Foundation 2000

Digital

Recorder

Editor

Mixer



User's Guide

FOSTEX

©1994 Fostex. All rights reserved.

Foundation 2000, Intelligent De-emphasis Process, Removable Project Environment, Algorithmic Computing Engine, Sample Transfer Audio Routing Bus, and Shared Memory Interface are trademarks of Fostex.

If you have any suggestions or comments concerning this manual, please contact Fostex Research and Development, Inc., 2 Buck Road, Suite 2, Hanover, New Hampshire 03755. Telephone 603-643-9811 or Fax 603-643-1776.

Version 1.0

Part #83-88-002-000

FOSTEX

Safety instructions



Please read the following safety instructions before operating *Foundation 2000.*

Safety Instructions

1 **Obey all warnings on the unit and in the User's Guide .**

2 **Do not block ventilation openings.**

3 **Do not place near heat sources, such as radiators, heat registers, or appliances which produce heat, including amplifiers.**

4 **Guard against objects or liquids entering the enclosure and damaging the unit.**

5 **Connect only to AC power outlets rated 100-125V or 200-250V 47-63 Hz. Current ratings should be a minimum of 7A for the 120V rage and 3.5A for the 240V range.**



6 **Never operate the system with the cover removed. Permanent damage could occur.**

7 **Always connect to AC power outlets.**

8 **Group all equipment to reduce ground loops that may occur.**

9 **Do not step on power cords. Do not place items on top of power cords so that they are pinched or leaned on. Pay particular attention to cords at plugs ends and the point where they are attached to the unit.**

10 **Unplug when not in use for extended periods of time.**



11 **For continued protection against fire and circuit damage, replace only with fuse of the same specified voltage and current ratings.**

12 **Carefully follow instructions in the User's Guide for cleaning the unit, especially the touch screen.**

13 **Do not perform service operations beyond those described in the User's Guide or Service Manual. In the following circumstances, repairs should be performed only by qualified service personnel:**

- power supply cord or plug is damaged
- liquid is spilled into the unit
- an object falls into the unit
- the unit is exposed to rain
- the unit does not operate normally or changes in performance in a significant way
- the unit is dropped or the enclosure is damaged

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numérique de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

TABLE OF CONTENTS

INTRODUCTION

About Foundation 2000 3
Customer Service 4
Unpacking Foundation 2000 5
Package contents 5
Registration and warranty 6
About the manuals 7
User's Guide and Service Manual 7
Sign posts 7
Main Unit and Edit Controller 8
Installing the Main Unit 8
Mounting the Edit Controller 9
Attaching the wrist rest 10
Audio I/O 11
2 Channel I/O 11
Multichannel I/O 11
Synchronization and control 11
Synchronization 11
Control modules 12
Powering up 13
Handling an RPE™ 13

GETTING STARTED

Overview 19
Foundation 2000 tutorial 19
Connecting audio inputs and outputs 19
Selecting a track for recording 20
Checking levels 20
Transport buttons and time displays 21
Recording tracks 1 and 2 22
Listening to the tracks 23
Troubleshooting 25
Restoring a take 25
Auto record 27
Punch-in editing 29
Cut, copy, paste editing 30
Locating 32
Mixing 33

GENERAL CONTROLS

Buttons and time displays 41
Buttons 41
Time displays 41
Touch sensitive display 42
Navigation 42
Entering information 43
Status bar 45
Maintenance 46
Transport controls 46
Jog/shuttle knob 47
Speed display 48

PROJECT MANAGEMENT

Selecting projects and reels 51
Hierarchy 51
The Index 51
Naming projects and reels 54
Copying projects and reels 55
Erasing a project or reel 57
Reel preferences 58
Preferences page 58
Changing reel preferences 59
Archiving and restoring 60
Archiving projects and reels 60
Restoring projects and reels 61
Erasing an archival tape 65
Removable Project Environment™ 65
Inserting and removing an RPE 66
Erasing and formating an RPE 67
Security 69
Other RPEs 72

RECORDING

Tracks display 75
Input routing 76
Using the 2-channel inputs 76
Using the multichannel direct inputs 78
Readying tracks 80
Metering 81
Meters display 81
Reference level 82
Manual recording 83
Techniques 83
Footswitch 84

Auto recording and playback 84
Simple auto record 84
Auto functions and looping 85
Preroll, postroll and delay 86
Undo and redo 89
Locate 90
The buttons 90
Locating 91
Storing and recalling a time 93
Editing a time 94

EDITING

Overview of editing buttons 97
Cut and copy editing 98
Paste 99
Simple paste 99
Splitting tracks 100
Fill and ripple editing 102
Fill paste 102
Ripple 102
Inserting leader 104
Undo and redo while editing 104

MIXING

Foundation 2000 mixer 109
Mixer displays 110
2-Channel I/O Module 110
2-channel view 111
Multichannel I/O Module 112
8-channel view 112
Patch view 113
MixTab 114
Setting up 114
Channel controls—DCM 1 116
Monitor controls—DCM 2 117
A-B inputs and aux returns—DCM 3 118
Storing and recalling snapshots 119
Mixing applications 120
Overdubbing 120
Mixdown 121
Premixing inputs 123
Aux sends and returns 124
MIDI implementation 125

Mixer signal flow diagrams 127
Conceptual console 127
Mixer map 128
Mixer signal flow—minimum configuration 129
Mixer signal flow—expanded configuration 130
MixTab implementation 131

SYNCHRONIZATION

Synchronization preferences 135
The sync reference 136
Machine control 137
Foundation 2000 as a controller 137
Controlling a Foundaiton 2000 139
General Purpose Interface (GPI) 140
Timecode 141
SMPTE format 141
Timecode offsets 142
Chase 144
Status lights 144
Digital transfer 145
Sync reference 145
Transferring audio 146
De-emphasis 148

SETUP AND MAINTENANCE

Time and date 151
Loading the data card 151
Status messages 153
Diagnostics 153
Main unit module placement 155

SPECIFICATIONS

General specifications 159
Audio specifications 160
Analog audio I/O 160
Digital audio I/O 160
Synchronization 161
Word clock 161
Video sync 161
VITC 161
LTC 161

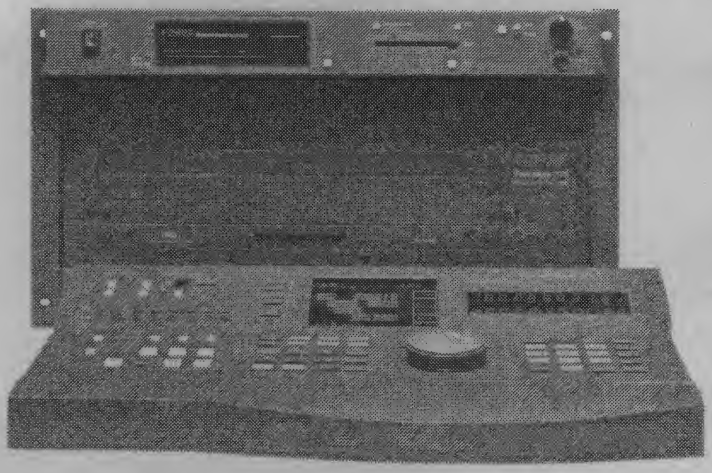
INTRODUCTION

About Foundation 2000 3
Customer Service 4
Unpacking Foundation 2000 5
Package contents 5
Registration and warranty 6
About the manuals 7
User's Guide and Service Manual 7
Sign posts 7
Main Unit and Edit Controller 8
Installing the Main Unit 8
Mounting the Edit Controller 9
Attaching the wrist rest 10
Audio I/O 11
2 Channel I/O 11
Multichannel I/O 11
Synchronization and control 11
Synchronization 11
Control modules 12
Powering up 13
Handling an RPE™ 13

About *Foundation 2000*

FOUNDATION 2000 is a random access digital audio recorder, editor, and mixer which can be used as a stand-alone system or integrated into a multi-machine environment. A selection of analog and digital I/O configurations and extensive synchronization and machine control interfaces are provided.

Foundation 2000's unique hard disk recording medium, the Removable Project Environment, or RPE, stores all audio, edit, mix and project data on removable hard disk cartridges. The standard 540MB drive provides 90 minutes of storage. (A 1.3GB drive, over twice the storage capacity, is also available.) The RPE is designed to be removed and inserted into another *Foundation 2000* quickly and easily. Background archiving and restoring is supported for Exabyte or WangDAT SCSI drives.



The unit features 16 audio channels in an eight-track configuration, allowing simultaneous real-time crossfades on all tracks. *Foundation 2000*'s architecture supports full 24-bit audio, although initial release supports 16-bit. Convertors are 18--bit, with A-Ds using 64x oversampling and D-As using 8x oversampling. The Foundation 2000 uses modular ACE™ (Algorithmic Computing Engine) cards which provide real-time digital mixing within the unit, as well at 16 simultaneous channels of 3-band parametric EQ. The internal mixer is an 8:2:2 configuration, with two aux sends and four aux returns. Level, pan and routing is controlled through the *Foundation 2000* user interface or external controllers.

The Edit Controller features dedicated buttons for recording, editing, transport, and machine control. Ten levels of undo/redo editing are instantly available. The touch sensitive display contains soft buttons for track display, metering, mixing and other functions. A jog/shuttle knob provides smooth audio scrubbing. The Edit Controller is designed to operate as part of the 6U Main Unit, or as an easily detachable desktop unit.

The *Foundation 2000* takes a modular approach to I/O configuration. The standard configuation uses 2-channel analog XLR inputs, 4 analog XLR outputs (L-R mix and monitor mix), plus 2-channel AES/EBU and S/PDIF digital I/O (XLR, RCA and Toslink optical connectors). An optional multichannel analog I/O board has 8 inputs and 8 outputs, or 2 aux sends and 4 aux returns.

Extensive machine control and sync options enable *Foundation 2000* to operate within a multi-machine environment. You can sync to word clock, video sync, LTC (all standard varieties) and VITC. A high-speed LTC and VITC timecode reader is standard. The unit chases timecode (continuous audio output in forward and reverse directions) and supports "hard lock" when following slower than play speed sources. MIDI and RS-422 Sony 9-pin protocols are used for control, or for communicating with external transports or controllers, such as the Fostex RD-8 digital multitrack.

Customer Service

Fostex maintains a worldwide Customer Service program that is dedicated to serving the needs of *Foundation 2000* users. Customer Service is a good resource for questions about how to operate your *Foundation 2000*. Should minor repairs be necessary, they can walk you through the procedure. In addition, Customer Service keeps you informed of future software and hardware updates, and it is a good place to request future products or features.

Contact Customer Service	
7 a.m. to 7 p.m. every day	
US and Canada	1-800-8FOSTEX
International	1-603-643-4748
Fax	1-603-643-1776

When contacting Customer Service, please have on hand the following information:

- serial number of the Main Unit and the Edit Controller (see the chapter *Setup and Maintenance* for information on where to find these)
- description of the external equipment operating with your unit

Please return the Registration Card included with your *Foundation 2000* as soon as possible. The Registration Card provides Customer Service with information essential to serving your needs.

Unpacking *Foundation 2000*

Package contents



Standard Package Contents		
1	Main Unit	Processing unit.
2	Edit Controller	Detachable remote controller.
3	Wrist rest	Comfort rest attaches to the front of the Edit Controller.
4	RPE™	540MB Removable Project Environment.
5	User's Guide	Operational manual for users.
6	Service Manual	Technical manual for authorized service technicians.
7	Registration card	Official registration of ownership. Please send this back to us.
8	Power cable	Cable for connecting Main Unit to power source.
9	EC cable	25' cable for connecting Edit Controller to Main Unit.
10	Datacard	Contains software updates.
11	Guide brackets	Screw mount brackets for attaching the Main Unit to a rack. (SEE WARNING ON BRACKETS)

* For further details, see the chapter Specifications.

You can purchase the following optional equipment from Fostex or another manufacturer.

Optional Equipment*	
Sony 9-pin cable	Provides RS-422 control.
25-pin to XLR cable	Cable for the multichannel I/O.
Footswitch and cable	For remote control of recording and playback.
100' or 200' EC cable	Cable for connecting the Edit Controller to the Main Unit.
Rack mount kit	Kit for securely mounting Main Unit in a rack.



We suggest that you save the box and other packing materials in which your *Foundation 2000* arrived. These materials are specially designed to cushion your *Foundation 2000,* and they can be reused should you need to transport your unit.

If you choose to discard the packing materials, we strongly encourage you to recycle them. We have used as much recyclable or reusable material as possible, without jeopardizing the protection of your unit during shipping, and have kept the amount and variety of materials to a minimum. None of our packing materials contains CFCs.

Registration and warranty

Included in your *Foundation 2000* package is a registration card. Please fill it out and send it back to Customer Service. This ensures that you are notified of all software and hardware upgrades and new products as they become available.

Foundation 2000 comes with a one year parts and labor warranty.

About the manuals

The *User's Guide* is an operational manual for *Foundation 2000.* The *Service Manual* is for service technicians authorized to work on *Foundation 2000.*

User's Guide and Service Manual

The *Foundation 2000 User's Guide* contains information needed to use *Foundation 2000* in a variety of studio environments. After you have read this introductory chapter, we recommend that you go to the next chapter, Getting Started, and complete the tutorial. The tutorial gives you a good overview of how *Foundation 2000* operates, however as you become more familiar with your system, we encourage you to develop your own ways of working.

Foundation 2000 has more functionality than is covered in Getting Started. Consult the remainder of the *User's Guide* for more detailed information. Major topics are listed in the table of contents in the front of the guide and at the beginning of each chapter. Use the index in the back to locate individual topics of interest.

The *Foundation 2000 Service Manual* is an authorized service technician's guide. It includes specifications, diagrams and troubleshooting flowcharts. If you have further questions, call *Foundation 2000* Customer Service (see above).

Sign posts

The following sign posts appear throughout the manual. They indicate special information.

Name	Description
Note	Additional information concerning the current topic.
Tip	Shortcuts or ways for experienced users to perform an operation. Submit your tips for inclusion in manual updates.
Caution	Be careful! Important operating information. Read the information next to all caution signs.
Electrical Caution	Information about operating voltage and potential risks of electrical shock. Be alert to all electrical caution messages.

Main Unit and Edit Controller

Foundation 2000 consists of two primary components: the Main Unit and the Edit Controller. The Main Unit contains the processing hardware and system software. The Edit Controller is a detachable remote controller for the Main Unit.

Installing the Main Unit

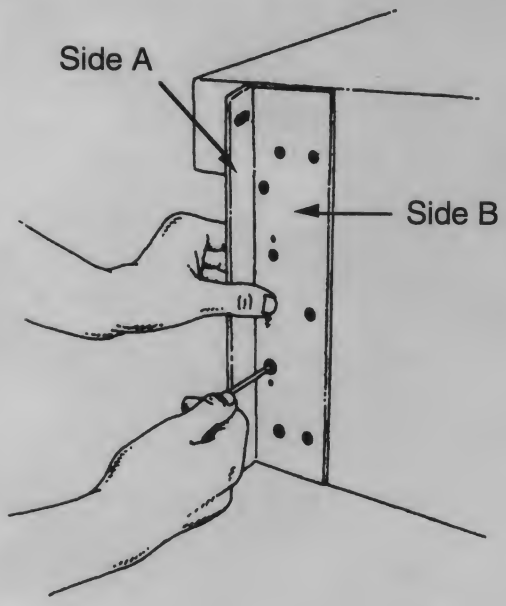
The *Foundation 2000* Main Unit can be placed on a flat surface or mounted in a 6 unit high rack space. If the Main Unit is mounted, it must be supported by a shelf unit that is designed to support 75 pounds (35 kilograms). The guide brackets included with your unit are for stabilizing your *Foundaiton 2000* when it is mounted in a rack.



The guide brackets cannot support the unit by themselves. You must purchase a rack mount kit in order to mount the unit in a rack. (This can be purchased from Fostex or another manufacturer.) Do not attempt to use the Main Unit on its side.

Attaching the guide brackets

The guide brackets attach vertically on either side of the Main Unit. Side A of the bracket has two screw holes for attaching to the rack (screws not provided). Side B has six screw holes (screws provided) and two smaller holes which slide into place when the bracket is properly positioned.



1 **Locate the six holes on the bracket and on the Main Unit.**

Bracket Side B attaches to the Main Unit. Note that there are two small raised bumps near two of the screw holes on the Main Unit. These line up with the two smaller holes on the bracket.

2 **Line up one of the brackets with the holes in the Main Unit. Let the two bumps on the Main Unit slide into the small holes on the bracket.**

When the small holes are lined up properly, the bracket should not move out of place easily.

3 **Use a 2.5mm hex wrench to insert the two screws on either side of the dimple holes first. Then insert the six remaining screws.**

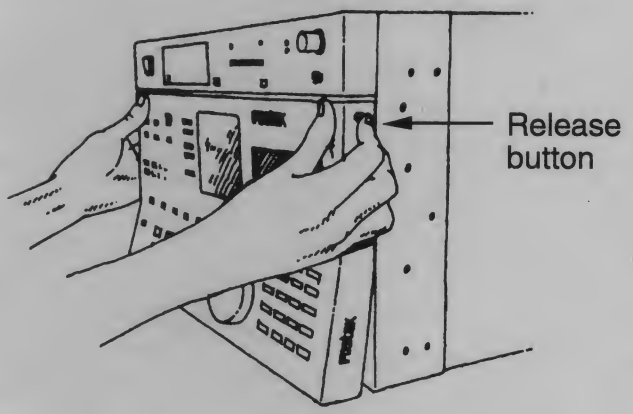
To assure adequate ventilation always leave at least 3 inches (8 centimeters) of air space in the rear and two inches (5 centimeters) at the front of the Main Unit. The ventilation system has been designed so that you do not need to leave rack space between the Main Unit and other equipment above or below. The normal operating temperature for the *Foundation 2000* is 32°F to 85°F (0°C to 29°C). This is the general range in which you can safely operate *Foundation 2000*.

Mounting the Edit Controller

The Edit Controller is designed to mount on the front of the Main Unit, but it can be detached and used remotely. A 25 foot EC cable is included. (100 and 200 foot cables also available.)

Mounting and unmounting the Edit Controller

1 **Press and hold the black release buttons on either side of the Edit Controller.**

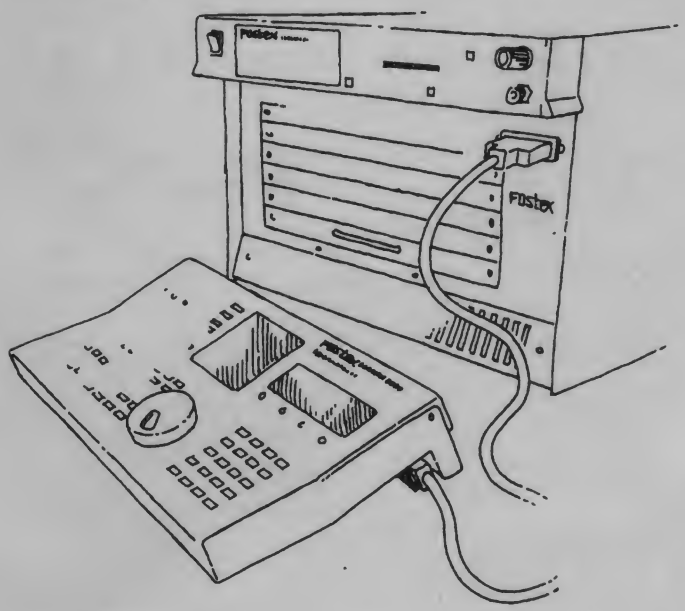


2 **Hold the Edit Controller up to the front of the Main Unit and firmly press it into place. Let go of the black release buttons so that they catch.**

While mounted, the Edit Controller is joined to the Main Unit by a power connector. You must push firmly enough to engage the connector.

3 **To detach the Edit Controller from the Main Unit, press the black release buttons and pull the Edit Controller firmly towards you.**

4 **To operate remotely, plug one end of the EC cable into the bottom of the Edit Controller and the other end into the matching 25-pin connector on the front or back of the Main Unit.**



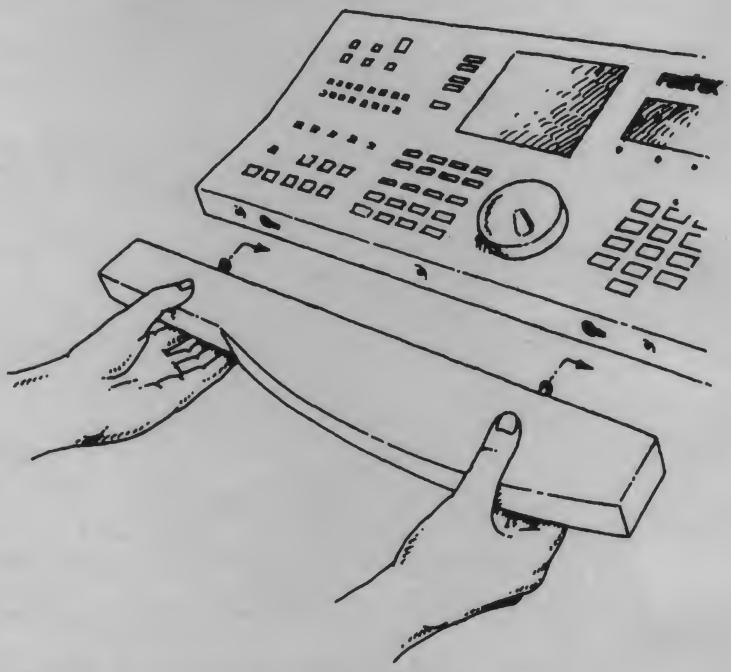
Do not connect or disconnect the Edit Controller cable,or mount or unmount the Edit Controller while powered up. This may result in a communication error. Always turn the power off firrst.

Attaching the wrist rest

The wrist rest snaps onto the front edge of the Edit Controller. Once attached it will stay firmly in place, providing you with comfortable hand and wrist support.

Attaching the wrist rest to the Edit Controller

1 **Line up the two pins on the wrist rest to the pin holes on the front edge of the Edit Controller.**



2 **Insert the pins into the left side of the holes.**

3 **Slide the wrist rest to the right and snap it into place.**

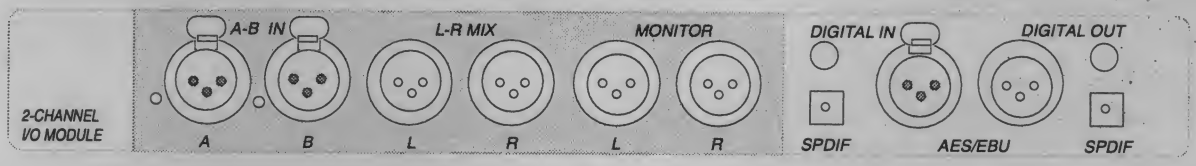
The wrist rest should line up with the form of the Edit Controller. If it does not, remove the wrist rest and start again.



If the Edit Controller is stored on the Main Unit with the wrist rest attached, an additional two units of rack space are required, otherwise the wrist rest will obscure equipment mounted directed below the Main Unit.

Audio I/O

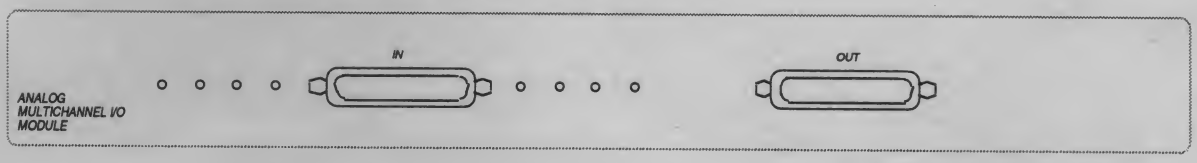
2-Channel I/O



The Main Unit contains one standard 2-channel analog and digital I/O module. The standard 2-CHANNEL I/O MODULE includes two +4 dBu/-10 dBV balanced XLR connectors for analog input (18-bit sigma-delta A/Ds with 64x oversampling). These A-B inputs include trim pots with an 18 to ∞ dB headroom adjustment. The 2-channel module also includes two analog L-R mix outputs and two monitor outputs with 18-bit D/As and 8x oversampling. Outputs are +4 dBu (switchable internally to -10 dBV) balanced XLR connectors.

