24-Track 24-Bit Hard Disc Recorder/Editor MX-2424

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TASCAM

The TASCAM MX-2424™ is changing the world of recording forever

With the MX-2424™, TASCAM has again introduced a truly revolutionary recording product to make a profound impact on the way people capture music and sound. The fusion of audio and computing technologies makes high-end results achievable in every recording environment from the personal studio to the highest echelons of commercial facilities.

In one 4U box, the TASCAM MX-2424 by TimeLine™ offers sophisticated editing capabilities, compatibility with a wide variety of other systems, instantaneous random access and esoteric sonic fidelity. This highly advanced hard disc recorder/editor delivers 24 tracks of uncompressed 24-bit audio with awesome digital creative tools at a price within reach of every serious recordist.

highlights

24-tracks of 24-bit hard disc recording with internal 9.1GB hard drive (45 minutes record time).

Front panel 5.25" drive bay and rear panel Ultra 2 SCSI port so you can extend recording times with additional hard drives and backup or deliver with DVD-RAM or industry-standard removable hard drive systems.

Extensive audio editing tools accessed from the front panel or via a computer (software included).

Single sample-accurate multi-machine synchronisation of up to 32 MX-2424s without external sync devices. Built-in synchronisation tools: SMPTE, Word Clock, MIDI Machine Control, Video Sync.

999 virtual tracks per project for alternate takes and comps.

File format and drive compatibility for transfer to popular Mac and PC Digital Audio Workstation (DAW) applications.

2-channel AES/EBU and S/PDIF I/O for direct connection of digital devices. Optional I/O cards for 24 channels of 24-bit analogue, TDIF, ADAT® or multichannel AES/EBU.

Special high sampling rate mode for up to 12 tracks at 96kHz.

Ultimate sound quality

The MX-2424 lineage is impressive. 27 years of recording innovation plus the hard-disc engine from the Oscar® and Emmy award-winning MMR-8 Digital Dubber have led to the world's ultimate recording and editing tool: the TASCAM MX-2424.

TASCAM has a long track record of delivering the latest recording principles to home recordists and latterly to 'project studios'. This philosophy took a dramatic step forward when TASCAM DTRS delivered not only the principles but also the same technology and recording media. DTRS tapes quickly established a common currency through all levels of the world's music and film industries enabling unprecedented collaboration between artists and engineers across the world. Using the hard disc engine from the award-winning TASCAM MMR-8 Digital Dubber, the TASCAM MX-2424 goes further still by generating common currency 24-bit audio data that can be exchanged using any high capacity data storage media or computer network.

WHY ISN'T CD QUALITY GOOD ENOUGH?

The old benchmark 44.1kHz sampling rate was the result of science recognising that a sampling rate needed to be at least twice the value of the highest frequency sound we can hear: 20kHz. The trouble is, the making and enjoyment of music is not all science.

While we may not be able to hear beyond 20kHz, we are AWARE of far higher frequencies: these are the harmonics. Analogue audio retains harmonics which is why some engineers pursue the reduction of analogue noise in preference to the 'easy' route of losing noise with 16-bit, 44.1kHz digital audio — and losing the precious harmonics with it.

When the sampling rate is increased to 96kHz (96,000 samples per second) in conjunction with 24-bit resolution, the harmonics are captured. The sound is as smooth and warm as the finest analogue …with all the clarity and

editing advantages of the digital domain. 24-bit, 96kHz digital audio captures the upper-end harmonics characteristic of pianos, cymbals, acoustic guitars, vocals, strings, horns and even vintage analogue synthesisers.

SPACE: THE FINAL FRONTIER

The colossal amount of data required for this kind of high resolution audio would have been a problem to process, store and distribute even quite recently. But since the cost of large data storage and backup devices has fallen (storage capacity on hard discs and DVDs is measured in GigaBytes rather than MegaBytes) high resolution digital audio is affordable.

Just as media can handle GigaBytes of data, so the processing speeds of PCs used for digital audio workstations have exceeded 1GHz. The role of the TASCAM MX-2424 is to capture audio for processing with the best tools that the computing world makes available.

INCREDIBLE ANALOGUE CIRCUIT DESIGN

Of course, all those wonderful instruments mentioned earlier do not generate digital audio themselves! You will need the optional MX-2424 analogue input/output module to convert analogue music into digital data. The audio fidelity of the MX-2424 digital architecture makes high demands for an analogue input stage and similarly, having preserved the delicate harmonics though its digital stages, the analogue output must be able to deliver 'Piano Out' as pure as 'Piano In'.

