



# Merlin User Manual

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1. Connect a stereo audio source to analogue inputs 1 and 2. They are at the rear of the Merlin mainframe. Make sure the output from tracks 1 and 2 is not fed back to these inputs via your console.
2. Power up Merlin. It will always boot up with the “Project Menu” active. The light under the Proj key on your Merlin console will confirm this.
3. Along the bottom of the LCD display there is a row of words (the Project Menu), and below these, Soft Keys that do what the words suggest. Press the {new} Soft Key to create a new Project for recording.
4. Name your project by typing “My First” on the pull-out keyboard and pressing the <Enter> key. You have now created a new project called 'My First' and you are ready to record.
5. Press Track Arming Key number 1 in the top row of keys. Its red light should begin flashing, showing that it is armed for recording.
6. The video screen now displays input meters at the top, with track 1 shown armed. Play some of your source material into Merlin.
7. Cue the source material and begin recording by pressing <Play> and <Record> together.
8. You can now see the audio clip and its waveform as it is recorded to the left of the cursor on the Merlin video display.
9. Press <STOP> and use the <left Jump> key to locate to the beginning of the clip. Press <PLAY> and listen to a bit of what you recorded.

## 2. The Merlin

### Track Arming Keys

These 48 keys in the upper rows are used exclusively for arming audio tracks. If pressed while the transport is in Record, the corresponding track will immediately drop into Record (if it has a valid input patched to it).

To arm a range of tracks, hold down one key and double click on another - this will arm the range between them, and disarm all others. Similarly, double clicking on a single key arms it exclusively and disarms all others. To force a number of tracks to enter record at the same time, hold down one of the Track Arming keys while pressing others. When the last one is released, all the tracks will enter record together

### Track Selection Keys

These 48 keys in the lower rows are used for selecting audio tracks for editing and other purposes. Double clicking one of the Track Selection keys causes exclusive selection of that track. To select a range of tracks, hold down one key and double click on another - this will select the range between the keys, and deselect all others. The Track Selection keys are also used to select Location points within the Project.

### Mode Keys

Each Mode key displays a set of choices on the LCD screen to the right. To access a Mode written in Blue, hold down the Blue key while pressing the Mode key.

To leave a Mode, simply select another.

### Disable Key

Used to disable tracks from playback. Differs from muting in that disabled tracks cannot be immediately switched on, because they are not being loaded from disk, and changing the selection of disabled tracks will cause buffers to be re-loaded.

### Solo and Mute Keys

Hold down key to display soloed or muted tracks on the Track Keys, then press them to change selection.

### Undo Key

Reverses the most recent edit. Pressing again reverses the edit before this one, up to a maximum of 64 levels.

### Redo Key

Reimplements the last edit that has been undone. This can be repeated until all edits are redone.

### Enter Key

Used to terminate command sequences or confirm destructive actions.

### Jump Keys

Move the transport to next or previous Points (clip starts and ends), timecode Marks, or by specified intervals.

### Transport Controls

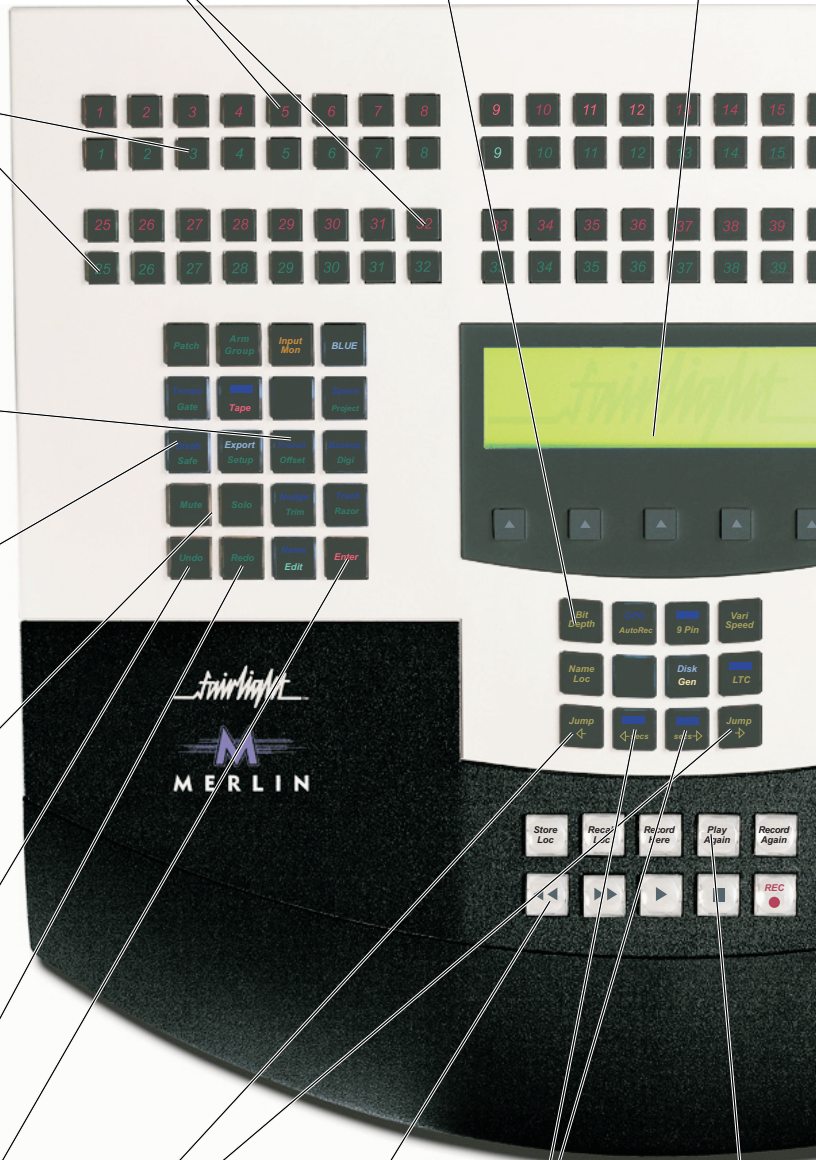
Record may be entered by pressing Play and Record together, or by pressing the Record key alone. The control for this setting is on the System Page (Type <Blue-S>).

### Bit Depth Key

Sets the bit depth for recording on all current channels, from 16, 20 or 24 bits.

### Soft Menus and Keys

Each disk or transport mode has a menu of choices which are activated by the "Soft Key" directly below.



### Seconds Keys

Move the transport by a predetermined amount. Hold Blue and press the key to set the amount.

### Transport Smart Keys

These keys provide special functions for making recording easier.



# Console

### Disk Button

Takes disk recorder on and off line. While offline, it will not respond to transport commands.

### 9-pin Button

Puts a 9-pin machine on the line, or activates 9-pin slave mode if selected. Press with the Blue key to set this machine's parameters. Cannot be activated when the LTC button is on.

### Master Time

Shows the current timecode position of the master machine. Cannot be activated when the LTC button is on.

### Numeric Register

Used for timecode entry and arithmetic.

### + and - Keys

Used to increment and decrement the Numeric Register, the Zoom range, or any selected parameter in a Soft Menu.

### Numeric Keypad

Types numbers into the Numeric Register, the Zoom range, or any selected parameter on a Soft Menu.

When used with the Blue Key, selects track displays as follows:

- 1 T 1 track display <Blue-7>
- 2 T 2 track display <Blue-4>
- 4 T 4 track display <Blue-1>
- 8 T 8 track display <Blue-0>
- 16 T 16 track display <Blue-8>
- 24 T 24 track display <Blue-5>

### Blue Key

Hold down while striking other keys if item printed in Blue is required.

### Clear Key

Enters zeroes in the Numeric Key Pad, or in any selected parameter in a Soft Menu.

When used with the Blue Key, toggles subframes off and on in the Numeric Register and all other LCD timecode displays.

### From and To Keys

Used to create ranges for edit operations, and start/ end times for Looping, Auto Recording etc. Single press and release means From or To Here. Hold key down for LCD soft menu items to appear, press Enter to confirm choice.

### Zoom Key

Used to change the time scale across the video screen. Hold Zoom key down and turn Jogger Wheel, press + or - or type a number from 1 (8 hours across the screen) to 16 (6 frames across)

### Jogger Wheel

Used for Zooming, changing parameter values in Soft Menus, transport Jog and Shuttle and increasing or decreasing the Numeric Register timecode.

### Jog and Shuttle Keys

Holding down the Jog key shows a menu of setup parameters for jogging.

### Gen Button

Enables and disables the timecode generator.

### Location Keys

For storing and recalling remembered points within the Project.

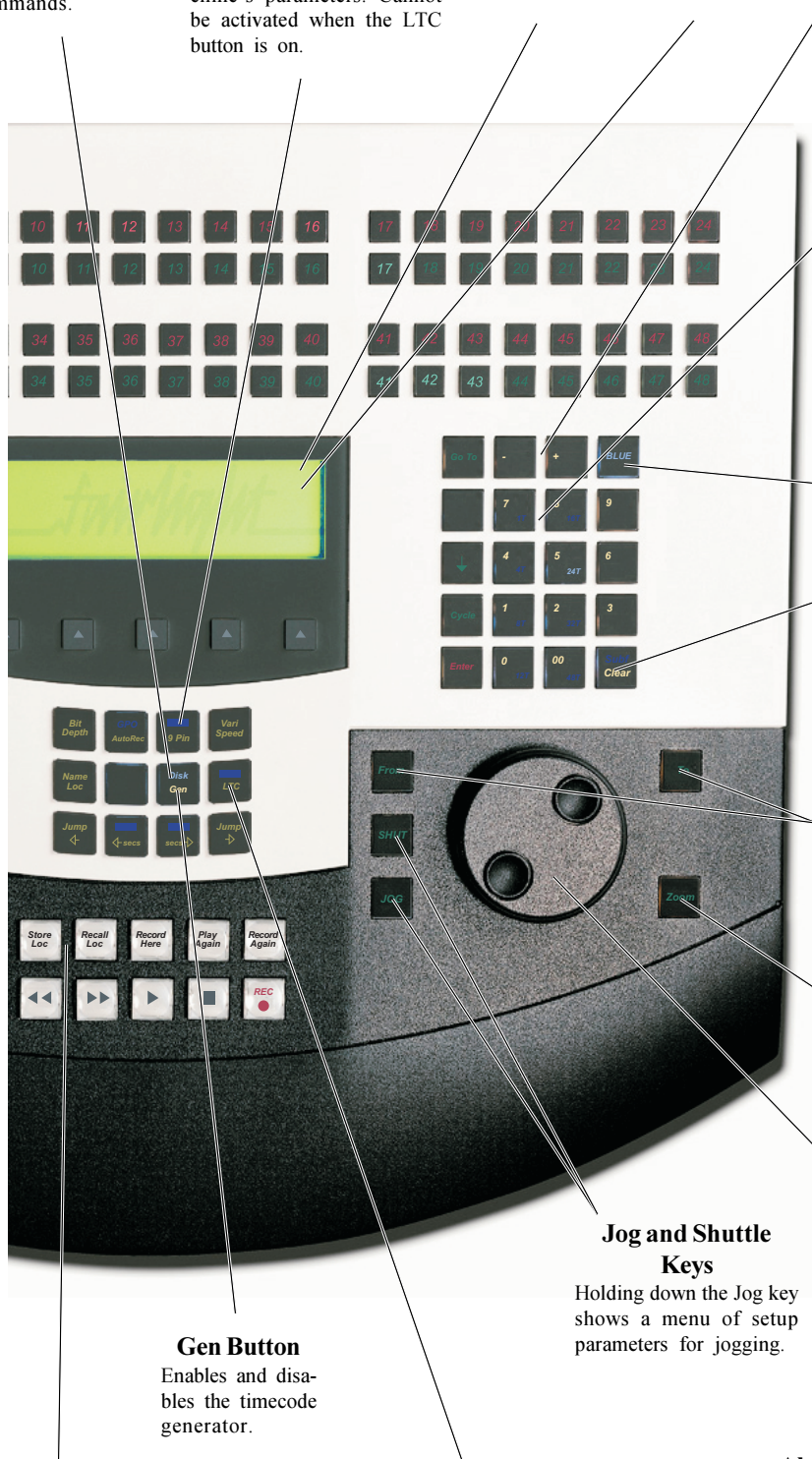
### LTC Button

Turns on LTC chase. Press with the Blue key to set this machine's parameters. Cannot be activated when the 9-pin button is on.

### Alphanumeric Keyboard (not shown)

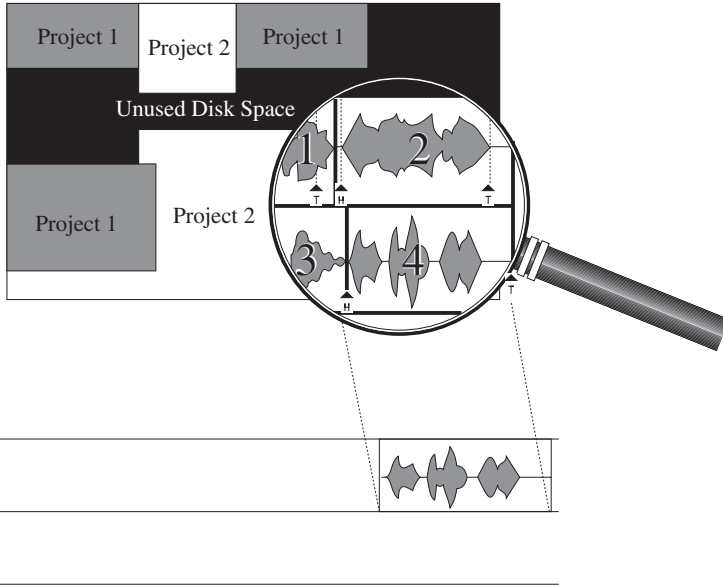
The alpha keyboard is a separate unit which may be stowed in a pull-out drawer in the Merlin trolley. It is used to name disk recorder items (clips, tracks, projects).

<RETURN> key is also used to clear error messages from the status line on the video screen (second from top).



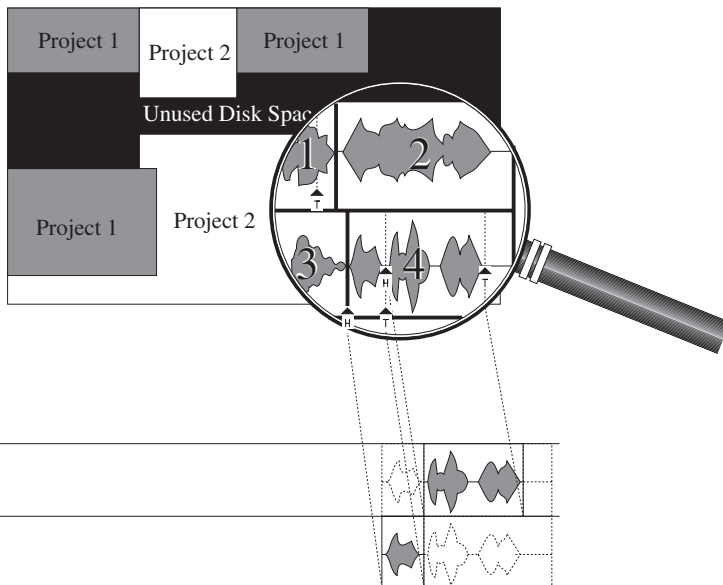
### 3. How the Merlin Disk Recorder Works

When we record in Merlin, the audio is turned into digital data and stored on hard disk, together with the other recordings we have made. It also appears as a clip on the screen, which is a “reference” to the “Master Recording” we just made.



Immediately after our fourth recording, we can see the Master Recording on the hard disk, and its referencing clip on the track where we went into record. The clip references the Master Recording by “pointing” at the audio to be played (in this case the whole Master Recording)

When we edit the audio, we do it by changing which part of the Master Recording we are pointing at. We call these pointers the Head and Tail of the clip



Here we have split the original clip so that the first part is on a different track. In fact we now have two clips which point at different parts of the Master Recording. On the first one we have also removed part of the Tail, which has moved the Tail pointer to an earlier part of the audio.

The Head and Tail pointers can be moved by editing at any time, allowing us to cut pieces off the clip, or replace parts that were previously removed.

A clip can be thought of as an instruction to the computer to play a certain Master Recording at a particular time, within the given pointers.

#### 4.

## Merlin Screens

There are 10 user screens in the Merlin software. Some take up the top section of the screen and others the lower part. There are always one upper and one lower display on the screen.

Displays are automatically changed in response to recording, editing and transport control commands, but they can also be placed on the screen by command. A description of each display follows:

Display Name	Upper/Lower	Key sequence	Automatic Display
Arm	Upper	<Blue>A	AutoRec Menu
The display shows the amount of recording time left in the currently-used disk drive, the length of the currently recording clip, and the input/output meters.			
Patch	Lower	<Blue>P	Patch SubMenu
Shows the inputs that are patched to each track, plus the type of input selected.			
Track	Lower	<Blue>T	Whenever a project is open
Shows clips on the tracks with waveforms that scroll when the transport is moved. The number of tracks shown on the screen can be changed up to 24 by holding down the Blue key and pressing the number keys in the Numeric Display. These are marked to show the numbers of tracks that will be displayed.			
Takes	Upper	<Blue>K	Edit Menu and others
Shows clip information including mono/stereo, audio level, duration, source file (if borrowed) and layer number. Where several clips are stacked on top of each other, it is possible to see the top four layers. By going to the Track Menu you can scroll down to lower layers and lift any clip to the top layer.			
File	Lower	<Blue>F	Project menu, Backup
Displays a list of files on the current storage device, and information about that device.			
Device	Upper	<Blue>D	Same as file
Displays a box for each storage device on line (and configured in the mdr_devices file). A "fuel guage" shows the available storage on the device in blue, the size of an open file in yellow and the amount of freespace in an open file in green.			
Locations	Upper	<Blue>M	GoTo Location and Name Location
This display shows a list of Locations in numerical order with their names. Three columns are shown, with the active column in the centre showing timecode positions of the locations. When the transport is being moved the locations display scrolls to highlight the latest location passed by the transport.			
Waveform	Upper	<Blue>W	
The waveform display shows a list of all the Master Recordings in the project. This can be scrolled up and down using the arrow keys on the alphanumeric keyboard. It is used for recovering clips that have been accidentally erased. (See Recovering Lost Clips)			
System	Lower	<Blue>S	
This is used to change system setup parameters including print characteristics, backup device options, crossfade characteristics and meter scaling. These functions are described in other sections of this manual. Do not change parameters on this page unless you know what you are doing.			

## 5. The Merlin Recording

The Disk Recorder Page is Merlin's display medium. It consists of a number of different sub-pages which are automatically changed to suit functions being performed. You can also force the display of a screen that you want by

### Disk Light

The Fairlight logo flashes red when a disk is writing, and blue when it is reading. During network activity it flashes white.

### Time Line

These four "lanes" are timing graduations in hours, minutes, seconds and frames. They expand and contract with changing Zoom scales. The finer graduations are not shown unless the Zoom scale gives at least one pixel for each unit of time in that lane.

### Fade

These lines indicate a fade. If the fade occurs where clips are overlapping, then a crossfade between the two clips results.

### Range Size

In modes that use timecode ranges to indicate the active editing area, this field shows the size of the current range (in timecode units). The pictured mode, Grab, does not use a range.

### Selected Track

The track(s) selected for editing (by lighting their Track Select Keys on the Merlin Console) are shown with their numbers and track "bed" in a light colour.

### Unselected Track

Tracks that are not selected for editing are shown in dark colours. Their Track Keys are not lit up.

### Audio Waveform

Displays a graphic of audio amplitude versus timecode. The data for this graphic is generated as the audio is loaded from disk, just prior to being played. As soon as you locate the transport to a new place the audio for that timecode location is loaded, and the waveforms quickly appear.



### Selected Clip

The selected clips are shown in red. If you are working in a Menu with an editing range, the parts of the clips inside the range (on selected tracks) are shown in the same red colour. In all cases, red indicates that the clip(s) will be affected by the next edit command.

### Cursor

Also known as the Play Head or Now Line. Indicates the current timecode position of the disk project. Audio clips play as they pass this line. In edit modes without ranges, the clips selected for editing are always the one(s) touching the cursor.



## and Editing Screen

pressing the Blue Key with certain keys on the Numeric Keypad. Several of the screens are shown or described in the next five pages.

### Current Time

This field shows the timecode position of the current disk project.

### Zoom range

Shows the Zoom number, from 1 to 16, of the horizontal scale. Higher numbers indicate finer display (less time on screen).



### Takes Screen

Shows information about the clips (pieces of audio) on the currently selected track. You also see layers of clips that are “underneath” and cannot be heard. This screen is automatically displayed whenever you enter an editing Menu. You can also force its display by typing <Blue>k.

### 4T Screen

Shows four tracks. You can select this screen by typing <Blue -4>. The features of this screen are identical to those of the 24, 16, 8, 4, 2 and 1-track displays. They are selected by typing <Blue-5>, <Blue-8>, <Blue-0>, <Blue-1>, <Blue-4> and <Blue-7> respectively. Tracks higher than 24 can be shown by selecting any one of them. This will cause the block containing that track to be displayed.

### Clip Names

Each clip is named as it is recorded, and can be renamed in the Name Menu. These names scroll as the clip moves across the screen.

### Unselected Clip

Clips must be touching the cursor in order to be selected (unless a range is used by the editing mode). In either case, unselected clips are shown in blue, and are not affected by editing commands.

### Track Names

Each track can be named in the Name Menu. These names are fixed in position on the screen.

### Explanation of Terms

Name of the current open project, if any (see Starting a Project)

Each storage device has a number from 1 to 6 (plus a backup device which may be number 7)

You can name each device when initialising it if you wish (see Preparing Disk Drives for Work).

Manufacturer of disk drive

Total size in Megabytes (each megabyte is approximately 10 seconds of mono audio at 44.1 kHz).

Unused disk space in Megabytes

Unused disk space in minutes and seconds of mono audio at 44.1 kHz

Name of domain, or working group of systems.

Name of network node, which may be a Merlin, MFX or FAME system, a server, or another computer.

Unit, or hard disk drive, attached to system.

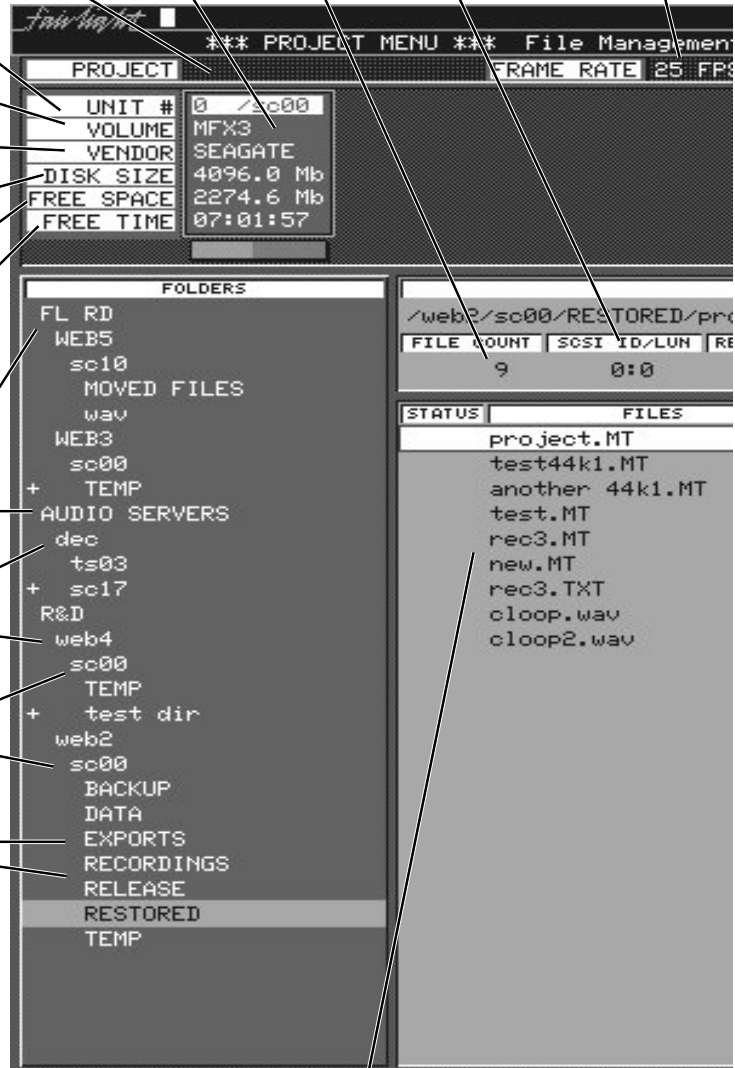
Folder or directory on a disk drive.

4 Gbyte hard drive by Seagate, SCSI address 0

Number of items in current directory view.

SCSI ID and Logical Unit Number of current disk.

The timecode frame rate for the project (see Setup Menu)



Projects are named on the Project Menu or renamed on the Name Menu. The .MT at the end of the name indicates a "multitrack" file or project. Other file types you may see are .MK files (macro files) .omf files (OMF export files) WAVE files and more.

## and File Pages

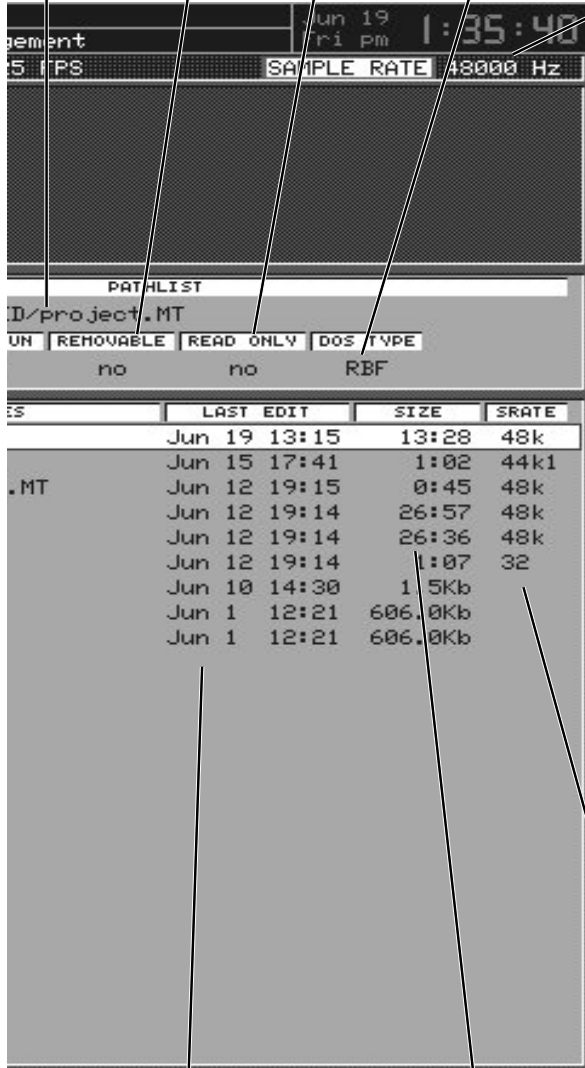
Complete location or "path list" of currently selected file.

Indicates if the disk is removable (e.g. Magneto-Optical drive)

Indicates if the device is write protected.

Indicates the device disk file system. This could be RBF (the OS-9 file system), FLFS or MDR-DOS (proprietary Fairlight file systems) or NTFS (Windows NT file system, only on servers or other PCs)

Sample rate of audio in current project (see Arm Menu)



### The Device Page

This page shows information about the storage devices attached to the currently selected node (machine). The page is automatically displayed whenever you open or close a project, or begin a file copy or backup procedure. You can also force its display at any time by typing <Blue>D.

### The File Page

This page is split into sections showing the network structure in which machines are placed, and information about one of the storage devices, including the files it contains. One file is highlighted, making it ready for opening, copying, or whatever function you have in mind. You may scroll the highlighted bar up and down the screen, choosing a file to be acted on by the next command.

This display is shown whenever you are opening a file, deleting etc. You can force its display at any time by typing <Blue>F.

Shows the last date on which the file was altered.

Size of files (given in hours, minutes and seconds for Merlin Project files - those with suffix .MT)

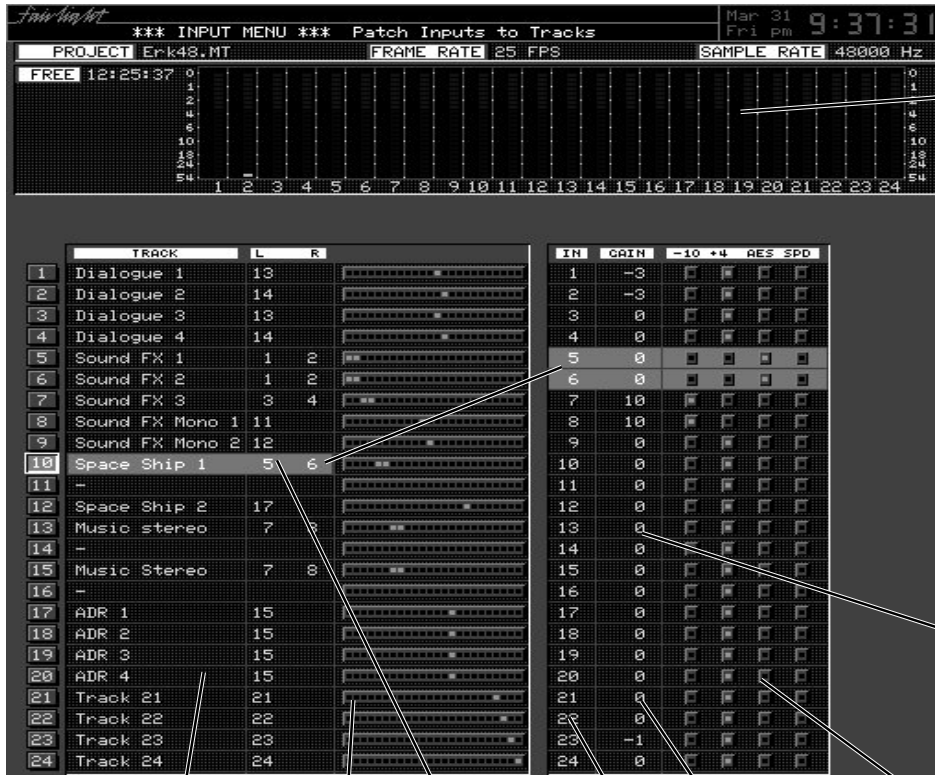
Shows the sampling rate of the audio in the file.

## 7. The Patch and Meters Display

The Patch Display shows all the information about which input is patched to which track, and what choices have been made on each of the inputs.

This display is shown whenever the Patch Menu is selected. You can also force its display at any time by typing <Blue>P.

The Meters show you the audio level at each output. It is automatically displayed whenever you enter the Arm menu, and you may force its display at any time by typing <Blue>A.



### Twenty Four Track Meters

This display shows the output levels of every physical output of the system. Whenever a track is armed, the meter shows you the input to that track. Small red rectangles indicate the input(s) patched to each track. When a track is playing a stereo clip, the right side of the clip appears on the next highest output, and the meters show this. Selecting a track above 24 causes a second bank of meters to be displayed.

### Patch Display

This display shows you the inputs which are patched to each track, as well as the type of input selected and the gain setting for each input.

List of tracks by name. When you first create a project these will be named "Track 1", "Track2" etc, but you can give them your own names using the Name Menu.

Grid showing the input(s) patched to each track. Note that the same input can be patched to many tracks, but only one of them can be in record at a time. When two inputs are patched to the same track, it means that stereo clips will be created when the track goes into record.

This track has been selected so that its inputs can be changed. It is possible to select any number of tracks for this purpose. Note that the inputs that are currently patched to this track are also selected.

Shows the gain currently applied to each input.

List of inputs, numbered 1 to 24.

Grid showing the type of input selected, out of ANLG -10, ANLG +4, AES/EBU or SP-DIF.

### Note:

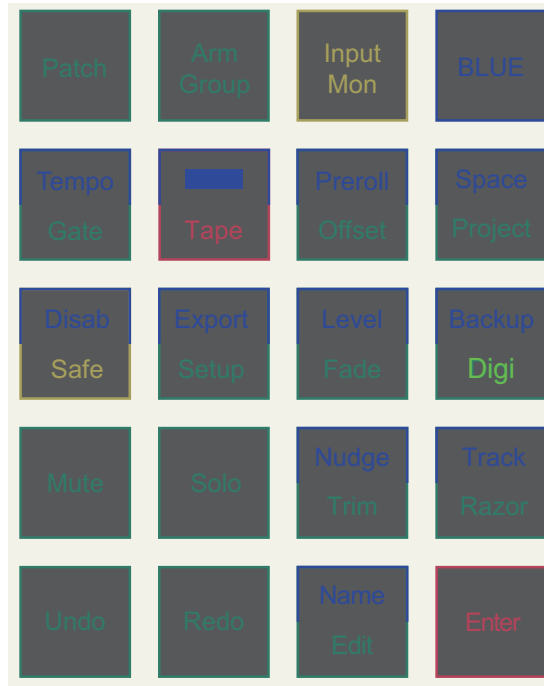
To change the settings for an input, you must open the Patch Menu, and then choose a Track which has that input patched to itself. There is no direct way to choose a particular input.