The standard 2-CHANNEL I/O MODULE also provides 2 channels of AES/EBU or SPDIF digital I/O with XLR , RCA and Toslink optical connectors.

Multichannel I/O

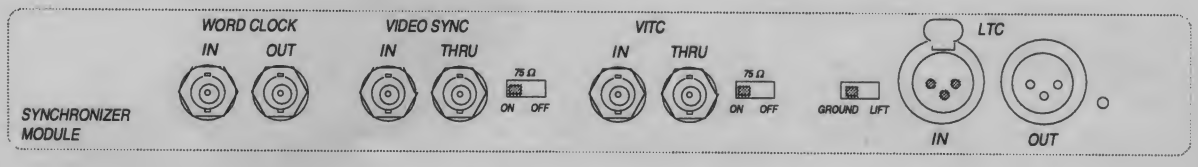


An optional ANALOG MULTICHANNEL I/O MODULE provides either 8 additional inputs and outputs, or 2 aux sends and 4 aux returns, depending on which slot in the Main Unit it is inserted into.

Synchronization and control

The *Foundation 2000* contains synchronization and machine control capabilities which allow it to function as both a controller and a controlee in a multi-machine environment.

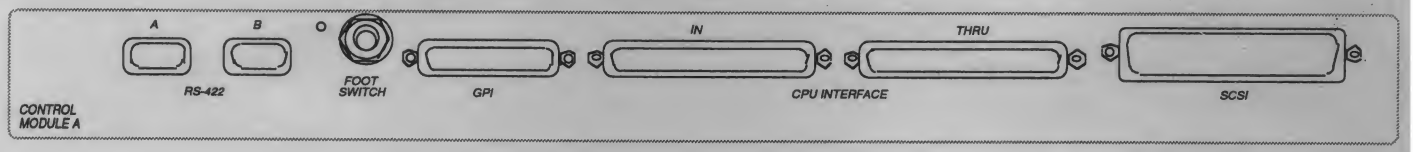
Synchronization



The Main Unit contains a standard SYNCHRONIZER MODULE which allows the *Foundation 2000* to read and generate LTC and VITC in all SMPTE formats.

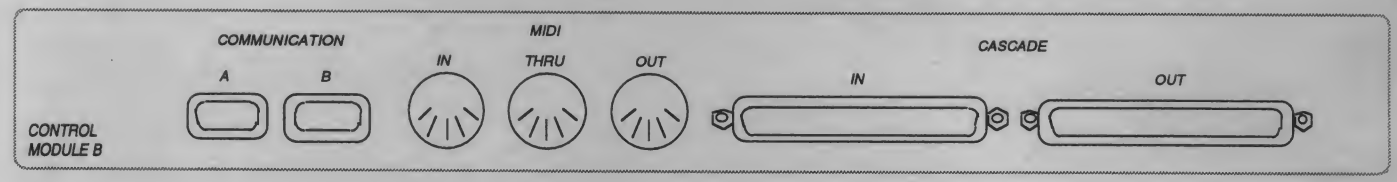
The Video Sync port allows synchronization to a video signal. The Word Clock connectors allow exchange of a word clock signal for digital audio transfers.

Control modules



The Main Unit has two standard control modules. Control module A contains the following.

- dual 9-pin RS-422 ports for control of and by external machines
- 1/4" footswitch port
- a 25-pin GPI connector
- dual CPU interface ports (currently not used)
- a SCSI port for archiving to magneto-optical disk or tape drive



Control module B contains the following.

- MIDI In, Thru and Out ports for external MIDI controllers such as the Fostex Mixtab.
- dual 9-pin connectors for external devices (currently not used)
- dual expansion ports for cascading *Foundation 2000*s (not currently used)

For more information on synchronization and machine control see the chapter "Synchronization."

Powering up

Always use a power cord that is approved by the appropriate national safety agency for the country of use. For applications utilizing 100-125 V, use a cord rated for 10A or greater. For applications utilizing 200-240 VAC, use a cord rated for 5A or greater. Users that require the CE mark for regulatory compliance must use a shielded power cord.

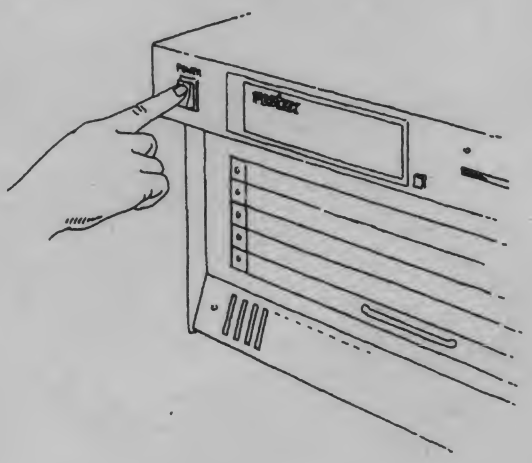
Turning on the power

1 **Before you connect the power plug, make sure that the black power button on the front of the *Foundation 2000* Main Unit is turned off (press 0).**

2 **Connect the AC power plug on the back of the Main Unit to the wall socket. (See warning above.)**

3 **To turn on *Foundation 2000*, press the power button (1) on the front of the Main Unit.**

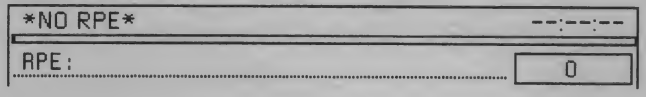
The system takes several seconds to power up, during which time the Edit Controller and the Main Unit conduct a series of diagnostic tests.



Handling an RPE

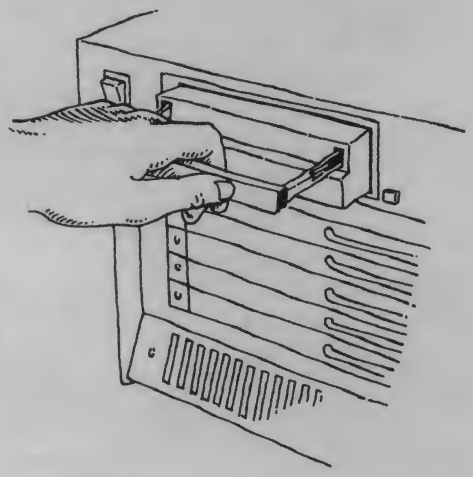
The Removable Project Environment™ (RPE) is a hard disk storage medium that stores audio, edit, mix, project and reel information. When the RPE is removed and inserted into another *Foundation 2000*, it automatically restores the previous working environment.

After powering up, wait for the Tracks display to appear on the Edit Controller touch screen. Before the RPE is inserted into the drive, the message "*NO RPE*" appears at the top of the display.



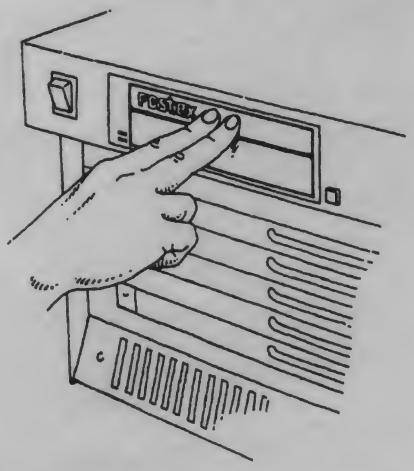
Inserting an RPE

1 Grasp the handle on the RPE and insert the RPE into the drive in the front of the Main Unit.



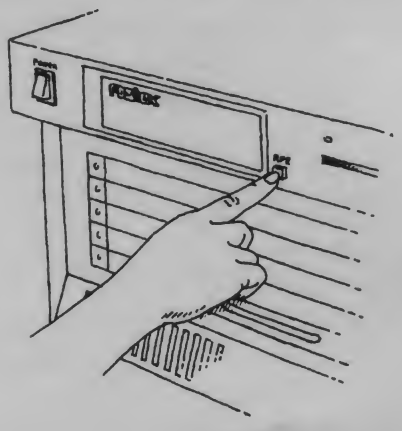
2 Firmly press the RPE and its handle into the drive.

The connectors on the back of the drive and the chassis must fully engage.



3 Press the RPE button next to the drive.

The *RPE* button next to the drive blinks during loading and unloading. When the drive is ready to be used, the button lights solid.



Powering up

Always use a power cord that is approved by the appropriate national safety agency for the country of use. For applications utilizing 100-125 V, use a cord rated for 10A or greater. For applications utilizing 200-240 VAC, use a cord rated for 5A or greater. Users that require the CE mark for regulatory compliance must use a shielded power cord.

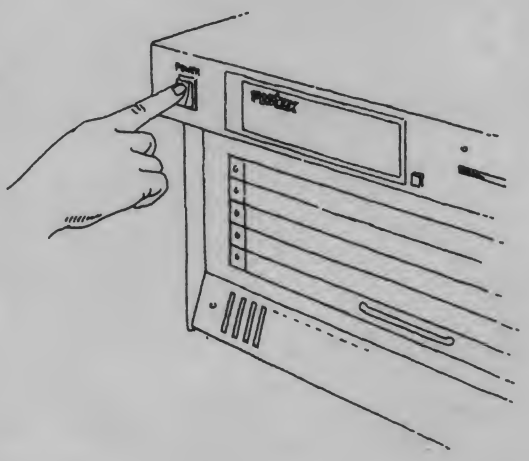
Turning on the power

1 **Before you connect the power plug, make sure that the black power button on the front of the *Foundation 2000* Main Unit is turned off (press 0).**

2 **Connect the AC power plug on the back of the Main Unit to the wall socket. (See warning above.)**

3 **To turn on *Foundation 2000*, press the power button (1) on the front of the Main Unit.**

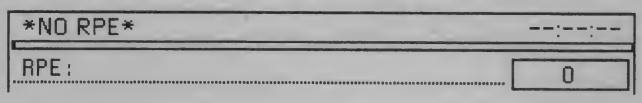
The system takes several seconds to power up, during which time the Edit Controller and the Main Unit conduct a series of diagnostic tests.



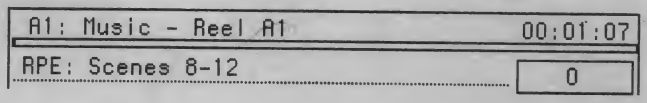
Handling an RPE

The Removable Project Environment™ (RPE) is a hard disk storage medium that stores audio, edit, mix, project and reel information. When the RPE is removed and inserted into another *Foundation 2000*, it automatically restores the previous working environment.

After powering up, wait for the Tracks display to appear on the Edit Controller touch screen. Before the RPE is inserted into the drive, the message "*NO RPE*" appears at the top of the display.



When an RPE is successfully inserted into the drive, the RPE name, along with the current project and reel names, appears at the top of the display.



Removing an RPE

1 **Press the RPE button and wait for the button to go out.**



Do not remove the RPE when the RPE button is blinking. Wait until the RPE button is not lit.

2 **To pop the handle out of the RPE, firmly press and release the handle bar.**

3 **Grasp the handle and firmly pull the RPE from the drive.**

For more information on RPEs, see the chapter Project Management.

GETTING STARTED

Overview 19
Foundation 2000 tutorial 19
Connecting audio inputs and outputs 19
Selecting a track for recording 20
Checking levels 20
Transport buttons and time displays 20
Recording tracks 1 and 2 22
Listening to the tracks 23
Troubleshooting 25
Restoring a take 25
Auto record 27
Punch-in editing 29
Cut, copy, paste editing 30
Locating 32
Mixing 33

Overview

GETTING STARTED is devoted to getting you up and running quickly. It jump starts many of the tasks that are described in more detail in later chapters. In this tutorial you will practice many of the concepts and functions available from your *Foundation 2000*. Later chapters offer you guidance on specific topics.

Foundation 2000 can be used in many different studio situations, such as dialog replacement and editing, audio transfer, and mixing. This tutorial is only a starting point. Once you become familiar with your *Foundation 2000*, you will develop a style of working that fits your particular needs.

Foundation 2000 tutorial

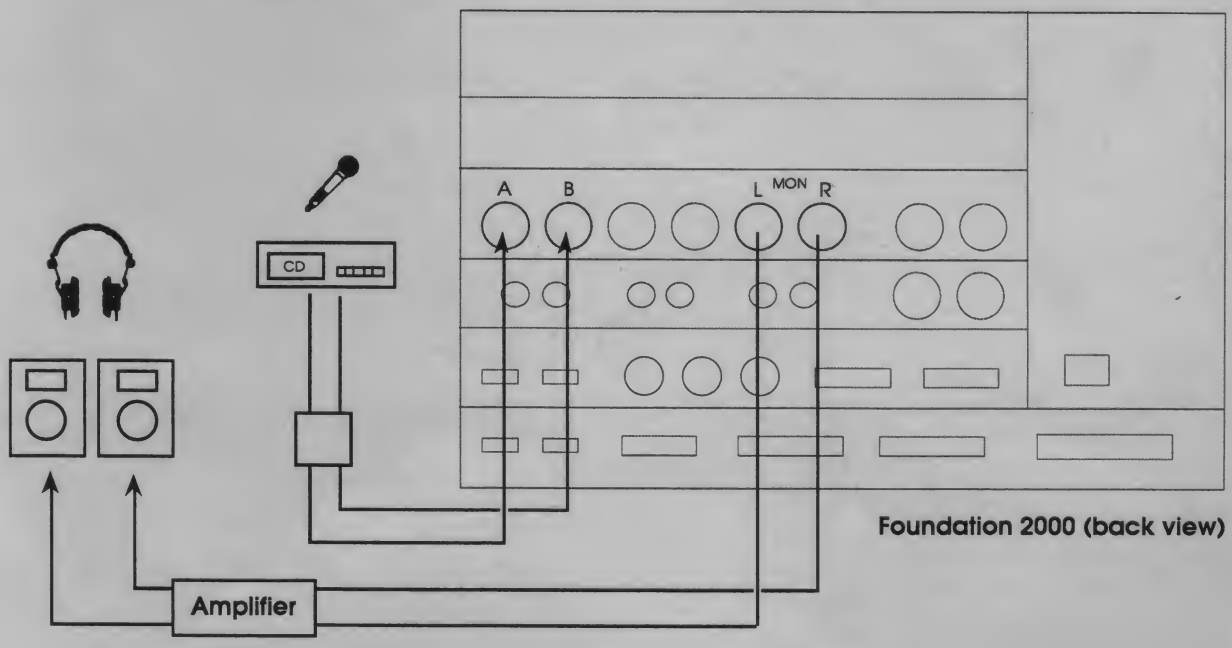
The following tutorial covers basic recording, editing and mixing. Even though *Foundation 2000* has capabilities far beyond the traditional tape machine, it can be used as a linear multitrack recorder, where tracks are recorded separately in sync with each other. For simplicity, this is the way this tutorial uses the system.

Connecting audio inputs and outputs

Use the analog A-B inputs in the 2-CHANNEL I/O MODULE for audio input and use the Monitor output for monitoring.

Connecting the inputs and outputs

1. **Plug an XLR cable from your sound source, such as a CD player, a microphone, or a guitar, into the A (left) and B (right) input connectors.**
2. **Plug an XLR cable from your monitoring device, such as headphones or speakers, into the Monitor outputs.**



Foundation 2000 (back view)

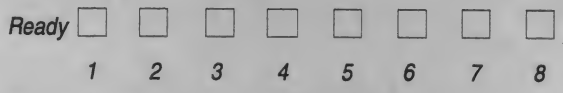
Selecting a track for recording

By default, input A is routed to odd-numbered tracks and input B is routed to even-numbered tracks. The input you use is determined by which track you ready.

Readying tracks for recording

You are going to ready two tracks for recording. Track 1 gets its signal from input A. Track 2 gets its signal from input B. *Ready* buttons blink when they are armed.

1 Locate the *Ready* buttons on the Edit Controller.



2 Press *Ready* buttons 1 and 2.



Checking levels

The *Foundation 2000* has a dynamic range of 96 dB. The maximum possible signal level is 0 dB, above which clipping and distortion occur. To check your input levels before recording, use the input monitoring function. When input monitoring is on, input to an armed track can be measured on the *Meters* display.

Turning on input monitoring

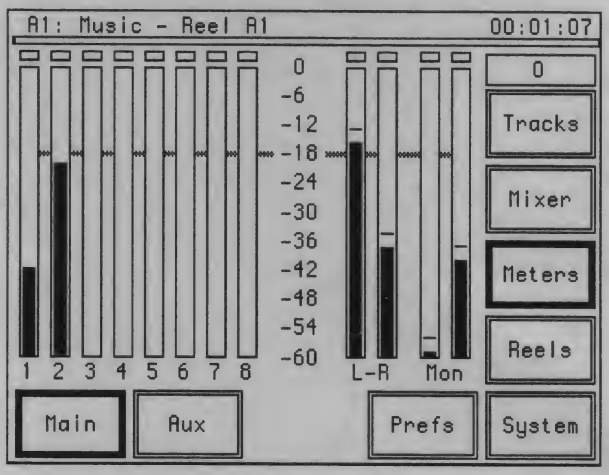
In the following steps you will turn on input monitoring and monitor the signal sent to the A-B inputs. If your inputs and outputs are connected properly, you should be able to view the level of the input on the *Meters* display.

Input Mon

1 Press ☐ near the transport controls.

2 Send a signal to the A-B inputs.

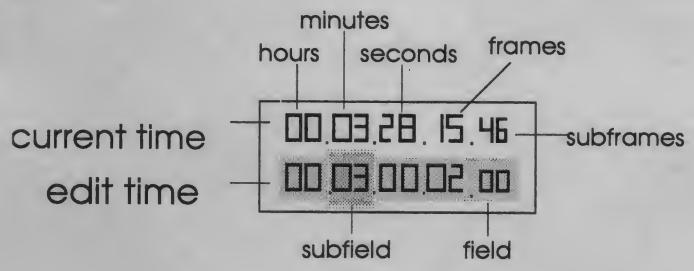
3 Touch the *Meters* button on the display.



4 Adjust the input level at your audio source.

Transport buttons and time displays

Before recording, find the time displays on the Edit Controller. The upper display shows the current playback location. The lower display shows the edit time. It also displays several different types of information, such as the current locator point.



During recording and playback, the following transport buttons are used frequently. Familiarize yourself with their functionality by using them while watching the time displays on the *Foundation 2000* Edit Controller.

Button	Function
Record ●	Press with *Play* to initiate recording. Button blinks in ready and lights solid when recording.
Stop ■	Stops transport. Button lights solid when stopped. Disables record.
Play ▶	Starts playback. Button lights while playing. Initiates recording when pressed with *Record*. Stops recording when in record mode; playback continues. Press with *FForward* to initiate forward cueing. Press with *Rewind* to initiate reverse cueing.
Rewind ◀◀	High speed reverse. Button lights solid while in reverse. Press once for playback 2x real time. Press twice for playback 4x real time. Press three times to locate to beginning of audio on ready tracks. If no tracks are ready, goes to beginning of all recorded audio. Press with *Play* to initiate reverse cueing.
F Forward ▶▶	High speed forward. Button lights solid while in fast forward. Press once to playback 2x real time. Press twice to playback 4x real time. Press three times to locate to the end of audio on ready tracks. If no tracks are ready, goes to end of all recorded audio. Press with *Play* to initiate forward cueing.

Recording tracks 1 and 2

Recording takes place on armed tracks only. When you start recording, the *Record* button lights; the *Ready* buttons stop blinking and remain lit. Press *Play* or *Stop* to stop recording. After recording, an In point is set at the beginning of the take and an Out point is set at the end. In and Out become useful later in the tutorial.

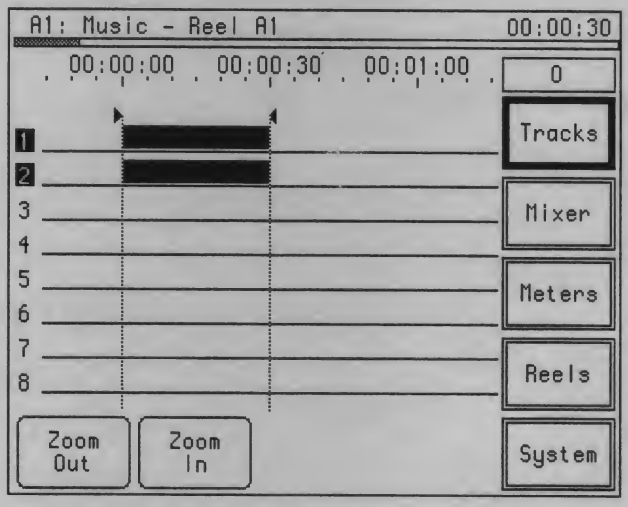
Recording on the tracks

1 **Hold** *Record* ● **and press** *Play* ▶ **to start recording.**

2 **Press** *Play* ▶ **to stop recording.**

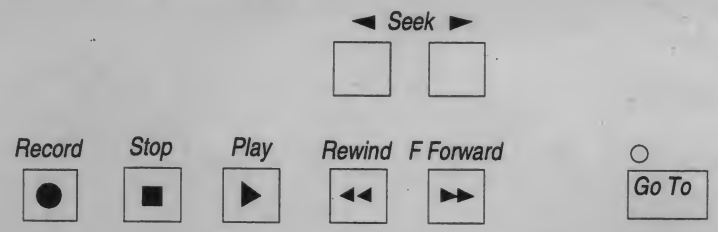
3 **Press** *Stop* ■ **to stop playback.**

4 **If you have not done so already, touch the Tracks button on the display to view your recording.**



Listening to the tracks

There are several ways to quickly locate and play back a track. You can use the transport buttons with *GoTo*, *Seek* or the locators. During playback, you can view the track level from the *Meters* display.



Playing back using the transport buttons

1 **Quickly press** Rewind ◄◄ **three times to return to the beginning of recorded audio on the readied tracks.**



2 **Press** Play ► **to hear what is recorded on tracks 1 and 2.**

3 **Press** Stop ■ **to stop playback.**

Locating using the Seek buttons

You can easily locate to the beginning or end of any recorded audio using the *Seek* buttons. The *Seek* buttons look for recorded audio on the armed tracks and locate to the beginning or end of any audio segment.

■ **Press** ◄ Seek ► **to locate to the beginning or end of your take.**

If you have additional recordings on the track, you can continue seeking through the track. The *Seek* buttons search through the armed tracks for audio. If no tracks are armed, the *Seek* buttons look for audio across all tracks.

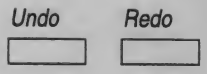
Troubleshooting

If you had a problem with recording or playback, check the following possible problems:

QUESTION		ANSWER
Does the *Tracks* display show recorded audio on tracks 1 and 2?	No	There is no audio recorded on the tracks. Did you ready the tracks before recording?
	Yes	A track was readied but you may not have had your I/O cabled properly. Are cables from your audio source going to the 2-Channel A-B inputs? Are the cables going to your monitoring device connected to the 2-Channel Monitor output?
Did the *Meters* display show a level on tracks 1 and 2 and the L-R bus during recording?	No	No audio was recorded on the tracks. Did you ready the tracks before recording?
	Yes	Make sure your monitoring system is connected properly.
Does the *Meters* display show a level on tracks 1 and 2 and the Monitor bus during playback?	No	If your answer to the previous question was "Yes," check to make sure you have not changed something in your monitoring system since recording.
		Your input may have been silent.
	Yes	Make sure the *Mixer* displays are set to their defaults: 2-Channel Source "analog" and L-R to Monitor "off" on the Patch display.

Restoring a take

Foundation 2000 performs non-destructive recording and editing. Even if you record over something or make an edit that you don't like, you can recover it. The process of recovering earlier work is easy using the *Undo* and *Redo* buttons.



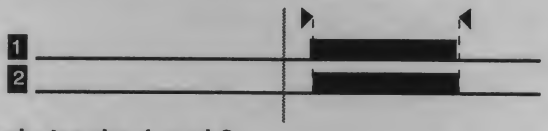
Each time you press the *Undo* button, you step back to the state before the previous record or edit action. Each time you press the *Redo* button, you step forward to recover the previous actions which were undone. In this way, you can recover the last ten record or edit actions.

Recording a second take

Now you are going to record over the previous take.

