

TASCAM

TEAC Professional Division

MX-2424

24-Track 24-Bit Hard Disk Recorder

Operational Tutorial

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INTRODUCTION

Congratulations on the purchase of your new MX-2424. We are pleased that you've chosen the MX-2424 for your digital multi-tracking needs. The MX-2424 is a very flexible Hard Disk Recorder/Editor with many powerful features. Designed and built to exacting standards, the MX-2424 will give you many years of outstanding service—the kind of quality and performance you've come to expect from TASCAM.

Standard Features

Recording

- 24-tracks at 24-bit/48kHz, or 12-tracks at 24-bit/96kHz
- 999 virtual tracks per project (freely interchangeable between projects)

Editing

- Audio editing directly from the front panel (no computer needed)
- Visual editing with Mac or PC using the supplied software
- Audio is recorded as either SDII or Broadcast WAV files (dependent on drive format)
- 100 levels of undo

I/O and Sync

- AES/EBU and S/PDIF (one stereo pair each)
- MIDI In, Out, and Thru
- SMPTE In, Out, and Thru
- Word Clock In, Out, and Thru
- Video Sync In and Thru
- TL-Bus (for synchronization of up to 32 MX-2424 machines)

Remote Control

- Punch In/Out Footswitch (the footswitch jack is also compatible with the Alesis LRC)
- Transport control and track arming from Mac or PC using the supplied software

Options

I/O Cards

- 24 Channel Analog I/O (IF-AN24)
- 24 Channel TDIF digital I/O (IF-TD24)
- 24 Channel ADAT Optical I/O (IF-AD24)
- 24 Channel AES/EBU I/O (IF-AE24)

The Analog I/O module may be installed simultaneously with one Digital I/O module.

Remote Controller

- Comprehensive remote control surface (RC-2424)

Support

Customer Care and Updates

- Smart Media Card Slot and Smart Media card (allows fast and easy MX-OS updates)
- Operational support is available online at <http://www.tascam.com> and <http://www.mx2424.com>. Registered users may also call phone support during normal business hours Pacific Standard Time at (323) 726-0303 Ext. 617.

USING THIS TUTORIAL

This tutorial covers the basics of how to set up and operate the MX-2424. It provides details on the machine's operating conventions and gives a step by step tutorial on recording your first project. There are four main sections: Setup, Recording Your First Project, Digital Audio Basics and a Glossary of terms. If you are a first time digital multi-track owner, we recommend reading this manual carefully, at least once through. If you have a good grasp of digital audio multi-tracks, use the table of contents to find just the explanations you need. For details of the MX-2424's more advanced features, or to find the description of a specific button or connection, please see the *Owner's Manual* and the *Owner's Manual Updates* which are released with new versions of the MX-2424's operating system.

What's In This Tutorial

Set Up

We will cover unpacking, proper AC hook up, choosing the right audio cables, and plugging the MX-2424 into your mixing console. There are several diagrams illustrating the connections for analog, digital, and combined analog/digital systems.

First Project

The first part of this section is a road map of the MX-2424's interface, LCD displays, and general operating conventions. The second part of this section walks you through your first recording, step by step, including loading the MX-2424 demo song and creating a new Project. This section concludes with explanations about recording and monitoring modes, virtual tracks, and a variety of other helpful operating tips.

Digital Recording Basics

If you are new to hard disk based digital recording, this section is for you. Here we cover basic digital recording techniques, SCSI and hard disk management, and how to synchronize multiple digital devices.

Glossary of Terms

This section provides definitions of common digital audio terms.

Conventions

All of the MX-2424's buttons, controls, LEDs, and connectors are printed in this tutorial exactly as their names appear on the MX-2424 itself. For example, the Store button is written [**STORE/YES**], where the button's main function is Store and its shifted function is Yes. The only exception to this rule is when a button has no text label and a symbol is used instead to show the button's function. In these instances, the action associated with the symbol is written out. For example, the Play button is printed as [**Play**], the Stop button as [**Stop**], etc.

Hot Tips

Important operational notes, that are in addition to the general instructions, are titled "HOT TIP!" and highlighted in their own boxes (see the example below). These Hot Tips call your attention to special situations and offer helpful operating suggestions.

• **HOT TIP!** — While reading the *MX-2424 Instructions & Tutorial* guide, keep your eyes peeled for special operating tips that are highlighted in boxes just like this one.

EXPLAINING THE I/O OPTIONS

Due to the unpredictable variety of possible setups, the MX-2424 base unit doesn't come standard with multi-channel inputs and outputs. The only stock I/O on the MX-2424 are the AES/EBU and S/PDIF connectors (one stereo pair each). The unit is designed this way to let you pick the type of multi-channel connectors you need for your setup. Whether your mixing console has analog or digital connections, or some combination of the two, the MX-2424 can be outfitted with the connectors that best suit your system.

The analog option module has 24-channels of I/O with professional quality 24-bit converters capable of up to 96 kHz sampling rates. For digital I/O, 24-channel modules are available with TDIF, ADAT Optical, or AES/EBU. Your local TASCAM dealer can help you select the card, or cards, that are best for your setup. All the cards are user installable, but if you prefer, an authorized TASCAM service center can perform the installation for you.

I/O Options at a Glance

| Type | Model Name | Channels | Connections |
|--------------|------------|---------------|--------------|
| Analog | IF-AN24 | 24 in and out | D-Sub 25F |
| TDIF | IF-TD24 | 24 in and out | TDIF |
| ADAT Optical | IF-AD24 | 24 in and out | ADAT Optical |
| AES/EBU | IF-AE24 | 24 in and out | D-Sub 25F |

• **HOT TIP!** — 25 pin D-Sub connectors are used on the analog and AES/EBU modules instead of XLR connectors since 48 XLR connectors would be physically impractical. To connect the D-Sub connectors to more standard connections (such as, XLRs or balanced 1/4-inch), custom break-out cables are available. These cables can be purchased from your local TASCAM dealer and are described in the *MX-2424 Owner's Manual*.

• **HOT TIP!** — The D-Sub connectors used for the IF-AN24 appear identical to those used for the IF-AE24. However, they are wired differently, transmit different signals and are not compatible. Always be sure to use the correct cable for the installed module.

SET UP

Cables, & Power

Proper Power

A crucial ingredient to keeping your MX-2424 healthy—and your digital recordings sounding their best—is clean AC power. Plugging into high quality surge protector is highly recommended.

Power Interruptions

Consider buying an Uninterruptable Power Supply (UPS) for your MX-2424. This is not a prerequisite, but it can be a real life saver—or should we say, data saver. While your MX-2424 automatically saves whenever an operation is completed, if the power should fail in the middle of a recording, that recording is lost forever and corrupt data on the drive could result. But with your MX-2424 plugged into a UPS, you can avoid this pitfall. A UPS will provide enough power to run your MX-2424 for several minutes, without power from a utilities company. This gives you time to complete your current action and perform a proper shut down, ensuring that nothing is lost.

UPS devices are available at most computer stores. Consider it inexpensive insurance.

Being Grounded

Don't plug your MX-2424 into an ungrounded outlet. Nor should you plug a UPS into an ungrounded outlet. Ungrounded power may introduce hums and buzzes to your audio signal and can lead to serious equipment damage (especially in the event of an electrical storm) and even electrical shock. If your residence does not have grounded outlets, contact a professional electrician about installing a ground.

Avoiding Ground Loops

A ground loop occurs when a piece of equipment has more than one electrical path to ground. Ground loops cause hums, buzzes, and sometimes even radio signals in your audio. Needless-to-say, hearing the local weather station in the background of your recordings isn't too cool. Luckily, ground loops can often be avoided by running all of your equipment from a single wall outlet. Plug your surge protector into one outlet and then plug all of your equipment into that one surge protector. Most surge protectors have several outlets, and these outlets can be multiplied using standard power strips for plenty of free sockets. Correctly configured, this system will direct every ground connection to one ground terminal and prevent a ground loop.

A ground loop can occur when two devices are plugged into separate wall outlets and the devices are also connected to each other. This allows each device to reach ground by going through the other device and directly to the outlets. The result is a ground loop through which noise and radio waves can enter your audio.

Audio Cable Considerations

Always use high quality TASCAM Cable Up audio cables for wiring your studio. This ensures that the audio connections between your mixing board, outboard processors, and your MX-2424 are of the highest possible caliber. TASCAM also has a full selection of digital cables, including ADAT Optical and TDIF in a variety of convenient lengths. Visit us online to see our full Cable Up product line and ask your local TASCAM dealer which Cable Up cables are right for your setup.

Wiring Rules

Even though modern cables are rugged and well shielded, there are still several good wiring and cable upkeep rules you should observe. Following these simple rules will help you create and maintain clean signal paths. Below is a list of these rules.

- Keep your audio and AC power cables separate.
- When audio and power cables cross, run them at right angles to each other.
- Never bundle audio cables with AC power cords.
- Keep audio cables away from sources of EMF – Electromagnetic Interference (transformers, monitors, amps, etc.).
- Avoid stepping on your audio cables.
- Don't twist or knot your audio cables.
- Always unplug by grabbing the plug's body—don't tug on the cable itself.

• **HOT TIP!** — Check the MX-2424 Downloads section of <http://www.tascam.com> and <http://www.mx2424.com> for setup instructions with various mixers.

Connecting Back Up Devices

Backing up your projects after each session is very important. In order to get into the habit of backing up regularly, you should connect a back up device to your MX-2424 before your first session. This will make backing up convenient, encouraging you to do it frequently.

Though your MX-2424 can back up projects to a variety of SCSI devices, one of the most convenient and cost effective is DVD RAM. This is a removable media that comes in very large sizes (up to 9.4 GB per disk), is inexpensive, and robust. To take the guesswork out of finding a good DVD RAM drive with all the right cables, TASCAM offers DVD-RAM drive kits for the front bay as well as external use. Ask your authorized TASCAM dealer about pricing and availability.

To learn more about backing up, hard drives, and SCSI, see Chapter 7, "Hard Drive & SCSI Basics."

• **HOT TIP!** — To learn more about backing up, hard drives, and SCSI, see Chapter 7, "Hard Drive & SCSI Basics" as well as the separate SCSI Instructions and be sure to check <http://www.tascam.com> and <http://www.mx2424.com> for updated documentation.