## 8. The LCD Display

The LCD Display is used to show parameters and timecodes whenever Merlin is being used. The Soft Keys just below the LCD screen are used to perform the majority of setup and editing functions in the system.

Mode Keys are used to choose a menu in the LCD, then the Soft Keys are used to set parameters and execute commands.



*A bank of switches, with the current Mode highlighted.*



*Master Timecode Position  
Numeric Register*

*The LCD Menu, showing soft key labels associated with the current Mode.*

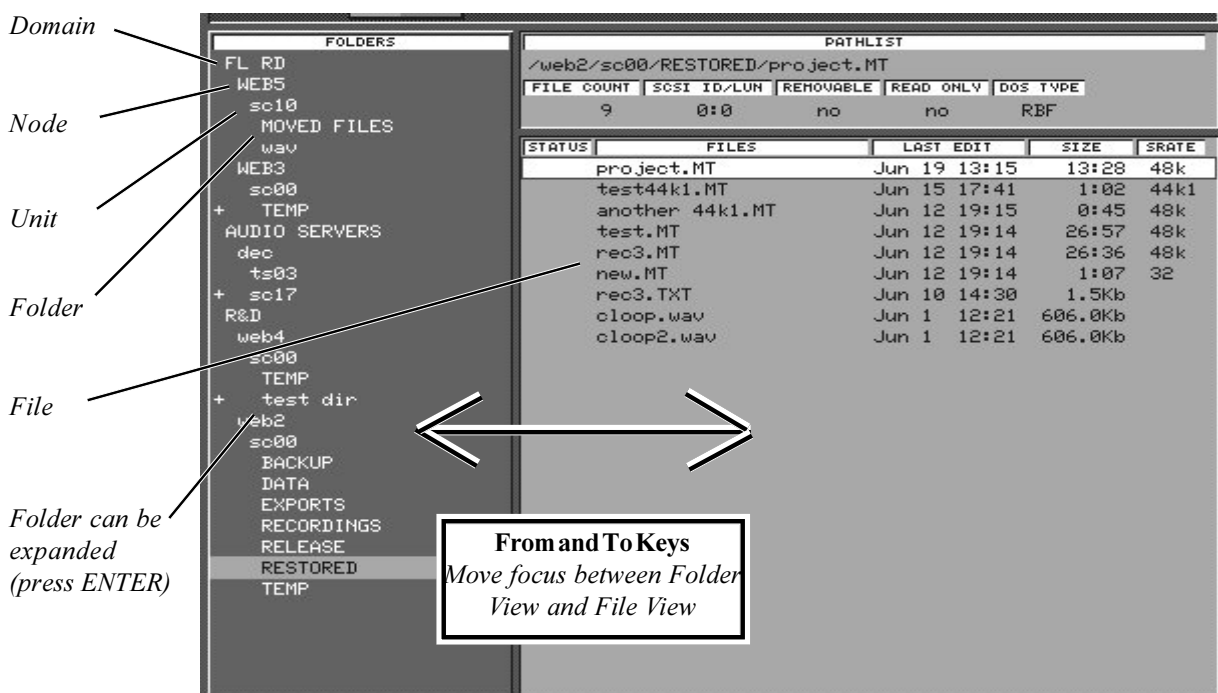
## 9. Starting a Project

A piece of work on Merlin is called a Project. When you wish to begin recording a Project must be open. By pressing the Project key you can see the directory of files in the system, and access file management functions.

### The Directory

The Directory is arranged in a hierarchy as follows:

- Domain - a network group, consisting of servers and clients.
- Node - a machine on the network, which could be a server, a Fairlight machine (Merlin, MFX or FAME) or another computer.
- Unit - a SCSI storage device (hard disk, magneto-optical platter or tape drive).
- Folder - a directory on a disk. Folders may be nested to many levels inside each other.
- File - a Project file or other useful file in the system.



#### Folderview

On the left side of the screen, the hierarchy of items, other than Files, is shown in a descending indented structure. From an operational point of view, Domain, Nodes, Units and Folders are seen in the same way, except that only Folders can be created, deleted and renamed. Henceforth the term Folders will be used to indicate any of these levels in the hierarchy. A Folder containing other Folders is shown with a + sign.

#### Fileview

On the right side of the screen, one level in the hierarchy is shown in a vertical list. This level may contain Folders and Files, which are contained in one highlighted Folder on the left side of the screen.

#### Navigation

At any time while browsing the Directory, there is a current navigation point where a file or folder is highlighted. This point may be in the Folder view or the File view.

To cross from the File side to the Folder side and vice versa, press the From and To keys.

To move the navigation point up or down the screen, use the + and - keys, or the Jogger Wheel.

To open a Folder and reveal the other Folders and Files inside it, press <Blue +> or Jump Right.

To retract all Files and sub-Folders under a Folder, press <Blue -> or Jump Left.

To select the next/previous Node on the network, press <ctrl +> / <ctrl ->

To select the next/previous Unit on any node, press <shift +> / <shift ->

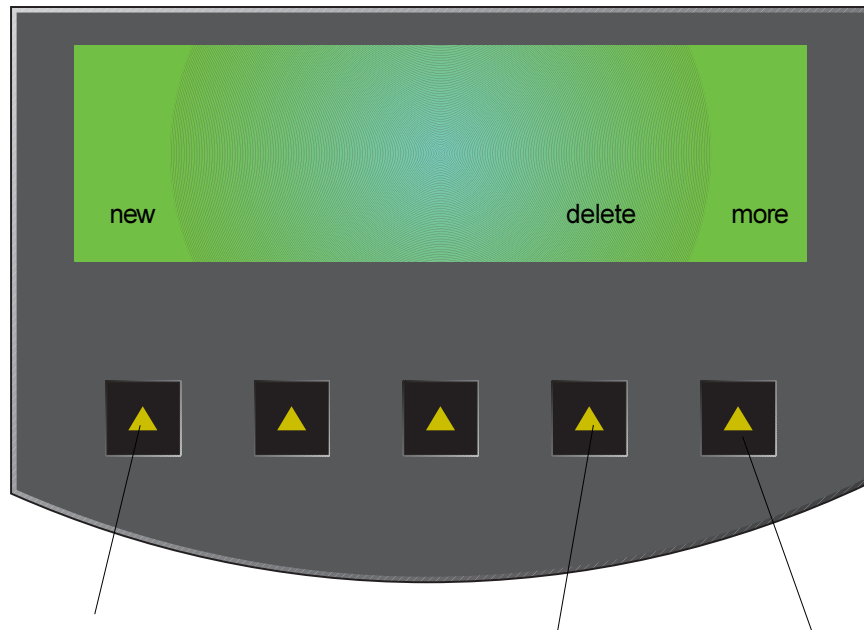
To open a File, press the Enter key. This can only be done in the File view.

Notes:

1. The operation of keys in this interface is very similar to that of Windows.
2. There is no way to open a File other than by pressing the Enter key.
3. Locked files have an L indication. This usually means that another user has the file open.
4. Any navigation moves done with the plus and minus keys e.g. <ctrl +>, can also be done with the Jogger Wheel. For example, holding down the Blue key and turning the Jogger Wheel anticlockwise will open the entire directory "tree" for the network.

**The Project menu**

All file operations other than opening are done by moving the navigation point to a Folder or File and then pressing a Soft Key in this menu. When there is no file open, the menu looks like this:



The first step in any project. You will be prompted for a name before you can continue, so type one of up to 15 characters. The current device number is displayed in the upper LCD, and you can change it using the Numeric Keypad if you wish to start your new project on a different device. Press ENTER to create the new project. If there is a project open when you press this key, it will be closed before the new one is opened. Note: names should contain only the following characters:

A - Z, a - z, 0 -9, \_ (underscore)

Although Merlin will allow entry of some other characters, you are advised NOT to use them, as they may cause problems in exchange with other computer systems.

Press this Soft Key to delete a File or Folder. You will

be prompted for confirmation, and in the case of a Folder, you will be prompted again if the Folder contains Files.

Press this key to access other functions. See next

page

**More**

## Project Menu Options



Creates a new Folder underneath the currently selected one (i.e. the one where the Navigation Point is). You must supply a name for the new Folder, then press Enter.

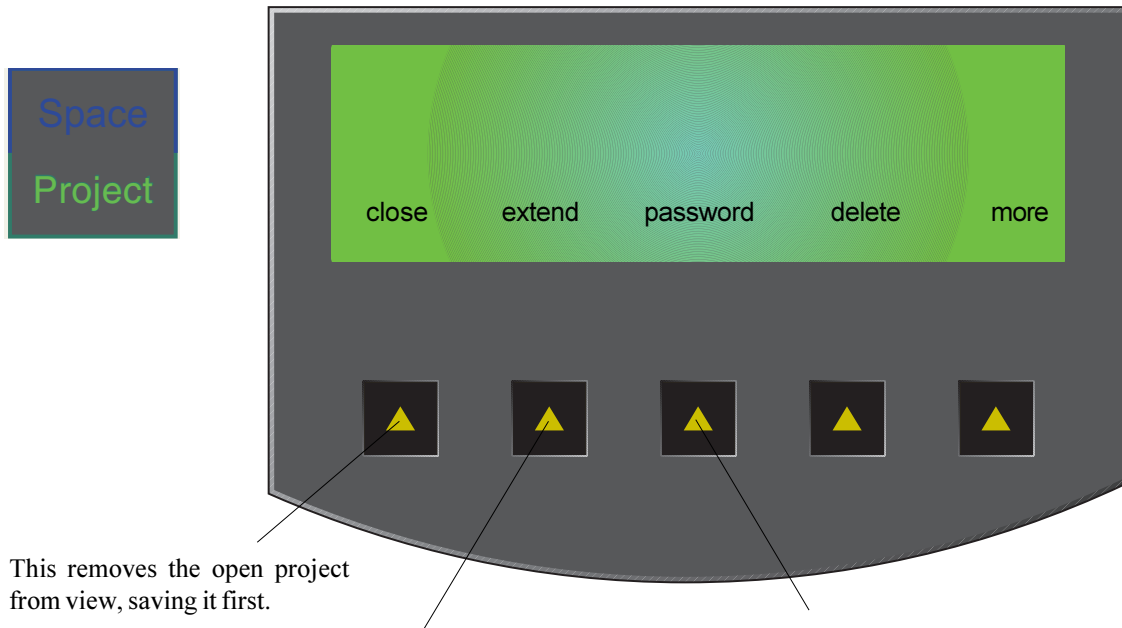
Initiates the copy sequence. First you must select the destination directory for the copy by browsing and pressing the Okay Soft Key. (If required you may create a New Folder by pressing this Soft Key, typing a name and pressing Enter. Then open it by browsing and press Okay to make it the destination Folder.) Now you must supply a name for the copy by editing the one in the upper LCD. Press ENTER to start the copy. Note that if the machine you are copying from or to is in Play at the time, the copy will be held off until the machine stops, and will be held off again each time the machine goes into Play.

The Move sequence is exactly the same as the Copy sequence, except that the original file is removed. If the destination Folder is on the same storage device as the File, the Move command takes only a few seconds, regardless of File size.

Goes back to the first level of the Project Menu

Allows any File or Folder to be renamed. Edit the current name in the upper LCD and press Enter. Domains, Nodes and Units cannot be renamed here, and the currently open Project can only be renamed in the Name Menu.

When a Project is open, the Project menu looks like this:



This makes a copy of the open project, but accesses all of the audio data from the original file. This is used to extend a file to another project or disk drive when you have filled the one you are on, or to make a copy of the edit list so you can try radical changes. The command syntax is exactly the same as for Copy. Extend takes only a few seconds and opens the extension file after creating it. See below for more information.

#### Automatic Project Extension

Merlin Project files have a maximum size of 4 Gigabytes. If this limit is reached while recording is in progress, the file is automatically extended. This is hardly noticeable when it happens, but will cause a split in the clips that are currently recording.

Once a file has been extended, all the audio data from the original or "parent" file is in read-only mode, and therefore cannot be destructively over-recorded in Tape Mode. If this is attempted, recordings will be made instead of the old ones being replaced. Editing of extended audio is, however, unrestricted, because this is a non-destructive process. Automatic extension can be switched off on the Setup (Blue-S) page.

#### Password Protection

Any Merlin project may have a password which restricts access to the material. When there is no password, one can be applied by anyone who opens the file. There are three levels of access available to a file with a password, one of which must be chosen when the password is created. These are:

- Public - any user can open the file and change any part of it. A password is not requested upon opening the file.
- Read Only - any user can open the file and play the audio, but cannot change anything. A password is requested when first opening the file, and if none is supplied, read-only permission is granted. Extending the file will then create a new unpassworded file extension, which can be edited as required without changing the original file. If the correct password is supplied when opening the file, then full write, delete, rename and move permission is granted.
- Private - no user can open the file at all, without supplying the correct password.

Notes:

1. Even a file which has Public Write access cannot be deleted, renamed, or moved. Any attempt to perform these operations will result in the system requesting a password.
2. Once you have opened a file using its password, all other projects with the same password will be opened without the machine requesting you to supply the password again. This may apply to several passwords that have been used in a single session on the machine, and the only way to make the machine "forget" these passwords is to restart it.

## Access Modes - Levels of “Openness”

Merlin operates in a networking environment and therefore must prevent conflicts between users which could compromise the integrity of file data. To do this it defines five different access modes, which are listed below in order of ascending “openness”.

### Media Read

At this level, only the audio data from a Project is being read, and nothing is being modified. When audio clips are “borrowed” from other Projects (see Importing for details), the borrowed-from Project is first opened for Project Read (see below) in order to check the file headers and other information that guarantee the project integrity, and is then dropped back to Media Read. A project open for Media Read has a book-like icon on the File Page display, representing it as a Library.

### Project Read

At this level, the header information is being read, and nothing is being modified. No other user may modify the project while it is in this state. Project Read occurs on first opening a file for import, and on first re-attaching a Project when opening another Project which borrows from it. In both these cases, as soon as the header information has been read, the Project is dropped back to Media Read.

### Marked for Backup

When a Project is marked for backup it is at the same level as Project Read, because the header information is backed up along with the audio data. The Project remains at this level throughout the backup, except at the end when it is briefly raised to Append Write (see below) in order to change the Last Backup date.

### Append Write

When a Project is open for recording and editing, audio is normally being appended to the file rather than removed. Although the edit list may be constantly changed in the most destructive ways, the audio data and the Project header information which describes it are generally added to but not changed. This means other Projects which depend on the integrity of that information are not affected.

### Modify Write

Only a few operations have the ability to change existing audio data or audio header information. These include Overwrite recording, Commit, Dispose and Pack. Project Status is raised to Modify Write only during these operations. If another user has the Project open, permission for Modify Write is not granted, and the operation cannot proceed.

### Multi-User File Access

This section contains information relating to network clients which may not be Merlins - they may be MFX or FAME products instead. Some of the actions described here are not available in Merlin software, but the information may be useful to understand the network directory screen, which can be affected by any client on the network.

In a network, many users may have access to the same files, and sometimes they will want to work with them at the same time. The following chart shows which access modes may co-exist.

Access Mode	Coexists With
Modify Write	None
Append Write	Media Read only©
Marked for Backup	Media Read only
Project Read	Media Read only
Media Read	Append Write, Backup, Project Read, Media Read

Media Reads may co-exist in any number, meaning that a Project may sustain, for example, any number of users at Media Read level (i.e. borrowing clips from it) and also one user at up to Append Write level, who may be recording and editing. If any user is currently attached to the Project by borrowing, the user who is editing it will not be able to perform overwrite recording, committing etc.

Another constraint is that, in order to initiate a Media Read, a user must first pass briefly through Project Read in order to check the header information. This cannot be done while another user has the Project open for Append Write, since the second user might be changing the header information at the very moment that the first one is reading it. So, if a user is editing a Project, no one else can attach to it, although any users who were already attached to it before it was opened for editing will be able to maintain their attachments.

The action of opening a Project for Import also causes it to briefly enter Project Read, even if it has already been opened and closed previously during this session. This means that if another user has opened the Project for editing since the first time it was opened for Import, it will not be able to be opened for Import again. (Import is not available in the first Merlin software release.)



## The Clip

What you are creating when you record is called a “Master Recording” (you could be creating up to 24 at a time). It starts when you drop into record, and it ends when you drop out. You are also creating clips which are displayed on the tracks you are recording. Each clip is a reference to the Master Recording, instructing the computer to play it at that timecode and out of that output.

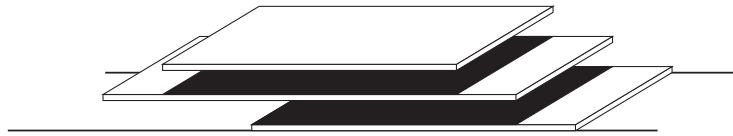
Later you may edit this clip, and this will be fully described in the section “Editing”.

### Time Code Reference

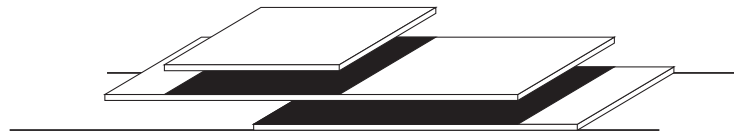
Each clip has a time code reference built into it that causes it to “remember” the right time to play. Unlike a tape machine, which must record all of the silence in between the useful audio, Merlin only stores the useful audio, and the time that it should be played.

### Overlapping Clips

You can record many clips on the same track, even if they overlap. The track can only play one clip at a time, however, and this will be the most recent one you recorded or copied to any piece of track (during crossfades the top layer and the next one down are both played). It is useful to think of the clips as being stacked “on top” of each other as they are recorded, with only the topmost one being visible to the “tape head”. This is illustrated below.



*Clips are recorded or pasted on top of earlier clips. We hear only the top layer (white portions).*



*The same group after one clip has been trimmed, “revealing” the audio underneath.*

## The Track

A track in Merlin behaves something like that on a tape recorder. But it is not the same. A track is simply a piece of time on to which you may record or paste clips. All the clips on a track go to the same output.

### The Current Track

Throughout this manual reference is made to “Current Track(s)”. They are the ones you have selected for recording or editing. Selecting tracks for any purpose is always done on the Track Select Keys (except for arming them), and the last one you selected is a special Current Track which has a higher priority than the other selected tracks. The video screen changes when necessary to show the group of tracks that includes the current track. Selected tracks are shown with their numbers and backgrounds in lighter colours than unselected tracks.

Setup for recording is controlled by two menus and a toggle. The Patch Menu connects inputs with tracks, while the Tape Mode Menu (accessed by holding down the Blue Key while pressing the Tape Mode key) allows critical recording parameters to be set. The Tape Mode switch itself toggles between destructive (Tape) and non-destructive (New) recording modes which are described below.

### **Selecting Tracks for Recording**

Making a track ready for recording is called "Arming" the track. Merlin's upper row of Track keys is dedicated to this purpose. A track can always be armed, as long as it has an input patched to it. To see the patching setup, and change it, use the Patch menu, described below.

### **Recording Modes**

The Tape Mode switch toggles between destructive (Tape Mode) and non-destructive (New Mode) recording.

#### **New Mode**

When the Tape Mode switch is OFF, Merlin records in New Mode, which has the following properties:

Whenever Merlin enters record, a new Master Recording is created for every armed track.

If there are clips already on the track, the new material forms clips that are placed "on top" of the existing clips. Later the Track Menu can be used to bring the lower clips to the surface.

New Mode is mistake-proof - going into record over the top of existing material does not damage it in any way. It is also very useful for recording multiple takes of the same performance eg. while recording instrumental overdubs or alternative ADR lines, because there is no need to change recording tracks in order to preserve a good take.

#### **Tape Mode**

When the Tape Mode switch is ON and illuminated bright red, Merlin records in Tape Mode, which has the following properties:

When TAPE mode is selected the recording process chooses, for each track, whether to create a new recording or replace an existing one, depending on the situation where record is entered. If recording is commenced where the track is empty of clips, a new Master Recording is created. If recording commences where there is an existing clip, its Master Recording is overwritten, subject to these rules:- overwriting can only occur if the material already on the track is the same bit-depth as the current setting for recording, and if the existing material and the recording setup are either both Mono or both Stereo.

Overwriting means directly replacing the recorded data on the hard disk. This cannot be reversed in any way, so if Recording is commenced at the wrong place, a permanent mistake is made. On the positive side, while overwriting is occurring, no disk space is being consumed, because we are replacing what already exists on disk.

Material that has been imported into the project (borrowed) or material from earlier versions of the project that have been extended cannot be overwritten, because the media is actually in another file.

If, while overwriting the material in a clip, the transport reaches the end of that clip, it will be extended, but only if the clip has not been trimmed at the tail. (This rule prevents Merlin from overwriting audio that is not visible on screen, which is considered too dangerous.) If the clip's tail has been trimmed, a new clip and Master recording will be started when the tail is reached.

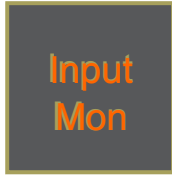
Once a Tape Mode recording begins, it erases all clips or parts of clips in its path, except the clip, if any, that it is replacing. So, after a Tape Mode recording, the range of time just recorded will have no "layers" of clips, only the one that has just been recorded.

Tape Mode is used when it is desirable to save disk space, when a simple edit structure with no layers is desired, and when Merlin is being controlled by an external source such as a mixing console. The reason for this last item is that, if many passes through approximately (not exactly) the same range of time are performed, the clips created by New Mode would result in many tiny pieces being played, which is not only confusing, but can affect disk bandwidth adversely.



### Monitoring of Armed Tracks

When tracks are armed, you have a choice of listening to their input (source) or their playback (track). To control the monitoring function, use the Input Mon button.



When Input Mon is toggled ON, the armed tracks play their input (source) all the time, except when the transport is in Jog.

When Input Mon is OFF, the armed tracks play their playback (track) when the transport is in Play or Jog, but play their input for all other transport modes.

All unarmed tracks are in repro or track mode, all the time.

## The Patch Menu

The Patch Menu is used to choose inputs for the tracks, as well as the type and gain of each input. In this submenu, the Track Keys are first used to select which tracks are having their inputs patched. Once the {patch} or {group} button has been pressed, the Track Keys are used to patch inputs to the selected tracks.



Press to patch inputs to selected tracks. Track keys will flash, indicating that they now represent inputs. The ANALOG/DIGITAL toggle becomes active, allowing either type of input to be selected. Press one key to patch that input to all selected tracks, or any two keys together to patch stereo inputs. Releasing the keys makes the patch and returns the Track Keys to selecting tracks.

Press to change the gain on the inputs to the selected tracks. This can be done with the Jogger Wheel, the + and - keys, or the Numeric Keypad. If you want to type a negative value, press the <Clear> key, then <minus>, and then the number.

Press to assign multiple inputs to multiple tracks (in mono only). The tracks are selected before pressing this Soft Key. All the Track Keys flash, indicating that they represent inputs. Any number of inputs can be selected simultaneously, and upon release they are patched sequentially to the selected tracks. If there are more tracks than inputs, the inputs “wrap around” to the beginning again, allowing multiple sets of the same inputs to be patched to multiple tracks.

**Analog/Digital** Whenever the patch or group commands are issued, the 4th and 5th Soft Keys change to allow a choice between Analog and Digital inputs. Only one type at a time can be patched, so choose the appropriate one before making a choice of inputs using the track keys.

**Mono/Stereo** This is not selected explicitly, but is simply determined by the number of inputs patched to the track. When two inputs are patched to a track it will automatically record stereo clips. It is possible to have some tracks patched for mono recording and others patched for stereo. It is even possible to patch an input to one track in mono, and as part of a stereo pair on another track (though they cannot be armed at the same time).

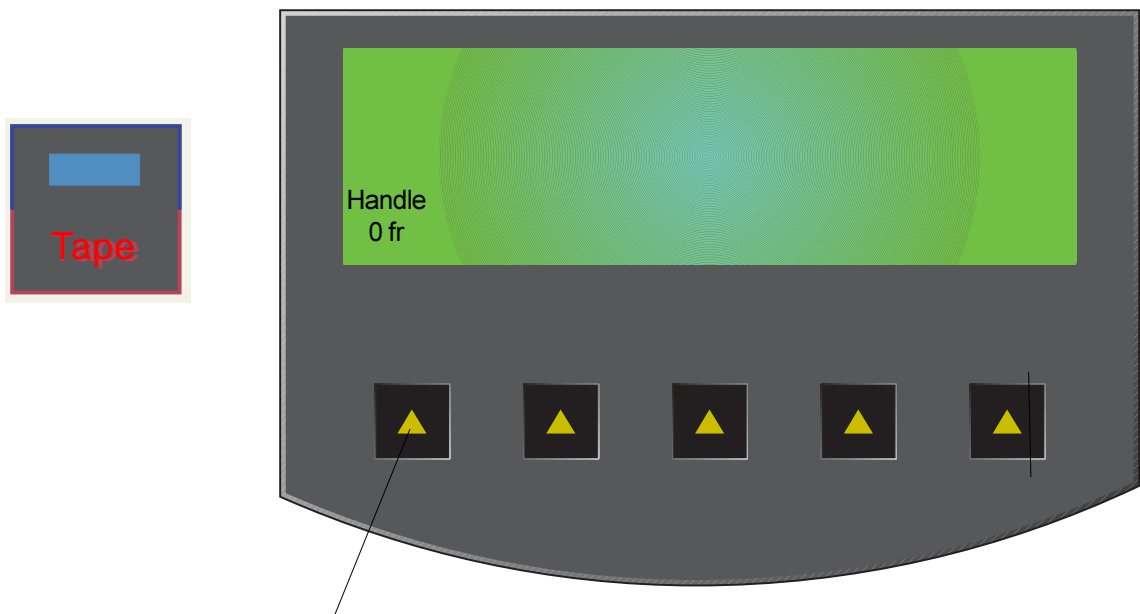
In the disk recorder, a stereo pair has the following properties as distinct from any pair of mono tracks:

1. Editing is always performed on both sides at once.
2. The output numbers are always a consecutive pair.
3. If a clip overlaps a stereo clip on the preceding track, the right hand side of the stereo clip is not heard.

- Gain Structure
1. To get Unity Gain through the system with Analog inputs, set Gain to zero and set Type to Analog +4.
  2. The maximum analog input level with Unity Gain is +24 dBu. More than this will cause overload of the Analog to Digital Converter. If your audio source is lined up to give +4dBu output at 0 VU, this will correspond to -18 on the meters of Merlin. Maximum output level is also +24 dBu, which occurs when the waveform amplitude is at maximum (0 dB on the Merlin meters). This level may be changed. Please refer to the Installation Manual, or see your Fairlight distributor if you want to do this.
  3. To get Unity Gain through the system with Digital inputs, set Gain to zero and Type to AES/EBU.
  4. The Gain field causes boost or cut of the input signal, in the same domain (digital or analog) as that signal.
- Arming Restrictions     Sometimes Arming a track disarms another track. This occurs when there is already a track armed that is patched to the same input .
- Repatching                It is not possible to repatch an input to a track while the track is in record.

## The Tape Mode Menu

While the TAPE Mode menu is active, the Track Keys can be used to arm and disarm the tracks.



A "handle" is extra audio at the start of the recording. This may be set up to 30 frames, and it causes Merlin to enter record earlier than you tell it to. For this to work, the track must have been armed for at least the length of time corresponding to the handle length. The extra audio does not appear in the clip created immediately after the recording, but may be "uncovered" using the Trim Head command in the Trim Menu.

Notes:

- Arm Many Tracks** Any number of tracks can be armed at the same time.  
You may patch one input to as many tracks as you like, but only one track at a time can record or monitor it. If a track is armed, and you try to arm another one patched to the same input, the new choice will replace the old one. This is true even if Merlin is in Record, where recording will end on the originally armed track, and continue at the next audio sample on the new track.
- Arm on the Fly** It is possible to arm tracks while the system is in record. The track goes into record immediately, as long as it has a patched input.
- Handle in Tape Mode** Handles are only created when recording new material, not when overwriting old material. In Tape mode this will depend whether any audio is present at the punch-in point.

### Metering Input Levels

The input levels to the armed tracks are shown as vertical bargraphs at the top of the screen. These are seen on the Video Display whenever the default AutoRecord menu is displayed. For tracks that are not armed for record, meters show the playback levels. The behaviour of the meters can be changed so that the background colour changes to warn you when a certain input level has been reached. This is done by setting the METER RED LEVEL field on the System Page (type <Blue>S, then use the mouse to change the value of RED, or type RED *level*<RETURN>, where *level* is the desired audio level, with or without a minus sign.)

The meter scaling can also be changed. This is done by setting the METER LAW, which affects the range of the meter and its linearity. Meter LAW can be changed on the System Page (type Blue-S), or by typing LAW *n*<RETURN>, where *n* is a number from 1 to 6.

## Entering Record

### Using the Merlin Record Button

With the setup for recording complete, start recording by pressing the Play and Record buttons at the same time.

Merlin will not enter record until it has locked to the synchronising signals in the system. This takes a short time after entering Play, longer if you are running in sync with a video machine. If you try to enter record earlier than the system is ready, it will automatically delay the onset of recording until locked. If the system is in Play when the Record command is issued, recording is immediate.

While in record mode, individual tracks can be placed in and out of record by arming and disarming them, using the Track Arming Keys.

### Timecode Track?

It is not necessary to record a timecode track on the Merlin. It stays in sync with the machine controller by counting the samples of recorded audio that are played and comparing this with the amount of elapsed time since play started.

### Playback

Use the Play button to hear what you have recorded. All the tracks will play, except armed tracks if Monitor is set to Source.

## Punch-in Punch-out

While playing, start recording by pressing the Record and Play buttons together. To drop out of Record, press the Play, Stop, Jog, Rewind or Fast Forward buttons. You may punch in and out at any time while the transport is moving.

On the armed tracks, if Monitor is set to TRACK, monitoring switches from recorded material to track inputs as you enter Record, and back to recorded material when you punch out.

### Automatic Drop-in

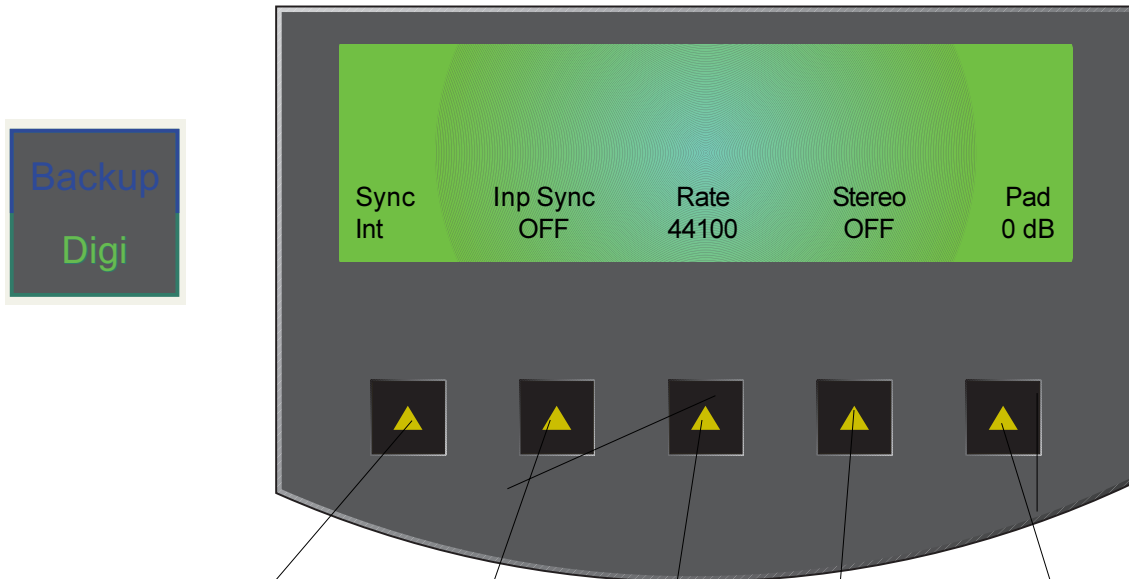
Pre-determined Drop-in and Drop-out points may be activated using the AutoRec menu. This is described later in this manual.

## The Digi Menu

The Digi Menu is used to choose the source of Master Clock synchronisation, and to switch on Stereo mixing within the system.