1 **Touch the *Tracks* button on the screen so you can see the recording on the tracks.**

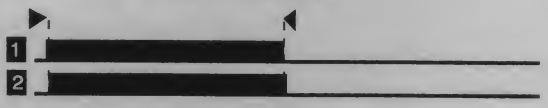
2 **Rewind to before the In time.**



3 **Ready tracks 1 and 2.**

4 **Hold** *Record* ● **and press** *Play* ▶ **and record over your previous take.**

5 **Press** *Stop* ■ **to stop recording.**



6 **Play back your second take.**

Using Undo

Assume that you liked the first take better than the second. If you had recorded on a conventional tape machine, the first take would be lost because you recorded over it. But *Foundation 2000* allows you to recover the first take by pressing the *Undo* button.

1 **Press** *Undo* ▭ **to recover your fist take.**



2 **Press** *Undo* ▭ **again to step back to when there was nothing recorded on the tracks.**

Using Redo

If you change your mind and want to go back to the second take, all you have to do is press the *Redo* button.

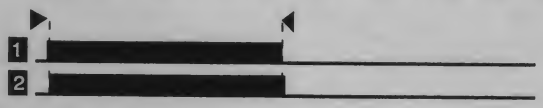
Redo

1 Press ☐ to restore your first take.



Redo

2 Press ☐ again and bring back your second take.



If you had recorded more than two takes, you would be able to step forward through ten of them.

Auto record

So far, all of your recording has been done manually—you pressed the transport buttons to start and stop recording. Auto recording, using the *Auto Rec* button, stops and starts recording automatically at preset times.

Auto Rec ☐

Auto record is useful when you want to record a specific segment of synced audio, or you want to punch in to a specific place on a track. You might also want to repeat a take that you recorded manually. In the following steps, you'll do a simple auto record on track 3.

In the previous section, after you recorded a take, the In point was set to the beginning of the take and the Out point was set to the end of the take. When auto record is turned on, these In and Out points can act as punch in and out points during recording.

Auto-recording a take

You are now going to turn on the *Auto Rec* button and record automatically on track 3 using the previously set In and Out points.

1 Set In and Out points. (Use the In the Out points that are already set.)

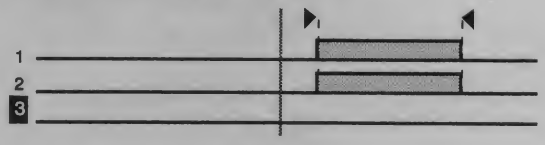
Auto Rec

2 Press ☐ on the left side of the Edit Controller.

3 Unready tracks 1 and 2 and ready track 3.

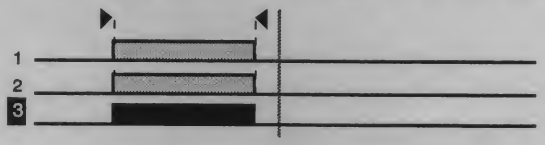
continued ⇨

4 Rewind to before the In point.



5 Hold *Record* ● **and press** *Play* ▶

6 After recording stops, press *Stop* ■ **to stop playback.**



Setting new In and Out times

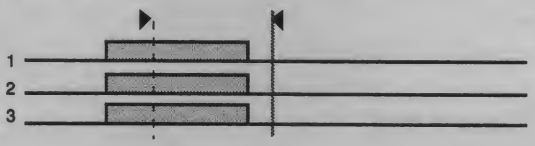
If you do not want to use the current In and Out points, you can play or locate to a time and press the In or Out button on the Edit Controller to set a new time. You are now going to set new In and Out points on the fly.

1 Unready track 3.

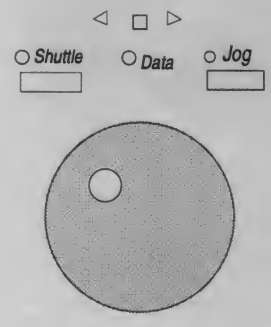
2 Press *Play* ▶

3 Press *In* **when you reach the time at which you want to start recording on track 4.**

4 Press *Out* **when you reach the time at which you want to stop recording on track 4.**



Shuttle/Jog to find a time



You can also scrub the audio on the tracks using the jog/shuttle knob to precisely find an edit point. Press the *Shuttle* button and turn the knob to playback in real time or faster. Press the *Jog* button and turn the knob to scrub at slower than real time.

1 Press *Shuttle* **or** *Jog* **to set the playback mode of the knob.**

2 Turn the knob to hear a new In location and press *In*

3 Repeat Step 2 as often as needed to get the right In time.

4 Turn the knob to hear a new Out location and press *Out*

5 Repeat Step 4 as often as needed to get the right Out time.

Trimming a time

If you feel like your In or Out time is not exactly where you want it, you can also trim the time by as little as a frame or even an 1/100th of a frame. You first recall the In time to the edit time field and then use the + and - keys on the keypad.

1 **Press** *Recall* **and then** *In* **to recall the In time to the edit time field.**

2 **Press** + **or** − **to trim the time by frames.**

3 **Press** • **to move to a different subfield of the edit time field and repeat step 2. (The subfield you are editing is to the left of the dot.)**

4 **Repeat steps 1-3 for the Out time, if desired.**

Recording a take on track 4

Now that you have precisely placed your In and Out points, and *Auto Rec* has been turned on, you can start recording. Once recording is done, turn *Auto Rec* off before staring the next section.

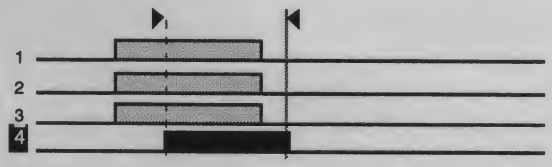
1 **Rewind to a point before the In time.**

2 **Ready track 4.**

3 **Turn** *Auto Rec* **on.**

4 **Hold** *Record* **and press** *Play*

5 **After you pass the Out point, press** *Stop* **to stop playback.**



6 **Press** *Auto Rec* **again to turn off the auto record function..**

Punch-in editing

One way to edit a track is to record over previously recorded material while monitoring one or more tracks. Erasing audio seems risky, but as you learned in the previous session, the *Undo* and *Redo* buttons provide security.

You can punch in manually by pressing the *Record* and *Play* buttons, or you can auto record a punch in. Auto record, in this situation, works just as it did above.

Performing a punch in on the fly

You can perform a punch in on the fly by unreadying all the tracks, going into record, and then punching in and out of a track by pressing its *Ready* button.

1 **Unready all tracks.**

2 **Go to a time before the punch in point.**

3 **Hold** *Record* ● **and press** *Play* ▶

4 **When you want to start recording, press the *Ready* button of the track you want to punch over.**

5 **When you want to stop recording, press the *Ready* button again.**

Cut, copy, paste editing

The In and Out points define a region on the tracks that can be edited. The *Ready* buttons specify which tracks to edit. If you ready track 1 and perform an edit, such as a cut, then only the audio on track 1 is affected. If you ready two tracks, only the audio on those two tracks will be edited, and so forth. Cut or copied audio is temporarily stored in a storage area called the Clipboard.

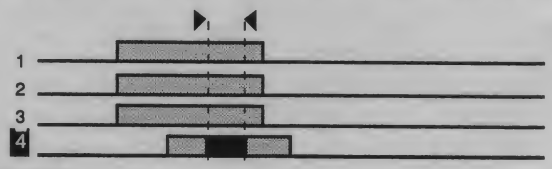
Performing a cut

To perform a cut, define the region of audio that you want to cut by setting In and Out points and ready the track from which you want to cut audio, then press *Cut*.

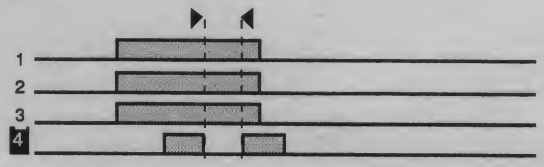
1 **Ready the track(s) that contains the audio you want to cut by pressing its Ready button.**

2 **Use the jog/shuttle knob to find the In point of the region and press** *In*

3 **Use the jog/shuttle knob to find the Out point of the region and press** *Out*



4 **Press** *Out*



Audio in the Clipboard can be placed onto the same or a different track by pasting. Simply place the In point where you want to paste, ready the track on which you want to paste, and press *Paste*.

Performing a paste

First, you are going to paste the cut audio from track 4 onto track 5, without moving the In point. This is useful when pingponging dialog tracks. Then you will move the In point and paste again.

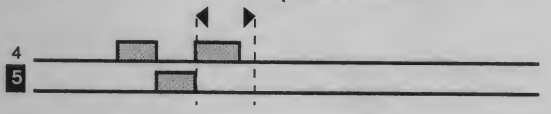
1 Unready track 4 and ready track 5.



2 Press *Paste*

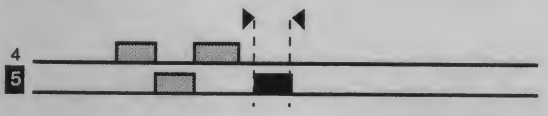


3 Shuttle to a later time and press *In*



4 Press *Paste*

You do not need to specify an Out time before pasting. After pasting, the Out point is set automatically.

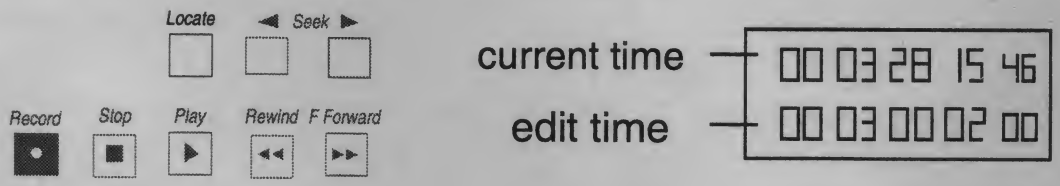


Performing a copy

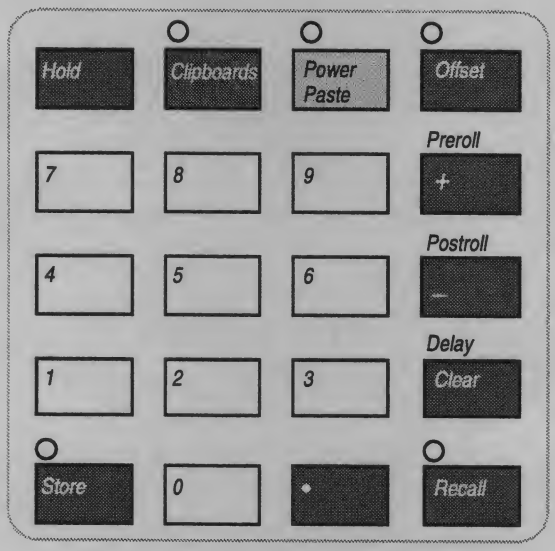
A copy is very similar to a cut, except that the audio is not removed from the track(s). Go back and try the previous cut and paste exercise using the *Copy* button instead of *Cut*. And remember, the previous ten edits you perform can be undone or redone using the *Undo* and *Redo* buttons.

Locating

The locate function allows you to go to any time on the reel whenever you want instantly. The *Locate* button always takes you to the time in the edit time field. If a preroll has been set, it takes you to the locator time minus the preroll. Use the *Hold* button to take the current time into the edit time field and the +, -, and • buttons to trim.



You can define 10 locator points and store them in keypad button 0-9 for easy reference, and then recall them to the edit time field for autolocation.



Storing a locator point

In this example you are going to use the *Hold* button to put the current time into the edit time field, and then you'll store the time into a numbered keypad button.

1 **Use the jog/shuttle knob to find a time you want to store.**

2 **Press** [Hold] **to put the current time into the edit time field.**

3 **Press** [Store] **and then** [1] **to store the time to the numbered button.**

4 **Repeat steps 1 -3 above, except store the time into** [2]

You now have two stored locator points.

Using a locator point

Now that you have a couple of locator points, you can use them to locate to specific times quickly. Just recall them to the edit time field.

1 **Press** Recall **on the keypad.**

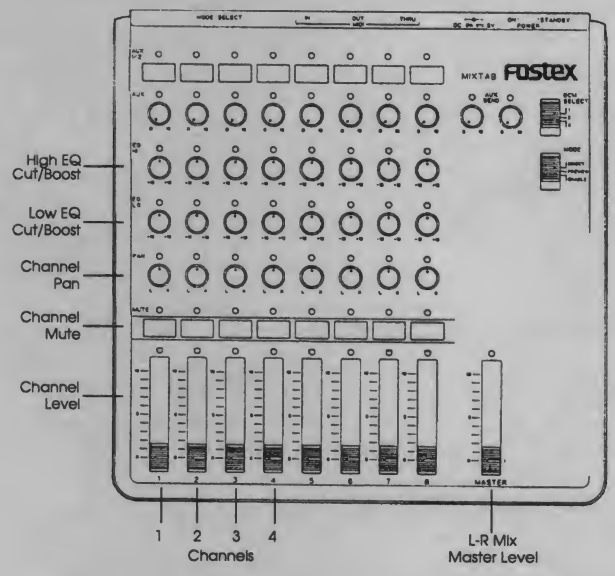
2 **Press** 1 **on the keypad.**

3 **Press** Locate

The transport locates you to the recalled time. The current time and the edit times fields now match.

Mixing

Foundation 2000 includes an 8-channel mixer. Until now, you've been using the L-R bus as the print bus for recording and listening to all the tracks at unity gain, with flat EQ and pans centered. Now you'll use the L-R bus for mixing, and the Fostex MixTab to adjust the level, pan and EQ parameters for each track.



You can mixdown a maximum of seven tracks to one or six to two using *Foundation 2000*'s internal mixer. You could also mix all eight tracks to the L-R Mix output and record the mix to a DAT or other mastering device.

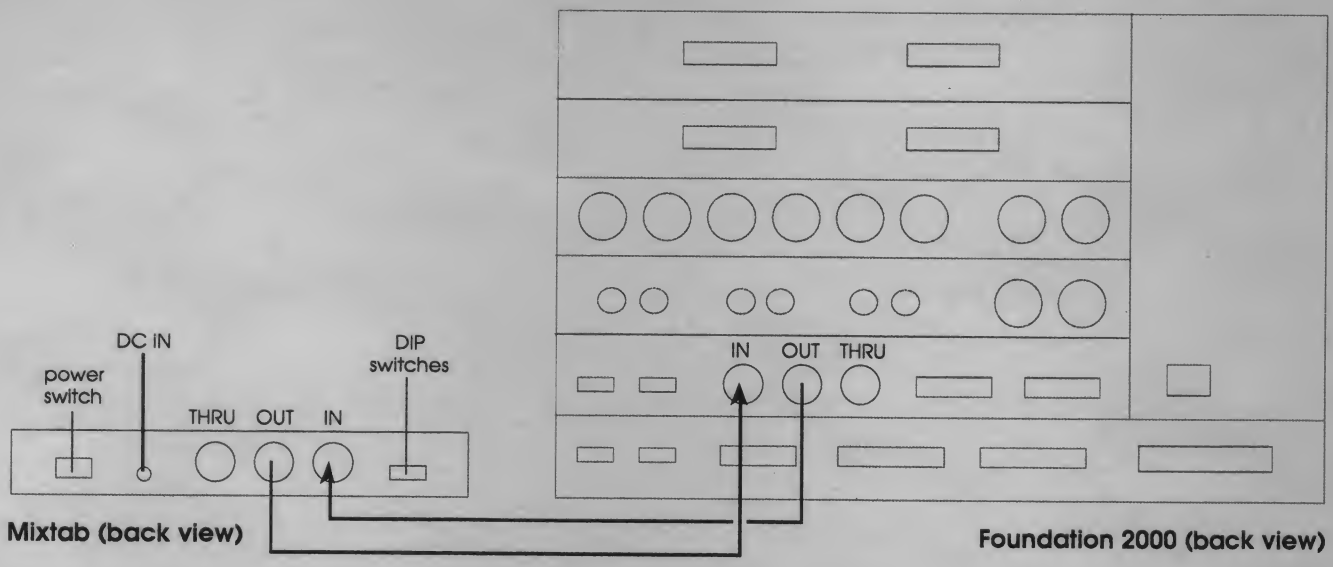
For the next portion of this tutorial, you are going to mix four tracks together to create a submix on tracks 5 and 6. Before doing this, you will want to start with an empty reel and record four tracks in sync.

Preparing to mix

1 **Cut all of the audio from the tracks, so that you can start with an empty reel. (Or open a new reel.)**

2 **Record tracks 1-4 in sync. For example, you might record a couple of drum tracks, a keyboard track, and a vocal track.**

3 **Follow the instructions on the next pages to adjust the level, pan and EQ parameters before mixing down to tracks 5 and 6.**



Connecting the MixTab

1 **Connect the DC cord from the AC power adapter to the DC IN port on the MixTab.**

2 **Plug the AC power adapter into an AC outlet.**

3 **Connect the MIDI IN port of the MixTab to the MIDI OUT port of the Foundation 2000.**

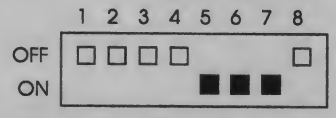
4 **Connect the MIDI OUT port of the MixTab to the MIDI IN port of the Foundation 2000.**

Foundation 2000 MIDI ports are on CONTROL MODULE B in the back of the Main Unit.

Configuring the MixTab

The MixTab faders and knobs can control parameters for the tracks, the Monitor mix, or the A-B inputs and Aux Returns. In this example, the MixTab is configured for track parameters only.

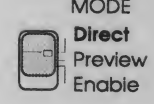
1 **Verify that the DIP switches on the back of the MixTab are set to these positions—**





2 **On the front of the MixTab, set the DCM SELECT switch to 1.**

3 **Set the MODE switch to Direct.**



4 **Turn on the MixTab power switch.**

Monitoring the L-R mix

The L-R Mix bus is always sent to the L-R Mix outputs in the 2-CHANNEL I/O MODULE. But you can also send the L-R Mix bus to the Monitor outputs. These are the outputs you'll be using in this session.

1 **Touch the *Mixer* button on the Edit Controller screen.**

2 **Touch the *Patch* button.**

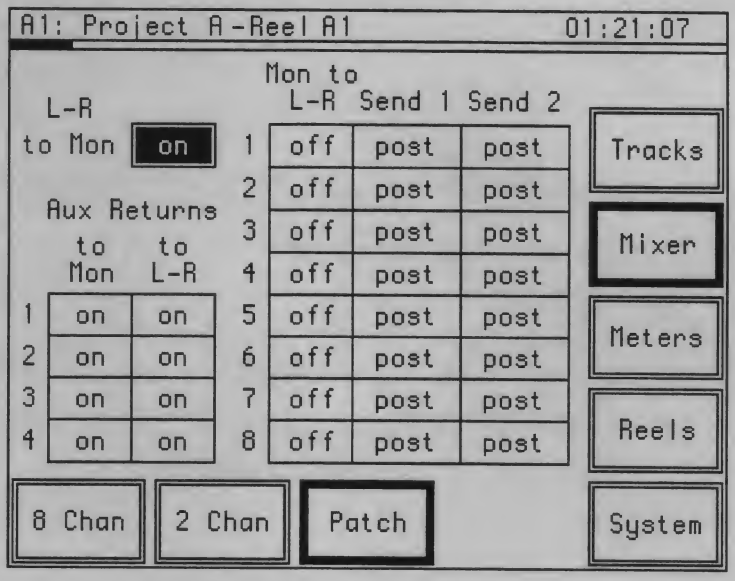
3 **Touch the "L-R to Mon" field to select it.**

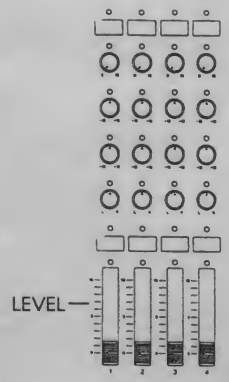
4 **Press the *Data* button.**

5 **Press the arrow buttons to toggle the field to "on."**

Turning on "L-R to Mon" lets you hear the L-R Mix through the Monitor outputs in the 2-CHANNEL I/O MODULE.

6 **Press *Data* again to close the field.**





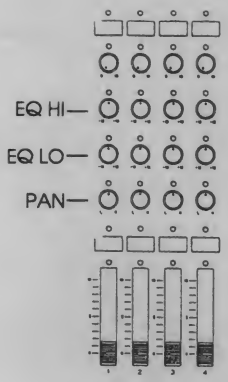
Setting levels

MixTab faders 1–8 let you adjust individual track levels. The Master fader controls the overall level of the L-R Mix. Unity gain is equivalent to 7 on the fader scale 1–10.

1 **Locate to the beginning of your recorded tracks and begin playback.**

2 **Listen to the L-R Mix while you adjust the individual track levels from the MixTab.**

3 **Use the Master fader to adjust the overall level of the L-R Mix.**

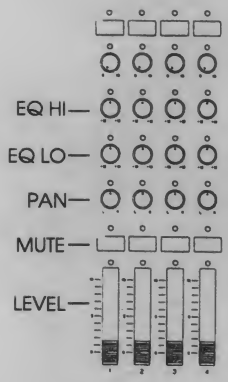


Adjusting EQ and pan

The MixTab has cut/boost knobs for high and low EQ and a pan knob for each track. The high-band EQ has a center frequency of 5 kHz; the low-band EQ has a center frequency of 100 Hz. Each has a bandwidth of 3 octaves.

1 **Continue playing back the audio you already recorded.**

2 **Listen to the L-R Mix while you adjust the EQ and pan knobs.**



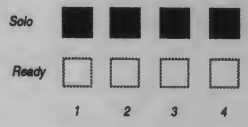
Mutes and solos

The MixTab has a mute button for each track. The Edit Controller has a solo button for each track.

1 **Press a mute button.**

Its LED lights, indicating that the track is removed from the L-R Mix.

2 **Press the mute button again to unmute the track.**



3 **Press a solo button on the Edit Controller.**

The button lights, indicating that all *other* tracks are removed from the L-R Mix.

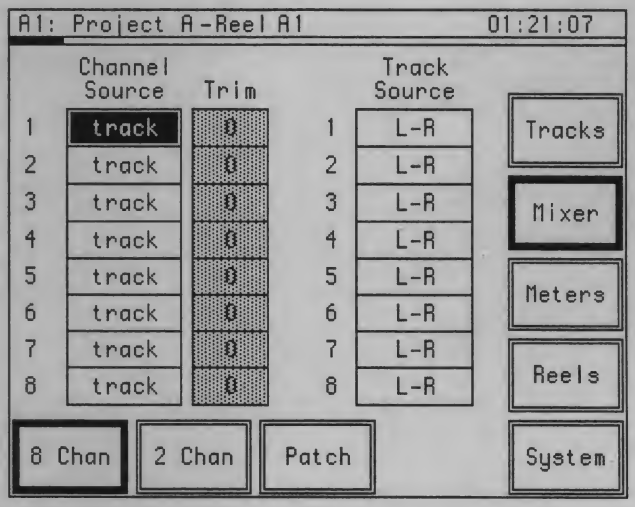
4 **Press the solo button again to unsolo the track.**

Mixing down

You are now going to mix tracks 1-4 to track 5 and 6.

1 **Touch the Mixer button.**

2 **Touch the 8 Chan button.**

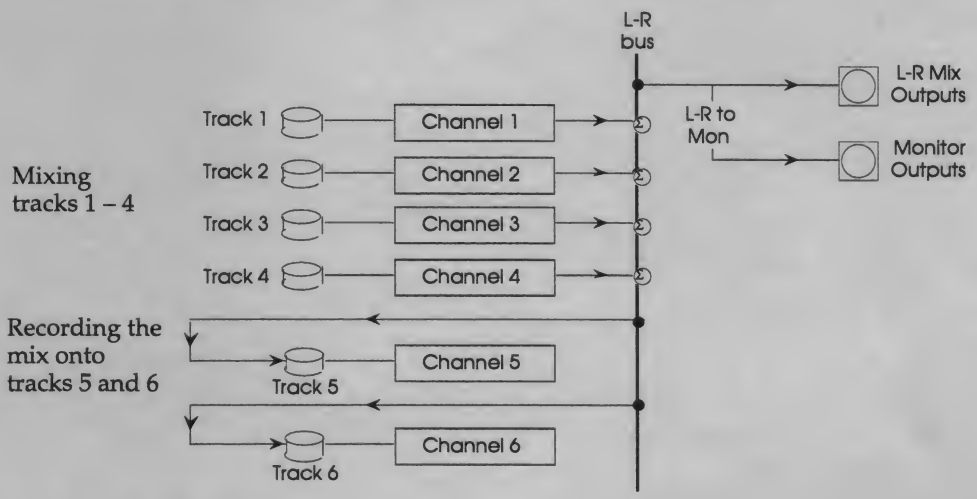


3 **Make sure that the Channel Source for tracks 1-4 is set to "track."**

This sets the audio source for channel 1-4 to the recorded tracks.