GETTING AROUND

When you first look at your MX-2424's front panel, the wide array of buttons can be overwhelming. However, understanding that the MX-2424's front panel is divided into several different control sections, each with its own set of related functions, can help bring the front panel into clear focus. Below is a list of the control sections with descriptions of their functions, and Figure 3-1 shows where each control section is located. But don't just use the figure alone as a guide - be sure also to have your MX-2424 in front of you to really get the feel of where things are.

Control Section Descriptions

Track Function

These "master" buttons determine how the Track Select buttons will work. For example, setting the Track Select buttons to be used for switching a track's input monitoring mode, selecting a track to record on or selecting a track to edit.

Track Select

The buttons immediately below the Track Meters make up the Track Select section. In their default mode, these buttons record enable tracks. However, they can also be used to switch a track's input monitoring mode or select a track for editing. The function of the Track Select buttons is determined by the Track Function buttons.

Edit Controls

This section gives you control over the MX-2424's front panel editing features. Use these buttons to make edits such as, cut, copy, paste, etc. Buttons to undo or redo edits are also found here. (A few editing functions that are associated with fine tuning in/out points and moving audio selections are conveniently placed near the Jog/Shuttle Dial.)

Transport & Locate

There are two rows of buttons in this section. Use the top row for Locate functions, such as, creating a playback loop or setting and jumping to locate points. The bottom row has all the basic Transport buttons, including Stop, Play, and Record.

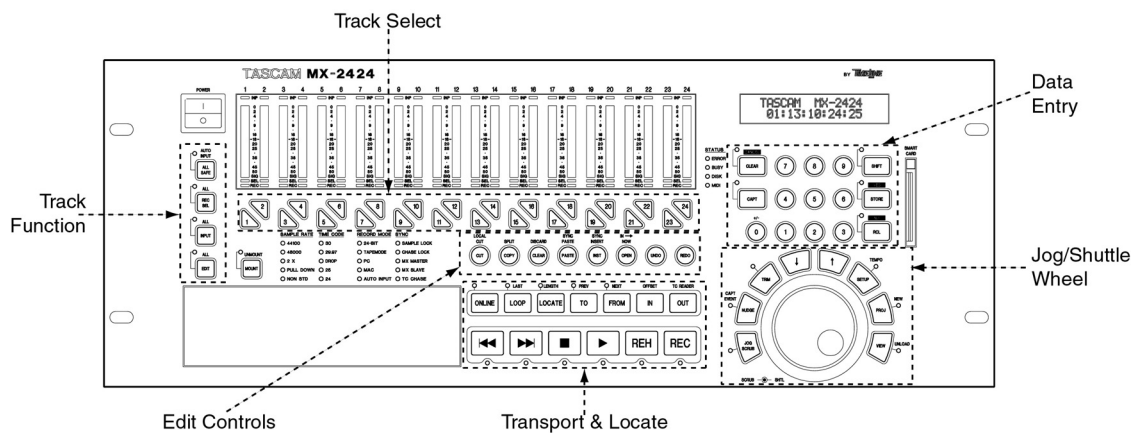
Data Entry

This section is for inputting data and changing parameters. There is a numeric keypad that is useful for entering timecode values, dialing up specific locate points, and creating names—among other things. And surrounding the keypad are several buttons for confirming or canceling an action.

Jog/Shuttle Wheel

Surrounding the Jog/Shuttle wheel are several buttons for navigating the MX-2424's system, project, and track pages. Use these buttons to call up specific LCD displays, scroll through menus, and edit parameters. The Jog/Shuttle Wheel isn't just for audio editing, it also doubles as a data entry and navigation tool.

MX-2424 Control Sections

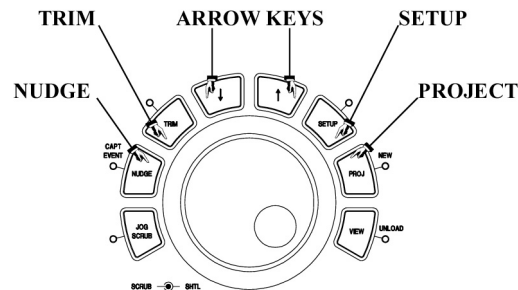


This diagram shows the different control sections of the MX-2424's front panel.

Navigating the System

The key to getting around your MX-2424's system, project, and track windows is the Jog/Shuttle Wheel section. The Jog/Shuttle Wheel section includes several surrounding buttons. Using the Jog/Shuttle control and its surrounding buttons, you can reach every page and scroll through every menu in the MX-2424. Figure 3-2 is a close-up of this section.

Jog/Shuttle Wheel & Affiliated Buttons



To the right of the Jog/Shuttle Wheel are your MX-2424's two main menu buttons ([**SETUP**], [**PROJ/NEW**]. The two buttons directly above the Jog/Shuttle ([**Down Arrow**] and [**Up Arrow**]) give you value up and down control. The two buttons to the left of the Jog/Shuttle ([**NUDGE/CAPT EVENT**], and [**TRIM**]) are for nudge and trim functions. The Jog/Shuttle Wheel can be used for dialing in numerical values, selecting characters, and scrolling.

Main Menu Buttons Explained

Each of the three main menu buttons ([**SETUP**], [**PROJ/NEW**], and [**VIEW/UNLOAD**]) accesses its own unique set of LCD displays. Below are descriptions of these displays and their associated menu items.

• **HOT TIP!** — Many buttons on the MX-2424 are dual function, that is, they have a shifted function. Press [**SHIFT**] (located near the top right of the numeric keypad in the Data Entry section) and then hit the button whose shifted function you want to access. For example, press [**SHIFT**] and then [**COPY/SPLIT**] to perform a split edit.

[SETUP]

Pressing **[SETUP]** takes you to the MX-2424's system setup menus. These menus include everything having to do with how your MX-2424 operates. For example, from these pages you can set sample rate, format a hard drive, choose a recording mode (TapeMode or non-destructive), specify timecode type, and decide how specific transport buttons will operate.

The system menus are arranged into 10 banks of related functions, 000 to 900. Don't worry there aren't 1000 menus! Not every page of every bank is filled up. There are unused menus for future updates. Table 3-1 gives good general descriptions of the system parameters you will find in each bank. (If you want a more detailed description of each parameter, see the *Owner's Manual* and *Owner's Manual Updates*.)

A great way to familiarize yourself with the system parameters that are available is to press **[SETUP]** and just scroll through the pages (the **[Up Arrow]** and **[Down Arrow]** buttons work great for this). Having seen all the pages at least once, when there is a system parameter you need to adjust, you will have a good idea of where to find it.

Setup Bank Descriptions

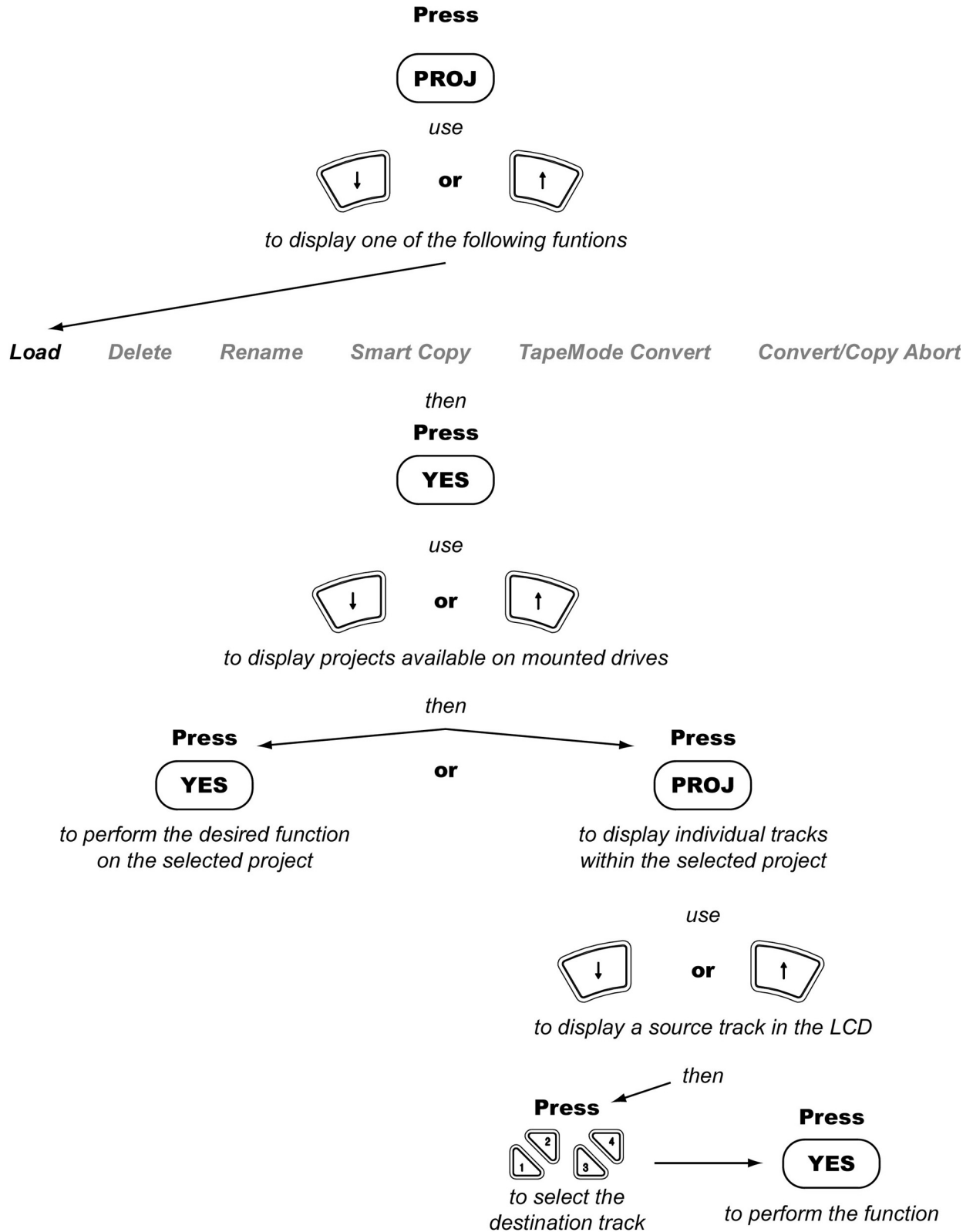
| Bank | Title | Description |
|-------------|--------------------|------------------------------------------|
| 000 | Rates & References | Timecode, sample rates, and varispeed |
| 100 | Bus Controls | Machine control and identification |
| 200 | System Controls | Recording and operational preferences |
| 300 | MIDI/P2 | MIDI and machine control parameters |
| 400 | Input/Output | Input and 2-channel digital routing |
| 500 | Audio Controls | Special audio handling (like crossfades) |
| 600 | | Reserved for future updates |
| 700 | Disk | Recording and storage media management |
| 800 | Project | Project and track naming preferences |
| 900 | System | System settings and information |

• **HOT TIP!** — Individual menu banks can quickly be accessed using the numerical keypad. For example, press **[SETUP]**, then press the number **[8]** key and you are instantly transported to the 800 bank.