TASCAM A/D and D/A converters have always been special. The IF-AN24 module for the MX-2424 possesses extraordinary specifications. With the focused purpose to convert and deliver the purest signals, design engineers were able to make uncompromised decisions and component selections. In laboratory and listening tests, an MX-2424 equipped with the IF-AN24 exceeded all expectations. This is ultimate sound quality.

ADVANCED …BUT EASY TO USE

The sophistication of MX-2424 and unprecedented statistics like '999 virtual tracks' may sound complex. But the fact is that it is just as easy to record a track as a TASCAM Portastudio: arm the track and hit Record!

Then it actually gets easier. Swapping tracks and snatching pieces of one track to fix another are simple enough processes but - better still - they are risk-free because editing is non-destructive. If you make an error or change your mind, there are 999 levels of Undo and Redo! The Jog/Scrub wheel acts and sounds just like it would if you were scrubbing a tape deck. Metering is clear and easy to read. The advanced functions never get in the way of doing basic recording …but they are always at your fingertips whenever you need them.

Edit however you like to edit: MX-2424 gives you options

Comprehensive on-board non-destructive editing tools

1 **Edit Keys.**
2 **Special transport keys allow for specialised transport functions (such as Auto Punch) and edit auditioning for easy recording, mixing and editing — as well as synchronising with external sources.**
3 **Jog/Scrub wheel for precise analogue-feel audio 'scrubbing'. Surrounding keys control menu settings and other special functions.**

There is no single right way to edit audio. Some people enjoy the ability to "see" their audio via a computer-based graphic user interface. Others do not want the focus to be removed from the important listening aspect of the recording process.

With the MX-2424, you get the best of both worlds. It offers access to all of advanced editing functions on the front panel so if you prefer not to use a computer-style interface to edit, you are not forced to. On the other hand, the MX-2424 includes MX-View, a powerful waveform-based graphic editor specifically designed to take advantage of this recorder's amazing capabilities. Edit how you like to edit!

EDITING ON THE FRONT PANEL

You do not need a computer, a monitor, a keyboard and a mouse to edit audio on the MX-2424. The controls on the front panel allow you to flexibly edit tracks while keeping your mind on your audio. With the self-contained MX-2424, your 24-track recording and editing system is eminently portable — it can liberate you from your studio environment. As a result, you may find new ways to work that make better use of your time.

Editing is done by capturing edit points, fine tuning them by scrubbing the audio with the jog dial then performing the edit on whatever tracks you choose. If your first try at an edit does not sound quite like you expected, there are 100 levels of undo/redo that allow you to get back to where you were before.

Editing possibilities are endless. If you have recorded the perfect backing vocal tracks, it is easy to Copy and Paste

them to the next couple of choruses. Copy just a measure or two of drum grooves then Loop them into the rest of your song. Snipping an extra hi-hat hit with the Clear feature is as simple as this sentence. With only a few keystrokes, you can Insert an entirely new bridge between the second chorus and the third verse. If you have a solo passage timed in a strange place, the MX-2424 enables you to Sync Paste it around the song as desired.

EDIT ON A MAC OR PC WITH MX-VIEW

MX-View is a computer-based editing interface for the MX-2424. It is a custom-designed software application that runs on Mac OS and Windows platforms. Just like high-end digital editing workstations, MX-View allows you to see the actual waveforms produced by your recordings down to the sample level, giving you an incredibly detailed visual representation of your tracks.

The MX-View editing software allows you to perform detailed editing with the aid of a graphic representation of each track's audio waveform. MX-View can provide a single computer-based interface for up to 32 MX-2424 units.

The result is spectacular. You can identify and zoom in on tiny sections of audio, select clicks and pops to remove them, nudge a drum track so it starts on time and so on.

All the controls offered on the MX-2424 front panel are duplicated in MX-View plus additional functions like Reverse, Duplicate and more. The MX-View interface is also a complete system interface for an unlimited number of MX-2424s via standard 100 Megabit Ethernet links. Multiple MX-2424s can be displayed and edited on a single screen simultaneously.