4 **Make sure that the Track Source for channels 5 and 6 is set to "L-R."**

This sets the audio source for tracks 5 and 6 to the L-R bus.



4 **Ready tracks 5 and 6.**

5 **Start recording.**

The audio recorded on tracks 1-4 is re-recorded onto tracks 5 and 6.

6 **Stop recording when the transfer is complete.**

General Controls

Buttons and time displays 41
Buttons 41
Time displays 41
Touch sensitive display 42
Navigation 42
Entering information 43
Status bar 45
Maintenance 46
Transport controls 46
Jog/shuttle knob 47
Speed display 48

Buttons and time displays

Buttons

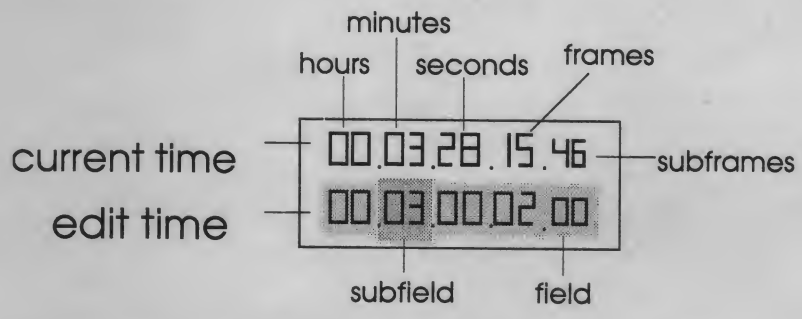
Buttons
Push buttons are hard buttons. Touch buttons are on the touch sensitive display.

There are two types of buttons referred to in the *User's Guide*: "push" buttons and "touch" buttons. Push buttons are the hard buttons on the Edit Controller and the Main Unit. Touch buttons are on the touch sensitive display on the Edit Controller. These buttons change depending on which screen you have displayed. They are activated by a gentle pressure with your finger, and they emit a "chirp" when successfully activated. Touch buttons are described in detail below under "Touch sensitive display."

Time displays

There are two time fields on the Edit Controller. Each field displays SMPTE time, which is divided into five subfields: hours, minutes, seconds, frames, subframes (1/100th of a frame). The top display shows the "current time," which corresponds to the vertical cursor in the *Tracks* display. When you play, the current time is the time at which you start.

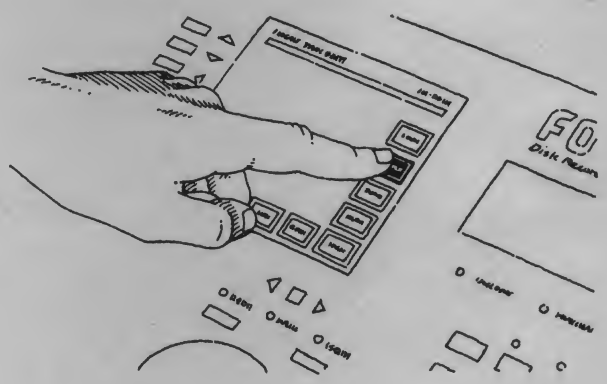
Time displays
Top display shows current time. Bottom display shows edit time.



The lower display shows the "edit time." When you recall a locator point it appears here. And when you press the *Locate* button, you locate to the time in the edit time field. You can also enter a time and save it or locate to it. The edit time field sometimes displays other types of numeric information, such as the amount of preroll.

Touch sensitive display

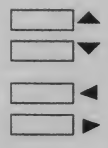
The display on your *Foundation 2000* Edit Controller is touch sensitive, which means operations are activated by touching buttons or fields on the screen with your finger. A slight pressure is all that is needed. The areas which are sensitive to touch are buttons, lists and fields. Touch anywhere in a button to activate it. Run your finger down a list to quickly make a selection.

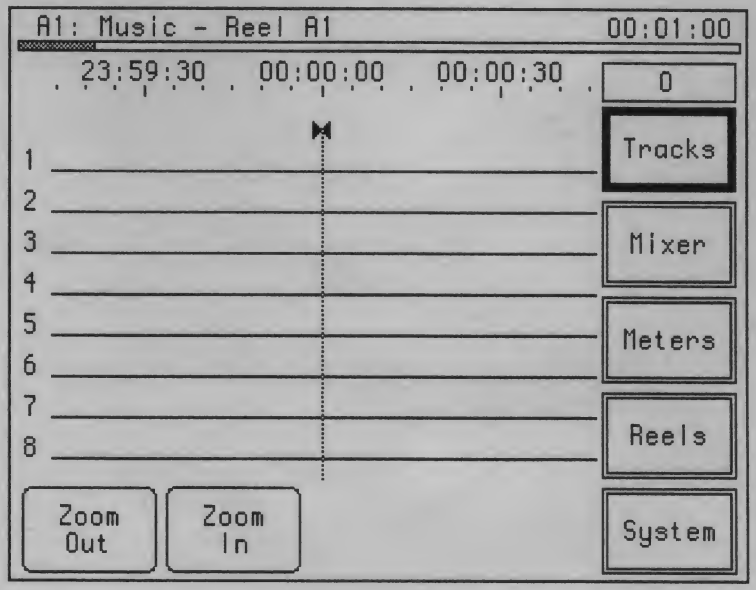


Navigation

The arrow buttons, the *Data* button, and the jog/shuttle knob can be used to navigate and enter information into screen displays.

There are five major displays that can be accessed at any time by touching the buttons on the right side of the screen: *Tracks, Mixer, Meters, Reels, System.* Within each of these displays there is a set of subdisplays and commands, which are accessed by touching the buttons at the bottom of the screen.







Navigation button



Action button

There are two types of screen buttons: navigation buttons and action buttons. Navigation buttons have a double border. They get you around the matrix of displays. They do not affect your work, they merely change the display. When a navigation button is selected, its outline is bold.

Action buttons have a single border. They carry out commands or provide you with a set of options to choose from, or they may perform an action, such as erasing a reel.



If you press an action button that is destructive to audio, you will be requested to confirm the action by pressing the OK button on the display.



Button unavailable

Sometimes a button is temporarily not available. For instance when you zoom all the way in to the *Tracks* screen, you can't zoom in any further using the *Zoom In* button. When a button is not available, it grays and does not respond to touching.

Entering information

Some displays contain fields that ask for information or present you with options. The arrow keys to the left of the touch screen move you from one field to the next. Or you can touch a field with your finger. The *Data* button next to the touch screen opens the field that has been selected so that you can choose an item or enter text or numbers.

Selecting from a list

List fields contain two or more items that you can select. The *Data* button opens and closes the field.

List field
A screen display field that pops up multiple selections.

1 Touch the desired field, or use the arrow keys to select.



Data

2 Press [ ] to open the field.



3 Press the arrow buttons or turn the jog/shuttle knob to step through the options.

Data

4 Press [ ] to confirm your choice.

Entering numeric values

Numeric fields can contain time or other numeric values. Numeric values can be entered using the arrow keys or the jog/shuttle knob. Time entries can also be made with the keypad, just as you would enter a locator time.

Numeric field
A screen display field for making numeric or time entries.

1 Touch the desired field, or use the arrow keys.



Data

2 Press [ ] to open the field.



3 Press the arrow buttons or turn the jog/shuttle knob to increment or decrement the number.

OR

If you are entering a time, use the keypad. For example:



Data

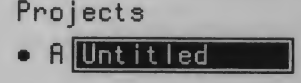
4 Press [ ] to confirm your entry.

Entering text

When you select and open a text field, a keyboard display appears. By touching the buttons on the screen, you can "type" an entry.

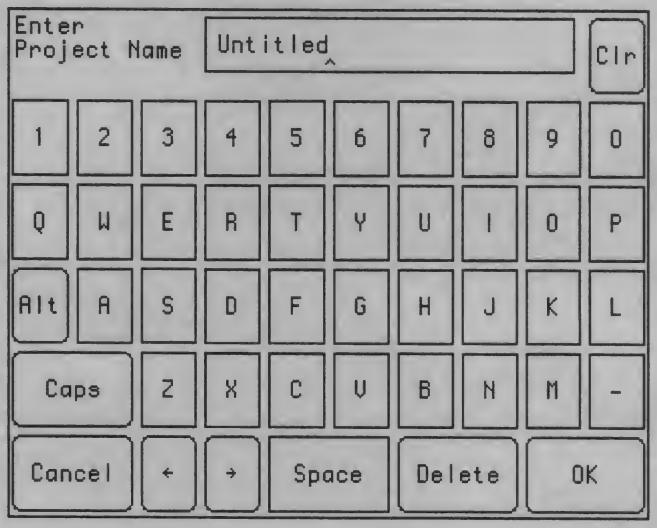
Text field
A screen display field for entering textual information using the Keyboard Display.

1 Touch the desired field, or use the arrow keys to select.



Data

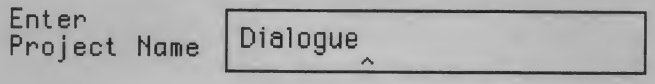
2 Press [ ] to open the Keyboard Display.



continued ⇨

3 **Touch the Clr button to clear the entry.**

4 **Touch the screen buttons to enter characters.**



The cursor (^) indicates where the next character will appear.

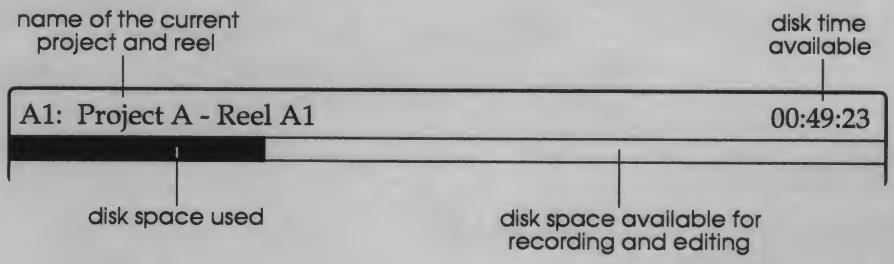
5 **Touch OK to confirm your choice.**

Special keyboard buttons include:

Button	Function
Caps	Keyboard enters uppercase characters. Touch again to access lower case characters.
Delete	Deletes the character to the left of the cursor.
Space	Places a space in the entry.
-->	Moves cursor to the right without deleting characters.
<--	Moves cursor to the left without deleting characters.
Alt	Displays a set of additional characters. Touch again to display original characters.
Clr	Deletes all characters from the entry.
Cancel	Closes the keyboard display without changing the field.
OK	Closes the keyboard display and updates the field.

Status bar

The status bar at the top of all screens displays the name of the currently mounted project and reel followed by the user-defined (or default) name.



Status bar
Project and reel information displayed at the top of the screen.

At the opposite end of the status bar is the amount of recording time available—how many minutes you can record before running out of disk space. The more tracks you ready, the less time you have available. For example, if you record on one track for one minute you've used up a minute of recording time. If you record on two tracks for one minute you've used up two minutes of recording time.

The horizontal gauge in the status bar shows you the relative amount of disk space currently used. The disk space used grows as you record or edit. (A blank disk shows an empty gauge.)

Maintenance



If the display screen gets dirty, wipe it clean with a soft cloth. Do not use abrasive cleaners of any kind, including spray cleaners. If liquid enters the screen enclosure, contact Fostex Customer Support Services.

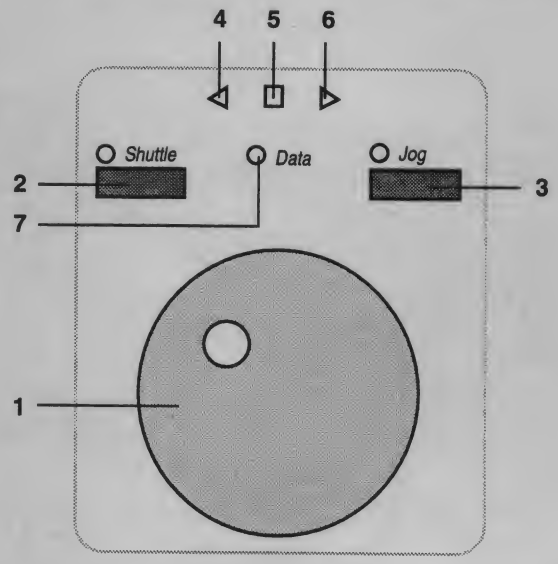
Transport controls

The transport controls are similar to those found on a conventional tape recorder, however they contain features which make them faster and more convenient to use.

Button	Function
Record ●	Press with *Play* to initiate recording. Button blinks in ready and lights solid when recording.
Stop ■	Stops transport. Button lights solid when stopped. Disables record.
Play ▶	Starts playback. Button lights while playing. Initiates recording when pressed with *Record*. Stops recording when in record mode; playback continues. Press with *FForward* to initiate forward cueing. Press with *Rewind* to initiate reverse cueing.
Rewind ◀◀	High speed reverse. Button lights solid while in reverse. Press once for playback 2x real time. Press twice for playback 4x real time. Press three times to locate to beginning of audio on ready tracks. If no tracks are ready, goes to beginning of all recorded audio. Press with *Play* to initiate reverse cueing.
F Forward ▶▶	High speed forward. Button lights solid while in fast forward. Press once to playback 2x real time. Press twice to playback 4x real time. Press three times to locate to the end of audio on ready tracks. If no tracks are ready, goes to end of all recorded audio. Press with *Play* to initiate forward cueing.

Jog/shuttle knob

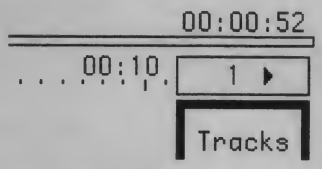
The jog/shuttle knob allows you to control the direction and speed of playback independent of the transport buttons. It has two playback modes and a data entry mode.



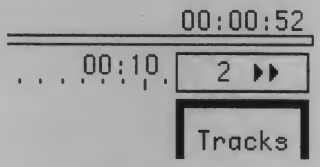
Number	Name	Function
1	Jog/Shuttle Knob	Turn counterclockwise to rewind. Turn clockwise to play forward. Play mode depends on whether the *Shuttle* or *Jog* LED is lit.
2 ○ *Shuttle*	*Shuttle* button & LED	Press to initiate shuttle mode (1/32x to 32x play speed). Plays faster the farther the knob is turned in either direction. LED lights when shuttle mode is active.
3 ○ *Jog*	*Jog* button & LED	Press to initiate jog mode (1/32x to 1x play speed). Scrubs the audio at real time or slower when knob is turned in either direction. LED lights when jog mode is active.
4	Reverse indicator	Lights during reverse motion.
5	Stop indicator	Lights when the transport is not in motion.
6	Forward indicator	Lights during forward motion.
7	Data LED	Lights when in Data mode: an arrow button is being held down or *Data* has been pressed.

Speed display

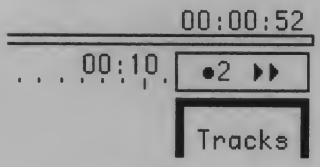
As you rotate the jog/shuttle knob, the play speed is displayed in the upper right corner of the touch screen above the *Tracks* button.



An arrow tells you whether you are playing or cueing forwards or backwards. A double arrow indicates that you are in wind speed and therefore cannot hear audio.



A single dot (•) indicates that you are playing at exactly that speed. If no dot appears, then you are playing between the displayed and the next faster speed.



Play speed is determined by the transport buttons or the jog/shuttle knob. Available speeds are: 1/32, 1/16, 1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 4, 8, 16 and 32 times play speed.

PROJECT MANAGEMENT

Selecting projects and reels 51
Hierarchy 51
The Index 51
Naming projects and reels 54
Copying projects and reels 55
Erasing a project or reel 57
Reel preferences 58
Preferences page 58
Changing reel preferences 59
Archiving and restoring 60
Archiving projects and reels 60
Restoring projects and reels 61
Erasing an archival tape 65
Removable Project Environment™ 65
Inserting and removing an RPE 66
Erasing and formating an RPE 67
Security 69
Other RPEs 72

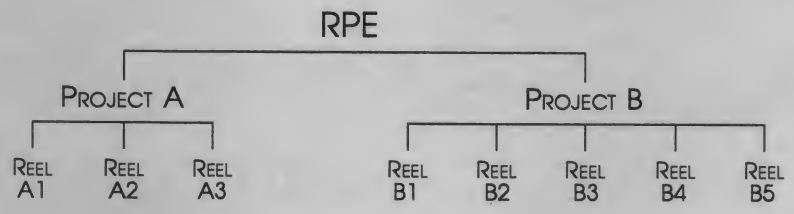
PROJECTS AND REELS are the basic organizational building blocks of *Foundation 2000*. A project may contain a particular job or session. A reel is a version of your work contained within a project. Reels contain recorded audio as well as editing, mixing and DSP information describing how the audio is processed, assembled and played back.

Selecting projects and reels

Hierarchy

Seven projects with the default names Project A-G are reserved for your use on any formatted RPE. A project can contain up to six reels. In the following example, the RPE contains two projects. Project A has three reels of audio and Project B has five reels of audio.

RPE
Hard disk or magneto-optical storage medium containing A-G projects.



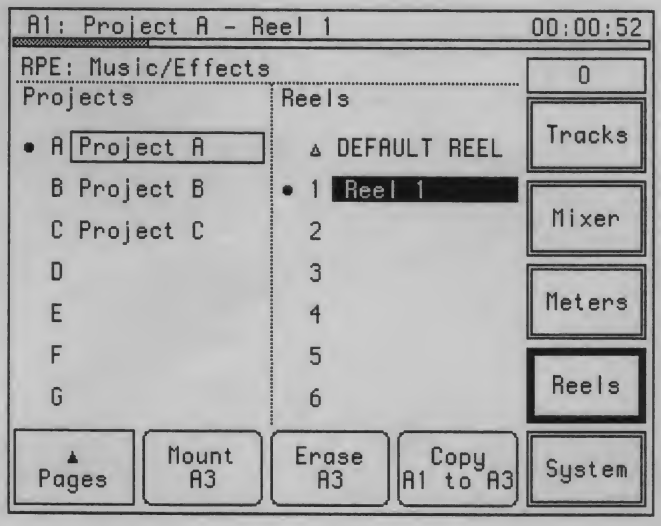
Project
A job or session containing 1-6 reels.

The number of projects and reels you can have depends on how much storage space you have available on your RPE, and how much audio is recorded on each reel. When you first receive your *Foundation 2000*, by default you are in the first project and reel.

Reel
A version of your work containing recorded audio, as well as editing, mixing and DSP data.

The Index

All project and reel management is performed from the *Reels* display. The *Index* page of the *Reels* display lists all projects on your RPE. All reels in the selected project are listed on the right.

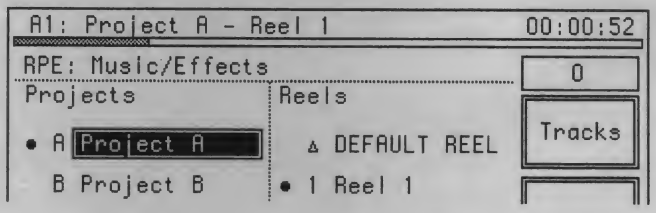


Viewing the project Index

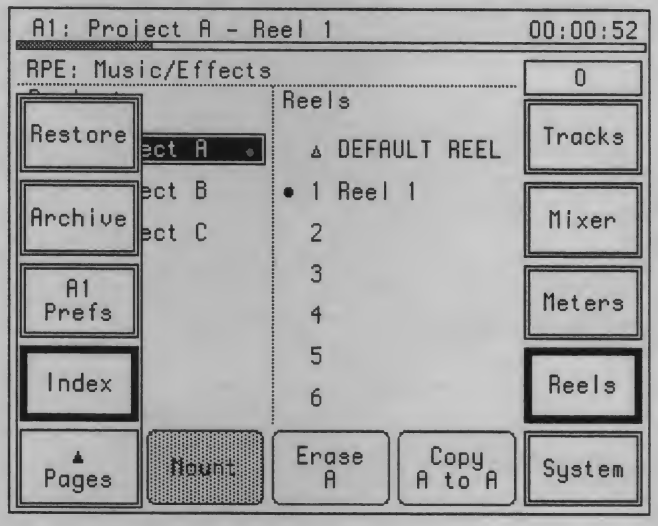
You can view the reels in a project at any time, even while you are recording in another reel. The *Index* page of the *Reels* display shows you a list of projects and reels on your RPE. The currently mounted project and reel have a dot (•) next to them.

Index
The *Index* page of the *Reels* display lists projects and reels on the current RPE.

1 Touch the Reels button on the display.



2 If you are on another page of the Reels display and you want to get to the index, touch the Pages button at the bottom of the display and then touch the Index button from the popup menu.



3 Touch a project name to view the reels in a project.

Projects appear on the left and the reels in the project appear on the right.

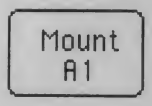
Mounting a reel

When you mount a reel, it becomes the current location for recording. You can view the index of all projects and reels, but only one reel at a time can be mounted.

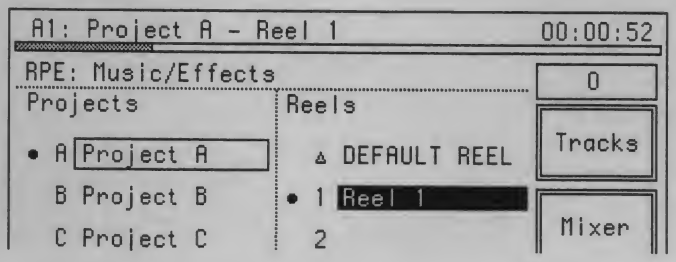
1 **Select the project you want to view. (See instructions above)**

2 **Touch the name of the reel you want to mount.**

3 **Touch the Mount button at the bottom of the display.**



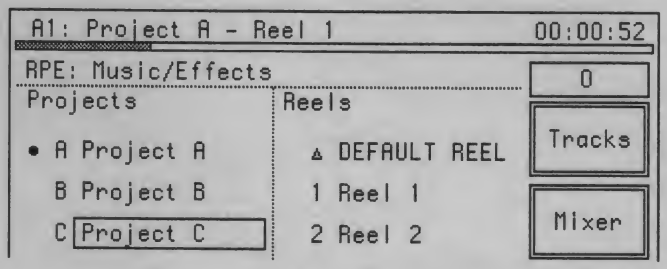
The *Mount* button tells you which reel you are mounting. The reel you mount is the current reel for recording.



Mount
Make a selected reel the current location for recording.

The mounted reel has a dot (•) next to it, as does the project that the reel is in. When you are in the reels column, the name of the project that the reel is in appears with a box around it.

Because you can display any project and reel, not just the one that is mounted, the dot always tells you what is *mounted*, and the box tells you what is being displayed on the index. For example, you may have Reel A1 mounted while you are displaying Project C. In the example below, notice that the name of the mounted reel still appears in the status bar at the top of the display.



Naming projects and reels

All projects and reels are assigned a default name. Projects are named alphabetically A to G. Reels are numbered 1-6. For example, the first reel in Project A is "A1." The name of the active project and reel always appears at the top of the display in the status bar.

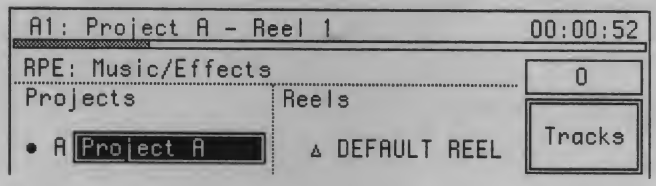
Default name
Projects and reels are assigned default names: projects A-G, reels 1-6 and "untitled."

Naming a project or reel

You can change the default name to something that describes the project or reel more completely.

1 Select a project or reel from the Index page of the Reels display.

You do not have to mount a reel to change its name. You can change the name of a project or reel at any time.