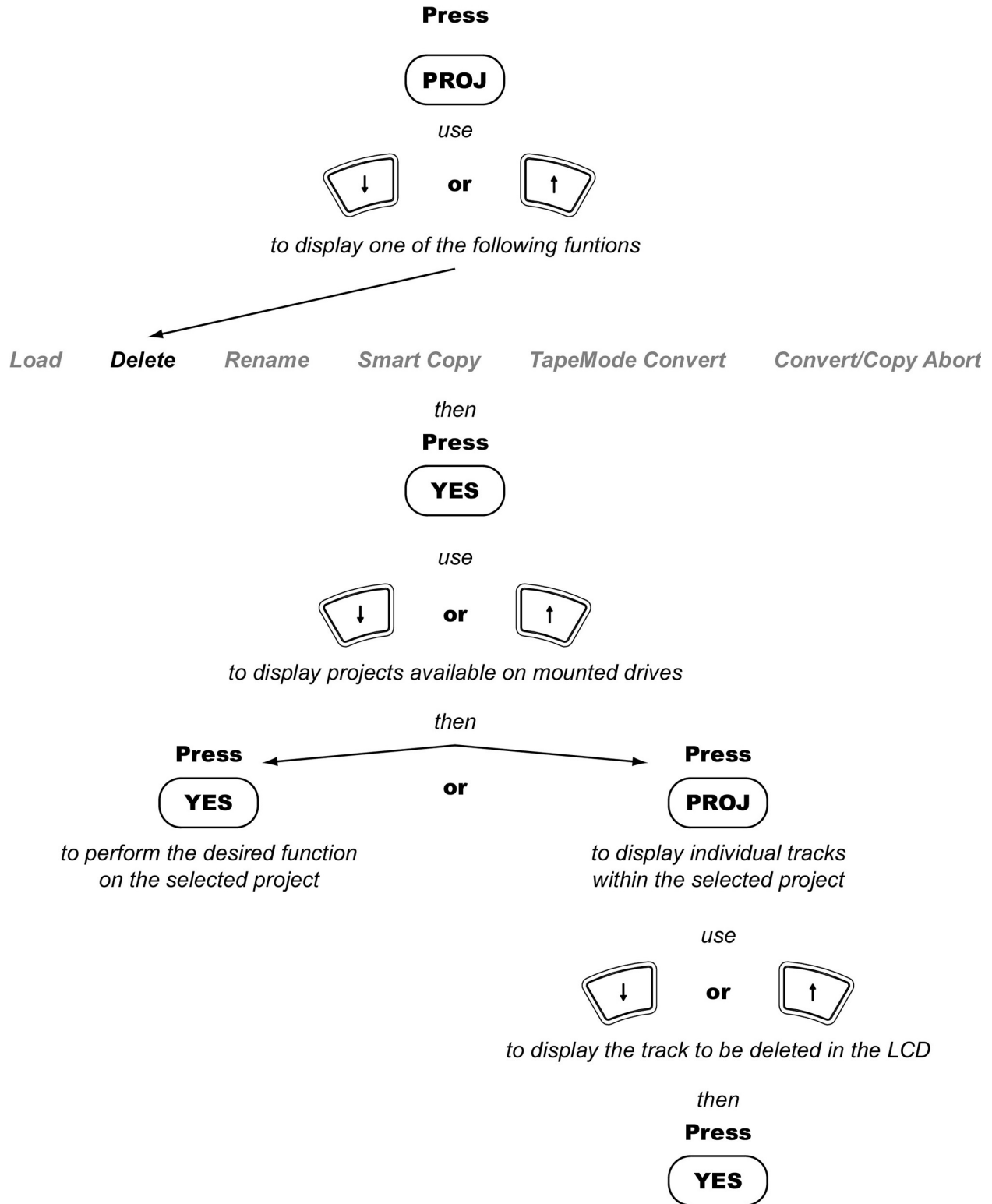
[PROJ/NEW]

The **[PROJ/NEW]** button takes you to the MX-2424's project and track menus. These menus are used for managing project and track files. You can create new projects, delete or rename existing projects, load tracks from another project into your current project, and other similar actions. The following pages detail the menu structure behind the **[PROJ/NEW]** button.