### The Master Clock

A digital audio system needs a Master clock to determine the precise moments at which audio samples enter and leave the system. When transferring samples directly between two systems using the AES/EBU inputs and outputs, it is necessary to synchronise the Master Clocks of the two systems. Merlin provides a number of synchronisation inputs, and the Digi menu is used to choose which one of them will be used.



Selects the source for Master Sample clock synchronisation. Includes Internal (crystal sync), AES/EBU, Word Clock, Video and Input. This last choice allows you to choose one track, whose digital input will be used as the source for House Sync.

When switched to AUTO, finds the lowest numbered armed track with a digital input (if any), and selects it as the sync source. This means that sync may change if different tracks are armed. When switched to OFF, the normal Sync source, as defined by the Sync Soft Key, is used.

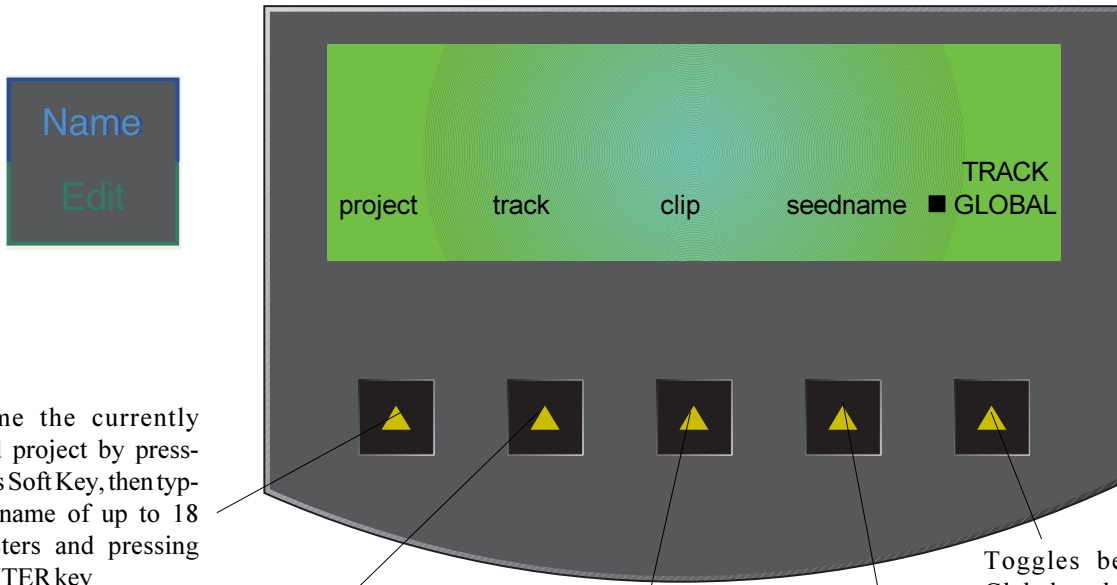
Chooses the sample rate of the project. Cannot be changed after the first audio has been put into the project, by recording or by importing from another project.

When switched on, causes all tracks to be mixed to stereo, and sent to outputs 1 and 2. In this mode, levels and panning of the tracks is determined on the Level Menu.

Allows the audio level of all outputs to be reduced or increased in the digital domain. In some cases this will result in reduced audio resolution. Merlin stores a separate setting for the pad when Stereo Mix is ON so that it is not necessary to change the Pad every time Stereo is turned ON or OFF.

## Naming

The Name Menu is used to give names to clips, tracks or the whole Project. Clips can also be automatically named. Press the NAME Mode key. The LCD gives you a menu as follows:



Rename the currently loaded project by pressing this Soft Key, then typing a name of up to 18 characters and pressing the ENTER key

Name the currently highlighted track by typing a name up to 15 characters and pressing ENTER. You can then choose another Track Key and type its name and ENTER

The clip to be named is the one on the current track, positioned under the cursor (it will be coloured red). Press Soft Key, then type a name up to 24 characters and press ENTER. You may then move immediately on to another clip and name it. If a range exists, all the clips within it will be named with one command.

Toggles between Global and Track-based autonaming. See below for details.

The seedname is used as the beginning of an automatic name. A number will be appended to this name, and incremented each time a new clip is recorded. See below for more details

### Use of Ranges

If a range has been created, all clips that are wholly inside it can be named with one command.

### Keyboard Use

As soon as you press one of the naming Soft Keys, the current name of the thing you have selected will be shown in the upper LCD. This allows you to use it again, or copy it to another item. You can use the Backspace key to erase the last character, or the del key to erase the whole name.

Having pressed the clip Soft Key, it stays “armed”, so as soon as you move the transport over another clip, you can enter the name into it, perhaps after changing one or two characters. This applies to the track Soft Key also.

### Automatic Naming

When new clips are created by recording, they are given a name automatically. This consists of the seedname set in the Name Menu above, plus a number, which is incremented by one each time a clip is created. When creating the seedname, you can add a number at the end, and it will be taken as the starting number to be incremented.

If there is no seedname set, new clips are given a number only.

If you select the TRACK toggle, it is possible to set a seedname for each track. As long as TRACK remains selected, the track seedname will be used when recording on any track which has one. The GLOBAL seedname is used whenever the toggle is set to GLOBAL, or when you have not set a seedname for the track in record.

### Legal Characters

Use only the following characters in names:

A - Z, a - z, 0 - 9, \_ (underscore)

## 11. Solo, Mute, Disable and Safe

Disk Recorder tracks can be soloed and muted from the Merlin console.

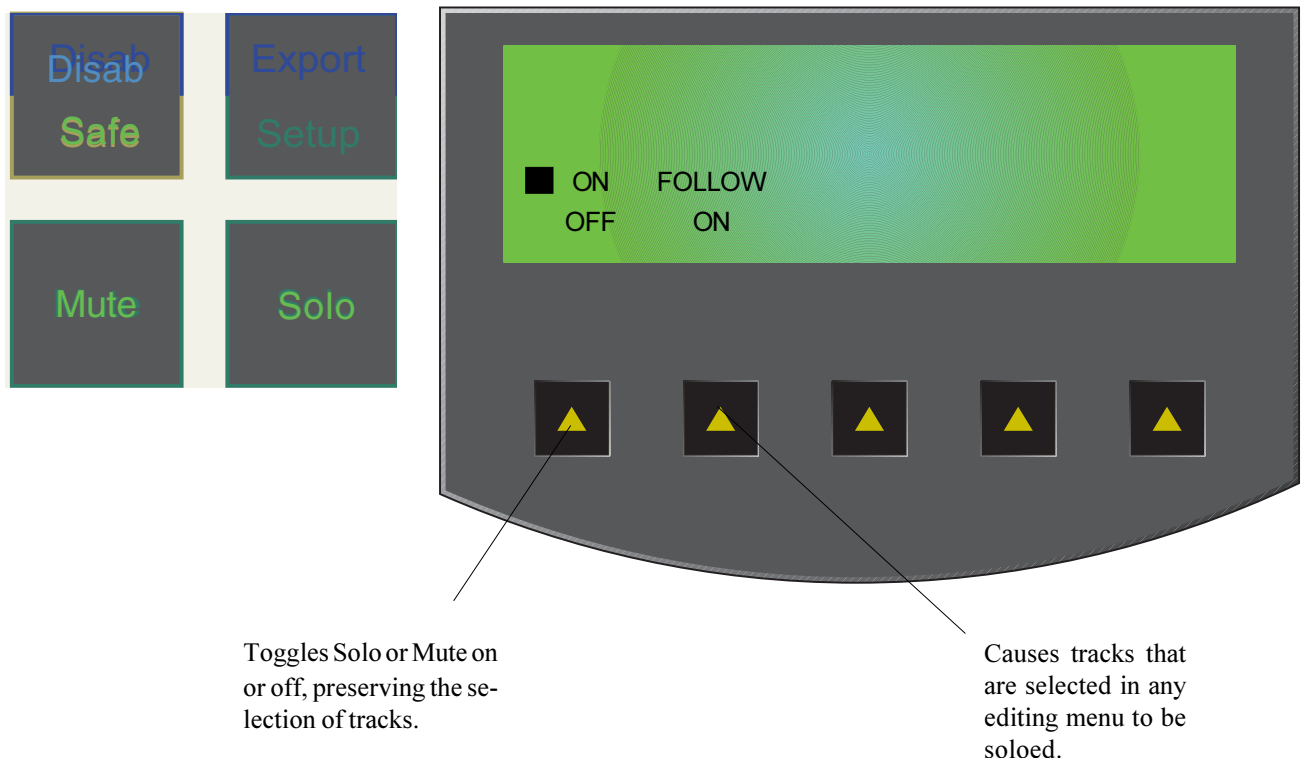
To choose which tracks are to be soloed or muted, hold down the SOLO or MUTE key, and use the Track Keys to make your selection. Disabled tracks (see below) will flash, indicating that they are not available for soloing or muting. When you release the Solo or Mute key, Merlin will return to the Mode you were in previously.

For example, hold down the SOLO button and select Tracks 3 and 4. They are soloed. Release the SOLO key, and its LED will flash, indicating that the Disk Recorder has tracks SOLOED.

If you prefer, press and release the Solo or Mute key, and that mode will be “latched”. Then you can make your selections at leisure before selecting another editing or transport mode.

You can toggle the soloed or muted tracks on or off using the first Soft Key, as shown. When you toggle the key back ON, the Merlin remembers which tracks were selected before.

Note: Selecting a track for Muting or Soloing does not make it the current track.



Toggles Solo or Mute on or off, preserving the selection of tracks.

Causes tracks that are selected in any editing menu to be soloed.

### Track Safe

It is possible to make a track safe, so that nothing on it can be moved, nor can anything be added to the track by recording or editing. To make a track Safe, press the Safe key and select the tracks to be made safe, using their Track Select keys (not their arming keys). The arming key will be illuminated in yellow while the track is safe. Pressing the Track Select key again toggles the track unsafe.

Note that, even when a track is safe, it can be selected for editing, but only copying FROM the track TO the clipboard, ready for pasting on other tracks, is allowed.

### Disabling Tracks

Disk Recorder tracks can be disabled from playback. This differs from muting them in that the audio data from disabled tracks is not fetched from the disk. It is though those tracks do not exist. This can be useful because you can place clips on disabled tracks, providing extra storage or “virtual” tracks that are not played.

When you re-enable tracks, there is a delay of a second or two while they are reloaded.

To disable tracks, hold down the Blue key while pressing MUTE. Then the currently enabled tracks will be lit up, and the disabled ones will be flashing. You may now toggle the status of any track. Double pressing any track key will make it the only enabled track. Holding down one Track key and double clicking on another will “fill in” the tracks between.



**The Clip**

Editing in Merlin is achieved by performing operations on Clips. First we will explain the way a clip is structured. A clip is “born” when we record or by being copied from another clip. It contains information about the following:

**Master Recording Number**

This is a piece of audio stored on disk. It is never altered by editing.

A clip plays by “referencing” part (or all) of a Master Recording. Many different clips may access one Master Recording.

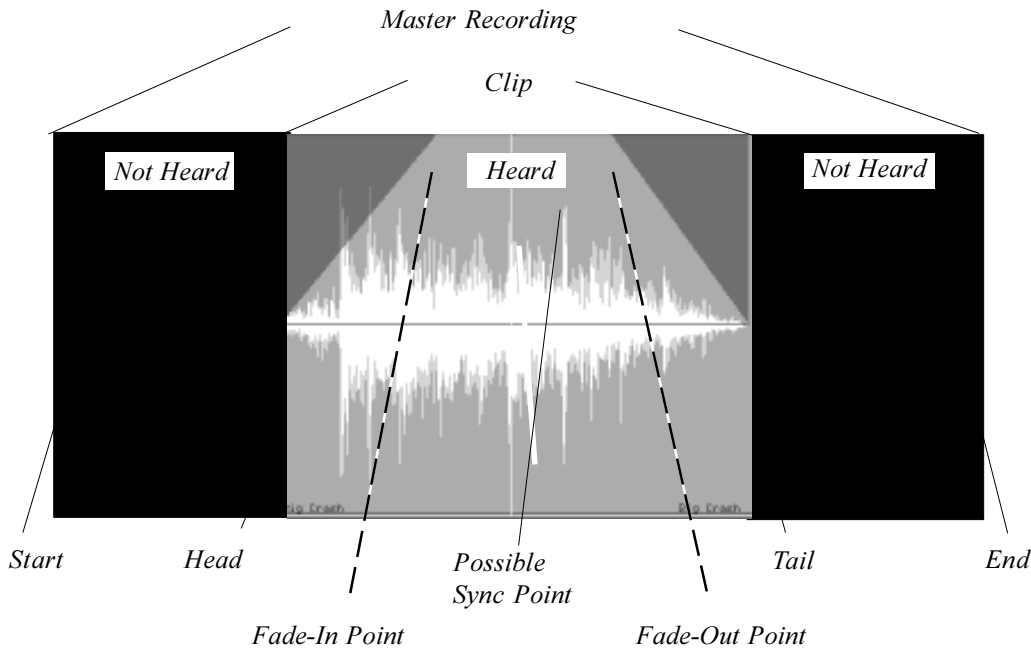
The process of editing may change which part of the Master Recording is accessed by the clip, or at what timecode this happens, but does not change the Master Recording at all.

**Head**

The Head is a “pointer” to the first part of the Master Recording that the clip plays. Immediately after recording, the Head will be at the Start of the Master Recording. By editing you can move it elsewhere.

**Tail**

The Tail is a pointer to the last part of the Master Recording that the clip plays.



**Sync Point**

The Sync Point of the clip is a point that you can place anywhere in the clip. It is usually chosen as the clearest moment of the audio that you can use to check whether it is in sync. For example it might be a particularly loud crash in a sequence of smashing plates. Until you set a Sync Point in a clip, it is at the Head of the clip.

The Sync Point can be found by jumping to points (see Jump keys).

**Timecode Reference**

The clip is played at a predetermined timecode, and this is stored in the clip.

**Fade**

Every clip contains a fade-in and a fade-out. By default these are of zero length, so the clip reaches its maximum level right at the start. But you can set fade points in the clip so that the level is ramped up from silence at the Head to maximum at the Fade-In Point, and from maximum at the Fade-Out Point to silence at the Tail.



When clips overlap, the Fades become Crossfades.

### Level

Every clip has an audio level. After fading in and before fading out, the clip plays at this level. While the clip is fading, the effects of the fades are added to the level.

### EQ

Every clip has a 4 band equaliser built in to its structure. Merlin plays existing EQ settings created in MFX files, but has no way of changing them.

### Name

A clip may have a name up to 24 characters long. This is given to it in the Name Menu. Many clips can have the same name.

### Project Layer

Each clip occupies a unique layer which is used to determine which clip will overlap when two enter the same timecode and track. The layers are assigned chronologically, so the most recently created clips have the highest numbers.

## Summary of Editing Commands

All editing is achieved by altering clip parameters as follows:

Editing Menu	Command Name	Editing Action
Edit	Cut clip	Removes selected clip(s), places a copy of them on the clipboard, ready for pasting
	Cut head or tail	Moves head or tail pointer to reduce the size of the clip, places the removed piece on the clipboard
	Copy	As in cut, but pointers to original clip are unchanged
	Enter key	Places a copy of the edit clipboard at the current timecode position, on the top project layer.
Trim	Trim	Move head or tail pointer
Fade	Fade Head or Tail	Moves fade in or fade out point
Level	Level Set or Trim	Change clip audio level
Nudge	any	Change timecode reference
Track	Pop	Change project layer
Razor	any	Cut time out or insert time into Project

## Selecting Clips for Editing

When you edit, only clips on the selected track(s) will be affected. **The clips (or parts) that can be changed are always shown in red.**

To select the tracks you want, use the Track Select Keys, not the Track Arming Keys. The selected ones will be lit. The clips on the selected track that are affected are chosen in two ways:

1. On some menus the clip(s) that are touching the cursor are the ones that will be affected by the commands you issue. This is true on the Trim and Track menus.
2. Some menus require you to construct a “range” between two timecodes, inside which the audio is affected. This is done using the FROM and TO keys. The Razor menu uses a range. Many menus work with or without a range, such as the Edit Menu.

Merlin allows two methods of choosing what to edit. One mode is called clip or object-based editing, and the other is called range or timecode-based editing. Some editing menus, such as Grab, work only in clip mode, while others, such as Block, work only in range mode. Many menus can work in either mode, sometimes with slightly different commands for each.

There are also two range modes, part mode, where any parts of clips included in the range will be affected by edit commands, and whole mode, where only clips entirely inside the range will be affected. Any editing menu will use only one of these modes. The redness of the clips always shows what will be affected.

**Setting up a Range**

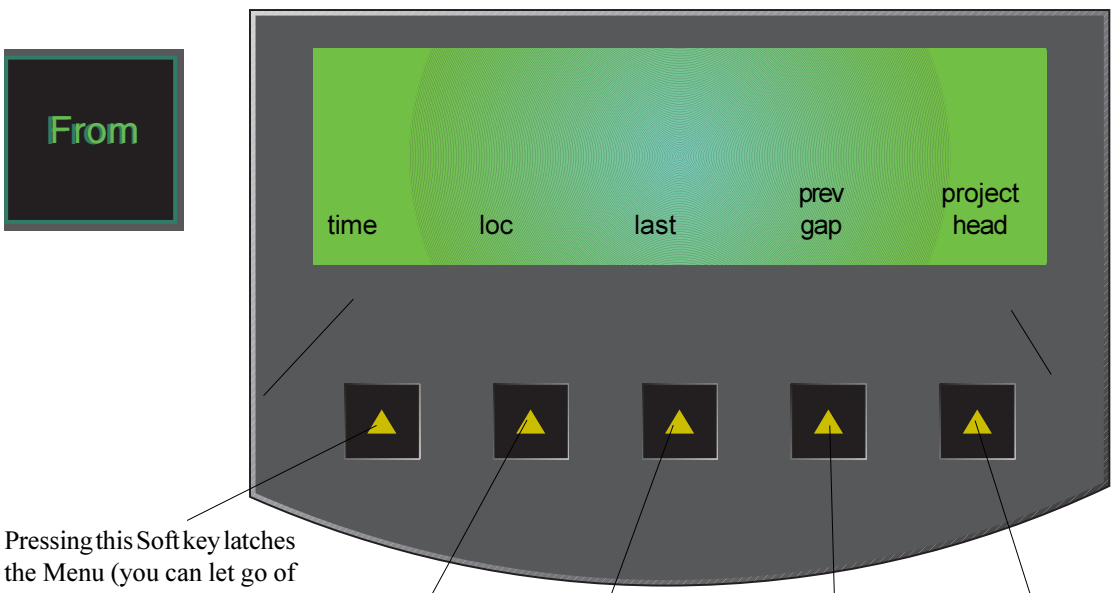
A Range is the span between two timecode numbers. When using a Range for editing, only audio between the two timecodes is affected. The Range keys (From and To) are used for setting ranges.

**Simple Method**

To set a Range, press and release the FROM/TO keys at the start/end of the Range you wish to edit. If there is no range at the moment, you may press just one of these keys and use the Jogger Wheel to drag out a range. You may issue edit commands at any time while dragging out a range.

**Using Range Menus**

(The following description applies equally to the To key.) Holding down the From key causes a menu to appear, described below. At the same time the graphics show the existence of a range with its end at the cursor. Pressing the Soft Keys affects the range end position as follows:



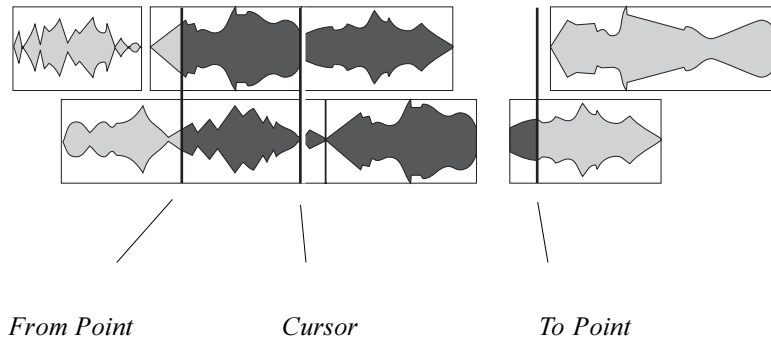
Pressing this Soft key latches the Menu (you can let go of the From Key), and adopts the time in the Numeric Register as the range start. You can now type in or edit a timecode number and press ENTER. For details on editing Timecodes, see Entering Timecode Values.

Pressing this Soft Key latches the menu, adopting the current Location as the range start. You may now type in a Location number or select one with the Jogger Wheel or + and - leys, and press ENTER.

This has the same effect as pressing the {time} Soft Key, except that the previous Range end (from before entering the menu) will be adopted. Now it can be edited in the usual ways, before pressing ENTER.

This Soft Key does not latch the menu. The From Menu "finds" the nearest previous moment of silence between clips on the current track, and adopts it as the Range start. At this point you can press other keys to continue moving the Range start: Release the From Key at any time to accept the current Range start; Press the {prev gap} Soft Key again to find a further previous gap; Press any other Soft Key and switch to its functions. If this latches the menu, the ENTER key will be needed to complete the sequence; Press either Jump Key to move the Range start.

This Soft Key does not latch the menu. The time of the Project Head (i.e. Mark 0) is adopted as the Range Start, and you have the same options as for the {prev gap} Soft Key.



While a Range Menu is latched:

1. You can use the Jogger Wheel to move the end of the Range.
2. You can use the Jump keys to move the end of the Range
3. The video display highlights the Range that will be created if you press ENTER
4. The Numeric Register shows the current value of the Range end that is being changed
5. Pressing ENTER establishes the range and takes the system back to the previous editing mode.

#### **Shortcut to Range Setting**

The Track Keys can be used to set range ends very quickly using the following key sequence:

**<From - TrackKey>** - hold down the From key and press a Track Key, then release the From key. Sets the range start at the Location represented by that Track key.

Similarly for the To key.

#### **Automatic and Manual Ranges**

Ranges can be set to Manual or Auto on the Setup Menu. This determines whether ranges persist across different editing modes. Please see the explanation attached to the Setup Menu.

## 14. The Edit Menu (Cut & Paste)

The EDIT menu is the most powerful and flexible of the menus in Merlin. It is used for Cutting and Pasting clips and parts of clips. It now has multitrack capability.

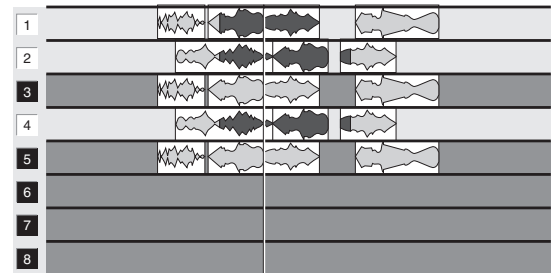
To use the Edit Menu you must first press the Edit Mode key. Then:

1. Select some audio and cut or copy it to the “clipboard”
2. Locate to the position where the audio is to be pasted, and select the track(s) where the audio is to go.
3. Press ENTER to paste the audio into the tracks. This can be done many times, as the clipboard remains intact until you cut or copy some new audio to it.

### Selecting Audio

Tracks are selected using the Track Keys. If there is no “range”, any clips that are touching the cursor (centre line) will go red, indicating that they are selected. If there is a range, all the audio inside it will be red (on the selected tracks). Use the From and To keys to create or change a range (see below).

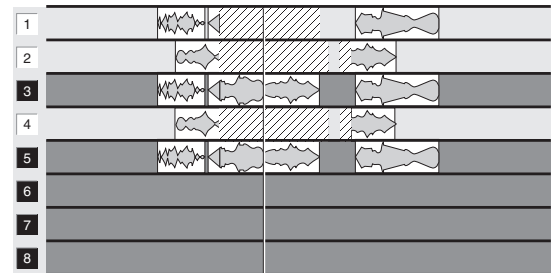
*In this example, a range has been created, and tracks 1, 2 and 4 selected. The selected audio is shown in red on the video screen.*



### Cutting or Copying to the Clipboard

Use the Edit Menu Soft Keys to cut or copy audio to the clipboard.

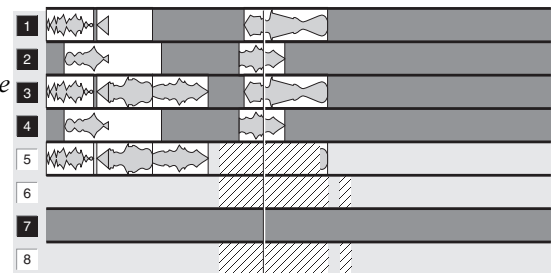
*The CUT RANGE command is issued. The “ghost” clips show the contents of the clipboard.*



### Selecting Destination Tracks

After cutting or copying audio to the clipboard, pressing any track key will cancel the previous selection, and select a destination pattern based on what was cut or copied. You may change that selection before pasting. The screen shows you an outline of what is to be pasted.

*After moving location and selecting track 5. Tracks 6 and 8 are automatically selected. The “ghost” clips show where the clipboard will go if ENTER is pressed.*

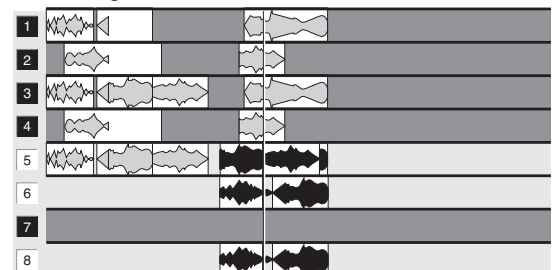


### Pasting From the Clipboard

Press the ENTER key to paste the clipboard contents into the selected tracks.

If the clipboard contains more tracks than you have selected, less than the full clipboard is pasted. If you have selected more than the number on the clipboard, only the number on the clipboard are pasted.

*After pressing ENTER. The “ghost” clips have become real clips in their new location.*



### Other Paste Commands

The FILL commands are available in the Edit Menu (only when a range is present). They are used to paste into a specific range.

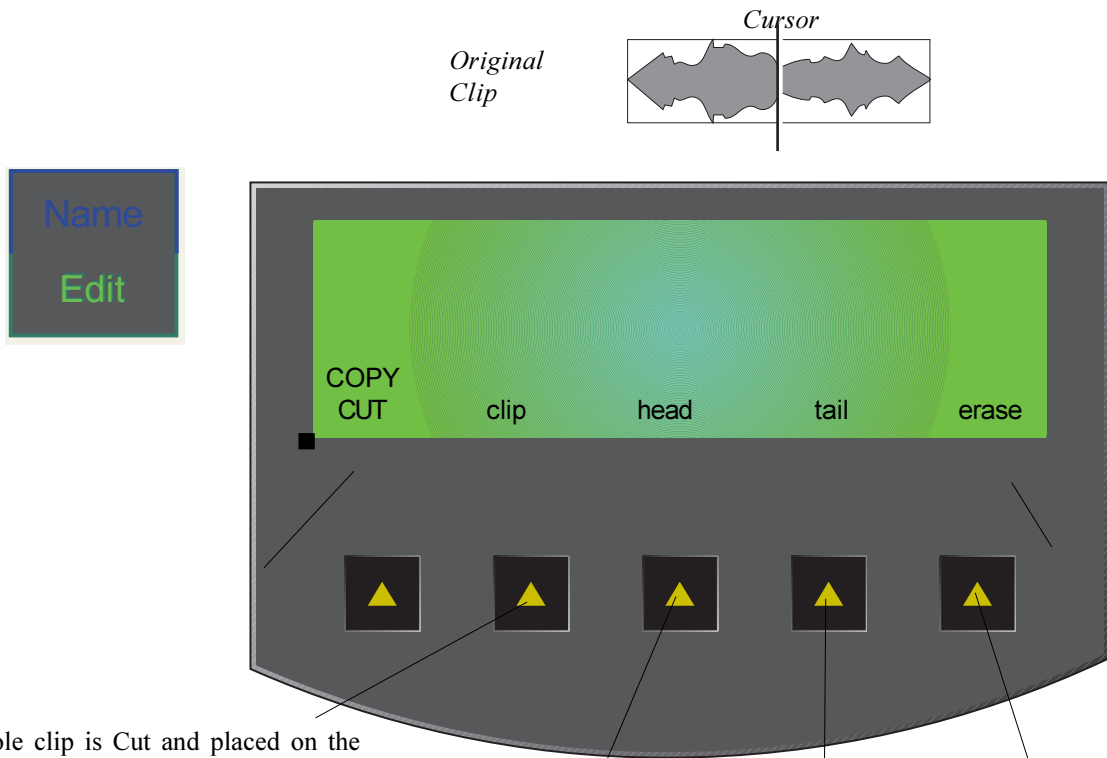
The Blue-Paste command creates new recordings, made from the contents of the clipboard.

## The Edit Menu

The Edit Menu is divided into two submenus called the Cut Submenu and the Copy Submenu. The first Soft Key is used to choose which one of these you want to use. To set the default submenu when Edit is entered, hold down the Shift Key and press the first Soft Key.

When you use the Cut submenu, any clip or part of a clip you act upon is removed to the clipboard, but with the Copy submenu the clips are copied to clipboard and also retained in their original position.

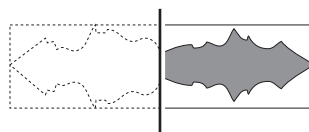
### The Cut Submenu



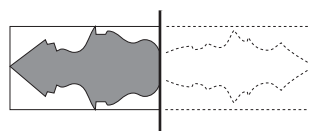
The whole clip is Cut and placed on the clipboard, and the cursor position stored as a sync mark. The transport can then be moved to another time, and/or a new track selected, then the audio may be Pasted there by pressing the ENTER key. The part of the audio that was under the cursor when you Cut will be placed under the cursor at its new location.

The clip ceases to exist. Not the same as Cut Clip because it does not put the clip in the clipboard, but simply removes it, leaving the clipboard unchanged.

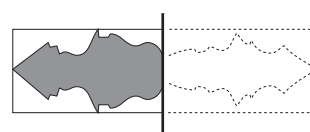
The first part of the clip, from the Head of the clip to the cursor is Cut and placed on the Clipboard. It can be Pasted at a new location by pressing ENTER.



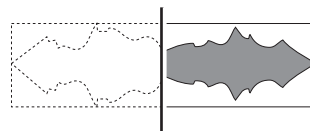
+ Paste



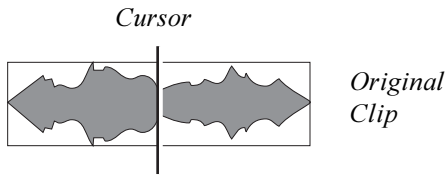
The last part of the clip, from the cursor to the Tail of the clip is Cut. Otherwise as for Head.



+ Paste

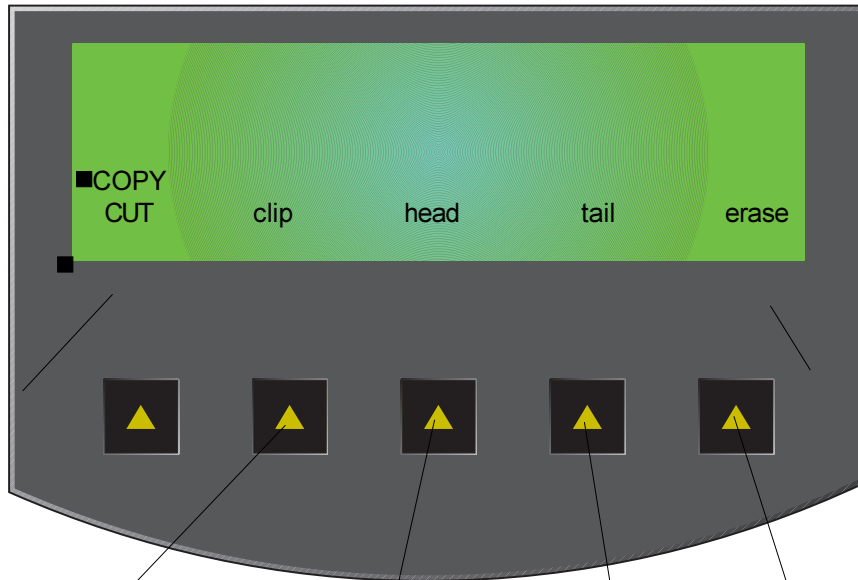


### The Copy Submenu



Name

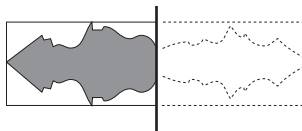
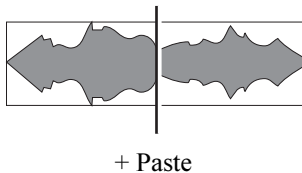
Edit



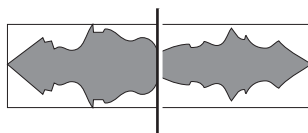
As for the Cut Submenu.

The whole clip is Copied to the clipboard, and the cursor position stored as a sync mark. The transport can then be moved to another time and/or another track selected, then the audio may be Pasted there by pressing the ENTER key. The part of the audio that was under the cursor when you Copied will be placed under the cursor at its new location.