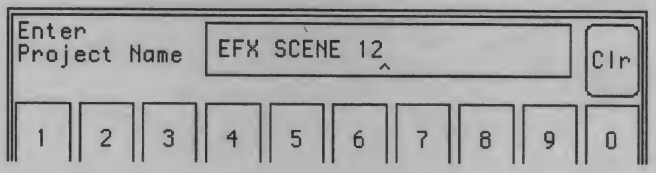


2 Press the *Data* **button.**

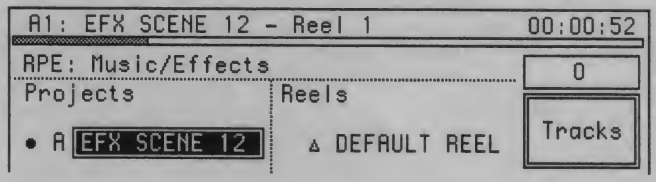
The keyboard display appears for alpha-numeric entry of a name.

3 Enter the project or reel name by touching the "keys" on the display.

The name of the project or reel appears at the top of the keyboard display.



4 Touch OK to confirm the name entered.



Copying projects and reels

You can copy the contents of one reel to another or one project to another using the *Copy* command. No audio is erased when you copy; a duplicate is created in the destination location.

Copying a reel

When you copy one reel to another using the *Reels* display, all audio as well as other data, such as editing and mixing information, is also copied.

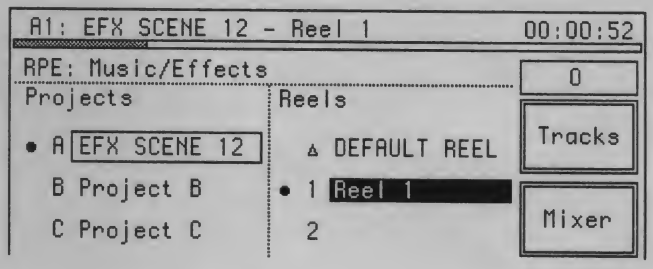


The audio is not actually copied, but rather the destination reel references the same audio on the disk as the source reel. Therefore, a copy does not take up additional space on the disk.

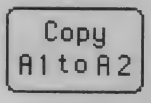
Copy
Duplicate a project or reel to another location.

1 Touch the Reels button and make sure the index is displayed.

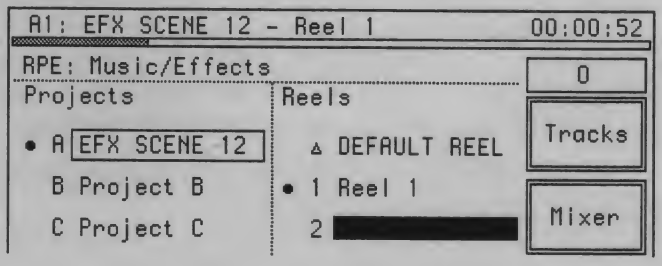
2 Mount the reel that you want to copy from. This is the source reel.



3 Select the reel that you want to copy to. This is the destination reel.



The destination reel can be an empty reel or one containing audio (although the audio will be erased after the copy). Notice that the *Copy* button tells you the source and destination reel names.



4 Touch the Copy button on the screen.

If you copied to an empty reel, the copy is completed and the audio is transferred from the source reel to the destination reel.

If you copied to a reel containing audio, you must confirm or cancel the following message:

Do you really want to replace reel "A2" with reel "A1"?

Copying a project

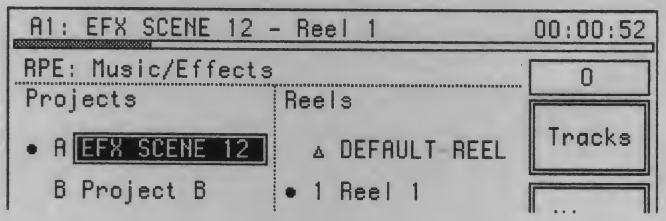
When you copy one project to another, all reels in the project are copied to the destination project.



The audio is not actually copied, but rather the destination project references the same audio on the disk as the source project. Therefore, a copy does not take up additional space on the disk.

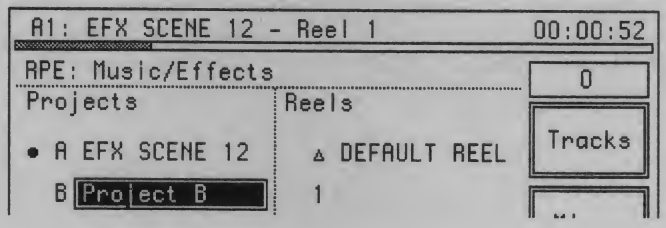
1 Touch the Reels button and make sure the index is displayed.

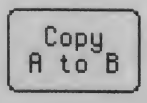
2 Mount the project that you want to copy from. This is the source project.



3 Select the project that you want to copy to. This is the destination project.

The destination project can be an empty project or one containing reels with audio (although the audio will be erased after the copy). Notice that the *Copy* button tells you the source and destination project.





4 Touch the Copy button.

If you copied to an empty project, the copy is completed and all reels in the source project are copied to the destination project.

If you copied to a reel containing audio, you must confirm or cancel the following message:

Do you really want to replace project "name" with project "name"?

Erasing a project or reel

When you erase a reel, all audio and other data stored on that reel is permanently removed. When you erase a project, all audio and other data stored on *all* reels in the project is permanently removed.



BEFORE you erase a project or reel, make sure that you have archived it or copied it to another location. Erased audio cannot be recovered.

Erasing a reel

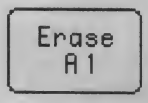
Erase
Remove all audio from a project or reel.

1 **Touch the Reels button and make sure the index is displayed.**

2 **Select the reel that you want to erase.**

Notice that the *Erase* button tells you the name of the reel that you are going to erase.

3 **Touch the Erase button.**



The following message appears:

Do you really want to Erase reel "[name]"?

4 **Touch OK if you want to erase the entire reel.**

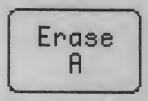
OR

Touch Cancel if you DO NOT want to erase the reel.

Erasing a project

1 **Touch the Reels button and make sure the index is displayed.**

2 **Select the project that you want to erase.**



3 **Touch the Erase button.**

Notice that the *Erase* button tells you the name of the project that you are going to erase.

The following message appears:

Do you really want to erase project "[name]"?

4 **Touch OK if you want to erase the entire project and all of the reels in the project.**

OR

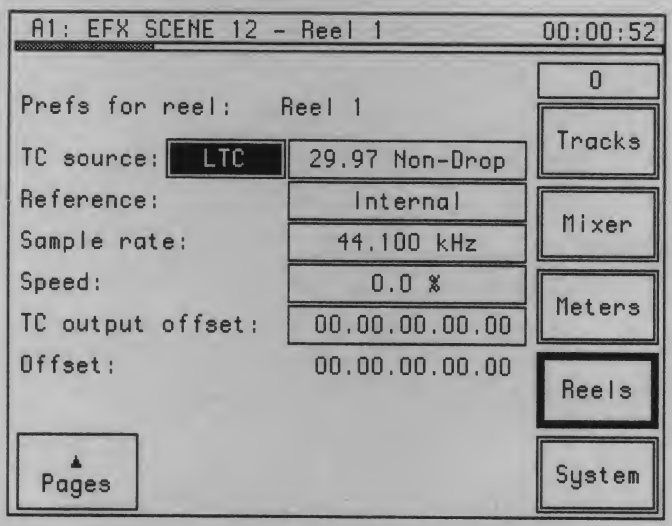
Touch Cancel if you DO NOT want to erase the project.

Reel preferences

Preferences page

Each reel has assigned to it a set of preferences, such as sample rate and timecode format, which act like a template. You can change the preferences for all new reels (reels that do not contain audio), or for an individual reel. Preferences are set from the *Prefs* page of the *Reels* display.

Preferences
Reel settings that apply to one or all reels like a template.



Setting	Definition	Options
TC Source	Select timecode port	LTC, VITC
	Select timecode format	30 Non Drop, 30 Drop, 29.97 Non Drop, 29.97 Drop, 25 fps, 24 fps
Reference	Select incoming synchronization reference	Word Clock, Timecode, Video, AES/EBU, SPDIF, SPDIF(O), Internal
Sample rate	Record or playback sample rate of the reel.	32, 44.056, 44.1, 44.144, 48 and 48.048 kHz
Speed	Varispeed adjustment for recording and playback.	± 12.5 %
TC output offset	Timecode offset between internal *Foundation 2000* time and timecode output.	00:00:00:00—23:59:59:29
Offset	Timecode offset between incoming timecode and internal *Foundation 2000* time.	00:00:00:00—23:59:59:29 Set using the *Offset* button on the keypad.

Changing reel preferences

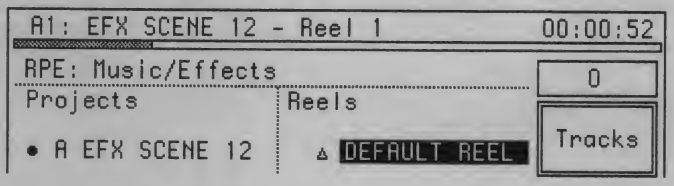
At the top of the reels list on the *Reels* display is an entry called "Δ DEFAULT REEL." When you set the preferences of the default reel, they are applied to any new reel (any reel that does not contain audio) in a project. Changing the default reel does not change the preferences for reels which have already been opened.

Regardless of what preferences are set in the default reel, you can also change the preferences of an individual reel, without affecting the other reels.

Setting default reel preferences

1 Mount the reel whose preferences you want to change.

Default reel
Contains preferences for all new reels.



2 Touch the Pages button.

3 Touch the Prefs button from the popup menu.

The preferences view of the *Reels* display appears.

4 Arrow to any value listed and press *Data*

5 Enter your selection.

If you changed the preferences for an individual reel, only those reel preferences were changed; no other reels were altered.

OR

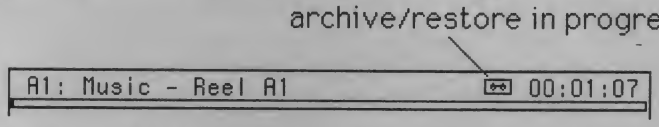
If you changed the preferences in the default reel, you only changed the preferences for reels which do *not* already contain audio; any reels that contain audio were not changed.



For more information about synchronization parameters, see the chapter "Synchronization."

Archiving and restoring

Archiving is the process of storing a project, reel, or RPE to an external storage medium. Restoring is the process of retrieving an archived project, reel, or RPE to the current RPE. Archival devices include WangDAT 4mm DAT or Exabyte 8mm tape. Connect the archival device to the SCSI port on CONTROL MODULE A of the Main Unit. During archive or restore, a tape icon appears in the status bar.



Turning on the WangDAT tape drive after powering up Foundation 2000 *can cause SCSI errors. To prevent these errors, turn off* Foundation 2000 *before connecting the WantDAT drive to the SCSI port, and power up the WangDAT before powering up* Foundation 2000.

Archiving projects and reels

Archiving allows you to store projects, reels, or an entire RPE to a archival device. Archiving is done from the *Archive* page of the *Reels* display.

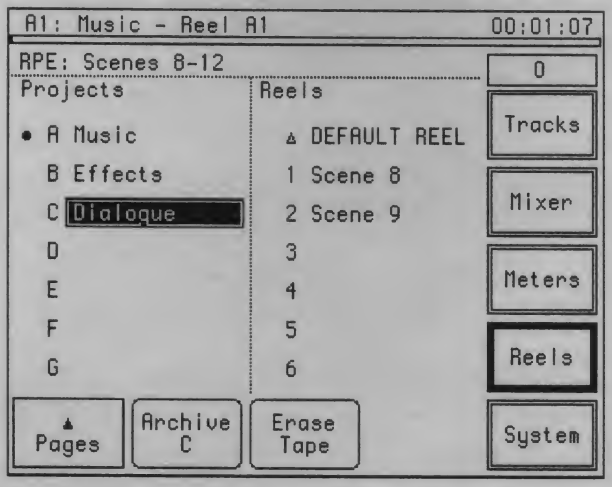
Archiving projects

1 Insert a tape into the archival device.

2 Touch the Reels and then Pages buttons.

3 Select Archive from the popup menu.

Archive
Save a copy of a reel, project or RPE to an archival device attached to the SCSI chain.



4 Select the project, reel or RPE that you want to archive.

The project or reel that you choose does not have to be mounted, just selected.

5 Touch the Archive button at the bottom of the screen.

The following message appears:

Do you really want to archive project "[name]"?

6 Touch OK.

The selected project, reel or RPE is copied to the tape.

Restoring projects and reels

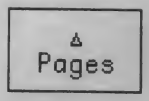
Restoring allows you to recall individual projects and reels or an RPE from your archival device to the current RPE.

Selecting a source

The first step in restoring is selecting the project, reel or RPE on tape that you want to restore to the current RPE. The project, reel or RPE you select is called the "source."

1 **Insert into the archival device the tape containing the project, reel or RPE that you want to restore.**

2 **Display the Reels screen.**



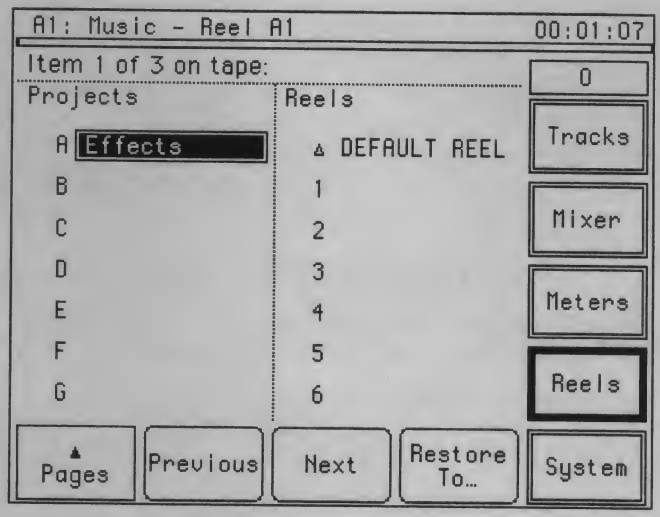
3 **Touch the Pages button and select Restore from the menu.**

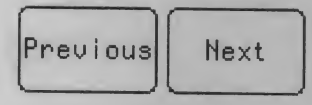
The following message appears:

Getting Tape Directory, please wait . . .

After the directory is loaded, the first entry on the tape appears on the screen.

Restore
Recall a reel, project or RPE to the current RPE.





4 **Use the Previous or Next buttons to view other items on the tape. The number of the current item is displayed above list of project names.**

5 **Select the project, reel or RPE that you want to restore to the current RPE. This is your source.**

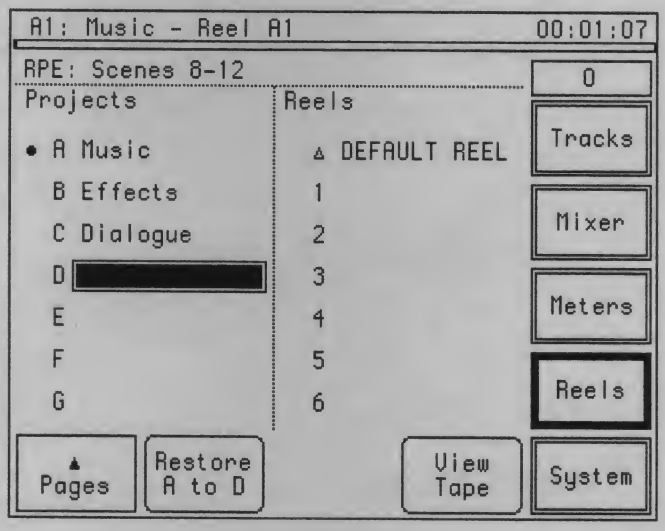
Restoring a project

After selecting a source (see above) you must select a destination. This is the location on the RPE to which you want to restore the project.

Restore To...

1 Touch the Restore To... button.

The contents of the mounted RPE appear on the screen. Above the project list is the name of the device.



2 Select the empty project to which you want to restore the source material.

View Tape

3 If you want to view the archival device again before restoring, touch the View Tape button and then repeat step 1.

4 Touch the Restore button.

The following message appears:

Restore A to D

Do you really want to restore project "[name]"?

If the destination project is not empty, you will be asked to confirm your selection.

5 Touch OK in the dialog.

The source project is copied from the tape to the RPE.



A restore can take several minutes to complete. The tape icon in the status bar appears during the restore. When the restore is complete, the tape icon disappears.

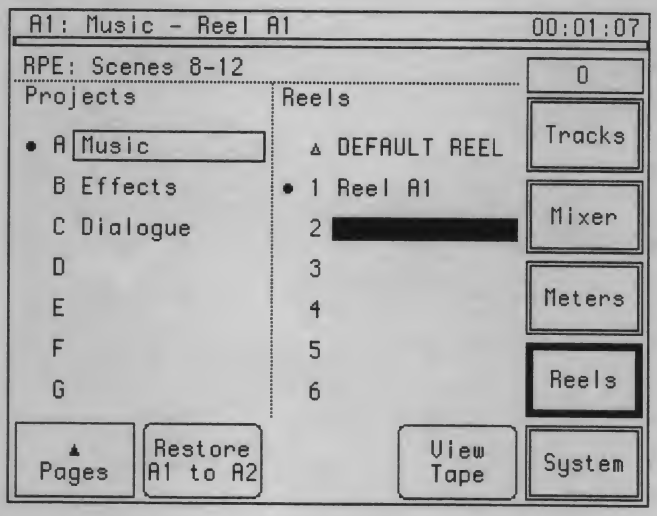
Restoring a reel

After selecting a source (see above) you must select a destination. This is where you want to restore the reel to.

Restore To...

1 Touch the Restore To... button.

The contents of the RPE appear on the screen. Above the project list is the name of the device.



2 Select the empty reel that you want to restore the source material to.

View Tape

3 If you want to view the archival device again before restoring, touch the View Tape button and then repeat step 1.

4 Touch the Restore button.

Restore A1 to A2

The following message appears:

Do you really want to restore reel "[name]"?

If the destination reel is not empty, you will be asked to confirm your selection.

5 Touch OK.

The source reel is copied from the tape to the RPE.



A restore can take several minutes to complete. The tape icon in the status bar appears during the restore. When the restore is complete, the tape icon disappears.

Restoring an RPE

After selecting a source (see above) you must select the destination RPE.

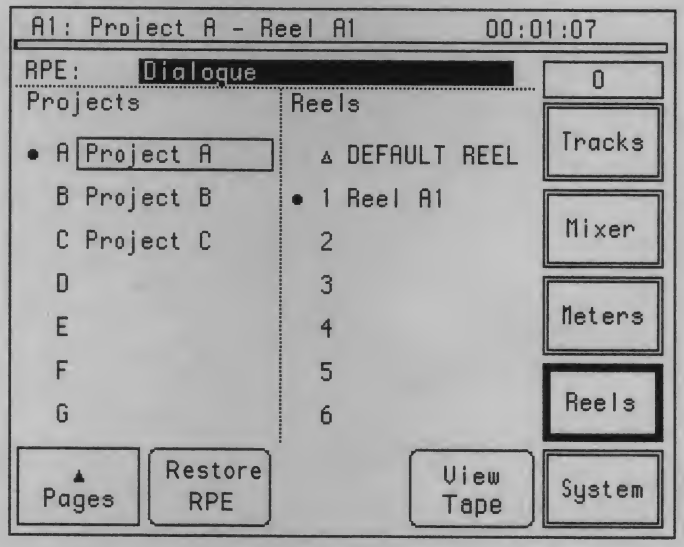
In the current release you can only restore an RPE to the current RPE.

1 Touch the Restore To... button.

The contents of the destination RPE appear on the screen. Above the project list is the name of the device.

2 Select the RPE name at the top of the display.

Restore To...



View Tape

3 If you want to view the archival device again before restoring, touch the View Archive button and then repeat step 1.

4 Touch the Restore RPE button.

Restore RPE

The following message appears:

Do you really want to restore RPE "[name]"?

If the destination RPE is not empty, you will be asked to confirm your selection.

5 Touch OK.

The source RPE is copied from tape to the destination RPE.

A restore can take several minutes to complete. The tape icon in the status bar appears during the restore. When the restore is complete, the tape icon disappears.

Erasing an archival tape

You can erase an archival tape using the *Archive* display.



Erasing removes all information from the tape. This operation cannot be undone.

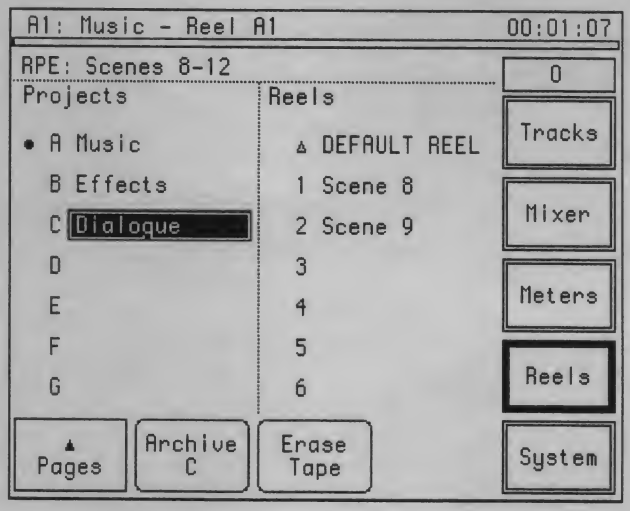
Erasing a tape

1 **Insert the tape that you want to erase into the external tape drive.**

2 **Display the Reels screen.**

3 **Touch the Pages button.**

4 **Select Archive from the popup menu.**



4 **Select Erase Tape from the popup menu.**

The following message appears:

Are you sure you want to erase the archive tape? All information on the tape will be lost.

5 **Touch OK to erase the tape.**

Removable Project Environment™

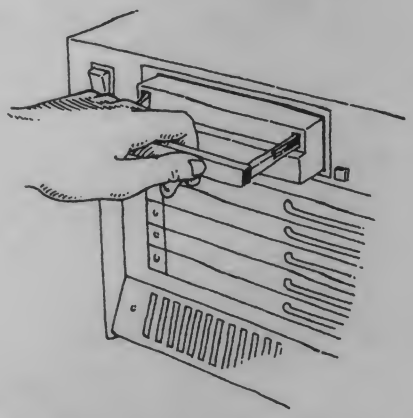
The Removable Project Environment™ (RPE) is a hard disk or magneto-optical recording medium that docks in the Main Unit. The hard disk RPE provides 90 (535 MB) or 180 (1.3 GB) mono minutes of recording time at 44.1 kHz, allocated as needed to eight tracks. A 535 MB RPE is included with your *Foundation 2000*.

Inserting and removing an RPE

The RPE can be removed and reinserted into the same or another *Foundation 2000* with total data integrity. You must have an RPE in the drive in order to record.

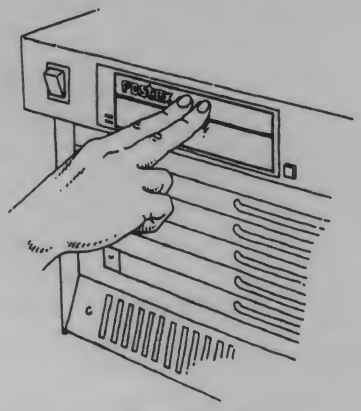
Inserting an RPE

1 Grasp the handle on the RPE and insert the RPE into the drive in the front of the Main Unit.



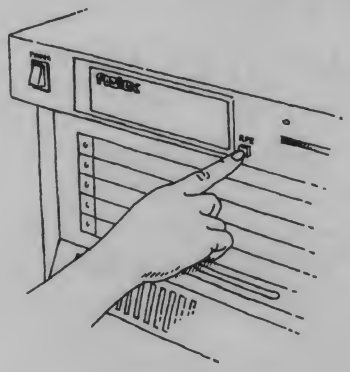
2 Firmly press the RPE and its handle into the drive.

The connectors on the back of the drive and the chassis must fully engage.

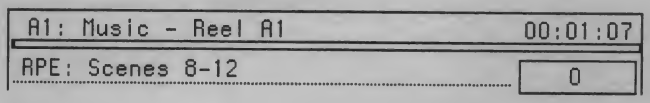


3 Press the RPE button next to the drive.

The RPE button next to the drive blinks during loading and unloading. When the drive is ready to be used, the button lights solid.