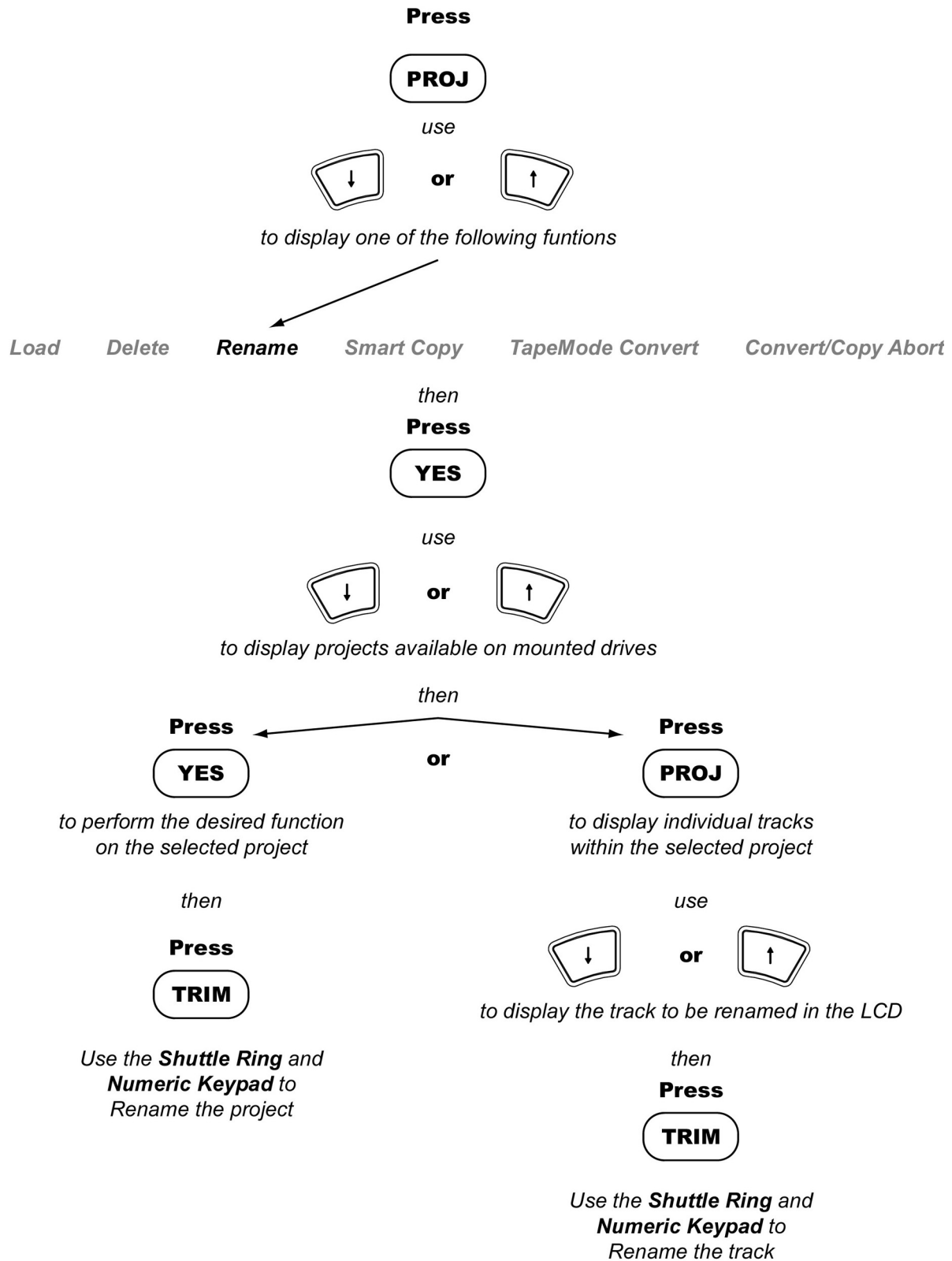
Load



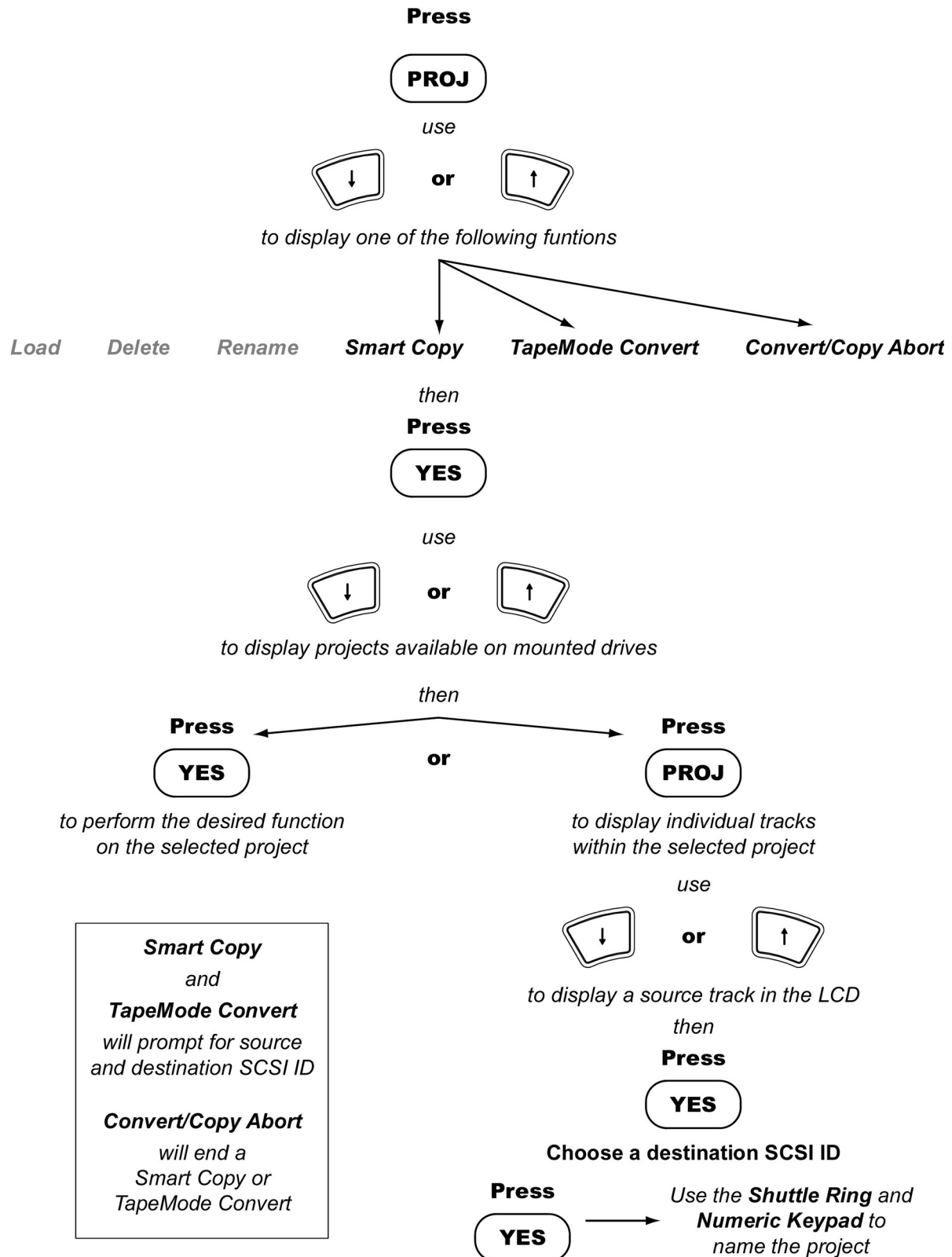
Delete



Rename



Smart Copy – TapeMode Convert – Convert/Copy Abort



[VIEW/UNLOAD]

Press **[VIEW/UNLOAD]** to see the names of the tracks in your current project (see the LCD illustration below). In this display, you can scroll through the tracks one at a time using the **[Up Arrow]** and **[Down Arrow]** buttons, or the Jog Dial. It is also possible to go directly to a track using the Track Select buttons. The shifted function of **[VIEW/UNLOAD]** lets you move tracks out of your current project and into the MX-2424's virtual track pool. (Virtual tracks are explained later in this tutorial.)

| | |
|-----------------|--------|
| Track Contents: | |
| 1 | Bass_1 |

Operating Conventions

There are several prompts, indicators, and ways of performing an action which are common across many functions of the MX-2424. These are called operating conventions and they help to streamline the MX-2424's interface. For example, the Scrub Dial, the **[Up Arrow]** and **[Down Arrow]** work as navigation tools in every window.

LED Conventions

- The primary function of a button is printed directly on the button itself.
- The shifted function of a button is printed on the front panel next to the button.
- A white line connecting an LED to a button shows that the LED is used for that button. LED's always indicate primary button functions.
- A steadily lit LED means that the primary function of a button is active.
- A blinking or flashing LED is a prompt to press its associated button to perform the action.

Changing Parameters

- Pressing **[TRIM]** allows parameters to be changed. You can press **[SETUP]** and scroll to any system page, but until you press **[TRIM]**, you can't change that page's parameter.
- Press **[TRIM]** to change a project or track's name. For example, scroll to the Rename window under the **[PROJ/NEW]** button, press **[STORE/YES]** then select the project or track you want to rename and press **[TRIM]**.
- An asterisk (*) in front of a parameter always indicates that it is the current setting. When you press **[TRIM]** to edit enable a parameter, changing that parameter causes the asterisk to disappear. When you make the new parameter current, by pressing **[STORE/YES]**, the asterisk reappears.
- To lock in a new value after making a change, you always press **[STORE/YES]**. The **[STORE/YES]** LED will flash to prompt you.

• **HOT TIP!** — It is not necessary to press **[STORE/YES]** when changing the value of menu 006, Varispeed Rate or menu 920, LED Brightness.

Escaping an Action

- Pressing [**CLEAR/CANCEL**] lets you escape any page or action and returns you back to the main timecode display.
- Press [**UNDO**] to reverse the last edit operation or recording pass (if your MX-2424 is in the non-destructive record mode—more on this in a minute). Each consecutive press of [**UNDO**] takes you back to the previous edit or recording pass, up to 100 times.
- Press [**REDO**] to reverse the last undo.

• **HOT TIP!** — When the LED for [**RCL/NO**] is blinking, pressing this button will take you back one page to the edit enabled parameter (as opposed to pressing [**CLEAR/CANCEL**] exits all the way out to the main timecode display).

FIRST SESSION

Loading the Factory Demo

The MX-2424 doesn't automatically load a project when it is powered up. It leaves the decision of which project you want to load up to you. If you have just connected your MX-2424 to your mixing board, it can be helpful to load the MX-2424 Demo Song to become familiar with the MX-2424's operation. This will also give you 24-tracks of music to check all of your connections.

Loading the Factory Demo Song

1) Turn your MX-2424 on using the rocker type power switch on its face. Give it a minute to boot up. You will see the message, "Mounting Volumes," on the LCD. When it is finished booting and ready to run, the LCD will read,

| | |
|-------|-------------|
| MX-01 | 01:00:00:00 |
| | 00:00:00:00 |

2) Press [**PROJ/NEW**]. The button's associated LED will light and the [**STORE/YES**] LED will flash. The LCD will read,

| |
|-----------------|
| Load |
| * Select Action |

3) Press [**STORE/YES**]. Then use the [**Up Arrow**] or [**Down Arrow**] to scroll to the project titled, "Warmness.tl" (if this is the very first time you have booted your MX-2424, it may be the only project listed or by the time you read this, there may be a different project pre-loaded). The LCD screen should look like this,

| | |
|-------------|---------|
| Load | Project |
| Warmness.tl | [0:23] |

4) Press [**STORE/YES**]. You will hear the hard drive working and the DISK LED will illuminate for a few seconds as your MX-2424 loads the project.

5) Double click the [**REW**] button and press [**Play**] to have a listen.

| |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• HOT TIP! — To load any project, follow Steps 1 to 4. But instead of choosing the Demo Song in Step 3, select a different project to load.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|

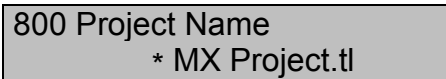
Creating a Project

A project stores all the information associated with a multi-track recording. This includes audio files, track files, the project file itself, bit depth, sample rate, and so on. To keep all of your multi-track sessions neat and tidy, it's a good idea to create a new project whenever you begin a new song.

Create a New Project

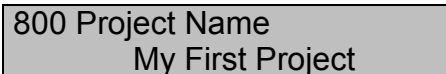
1) Press [**SHIFT**].

2) Press [**PROJ/NEW**]. The LCD screen will display the name of your currently loaded project. For example,



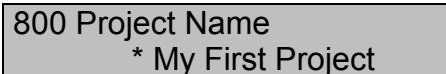
800 Project Name
* MX Project.tl

3) The next step is to name your new project. [**TRIM**] becomes active automatically when you press [**SHIFT**] and [**PROJ/NEW**], so the project name is ready to be edited. Use the Shuttle Ring (the outside control of the Jog/Shuttle Wheel) to scroll left and right. The numerical buttons are used for alphabetic entry just like a cell phone with the [**SHIFT**] button used for CAPS. After composing a name, the screen should look something like this,



800 Project Name
My First Project_

4) Press [**STORE/YES**] and your new project is created. An asterisk will appear in front of the project's name to let you know it is the currently loaded project. The project is stored in the memory of the MX-2424 but not actually written to disk until audio is recorded.



800 Project Name
* My First Project

Choosing The Project's Parameters

Certain decisions must be made before recording audio. These are decisions that affect the way the actual audio files are recorded and whose settings are stored as part of the project. After creating a new project but before recording audio, make sure the following parameters are set to the desired values. Keep in mind that the default settings may be acceptable for your application.

Selecting a Sample Rate

1) Press [**SETUP**].

2) Press [**0**] on the numeric keypad and then use the [**Up Arrow**] to scroll to system page #005. You will see,

| | |
|-----|-------------|
| 005 | Sample Rate |
| | * 44100 |

3) Press [**TRIM**].

4) Use the [**Up Arrow**] to scroll to your desired sample rate. For example,

| | |
|-----|-------------|
| 005 | Sample Rate |
| | 96000 |

5) Press [**STORE/YES**] to set the new sample rate. An asterisk will appear in front of the new rate to let you know it's active. It should look like this,

| | |
|-----|-------------|
| 005 | Sample Rate |
| | * 96000 |

• **HOT TIP!** — If you tend to record at a sample rate other than 44.1 kHz on a regular basis, you may want to set a different sample rate as your MX-2424's default. Press [**9**] to jump to system page #900 ("Store Settings") and press [**STORE/YES**]. This stores the new sample rate as your default.

TapeMode or Non-Destructive?

There are two types of recording modes, TapeMode and Non-Destructive. TapeMode is destructive recording and does not provide editing or the ability to undo recordings. It's just like recording on tape, when you record over something it's gone forever. The Non-Destructive Mode allows you to perform/undo/redo edits as well as undo/redo recordings. In Non-Destructive Mode, an Edit Decision List (EDL) called a project file is written on the drive by the MX-2424 to keep track of all your recordings and edits. The Non-Destructive Mode is the MX-2424's default setting.

Tape Mode writes and maintains a single unbroken audio file per track. The Non-Destructive Mode writes many separate audio files in order to keep all the recordings available for undo. If you plan to transfer the audio files recorded on your MX-2424 to a computer based digital audio workstation (DAW), TapeMode makes this easy.

A project recorded in Non-Destructive Mode can be converted to a TapeMode project using the TapeMode Convert function. You'll find TapeMode Convert under the **[PROJ/NEW]** button. TapeMode convert creates a copy of the original Non-Destructive project with new audio files created from the original EDL tracks so there will need to be enough space available on the drive for the TapeMode project.

