

Bench Test 2: Nailing the analogue coffin

DX-NT400 digital video recorder
Pioneering Mitsubishi continues to innovate

What our experts say ...

The transition from analogue to digital video recording continues apace with a growing number of new products arriving. It has been a fascinating process to observe and many first and second-generation recorders have come from companies with a background in computer technology. However in recent months there has been a shift of emphasis with more products from the mainstream time-lapse VCR manufacturers.

This is a most welcome development; over the past five or six years, since the first digital video recorders started appearing, we have often remarked on the awkward and sometimes downright unfriendly control and display systems of early DVRs, many of which appeared to have been designed by obviously talented computer experts, but with little or no insight into the needs of 'real world' surveillance video recorder users.

Mitsubishi has impeccable credentials in the time-lapse VCR market, indeed it was a pioneer and continues to innovate so it is no surprise that now it has turned its attention to small and medium scale digital video recorders and its wealth of experience clearly shows through.

The DX-NT400 illustrates the point neatly and anyone accustomed to tape-based video recorders should feel immediately at home with it. More importantly, installers and end users will not have to grapple with the steep learning curves involved in getting some digital video recording equipment up and running. That's not meant to suggest that the NT400 has a basic specification: it is a highly specified design with many advanced features. It is a hard-disk based video recorder with full duplex operation, able to simultaneously record and replay, plus it has a built-in four-channel multiplexer and quad display. It uses the highly efficient 'wavelet' compression scheme to record video at more than 450 lines of resolution at the highest quality and recording speed settings. Our sample was fitted with two 120Gb hard disk drives in a removable caddy and the system is capable of supporting up to four terabytes of storage.

In common with all digital recording systems recording times vary according to a number of factors including the number of cameras connected, the quality setting (the NT400 has four picture grades) and recording intervals (17 steps, between 0.031 to 25 pictures per second).

Unlike tape it's not possible to give definitive recording time figures but to give an idea of what it can do, with a single camera connected on the highest quality setting and fastest picture rate, 240Gb gives around two days of recording. This extends to a most impressive 2991 days on the lowest and slowest settings. It meets and comfortably exceeds the capabilities and performance levels of any current tape-based video recording system.

Additional facilities include single channel audio recording – comparatively rare on digital equipment – motion detection, pre-event alarm recording, timer operation, two-mode picture zoom, covert camera option and network operation, allowing images to be viewed remotely on a standard Internet browser, and the ability to send alarm or status messages by email.

Reassuringly simple

From the outside it looks reassuringly simple: there are no visible controls, apart from an illuminated power button and there are no displays other than a row of LEDs indicating recording mode and status. The front panel is dominated by the twin hard-disk caddy, which at a distance looks a bit like tape loading slot.

The caddy is protected by a key-lock on the right of the panel; it is removed by sliding a locking lever below the tray and the caddy can then be withdrawn. Drives can be easily fitted, removed or replaced in the caddy, which makes the system simple to upgrade and overcomes one of the shortcomings of many hard disk based recorders, namely being able to remove and transport recording media, albeit in this case only to another similarly equipped machine.

The absence of front panel controls is explained by a socket next to the power button, labelled 'Remote'. This is for a wired remote control keypad, which looks a lot like a VCR remote with keys for Stop, Pause, Record, forward and reverse Play and Picture Search. Additionally it has buttons for accessing and controlling the system's on-screen menus and secondary functions. It's all very straightforward and simple to use. There are no unpleasant surprises around the back, just a row of BNC sockets for the four camera inputs and monitor output, two phono sockets for the audio input and output, a standard IEC mains socket and master on/off switch. On the far right is an Ethernet socket, a nine-pin D-Sub socket for serial communications and a bank of spring terminals for the alarm connections. Sadly there are no video loop-throughs or separate video outputs, which would have added little to the cost but would have greatly improved the system's flexibility. As soon as the unit is switched on for the first time it goes into an automatic setup routine, asking the installer or user to select the appropriate menu language, set the time and date, recording duration (24 hours to one year), recording quality and picture rate. The setup concludes by initialising the blank hard disk and setting up separate partitions, if required, for archiving alarm recordings.

For basic operation it is only necessary to specify the recording interval and picture quality and these can be set individually for each camera. This and all other functions are accessible from the on-screen menus, which opens with six main selections: Time/Date and Display, Multiplex Display Settings, Motion Detection Settings, Record Settings, Timer Program Settings and Initial Setup/Information. Selections are made using a cluster of four buttons and an Enter key on the remote. At first glance it appears fairly straightforward but it's not as intuitive as it could be. The Time/Date menu has six sub menus covering time date adjust, display mode, display position, camera display, which includes the option to use a number or compose a title or on-screen memo or comment. The multiplexer menu has three selections, to change the position of the four cameras in a quad display, set camera sequence and dwell time and switch between an interlaced or non-interlaced video for the split-screen display (a non-interlaced display reduces flicker at the expense of resolution).

