 9Gb hard drive and a double-speed 9.2Gb DVD-RAM backup drive. The rear panel is festooned with connectors including six 25-way D-Sub connectors for the optional analogue I/O, three more for the standard TDIF digital I/O and another for a parallel port interface. A number of smaller D-sub connectors are incorporated on PC-style interchangeable back plates and these interface with the remote control and RADAR Link (see below) facilities, as well as providing a standard SVGA monitor output port and SCSI connector (complete with active terminator). The RADAR Link facility is a bespoke protocol allowing multiple machines to be operated as if they were a single unit. Other options which may be installed here include Sony nine-pin remote control interfaces and USB ports.

The chassis carries dedicated XLR connectors for SMPTE input and output, a trio of MIDI sockets for MIDI timecode and machine control, XLR and phono sockets for AES3 and S/PDIF I/O, plus BNC connectors for video and word clock sync (though the word clock options were blanked off on the review machine). A

standard PC keyboard socket can be provided alongside the DC outlet which powers the remote panel. Mains inlet is via an IEC socket, and a pair of binding posts link the chassis and analogue signal grounds.

The standard 9Gb removable hard drive affords around 45 minutes of continuous 24-track recording at 24-bit/48kHz. Of course, larger and/or additional drives can also be employed — for example, 18Gb Barracuda, 9 and 18Gb Cheetah, and 36Gb Ultrastar drives are all 'iZ-Corp approved'. The standard backup medium is now DVD-RAM, although Eliant 820S or Mammoth tape drives may also be installed for compatibility with the previous generations of RADAR.

If the TDIF I/O connections are not appropriate, 24 channels of AES3 or ADAT optical interfacing can be fitted instead. There is also a choice of three types of analogue converters: the Classic board is the same as that employed by the RADAR II (which has enjoyed widespread acclaim for its sound quality) and offers a maximum 48kHz sampling rate at 24-bit resolution. The Nyquist board is available in two flavours, providing either 24-bit/96kHz or 24-bit/192kHz as maximum sampling rates (the latter known as the S-Nyquist board), and both claim slightly improved specs over the Classic board. With the S-Nyquist board, the RADAR 24 is the first hard disk multitrack to offer a 192kHz sampling frequency.

Although the converters are all capable of 24-bit recording, the RADAR 24 allows recording at 16-bit, if required, and all the standard sampling and timecode rates are supported. The machine is even capable of varispeed, although this is only really of any use when connecting via the analogue interfaces — unless you happen to have a digital console with sample rate converters on every input. In 44.1kHz mode the varispeed range is roughly +12 to -38 percent, whereas in 48kHz mode it spans +3 and -44 percent.

The standard SVGA monitor output provides a useful multichannel waveform display, zoomable in both time and amplitude, and offers a great deal of other useful information including current and locator times, various configuration settings, track names and even repeated bar-graph metering. There is apparently an Enhanced Open Graphics option in the pipeline, though this was not yet available for this review — it will be designed to extend the quality and speed of the monitor feed with an updated processor, more memory and an AGP graphics card. However, as all functions are available without a monitor, there's also nothing stopping you from using the RADAR 24 on its own.

Remote Control

Although a fairly standard keyboard is provided with the RADAR 24 base model, the majority of users will probably opt for the dedicated remote control. This is a familiar-looking machine controller with three main groups of buttons performing specific operational functions, 48 track arming buttons, and a small two-line LCD display. Separate numeric keys, QWERTY keyboard, transport buttons, and a jog/shuttle wheel complete the facilities. One of two meter bridges can be fixed to the rear of the controller, offering 24 or 48 channels.

For the record, iZ Technology are apparently also in the process of making a 48-track RADAR 48, which will be conceptually very similar to its smaller sibling. Its increased capacity will require a double-height rack frame to house its pair of hard drives and the doubled-up digital and analogue I/O facilities. However, the entire machine operation, remote controllers, meterbridge and video monitor facilities are to be identical.