When an RPE is successfully inserted into the drive, the RPE name, along with the current project and reel names, appears at the top of the display.



Removing an RPE

1 Press the RPE button and wait for the button to go out.



Do not remove the RPE when the RPE *button is blinking. Wait until the* RPE *button is not lit .*

2 To pop the handle out of the RPE, firmly press and release the handle bar.

3 Grasp the handle and firmly pull the RPE from the drive.

Erasing and formating an RPE

Format
Permanently removes all data from the disk.

You can reuse an RPE by erasing or formating it. Erasing an RPE quickly removes all of the data on the disk, including all recorded material. Formating an accomplishes the same thing, except that it also fixes data errors that may be occurring on the disk. Erasing takes only a few seconds; formatting a 540 MB disk can take fifteen minutes.

If you experience problems with the disk while recording or playing back, or while erasing or doing other operations, it is best to back up the disk contents and then reformat it. If you buy a hard disk not supplied by Fostex, you will also have to format the disk before it can be used.



Erasing or reformating an RPE permanently removes all audio from the disk. Before you erase an RPE, make sure that the disk is archived. Erasing or reformating an RPE cannot be undone.

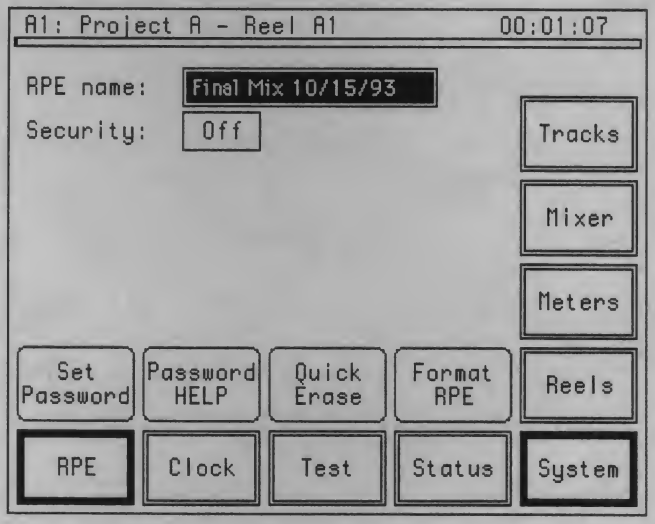
continued ⇨

Erasing an RPE

1 **Make sure the RPE that you want to erase is in the drive.**

2 **Touch the System button.**

3 **Touch the RPE button.**



4 **Touch the Quick Erase button.**

The following message appears:

Do you really want to erase the RPE "[name]"?

5 **Touch the OK button.**

The following message appears:

Erasing RPE, please wait . . .

Formating an RPE

1 **Make sure the RPE that you want to format is in the drive.**

2 **Touch the System button.**

3 **Touch the RPE button.**

4 **Touch the Format RPE button.**

The following message appears:

Do you really want to reformat the RPE "[name]"?

5 **Touch the OK button.**

The following message appears:

Formatting RPE, please wait . . .

Formatting takes several minutes.

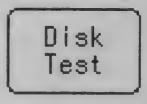


The Disk Test on the *System* page can calculate the playback and record capacity of any disk used as an RPE. Be careful, this test erases your disk while calculating its capacity. Erased audio cannot be recovered.

Running the Disk Test

1 **Touch the System button.**

2 **Touch the RPE button.**



3 **Touch the Disk Test button.**

The following message appears:

This test tells you the average number of tracks that your disk can play or record. The test erases your disk. It takes 1 to 2 hours.

4 **Touch OK.**

The following message appears:

WARNING: This ERASES your disk and can take a couple of hours. Press CANCEL to abort.

5 **Touch OK to continue, or Cancel to abort.**

Security

You can secure your RPE against unauthorized use by requiring a password for operation. The password is initially requested when you load the RPE into the drive. If you do not enter the correct password, you cannot access the RPE.

Security
Requiring a password for disk usage.

Opening a secure RPE

1 **Insert the RPE into the drive.**

2 **Press the RPE button on the Main Unit.**

A dialog appears on the display:

This RPE is password protected. Press the Data button and enter password.

••••

Password
Code required for disk usage, or for changing the security status of a disk.

3 **Press the** *Data* **button.**

4 **Enter your password.**

If you entered the correct password, the RPE opens to the *Tracks* display.



If you forget your password, press the Password HELP *button on the System RPE screen and follow the instructions.*

From the *System* display you can enter a password, change your current password, or turn security off and on.

Setting a password for the first time

1 **Touch the System button.**

2 **Touch the RPE button.**

3 **Touch the Set Password button.**

The keyboard display appears. At the top of the display the following message appears:

Enter Password: ^

4 **Enter a password up to 25 characters long.**

The password appears in the field as you enter it. Once you confirm the password, you have to remember it in order to open your RPE or to change the password to something else.

5 **Touch OK when you are sure of your password.**

The password is entered. While security is turned on, you will have to enter the password in order to use your RPE.

Changing your password

1 **Touch the System button.**

2 **Touch the RPE button.**

3 **Touch the Set Password button.**

The keyboard display appears. A message appears at the top of the display:

Enter Current Password: ^

4 **Enter your current password and touch the OK button.**

If you entered the correct password, the following message appears at the top of the display:

Enter New Password: ^

5 **Enter your new password and touch the OK button when you are certain of your new password.**

The following dialog appears:

Your password has been changed successfully.

6 **Touch the OK button.**



To delete the password altogether, do not enter anything into the "new password" dialog above. Be advised that when you do this, you have no security protection.

Turning security off and on

It may not be necessary to secure your RPE at all times. If you turn security off, the password is not required to use the RPE or to open projects and reels. However, you must know the password in order to turn security off and on.

1 **Touch the System button.**

2 **Touch the RPE button.**

3 **Arrow to the Security entry.**

4 **Press** *Data* **.**

5 **Select on or off.**

6 **Press** *Data* **again.**

The Keyboard display appears and a message appears:

Enter Password: ^

You must know the password in order to turn security off and on.

7 **Enter your password and touch OK.**

The following dialog appears:

The security state has been changed successfully.

8 **Touch OK.**



There may be times when you want to secure your RPE, and other times when you don't. For instance, while you are working in your studio you may not want to bother with entering a password when you load the RPE. But if you are going to take your RPE to another facility, you may want to secure it against unauthorized use or accidental erasure. In this case, it is useful to turn security on and off.

Other RPEs

The following disk drives have been tested with *Foundation 2000* and exhibit good recording and playback performance. The 1" x 3.5" drives can be installed in your current RPE canister. Drives with larger dimensions must be connected to the SCSI port on CONTROL MODULE A.

Manufacturer	Model	Capacity (MB)	Approximate Recording Time (mono minutes)	Drive Dimensions
Quantum	LPS525S	525	99	1" x 3.5"
Seagate	ST3610N	535	101	1" x 3.5"
Conner	Aegean	545	103	1" x 3.5"
Digital	DSP3105	1024	198	1" x 3.5"
Quantum	LPS1080S	1024	198	1" x 3.5"
Digital	DSP3107L	1024	198	1" x 3.5"
Seagate	ST3120N	1024	198	1" x 3.5"
Seagate	ST12400N	2040	370	1.75" x 3.5"
Sony	SMO-S501-11 (optical)	300 (per side)	56 (per side)	3" x 5.5"

RECORDING

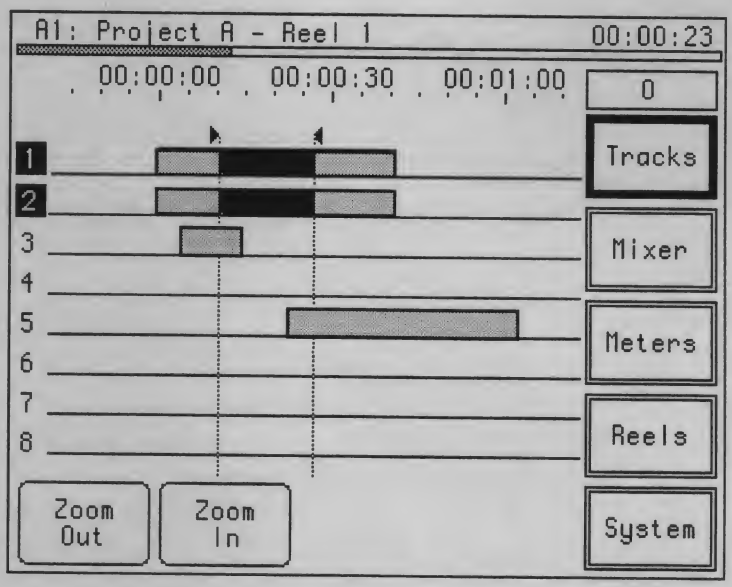
Tracks display 75
Input routing 76
Using the 2-channel inputs 76
Using the multichannel direct inputs 78
Readying tracks 80
Metering 81
Meters display 81
Reference level 82
Manual recording 83
Techniques 83
Footswitch 84
Auto recording and playback 84
Simple auto record 84
Auto functions and looping 85
Preroll, postroll and delay 86
Undo and redo 89
Locate 90
The buttons 90
Locating 91
Storing and recalling a time 93
Editing a time 94

THE *FOUNDATION 2000* contains eight tracks on which you can record. You have the choice of using the standard 2-channel analog or digital inputs, or you can use the multichannel analog inputs, if you have purchased this option.

Tracks display

The touch sensitive display on the *Foundation 2000* Edit Controller graphically shows you the recorded audio on the tracks. Press the *Tracks* button on the screen to access this display.



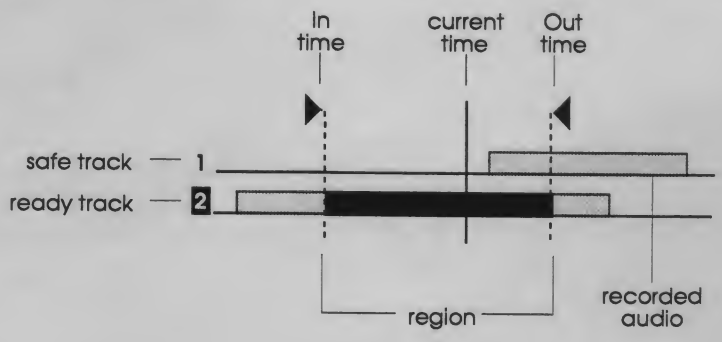




Recording and editing does not require the Tracks *display. You can start recording from any display. The* Tracks *display is merely a graphical representation of a reel.*

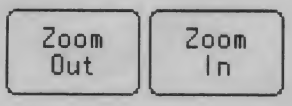
Tracks Display
Screen display that graphically represents recorded audio.

In the middle of the *Tracks* display is a graphic representation of the recorded audio on the tracks. Recorded audio appears as rectangles on the tracks. In, Out, and current time are marked by triangles and vertical lines. After each recording, or after an edit, the display updates. During recording any ready track number lights solid.



Zooming in and out

You can change the horizontal view of the tracks by using the zoom buttons at the bottom of the display. There is a maximum of three zoom out and zoom in levels.



Zoom
Change the horizontal view of the Tracks display.

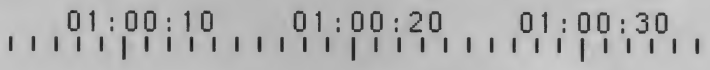
1 **Touch the Zoom Out button to see more time per track.**

Press the button repeatedly to zoom out further.

2 **Touch the Zoom In button to see less time per track.**

Press the button repeatedly to zoom in further.

Above track 1 is the time line, which scrolls across the display during playback or recording. Time is displayed in SMPTE format (hours : minutes : seconds). When zoomed in, the SMPTE format changes (seconds : frames : bits).



Input routing

The analog and digital input jacks are located on the rear of the Main Unit. *Foundation 2000* accepts analog and digital (AES/EBU, SPDIF) signals through the standard 2-CHANNEL I/O MODULE. If you have an optional ANALOG MULTICHANNEL I/O MODULE installed, you have an additional eight direct inputs and outputs. By default the direct inputs are routed to the channel of the same number. For example, input 1 to channel 1, input 2 to channel 2, and so on.



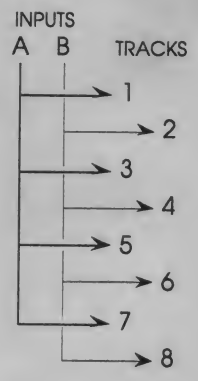
Connecting the 2-channel analog and digital inputs as well as the multichannel analog inputs does not cause any signal interference.

Using the 2-channel inputs

Input routing
Sending the input signal to various tracks and outputs.

The 2-CHANNEL I/O MODULE is standard on all *Foundation 2000*s. The analog A-B inputs are balanced inputs with a nominal level of +4 dBu, switchable internally to -10 dBV.

For digital input use the Digital I/O connectors. You have a choice of using the XLR connectors for an AES/EBU signal, or the RCA or optical connectors for an SPDIF signal.



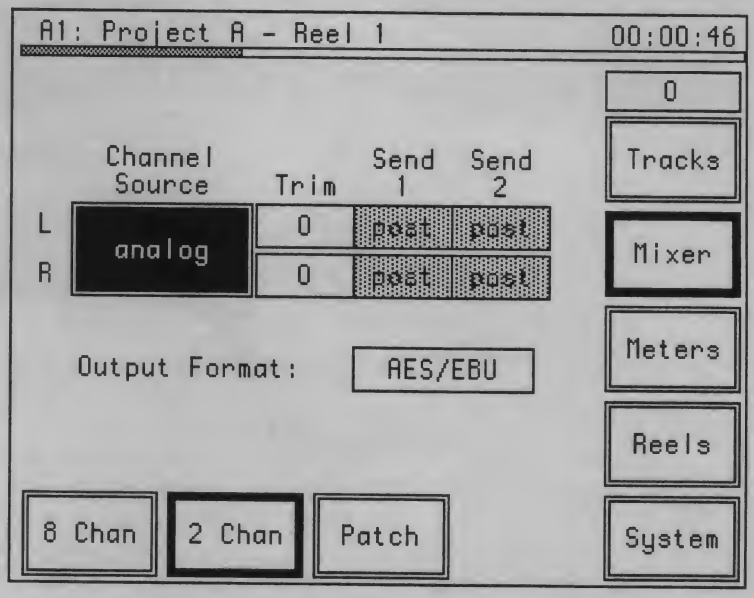
When recording, the left bus is routed to the odd-numbered tracks and the right bus is routed to the even-numbered tracks. When using the analog A-B inputs, by default A is panned left and B is panned right. For example, if you were to ready tracks 1 and 2, the left bus would be recorded on track 1 and the right bus would be recorded on track 2. If you were to ready tracks 1 and 3, the left bus would be recorded on both tracks.

Setting up to record 2-channel input

The 2 *Chan* view of the *Mixer* display is used to select analog 2-channel input and digital 2-channel input and output.

1 Touch the Mixer button.

2 Touch the 2-Chan button.



3 Select "Channel Source" and set the analog or digital input source (described below).

4 Select "Trim" and enter a trim amount.

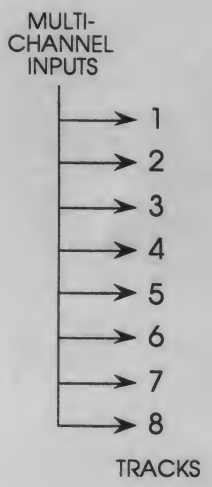
5 If you are sending digital output, select "Output format" and set the digital format.

2-Channel Selections

Entry	Selection	Meaning
Channel Source	analog	Analog input from the A-B connectors.
	AES/EBU	Digital input from AES/EBU IN connector.
	SPDIF	Digital input from SPDIF RCA connector.
	SPDIF(O)	Digital input from SPDIF optical connector.
Trim (analog only)	-40 dB to +12 dB	Pre-EQ level for the selected channel.
Output Format (digital only)	AES/EBU	Digital output going to AES/EBU OUT connector.
	SPDIF	Digital output going to SPDIF RCA connector.
	SPDIF(O)	Digital output going to SPDIF optical connector.

Aux sends are only available when the multichannel module is installed.

Send1 **Send 2**	pre	The signal is sent to the aux send bus before going to the fader.
	post	The signal is sent to the aux send bus after going to the fader.



Using the multichannel direct inputs

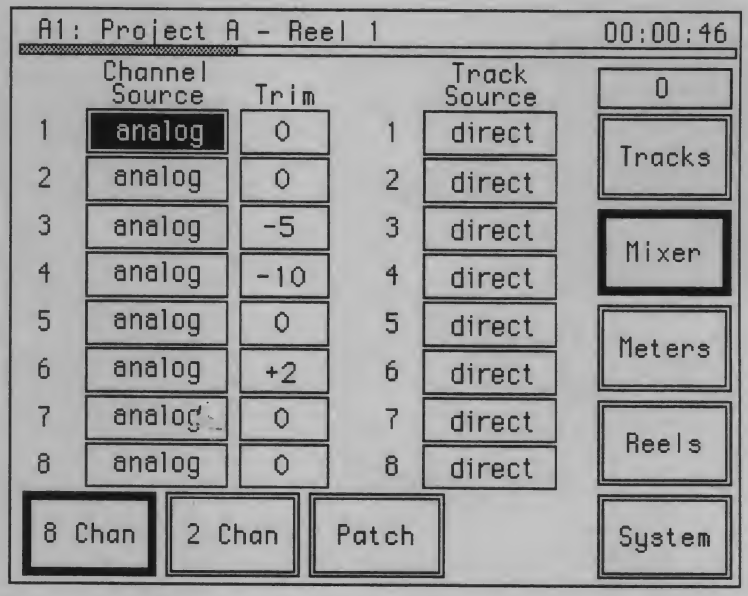
If you have purchased the ANALOG MULTICHANNEL I/O MODULE, you have eight additional direct inputs with which to work. When using direct inputs for recording, each input on the module is routed to the correspondingly numbered channel and track; channel 1 to track 1, channel 2 to track 2, and so on. (The signal does not go onto the L-R bus.) This way you can record up to eight different channels of audio at the same time.

Setting up to record multichannel input

The *8 Chan* view of the *Mixer* display allows you to set the input routing for recording eight channels of audio simultaneously. When using the multichannel inputs for recording, the "Channel Source" is set to "analog" and the "Track Source" is set to "direct."

1 **Touch the Mixer button.**

2 **Touch the 8-Chan button.**



3 **Select a channel in the "Channel Source" column that you want to use for recording and set to "analog."**

This indicates that the channel is receiving a signal from the multichannel analog inputs.

4 **Select the same channel in the "Trim" column and enter a value.**

5 **Select the "Track Source" of the same track and set to "direct."**

This indicates that the channel signal of the same number is sent to the track.

6 **Repeat Steps 3-5 for each channel that you want to record on using the multichannel inputs.**

8-Channel Selections

Entry	Selection	Meaning
Channel Source	analog	The channel is receiving signal from a direct input.
	track	Track playback mode. The channel is receiving signal from the track and sending it to the L-R bus.
Trim (analog only)	-40 dB to +12 dB	Pre-EQ level for the selected channel.
Track Source	L-R	The L-R bus is sent to the track(s) as explained above.
	direct	The channel signal of the same number is sent to the track. The signal is not sent to the L-R bus.



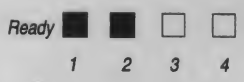
Connecting the 2-channel analog and digital inputs as well as the multichannel analog inputs does not cause any signal interference.

Readying tracks

Readying a track puts it into input mode. A track must be readied before you can record on it. The number of tracks that can be recorded at once depends on how much disk space you have available.

Ready
Track is prepared to record. Ready button is blinking or lit.

Safe
Track cannot be recorded on. Ready button is not lit.



Readying a track

■ **Press a Ready button.**

The button blinks, indicating that the track is ready for recording. You can ready more than one track at a time.

The *Ready* buttons have four modes.

Mode	Function
off	Track is safe. Cannot record on the track.
lit	Track is ready and recording is taking place.
blinking	Track is ready but not recording.
fast blinking	Error condition. A problem with recording. For example, you may have run out of disk space. Go to the *Status* view of the *System* display to view the error messages.

When a track is ready, its track number on the *Tracks* display and the *Meters* display light.

The track numbers on the screen are not touch sensitive. Use the Ready *buttons to light track numbers.*

Input Monitor
Listen to the input to the track rather than the track playback.

Input monitoring allows you to monitor the signal going to the ready tracks, while also monitoring audio playing off the safe tracks. During recording, input switching occurs automatically; safe tracks play back while ready tracks monitor input. Before recording, you can use input monitoring to check the level of the input.

Turning on input monitoring

1 **Press** *Input Mon* ☐ **to turn input monitoring on and off.**

The button lights when input monitoring is on.

2 **Ready a track.**

The readied track meters the signal entering the channel input, instead of the signal playing off the track.

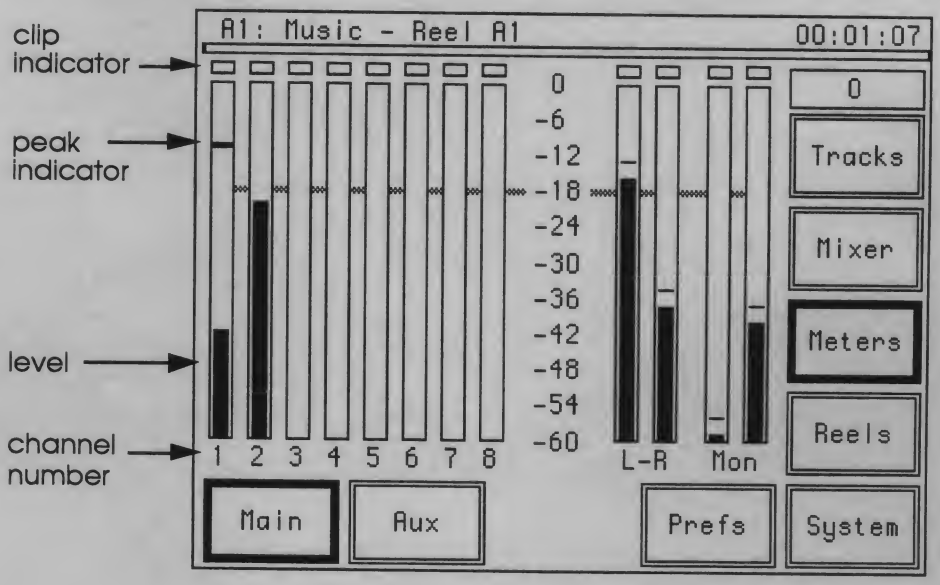
Metering

Meters display

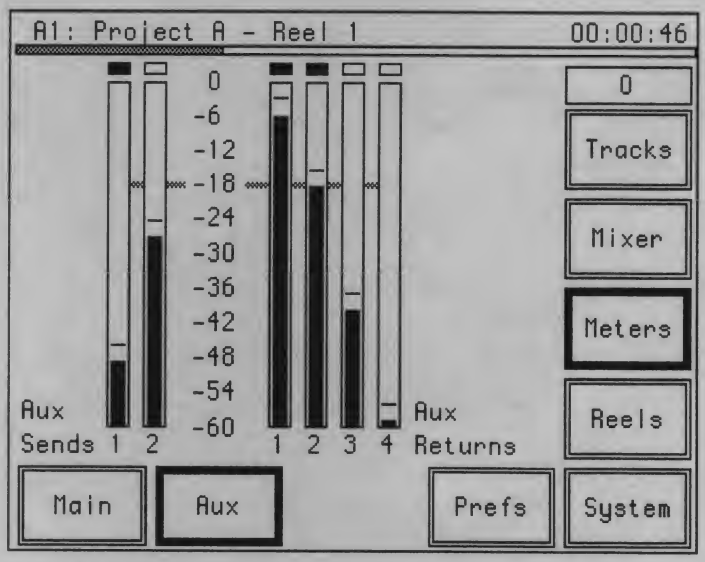
You can visually check the level of the inputs by going to the *Meters* display. The meters indicate peak-hold and clip.

■ **Touch the Meters button on the screen.**

The *Main* view of the *Meters* display shows you the level of input to tracks 1-8, the L-R mix and the Monitor mix. Clipping occurs at 0dB and is indicated by a light at the top of the meter. Adjust your channel "Trim" values on the *8 Chan* or *2 Chan* view of the *Mixer* display as needed.