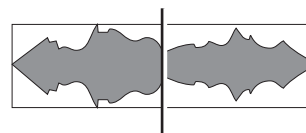
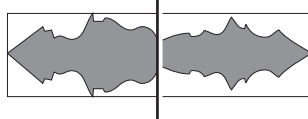
The audio from the Head of the clip to the cursor is Copied. It can be Pasted as described above.



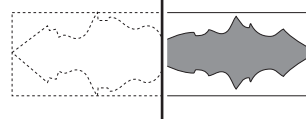
The audio from the cursor to the Tail of the clip is Copied. Otherwise as for Head.



+ Paste



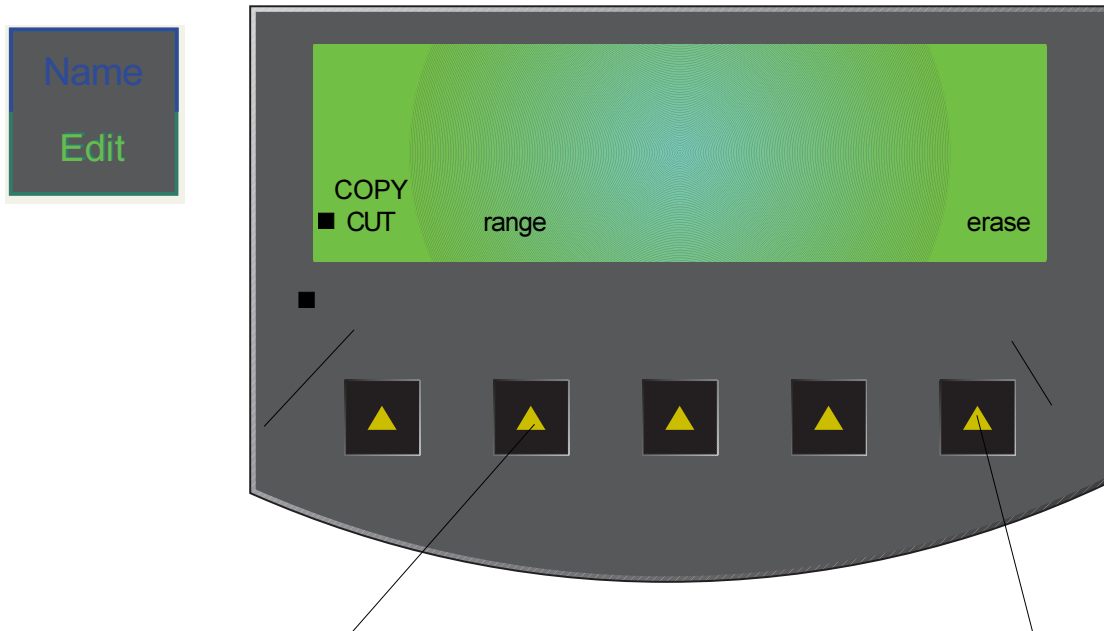
+ Paste



## Edit Commands with a Range

When a range is created, the LCD menu changes to show alternative commands.

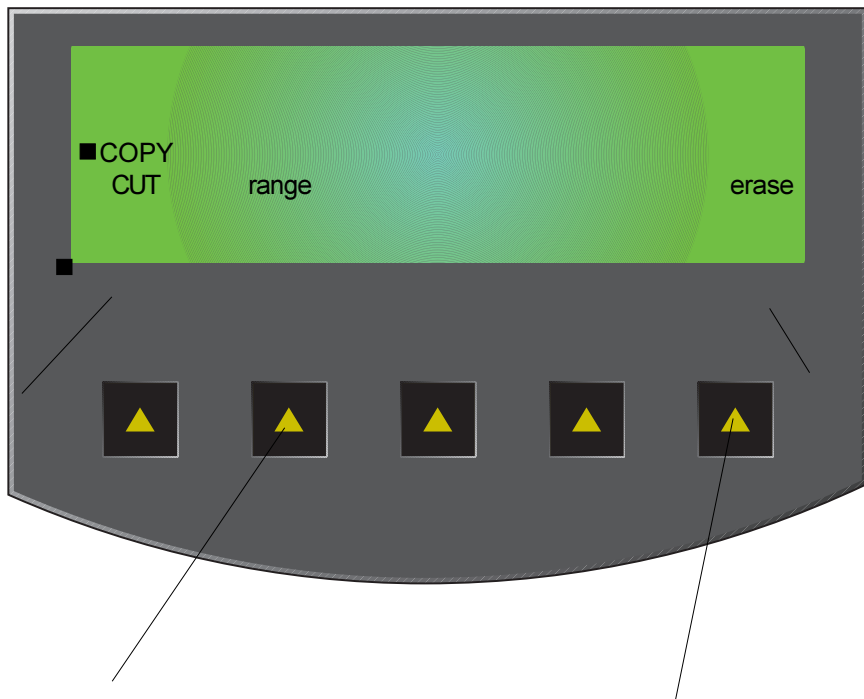
### The Cut Submenu



The whole range is Cut to the clipboard, and the cursor position stored as a sync mark. From there it may be Pasted to a new location by pressing the ENTER key. The whole range is back-timed, i.e. the part of the audio that was under the cursor when you pressed the range Soft Key will be placed under the cursor at its new location.

The contents of the range are erased.

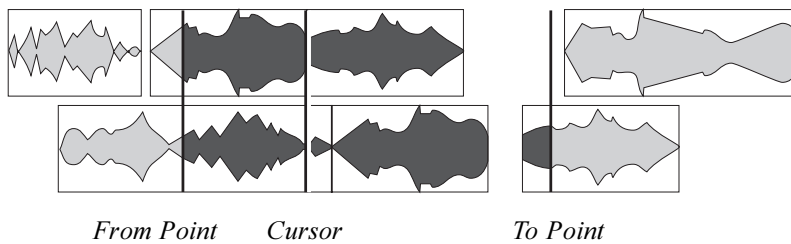
### The Copy Submenu



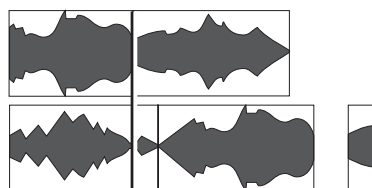
The whole range is Copied to the clipboard, and the cursor position stored as a sync mark. From there it may be Pasted to a new location by pressing the ENTER key. The whole range is back-timed, i.e. the part of the audio that was under the cursor when you pressed the range Soft Key will be placed under the cursor at its new location.

The contents of the clipboard are erased

*This diagram shows the range before copying to the clipboard.*



*After copying, the clipboard contains only the highlighted audio, with the cursor position saved as a sync point.*



*The video screen displays the clipboard outlines, showing you what will be pasted in when you press ENTER.*



The Trim menu is used for resizing clips. We grab some part of a clip (such as the Head, the Tail or the whole clip), move somewhere and DROP it, using the ENTER key. The audio always remains in sync with its previous position, but with a different amount of the originally recorded material exposed.

The Trim Menu allows multiple track selection, so you can slip or trim many clips in the same move.



Grabs both Head and Tail. Move the transport to another timecode and press ENTER. Both the Head and Tail are moved while the audio maintains the same sync relationship to Time Code. This results in a different part of the clip being played, but sync being maintained.

Grabs the Head of the clip. When you move the transport and press ENTER, the Head will be relocated (making the Clip longer or shorter), but the sync of the clip remains unchanged.

Grabs the Sync Point. Press ENTER at any timecode and the Sync Point will be relocated within the clip, without anything else changing.

Grabs the Tail of the clip. Otherwise the same as for Head.

**Restore Trimmed Audio**

Trim head (or tail) is important because it is the only way to “put back” parts of a clip that have been removed by editing.

**Super Trim**

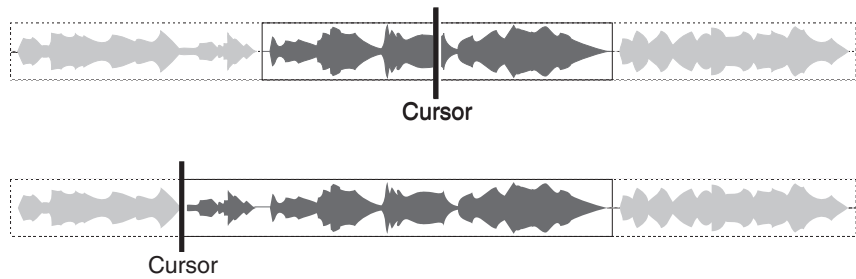
If Super Trim is toggled ON in the Setup (Blue-S) Menu, each time a clip is selected for Trim Head or Trim Tail, the clip is immediately shown at its full possible extension in the chosen direction i.e. showing all the audio in the original recording at the Head or Tail respectively. The extension is always shown "on top" of overlapping clips on the same track, even if it is really underneath them. This allows the clip to be scrubbed, with full waveform visible, before choosing the place to trim the Head or Tail.

If you need to see the clips that have just been covered by the clip extension, press Head or Tail a second time, and the clip will shrink back to its size before you started changing it. The normal trim procedure works in exactly the same way, but the clip is shown differently. Turning SUPER TRIM off on the Blue-S page stops this feature.

## Trim Menu Illustrated

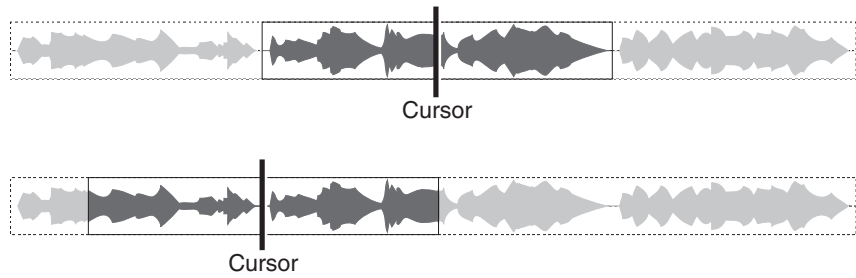
In each illustration, the first diagram shows the situation at the moment a Soft Key is pressed, and the second diagram shows the results of moving the cursor and pressing the ENTER key.

### Trim Head



Head moves to Cursor position, but audio sync is fixed. Clip may be shortened or lengthened.

### Trim Clip

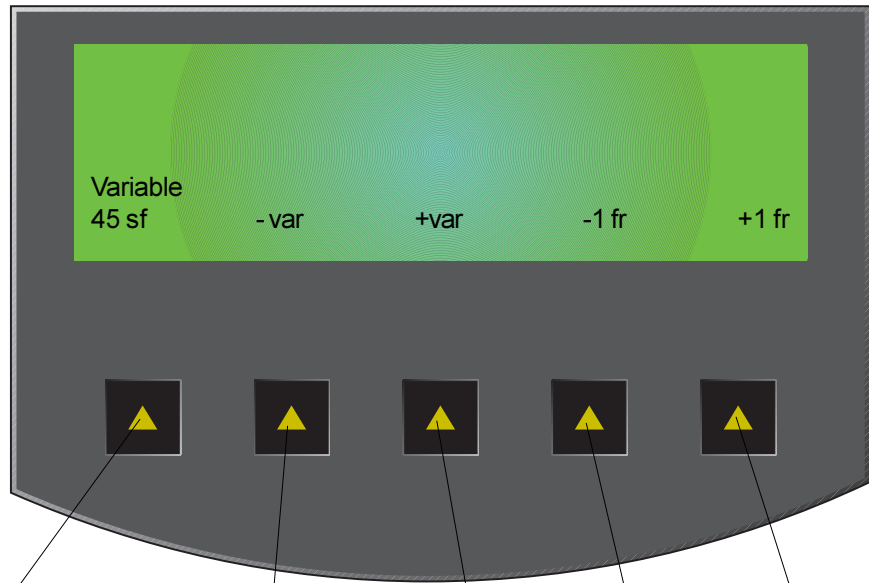


Head and Tail move with Cursor, but the audio sync remains fixed.

The Nudge Menu is used to slip clips forward or backward in time by a fixed small amount. This can be done while playing if desired so you can use it to synchronise tracks on the fly. In this case there will be a short interruption to the playback while the edit list is re-compiled.

**Range**

Range is optional on the Nudge menu. You may set up a range of timecodes using the FROM and TO keys, as described under Editing with a Range. You may also select any number of tracks to be affected. The Nudge Menu will affect all clips that are wholly contained in the highlighted range and on the selected tracks. If you have no range set up, then only the clips under the cursor on the selected tracks will be nudged.



Sets the amount of the variable nudge, which is operated by the following two Soft Keys. Can be a number of subframes from 1 to 99. Use the Jogger Wheel and the + and - keys to set the amount, then press ENTER.

Nudges the selected clips backwards in time by the amount shown under Variable.

Nudges the selected clips forwards in time by the amount shown under Variable.

Nudges the selected clips forwards in time by one frame.

Nudges the selected clips backwards in time by one frame.

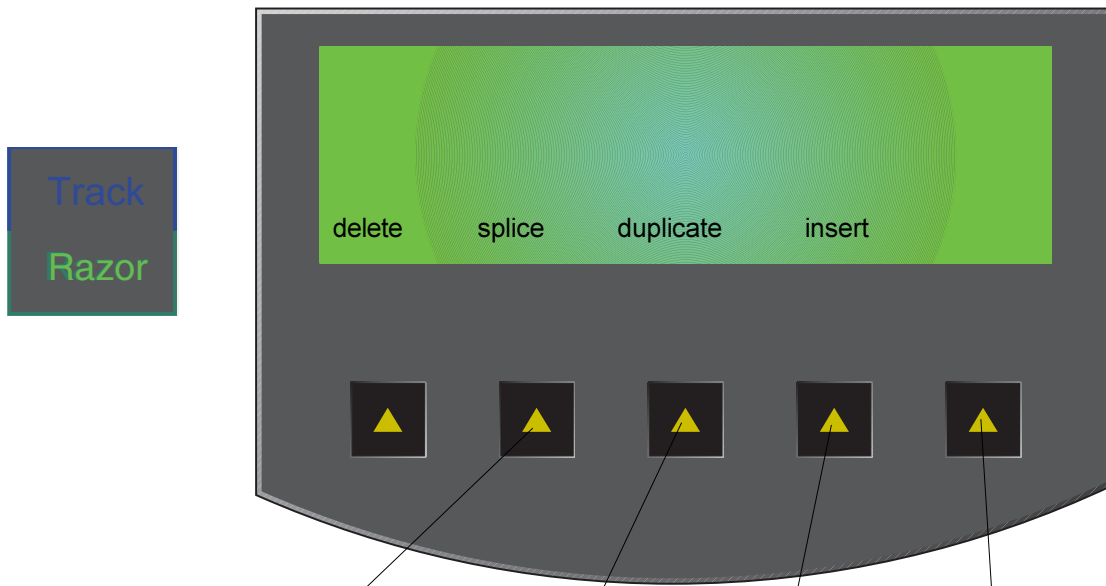
**Notes:**

1. When Nudging the clips in a Range, the software automatically moves the Range so that all the clips remain inside it after being nudged.
2. The Nudge Menu has an alternative mode in which the audio is slipped within the clip, but the boundaries of the clip remain at their current timecode positions. This is known as Nudging Sync. To get into Nudge Sync mode, hold down the Shift key while pressing the Nudge Mode Key. This action is repeated to go back to Nudge Clip mode. A label in the upper LCD tells you which mode the system is in.

Razor Editing is used to insert or delete time on multiple tracks, as though you were cutting tape with a razor blade. A range is always started as soon as you enter the menu. When you use a razor command, many clips may be trimmed, slipped, split or created, but you take no account of this. The Disk Recorder software will do all the housekeeping for you.

To fix the target of a block editing command, you must select the tracks to be edited, and the Range (time) over which the edit operates (see Editing with a range, page 25).

## The Razor Menu



This will remove all of the audio in the Range, and the time as well, so the ends of the range come together. Useful for removing audio after a recut of pictures.

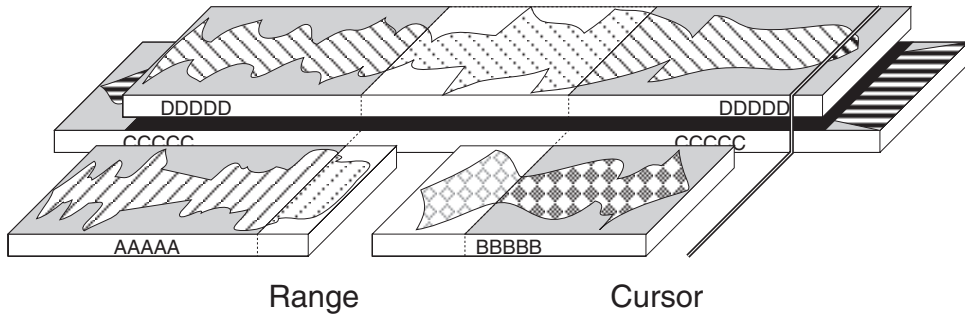
The audio in the range, and the time it occupies, are moved to the cursor position. This is equivalent to cutting a piece of tape and re-inserting it at the cursor position.

A copy of the audio in the Range, and the time it occupies, are inserted at the cursor. This is equivalent to making a tape dub of the audio in the range, and inserting the copy at the cursor position.

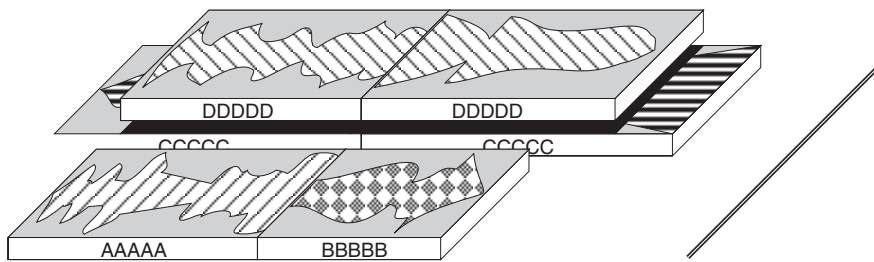
A period of silence, equal in length to the range, is inserted at the start of the range.

## The Razor Submenu Illustrated

### Original Track Layout

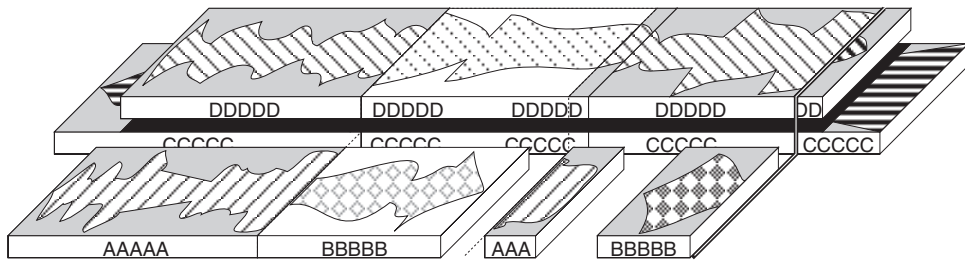


### Delete



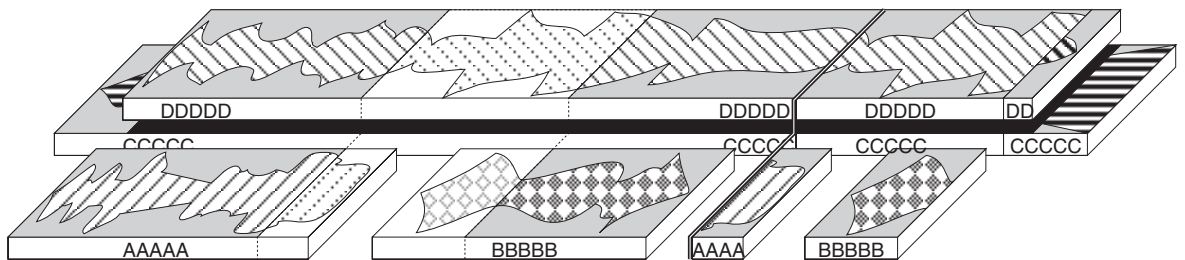
*The Range is completely removed, and the audio on either side butts up together.*

### Splice



*The Range, and the audio in it, are relocated to the Cursor position.*

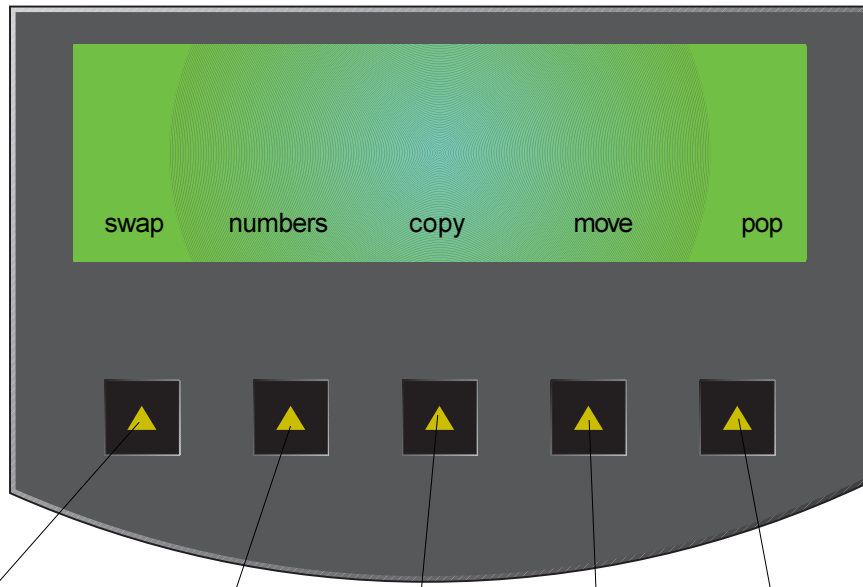
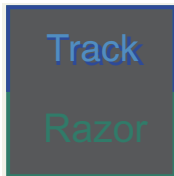
### Duplicate



*The Range, and the audio in it, are copied to the Cursor position*

The TRACK Menu is used for editing across tracks, and amongst layers of audio that have been recorded "on top" of each other. Most of its functions start with selection of a SOURCE track, followed by a command, then selection of a DESTINATION track. This applies to the first four Soft Keys.

The function of the fifth Soft Key is to select a buried piece of audio and bring it to the top of the stack so it can be heard. While the Track Menu is current, the top section of the screen shows the presence of layers of audio at the current cursor position, on the current track. This display is used as a guide to the layers that can be brought to the top for listening and editing.



Used for swapping audio between tracks. Select the SOURCE track, then press the swap Soft Key, then select the DESTINATION track. All the clips and parts of clips within the range will be swapped between the two tracks. All layers of audio are swapped.

Used for swapping the positions on the screen of two tracks. Use the SOURCE and DESTINATION selection as described above to exchange positions and outputs between two tracks.

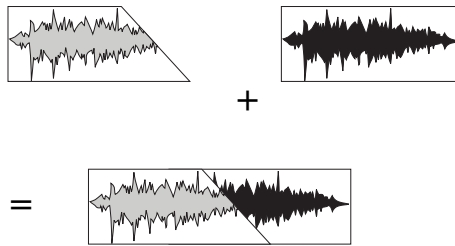
Used to copy audio from one track to another. Select the SOURCE track, press the copy Soft Key, then select the DESTINATION track. The audio in the range on the source track will be copied over the same range in the destination track. All layers of audio are copied.

Press this Soft Key, then use the Jogger Wheel or the plus and minus keys to select one of the clips shown as separate layers at the top of the screen. Pressing ENTER bring the selected clip to the top of the stack.

As move, except the audio on the source track is removed.



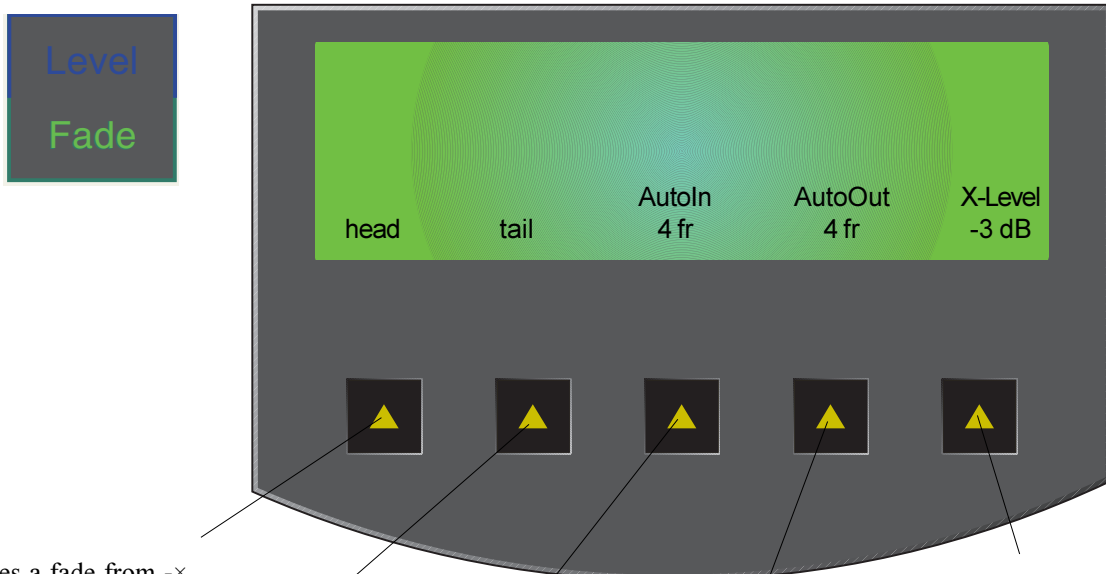
Each clip can be given a fade-in and fade-out. These are performed in the digital domain before the audio is converted back to an analogue signal at the output. When the fade of one clip is placed over another clip, a crossfade between the two clips occurs.



Press the Fade key and select the track(s) on which you want to fade clips. The clips to be faded are the ones on the selected tracks which lie directly underneath the cursor.

The Fade menu achieves the fade-in and/or fade-out. If two fades lie on top of each other, only the fade on top will act, and the clip underneath will crossfade as illustrated above.

**The Fade Menu**



Causes a fade from -∞ dB at the Head of the clip to the clip level at the cursor

Causes a fade from the clip level at the cursor to -∞ dB at the Tail of the clip

Select a number of frames up to 99 to be the Auto fade in time, then hit ENTER to execute the fade-in.

Select a number of frames up to 99 to be the Auto fade out time, then hit ENTER to execute the fade-out.

Sets the level at the mid point of new fades, where both clips have the same loudness. In theory this should be set to -6 for perfectly in phase audio, and to -3 for completely randomly phased audio. You can also set the value outside these limits to achieve desirable fade in and fade out contours.

**X-Point**

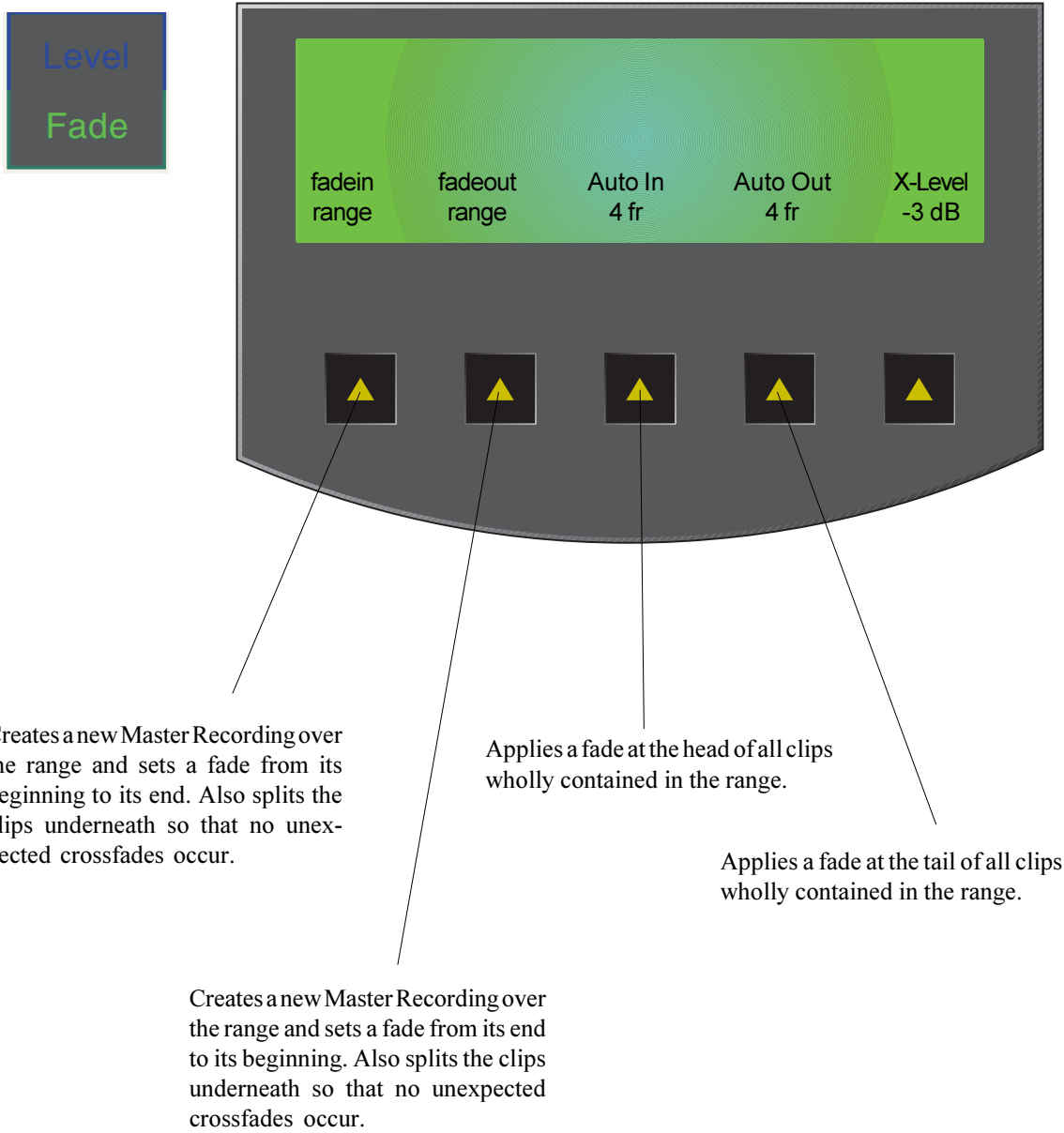
It is possible to move the “mid-point” of the fade earlier or later in time. To do this, hold the Blue key and press this Soft Key. Its label will change to X-Point, and you can enter the position of the mid point as a percentage of the duration of the crossfade.

**Notes**

1. Auto In and Auto Out can be performed together.
2. You can use the mouse to shift the point of equal level right and left within the duration of the fade. Just click anywhere inside the graph at the top of the screen

## Fades With a Range

When a Range is established, the Fade Menu changes its behaviour, allowing fades across multiple clips.



## More About Fades

### Crossfades and Channels

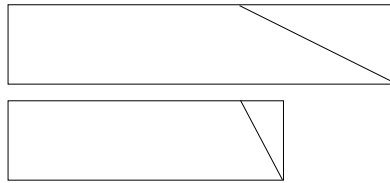
During a crossfade, two clips are actually playing, one fading down and the other fading up. Merlin can play crossfades on all tracks at the same time, but not for an indefinite period of time.

### Fade Defaults

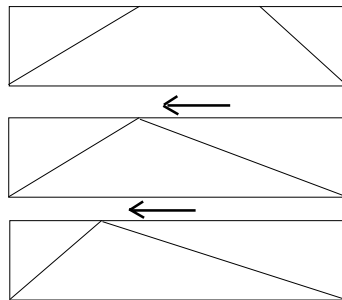
Every clip has a small fade at the head or tail to make it sound smoother. This is called the default fade, and you can control its length. One way is to type FDEF n <RETURN> where n is the length you want in subframes. This method lasts only during the current session and is not remembered by the project or the machine. To change it permanently you must edit a Configuration file (see Configuration files).

### Notes

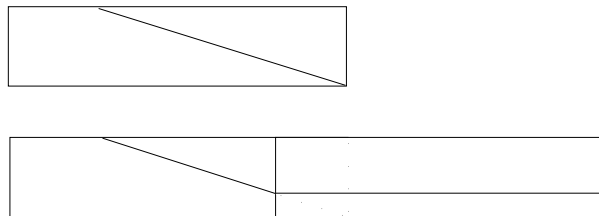
1. If one fade lies on top of another, starting later than the underlapping clip's fade-out point, both of the fades are performed normally, without any "induced" crossfade effect. This occurs only while there is overlap between the two clips, so it is not a good idea to extend the underlapping clip past the end of the overlapping fade.
2. Trimming the end of a clip where a fade occurs will result in a fade with the same Timecode point inside the clip, but starting or ending at the new Head or Tail.