Apart from the basic transport operations, the RADAR is a menu-driven machine with all of the customisable functions and lesser-used operations being accessed in a number of hierarchical menus displayed on the LCD panel of the controller. This is not as cumbersome as it sounds, however, as most of the commonly used menu options are also accessible directly from dedicated keys on the remote controller. The five main menus are accessed, logically enough, by pressing the Menu/Prev button followed by the cursor buttons to find the appropriate page: System, Project, Edit, Preferences, Diagnostic, and Shutdown. I think these are all fairly self-explanatory, and the facilities found in each sub-menu are totally predictable — I certainly found navigation largely intuitive. The Enter button is used to access the sub-pages of a particular menu section and the cursor keys or the jog/shuttle wheel select parameters and alter their values. To exit a submenu, the Menu/Prev key is pressed once again.

Setting Up

Rigging the RADAR is straightforward, simply requiring the remote control to be hooked up to the main frame (a D-Sub connector and the coaxial power plug), and the meter bridge to be linked to the Controller (more D-Subs). With mains plugged in, the machine is ready to go — although hooking up an SVGA monitor helps to boost confidence that all is well. The machine powers up fairly rapidly, seeking and mounting all connected audio drives automatically.

As with many hard disk recorders, there is a prescribed shutting-down procedure. Here it involves a lot of button pushing to get to the appropriate menu command, but at least it ensures everything is properly saved and that the temporary working files are removed

The RADAR Family Tree

The original RADAR was developed by a Canadian company called Creation and launched in 1994 as the world's first 24-track digital audio hard disk recorder. This pioneering machine — as well as its second generation version, the RADAR II — was distributed and badged by the Otari Corporation for

appropriately to avoid fragmenting the disks.

For anyone interested in using the RADAR in conjunction with an analogue desk (and plenty of engineers do just that) the analogue reference level is user-adjustable between +18 and +24dBu, providing headroom above a nominal +4dBu operating level of between 14 and 20dB respectively. On the other hand, if you're working with a digital desk, then you'll have to set up the required menu options for whichever digital interface you're using. This is perhaps the least intuitive element of the RADAR 24's otherwise logical operating system. I managed to turn out an excellent rendition of that well-known hit album, *The World's Best Aliasing Noises... Ever!*, before a quick rummage in the manual got me back on the straight and narrow...

With audio plugged and the machine configured correctly, the process of recording is entirely obvious and completely familiar — so much so that anyone used to working with tape-based multitrack recorders would very quickly feel completely at home with the RADAR. All the normal functions work exactly as expected: transport controls, auto-location, looping, manual or automated drop-ins, and track monitoring. The Record button can be conveniently configured either to engage recording when pressed on its own, or only to do so when pressed with the Play button. Furthermore, the machine can be record armed by pressing the Play and Record buttons, with individual tracks then being dropped in and out with their track arming buttons — all pretty standard stuff.

The remote control's wheel has two operating modes, Jog and Shuttle, which are selected from a neighbouring button. The Jog mode provides an excellent audio scrub facility, enabling precise edit points to be found by ear with the greatest of ease. In fact, I often found myself using this more traditional technique in preference to using the waveform display on the monitor. The only criticism I would raise is that having located an edit point, winding on a few seconds and back again, by way of confirmation, always brought the wheel to a different position. Scrubbing open-reel tapes against the head never suffered from that sort of ambiguity and I think a software update should be implemented to cure this failing in an otherwise exemplary transport. The Shuttle mode permits rapid or slow-motion audio searches.

Locate points can be loaded and edited manually by entering timecode values from the numeric keypad, or they can be loaded on the fly by hitting the Mark Loc button during playback. Additionally, there are two dedicated locate memories for loops and automatic drop-ins, labelled Mark In and Mark Out. Recalling a locate memory causes the playback point to jump instantly to that point, and if the Auto Play button is engaged, it will also enter playback. Pre-roll and post-roll times around automatic drop-in points can also be programmed.