The *Aux* view of the *Meters* display shows you the level of input to the aux sends and the aux returns if you have an ANALOG MULITCHANNEL I/O MODULE.



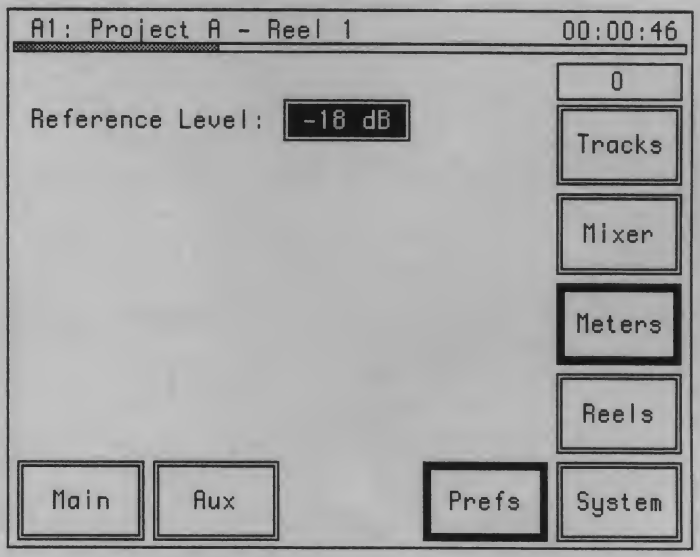
Reference level

The metering reference level indicator is a horizontal line behind the meters. It is configurable to the unit's nominal operating level and can be set from the *Prefs* view of the *Meters* screen. The default reference level of the *Foundation 2000* is -18 dB. It can be set to anything between 0 and -24 dB in 2dB steps.

Changing the reference level

1 Touch the Meters button.

2 Touch the Prefs buttons.



Reference Level
Operating level indicator on the Meters display.

3 Enter the reference level.



See the Service Manual *for information on system calibration.*

Manual recording

Techniques

During manual recording, you start and stop recording by simply pressing the transport buttons.

Manually recording with transport buttons

1 Press a Ready button to ready one or more tracks.

The *Ready* button blinks.

2 Hold *Record* ● **and press** *Play* ▶ **to start recording.**

The *Record* and *Play* buttons light.

Manual Recording
Start and stop recording using the transport or ready buttons.

3 Press *Play* ▶ **to stop recording.**

4 If you want to start recording again, hold *Record* ● **and press** *Play* ▶

5 Press *Stop* ■ **to stop recording and playback.**

When you stop recording, the In point is set at the beginning of the recording and the Out point is set at the end of the recording. Each time you record, the In and Out points are reset again automatically.

Manually recording with Ready buttons

Another way to do manual recording is by using the Ready buttons to start and stop recording.

1 Hold *Record* ● **and press** *Play* ▶ **to start recording.**

The *Record* button blink. Since you have not readied a track, the transport is moving but recording has not started.

2 Press a Ready button to start recording.

The *Ready* button lights. Recording begins.

3 Press a Ready button to stop recording.

The *Ready* turns off. Recording stops.

4 Press *Stop* ■ **to stop playback.**

Footswitch

A 1/4" footswitch connector for manually starting and stopping recording is located on CONTROL MODULE A on the rear of the Main Unit.



FOOT SWITCH

Using a footswitch for recording

1 **Plug the footswtich into the conector on the rear of the Main Unit.**

2 **Press a Ready button to ready one or more tracks.**

3 **Press** *Play* ▶

4 **Press the footswtich once to start recording.**

5 **Press the footswitch again to stop recording.**

6 **Repeat steps 4 and 5 as desired.**

7 **Press** *Stop* ■ **to stop playback.**



Any of the manual recording techniques described above are useful when recording discrete blocks of audio, such as dialog or a collection of sound effects. While the transport continues to move forward, you can go in and out of recording using the Play button. By readying different tracks you can easily pingpong dialog between tracks while recording.

Auto record and playback

Auto record is a user-definable, automated recording mode that is useful for punch-in and multitrack recording as well as looping. You can record multiple sychronized takes on successive tracks, or you can precisely punch into a track in order to replace audio. You can lock to timecode and record synced to picture times.

Simple auto record

Auto Record
Start and stop recording automatically using the In and Out points.

When auto record is on, the In and Out points are used for recording. You can set In and Out points on the fly or by jogging to specific times.

Performing an auto record

1 **Play, jog/shuttle, or locate to a time.**

2 **Press** *In* **at the desired In time.**

3 **Press** *Out* **at the desired Out time.**

4 **Press** *Auto Rec* ☐ **to turn on auto record.**

continued ⇨

5 Go to any time before the In time.

When using auto record, playback must start before the In time.



You can also set a preroll and locate to before the In time. See "Preroll, postroll, delay" later in this chapter.

6 Hold *Record* ● **and press** *Play* ▶

Recording begins automatically when the In point is reached. Recording stops automatically when the Out point is reached.

Auto functions and looping

Looping is the process of using the In and Out points to set up a continuous record and/or playback cycle. You can use the *Auto Record*, *Auto Return* and *Auto Play* buttons in any combination you desire to accomplish looping.

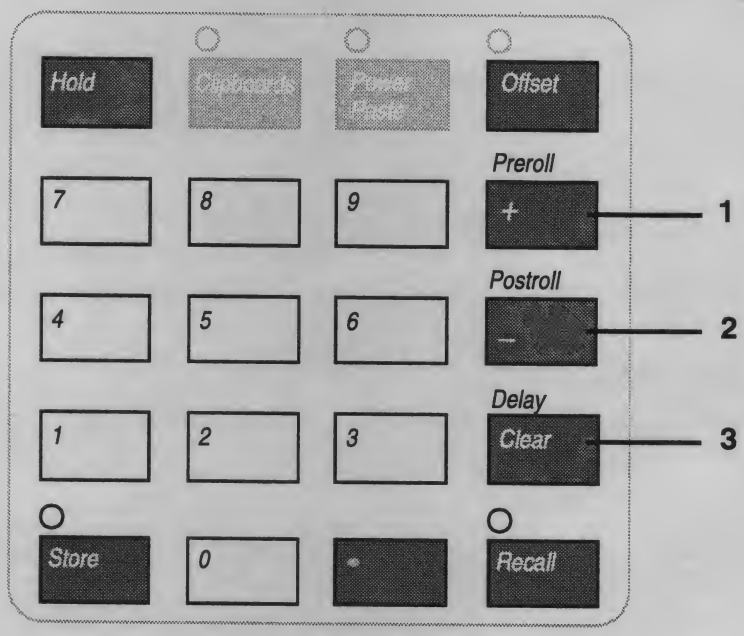
Buttons On	Result
Auto Play ☐	Playback begins automatically after every locate.
Auto Rtn ☐	When Out time is reached during playback or recording, the system automatically locates to the In point.
Auto Rec ☐	When In time is reached recording begins. When Out time is reached recording ends.
Auto Rtn ☐ *Auto Play* ☐	Playback loop only. After reaching Out, transport locates to In and plays.
Auto Rec ☐ *Auto Rtn* ☐	Recording begins at In and stops at Out, after which transport locates to In and stops.
Auto Rec ☐ *Auto Rtn* ☐ *Auto Play* ☐	Recording begins at In and stops at Out, after which transport locates to In and plays. After recording, the system continues in a playback loop only.



If you have set a non-zero postroll, playback continues to the Out time plus postroll. If you have set a non-zero preroll, the transport locates to the locate time minus preroll.

Preroll, postroll and delay

Preroll, postroll and delay are secondary functions on the keypad. A secondary function is accessed by first pressing the *Store* or *Recall* button, and then pressing the secondary function.



Button	Name	Function
1	Preroll	Number of seconds or frames automatically subtracted from a locator point. After pressing the *Locate* button, transport goes to locate time minus preroll.
2	Postroll	Number of seconds or frames automatically added to Out time. Auto Return plays to Out time plus postroll before locating.
3	Delay	Number of seconds or frames of pause preceding an Auto Play.

Setting a preroll

Preroll is an amount of time, usually in seconds, automatically subtracted from a locate point before playback begins. If you are controlling a video deck, preroll assures that the deck has enough time to come up to speed and lock to the sync reference before recording begins.

1 **Press** *Clear* **to zero the edit time field and enter the desired preroll duration.**

2 **Press** ○ *Store*

3 **Press** *Preroll* +

The value in the edit time display becomes the amount of the preroll.



GoTo does not use the preroll when locating. You can go directly to the time shown in the edit time field (no preroll) by pressing GoTo-Locate.

Setting a postroll

Postroll is an amount of time, usually in seconds or frames, automatically added to the Out point during playback or recording. *Foundation 2000* and a synced video deck, will continue to play to the Out point plus the postroll.

1 **Press** *Clear* **to zero the edit time field and enter the desired postroll duration.**

2 **Press** ○ *Store*

3 **Press** *Postroll* –

The value in the edit time field becomes the amount of the postroll.

Clearing a preroll or postroll

You can clear a preroll, postroll or delay and set it to zero.

1 **Press** Clear

2 **Press** ○ Store

3 **Press** Preroll + , Postroll − **or** Delay Clear

The value of the selected parameter is set to zero.

Setting a delay

Delay is an amount of time, usually in seconds, automatically added before playback begins. It can be used with *Auto Play* to introduce a silent interval before each playback loop begins.

1 **Press** Clear **to zero the edit time field.**

2 **Enter the desired delay duration (seconds.frames).**

2 **Press** ○ Store

3 **Press** Delay Clear **again.**

The value in the edit time field becomes the amount of the delay.

Recalling a preroll, postroll or delay

1 **Press** ○ Recall

2 **Press** Preroll + , Postroll − **or** Delay Clear **depending on which value you want to recall.**

The recalled value appears in the edit time field.

3 **You can now edit the time and store it back to its button, if desired (see above).**

Undo and redo

The *Undo* and *Redo* buttons allow you to perform non-destructive recording and editing. This means you can record over a track and then change your mind and go back and retrieve it. Or you can compare two different takes by toggling between them. The result of an undo or redo are visible on the *Tracks* display.

Button	Function
Undo	Steps backward through the previous ten recording or editing actions.
Redo	Steps forward through actions that were undone.

Using Undo and Redo

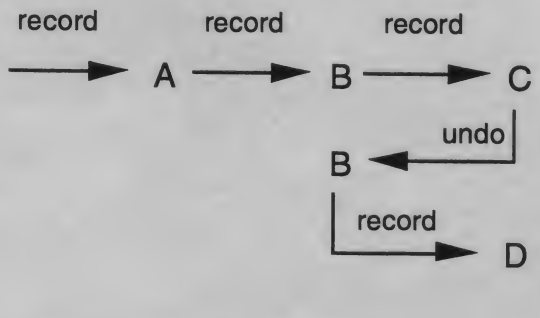
1 **Press** *Undo*

There are ten levels of undo. Each time you press the *Undo* button, you step back in time to the previous action.

2 **Press** *Redo*

You can step forward through all of the undo actions you just performed.

When you undo one or more actions and then begin recording or editing again, any action that you undid is no longer retrievable. In the example below, you recorded three times. After the last recording (C), you pressed the Undo button and returned to the previous recording (B). At this point you began recording again. As a result, you can no longer retrieve recording C.



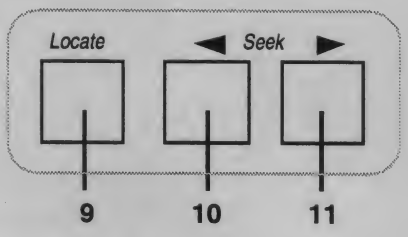
The new sequence of recordings that is available to you by undo is A—B—D. Recording C is no longer available in the undo sequence.

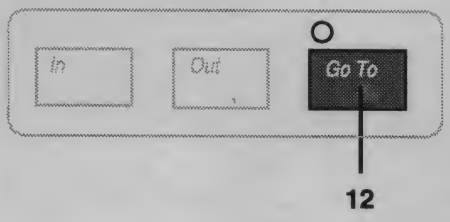
Locate

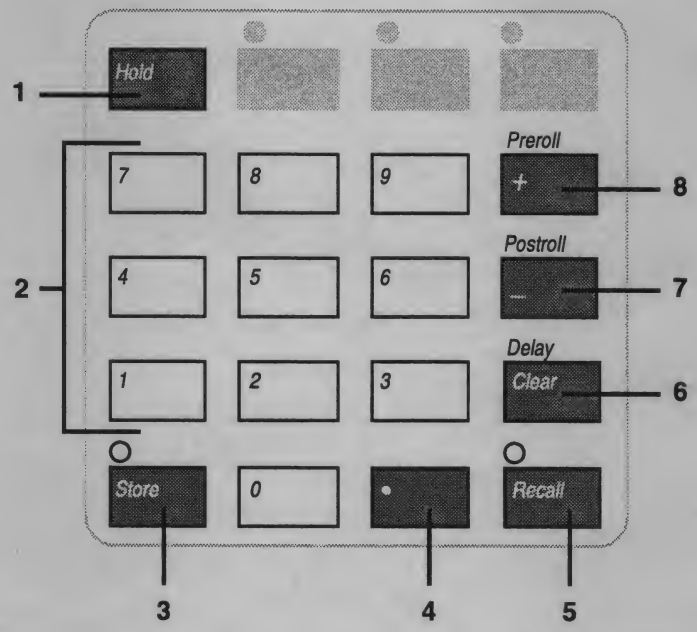
The buttons

Locators are times to which the transport goes when requested. When you press the *Locate* button you go to the time appearing in the edit time field. Ten additional times can be stored in the numbered keypad buttons. You can also locate using the *Go To* button.

If a preroll, has been set, Locate *goes to the edit time minus preroll, but* Go To *ignores preroll.*







Button	Name	Function
1	Hold	Captures current time and stores it into the edit time field.
2	Keypad 0-9	Updates edit time field. If *Store, Recall, Go To,* or *Offset* is blinking, keypad button is used for selected action (see other buttons).
3	Store	Turns on store function. Press keypad 0-9, *In, Out, Preroll, Postroll* or *Delay* to store edit time to selected button.
4	•	Selects next edit time subfield.
5	Recall	Turns on recall function. Press keypad 0-9, *In, Out, Preroll, Postroll* or *Delay, Locate, In, Out* to recall a stored time.

continued

6	Clear	Sets edit time field to zero. If pressed after *Store* or *Recall*, stores or recalls delay time.
7	–	Decrement selected edit time subfield by one unit. If pressed after *Store* or *Recall*, stores or recalls postroll.
8	+	Increment selected edit time subfield by one unit. If pressed after *Store* or *Recall*, stores or recalls preroll.
9	Locate	Locates to edit time. (If preroll is set, locates to edit time minus preroll.)
10	◄ Seek	Locates to the previous audio boundary.
11	Seek ►	Locates to the next audio boundary.
12	GoTo	Turns on GoTo function. Press In, Out, Locate, or keypad 0-9 to locate to that time. (Preroll has no effect.)

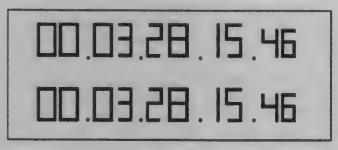
Locating

The *Locate* button moves the transport to the time appearing in the edit time field.

Locating using the Locate button

■ **Press** *Locate*

The transport locates to the edit time. The edit time and the current time are now identical.





If a preroll is set, the transport locates to the edit time minus the preroll. (See "Preroll, postroll and delay" below)

Locating using Go To

Another way of locating is to use the *GoTo* button. The *GoTo* button can be used with *In, Out, Locate* and the numbered keypad buttons.

Preroll is ignored when using GoTo for locating.

1 **Press** *Go To*

The *Go To* button LED blinks.

2 **Press** *In* **or** *Out*

The *Go To* LED goes out. The transport locates to the time stored in the button pressed.

OR

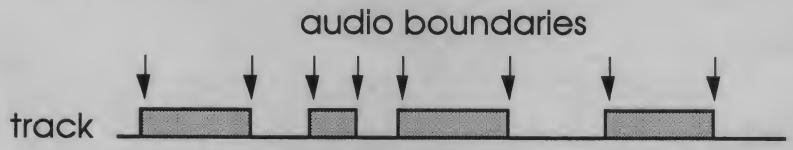
Press a numbered keypad buttons or *Locate*

The *GoTo* LED goes out. The transport locates to the time stored in the selected button.

Using the Seek buttons to find audio boundaries

Another way to locate is to use the *Seek* buttons, which act like a tab key, locating the system to the beginning or end of the next or previous audio segment. This eliminates jogging to find the precise start or end of audio.

If no tracks are armed, *Seek* searches through all tracks for audio boundaries. If any tracks are armed, *Seek* searches only the audio on the armed tracks.



■ **Press** *Seek* ► **to locate to the next audio boundary.**

■ **Press** ◄ *Seek* **to locate to the pervious audio boundary.**

Storing and recalling a time

The value in the edit time field can be saved to a numbered keypad button or to the *In* and *Out* button.

Storing a locator point

Locators
User-defined times that can be stored to and recalled from numbered keypad buttons.

1 **Press** ○ *Store* **on the keypad.**

The *Store* button LED blinks.

2 **Press a numbered keypad button.**

The *Store* LED goes out. The edit time field is stored as a locator in the numbered button.

OR

Press *In* **or** *Out*

The *Store* LED goes out. The edit time field is stored in whichever button you press.

Recalling a locator point

The *Recall* button is used to recall a stored locator point from the numbered keypad buttons or from the *In* and *Out* buttons.

1 **Press** ○ *Recall* **on the keypad.**

The *Recall* button LED lights.

2 **Press a numbered keypad button.**

The *Recall* LED goes out. The locator stored in the numbered button is recalled to the edit time field.

OR

Press *In* **or** *Out*

The *Recall* LED goes out. The time stored in the pressed button is recalled to the edit time field.

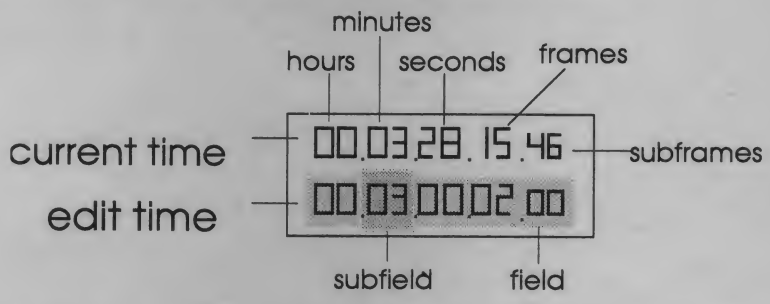
Using the Hold button

■ **Press** *Hold* **on the keypad.**

The current time is copied to the edit time field. You can locate to this time by pressing the *Locate* button, but unlike a numbered locator point, the Hold time is not permanently stored anywhere.

Editing a time

The edit time field is divided into five subfields separated by dots: hours, minutes, seconds, frames, 1/100ths of a frame. There are two ways to edit this time: replace the entire time or edit an individual subfield.



Pressing the [•] button on the keypad allows you to edit an individual subfield. Pressing the same button repeatedly, selects the next subfield, as indicated by a lighted dot (•) in the edit time field. The subfield that you are editing is to the left of the dot (•). Use the [+] and [–] buttons on the keypad to increment an decrement the subfield.

Editing a subfield

1 **Press [•] to select subfield editing mode.**

2 **Press a numbered keypad button.**

The numbers you press are entered into the subfield.

2 **Press [+] to increase the subfield time.**

3 **Press [–] to decrease the subfield time.**

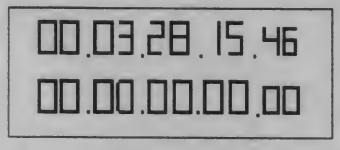
4 **Press [•] to select the next subfield to the left.**

The selected subfield is the one to the left of the time field dot.

Editing the entire edit time field

The *Clear* button takes you out of subfield mode and allows you to type in the entire time, without using the Dot button. It also sets the edit time field to zero.

1 **Press [Clear] on the keypad to set the to zero.**



2 **Press numbered keypad buttons to enter a time value.**

Values enter from the right continuously.

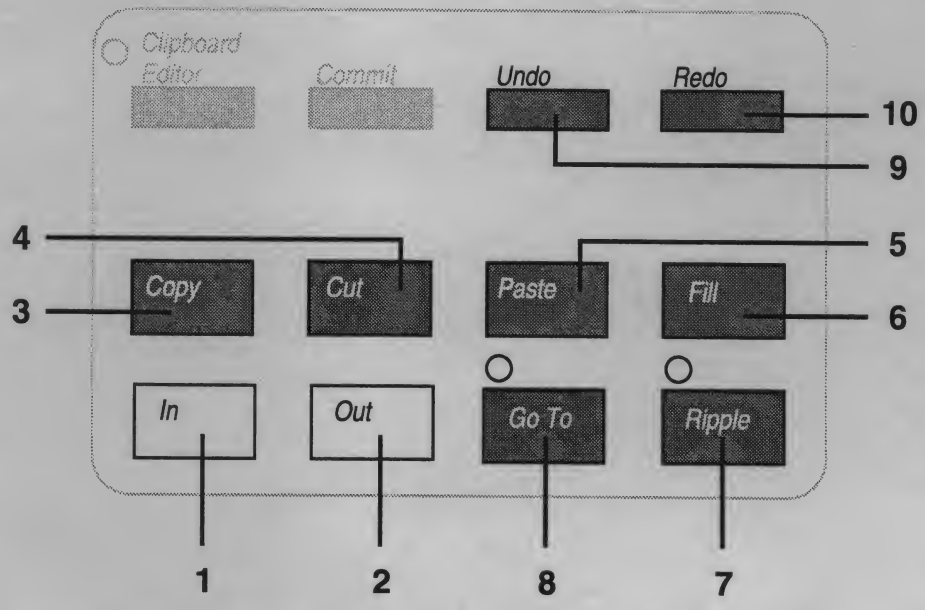
3 **Press [•] to re-enter the subfield mode, editing the seconds subfield.**

EDITING

Overview of editing buttons 97
Cut and copy editing 98
Paste 99
Simple paste 99
Splitting tracks 100
Fill and ripple editing 102
Fill paste 102
Ripple 102
Inserting leader 104
Undo and redo while editing 104

Overview of editing buttons

A selection of buttons in the middle of the Edit Controller is used for editing functions.



Button	Name	Function
1	In	Sets In point to current time.
2	Out	Sets Out point to current time.
3	Copy	Copies region to Clipboard.
4	Cut	Deletes region and puts it into Clipboard.
5	Paste	Pastes Clipboard to In time.
6	Fill	Fills region with contents of Clipboard. If the region is longer than the event, the event loops to end of region. If the region is smaller than the event, the event is cut off.
7	Ripple	During a cut , subsequent audio on the edited track(s) automatically slides in by the length of the cut. During a paste, subsequent audio on the edited track(s) automatically slides out by the length of the paste.
8	Go To	Pressed with In, Out, Locate or keypad number, goes to time stored in pressed button (no preroll).
9	Undo	Restores previous state of reel. 10 levels.
10	Redo	Restores state of reel before an undo was performed. 10 levels.

Cut and copy editing

Many of the editing functions of the *Foundation 2000* use the In and Out points as edit points. The In point marks the beginning of the edit; the Out point marks the end of the edit. The area between the In and Out points is called the "edit region." It is useful, but not necessary, to display the *Tracks* screen while editing.

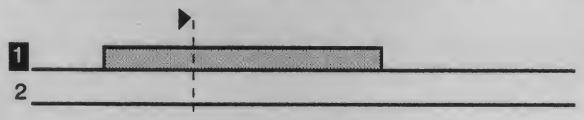
Defining a region

1 Press the Ready button of the track that contains the audio you want to edit.

The number of the ready track highlights on the *Tracks* display. This is the track you are going to edit. You can ready as many tracks as you want. An edit is only performed on ready tracks.

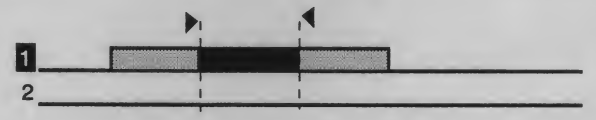
2 Locate an In point and press *In*

The In point marks the start of the region you want to copy or cut.