For most applications, Non-Destructive Mode is preferable since you will have the option of going back to a previous recording and/or performing edits. But in some instances, Tape Mode is more space efficient than Non-Destructive Mode. For example, when recording many tracks in a situation where re-takes are likely, each re-take in Non-Destructive mode could use up a significant amount of drive space. TapeMode keeps the drive space used in this situation constant over multiple re-takes then the project can be switched to Non-Destructive mode for overdubs/editing. Any Non-Destructive project would need to be converted to TapeMode using TapeMode convert if desired.

Creating a TapeMode Project

- 1) Press [**SETUP**].
- 2) Press [**2**] on the numeric keypad. You will see,

| | |
|-----|----------------------------------|
| 200 | Record Mode * Non-Destructive |
|-----|----------------------------------|

- 3) Press [**TRIM**].
- 4) Use the [**Up Arrow**] to change the display to:

| | |
|-----|-----------------------------|
| 200 | Record Mode TL-Tape Mode |
|-----|-----------------------------|

- 5) Press [**STORE/YES**] to set the new recording mode. A prompt will appear asking for confirmation. Press [**STORE/YES**] to confirm.
- 6) Use the [**Up Arrow**] to change the display to:

| | |
|-----|---------------------------------|
| 230 | Tape Mode Start *01:00:00:00 |
|-----|---------------------------------|

- 7) Press [**TRIM**], then use the Shuttle Ring and numeric keypad to set the TapeMode Start time to the desired position. Press [**STORE/YES**].
- 8) Use the [**Up Arrow**] to change the display to:

| | |
|-----|----------------------------------|
| 231 | Tape Mode Length *00:10:00:00 |
|-----|----------------------------------|

- 9) Press [**TRIM**], then use the Shuttle Ring and numeric keypad to set the desired value. Press [**STORE/YES**].

• **HOT TIP!** — Generally, it's a good idea to avoid starting a project at 00:00:00:00 due to the need for pre-roll during loop, auto-punch or synchronized operation. If a pre-roll value sends the transport to a location earlier than 00:00:00:00 the MX-2424 would not know to go forward or backward.

• **HOT TIP!** — It is possible to record longer than the value set in menu 231 as long as recording began before the set Tape Mode Length ran out. However, if it is needed to punch in after this time, the value of menu 231 will need to be increased.

Record!

If you have followed all the steps so far, you are ready to record your first tracks. Don't worry too much about recording a perfect signal right away - just get something recorded to disk. Recording technique can be perfected with time and practice.

Recording Tracks

- 1) Use the Track Select buttons to arm the track, or tracks, you want to record on.
- 2) Send some audio from your mixer to the MX-2424's input. You should see a level, representing the incoming signal, on the record enabled tracks' meters. Be sure the outputs of the MX-2424 are connected to playback channels of your mixer in order to hear the recorded sound.
- 3) Adjust the incoming signal so that the peaks do not exceed 0 dB on the track meters.
- 4) Enter 01:00:00:00 on the numerical keypad and press [**LOCATE**] to cue up the transport for beginning a project at one hour.
- 5) Press and hold [**Play**]. And when you reach the spot where you want to begin recording, press [**Record**]. The track record enable lights will change from blinking to solid, to let you know recording is in progress.
- 6) When you are done recording, press [**Stop**].
- 7) That's it, your tracks are recorded. Double-tap the [**Rew**] button to rewind to the top of the recording and have a listen.

Naming Tracks

1) After recording a track, you may want to name it. Since the MX-2424 automatically assigns your track a name (for example, "MX Trk 2_002"), naming a track is actually the process of renaming a track.

2) Press [**PROJ/NEW**].

3) Using the [**Up Arrow**], scroll to the "Rename" menu. It should look like this:

```
Rename
* Select Action
```

4) Press [**STORE/YES**], then scroll to the project containing the tracks you want to rename. (*Don't press "Yes" yet or you will be renaming a project instead of a track in the project.*)

5) Press [**PROJ/NEW**] and the name of a track appears. This is the first track of the project chosen in step 4. It will look something like this,

```
Rename      Track
MX Trk     1_001
```

6) Scroll to the track you want to rename.

7) Press [**STORE/YES**], then press [**TRIM**] to edit the name.

8) Move the cursor using the Shuttle Ring to and the numerical keys to enter characters.

9) Press [**STORE/YES**] and you are prompted with, "Are you sure (y/n)?" Press [**STORE/YES**] again if you are sure.

• **HOT TIP!** — Projects can be renamed in much the same way tracks are. At Step 4, select the project you want to rename, press [**STORE/YES**] and then [**TRIM**]. Then jump to Steps 8 and 9 to complete the process.

Power Off

The MX-2424's internal hard drive should be unmounted before powering down. Make it a habit to unmount your hard drive before turning your MX-2424 off.

• **HOT TIP!** — Remember also to make a back up of your most current work. If you have done anything during your last session that you want to keep, back it up now.

Unmounting the Internal Hard Drive

1) Press [**SHIFT**].

2) Press [**MOUNT/UNMOUNT**], the LCD screen will read, "Unmounting Volumes" (this will take a few seconds). When your hard drive is successfully unmounted, the LCD screen will display a message similar to this,

```
MX-01      01:02:50:10
  1  Volume Unmounted
```

Mounting the Internal Hard Drive

1) If you decide you want to continue working instead of powering down, you will need to mount (or in this case, remount) your hard drive. You cannot work from a hard drive that is not mounted.

2) Press [**MOUNT/UNMOUNT**], the LCD screen will read, "Mounting Volumes" (this will take a few seconds). When your hard drive is successfully mounted, the LCD screen will display a message similar to this,

```
MX-01      01:02:50:10
  1  Volume Mounted
```

• **HOT TIP!** — These actions mount/unmount every SCSI device connected to the MX-2424.

MAKING OPERATING CHOICES

The MX-2424 has a few different recording and monitoring modes. However, by default—when you first take your MX-2424 out of its box—it acts just like a traditional tape machine. That is, when a track is record enabled, in Stop and Record you hear your source inputs, and in Play you hear playback (the recording on the hard disk). If multi-track recording is new to you, we don't recommend changing the recording or monitoring modes because the default settings will work for most situations. But to understand more about your MX-2424's capabilities, read on... the next several pages explain the differences between some of the more commonly used recording and monitoring modes.

Monitoring Modes

There are three basic input monitoring modes, Auto Input On, Auto Input Off and Post. For this tutorial we will only deal with the first two since the “Post” mode offers a method of working unique to certain post production environments.

In the Auto Input On mode, your MX-2424 will monitor incoming signal just like a traditional tape machine. When you record enable a track (using a Track Select button), the input to that track is heard. When you enter play by pressing the **[Play]** button, you hear playback of previously recorded material already on the track. Pressing **[Record]** causes the track to begin recording and you again hear the incoming signal. This is the default mode and will work for most situations.

The Auto Input Off mode allows you to monitor the incoming signal no matter what mode the transport is in. For example, it is sometimes necessary to compare previously recorded sound on a track to new sound in order to punch in new parts matching the sound from a previous day.

Choosing Auto Input Off Monitoring

1) Press **[SHIFT]** then **[ALLSAFE/AUTO INPUT]**. The Auto Input status is indicated by the Auto Input LED under track select button #7.

2) Use the Track Select buttons to choose the tracks you want to input monitor while in Play.

• **HOT TIP!** — The Track Select buttons may be used this way with the **[REC SEL]** or the **[INPUT]** button enabled. If the transport is in record, this will also punch into record on a track by track basis.

Entering Record

There are different ways available to enter and exit record that may be used depending on the situation. The default way to begin recording is to hold down **[Play]** and press **[Record]**. To end recording, press **[Play]**. For example, as your MX-2424 is playing, start holding down **[Play]** a bit before you want to begin recording, then when you want to punch in, hit **[Record]**. At the end of your take, hit **[Play]** to punch out and keep the transport rolling. Pressing **[Stop]** at any time immediately exits record.

While the default method of punching in and out is familiar to many people, there are alternative methods to choose from. For example, you can set your MX-2424 to enter record without having to hold down **[Play]**. In this mode, all you need to do is press **[Record]** to punch in (to punch out you still hit **[Play]**). Tracks can be individually punched in/out of record using their Track Select buttons. Punching in/out can also be automated for hands free operation—this is great if you are working in the studio by yourself. For details on how to activate these different recording modes, read on.

Record Enable All

- 1) Press **[SHIFT]**.
- 2) Then press **[REC/SEL ALL]** to record-enable all tracks.
- 3) To de-select all tracks, repeat steps 1 and 2.

| |
|------------------------------------------------------------------------------------------------------------------------------------------|
| <p>• HOT TIP! — It is possible to deselect all record-enabled tracks by holding [Clear] and pressing [Rec Sel].</p> |
|------------------------------------------------------------------------------------------------------------------------------------------|

Setting One Button Recording

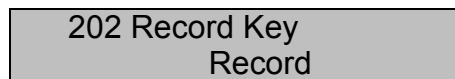
1) Press [**SETUP**], press [**2**] on the numeric keypad, and use the [**Up Arrow**] button to scroll to the following display:



202 Record Key
* Record + Play

2) Press [**TRIM**].

3) Press the [**Up Arrow**] once to change to the "Record" setting.



202 Record Key
Record

4) Press [**STORE/YES**] to enable the new setting. You will be prompted for confirmation. An asterisk will appear next to the new setting.

5) To change one touch "Record" back to "Record + Play," repeat steps 1 to 4.

Footswitch Punching

1) Make sure your MX-2424 is turned off, and plug in the footswitch. The footswitch jack is located on the rear of your MX-2424 (at the bottom left corner).

2) Turn on your MX-2424, it will automatically sense the polarity of the footswitch.

3) Load a project, record enable a track, and press [**Play**].

4) Depress the footswitch to enter record.

5) Depress the footswitch again to exit record.

Setting Auto Punch

There are times when playing an instrument that you just don't have a free hand to perform a punch. Or, you need to make a very precise punch that you don't feel comfortable making manually. It's times like these when the Auto Punch function is invaluable. But before you can make an Auto Punch, In and Out points must be set—follow along to learn how.