A 16 x 12 grid of movement sensor dots is used to activate an alarm or trigger archived alarm recording and this is configured on the Motion Detection menu, which has six options, for setting the detection mask, adjusting the sensitivity and threshold to avoid spurious triggering. There's also a test mode and a setting for the motion detector lock-out time, which helps prevent the machine from needlessly recording repetitive movements. The Record Settings menu has three selections, for setting internal or external alarm triggers for each camera, configuring the picture grade and recording intervals in both normal and alarm recording modes. It's also used to adjust the alarm recording interval, which extends from two seconds to 60 minutes in 13 steps.

Recording times are set using the Timer Program menu. Three patterns are available, each comprising eight program 'blocks' for specifying the days of the week start and stop times, recording mode and motion detection on/off. Additionally there are sub menus for setting up holiday recording times and alarm recording

duration. Finally, the Initial Setup menu contains sub-menus for managing data storage on the hard disk drive, switching audio recording on and off, setting up the alarm terminal, communications port (RS232 and Ethernet), accessing the machine's diagnostic and system logs, HDD data clear and factory reset options, passwords and menu language selection.

Recording and playback operations follow the same basic conventions as a tape-based video recorder, except that it can do both things at the same time. Pressing the forward or Reverse Play button brings up the playback screen, which can be in quad display or single camera format.

A percentage indicator shows the relative position of the recording in relation to the data recorded on the hard drive. A useful moving bargraph display also appears briefly – showing the relative position of the scene being replayed — though for some reason this disappears after a few seconds. It is also possible to search for a particular recording by time, date, index, alarm index or from the alarm list.

The picture zoom works on a single camera display in both record and replay modes. Pressing the Zoom button once superimposes a 'target' on the screen, which designates the part of the picture to be magnified; the target can be moved to any part of the screen using the four cursor buttons, when it is in position pressing the zoom button again magnifies the screen by 2x, pressing it a second time increases magnification to 4x; when in zoom mode the cursor buttons function like a simple pan/tilt control, changing the area of the picture being shown.

Fuss-free networking is a major innovation on a video recorder. In this case it is only necessary to connect the machine to a standard Ethernet hub (or a network-capable PC), open a standard Internet browser (Internet Explorer, Netscape etc), and enter the video recorder's IP address. The opening screen requests the user's ID and password and once entered a 'Welcome' screen appears with a choice of Live Monitor, Playback, User Maintenance, Time/Date adjust, Log Out and Change Login User options. The first time it is used the PC or workstation downloads a viewer utility, which takes just a few seconds after which it is possible to view live or recorded images or access some of the DVR's low-level functions. Images can be displayed single screen or in Quad format, with a choice of image sizes and data transfer rates; picture quality or grade can also be altered by right clicking on the image. The position of the images and the layout of the quad screen can also be modified. While the networking facility is a genuine advance it has a number of annoying short-comings. In the live monitor mode only the camera number can be displayed, there is no time, index, title or any other potentially useful information that is shown on the video monitor.

The layout of the live and playback screen leaves a lot to be desired and on most monitors the controls disappear off the bottom of the screen resulting in a lot of scrolling up and down. There is plenty of room on the page and the controls would have been a lot more accessible on the side of the screen.

Picture quality on a video monitor, using the top two picture grade settings, is as advertised with crisp, well-defined images, natural colours and an almost complete lack of picture noise so in that respect it performs as well as, and in most cases better than, most analogue VCRs.

What the manufacturer says ...

The DX-NT400E can accommodate up to 800Gb of hard disk recording space, using two 400Gb HDDs.

This model also has a unique HDD caddy, which is not only removable but also interchangeable, meaning that recordings can be removed and stored; this may be necessary if an incident occurs and images are required as evidence. The purchase of additional HDDs can provide the user with a long-term storage option.

This advanced yet easy to operate machine benefits from a built-in multiplexer that allows for up to four cameras to be connected. The built-in full duplex facility allows

for pictures from the attached cameras to be displayed live in various formats, or for recorded material to be searched and displayed without interrupting the recording process.

There are up to five selectable picture grades and nine recording time modes with up to 25 pictures per second per camera; this combined with various search facilities allows for a variety of monitoring levels.

The DX-NT400E also includes built-in motion detection, which allows the level of camera motion sensitivity to be individually adjusted and provides greater efficiency to maximise potential recording time. It also has full networking capability allowing for remote monitoring and control to be carried out through a networked PC.