Driving the RADAR 24 was child's play, and I found I was very quickly able to concentrate on the creativity of recording rather than the mechanics of it. The machine is immediate and consistent in its response to commands, encouraging total confidence. Anyone used to handling analogue or digital multitracks from a remote controller will assimilate the RADAR's operation in very short order.

Editing Facilities

While editing two-inch multitrack tape was certainly possible, and many great records have been compiled this way, I think most engineers preferred to edit the mix-downs or transfer material to Pro Tools or other similar systems for any serious audio juggling. However, the RADAR 24 incorporates a comprehensive set of editing functions which allow much more creativity than would be expected of analogue tape. The facilities, including cut, copy, paste, move, erase, slide, loop and reverse paste functions, can be applied on a per-track basis if required. All edits and drop-ins are performed with a programmable crossfade to avoid clicks — 5mS by default, but adjustable between 0 and 100mS.

Although editing can be controlled very easily from the remote control and its LCD menus alone, especially given the superb audio scrubbing, the VGA screen does make life easier and minimises the potential for error. Being able to zoom into single tracks, and to expand the time resolution, is a great aid to accurate editing. Copying sections of a multitrack — whether a complete chorus, or just a particularly inspiring bass line (*à la* Paul Simon) — is a very powerful tool which permits useful experimentation in the sequencing and structure of recordings, especially as the RADAR 24 can undo the most recent edit if you're not happy with it. Most of the technical limitations — a professional DAW would normally offer a choice of crossfades, for example — are largely

over six years. During this time, Creation grew to be a \$100 million entity in the custom electronics manufacturing market and, in early 2000, Creation's board of directors decided that the interests of the custom electronics business and the audio business would best be served by them becoming separate companies. The audio division was subsequently acquired by Barry Henderson (founder of Creation) and the employee group that had originally developed RADAR, and the iZ Technology Corporation was born.

Otari's distribution license for new RADAR machines expired last year, though Otari are continuing to market both the RADAR and RADAR II and to support customers of these original machines with software updates and so forth. As a result iZ Technology have chosen to market the new third-generation RADAR incarnations themselves, and it is partly for this reason that they are able to offer the machine now at a much lower price.

RADAR Hall Of Fame

There are literally thousands of RADARs in use in recording studios world-wide, and iZ Technology claim that more hit songs have been recorded on RADAR than on any other 24-track hard disk recorder. Of course, until fairly recently you could count the competing products on the digits of a three-toed sloth... without it losing hold of the tree! Nevertheless, many international artists have produced hits with the RADAR, including Celine Dion, Stevie Wonder, Backstreet Boys, Sarah McLachlan, Eric Clapton, Elton John, Luciano Pavarotti, Paul McCartney, Santana, Barbara Streisand, Garth Brooks, Shania Twain and countless others. The iZ Technology dedicated RADAR web site, www.recordingtheworld.com, contains a full list of users which makes for impressive reading.

irrelevant in this context and actually make the machine far faster to use.

RADAR 24 File Management

The RADAR 24 is very structured in terms of how audio files are stored and managed, much like a DAW. When the machine is first booted the most recently used Project is loaded automatically, or a default Project is created. Up to 99 totally independent projects can be stored simultaneously on a single hard drive, each having independent edit lists, locate points, timecode start times and synchronisation offsets. Incidentally, the system is quite happy if every project starts at 01:00:00:00, or some other house standard time.

The audio recorded on the hard drive is played back according to a particular project's edit list, which points the recorder towards those sections of files which should be played. Thus, if audio material is copied between projects via the audio clipboard facility, only the edit list is updated — no additional hard disk space is used. This also means that an original recording can be copied in its entirety to a new project and experimental editing performed without risking the original material at all. However, edit crossfades are rendered and rerecorded onto the hard drive so a small amount of additional space may be lost along the way. Computer users will be pleased to know that the RADAR stores its audio files in the PC WAV format, and it's possible to import WAV files for editing into a project, if you want.