- 1) Start your project playing before the punch In Point.
- 2) At the desired punch In Point, press [**CAPT/SPACE**]. Then press [**IN/OFFSET**] to assign the captured location to the [**IN/OFFSET**] button as the punch in point.
- 3) With your MX-2424 still in play, press [**CAPT/SPACE**] at the desired punch Out Point and press [**OUT/TC READER**] to assign the Out Point to the [**OUT/TC READER**] button.
- 4) Rewind or locate the transport a reasonable time before your punch In Point and record enable the track(s) you want to record on.
- 5) Press [**SHIFT**], then press [**Record**]. The [**Record**] button's LED will blink to let you know that it is in standby.
- 6) Press [**Play**]. When the punch In Point is reached, recording begins, and when the punch Out Point is reached, recording ends and the transport continues to play.
- 7) To exit the Auto Punch Mode, press [**SHIFT**] and then press [**Record**]. The [**Record**] button's LED will stop blinking.

• **HOT TIP!** — In and Out points may be fine tuned in either of two ways. Both ways start by pressing [**IN/OFFSET**] to adjust the In Point or [**OUT/TC READER**] to adjust the Out Point.

1. Press [**TRIM**] to edit-enable the In/Out Point. The Shuttle Ring works to move the cursor left or right. The Jog Dial can be used to dial in a new value. Press [**STORE/YES**] to store your edited punch point.
2. Press [**SCRB/SHTL**] and use the Jog Dial to scrub the audio. Re-capture the In/Out Points by pressing [**CAPT/SPACE**] then [**IN/OFFSET**] or [**OUT/TC READER**].

Rehearse Function

Sometimes you just aren't sure if your punch In and Out Points are set right. On other occasions, a musician might need to practice their part along with the recorded tracks and hear where the punch will happen. In both instances, you need to monitor playback before and after the punch, and monitor the incoming signal during the punch without recording. This would be useful when recording in TapeMode since there is no record Undo available in TapeMode.

The Rehearse feature lets you monitor a punch just like a real record punch without actually recording anything. The Rehearse feature has its own dedicated button, **[REH]**, which you can treat exactly like the **[Record]** button. Like Record, Rehearse can be automated and set to either one touch or "Rehearse+Play" operation (system page #203). Use **[REH]** in place of **[Record]** whenever you need to practice a punch.

• **HOT TIP!** — Rehearse is especially useful when recording in TapeMode since there is no record Undo available in TapeMode.

VIRTUAL TRACKS

Think of Virtual Tracks as audio tracks that are stored in a giant pool. The pool is made up of every Track from every project on your hard drive. And any Virtual Track in this pool can be pulled into your currently active project and placed into the playback track of your choosing. By definition, a Virtual Track is a track that is available on the hard drive but is not currently being played back as one of the 24 tracks.

Using Virtual Tracks

You are in complete control of creating Virtual Tracks. The MX-2424 does not, by default, create virtual tracks every time you go into record. Instead, it is up to you whether the track you recorded will become a Virtual Track or not.

To create a Virtual Track, you must first "unload" the track from its current playback position (1 through 24). For example, the Rhythm Guitar Track on Track 18 of the MX-2424 must be placed in the Virtual Track pool—this is called unloading. With the Rhythm Guitar Track in the Virtual Track pool, it becomes a Virtual Track. Track 18 is now empty and ready to be recorded on again. We record a New Rhythm Guitar Track on Track 18, in order to compare or combine the first Rhythm Guitar Track to the second one. We "load" the first Rhythm Guitar Track into an adjacent track, say Track 19, for playback (if something is already on track 19, it must be unloaded first). We can then listen to both tracks, side by side, to hear which one is best or to edit the best parts of each performance into one "master" or "composite" performance. If we still can't decide, we can always store one of the tracks as a Virtual Track for listening to at a later time.

When a Virtual Track is pulled out of the pool and loaded into a track (as in the example above), it is no longer a Virtual Track (since it's being played back in one of the playback positions {1-24}). All Virtual Tracks are time stamped. When you load a Virtual Track into your current project, it is automatically placed at its originally recorded position. For example, if the track you are loading was recorded at 00:10:14:12 to 00:13:24:20, then it's start time in your current project will also be 00:10:14:12. For step by step examples of how to load and unload Virtual Tracks, keep reading.

Unloading Tracks

1) Press [**VIEW/UNLOAD**].

2) Select the track you want to Unload using the Track Select buttons. When you have selected a track for unloading, the "SEL" LED of the track's Track Meter will blink to indicate the chosen track. You will also see the track's number and name on the second line of the LCD screen; something like this,

```
Track Contents:
1      Bass_1_58
```

3) Press [**SHIFT**].

4) Press [**VIEW/UNLOAD**] again. This unloads the track. You will also notice that your track selection is incremented by one track, which is convenient if you want to unload the next consecutive track.

5) To exit [**VIEW/UNLOAD**], press [**CLEAR/CANCEL**].

6) To check that you successfully unloaded the track, press [**VIEW/UNLOAD**] and select the Track that was unloaded. You should see the following,

```
Track Contents:
1      * Blank *
```

Loading a Track

1) Press [**PROJ/NEW**]. (The display should look like this.)

```
Load
      *Select Action
```

2) Press [**STORE/YES**]. You should see the names of the projects currently on your hard drive. For example:

```
Load      Project
Warmness.t1  [0:212]
```

3) Scroll to the project that contains the Virtual Tracks you want to load. (Don't press "Yes" yet or you will load a project!)

4) Press [**PROJ/NEW**] again. You will see the name of all tracks associated with the project listed in the previous window – unloaded or loaded. Such as,

```
Load into Track 23:
      Bass_1_58
```

5) Use the [**Up/Down**] buttons to scroll to the Virtual Track you want to load.

6) Use the Track Select buttons to choose the track position (1-24) where you want to load the Virtual Track.

7) Press [**STORE/YES**]. If the Virtual Track originated in the current project, that's it, the track is loaded. If the Virtual Track comes from a different project, you are prompted, "Import to Curr Proj?" Press [**STORE/YES**] to do it, or [**RCL/NO**] to cancel.

8) To exit, press [**CLEAR/CANCEL**].

9) To check that you successfully loaded the track, press [**VIEW/UNLOAD**] and select the Track that was loaded. You should see something like,

```
Track Contents:
23 Bass_1_58_129
```

LOCATE FUNCTIONS

Project Head & Tail

Head

Press [**Rewind**] once for a normal rewind speed.

Press [**Rewind**] twice in rapid succession to go to the project's Head.

Tail

Press [**Fast Forward**] once for a normal fast forward speed.

Press [**Fast Forward**] twice in rapid succession to go to the project's Tail.

Memory Locations

There are times when you need more than just a pen and paper to keep track of location points. Fortunately, the MX-2424 can remember up to 100 locations that are automatically stored in your project file. Locations can be stored or recalled using the numeric keypad.

Storing a Location

1) Press [**CAPT/SPACE**] to capture a location. The MX-2424 can be playing, recording, or stopped—it doesn't matter.

2) Enter a two digit number (00-99) on the numeric keypad (for example, 01, or 15). This number is the memory position of your stored location. The LCD screen will display a message similar to,

| | |
|-------|-------------|
| MX-01 | 00:01:05:24 |
| MEM15 | 00:01:05:24 |

3) To return to the regular time code screen, press [**CLEAR/CANCEL**].

• **HOT TIP!** — You can repeatedly press [**CAPT/SPACE**] while the transport is in motion updating the captured point until a memory location is chosen with the numeric keypad.

Recalling a Location

- 1) Press [**RCL/NO**] to recall a memory location. The MX-2424 can be playing, recording, or stopped—it doesn't matter.
- 2) Enter a two digit number (00-99) on the numeric keypad (for example: 01 or 15). This number is the memory position of your stored location. The LCD screen will display a message similar to,

| | |
|-------|-------------|
| MX-01 | 00:00:28:10 |
| MEM15 | 00:01:05:24 |

- 3) To locate to the memory location, press [**LOCATE/LENGTH**]. This will send the MX-2424's play head to that memory location (or any time position displayed in the lower half of the LCD). You will see the time code on the top line of the LCD become equal the time code on the bottom line of the LCD. For example,

| | |
|-------|-------------|
| MX-01 | 00:01:05:24 |
| MEM15 | 00:01:05:24 |

- 4) Press [**Play**] to begin playback from the recalled memory location.
- 5) To return to the regular timecode screen, press [**CLEAR/CANCEL**].

• **HOT TIP!** — Using memory locations, you can take full advantage of your MX-2424's non-linear playback capabilities. For example, storing locate points for different sections of your song (such as, verse, chorus, bridge, and so on) will give you instant access to those parts. Being able to jump instantaneously to the top of any section can really keep the creative flow going.

DIGITAL RECORDING BASICS

Digital 101

There are distinct differences between digital and analog recording. Even though the goal, to capture sound for playback, is the same, the technology behind each method dictates its own set of recording rules. Many issues with analog recording—tape hiss, slow transport functions, and bulky multi-track machinery—are no longer concerns with digital recording. However, digital recording has its own set of considerations—bit depth, sample rate, word clock, and recording media—that should be understood in order to get the most from your MX-2424.

If you have experience recording with an analog multi-track, be ready to rethink some of your old recording techniques to meet the demands of hard disk recording. Also, prepare yourself to let go of your notions about what is possible in a multi-track session. Hard disk recording with the MX-2424 is faster and more flexible than any multi-track tape machine. If this is your first multi-track recorder, take the time to grasp the basics through experimentation - it will greatly enhance your productivity, and enjoyment of your MX-2424.

In Sample Terms

Digital recording is the process of converting an analog signal into numbers that represent a sound's amplitude, frequency, and harmonic content. These numbers are then stored on the MX-2424's hard drive for later playback. On input, the analog signal is encoded (turned into numbers) by running it through an Analog to Digital Converter (ADC). On playback, these numbers are read off of the hard disk and decoded (turned back into analog signals) through a Digital to Analog Converter (DAC).

To take a picture of the analog signal, the ADC slices the sound into thousands of segments per second called samples. The rate at which sampling occurs is the sample rate. The higher the sample rate, the more accurate the picture of the audio signal's high frequency content is (see Figure 6-1); a higher sampling rate equals better frequency response. A sample rate of 44.1 kHz equals 44100 samples per second, which is CD quality. The MX-2424 can record at sample rates up to 96 kHz.