Compatibility in every studio

The TASCAM MX-2424 has a comprehensive choice of I/O and its data can be written to both Sound Designer II (SDII) and Broadcast Wave file formats. In brief, you can connect just about anything to your MX-2424 and you can transfer data files back and forth from Mac OS or Windows platforms using software such as Digidesign's Pro Tools™, Mark of the Unicorn's Digital Performer™, Steinberg's Cubase™. All the usual sync. protocols are supported but for true single sample accuracy, TimeLine TL-Bus™ is provided for locking multiple MX-2424 units. The MX-2424 is compatible.

SIMULTANEOUS ANALOGUE AND DIGITAL I/O

The MX-2424 offers a variety of audio interfacing options. All of the MX-2424 I/O options offer 24 channels and you can choose between analogue and a variety of digital protocols such as TDIF, ADAT Optical and AES/EBU. Connecting the MX-2424 to any digital or analogue console as well as popular digital audio recording/editing systems is easy. But that's only half the story — on the MX-2424 you can use both the analogue and digital interfaces simultaneously. Using this versatile routing, you could for instance record through the MX-2424's analogue converters and monitor via a digital console. Other hard disc recorders may limit you to choosing either analogue or digital if you want to access all 24 channels. With the exception of the IF-AD24, all MX-2424 I/O cards support 96kHz sampling rates.

FILE FORMAT COMPATIBILITY

Every hard disc recorder writes a particular type of audio file format to its particular format of hard disc. Instead of inventing yet another system that cannot be used outside its recorder, MX-2424 designers chose two of the industry's most popular formats: Sound Designer II for Mac OS discs and Broadcast Wave for PC discs.

Using these formats, it is easy to move audio files from the MX-2424 into audio editing systems on Mac OS and Windows computers, like Digidesign's Pro Tools™, Mark of the Unicorn's Digital Performer™, Steinberg's Cubase™ and others. Any system that is compatible with SDII or Wave files will allow you to import MX-2424 audio files. If the system supports time-stamped audio files then they can be placed at their original time code location with sample accuracy.

The MX-2424 is the perfect 'front-end' for Digital Audio Workstations with its comprehensive connections

Time Code In, Out, Thru for SMPTE sync
Word Clock In, Out, Thru
MIDI In, Out, Thru for MTC and MMC
Video Sync In, Thru for locking to blackburst or colour bars
TL-Bus In, Out for sample-accurate multi-machine sync
Stereo S/PDIF digital input, output
Stereo AES/EBU digital input and output
Ethernet port for computer interface
Fast/Wide Ultra 2 SCSI interface for external storage devices (68-pin connector)
Remote connector for optional RC-2424
Foot Switch connector

OPTION CARD SHOWN FITTED:
IF-AN24* A/D D/A module

SCSI DRIVES: FAST, DEPENDABLE, COMPATIBLE

SCSI drives have a proven track record in professional audio and video applications. At 24 tracks, the demand for sustained speed in reading/writing files to disc is critical. The MX-2424 SCSI architecture enables functions like seamless punch ins/outs on all 24 tracks at once and playing across sections with high densities of editing.

SCSI drives are also very robust. The MX-2424 internal Quantum Atlas V drive is rated for 300G impacts! Perhaps the best aspect of a SCSI-based hard disc recorder is its compatibility with other systems. You can take a drive from the MX-2424, connect it to a compatible computer, then access the audio data in your computer editing system …all without shutting down your MX-2424 or your computer system.

OPENTL™: AN EDL FOR TODAY AND BEYOND

OpenTL is an Edit Decision List (EDL) format developed for the audio recording industry. It allows for project file exchange between OpenTL recording and editing systems. OpenTL allows you to import and export project files that include every edit that has been made. For applications such as post-production, where thousands of sound effects and other edits may need to be transferred, OpenTL represents the ultimate in audio file format compatibility. Current industry-leading Digital Audio Workstation (DAW) applications such as Steinberg Nuendo, Waveframe, Sadie and DSP will be supporting OpenTL with more to be added as the MX-2424 becomes the standard "front-end" recorder for DAW systems in the professional audio industry.