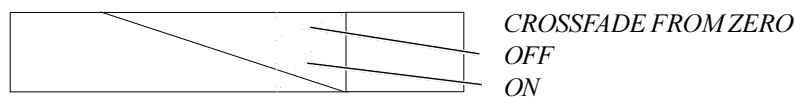
3. When a clip Level other than 0 dB is applied, the Fade will reach the applied level (see the Level Menu).
4. If you try to create a fade that overlaps a fade at the other end of the clip, the other fade will be "pushed" towards its end of the clip so that there is room for both fades without overlap.



5. It is possible to "interrupt" a fade by placing another clip on top of it. This can be used to create ramped level changes.



6. If a crossfade is positioned so that one of the clips is not as long as the fade requires, part of the fade will be cut off. To prevent this, select the CROSSFADE FROM ZERO option on the System Page.



7. Fade defaults do not usually occur at butt edits between clips. To turn them on, enable the Fade Def on Butted Clips option on the S Page.

The Level Menu allows you to set an amount of attenuation for each clip. The range is from -99 dB to +99dB (zero is the default when a clip is first recorded).

The clip fade-in and fade-out rise to and fall from this level.

**Range**

Many clips can be altered at the same time using a range. This is created using the FROM and TO keys, as described in the section on Editing with a Range. When using a range, only clips that are entirely within the range are affected.

**Track Selection**

Any number of tracks may be chosen by pressing their Track Keys.

**Mode Selection**

When CLIP is selected, the Set and Trim parameters alter the level of the currently selected clip(s). When DISPLAY is selected, the Set and Trim parameters affect the vertical size of the waveform display. When TRACK is selected (only possible if Stereo Mix is ON), Set, Trim and Pan affect monitoring of the selected tracks in the stereo output. These settings cease to have any effect when Stereo Mix is switched OFF.



Sets the value of the current parameter on selected clips/tracks (depending on the MODE setting, this could be CLIP level, DISPLAY amplitude or TRACK monitor level). This may be a negative or positive number. After pressing this Soft Key, you will see the current value below the Set label. Type the value you want, or use the Jogger or + and - keys, then press ENTER to set the parameter value. If a negative number is to be typed, first type <Clear><->, then the number, then ENTER.

Trims the value of the current parameter up and down on selected clips/tracks. Press the Soft Key, then type a number, use the Jogger or the + and - keys to change the number, then press ENTER to make the change. All the same parameters affected by the Set Soft Key can be changed using the Trim Soft Key, but the changes are relative to the current settings.

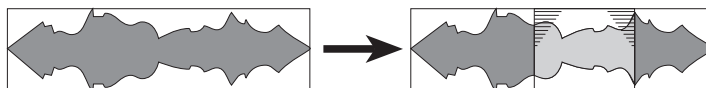
**Pan** is only visible when Stereo Mix is ON. It affects the pan position of the selected audio in the stereo mix. If MODE is set to TRACK, the pan value affects the whole track. If MODE is set to CLIP, only the currently selected clips are affected. By default, clips have Pan set to OFF, and are controlled by the Pan value for their Track. If a clip has a value for Pan, this overrides the Track setting. Pan values are positive if right of centre, and negative if left.

**Info** is visible when DISPLAY mode is selected. When it is ON, each clip shows its level (if non-zero) and its bit depth.

The selected clips are split into two at this point. If a range has been created, clips are split at both ends.

**Note:**

1. To set the level for just part of a clip, first use the SPLIT command to break it into the right sized pieces, then set the appropriate levels.
2. To create a ramp between different levels in one clip, first copy the section whose level is to be changed (using the Edit Menu), then paste it back on top of its source. Change its level as desired, then use the Fade Menu to create fades at either end of the clip. This will cause it to crossfade with the source clip underneath, which will be playing at the original level.



3. It is possible, when using the Level Menu, to push the level of a clip over digital maximum. Check meters.

The Gate Menu allows you to remove silence in a clip, by erasing ranges where the level is low. It has a number of parameters that allow you to achieve exactly the result you want.

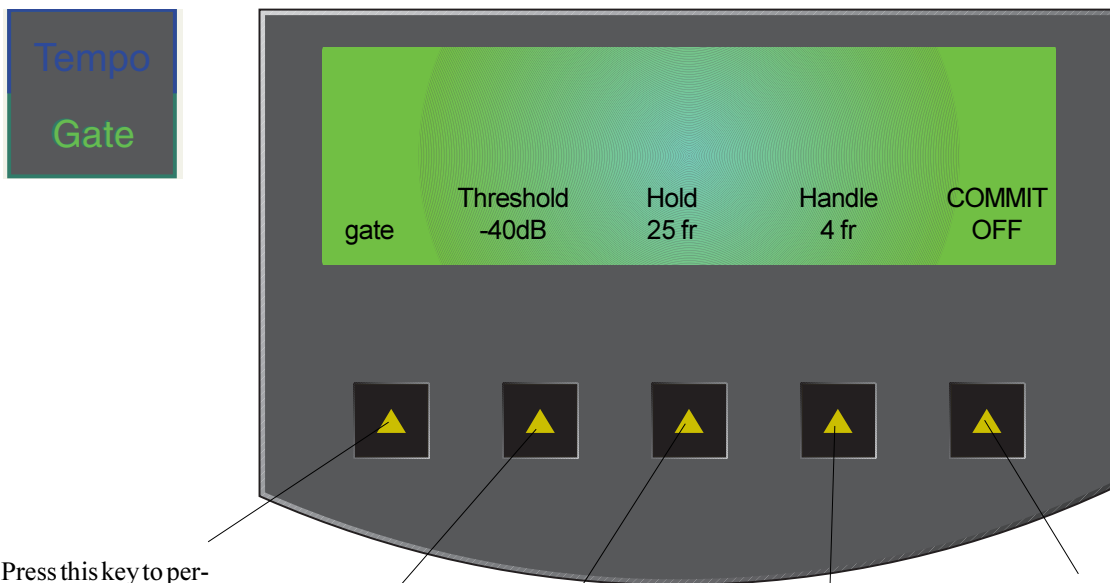
Like any editing function, gating is non-destructive, meaning that you can UNDO it, but a special form of the commit command is included in this menu (for more information about committing, see the Space menu).

### Gating During Recording

Whenever you record a new Master Recording, the system stores the information about levels that it will later use to execute the gating function. This allows you to perform gating instantly on newly recorded audio. If the memory is assigned to storing gate points runs out, scanning may be required (see below).

### Gating After Recording

If you gate a clip whose Master Recording was not done in the current session, or if you gate using parameters changed from the time of the original recording, the computer will scan the Master Recording to find the gate points. This takes about half real time.



Press this key to perform the gate function, once you have set the parameters to the right.

This is the level below which audio will be gated out.

This number is the amount of time that the level must stay below the threshold before gating takes place. This prevents gating from cutting the audio into too many pieces.

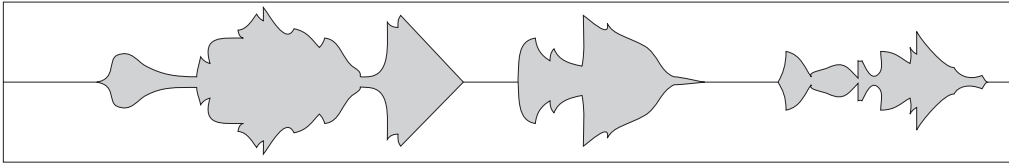
This number is a length added to the head and tail of all gated clips which you can use to retain the slow attack or decay of the audio below the threshold level.

If Commit is toggled on when the Gate command is issued, you will be offered the choice of committing the edits performed by the gate command. If you confirm the Commit by pressing ENTER, the erased material will be permanently removed from the disk.

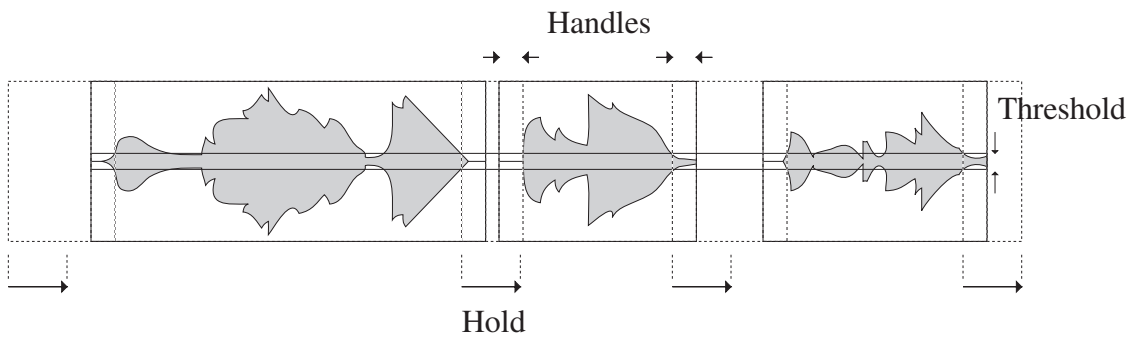
### Notes

1. The gating information gained during recording is based on the threshold and hold values set at the time of the recording. If you change those values and then issue the gate command, the audio will be re-scanned.
2. When you have armed tracks for recording and the meters are displayed, a “traffic light” display shows you the gating activity. A green light shows that the level is above threshold. A yellow light appears when it drops below, and finally a red light comes on when the level has stayed below the threshold for longer than the hold time (i.e. gating will now occur.)
3. When COMMIT is toggled ON, the system will ask you to confirm by pressing the ENTER key before anything destructive happens. While the computer is waiting for confirmation you may play the audio to check whether it is okay before pressing ENTER. To escape at this point, press any soft key or mode key.
4. See next page for illustration of the gating parameters.

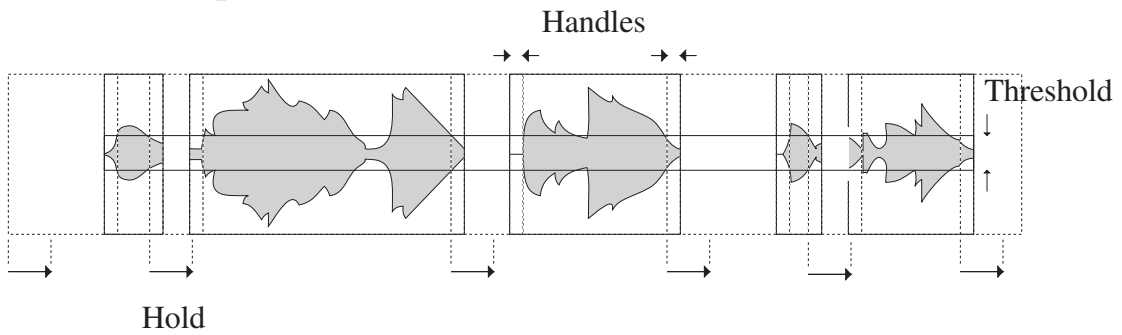
Original Audio



Example 1



Example 2





Undoing an edit means going back to the state the Project was in before you made it. Edits can be undone and redone on 64 levels, which means you can go back to how things were 64 edits ago if you want.

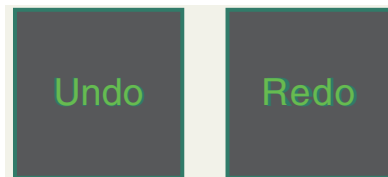
### Undo and Redo Buttons

Pressing the UNDO key causes the system to return to the edit version you had just before the last change in the edit list. Changes in the edit list are caused by all actions which change clips or parts of clips in any way, but not by changes in setup or configuration such as arming tracks or patching inputs.

Pressing the REDO button takes the system forward in time after one or more edits have been UNDONE.

#### Notes

1. Immediately after an edit, there are zero levels of REDO available. This is regardless of how many UNDOs you made just before the edit.
2. After the following operations, UNDO is not possible:
  - All Disk Menu operations
  - Changing frame rate when there is a clip straddling midnight (timecode 00:00:00:00). You can, however, reassert the previous frame rate and get back to where you were before changing it.
3. Immediately after a recording, pressing the UNDO button will cause the newly recorded clip to disappear from the screen, but the recorded data remains on the disk. It can be removed from there using the "dispose" command which is available in the Disk Menu.



After recording for some time, you may fill the hard disk you are working on. If you wish to continue recording you may extend to another hard drive and continue (see Project menu), or throw out some rubbish from your work so far.

### Throwing Out Rubbish

You may have a large amount of audio that was recorded but is not being used. It has either been erased, trimmed from the clips, or is being covered by other clips on the same track. At any rate, it is not now audible. If we need some space to do more recording, and are sure that some of the audio is not needed, we can get rid of it to create that space. This is done on the Space Menu, which is shown below. For a pictorial explanation, please see the diagrams on page 116.

### Range

The Commit command may operate in a timecode range, which is set up using the FROM and TO keys. If no range is specified, the clips under the cursor on the selected tracks are affected.

### The Disk Menu



Frees the disk space occupied by all completely UNREFERENCED recordings (e.g. clips that have been erased, or recordings that were undone)

The project is packed into the smallest possible area of disk, releasing the remainder for general use. This may take some time, because the audio on the hard disks will be moved around.

When using "keep borrowed" extra audio may be brought in for both ends of extended clips (if editing was done before the extension occurred). This allows the clips to be expanded later, using material that was trimmed off originally. Above 99 seconds, the display shows ALL, meaning bring in all of the original Master Recording.

Commit performs two actions, acting on all clips that are touching the cursor on selected tracks, or all clips in the range if you have created one. Firstly, it removes all the clips and parts of clips that cannot be heard (usually because they are "covered" by other clips). Secondly, it frees the disk space that has been left unreferenced because of the editing of the affected clips, but if the Handles field is set to a non-zero value, commit leaves at least that much extra audio at the extremities of the Master Recording, so that the ends can be pulled out later. See next page for further information.

The audio data for clips which have been extended from other projects are "kept" into the current project. This means that references to Master recordings in other projects are removed, and a new copy of the referenced audio is brought into the current project. This has the effect of making the current project independent of any other, and can be backed up with confidence that all the audio needed to reproduce this project is carried within it. If adding the extended audio data causes the Project file to reach 4 Gigabytes, the operation is stopped.

### More About Committing

Commit is complex. Here are some examples intended to clarify its workings.

1. A 30 second recording has just been made, and then the first ten seconds are trimmed off. Now we go the Disk menu and press commit while the cursor is touching this clip, with Handles set to zero. The effect will be to remove the first ten seconds of audio data, with that disk space becoming free. If Handles was set to 2 seconds, only the first 8 seconds of data would be removed. Attempting to enlarge the clip using the Trim menu will fail, because there is no more data in the Master Recording.
2. A 30 second recording has been made, and this time the last 15 seconds of the resulting clip (Clip A) are covered by pasting another clip (Clip B) on top. Now we go to the Space menu, move the transport so that Clip A is touching the cursor, and press Commit. Now erase Clip B, and it can be seen that the part of Clip A that was underneath Clip B has been removed. This part of the data on disk has also been removed, minus the Handle.
3. This time we do the same thing, but we make a copy of Clip A on another track. After committing the original Clip A and erasing Clip B, we find that Clip A has been trimmed as before, but it can still be extended using the Trim command. This is because, whenever there is a clip anywhere in the project that references the same Master Recording, even partially, the Master Recording will not be touched, allowing the uncommitted clips to be trimmed out to their fullest possible extent.

### Notes

1. Disposing and Committing create blocks of free space that can be used by the project. They cannot, however, be used by any other project or file, because the blocks are inaccessible little "islands" in the middle of the project. Packing shoves all the data down towards the beginning of the file so that it occupies a continuous block, and then gives back the empty piece at the end. An illustration of this is provided the section called Operations in the Disk Menu.
2. To regain the maximum possible disk space, highlight the whole project (from Mark zero to Mark 999), then Dispose, Commit and Pack. The first two operations are virtually instantaneous.
3. All Space Menu operations are permanent. No UNDO!
4. When Committing, nothing will happen to the Master Recording that a clip is referencing unless the selected range contains all clips that reference it.
5. It is a very good idea to dispose often during recording sessions. Each time a useless recording is made, UNDO it to remove it from sight, then dispose. The next recording will immediately occupy the freed disk space.
6. Committing with Handles set to ALL is a way of removing the parts of the clips that are not heard, but preserving the Master Recordings entirely. This can be used, for example when a stack of clips have been placed "on top" of each other, to simplify the edit structure down to one layer effectively, without losing any recorded audio data.
7. Disk Menu operations do not have any effect on material that was extended from another project, because that project is in read-only mode.
8. DO NOT use Disk Menu commands on any project which has been extended unless you are absolutely sure that the audio data you are about to destroy is not needed in the extension project!

**Warning:** Packing is dangerous. If anything goes wrong you will lose the project forever! You are advised to back up the project before packing.

Sometimes the tragic happens. A clip is accidentally erased, and we don't realise until later (so it's too late to UNDO the erase). Worse still, there are no other clips that reference the particular Master Recording, so it is not even possible to copy another clip and place it where we think the erased clip was.

As long as we know that the Master Recording is still on the disk (which it will be unless we have used the dispose command since we erased the last clip referencing the master recording) we can recover from our accident.

#### **The W Display**

To see a list of all the unreferenced master recordings, type <Blue>W. The top section of the video display changes to show a list of master recordings (or waveforms as they are known by the software) which have no clip referencing them. You can scroll the list up and down by pressing the <add> and <sub> keys on the alphanumeric keyboard.

You are looking for one of the unreferenced master recordings, and you have at least one clue which one it is, and that is the Birthday which tells you the timecode at the start of the original recording.

#### **The Recover Waveform Command**

If you have found a master recording that you think is the one you want, type:

RW *number*<RETURN>

where *number* is the number printed at the left end of the line. The RW stands for "Recover Waveform". This command will place a clip using the full length of the master recording on your current track, with its head at the cursor position. Then you can play the clip to find out whether it was the one you wanted.

If the master recording is a stereo recording, it will have two waveforms, and you will often see them on consecutive lines. They will have the same numbers in their birthday, size and space fields. Occasionally, due to the dispose command, the two waveforms will not be at consecutive positions in the display.

To recover both sides into a stereo clip, type

RW *number 1 number 2*<RETURN> using both waveform numbers.

You cannot create a stereo clip out of two original mono recordings. The software will simply refuse. You can make a mono clip from one side of a stereo waveform, but this will prevent it from subsequently being made into a stereo clip. By typing the two waveform numbers in reverse, you can reverse the right and left sides of the waveform.

To get a clip back into sync with the position it was originally recorded, highlight the clip and type the Return to Birthday command, RTB<RETURN>.

#### **The Waveform Show Command**

If you wish to show all the Master Recordings in the project, type:

WSa<RETURN>

This stands for "Waveform Show ALL". Each referenced Master Recording will show you the name of the first clip that references it.

If you want to return to a display of only the UNREFERENCED master recordings, type:

WS<RETURN>

## 25. Bulk File Handling - the Backup Menu

The Backup Menu provides four file handling commands, which all use the same scheme for choosing files. The commands are:

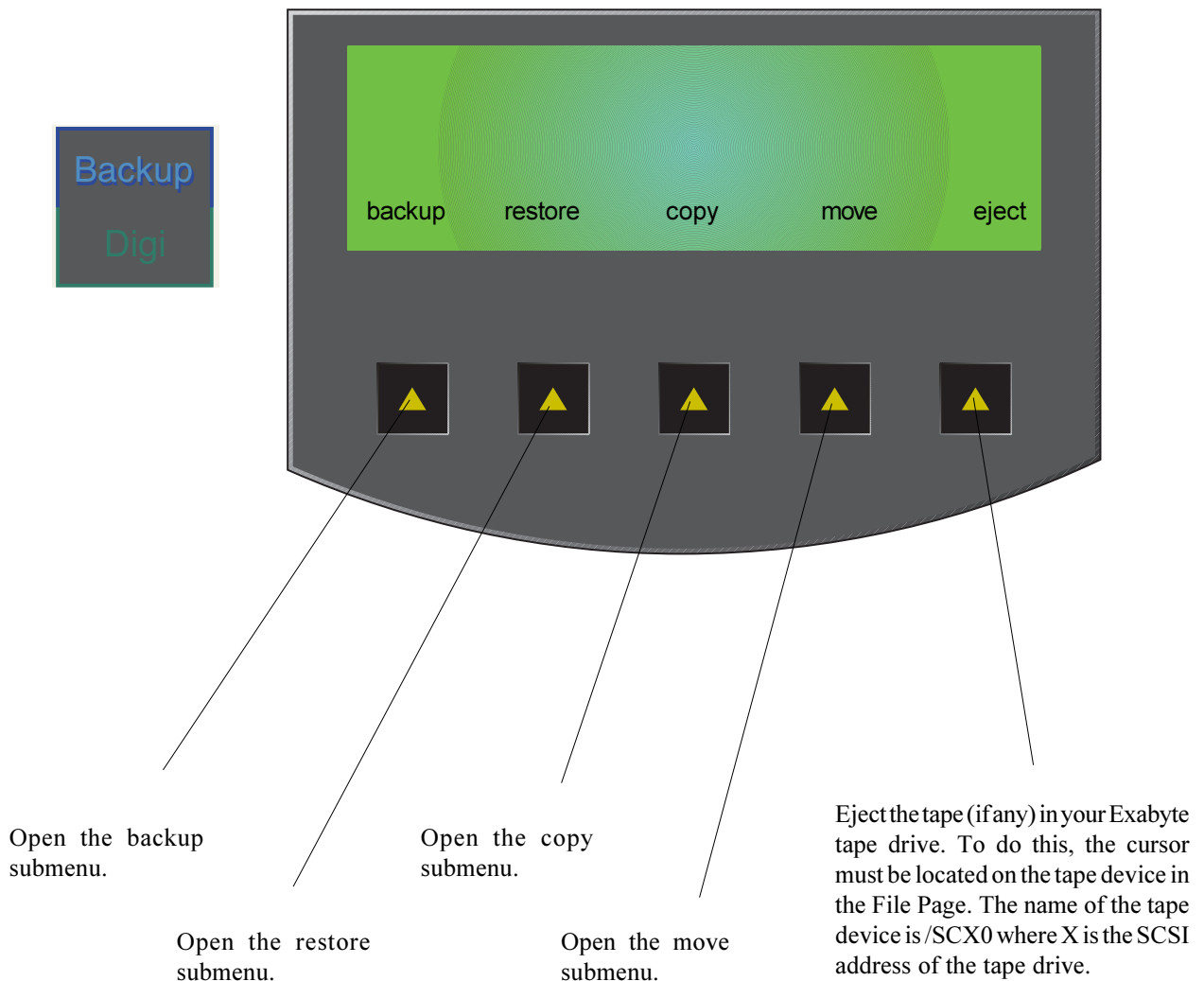
- Move - moves all the marked files from their current locations to one target directory
- Copy - copies all the marked files from their current locations to one target directory
- Backup - as in copy, but a BU (backup) file is also created, listing the files involved and the locations they came from. This is stored in the target directory where all the backed files have been copied.
- Restore - the reverse of backup, restore opens the BU file and uses it to mark the files. They can be sent back to their original location, or to anywhere else on the system.

The Backup Menu can work with files anywhere in your system, copying and moving them between hard disks and on and off Exabyte tapes. All operations operate in the background, and are suspended whenever Merlin needs to access its hard disks for play or record.

When backing up or restoring from tapes, files cannot be appended to the end of existing tapes, so they are always erased as part of the procedure.

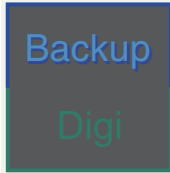
### The Main Menu

In this menu the choice is made of which file management activity to begin.

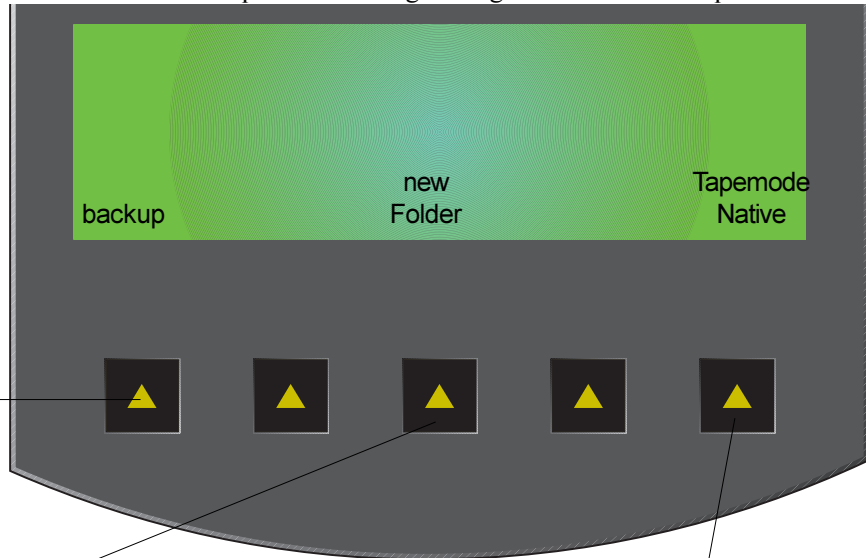


## The Backup Submenu

In this menu, files are marked for backup, and then the operation is started. During marking the Directory Browser is displayed so that files from any hard disk can be found and marked. Having pressed the backup Soft Key, the first thing to do is select the destination for the backup. If this is to be your Exabyte tape device, browse so that the cursor is located on its reference in the File Page. Alternatively you may select any Folder on a hard disk to be the backup destination, or even create a new folder for the backup. The following menu gives the command options:



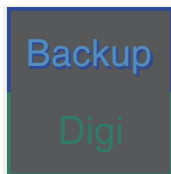
Return to the main menu.



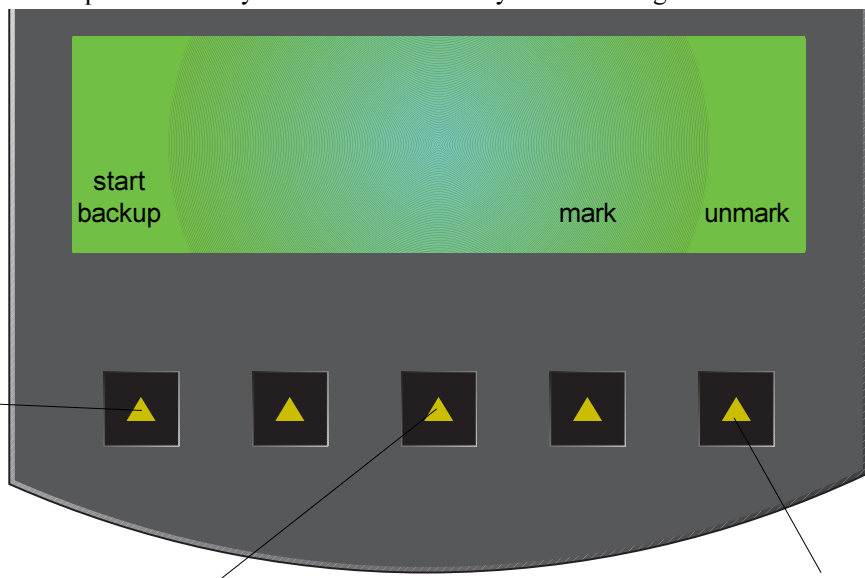
Press to create a new folder. Type a name for the new folder, then press ENTER. The browser will move into the new folder immediately, and you will be asked to name your BU (backup) file. See below.

Sets the storage mode of an Exabyte tape, allowing you to create tapes that can be read on older tape drives such as the 8200, 8205 (8200 compressed mode), 8500 or 8505 (8500 compressed mode). Native mode means the most up-to-date mode that the tape drive can store. The cursor must be highlighting the tape drive when the command is entered. Press this Soft Key, then use the Jogger Wheel or + and - keys to set the tapemode, followed by ENTER.

Having selected a destination for the backup, you will be asked to supply a name for the BU file that will be created. A name is suggested by the software, based on the date and time when the file was created. To change this, edit it using the arrow keys, backspace and alphanumeric keys. Press ENTER when you have the right name.



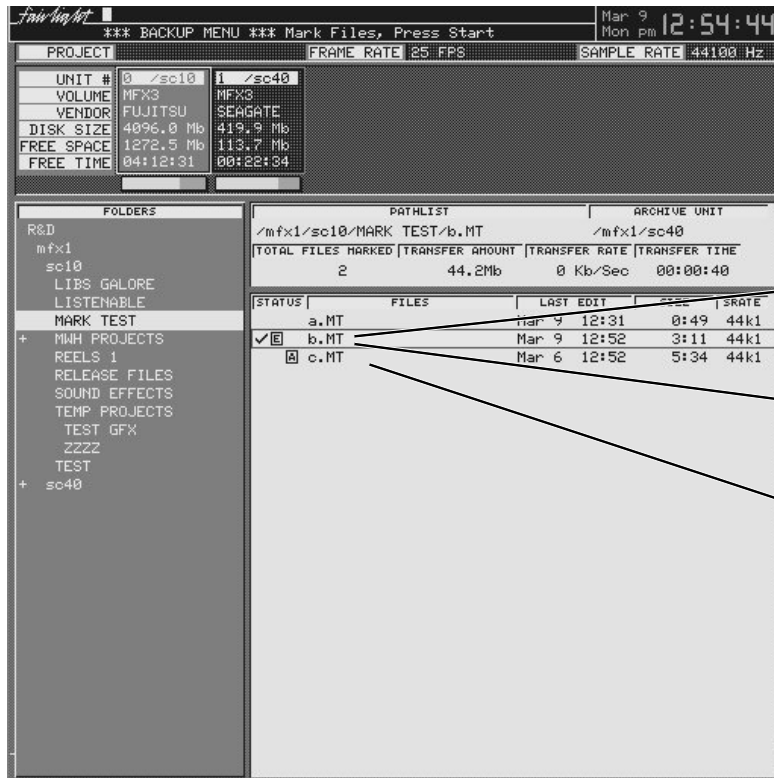
Press to start the backup when all desired files are marked.



Press to mark a File or Folder. Marking a Folder marks all Files inside it, and those inside Folders inside it, down to as many levels of Folders as have been created. If any Project File has attachments to other files i.e. clips have been borrowed from them, a window will appear showing all attached files and allowing them to be included in the backup (see Marking Attached Files below). Projects marked as attachments have a special icon to show this - they may also be marked explicitly in their own right. The currently open Project cannot be marked for backup. Nor can any file on the current archive unit.

Press to unmark a File or Folder. If a Folder is unmarked, everything inside it is unmarked, whether it is currently marked or not. A File's attachments are unmarked at the same time as it is, but if they have also been explicitly marked in their own right, they remain marked.





While marking files for backup/restore

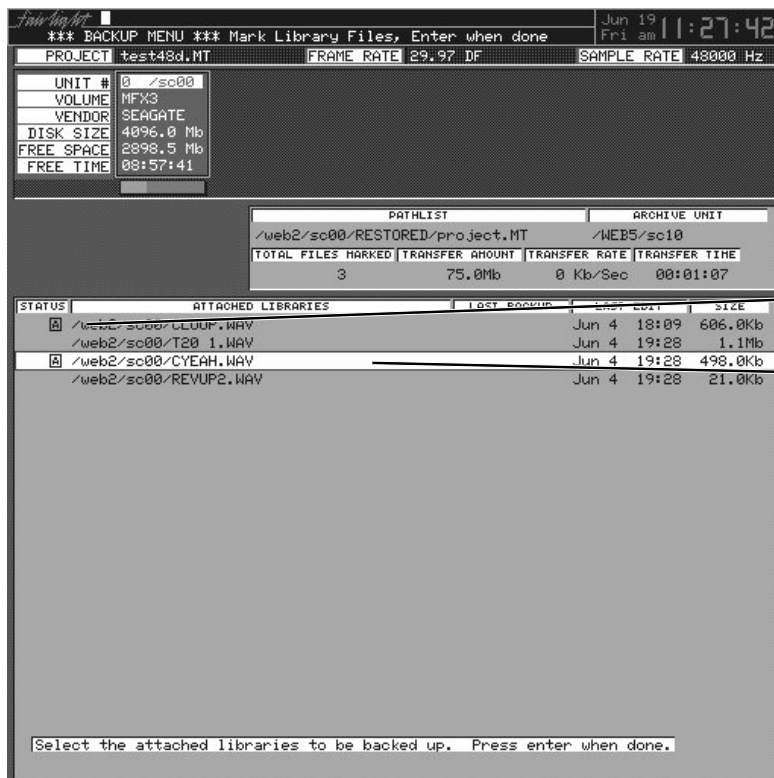
Tick indicates marked for backup or restore.