• **HOT TIP!** — When operating in one of the high sample rate modes (88.2 kHz or 96 kHz, the MX-2424 reduces its track count by half to 12 to take into account the doubled amount of data. In this way 12 tracks of 24-bit/96 kHz audio takes up the same amount of storage space as 24 tracks of 24-bit/48 kHz audio.

Bit Depth Defined

Computers use a binary number system composed of just 2 digits, 0 and 1. A binary digit is called a bit, and computers combine two or more bits to express bigger numbers. For example, using two bits, the computer can form four numbers: 00, 01, 10, and 11. With three bits, it can express eight numbers, from 000 to 111. So with 8-bits, the computer can form 256 numbers, with 16-bits it can make 65,536 numbers, and with 24-bits (like the MX-2424) it can express a whopping 16,777,216 numbers.

The number of bits used to represent each sample of sound is the resolution, or bit depth. The greater the bit depth, the more accurate the measurement. This is because resolution determines the total number of steps that are possible between the lowest, and the highest recorded amplitudes. At 16-bit resolution there are 65,356 steps between the lowest and highest recorded amplitudes, while at 24-bit resolution there are 16,777,216 steps. Resolution defines the dynamic range of a digital recorder—higher resolutions equal more steps and correspondingly better dynamic ranges in the form of a lower noise floor.

• **HOT TIP!** — Confused about the terms? A binary digit is a bit. Eight bits makes up a byte. Half a byte, or four bits, is called a nibble. And a large group of bits is a word. For example, a word may contain 16, 24, or 32 bits.

Digital Recording Techniques

With analog recording, it is perfectly acceptable (even desirable) to have occasional peaks in the red. However, with digital recording, you never want to see peaks in the red. If you are peaking in the red above 0 dB you will experience digital distortion that is quite unpleasant. Digital distortion occurs because amplitude peaks greater than what can be represented by the binary numbers get chopped off. This phenomenon is called clipping. The bottom line is, absolutely avoid clipping your incoming signal when recording digitally.

At the same time, it is important to record your incoming signals as hot as possible (without clipping, of course). This is because signals recorded at low volumes are not taking advantage of the maximum number of available bits. Set your incoming signals to peak just below 0 dB for the best recording resolution while leaving room for musical dynamics.

• **HOT TIP!** — A compressor can be used to control incoming signals during recording. These devices are key in capturing optimum recording levels.

Digital Transfers

The only time you don't have to set a level going into your MX-2424 is when you make a digital transfer (such as, AES/EBU, TDIF, or ADAT Optical). This is because the level has already been set at the source. During a digital transfer, the MX-2424 is simply copying data from the digital source to its own hard drive

HARD DRIVE & SCSI BASICS

Your MX-2424 comes standard with an internal 9 GB Hard Drive (HD). This is the drive where all of your audio is stored (until it's backed up to another device). The 9 GB HD provides up to 45 minutes of 24-track recording at 24-bit, 44.1 kHz. Of course, you can always install an additional internal HD, or connect an external drive if you need more space.

Remaining Drive Space

If you aren't sure whether your next project will fit on the drive space currently available, your MX-2424 can figure it out for you. Follow the steps below to find out how.

Checking Remaining Recording Time

- 1) Make sure that your bit depth and sample rate are set for the upcoming project.
- 2) Press **[SETUP]** and access menu #703. It should look something like this,



```
703 Rec Disk Free
* 08:11:06:14
```

- 3) Use the Track Select buttons to record-enable the total number of tracks you believe the project will be.
- 4) The remaining time will automatically adjust to take your record-enabled track count into consideration. (If no tracks are selected, the remaining time is based on a single track.)

SCSI Basics

Plugging an external hard drive or DVD RAM drive into your MX-2424 is a pretty simple operation with the proper terminator and cables. To achieve the performance standards of the MX-2424 certain SCSI devices have been tested/approved for use. It is very important that only tested/approved devices be connected to the MX-2424 to ensure performance and reliability. Once you have all the hardware, there are a several rules you must always follow when connecting a SCSI device. These rules are listed below, but for a more detailed overview of MX-2424 SCSI configurations, please read the *MX-2424 SCSI Instructions* which is updated as needed and available for download on the TASCAM web site.

SCSI Connection Rules

- 1) Only Approved SCSI devices should be connected to the MX-2424.
- 2) Only make SCSI connections (and disconnections) with the power off.
- 3) Narrow SCSI devices (DVD-RAM drives) always go at the physical end of a SCSI chain.
- 4) Each SCSI device in a chain must have its own unique SCSI ID number.
- 5) The MX-2424 supports up to four devices on its SCSI bus.
- 7) A SCSI chain's total cable length should not exceed 6 feet.
- 8) A SCSI chain must always be properly terminated.
- 9) High quality SCSI cables will greatly improve the reliability of a SCSI bus.

• **HOT TIP!** — Approved devices are hard drives, removable media systems, and other SCSI peripherals that have been successfully tested with the MX-2424. To see the most current approved device list, visit our web site (www.TASCAM.com).

Hard Drive Management

It is crucial that you keep your hard drive healthy since this is where all of your projects are stored. This applies not only to the stock internal hard drive, but to any other hard drives you use regularly for recording as well. To keep a hard drive healthy, there are a few important rules that you should follow.

- Backup regularly (we recommend after each session).
- Perform the "Disk Cleanup" operation regularly
- Low Level Format whenever it is empty
- Always make sure your SCSI connections are high quality, approved and properly terminated.

Backup Your Stuff!

Backing up is an important part of any digital recording, just like backing up any financial records you may have stored in your desktop computer. Nothing is absolutely 100% reliable. 99% maybe, but do we really want to trust that our priceless recordings will not fall into that 1%? No way! Tapes sometimes break, hard drives sometimes crash, things get dropped and broken, recordings get erased, soft drinks get spilled, sunglasses get crushed... you get the idea. If it's worth recording then it's worth making a back-up copy. Regular back ups ensure that, even if something bad does happen before your next back up, you will never lose too much of your work. Backup after every session or at the end of each day.

Always make sure you have backed up your projects before erasing them. This might seem obvious, but do not assume you will never need to recall a particular project again, and then erase it. You can never tell when you might need to recall an old project for some reason later.

If you did not purchase a backup solution with your MX-2424, now is a good time to do so while you are experimenting and getting to know your new recorder. Following are explanations of some backup solutions.

You can easily back up to your personal computer via Ethernet then archive the data to any media supported by the computer. No matter how big the project is, this method automatically creates CDR-size files on the computer for archival to inexpensive CDR media., Or you can backup directly to DVD-RAM on the MX-2424. Other backup possibilities include using a removable hard drive system to physically move a hard drive from the MX-2424 to a computer where the data can be backed up to any media supported by that particular computer. A DVD-RAM drive or removable hard drive system may be installed in the front panel of the MX-2424 or attached to its rear wide SCSI port. Let's look at the reasons for using each backup option to help you choose the one you need.

DVD-RAM:

A DVD-RAM drive may be installed in the front panel of the MX-2424. Combined with the stock internal hard drive, this creates a fully self-contained system for recording and backing up. If something else, such as a removable hard drive system, is installed in the front bay then a DVD-RAM drive may be connected to the rear SCSI port. An external DVD-RAM drive may be useful when the MX-2424 is to be used on location then backup performed upon return to a studio.

There are two methods of backing up to DVD-RAM. Both methods use Smart Copy, your choice of method is determined by how the DVD-RAM disk is formatted:

- 1) If the DVD-RAM disk is used un-initialized (straight out of the wrapper) then a Smart Copy would create a .BU file on the disk. A BU backup allows a single large project to span multiple disks and allows incremental backup. Incremental backup means that when new material is added to an existing project that has already been backed up, only the new material will be backed up. This is called *appending*. A BU backup is proprietary and cannot be recognized by a computer.
- 2) If the DVD-RAM disk is initialized to FAT-32 by the MX-2424 then it will be treated like a hard drive by the Smart Copy process. The advantage of this method is that a FAT-32 DVD-RAM disk will be recognized by a PC. Initializing a DVD-RAM disk to HFS or HFS+ on the MX-2424 is not possible, such an initialization must be done on a Macintosh with the proper software – that disk may then be used on the MX-2424 and will be treated like a hard drive by the Smart Copy process.

Ethernet:

You may already have a computer with an Ethernet port and a CDR drive, or other type of backup device (which does not use any kind of data compression). You may be planning to have that computer run the MX-2424 graphic user interface. You could backup your projects to the computer via that Ethernet connection and graphic user interface. Once copied to your computer via Ethernet, the data can be archived to CDR or anything else used by the computer for backup large enough for the files. This method is fast and doesn't require any additional SCSI devices be connected to the MX-2424.

Offline:

If you are using removable hard drive systems with your MX-2424 to move audio files between a computer DAW and the MX-2424, you can backup those recordings once the drive is mounted on the computer just as if they had been transferred there via Ethernet. This has the advantages of being very fast in addition to keeping your MX-2424 available for recording while backup/restore duties are being performed on the computer.

Disk Cleanup

The "Disk Cleanup" function keeps your available hard drive space optimized by erasing unused audio files. For example, audio files that were left over from a deleted project or any punch-ins previously made in a non-destructive project. Removing these files keeps your drive running at peak efficiency, and helps prevent running out of drive space unexpectedly.

Performing a Disk Cleanup

1) To clear the MX-2424's memory of your current project, you must first unmount then remount the drive. Press [**SHIFT**] then [**UNMOUNT**] to unmount the hard drive. Then press [**MOUNT**] to remount the drive.

2) Press [**SETUP**], press [**7**] on the numeric keypad, and then use the [**Up Arrow**] to scroll to Menu #720. It should look similar to this,

```
720 Disk Cleanup
    * Cleanup Disk 0
```

3) Press [**TRIM**] and select the SCSI device you want to cleanup. The stock internal hard drive is SCSI ID 0.

4) Once you have selected the SCSI device, press [**STORE/YES**]. You are prompted, "Are you sure (y/n)?" Press [**STORE/YES**] if you are sure.

5) The LCD will read "Cleanup in Progress." This may take a few moments depending on how many files need to be cleaned up.

6) When the cleanup is complete, the LCD will display the following,

```
720 Disk Cleanup
    Cleanup complete
```

• **HOT TIP!** — If you have a project that contains audio files located on more than one drive, all drives should be mounted when performing a Disk Cleanup operation. Disk Cleanup works by deleting any audio files not referenced by a project file, if the MX-2424 doesn't find such a reference then those unreferenced audio files will be deleted.