TL-BUS™: SYNC. WITH SINGLE SAMPLE ACCURACY

Having captured 24-bit 96kHz detail, precise synchronisation is essential to preserve the proper phase relationship of acoustic instruments across multiple machines. The MX-2424 uses TimeLine TL-Bus™, true single-sample accurate synchronisation for arrays of up to 32 MX-2424 units. (768 tracks at 48kHz; 384 at 96kHz.) TL-Bus also keeps unlimited virtual tracks locked: there is no limit to the number of virtual tracks you might use with just one MX-2424. For locking to other equipment, the MX-2424 has a built-in SMPTE synchroniser to generate and chases every industry-standard frame rate. The MX-2424 includes built-in Time Code in, out and thru connectors, Word Clock, MIDI and video sync interfacing built-in. You can enable all of these sync. protocols from the front panel any time.

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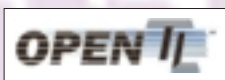
Expansion, security and archiving

Extra hard discs and backup media can be connected using the front panel bay or the rear panel SCSI port. The Ethernet port may also be used for data back up across computer networks.

The modular design of the MX-2424 allows you to work with up to 32 machines to single sample accuracy, making a huge seamless multitrack system. However, it is also possible to generate an unlimited number of virtual tracks, subject only to your available hard disc space, with just one MX-2424. With multiple machines or vast numbers of virtual tracks, the powerful MX-View software application makes complex project management straightforward.

EXTENDING RECORDING TIME

To extend recording time, you can install additional hard discs in the MX-2424 front panel drive bay or use the rear panel SCSI port. If you run out of space on the internal drive, you do not need to download the audio right away. Simply connect another drive and hit record. As many as four hard discs can be connected at once. The MX-2424 can record contiguous audio files of well over four hours in length!

KEEP YOUR AUDIO SECURE

Once of the biggest fears of moving to hard disc recording is the threat of a drive crash causing the loss of precious audio masters. Though hard disc recording offers amazing creative advantages over tape-based tracking systems, hard drives themselves are vulnerable to physical damage. Even the sturdiest drives, like the Quantum Atlas V drive fitted in the MX-2424 (rated to handle 300Gs of

impact) can be susceptible to losing an album's worth of material from an accidental drop on a hard studio floor. We strongly recommend backing up to media hardier than hard drives, such as DVD-RAM.

A 2x high-capacity DVD-RAM drive may be installed in the front panel bay of the MX-2424 or connected to the rear panel SCSI port. DVD-RAM has already been proven as a robust storage medium by the demanding computer industry. In addition to the benefit of being a secure archive format, DVD-RAM represents a substantial long-term cost saving over hard disc-only backup due to the low cost of DVD-RAM media.

A further advantage of a DVD-RAM drive is the portability of the discs. You can mail them to colleagues for project collaboration and mail them to mastering companies when projects are complete.

Optional interface cards allow you to customise your MX-2424 for your studio environment. The advanced analogue/digital/analogue card (2nd left) may be used in conjunction with any one of the other interfaces.

The RC-2424 remote control surface can operate up to 6 MX-2424 units from up to 100 metres away. The RC-2424 also provides useful macro functions for frequently repeated tasks.

OPTIONS

Each piece of optional equipment has been engineered specifically for the MX-2424 and is as thoroughly considered as the recorder/editor itself. The four multichannel interface modules all provide 24 independent interfacing channels and unlike other analogue interfaces, the IF-AN24 is a proper 96kHz module. The I/O module choice:

IF-TD24 (24-channel TDIF digital I/O)

IF-AN24 (24-channel, 24-bit 48kHz/96kHz compatible analogue/digital/analogue I/O)

IF-AD24 (24-channel ADAT digital I/O)

IF-AE24 (24-channel AES/EBU digital I/O)

For studios using multiple MX-2424 units, the RC-2424 remote control surface operates up to six recorder/editors from up to 100 metres away.