E indicates expandable to include attached files

A indicates marked by attachment to another Project file

### Marking Attached Files

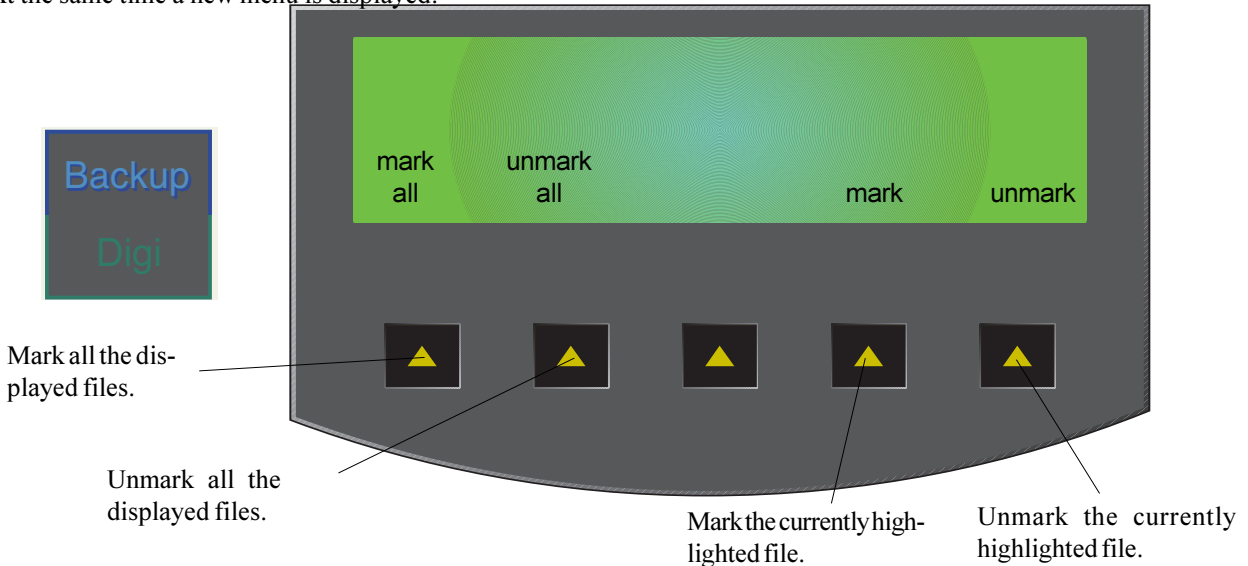
If a Project file you mark has borrowed audio from other files, Merlin will display a list of the files from which they are borrowed, allowing you to mark them as well.



A indicates marked

Current highlighted choice

At the same time a new menu is displayed:



When you have marked all the attached files you want to back up, press ENTER to return to the previous screen.

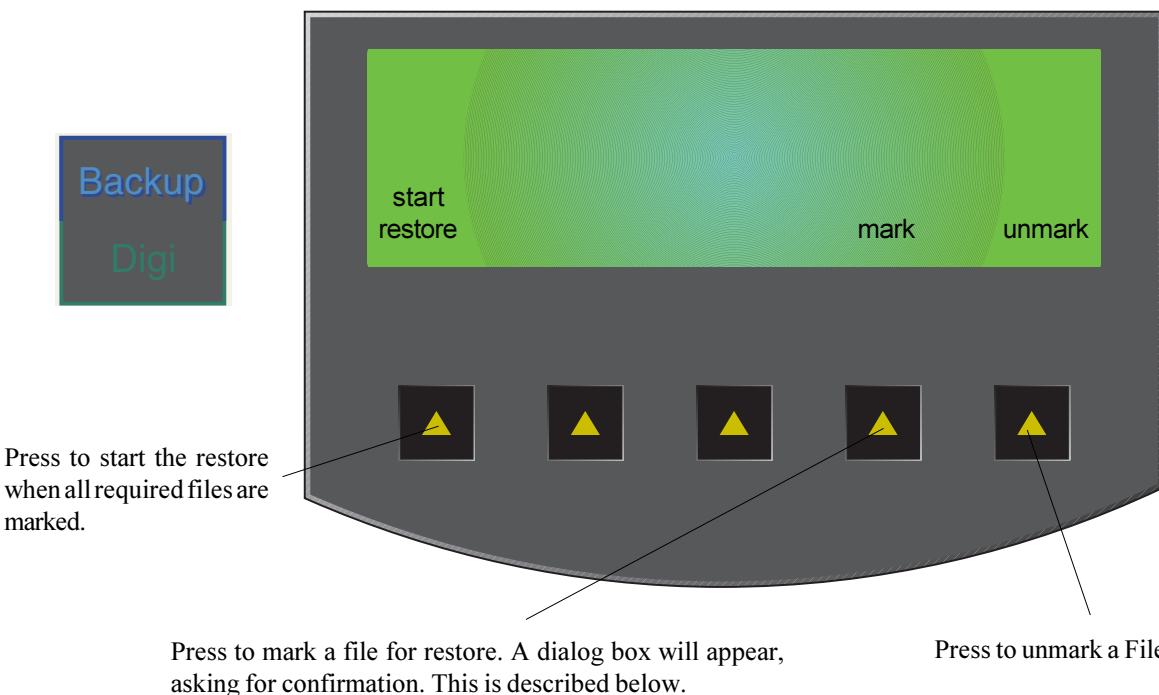
### Backup Progress Display

Once a backup has begun, the display shows its progress, estimating the time to completion based on the current speed of transfer to the backup device. Because multiple source devices are involved, and because variable data compression algorithms may be used by the backup device, these estimates may not always be accurate.

Backup occurs in the background, allowing other work to continue normally. Once the backup has started, you may visit other menus and perform other tasks such as editing or recording, but whenever the disk recorder needs to get audio from the disk, the backup process is stalled. Any time you return to the Backup Menu you can see the progress of the backup. The backup can be stopped at any time by pressing the STOP Soft Key. You will be asked to confirm this wish before it is carried out.

### The Restore Submenu

In this menu, files listed in a BU file are marked for restore, and then the operation is started. When the original backup was performed, all the marked files, plus the BU file, were placed in a single directory, and this is where they must be found in order to be restored. First you must browse to a BU file, then press the restore Soft Key. The video screen now displays the list of files that were backed up at the time the BU file was created, and you may move up and down the list in order to mark the files.



Each time you mark a file for restore, a dialog appears, naming the file and telling you the directory where it was originally located. You are now being asked what you want to do, and the replies are as follows:

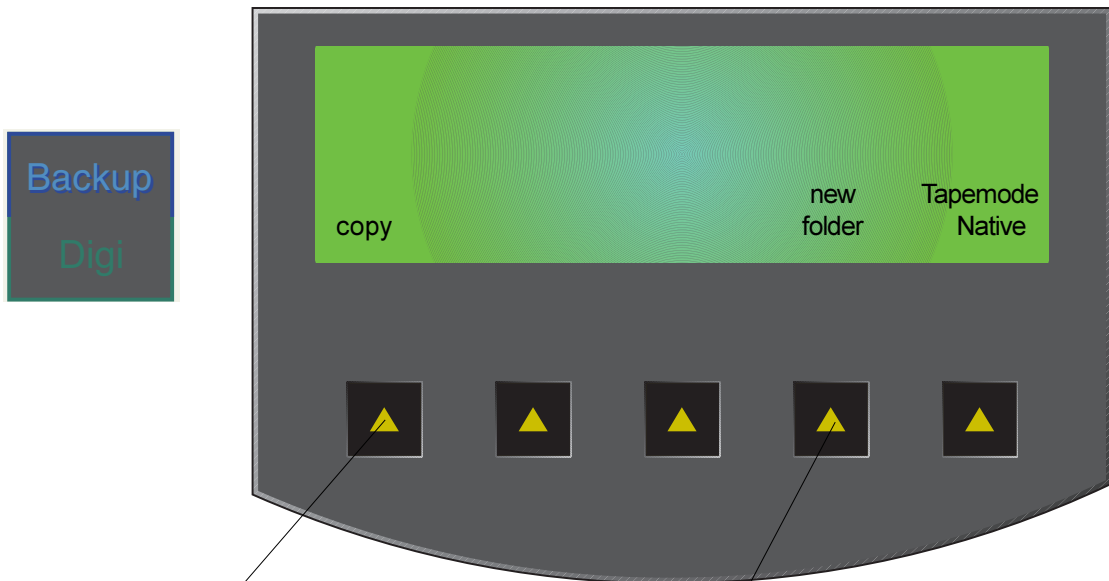
- Okay - restore the file back to its original location. If there is already a file of that name present, you will be asked if you want to overwrite it.
- All okay - restore all files I mark to their original locations without asking
- PickUnit - allows the file to be restored to a different disk location. Having typed P to choose this option, the browser allows you to move to any Folder on the system except the Folder where the BU file is located. While visiting other Folders you may delete any files you choose - this feature is provided so that you may remove other files in your chosen destination that might have the same name as this one. Press the Okay Soft Key to confirm the destination for this file and resume marking other files.

Sometimes a disk from where some of the files were originally backed up is no longer on the system, or it is too full to allow the marked files to be restored there. When this happens you are prompted for another destination for the files. Note that the same directory structure in which the original files were housed will be created on the destination device.

Restore occurs in the background, allowing other work to continue normally. Any requirement for the system to play or record, however, will cause the restore to be stalled, and to continue after playback has been stopp

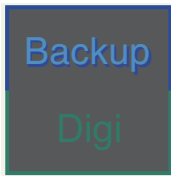
### The Copy Submenu

In this menu, files are marked for copy, exactly like backup, and then the operation is started. During marking the Directory Browser is displayed so that files from any hard disk can be found and marked. Having pressed the backup Soft Key, the first thing to do is select the destination for the backup. If this is to be your Exabyte tape device, browse so that the cursor is located on its reference in the File Page. Alternatively you may select any Folder on a hard disk to be the backup destination, or even create a new folder for the backup. The following menu gives the command options:



Return to the main menu.

Press to create a new folder. Type a name for the new folder, then press ENTER. The browser will move into the new folder immediately, and you may start marking files.



Press to start the copy when all desired files are marked.

Press to mark a File or Folder. Marking a Folder marks all Files inside it, and those inside Folders inside it, down to as many levels of Folders as have been created. If any Project File has attachments to other files i.e. clips have been borrowed from them, a window will appear showing all attached files and allowing them to be included in the backup (see Marking Attached Files on an earlier page). Projects marked as attachments have a special icon to show this - they may also be marked explicitly in their own right. The currently open Project cannot be marked for backup. Nor can any file on the current archive unit.

Press to unmark a File or Folder. If a Folder is unmarked, everything inside it is unmarked, whether it is currently marked or not. A File's attachments are unmarked at the same time as it is, but if they have also been explicitly marked in their own right, they remain marked.

## The Move Submenu

The operation of this submenu is exactly the same as for the Copy Submenu. The only difference is that the files at the original location are deleted, after the ones at the destination have been successfully created. Please note that, when the destination for the move is on the same hard disk as the source, no actual media copying takes place, simply a change in the disk's directory structure.

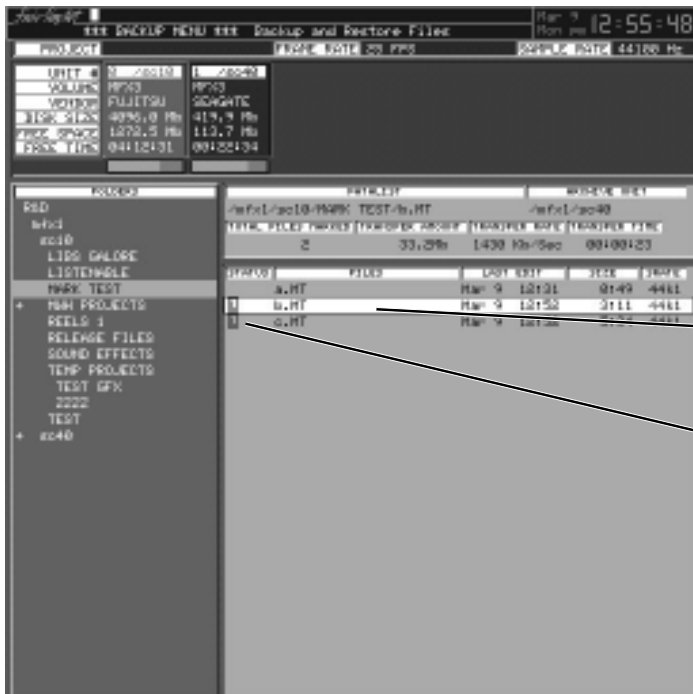
## More About File Management

### Warning on Overwrite

If you mark a file that already exists on the destination device the software will warn you. You may choose to continue with this course of action, or unmark the file. If you continue, the file carries an O flag (for Overwrite).

### The Backup Display

Entering the Backup Menu while Backups are taking place shows the progress of your backup, restore, copy or move.

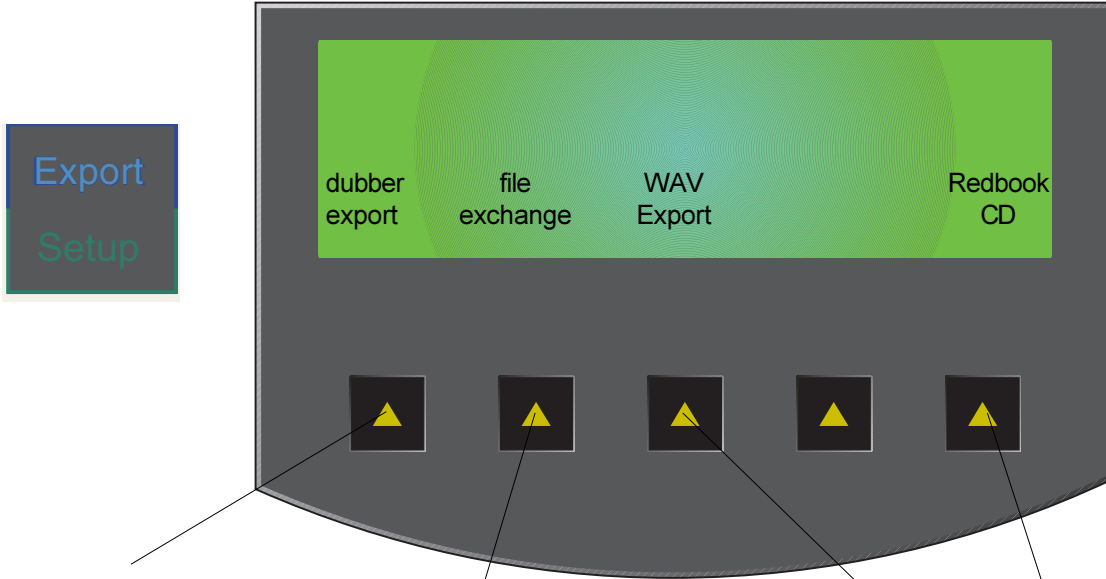


While backup/restore in progress:

*Highlighting indicates current file being backed up or restored.*

*L indicates locked because marked for backup/restore*

The Export menu allows material to be exported from Merlin Projects into a variety of formats.



Exports a file to the root of the current disk drive, which can be read by Fairlight's DaD Dubber product. The file will be named XXX.DL where XXX.MT is the name of the currently open Project. Exports a file to the root of the

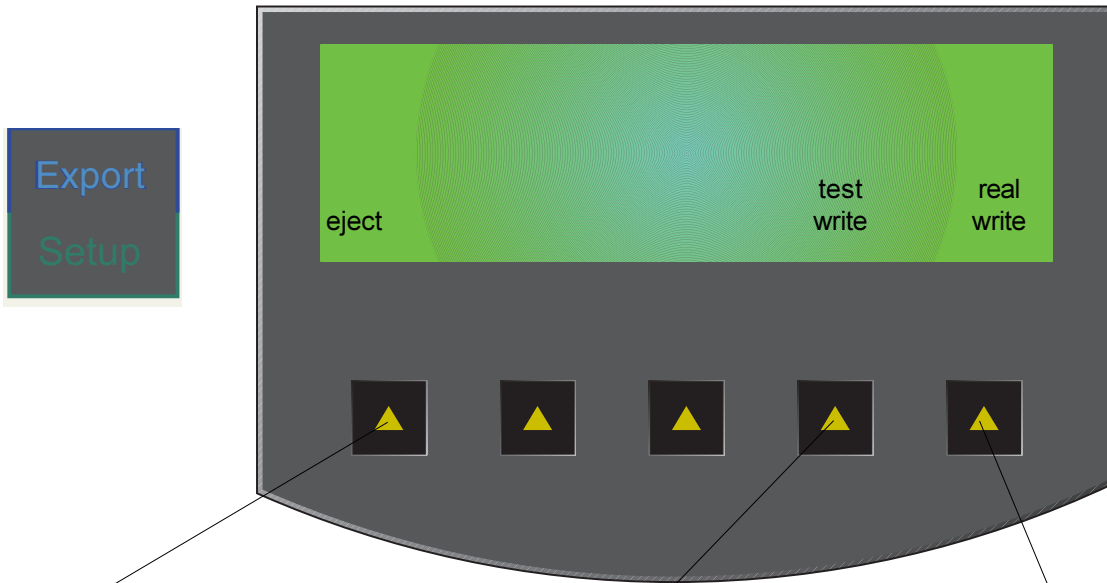
current disk drive, which can be read by Fairlight's File Exchange partners. The file will be named XXX.ML where XXX.MT is the name of the currently open Project. Opens the WAV Export submenu,

used for turning Merlin audio into WAV files. See next page. Opens the CD Submenu, used for

outputting an Merlin track to Redbook CD over SCSI.

### The CD Submenu

The CD submenu allows one track of stereo (or mono) audio to be written directly to a Yamaha CRW4416S Compact Disc writer (note: this model changes from time to time - please consult your Fairlight distributor if model unavailable). A range is set up to indicate the start and end of the Compact Disc, which cannot exceed 75 minutes in duration. The following controls are available on the submenu:



Ejects the CD from the drive.

Starts a test write. This will go through the entire write procedure, checking everything works, but will not actually burn a CD. Useful for saving media if uncertain about the result.

Writes the audio to the CD at twice real speed.

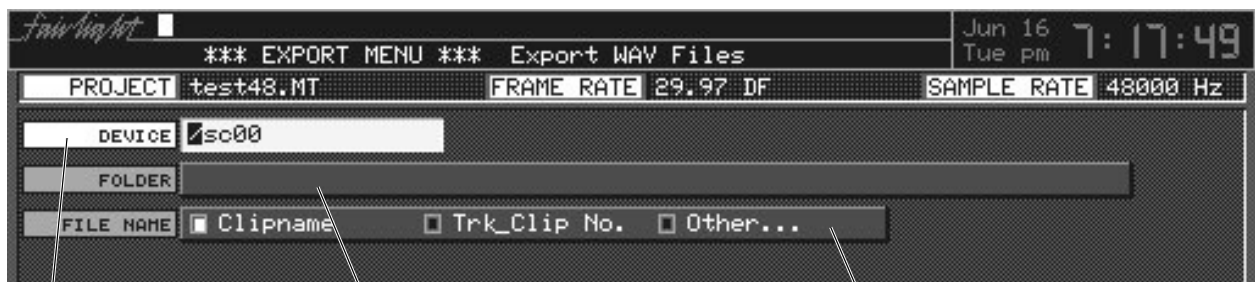


### Rules for writing to CD

1. All sample rates are supported. Regardless of the Project sample rate, the output to CD will be at 44,100 Hz.
2. EQ, level settings and crossfades between the clips on the track are not performed as the audio is written to CD. The clips are played as though they were butt edited together, and EQ is ignored.
3. CD tracks are defined by consecutive clips with the same name. Silences may appear between these clips without starting a new track. Where a clip has a different name to the one before it, a new track will be started.
4. Index markers can be created by placing normal Merlin Locations at the appropriate timecodes. Locations 0 and 999 will not produce index markers.
5. To set the Precount to a track, place a clip named PCOUNT (all upper case) as the last clip of the preceding track. If no such clip is placed there, the precount will be zero.
6. A CD write cannot be stopped except by switching off the CD writer. The disc will be destroyed.
7. A CD must all be written in one pass. There is no way to append information to it.

### The WAV Export Page

The WAV Export function may use either the red clips under the cursor, or, if a range is present, clips that are wholly included. Real time audio features such as EQ, level and fades are ignored - only the raw waveform data is exported. When the WAV Export Soft key is pressed, a display appears with choices for export destination, name etc. To move between text fields, use the M8 key for previous and the M9 key for next (the macro key must be OFF during these commands.)



*Sets the destination drive. Use the up and down arrows to move between the available drives on your system.*

*If desired, you can add a directory name where you would like these WAVE files to be placed. The WAVE Import page can search for them and find them in this directory, but they cannot be borrowed successfully from it, only kept (see Import Menu for details).*

*Determines how the WAVE files will be named. Use the left and right arrows to move between choices. If Other... is chosen, another field appears, allowing you to enter a new file name of up to 8 characters.*

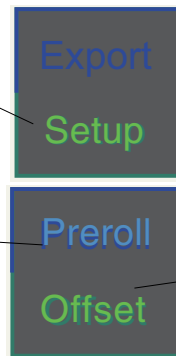
Press the ENTER key to start the WAVE export process.

**Note:** If there are multiple clips with the same name in the range being exported, the system will complain when Clipname is chosen as the source of the file name. Each one will successively cause a request to overwrite the previous one or choose a new name. If Other is chosen, and you have entered a new name for the files, numbers will be appended to each successive file to distinguish the names.

Merlin controls a 9-pin machine, chases and generates longitudinal timecode (LTC) at all frame rates. The buttons shown below are used to set up and control these processes.

**Setup Menu**  
Used to set system frame rate, time display format and NTSC "rundown".

**Preroll Menu**  
Used to set prerolls times for automatic recording and playback.



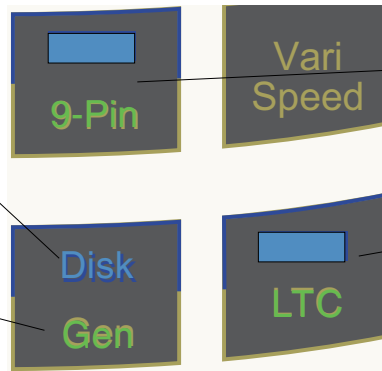
**Offset Menu**  
Used to set offsets for 9-pin, LTC, Disk and Gen.

**Disk Button**  
Takes the disk recorder on and off line. When it is off line, it does not locate, nor is any sound heard from it.

**Gen Button**

Switches the timecode generator on and off. When used with the Blue key, it opens a menu used to choose outputs for the generator.

The precedence of the



**9-pin Button**  
Takes a 9-pin machine on and off line. When used with the Blue key, it opens a menu for setting parameters for 9-pin Machine control.

**LTC Button**  
Puts Merlin in and out of LTC chase. When used with the Blue key, it opens a menu for setting parameters for LTC.

machines as Timecode Masters is fixed as follows:

9pin or LTC > Disk > Generator

A machine is master when all the machines above it are off line.

## Synchronisation - Quick Guide

Synchronisation is a complex subject in the digital world. If you just want to set things up quickly and get down to work, here is what to do before you record the first audio in your project:

### 1. Set Sample Rate (Digi Menu)

Start a new project, open the Digi Menu and set the Sample Rate at which you want to finally output this project. If it does not matter, then choose the sample rate at which most of your digital sources are recorded. If you don't care either way, choose 44,100.

### 2. Set Sync Source (Digi Menu)

If you want the Master Sample Clock to lock to an external source, set Sync to whichever signal is your best clock source (in order, the best are AES/EBU, Word Clock, Video). Make sure the sync signal is connected. This will govern Merlin's digital sample rate, so stability of this signal has a direct effect on audio quality. If you are not synchronising to anything, choose Internal.

### 3. Set Frame Rate (Setup Menu)

Set the TC Format to whichever type of timecode you are going to use, or whatever video frame rate you are going to input. If your choice is drop frame (DF) or non-drop frame (ND), you must also select whether the frame rate will be 29.97 (NTSC colour television) or 30.

### 4a. Control a Sony Machine (9-pin Setup menu)

If you wish to control a Sony video machine, press the 9-pin button. If there is a Sony Machine plugged into the A port, it will come on line. Open the Setup menu if desired (hold down the Blue key and press the 9-pin Button) to set up additional parameters for controlling the 9-pin machine. Once it is set up, use the button to put the Sony machine online and offline. Make sure that the video machine is locked to the same sync source as you chose in item 2 - normally this is video sync.

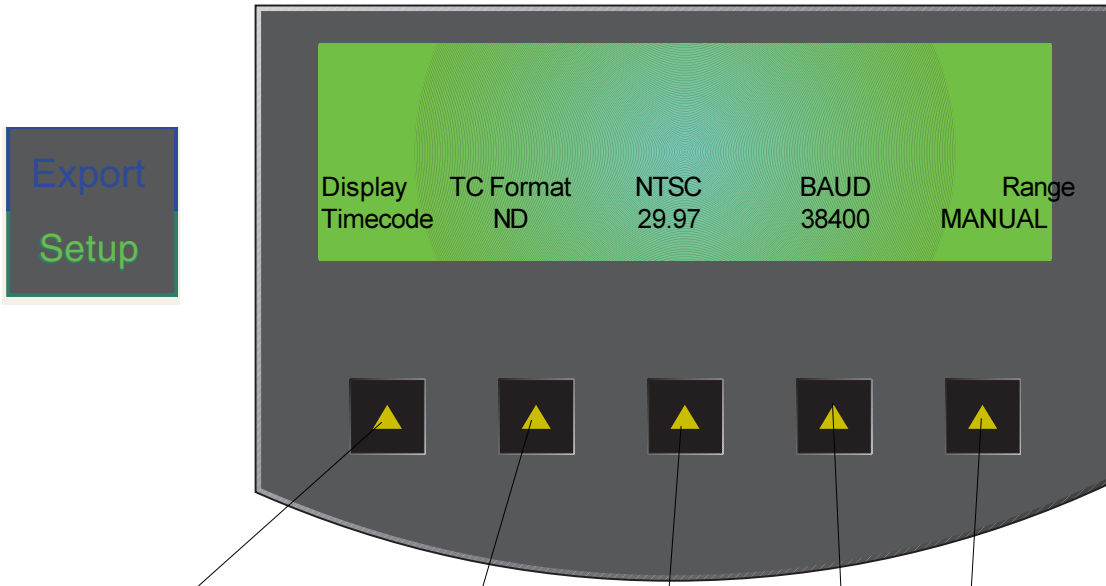
### 4b. Chase Timecode (LTC Setup menu)

If you wish to chase linear timecode without machine control, use the LTC button to toggle between chasing and running free. While chasing timecode you have the choice whether to trigger, then switch to House Sync (turn Master OFF in the LTC Setup Menu) or lock the sample clock to LTC (Master On). The former choice gives better audio quality.

### 5. Start Work

Merlin will play as long as its light (Disk) is on, and will synchronise to either 9-pin or LTC if one of them is lit. You cannot have both 9-pin and LTC switched on together. You cannot change sample rate after the first Master Recording has been made, but you can change timecode format and machine control settings as often as you like without changing the timing of Merlin's playback.

This is used to select synchronisation fundamentals: timecode format, type of NTSC timecode etc. Reopening a project will recall the settings it had when last open.



Choose units for displaying time: Time code (TC), Feet and Frames in 16mm format (F/F16), Feet and Frames in 35mm format (F/F35), or Hours, Feet and Frames at either film speed (H/F/F 16 and H/F/F/ 35). Use + and - or jog. Press ENTER to confirm selection. All feet and frames measurements are based on a 24 frame per second film speed, regardless of the timecode format you have actually set.

Sets the frame format for video sync or chasing timecode. Use the + and - keys or Jogger to choose: 24 fps, 25 fps, NTSC DropFrame (DF) or NTSC Non-Drop Frame (ND). Press ENTER to confirm your selection.

When ND or DF is selected for the previous Soft choice, allows you to determine whether the “correct” frame rate is 29.97 or 30 frames per second.

This field determines at which frame rate your selected sample rate will be accurately reproduced. For example, if you choose a sample rate of 44100 Hz and you set this field to 30, the system will run at precisely 44100 Hz when 30 frame timecode is used for synchronisation. But if you use standard NTSC video (at 29.97 fps) as a sync source, the system will “run down” to 44056 Hz. This may be desirable if you plan to return the audio to a 30 fps environment later.

Often, projects that are finished on film require a setting of 30, but projects finished on video normally use 29.97.

Determines what happens to ranges when changing menus (Modes). In Auto Mode ranges are always switched off when entering a new Mode, unless the new Mode must have a Range. In Manual Mode ranges are always preserved, unless the new Mode cannot have a Range. Also in Manual Mode, pressing the current Mode key again toggles the Range on and off, keeping the last timecode values that it had.

Sets the baud rate for communication between the Meroin console and its main-frame. Do not set this to other than 38400.

Note:  
Always set the correct sample rate and frame rate before making your first recording - this will avoid problems later.

## 29. Synchronisation - Detailed Explanation

Merlin can track the position and motion of external transports such as a Video Tape Recorder, timecode-striped audio tape or a timecode generator. The disk recorder will play in time with the Master Timecode source so that sound and picture coincide.

### 1. Position

This is an absolute location reference to a sequence of pictures or audio. It is used to determine whether the disk recorder is playing the right part of its project. For video, position reference is usually provided by 9-pin (Sony protocol from an RS-422 port). For audio tapes LTC is normally used (though 9-pin is also a possibility).

### 2. Motion

The motion of an external machine is a measure of its speed, and the disk recorder must move at the same speed to remain in sync. This translates into producing the correct number of samples every second, which is called the Master Clock rate. This can be locked to a Digital Word Clock, a video signal, an AES/EBU timing signal, by the internal crystal, a timecode source, or a Digital audio source which is being recorded.

If the Position Reference and Motion References are not the same, it is possible that they will drift apart over time. This will be shown by a warning at the top of the Merlin video screen which indicates when an inconsistent timecode frame was encountered.

### How Merlin Synchronises

Merlin goes through a number of steps in achieving synchronisation in play mode:

1. Read the position reference and start loading up the corresponding audio on all active tracks.
2. When ready, start playing, but with the outputs muted. Use variable speed to reduce the error between the Merlin position and the Position Reference until it is very small.
3. Switch to the Motion Reference for continued playback. The system is said to be “locked” once this switch is made, and the audio is unmuted.
4. Warn of error status if the sync error increases, if a reference signal is lost etc.

### Digital Synchronisation Conflicts

When you are recording a digital source, it must be synchronised to the same Master Clock Reference as Merlin, or an overflow (too many samples) or underflow (too few samples) may occur at the input. This causes a characteristic, periodic form of digital distortion called a “whisper”. A whisper sounds like a brief, “glassy” or “metallic buzz, and occurs about once every few seconds, depending how fast the samples are overflowing or underflowing.

One way to guarantee digital synchronisation is to choose the digital input signal itself as the Master Clock Reference for Merlin. This is done in the Digi Menu by selecting INPUT under the Sync Soft Key or AUTO under the Inp Sync Soft Key. This latter source of timing will only be used when a digital input is armed, with the normal sync setting used at other times.

A side effect is that the word clock rate of all digital outputs will also sync to the digital input, which may cause digital synchronisation conflicts downstream from the Merlin. For example, trouble may occur if at the same time as recording your digital input, your Merlin outputs are feeding the inputs of a digital console. If you choose INPUT, the digital console will be required to sample rate convert all of Merlin’s outputs, or synchronise with its Master Clock.

The best solution to digital sync conflicts is to drive all digital devices from a single, studio-wide word clock signal. Then all devices will have identical word rates, so whispers never occur and digital interconnections may be made with ease. In this instance, Merlin’s sync setting is always used.

### Pull-up and Pull-down

The “normal” sample rates used by the digital audio industry are 32,000, 44,056, 44,100 and 48,000 samples per second. The normal frame rates are 24, 25, 29.97 and 30. These last two may cause confusion when used together. Merlin can accommodate the 30 or 29.97 frames per second rate, so if you slow down the frame rate from 30 to 29.97, Merlin can slow its internal sample rate to match. This is called Pull-up or Pull-down, depending in which direction you are taking the speed.

When you choose a frame rate you are telling Merlin what frame rate to “expect”. To put it more scientifically, you are telling it the frame rate at which the chosen sample rate will be accurately reproduced. For example, if you tell Merlin that the NTSC frame rate is 30 (in the Setup menu) and the sample rate is 44,100, it will automatically pull down the sample rate to 44,056 if you feed in timecode at 29.97. If, however, you change the NTSC field to 29.97, Merlin will play at 44,100 at 29.97 frames per second, and will pull up to a sample rate of 44,144 when timecode runs at 30 frames

per second.

It is advisable to choose a sample rate at which you want to make the final transfer of the project. Then record your material at whichever frame rate is going to be used during that final transfer. The importance of this choice is that you do not want to compromise the quality of your final product by using sample rate conversion at the moment it leaves Merlin for the last time. You should make these choices at the very beginning of the project, and then you may use any other combination that suits your purposes temporarily during the recording and editing process.