Low Level Formatting

A low level format erases a disk sector by sector and maps out any physically bad sectors in the drive's FAT (File Allocation Table). This is different than initializing a disk which simply erases the disk's master directory files. Low level formatting always takes longer than initializing a disk—about 20 minutes for a 9 GB drive. Low level formatting is essential to optimizing a drive's performance and should be performed whenever you have the opportunity. For example, whenever you anticipate having an empty drive, and no need to use that drive immediately. And of course, a low level format will erase everything on the drive, so make sure you have the drive's contents properly backed up.

• **HOT TIP!** — After low level formatting a disk, you must also initialize the disk before it can be used (to learn how to initialize a disk, read on).

Performing a Low Level Format

A drive must be unmounted to perform a low level format.

1) Press [**SETUP**], press [**7**] on the numeric keypad, and then use the [**Up Arrow**] to scroll to system page #711. It should look similar to this,

```
711 Disk Low Format
* LowFormat Disk 0
```

2) Press [**TRIM**] and select the SCSI device you want to Low Level Format. The stock internal hard drive is SCSI ID 0.

3) Once you have selected the SCSI device, press [**STORE/YES**]. You are prompted, "Are you sure (y/n)?" Press [**STORE/YES**] if you are sure.

4) The LCD will read "LowFormat in Progress." Remember, this will take a while (about 20 minutes per 9 GB).

5) When the Low Level Format is complete, the LCD will display the following,

```
720 Disk Cleanup
LowFormat complete
```

• **HOT TIP!** — A Low Level Format can only be interrupted by turning off the power—don't do it! Never interrupt a Low Level Format or the drive will be unusable until a Low Level Format is completed.

Initializing a Drive

When you initialize a hard drive you define its format type. In turn, this format type dictates the kind of audio files the MX-2424 will write. The MX-2424 supports three formats, HFS, HFS+ and FAT 32. The HFS and HFS+ formats are compatible with Apple Macintosh computers, and supports the time stamped Sound Designer II (SDII) audio file format (popularized by Digidesign's *Pro Tools*). SDII audio files are compatible with a wide range of Macintosh based professional audio and video workstations. The FAT 32 format is compatible with PC (Windows) computers, and supports the Broadcast Wave audio file format. Broadcast Wave audio files are also read by a wide range of professional audio and video workstation applications operating on the PC/Windows platform.

• **HOT TIP!** — Always be sure the format you choose supports the size of the drive you are formatting. For any drives over 9GB you must use HFS+ or FAT-32, HFS will not function reliably.

Performing A Drive Initialization

- 1) The drive will already be unmounted from the low level format process. If not, it must be unmounted before initializing.
- 2) Press [**SETUP**], press [**7**] on the numeric keypad, and then scroll to system page #710. It should look similar to this,

| | | |
|-----|-----------------|---|
| 710 | Disk Initialize | * |
| | Init Disk 0 | |

- 2) Press [**TRIM**] and select the SCSI device you want to Initialize then press [**STORE/YES**]. The stock internal hard drive is SCSI ID 0.
- 3) Once you have selected the SCSI device, you are prompted for the type of format to perform. Press [**TRIM**] and use the [**Up Arrow**] button to choose the desired type of format then press [**STORE/YES**].
- 4) Once you have selected format type, press [**STORE/YES**]. You are prompted, "Are you sure (y/n)?" Press [**STORE/YES**] if you are sure.
- 4) The LCD will read "Disk init in Progress." This will take about one minute.

• **HOT TIP!** — Though you may find that initializing is a quick way of erasing a disk, more reliable operation will be obtained by performing a low level format and then initializing the disk. If you just initialize your disk without first doing a low level format, over time the drive may become corrupt.

SYNCHRONIZATION BASICS

There are many situations when it is necessary to run more than one multi-track simultaneously. For example, when 24 tracks just aren't enough, or maybe you need to lock the MIDI tracks of your sequencer with the audio tracks on your MX-2424. In these instances, you must lock your multi-track decks together for synchronized operation. Locking together two or more multi-tracks can be complicated—especially if you have never done it before. But once you grasp a few basic principles behind synchronization, locking multi-tracks together will become second nature.

Master & Slave

The most important idea to understand is the master & slave concept. It's pretty simple, whenever you lock two or more multi-tracks together, one deck must be the master while the other decks are the slaves. The master deck serves as the master timing source in addition to sending out word clock information that all the slave decks reference to in order to stay synchronized. Often, the master deck is also the primary transport controller, taking command over most of the slave decks' transport functions. Generally, the slave decks are placed in a standby mode while they await timecode, transport and location commands from the master.

Chase Lock

Once you have made the proper synchronization connections between multi-tracks (see Figures 8-1 to 8-4), you need to set each machine to act as either the master or slave. You also need to make sure that each slave machine is referencing the same timing information as that being sent by the master (for example, time code type and digital clock source).

Each multi-track will have its own unique set up procedure, and some machines may even require peripheral gear for synchronization. For example, computer based sequencers usually require a MIDI interface in order to send or chase time code. You should consult the supporting documentation for each multi-track that you wish to synchronize in order to insure a proper lock with your MX-2424.

The MX-2424 has all the synchronization features you need built right into it—no extra hardware interfaces are needed. While the MX-2424 can act as a slave, it is, by default, set to function as the master. It always generates SMPTE and MIDI Time Code (MTC) when the transport is running. To configure your MX-2424 for slave operation, and to select a digital clock source and time code frame rate, follow the steps below.

Selecting a Frame Rate

1) Press [**SETUP**] and access Menu #004. You will see something like this,

| | |
|-----|---------------------------|
| 004 | TimeCode Type * 30/NDF |
|-----|---------------------------|

2) Press [**TRIM**] and use the Arrow buttons to select the frame rate you want.

3) Press [**STORE/YES**] and that's it.

• **HOT TIP!** — The time code type selected here should be the same as that selected on other machines to be synchronized.

Choosing the Digital Clock Source

1) Press [**SETUP**] and access Menu #002. You will see something like this,

| | |
|-----|--------------------------------------|
| 002 | Sample Reference * Internal/Frame |
|-----|--------------------------------------|

2) Press [**TRIM**] and select the digital clock source you want your MX-2424 to reference.

3) Press [**STORE/YES**] to lock the setting in.

4) If you have selected a valid external digital clock source that is connected to the MX-2424, the "SAMPLE LOCK" LED will light. If the "SAMPLE LOCK" LED is blinking, it means that the MX-2424 is not receiving the digital clock source set in Menu 002.

Chasing Timecode

1) Press [**SETUP**] then the [**0**] button on the numerical keypad.

2) Press [**TRIM**] and select Timecode Chase

3) Press [**STORE/YES**] to lock the setting in.

4) Press the [**ONLINE**] button.

The MX-2424 will start chasing incoming time code as soon as it is received.

• **HOT TIP!** — The SAMPLE LOCK and TC CHASE LED's will blink until time code is received.

GLOSSARY

A/D Converter (ADC)

This is a hardware device that converts analog voltages into digital information.

AES/EBU

A protocol for transferring digital audio agreed to by the Audio Engineering Society and the European Broadcast Union. AES/EBU connections require 110 Ohm cable.

ADAT

This acronym (Alesis Digital Audio Technology) refers not only to the ADAT multi-track machine itself, but also to its recording medium and the optical connection that transmits eight channels of digital audio on a single fiber optic cable.

Automation

This term refers to having specific parameters programmed so that they playback in real-time.

Bouncing

The process of mixing together several tracks and re-recording them onto another track is called bouncing.

Frequency

The number of times a waveform completes one round trip per unit of time. The frequency of a waveform is directly related to what we hear as pitch.

I/O

This is short for Input/Output.

Jog

This is originally a video term used to describe small changes in the location of a video (such as two or three frames). Jogging is the process of using a jog wheel to move the digital recorder's play head back and forth small distances while listening to the audio to find an exact location.

Lightpipe

Often used as a generic term to mean an ADAT Optical cable or interface.

Non-Destructive (Destructive)

Non-destructive refers to the act of recording without overwriting previous recordings allowing undo operations and editing. Destructive is just the opposite, recording new audio permanently replaces previous audio.

Nudge

This is the technique of making small adjustments to the placement of an audio region. Nudging can be used for adjusting the "feel" of a track.

Punch (Punch In/Out)

The word "punch" is often used as short for the two terms, "punch in" and "punch out." This is the process where recording happens at a precise location, in the midst of an already existing recording. A punch in/out may be automated or performed manually.

Region

A region is a segment of audio that is part of a larger file and is defined by an EDL (Edit Decision List). A region can be edited independently of the larger sound file it belongs to.

S/PDIF

The digital audio protocol for interfacing digital equipment using a coaxial connection. S/PDIF stands for Sony/Philips Digital Interface. It typically uses unbalanced RCA type connectors and 75 Ohm cabling, but can also use fiber optic cable.

Sample Rate Conversion

The process of changing one sample rate to another.

SCSI

The acronym for Small Computer Serial Interface. This is the type of connection used for making data transfers between the MX-2424 and different types of backup drives. There are many sub-categories of SCSI, including narrow, wide, and ultra wide. Any time two devices using different types of SCSI are connected together, the proper cabling/termination must be used.

Smart Media Card

A thin rewritable data card. The MX-2424 uses a Smart Media Card to update its Operating System.

SMPTE

An acronym for the Society of Motion Picture and Television Engineers. This term is often used in place of the phrase "Linear Time Code" (LTC). SMPTE is used to lock different pieces of equipment together by having them all receive and chase a specific time code.

Synchronization

Synchronizing, or syncing, is the process of making two or more devices operate in tandem. One device acts as the "master", while the other machines are the "slaves."

TDIF

An acronym for the TASCAM Multi-Track Digital Interface. This protocol was developed for transferring multiple channels of audio simultaneously between multi-track machines made by TASCAM and other TDIF-equipped digital gear. TDIF connections are made via a 25-pin D-Sub connector.

Waveform

The waveform of a signal is a graphical representation of its voltages over time. From left to right, a waveform stretches out over time, and from top to bottom it represents amplitude.

Word Clock

Word clock is a digital signal based on sample rate and generated by a crystal. Word clock is used to ensure that two digital devices are operating at the exact same clock speed. It is generated by a master device and a slave device would be set up to receive it.