24-Track 24-Bit Hard Disc Recorder/Editor MX-2424

AUDIO SPECIFICATIONS

Analogue I/O Capacity: . . . .(6) D-Sub 25F connectors, 8 input or 8 output
. . . . .channels per connector 24 in/out channels total.
AES/EBU I/O Capacity: . . . .(3) D-Sub 25F connectors, 8 input and 8 output
. . . . .channels per connector 24 in/out channels total.
TDIF I/O Capacity: . . . .(3) D-Sub 25F connectors, 8 input and 8 output
. . . . .channels per connector 24 in/out channels total.
ADAT I/O Capacity: . . . .(3) ADAT Optical connector pairs, 8 input or 8 output
. . . . .channels per connector 24 in/out channels total.
Quantisation: . . . . .24 bits, A/D and D/A
Sample Rate: . . . . .38.5kHz to 54 kHz with 24 I/O channels
. . . . .77.2kHz to 108kHz with 12 I/O channels
Analogue Input & Output Level: +4dBu balanced, +22dBu ±1dBu clip, not adjustable
Analogue Frequency Response: . . . . .20Hz-20kHz, ±0.2dB
Digital Frequency Response: . . . . .20Hz-20kHz, ±0dB
Headroom: . . . . .18dB above nominal input level
Analogue Input Impedance: . . . . .10kΩ balanced
Analogue Output Impedance: . . . .<75Ω balanced THD+N (Through)
. . . .<0.004% @ 1kHz @ clip level -0.5dB
THD+N (A/D): . . . .<0.001% typical @ 1kHz @ clip level -0.5dB
THD+N (D/A): . . . .<0.003% typical @ 1kHz @ clip level -0.5dB
Dynamic Range (Through): . . . .>106dB (20Hz-22kHz, A-wtg.)
Dynamic Range (A/D): . . . . .109dB typical (20Hz-22kHz, A-wtg.)
Dynamic Range (D/A): . . . . .111dB typical (20Hz-22kHz, A-wtg.)
Signal-to-Noise Ratio (Through): . . . .>106dB (10Hz-22kHz, A-wtg.)
Crosstalk (Through): . . . .<-95dB between any channels (20Hz-20kHz)
Digital Option THD+N
(Through or Record, linear): . . . . .Adds no distortion to source material
AES/EBU Option Sample Rate Conversion: . . . . .0.33 to 3 input range to internal
. . . . .sample rate, with 14.5kHz minimum to 108kHz
. . . . .maximum external input frequency.
. . . . .Defeatable on all 24 channels simultaneously.
AES/EBU THD+N (through w/SRC): . . . . . .<0.003% typical @ 1kHz @ clip level -0.5dB

SYSTEM SPECIFICATIONS

Sample Length, Recording: . . . . .16-bit linear or 24-bit linear
Sample Length, Internal: 24-bit
Standard Audio I/O: . . . . .AES/EBU input on F XLR (1)
. . . . .AES/EBU Output on M XLR (1)
. . . . .S/PDIF input on F coaxial (1)
. . . . .S/PDIF on F coaxial Defeatable input SR convert (1)
Timing Reference Sources: . . . . .Internal
. . . . .Internal Varispeed
. . . . .Follow time code in
. . . . .Video (either NTSC or PAL)
. . . . .AES/EBU
. . . . .S/PDIF digital clock input
. . . . .Word clock input
. . . . .TL-Bus
Internal Sample Rates (in Hz): 44056, 44100, 44144, 47952, 48000, 48048
. . . . .88112, 88200, 88288, 95904, 96000, 96096
External Sample Rates: . . . . .38.5kHz - 108kHz (via external word clock input)
Time Code Type and Rate: .30 NDF, 30 DF, 25 (PAL Default)
. . . . .29.97 (NTSC Default), 29.97 DF
Nominal Operating Temperature: . . . . .41º-95º Fahrenheit (5º-35º Centigrade)
Relative Operational Humidity: .30%-90% (non-condensing)
Auto-switching Power Supply: . . . .
   Nominal: 100-240VAC, 1.5-0.8A, 150W, 50/60Hz
   Absolute Minimum/Maximum: 85-264VAC, 50/60Hz
Analogue Input/Output Voltage: . . . . .9.75VRMS Maximum

DIMENSIONS

Dimensions (W x H x D): . . .483 x 178mm x 444mm (19" x 7" x 17.5") 4U rack-mount
Weight: . . . . .14kg (31lbs) with all optional cards installed
RC-2424 Dimensions (W x H x D): . . . . .203 x 51 x 381mm (15" x 2" x 8")
RC-2424 Weight: . . . . .1.5kg (3.38 lbs)

The MX-2424 will continue to take advantage of updated features and capabilities. For the most up-to-date MX-2424 information go to www.tascam.com. MX-2424, RC-2424, ViewNet MX, MX-OS, TL-Sync, TL-Bus and DTRS are trademarks of TASCAM/TEAC America. Mac OS is a registered trademark of Apple Computer. Windows is a registered trademark of Microsoft. Oscar is a registered trademark of AMPAS. All other trademarks are the property of their respective holders.

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