#### **Control of Sony Machines**

Sony machines are those conforming to the Sony 9-pin transport protocol. Merlin can either control one of these machines, which should be connected to 9-pin Port A.

It is best if that machine is being referenced by the same house sync signal as Merlin (normally video). If this is not possible, Merlin and the Sony machine are essentially free-wheeling, and Merlin will relocate if a relative drift of more than one frame occurs. This will cause a dropout in the audio.

#### **Conflict of Sync**

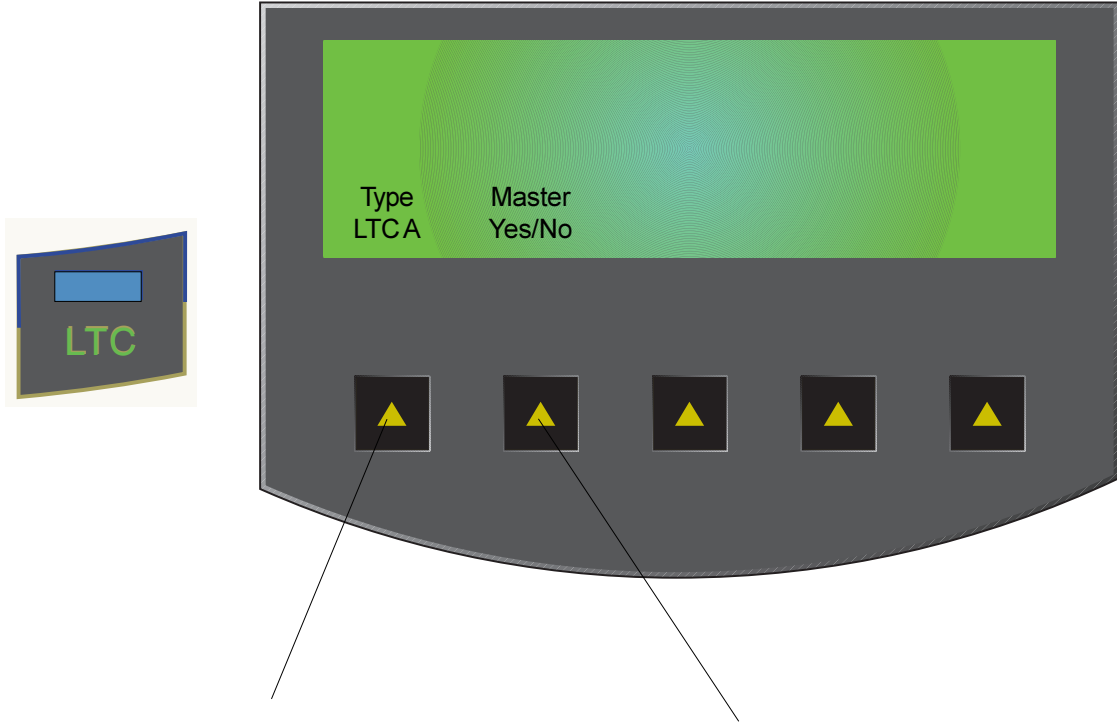
If Merlin is being told to synchronise to one of its digital inputs (see Digi Menu), and also being told to chase LTC, there is a natural conflict. If ever this condition arises, Merlin will issue an error message.

#### **Compatibility with other Fairlight products**

Any project created under MFX2, MFX3, MFX3plus, MFX4 or any FAME or Prodigy product can be loaded into Merlin, where it will be converted to a project with full Merlin facilities.

Compatibility with MFX3/48, Prodigy 2 and FAME 2 is bi-directional, but backward compatibility with all other models is not possible.

To access the LTC Setup Menu, hold down the Blue key and select LTC. To put Merlin into LTC chase, press the LTC button without the Blue key.



Chooses which LTC input port is being read, allowing you to have two timecode connections and choose whichever is appropriate for the current job.

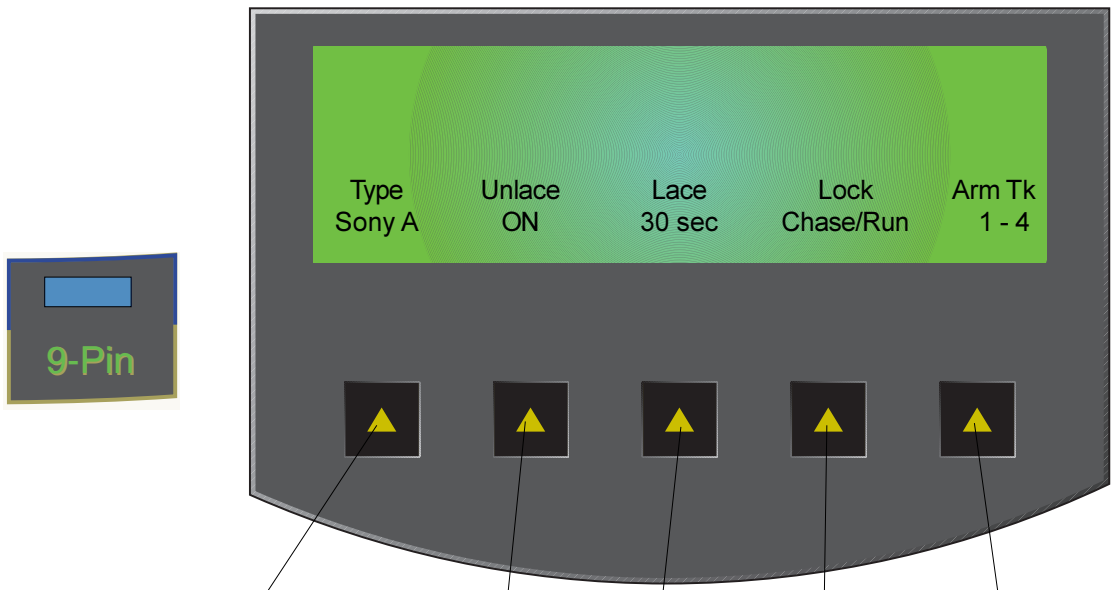
If switched on, the system Master Clock will be driven by the incoming timecode when LTC is on line. Generally it is better to use video or AES/EBU as a Master Reference, but the Master ON setting is useful if the source of timecode cannot be locked to one of these references.

**LTC Master**

If Master is ON, the system sample clock is locked to the LTC input. When it is off, the sample clock is locked to House Sync, while the transport still reads and chases the timecode input when the LTC button is ON.



To access the 9-pin Setup Menu, hold down the Blue key and select 9-pin. To put the 9-pin machine on line, press the 9-pin button without the Blue key.



Select the type of 9-pin machine control that will come on line when 9-pin pressed. Choices are:

- Sony A - controls any Sony 9-pin transport connected to port A. It is always the timecode Master (see options below)
- Sony B - controls any Sony 9-pin transport connected to port B. It is always the timecode Master (see options below)
- 9-pin Rem - Merlin emulates a Sony 9-pin machine and can be controlled from the Sony B port (this port is commoned to both sex connectors)

When issuing a Go To command to the machine, if the distance over which it is to be shuttled is greater than this time, the machine is given a REW or FF command, regardless of whether Lace is ON or OFF. Setting this time to zero guarantees that the slave will be given a GOTO.

Chooses which tracks on the selected machine can be armed using the track keys. Choices are: A1-4 (analogue tracks, of which one may be the timecode track), DA1-24 (the first 24 digital or analog tracks) or DA25-48 (a second bank of 24 tracks). These selections are not always as obvious as they might seem e.g. some DAT machines use A1 and A2, while others use DA1 and DA2.

When Lace is ON, the REW and FF commands send shuttle at maximum speed. This keeps the picture on the heads during rewind or fast forward for some machines which would otherwise unlace (e.g. Sony 9800). When Lace is OFF, the machine is given a REW or FF command, which will cause the tape to unlace in some machines. In other machines, however (e.g. BetaCam SP) these commands do not unlace the tape, but give a very fast shuttle in the desired direction.

When set to Chase, Merlin watches the timecode from the 9-pin machine and relocates if it jumps. When Run is selected, Merlin locks up and continues to play with House Sync until Stop is pressed, regardless of the 9-pin machine's behaviour.

## Entering Timecode Values

Most functions of the system can be accomplished without typing timecodes, simply by capturing current positions. But it is often useful to issue commands with specific timecodes.

### The Numeric Register

The Numeric Register is located in the top half of the LCD, beneath the Master Timecode Display. It is used to store and edit timecode numbers prior to making use of them.

Timecodes may be **typed** into the Numeric Display using the Numeric Keypad, **copied** into it using the down arrow key and some soft keys, **trimmed** using the + and - keys or the Jogger Wheel, and finally **entered** into a parameter with the ENTER key. Details below.

### Time

Many menus have a TIME option. When this is selected the system is ready to accept a timecode into the active parameter. This is always copied from the Numeric Display by pressing ENTER.

### Copy, Add or Subtract Master Time

The Master Timecode can always be copied (captured) into the Numeric Display by pressing the down arrow key (to the right of the LCD screen). Pressing Blue-Plus or Blue-Minus will add or subtract the current Master time from the Numeric Display.

### Copy Last Value

In some menus there is a LAST option on the Soft Keys. This will copy the last Timecode used for the parameter to the Numeric Display, and you can enter or trim it there as described below.

### Entering a Value

The ENTER key is used to copy a Timecode from the Numeric Display to the parameter you are setting. The TIME option on the Soft Keys must be selected (it usually is automatically).

### Trimming Numbers

After a number has been copied to or from the Numeric Display, the first number you type on the Numeric Keypad will clear the Numeric Display, and successive numbers will roll on to the Display from the right. If you press the + or - key, the number you have typed will be added or subtracted from the number that was cleared just before. (Pressing + or - before typing any numbers increases or decreases the current value by one frame [or by one subframe if subframes are selected for display]).

The + and - keys are always available for trimming timecode numbers, except when you have selected a menu parameter which has a numerical value or a series of choices. Then they will cycle you through values and/or choices. For example, when selecting Machine type on the Setup menu there is a list of choices. The + and - keys advance you one at a time through this list.

The Jogger Wheel duplicates the action of the + and - keys when turned, but only when it is available for this purpose, i.e. when Jog is not selected. See Jogger Wheel Priority for details.

### Displaying Subframes

Timecodes in Merlin are all accurate to the subframe (one-eightieth of a frame). But when you type timecodes you may choose to have them rounded to the nearest frame. The subframe key is the same as the Clear key in the Numeric Keypad, but you hold down the Blue key at the same time as pressing it. When you do this the display in the LCD toggles from having subframes in it or not. When subframes are not displayed, the system assumes that their value is zero for all typed numbers.

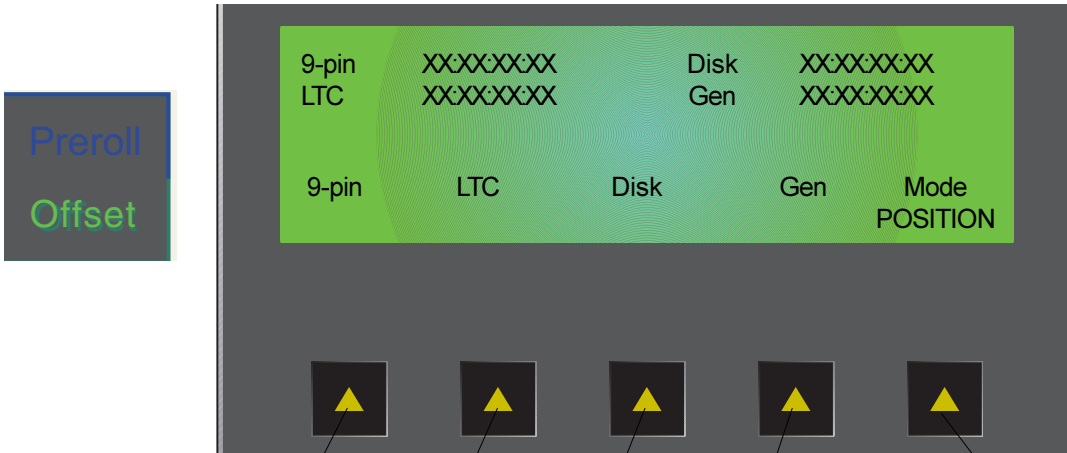
When you edit without typing numbers, by moving the transport to the edit point, the number is always accurate to the subframe value displayed at the top of the video screen.

Each machine on the system can be given an Offset. This is the amount by which its timecode position exceeds the Merlin console's displayed time.

When the disk recorder is offset, its position, which is shown on the video screen, will differ from the Merlin Console position, which is normally shown in the upper right of the LCD.

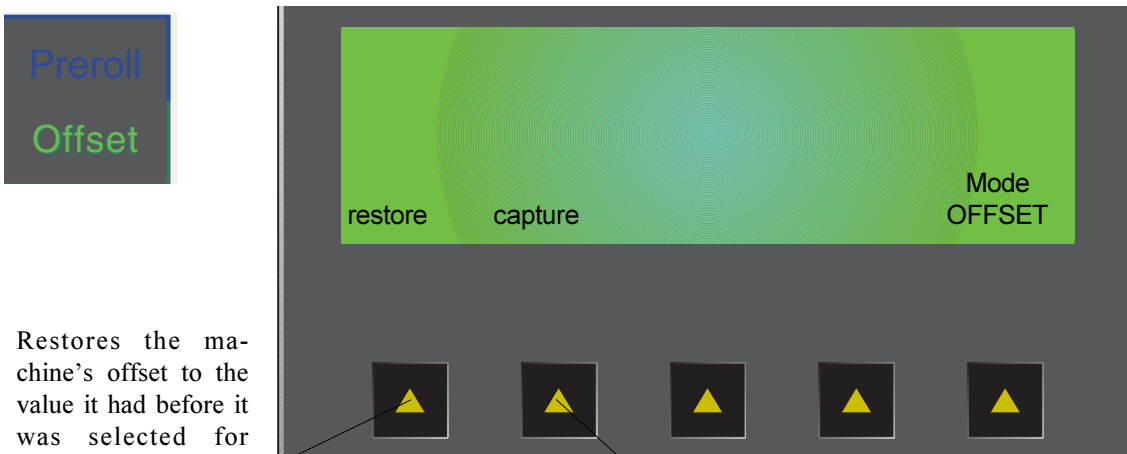
There are two ways of entering offsets. One is to specify a machine's offset, and the other is to specify its desired position. A toggle in the menu allows you to choose which you prefer.

In this menu the upper portion of the LCD shows the current position or offset of all the machines in the system.



Choose any machine(s), then set its offset or its desired timecode position by editing the Numeric Register, then pressing ENTER.

Toggles between displaying and changing machine offsets or positions. The LCD Menu also changes temporarily to give you the options shown below.



Restores the machine's offset to the value it had before it was selected for changing (effectively UNDOing an offset change).

Makes the offset equal to the current position relative to the Merlin Console's Master time display. The device being offset must be OFFLINE during this process, or it would always locate to its existing offset.

1. The Position of any machine when on line is defined as Merlin console position plus Offset. So if, for example, you give a machine a 30-second offset, it will immediately locate forward 30 seconds (unless it is the Master, in which case all the other machines will locate backwards by 30 seconds).
2. The Merlin Console will display the time Master minus Master Offset, when the Master is online.
3. Only positive offsets are allowed, so if you want a minus one hour offset, put in a 23 hour one. Or, CLEAR the Numeric Register, type the number, press the Minus key and then ENTER.
4. To capture an offset between a Sony machine and the Disk Recorder, first move the Sony machine to a timecode and take the Disk OFFLINE using the Disk button. Now move the Sony machine to another timecode. Select the OFFSET Menu, then Disk and press the capture Soft Key to produce a new offset for the Disk which keeps it in sync with the Sony machine's current position.

Each machine in Merlin has its own preroll and postroll value. The actual value used at any time is the largest preroll of any of the online machines. This means that you can set the system to “slow down” to the performance of the slowest starting machine that is currently connected.

Preroll  
Offset

9-pin 4 sec	Disk 2 sec	Gen 1 sec	Postroll Preroll
----------------	---------------	--------------	---------------------

Sets the preroll for the 9-pin machine.

Sets the preroll for the Disk Recorder.

Allows you to choose whether you are setting the Preroll or the Postroll, which are independent of each other.

Not active in this revision of software.



**Basic Controls**

The Play, Stop, Rewind, and Fast Forward keys all behave more or less as you would expect.

When you want to enter record, use the Record and Play buttons together.

The Rewind and Fast Forward keys can be pressed more than once. Each extra time gives an increase in speed, starting from 16 times play speed.

These controls will only work if either 9-pin, Gen or DISK is enabled.

**Play Again Command**

The Play Again command has a special key in the transport section. Pressing this key causes the transport to repeat exactly the same play range as the last time Merlin went into play (or record). A preroll of the normal length is added.

**Record Again Command**

The Record Again command has a special key in the transport section. Pressing this key causes the transport to repeat exactly the same record range as the last time Merlin went into record. A preroll of the normal length is added.

**Record Here Command**

The Record Here command has a special key in the transport section. Pressing this key causes Merlin to jump back, preroll, and go into record at exactly the timecode position where you pressed the key. Jump Keys

**Location Keys**

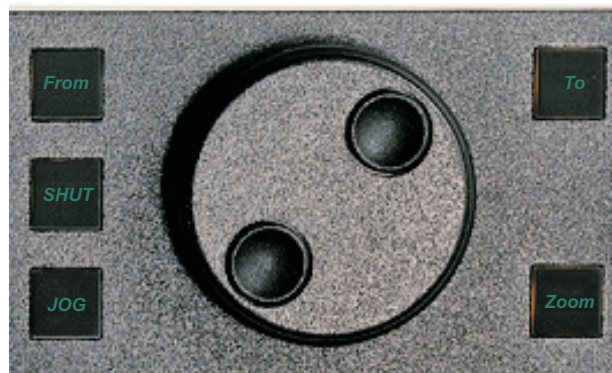
The Location keys allow you to create and recall up to 998 Locations, which are remembered points in the project. Please see the section on Locations for details.

**Jump Keys**

The JUMP keys allow you to locate to convenient places quickly. Hold the key and select any item from the menu, or simply release the key to choose the default (the last item you chose from the menu).

**Jog and Shuttle**

These two transport modes are designed for movement under the direct control of the user.





The Jogger Wheel is used for many purposes in operating Merlin. These include transport functions, which are described below, and changing of parameter values, which is described with the appropriate menus.

**Jog**

When JOG is selected, circular motion of the wheel moves the system forwards (clockwise movement of wheel) and backwards (anticlockwise movement) in time. The movement follows your circular movement, as if you were directly winding film or tape on to a spindle. An on-line 9-pin machine will be jogged at the same time as the Disk Recorder.

The audio on the Disk Recorder tracks is played while you jog, much like “scrubbing” tape. This can be used effectively for locating edit points.

The “gear ratio” of the Jogger Wheel depends on the resolution of the display on the video screen, so as you Zoom in and out using the Zoom key, the Jogging action becomes finer and coarser respectively. This allows you to jog very large distances (several hours if you wish) or very small ones, according to the needs of the moment. You can change the behaviour at the different Zoom ranges by changing the Jog Factor (see next page). Holding down the <ctrl> key while Jogging increases the speed by a factor of 4.

Playback of audio will not occur if jogging speed is too far above normal play speed. If audio is very jerky when jogging, select a larger Zoom number.

**Shuttle**

SHUTTLE is selected using its own dedicated key. The speed of movement through time is proportional to the angle you have turned the wheel, as if it was the speed knob on an electric train set.

Audio playback occurs during Shuttling, with the same restrictions as for Jogging.

Shuttle may be entered directly from Play. In this case, the shuttle speed will be identical to play speed when first entered, and can be trimmed from there. In addition, the Rewind key will reverse the direction of a forward shuttle instantly, and Fast Forward will do the reverse.

**Audio Freeze Frame (Loop Jogging)**

A variation on jogging allows you to listen to an audio loop which plays up to the Master Timecode position, with the width set on the Jog menu. The loop plays at normal play speed, allowing you to hear some kinds of edit point more easily.

When used with a serially controlled master video machine, loop jogging has the extra advantage that the frame being looped is the exact one that is shown by the video machine. This is called “audio freeze frame”.

**The Jog Menu**

To choose the kind of jogging you want, hold down the Jog key and select from the momentary menu that appears on the LCD.

The diagram shows a control panel with a 'Jog' button on the left. To its right is a menu area with a green background. The menu contains four fields: 'LOOP' (set to 'LINEAR'), 'Width' (set to '24 fr'), 'Factor' (set to '4'), and 'Dimmer' (set to '-8 dB'). Below each field is a control knob with a yellow triangle. A fifth knob is located to the right of the 'Dimmer' knob. Lines connect these knobs to descriptive text blocks.

**Jog**

LOOP	Width	Factor	Dimmer
LINEAR	24 fr	4	-8 dB

Toggles between loop jogging (Audio Freeze Frame) and normal jogging.

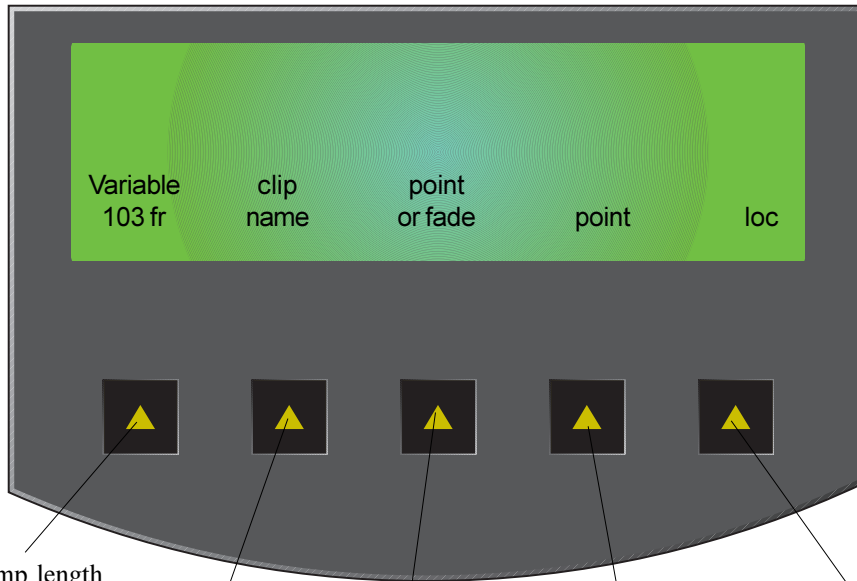
Set the width of the jogging loop using the + and - keys or jogger, then press ENTER

Increasing this number gives you a faster jogging speed at the existing zoom scale. The number represents the zoom scale at which jogging at play speed is comfortable. Pressing Zoom and Jog at the same time sets this number equal to the zoom number.

This number sets the attenuation of the audio when loop Jogging is on.

## The Jump Keys

The Jump keys allow you to move in either direction by convenient amounts, or to important “landmarks” in the project, only on currently selected tracks . Hold down a Jump button and select from the menu, or just press and release to repeat the last type of jump you made.



Choose your own Jump length by typing Variable (keep holding the Jump key down), then jog to display any number up to 999 frames. Then release the Jump key to go there.

Jump to the next or previous clip with a given name (on any track). Its track is also double clicked. To change the given name, see below.

Jump to next or previous point, or fade point (end of fade-in or start of fade-out.) See next entry for definition of point.

Jump to next or previous point (Head, Sync Point, or Tail of a clip) on the current Track(s). See The Clip.

Jump to next or previous Location (remembered point in the project).



Backwards (earlier) in time



Forwards (later) in time

### Modified Jump Commands

Holding the Blue key while Jumping will locate the transport to the start or end of the Range if one exists. Holding the ctrl key while Jumping will locate to the next or previous mark, despite the selection in the menu. Holding the SHIFT key while Jumping will locate to the next or previous point, despite the menu selection.

### Selecting Names

To change the given name, first hold down the Jump Key and strike the “clip name” Soft Key. Now release both of these keys and you’ll see the last-used name in the upper LCD with a flashing square to its right. Use the alphanumeric keyboard to add or delete characters from that name or Clear it and type another. You may insert “wild cards” using the Soft Keys - any (any number of characters), “any one” (any single character) or “one or none” (any single character or no character). You can find names that contain both of two strings by inserting and (&) between them, or either of two strings with an or (|) between them. & is evaluated before |. Note : Upper and lower case characters are not distinguished

If you have searched for a name in the GoTo menu, the same name will appear in the Jump to Clip Names menu, allowing you to move quickly through all of the names that match your request.



## The Seconds Keys

The Seconds keys allow you to move in either direction by a number of seconds which can be changed at any time. Pressing either of the Seconds keys moves the transport in the indicated direction, by the number of seconds currently chosen for that key. To change the number of Seconds, hold down the Blue key and press the Seconds key that you want to change. A menu becomes visible.



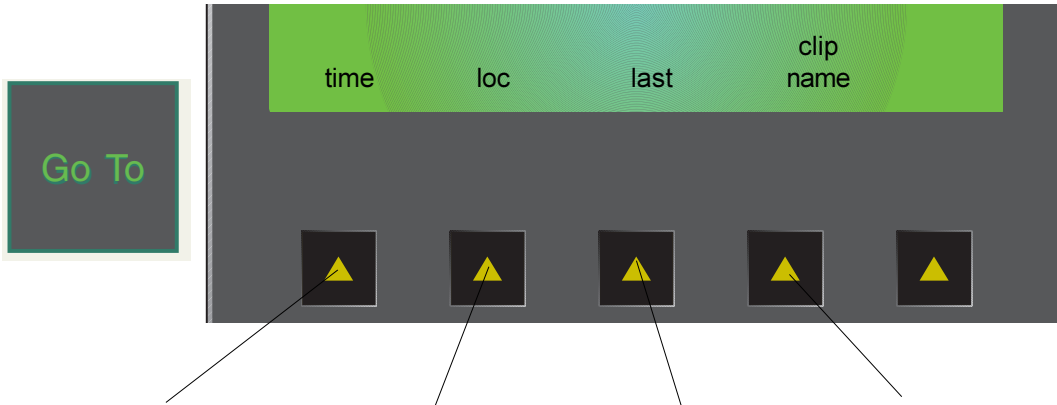
Set the desired number of seconds and press ENTER.



Note: the forward and backward Seconds keys store independent numbers of seconds.

GO TO is used to locate to SMPTE times, Locations (remembered timecode points), or named clips. It is a Supermode, which means that you will be returned to the mode you were in before the GoTo command.

GoTo commands are terminated with the ENTER key if you want to locate, or with the Play key to preroll the selected point and go into play immediately.



Allows you to locate to the time in the Numeric Display. Edit it first if you wish, then press ENTER to go there, or Play to preroll and start playing. The TIME key is always lit when you enter the GO TO menu.

Choose a Location by number, then press ENTER to go there, or Play to preroll and start playing. Each time you type an additional digit, the display shows you the mark corresponding to the last three digits you typed. You can use this feature to browse through several marks before acting on one of them.

Copies the SMPTE time you last went to using the GO TO command, into the Numeric Display. TIME is then selected automatically, so you can press ENTER or PLAY immediately, or edit the number first.

Locate a clip by its name. See below for details.

**Special Feature**

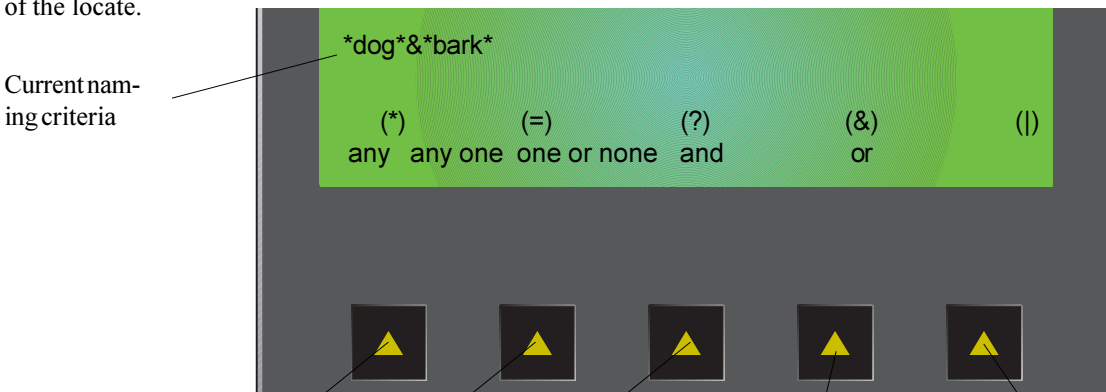
You can locate to any of the first 48 Locations in a shorthand way. Simply press GOTO, then the Track Key corresponding to the Location you want to locate.

**Locating by Name**

Selecting the “clip name” Soft Key brings up a list of names in the lower section of the video display screen. At first this is the names of all clips in the project. As you type letters into the LCD, the list changes to show only names which start with what you have typed.

You can use “wild cards” like the ones shown below to widen or narrow the search for names.

Use the + and - keys or Jogger Wheel to move up and down the list of displayed names, and press ENTER to go to the highlighted one, or Play to Preroll and play that clip. The track where the clip was found is always selected as part of the locate.



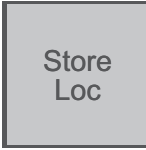
Current naming criteria

Adds a “wild card” to the name in the upper LCD, shown as the punctuation marks above the labels. \* means any number of characters, : means any one character, = means any one character or no character

Allows you to add another string. Name will be shown only if both strings are in it.

Allows you to add another string. Name will be shown if either of the strings is in it.

Locations are remembered timecode points that you insert into the project as easy finders or as labels.



To make a Location, press the Store Loc Key at any time, then press a Track Key corresponding with the Location number you want to store. Alternatively, double-press the Store Loc key, and then your Location will take the lowest available number. It is also possible, having pressed the Store Loc key, to jog to a Location number, or type a Location number using the Numeric Keypad, then press Enter to store into that Location.

You can create up to 998 Locations in any project, numbered from 1 to 998, and there are special Locations: zero which is the earliest point in the project, and 999 which is the latest. You do not need to set these Locations - the system works these out automatically. You may not explicitly change the name or position of these two special Locations, as the system is responsible for updating their position. Note: marks 0 and 999 are never moved “inwards” only “outwards”, so if you erase the last piece of audio in your project, mark 999 will not move to an earlier timecode.



To Recall a Location, press Recall Loc, then press a Track Key corresponding with the Location you want to recall. The transport will immediately locate to that point in the project. Double-clicking the Recall Loc button will cause the transport to locate to the last Location you created or selected for any purpose.

Locations are “remembered” by the project, so they will all be there when you reopen it.

You can change the name of a Location at any time. Press Name Loc, then select a Location by pressing a Track Key or by Jogging, using the + or - keys or typing a number, then pressing ENTER. Once ENTER is pressed, the name can be typed, followed by ENTER again to accept the name. Now a different Location may be chosen in the same way as before, and its name changed.



Removes the selected Location from the project.

Renumbers the Locations to conform with their chronological order in the project.

Notes:

1. Making and naming Locations can be done during recording. You can enter the Name Loc menu, create a Location, then immediately press ENTER to select the recently created Location, type a name and press ENTER, because the newly created Location is always the current selection.
2. You can create special Beat Marks for musical uses by typing the following: **IBM number tempo beats**<RETURN>, where IBM means Insert Beat Marks, number is the number of bars required, tempo is in beats per minute, and beats is the number of beats per bar.<RETURN> is the Return key in the alphanumeric keyboard. Beat marks are placed at the beginnings of all bars starting from the current timecode, and are named bar1, bar2 etc. They can all be deleted by typing **DBM**<RETURN> (delete beat marks)
3. Whenever “loc” is selected on a Soft Menu, or the Name Loc menu is entered, the Locations display is shown on the video screen. You can also display it at other times by typing <Blue-M> or <esc>M. When the transport is in motion, the Locations display automatically scrolls to show the last Location reached.
4. Locations are generally not the best way to create edit points on the fly, if the edit is to be done immediately. The best way is to use the From and To keys (see Edit Menu).

Cycling means playing through a section, rewinding to the beginning and playing again continuously. To make a Loop play, press the Loop key.

To set the start and end times for the loop, press the Cycle key. Now the From and To keys can be used to set new loop points (if you only set one end of the Loop, the previous time for the other end will be retained):

#### **In and Out Points**

The From and To keys, and their menus, are used to set up the In and Out points for automatic recordings. The use of these keys is described in the section “Editing with a Range”.

A quick way to initiate cycles is by using the Track Keys to represent Locations, as follows:  
**Cycle - Location 1 - Location 2**

To start cycling at any time, press Cycle Enter, or double-press the Cycle key.

To stop Cycling, press any other transport key.

Merlin provides an environment for automatic recordings with the minimum of effort. This environment, called the AutoRec Menu, is the default mode for Merlin.