As the edit list and audio are entirely separate physical entities, deleting one will not necessarily remove the other. By default, the machine engages an Auto Reclaim feature which automatically erases any audio material not used in the current project, thereby maximising disk capacity. Personally, I prefer a recorder to keep everything until I decide to delete unwanted material, but this mode is only a menu option away, if required. A manual reclaim process is also available for when the same audio is referenced by multiple projects, and this checks that only audio not employed in any edit list is removed.

With reel-to-reel recorders, archiving and restoring merely involved a trip to the tape library, but life is not quite so simple with hard disk recorders. While it is possible to swap hard drives, shelving projects on their own hard disk would require a substantial budget. A more practical approach is to backup audio and edit lists onto cheaper, removable media. Until recently, various forms of tape storage were the only option — very cheap but comparatively slow and not always reliable. However, the RADAR 24 capitalises on the DVD-RAM format to enable quick, efficient, and reliable backup. What's more, restoring single projects is much faster, as the DVD enables random access.

A variety of 'backup set' options are available, allowing you to archive all projects, all versions of the current project, only the current project, or any group of selected projects. When restoring, one or more complete backup sets have to be reloaded, so selecting the most appropriate backup strategy can make a significant difference to the speed of archiving and the flexibility of reloading projects.

iZ You iZ, Or iZ You Ain't?

I liked the RADAR 24 very much, and the audio quality was beyond reproach, either via the digital or analogue interfaces. After the odd initial frustration with the digital I/O, I became more and more impressed with this machine. Clearly, the RADAR does not have the flexibility of a full-blown DAW, but it was not designed to compete with the likes of Pro Tools. It is, however, a great deal cheaper, smaller and lighter than a full Pro Tools system, never mind the more comparable Sony PCM3324 reel-to-reel recorder.

The internal editing is simple, but sufficient, and easy to use quickly. In fact, the whole machine is fast in use and, although PC-based, the BeOS platform was rock solid — in a recording studio charging by the hour, that is very good news for everyone. Its overriding strength is that it is not overloaded with fancy functions which would clutter up the menus. Neither is the monitor a mass of miniature buttons, overly detailed waveform displays, and pop-up windows.

Although the RADAR 24 is not the cheapest of the stand-alone 24-track machines available here in the UK, it has had the benefit of a longer evolution, which I think shows in the ergonomic design of its control surfaces and menu structures. The noise of the fans and drives might be a concern if there is no way to put the unit in a separate room, but everything else about this machine is as near perfect as it gets. The RADAR 24 simply does what it says it will, with no glitches, no fuss, and no messing about.

information

Options & Pricing

- Radar 24 £4694.13. The basic unit with 18Gb drive, 24-channel TDIF interfacing, SMPTE connections and support for Sony nine-pin remote control.
- Session remote controller £1145.63
- 24-channel meterbridge £475.88
- 48-channel meterbridge £762.58
- HiCAP DVD backup drive £675.63
- Exabyte Eliant tape backup drive £1286.63

AUDIO I/O OPTIONS:

- Classic 24-channel 48kHz analogue I/O card, £1556.88
- Nyquist 24-channel 96kHz analogue I/O card, £2931.63
- S-Nyquist 24-channel 192kHz analogue I/O card, £1tc
- 24-channel AES-EBU digital I/O card, £951.75
- 24-channel TDIF digital I/O card, £475.88
- 24-channel ADAT lightpipe digital I/O card, £475.88.

All prices include VAT.

£ See 'Options & Pricing' box.

T Stirling Audio
+44 (0)20 7624 6000.

F +44 (0)20 7372 6370.

E [Click here to email](#)

W www.stirlingsyco.com
www.izcorp.com

Published in SOS August 2001

All contents copyright © SOS Publications Group and/or its licensors, 1985-2013. All rights reserved.

The contents of this article are subject to worldwide copyright protection and reproduction in whole or part, whether mechanical or electronic, is expressly forbidden without the prior written consent of the Publishers. Great care has been taken to ensure accuracy in the preparation of this article but neither Sound On Sound Limited nor the publishers can be held responsible for its contents. The views expressed are those of the contributors and not necessarily those of the publishers.

Web site designed & maintained by PB Associates | SOS | Relative Media