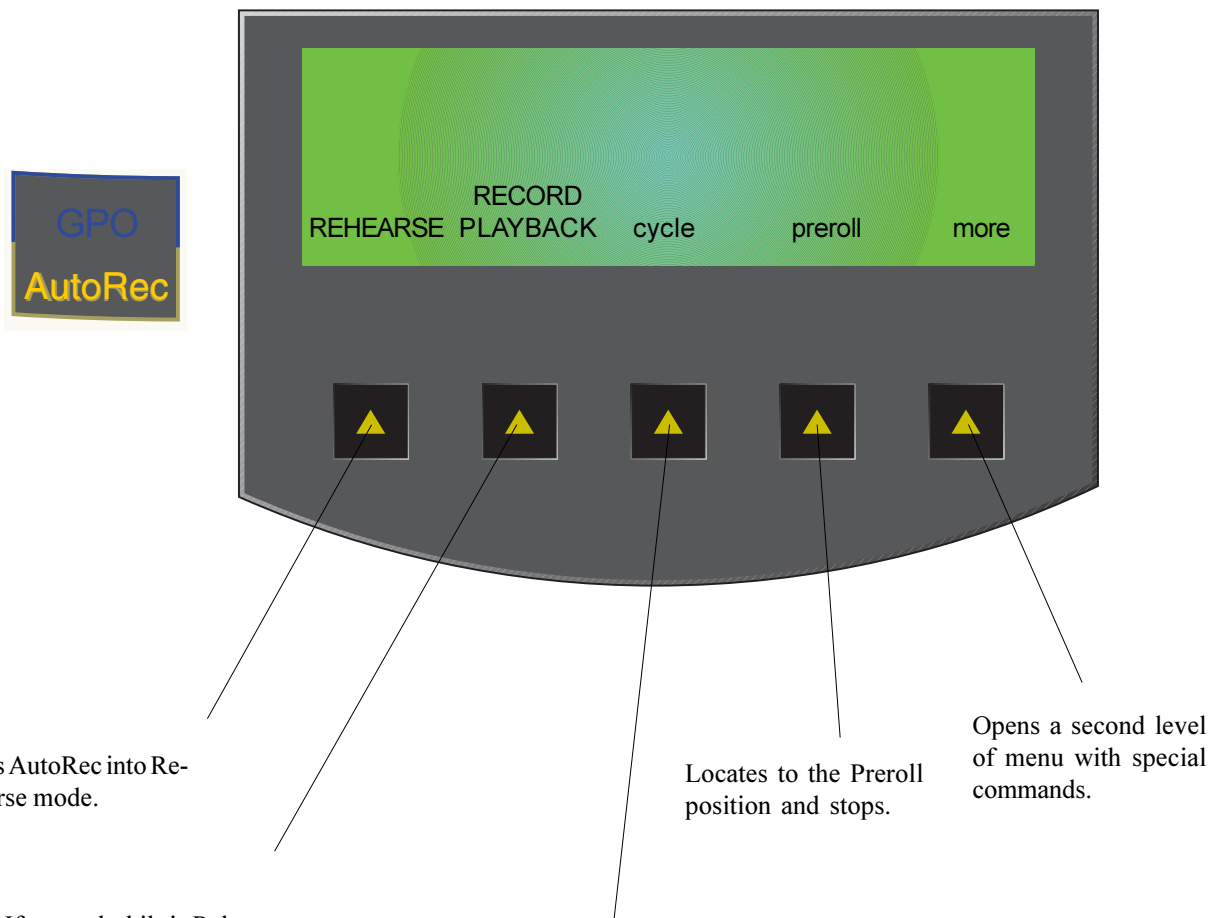
### Modes

There are three modes for this menu, and it is always in one of them. They are Rehearse, Record and Playback. The behaviour of the commands depends on which mode is current.

### In and Out Points

The From and To keys, and their menus, are used to set up the In and Out points for automatic recordings. The use of these keys is described in the section “Editing with a Range”.

### The AutoRec Menu



Puts AutoRec into Rehearse mode.

If pressed while in Rehearse Mode, puts AutoRec into Record Mode. Otherwise toggles between Record and Playback modes.

Causes the transport to move, with behaviour depending on mode.

If **Rehearse** is selected, the transport loops continuously between Preroll and Postroll, with the armed tracks switching to input between the In and Out points.

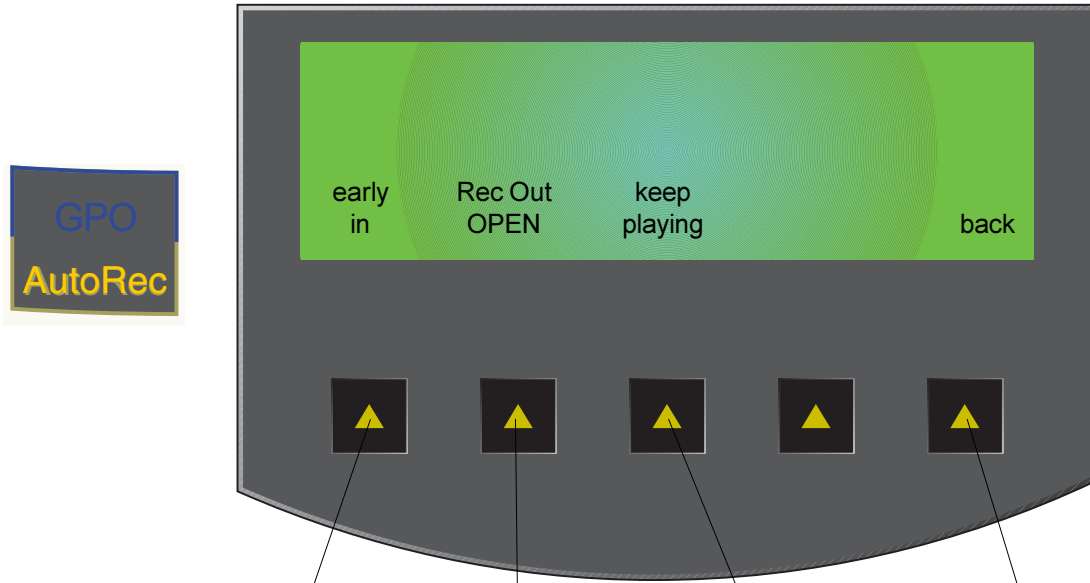
If **Record** is selected, the transport does one pass from Preroll to Postroll, dropping into Record between the In and Out points, then switches into Playback and does a second pass from Preroll to Postroll. Then it returns to the Preroll position.

If **Playback** is selected, the transport does one pass from Preroll to Postroll, then returns to the Preroll position.

Note:

The GPI Menu provides contact closures which can be set to work with the AutoRec Menu.

The AutoRec Menu - second level



Allows recording to be started early. If pressed during preroll, the transport enters Record immediately, then the Record cycle proceeds normally. In PLAYBACK mode this key has no effect, but in REHEARSE mode it switches the recording track to input immediately.

Toggles between two states: PROG, where the programmed time is used to terminate the recording, and OPEN, where the recording is not terminated automatically, but waits until manually stopped. The toggle remains active until changed, which means that all recordings with OPEN selected must be manually terminated.

Returns to the previous level of the menu.

May be initiated anywhere in the cycle. Has an effect equivalent to infinite Postroll, with playback continuing after the recording has finished, until manually interrupted. Applies only to the current cycle, after which things go back to normal.



## 40. The GPO Menu

GPO means General Purpose Output). It refers to 8 contact closure lines at the rear of the machine which can be used to trigger events external to the machine.

### GPO“Type”

GPOs switch at specific timecodes or upon certain events. Each GPO is given a “type”, which determines what type of event triggers it. Use the GPO Menu to set the type and other parameters.

### Choosing a GPO

The first 8 Track Keys represent the 8 GPOs when the GPO Menu is active. Only one can be selected at a time.

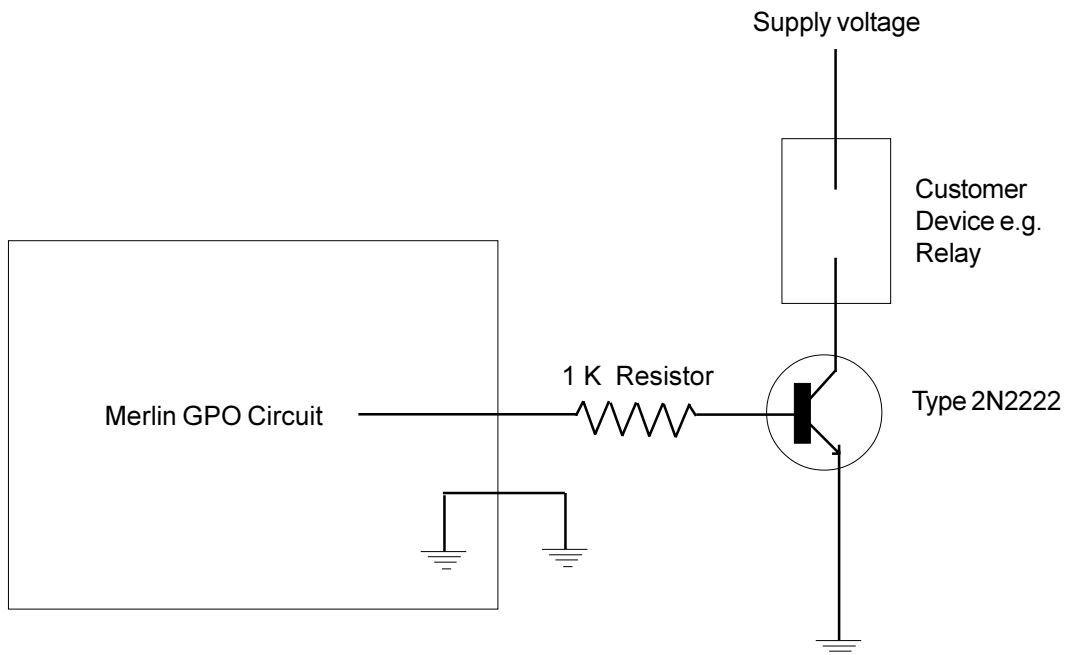
### The GPO Menu

The first Soft Key is always labelled Type. The other Soft Keys depend on what has been selected as the Type. This information is presented in tabular form on the facing page.

### Electrical Properties

PIN 37	GPIO OUT 0
PIN18	GPIO OUT 1
PIN17	GPIO OUT 2
PIN35	GPIO OUT 3
PIN34	GPIO OUT 4
PIN15	GPIO OUT 5
PIN14	GPIO OUT 6
PIN32	GPIO OUT 7

When ON, each GPO output is shorted to ground. When OFF it is open, and can be connected via a resistor to the desired trigger voltage.



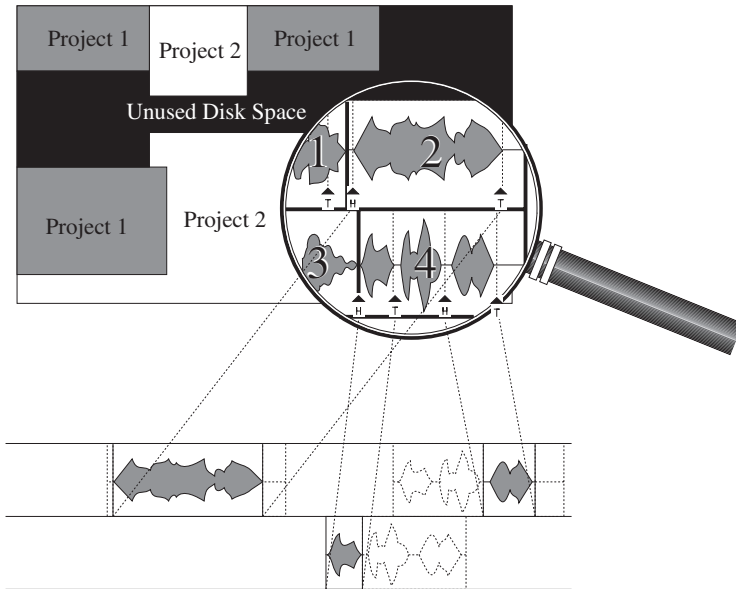
Note: when a GPO is set to the BEEPS type, Merlin can also output audio beeps from one of its channels. This is controlled from a configuration file called `mdr_cfg`, which is discussed in a later section of this manual called Configuration Files.

## GPO Types

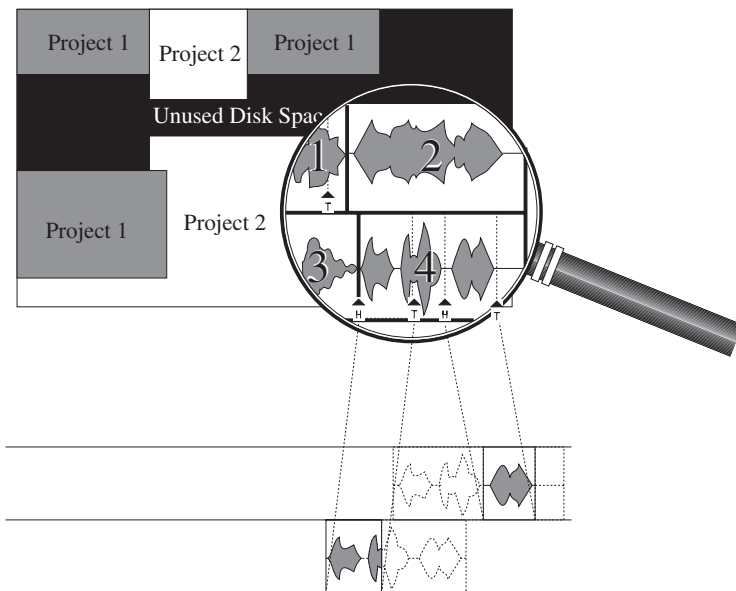
Type	Description	Some Uses	Soft Key 2	Soft Key 3	Soft Key 4	Soft Key 5
<b>OFF</b>	GPO is inactive	Switch OFF				
<b>ON</b>	GPO is always ON	e.g. recording session in progress				
<b>SIMPLE</b>	Fires at a given timecode	Machine starts	<b>Time</b> Timecode when the GPO fires	<b>Pulse</b> Sets the length of time GPO remains ON. May be set to a number of milliseconds, or set to HELD, in which case the GPO stays on until the transport stops.	<b>copy</b> Copies the value in the Time field to the Numeric Register, where it may be used for another operation.	<b>Fire</b> Fires GPO immediately, for testing purposes. If Pulse is set to HELD, the GPO switches on and off as the key is pressed and released.
<b>RECORD</b>	Remains on while the transport is in Record	Warning lights, tallies, indicator lights for artists.	<b>COMMAND TIMECODE</b> If this toggle is set to TIMECODE, the GPO remains on whenever the transport is inside the AutoRec Menu Record range. If COMMAND is chosen, the GPI turns on only while the transport is in Record.	<b>Pulse</b> As above when Timecode is selected. Not available when Command is selected		<b>Fire</b> As above
<b>PREROLL</b>	Remains on while the transport is prerolling	Indicator lights for artists	<b>COMMAND TIMECODE</b> Similar to above	<b>Pulse</b> As above		<b>Fire</b> As above
<b>POSTROLL</b>	Remains on while the transport is postrolling	Indicator lights for artists	<b>COMMAND TIMECODE</b> Similar to above	<b>Pulse</b> As above		<b>Fire</b> As above
<b>A/R REH</b>	Remains on while the AutoRec menu is in Rehearse mode.	Indicator lights for artists				<b>Fire</b> As above
<b>A/R REC</b>	Remains on while the AutoRec menu is in Record mode.	Indicator lights for artists				<b>Fire</b> As above
<b>A/R PLAY</b>	Remains on while the AutoRec menu is in Playback mode.	Indicator lights for artists				<b>Fire</b> As above
<b>BEEPS</b>	GPO fires three times leading up to a programmed recording	Cueing for artists	<b>Spacing</b> Time between beeps.	<b>Pulse</b> As above	<b>Offset</b> Offsets beeps from scheduled record time.	<b>Fire</b> As above
<b>PREREC</b>	GPO fires once at a given interval before a programmed recording.	Streaming lights.	<b>Pretime</b> Set a time in frames by which the GPO precedes the recording	<b>Pulse</b> As above		<b>Fire</b> As above
<b>LOC</b>	GPO fires when transport reaches each Location (in Play or Record)	Track starts for CD recorders	<b>Pulse</b> As above			<b>Fire</b> As above
<b>CUE MUTE</b>	Can be set On or Off independently for the PREROLL, RECORD and POSTROLL periods of the AutoRec Menu.	Controls whether original track is heard during each stage of the AutoRec recording.	<b>AHEAD</b> If toggled ON, GPO is ON during the Preroll section.	<b>IN</b> If toggled ON, GPO is ON during the Record section.	<b>PAST</b> If toggled ON, GPO is ON during the Postroll section.	

## 41. Disk Information

The following diagram illustrates some aspects of the way Merlin uses a hard disk.



*Two different clips are referencing Master Recording 4, while one is referencing Master Recording 2*



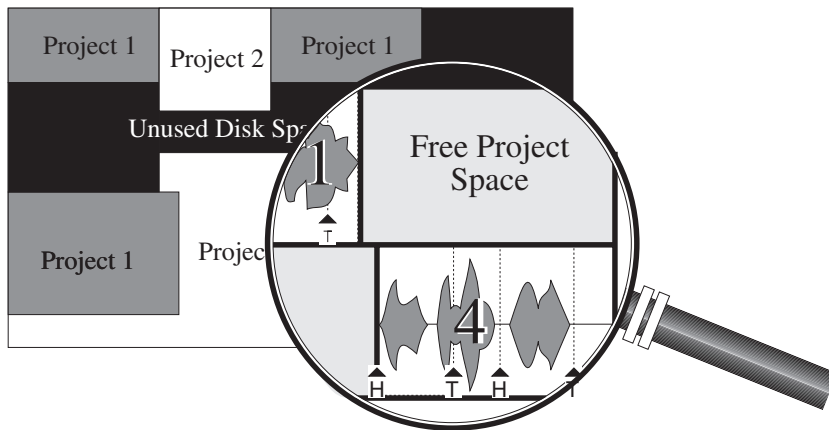
*One of the clips referencing Master Recording 4 has been extended at the Tail, which is done by moving its Tail Pointer. The clip that was accessing Master Recording 2 has been erased, leaving no pointers at all to Master Recording 2.*

A project is spread across a number of disk **segments**, interspersed amongst data from other files. The disk operating system is especially designed so that these segments are always very large, avoiding the “fragmentation” that can occur with hard disks generally.

**Clips** maintain pointers (head and tail) that tell the computer where to start and end playing Master Recordings. **Editing** is all achieved by moving the pointers. A copy of a clip is simply another set of pointers to the same Master Recording.

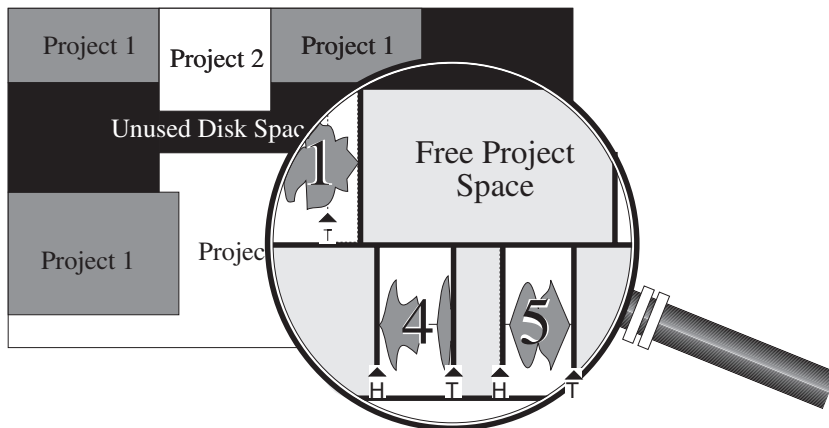
When all copies of a clip are **erased**, there are no longer any playback pointers to that Master Recording.

## Operations in the Disk Menu



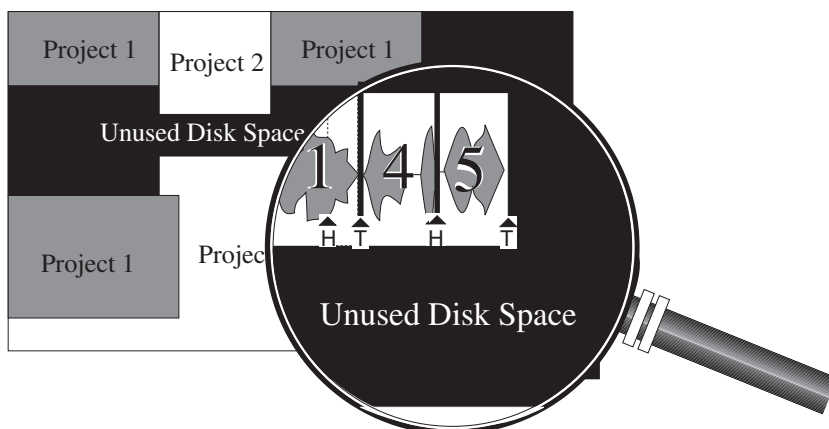
**Dispose** removes all clips which are not used at all in the project. The space they occupied becomes available for further recording in this file, but not for other projects.

*The Dispose Command has removed Master Recordings 2 and 3 because there are no pointers to them.*



**Commit** removes all the parts of recordings that have been edited out (i.e are not within the pointers.) The space thus freed becomes available for further recording in this file, but not for other projects.

*The Commit command has removed sections of Master Recording 4 that were not being referenced by any clips.*



**Pack** squeezes all the remaining audio data into contiguous space within the file segments, by copying into the free space within the file. At the end of this process the free space is right at the end of the file, and this is then truncated so that it becomes true free disk space.

*The Pack command has moved all of the audio so that it occupies the least possible space on the hard disk. The extra space that was inside the file is released as free disk space that can be used by any file.*

## 42. Preparing Drives for Disk Recording

---

It is assumed that any new hard drive you buy will be preformatted with a suitable sector size. To ensure that this is the case, only buy drives that have been approved by Fairlight.

Attach the new disk drive to the system, with the power OFF. Its SCSI address must be different from that of any other disk or tape drive already attached. Note its SCSI address.

Merlin supports two different disk file systems. The first, called RBF (Random Block File) is the native file system of OS-9, the operating system used by Fairlight. It will support devices up to 4 Gigabytes. All boot drives must be in RBF format.

The second type is called FLFS (Fairlight File System), and was invented by Fairlight to handle devices larger than 4 Gigabytes, and up to 200 Gigabytes. It must be used for these large devices.

Power up the system. Once Merlin has finished its bootup sequence, type (at the QWERTY keyboard):

```
QUIT<RETURN>Y
```

The colour screen will disappear, leaving a text interface. To initialise a disk in RBF format type:

```
diskinit /tsX0 -v=1024 -c=128 -z<RETURN>
```

X is the SCSI address of the drive. Upper or lower case is okay.

You will be asked to verify that you wish to go ahead with this highly destructive operation. If you confirm, the initialisation takes only a few seconds. A reboot is necessary after initialisation.

To initialise a disk in FLFS format, necessary if the drive is larger than 4 GBytes, type:

```
diskinit /tsX0 -v=1024 -c=128 -z -w<RETURN>
```

The only difference is the inclusion of the -w option.

### Formatting Optical Disks

Formatting optical platters is exactly the same as formatting hard disks.

### Making a System Disk

If you want to have a spare bootable hard disk that can be used in case of failure of your main disk, type the following:

```
chd /dd<RETURN>
```

This puts you into the root directory of your current system disk, where the relevant files are to be found.

```
bootgen /tsX0 dd.bf<RETURN>
```

This creates a bootblock on the target drive (X is the SCSI address of the drive)

To install software on a hard drive, first you need a “release file”. There may be one on your hard disk already. To find out, type:

```
dir<RETURN>
```

This searches the directory for all files.

If the system displays any file something like:

```
16_1_05.gz
```

then that is a release file. The numbers should be the same as those of the software version you are currently running (this is printed in the Merlin console whenever you QUIT from the Merlin application).

If you do **not** already have the correct release file for your current system software type:

```
xrelease -f=16_X_Y.gz<RETURN>
```

substituting the correct numbers for your current system software

Now type:

```
upgrade<RETURN>
```

The screen will change to show you a list of choices, and you should first choose the software version you want out of the listed choices. The system will then start the Media Daemon, which checks for available devices on the SCSI bus. You should then choose the SCSI address of the disk you want to upgrade.

After the software has run its routine, it should restart the system, but if not you should do it by typing RESTART<RETURN>Y.

Merlin uses a number of files to store setup information. These are normally set to sensible values at the factory, but in some cases you may need to change them.

The Configuration files are stored in OS9 partitions on the boot drive, that is the drive with SCSI address zero. The names of the files, which are given below, include the disk partition and all elements of the directory tree that is needed to access them.

Note: Some options are only taken into account when the machine boots up. Therefore, to ensure your changes take effect, restart the machine by switching it off and on.

#### **Before Changing a Configuration File**

It is always necessary to access the operating system in order to edit a configuration file, and therefore to QUIT from the disk recorder application (if you use a Mac or PC you will be familiar with the idea of quitting from an application - it is exactly the same inside MERLIN).

First, type: **QUIT<RETURN>Y**

and wait for the hash prompt (#) to appear.

Note: commands are written here in UPPER CASE and bold, but the system is not case sensitive, so you can type them any way you like.

#### **Editing a Configuration File**

Type: **ED filename<RETURN>**, where filename is the name of the file you want to edit.

Now you can move the cursor around the file using the arrow keys.

To add text, move the cursor to the desired location and start typing. Text is always inserted, never overwritten.

To remove text, use the **DEL** or **BACK** key.

#### **Saving Changes to a File**

When you have the file exactly the way you want, type **<esc>ZY**. This will close the file and save your changes.

If you want to abandon editing without saving changes, type **<esc>QY**.

To return to the Disk Recorder program, type: **MFX4<RETURN>**

### **The MDR Configuration File**

This file contains many settings that are used by the Multitrack Disk Recorder program (MDR). To open it when Merlin is running, type:

**CFG<RETURN>**

Editing is described in the section above (omit the line **ED filename<RETURN>**, as you have already performed a shorthand version of it). After saving the file you must restart the machine before changes take effect.

Important: The MDR Configuration File contains many things that you should not change! If you do, some operations of the system may become unstable, or not work at all. **DO NOT CHANGE ANYTHING** that is not described fully here.

The following lines may be changed:

#### **@ArmKeyDelay on**

Normally there is a delay in the reaction time of the Track Keys, to allow for the possibility of double clicking. Change this setting to "off" in order to remove this delay (useful when using the Track Keys to put individual tracks into record). When it is off, double clicking does not work.

#### **@FadeDefault 72**

Every clip is played with a fade at both ends (unless it is butted up to another clip), even when you do not specify one. The value here is used every time the system powers up (you may change it temporarily while the system is running). The number is set in time units, which are equivalent to sample periods at 48 kHz. A table shows you the equivalents in subframes at various frame rates.

#### **@DitherOutput 24**

This allows you to set the dithering of the digital and analog outputs. In most cases this should be left at 24, but if you are outputting to a digital system where only 16 or 20 bits are going to be used, you should set the dither accordingly.



### **@DefaultInputType1**

This will set the input type for newly created projects, immediately upon power up. Once a project has been loaded or created, all new projects created after it will inherit the patching and input type from it. The numbers of the different input types can be seen in the file you are editing.

### **@PlayInhibitThreshold24**

When you are recording a large number of tracks at once, the machine may sometimes have difficulty keeping up with the disk playback bandwidth requirements. Turning on this function (by setting it to the number of tracks you are recording) tells the machine not to try to load playback buffers on the tracks you are recording. This means when you exit Record, there will be no audio loaded to provide playback. This feature was designed for the MFX3 system, and is unlikely to be needed in Merlin.

This parameter does not normally need to be altered unless you are doing a lot of recording with more than 16 tracks armed.

### **@BeepsTrackNumber**

If you are using the AutoRec Menu, and you have set one of the GPIs to BEEPS, you will also get audible beeps from one of the outputs. This parameter allows you to choose the track that the beeps will output. It may be the track you are recording on if you want.

### **@BeepsVolume**

Sets the audio level of the beeps. Set it to -99 if you do not want any beeps.

### **@BeepsFrequency**

Sets the frequency of the beeps in Hertz.

### **@MinSegmentDuration0**

Sometimes a large amount of editing can result in lots of tiny clips sandwiched between larger ones. These clips are played, but not really heard, and can absorb a lot of disk bandwidth by requiring a single disk seek to fetch only a few inaudible samples. By setting this parameter to a non-zero number, these unnecessary seeks are avoided. In addition, any files that are being passed to the DaD will play much better if this parameter is set to 16 or more samples.

## **The Sony\_ID file**

The Sony ID file tells the system about the characteristics of different 9-pin devices, such as how many analog and digital tracks it has, and whether it is a fast or slow machine.

There is one line of importance that you can change: When Merlin is emulating a 9-pin device, it replies to the controlling machine with a device ID. Normally this is set to the official Fairlight ID, which is FA. But many editors do not recognise this device name, because it is too recent, and it is then useful to be able to give a device name that is familiar to the editor or other controller.

To open Sony\_ID for editing, first QUIT, then type:

```
ED/DD/USR/SYS/SONY_ID<RETURN>
```

To change Merlin's device name, edit the last line in the file:

```
0xFA0xA0
```

Change this ID to the ID for any Sony device that the controlling machine knows. All the Sony devices listed in this file have their corresponding ID at the beginning of the line, which can be copied over the Merlin ID. This will not affect the ability of another Fairlight product to recognise it.

## **The Sync Configuration File**

This file contains some settings that are used by the synchronisation system. To open it for editing, first QUIT, then type:

```
ED/DD/USR/SYS/TCS_CFG<RETURN>
```

This file contains a number of things that you can change. But do not touch them unless you know exactly what you are doing, because you could stop the system from working properly. Fairlight will not take responsibility for changes made to this file without supervision.

The explanations in the file tell you what can be changed. Most of it is only relevant to the system programmers, but there are some Environment Variables (which are like Preferences) towards the end of the file.

Each of the lines setting the Environment Variables has an asterisk at the beginning. This means the line is not actually being used, but a hard coded value for the variable is active. The value shown in the line is the one hard coded at the factory. If you want to change a value, remove the asterisk and change the number. Then save the file and restart the system.

Remember, it is advisable to consult your Fairlight service centre before doing anything major to this file!

This page is used for setting some system parameters. To reach it type <esc>S, that is type the <esc> key then an S. Your mouse is used to make changes on this page, then save them to disk if necessary. Whenever you wish to save the current configuration, click on the SAVE icon.

To get out of the System Page, select any mode, or one of the other <esc> key or Blue key options (see pages 2, 4 and 6).

### **Print Options**

Many of the fields on the S Page concern the operation of the printing software. These are applicable to other Fairlight products sharing aspects of Merlin software, but not to Merlin. Changing them will have no effect.

### **Backup Options**

#### Tape Drive Options

The first field allows you to choose the format when backing up to an Exabyte 8500 or 8505. You may choose 8200 format, in which case owners of the EXA-8200 can read your files.

The second field allows you to choose whether the backups use data compression, only if you are using the EXA-8505. Data compression will improve the read and write speed to around 7 times play speed or better, but will not allow the files to be read by an EXA-8500.

### **File Display Sorting**

Allows you to choose the order in which files are displayed on the F Page.

### **Meter Settings**

The Meter Calibration Law sets different curves for the channel meters. There are two groups: from 1 to 3 has a lower limit of -54 dB, and from 4 to 6 has a lower limit of -72 dB. Within each group, the lower numbered curves devote more meter length to the higher levels. You can change the meter calibration law at any time the meters are displayed by typing *law number*<RETURN>, where number is the meter calibration law you wish to use.

Meter Red Level allows you to set the level at which the meter elements are coloured red. You can also change this at any time the meters are displayed by typing:

red *number*<RETURN> where number is the audio level where the meters are to turn red. You may include the minus sign or not, just as you prefer.

### **Crossfade from Zero**

This is used when you have set a crossfade that is longer than one of the clips in the overlapping region. When ON is chosen, the short clip will fade in such a way that it will reach a level of -∞ at the edge of the clip, even if the crossfade is not at an end. When OFF is chosen the clip will fade in the normal way as dictated by the crossfade parameters, and then it will stop playing at its end, with the level still up.

### **Fade Def on Butted Clips**

This option allows you to decide whether fade defaults are used at butted clips. It is generally a good idea to leave it switched off if the audio is continuous across your edits.

### **Auto-Update DL File**

Allows you to have Merlin create a Dubber file automatically whenever a project is closed. Options are NEVER, ASK (you will be prompted each time a project is closed), or ALWAYS.

### **Wave Menu Audio Format**

This field has no effect in Merlin.

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