3 Locate an Out point and press *Out*

The Out point marks the end of the region that you want to copy or cut. Once you have set both edit points, the region is defined and appears highlighted on the display.

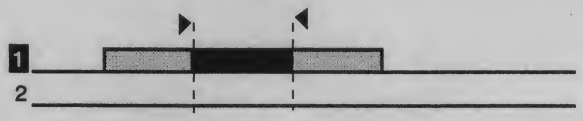


Copying audio

The *Copy* command makes a copy of the edit region and saves it in a temporarily memory location, called the "Clipboard." *Copy* does not change anything on the track. The Clipboard is replaced each time you use the *Copy* or *Cut* command.

■ **Press** *Copy*

The edit region is copied to the Clipboard. The tracks do not change.



Cutting audio

Whereas *Copy* does not change anything on the track, *Cut* removes an edit region from the track and saves it to the Clipboard. The edit region remains in the Clipboard until you cut or copy another region of audio, at which time the Clipboard is replaced with the new region.

■ **Press** *Cut*

The region is copied to the Clipboard and removed from the track.



Paste

Simple paste

The Paste command takes whatever is in the Clipboard and puts it on the ready track(s) at the In time. Up to eight tracks of audio can be cut and pasted at a time.

Performing a simple paste

1 Press the Ready button of the track(s) on which you want to paste the Clipboard. (Make sure that all other tracks are safe.)

The *Tracks* display highlights the track number.



2 Press *Paste*

If you have not moved the In point from the previous cut, a "paste-in-place" is performed on the ready track at the In point.



Pasting to a new In point

You can paste audio to any location on any track by simply readying the track and moving the In point.

1 **Ready the track on which you want to paste.**

2 **Locate a new paste point and press** *In*

You can use the jog/shuttle knob, the *Play* button, or any of the locate functions to find the new paste point. When you press the *In* button, the current time is captured and stored in the *In* button. The In arrow on the *Tracks* display moves to the current time.



3 **Press** *Paste*

The Clipboard is pasted to the new In time. You do not need to specify an Out time to perform a simple paste.

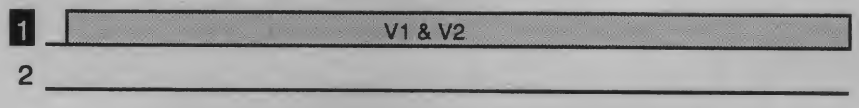


Splitting tracks

Simple cut and paste editing can be used to easily split a dialog track between two or more tracks while preserving its synchronization. In the following example, two voices (V1 and V2) are recorded on a single track., but you want them on different tracks so that they can be processed separately.

Splitting dialog tracks

1 **Ready the dialog track.**

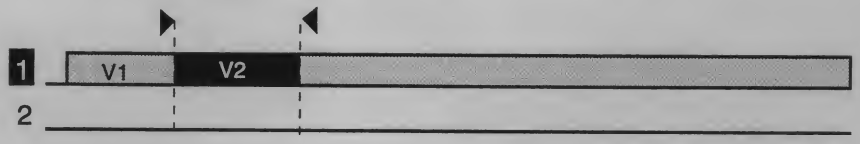


2 **Jog to the beginning of Voice 2's dialog and press** *In*

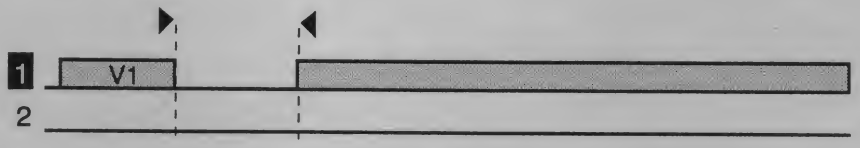


continued ⇨

3 **Jog to the end of Voice 2's dialog and press** Out



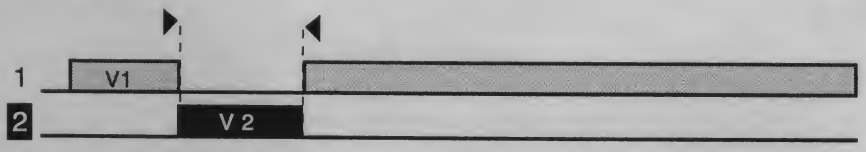
4 **Press** Cut



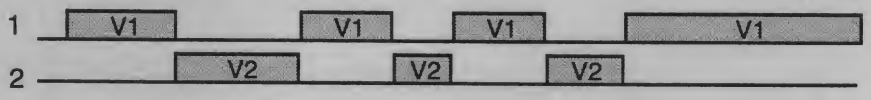
5 **Unready track 1 and ready track 2.**



6 **Press** Paste



7 **Repeat steps 1-6 wherever Voice 2's dialog is present. You will end up with synced dialog on two tracks.**





You can split tracks while the transport is still moving forward. Just set In and Out points on the fly, and then cut and paste in place by readying and unreadying the appropriate tracks. The transport continues to move forward while you are editing.

Fill and ripple editing

Fill paste

Fill is a special paste function that allows you to define a region and then fill it with the audio in the Clipboard, looping to the end of the region, if necessary. This is useful for ambience or other looped sounds.

Performing a fill paste

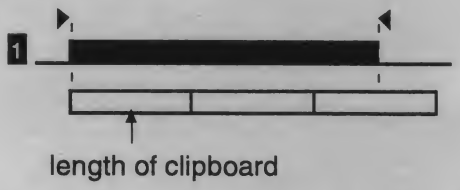
1 **Ready the track you want to paste onto.**

2 **Set an In and Out point for the region you want to fill with the contents of the Clipboard.**

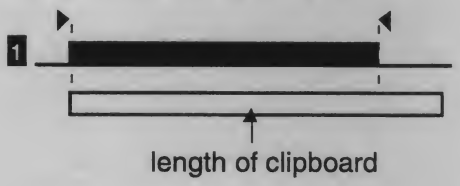


3 **Press** *Fill*

If the Clipboard is shorter than the length of the edit region, the Clipboard loops to the end of the edit region. A default crossfade of 10 milliseconds is used between each edit.



If the Clipboard is longer than the edit region, the audio is trimmed automatically at the Out point.





If the Clipboard is shorter than the region when you perform a simple paste, the Out point is moved to the end of the pasted audio.

Ripple

Ripple is a special cut and paste mode that is activated by pressing the *Ripple* button. It affects only ready tracks.

- If Ripple is on when a paste is performed, any audio that follows the paste point is slid out by the amount of the Clipboard.
- If a cut is performed while Ripple is on, the audio following the cut region is slid in by the amount of the region.

Performing a ripple paste

1 **Ready the track(s) you want to paste onto.**

2 **Set an In point at the place you want to paste.**

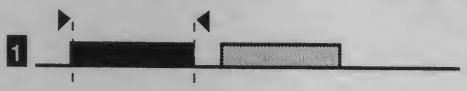


3 **Press** Ripple

The *Ripple* LED blinks, indicating that the mode is on.

4 **Press** Paste

The audio on the track is moved out by the length of the pasted audio. An Out point is set at the end of the pasted audio. The *Ripple* button turns off.



If ripple had been turned OFF, a simple paste would have taken place and the existing audio would have been punched over:



Performing a ripple cut

1 **Ready the track(s) you want to cut from.**

2 **Set In and Out points where you want to cut audio.**



3 **Press** Ripple

The *Ripple* LED blinks, indicating that the mode is on.

4 **Press** Cut

The resulting two pieces audio are spliced together. All subsequent audio on the readied track is moved up in time by the length of the cut. The *Ripple* button turns off.



If ripple had been OFF, a simple cut would have taken place and the track sync would not have been affected:



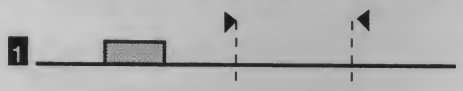
Inserting leader

You can also insert leader, or silence, into one or more tracks if, for example, a specified number of frames is added across all tracks to compensate for a picture change.

To insert leader you first copy the number of tracks of silence that you want and then ripple-paste it to the tracks. For example, if you are inserting silence onto two tracks, you can copy any two-track region of silence and then paste it to any two tracks.

Inserting leader onto a track

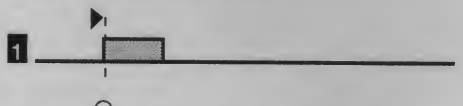
1 **Ready a track and set In and Out points where there is silence.**



2 **Press** Copy

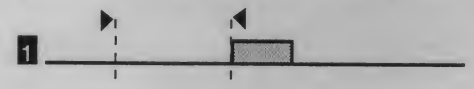
The region of silence on one track is copied to the Clipboard.

3 **Set the In point to the place where you want to insert silence. (If needed, ready another track.)**



4 **Press** Ripple **and then** Paste

The silence in the Clipboard is pasted to the track. All audio following the In point is moved out by the length of the Clipboard.



Undo and redo while editing

The *Undo* and *Redo* buttons allow you to do non-destructive recording as well as editing. If you cut or paste something to a track, you can undo your edit by pressing the *Undo* button, or you can go back to the edit you performed by pressing the *Redo* button.

There are ten levels of undo and redo, which means that you can undo the previous ten edits you performed, or step forward through the ten actions you undid. This allows you the flexibility to change your mind, or to toggle the track between two versions of an edit.

Actions which can be undone or redone include:

- record
- copy
- cut
- paste
- fill

Using Undo and Redo

1 **Press** *Undo*

You undo the action you just performed and step back to the previous state of the track.

2 **Press** *Redo*

You reinstate the tracks as they were before the previous undo.



Undo and redo also restore the contents of the Clipboard and the In and Out points.



Use Undo *and* Redo *to try out versions of an edit or a recording. Make several versions of a recording in the same location on the tracks and then press* Undo *and* Redo *to audition each one separately.*



Once you undo an action and then start editing or recording again, the actions you undid actions are not retrievable. You can no longer use the Redo *button to step to them.*

If you choose to discard the packing materials, we strongly encourage you to recycle them. We have used as much recyclable or reusable material as possible, without jeopardizing the protection of your unit during shipping, and have kept the amount and variety of materials to a minimum. None of our packing materials contains CFCs.

MIXING

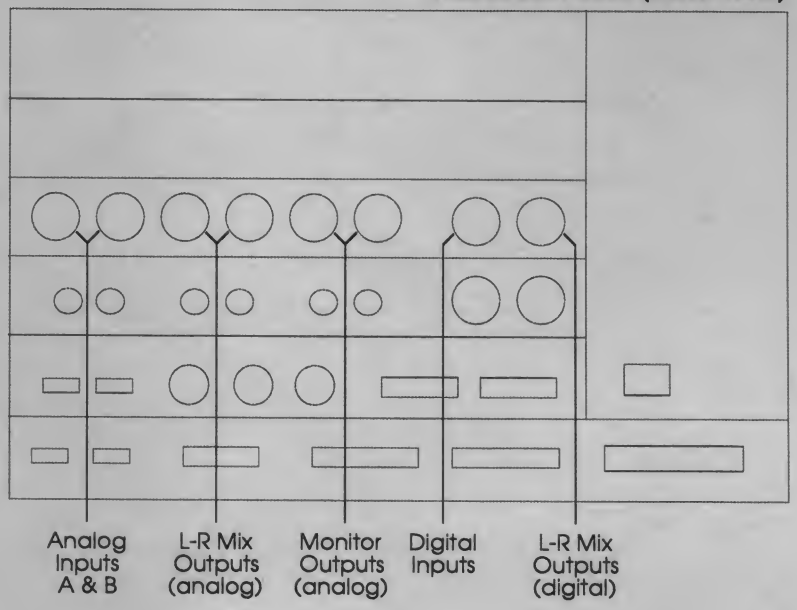
Foundation 2000 mixer 109
Mixer displays 110
2-Channel I/O Module 110
2-channel view 111
Multichannel I/O Module 112
8-channel view 112
Patch view 113
MixTab 114
Setting up 114
Channel controls—DCM 1 116
Monitor controls—DCM 2 117
A-B inputs and aux returns—DCM 3 118
Storing and recalling snapshots 119
Mixing applications 120
Overdubbing 120
Mixdown 121
Premixing inputs 123
Aux sends and returns 124
MIDI implementation 125
Mixer signal flow diagrams 127
Conceptual console 127
Mixer map 128
Mixer signal flow—minimum configuration 129
Mixer signal flow—expanded configuration .. 130
MixTab implementation 131

Foundation 2000 mixer

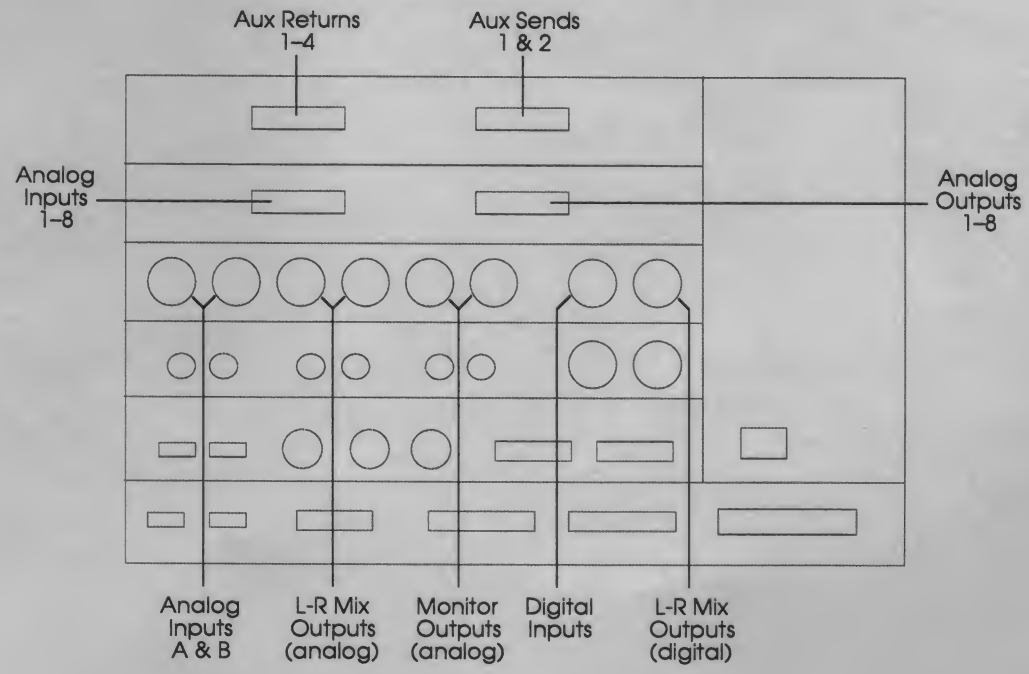
FOUNDATION 2000 has substantial routing, mixing and signal processing capabilities, assigned and configured in software. This release of the *Foundation 2000* includes a 10x2x2 mixer featuring analog and digital I/O, panning, summing and 3-band parametric EQ.

The minimum configuration has 2 analog inputs, 4 analog outputs (for the main L-R mix and a Monitor mix), and 2-channel digital I/O.

Foundation 2000 (back view)



Adding two ANALOG MULTICHANNEL I/O MODULES expands the system to include 8 analog channel inputs, 8 analog channel outputs, 2 aux sends and 4 aux returns.



In the *Foundation 2000* mixer, the L-R bus can be used both as a print bus (for bouncing down or when sourcing the 2-channel inputs) and as a mixdown bus.

Input trims and channel faders allow -∞ to +18 dB digital scaling of the signals. Each EQ has an 18 dB boost or cut, and a sweep of five octaves. Center frequencies for the low, mid and high EQ range from 25 Hz to 800 Hz, 250 Hz to 8 kHz, and 625 Hz to 20 kHz. Bandwidths range from 0.1 to 3 octaves.

Some mixing parameters can be set on the MixTab. Others are set on the Mixer displays, accessed from the Edit Controller. All mixing parameters can be controlled via MIDI.

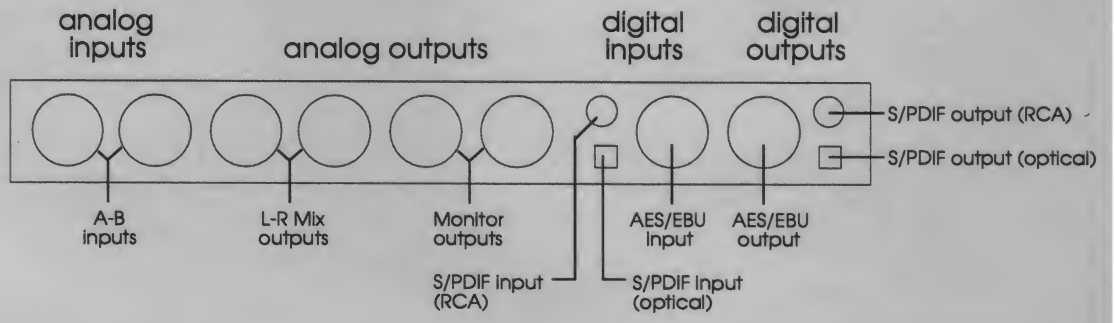
MixTab	Edit Controller	MIDI
mute high and low EQ channel level and pan monitor level and pan aux send level aux return level and pan master levels	channel source input trim pre/post fader switch for aux sends routing to Monitor and L-R busses solo	all mixing parameters

Mixer displays

Foundation 2000 has three Mixer displays. The 2-channel display sets parameters for the 2-CHANNEL I/O MODULE. The 8-channel display sets parameters for the 8 mixer channels and the optional MULTICHANNEL I/O MODULE. The Patch display is for routing and configuration.

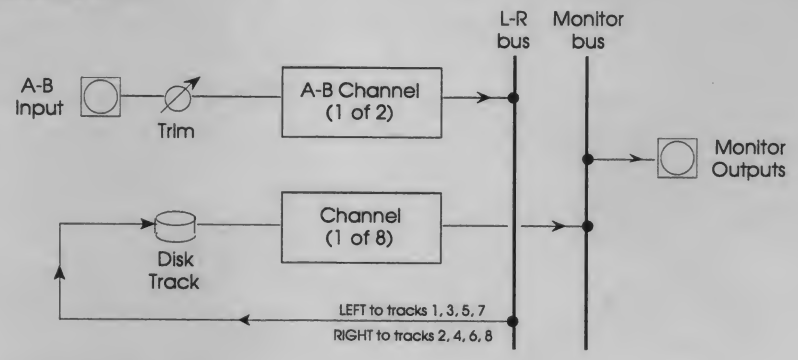
The illustrations in this section show the default setting for each parameter. You can change these defaults by altering the settings in the default reel. For more information, see the chapter "Project Management."

2-Channel I/O Module



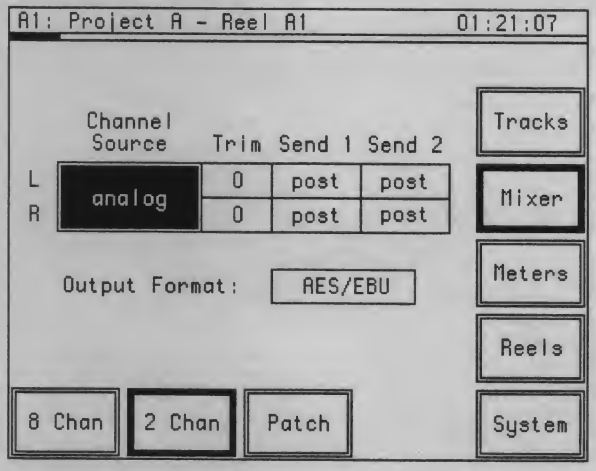
Inputs on the 2-CHANNEL I/O MODULE are always sent to the L-R bus.

This is a simplified flow diagram for systems with only a 2-CHANNEL I/O MODULE. The L-R bus is used for recording from the 2-channel inputs. The *left* channel of the L-R bus is routed to tracks 1, 3, 5, 7; the *right* channel is routed to tracks 2, 4, 6, 8.



2-channel view

Use the 2-channel view to set parameters for the 2-CHANNEL I/O MODULE.

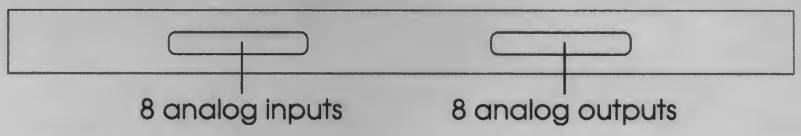


Field	Options	Function
Channel Source	analog AES/EBU SPDIF SPDIF (O)	Selects inputs on the 2-CHANNEL I/O MODULE. Use "analog" to record from the A-B inputs. Use "AES/EBU" to record from the AES/EBU (XLR) input. Use "SPDIF" to record from the SPDIF (RCA) input. Use "SPDIF (O)" to record from the SPDIF (optical) input.
Trim	-∞ to +18 dB	Adjusts the input trim.
Send 1	pre/post	Sets the source of Aux Send 1 to pre-fader or post-fader.
Send 2	pre/post	Sets the source of Aux Send 2 to pre-fader or post-fader.
Output Format	AES/EBU SPDIF	Selects the digital format sent to all three digital outputs.

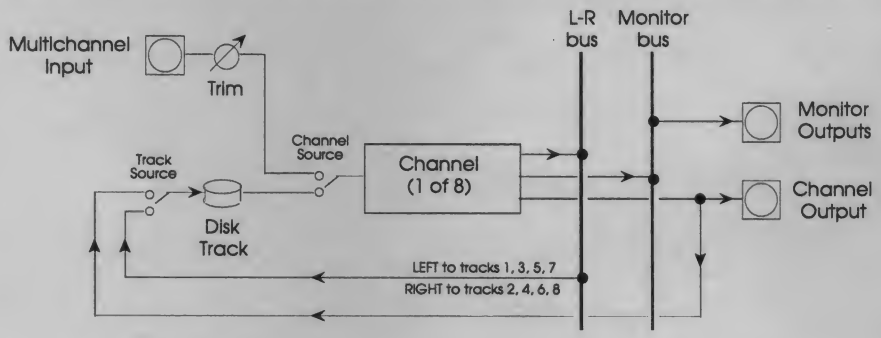


Set channel mutes, EQs, levels, pans, and Aux Send levels on the MixTab.

Multichannel I/O Module

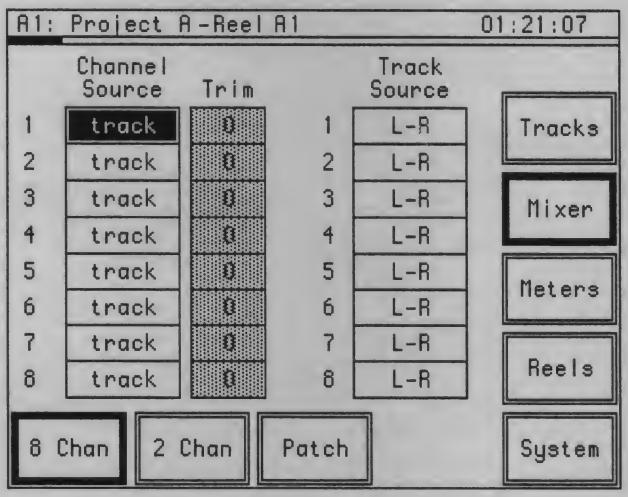


This is a simplified flow diagram for systems with an ANALOG MULTICHANNEL I/O MODULE. Each channel is sent to both the L-R bus and the channel output.



8-channel view

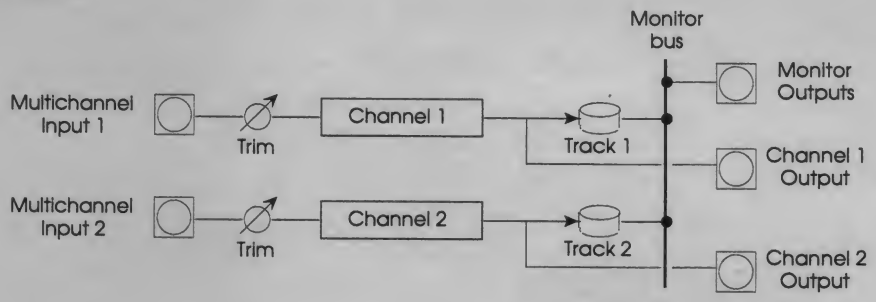
Use the 8-channel view to set parameters for the 8 mixer channels and the MULTICHANNEL I/O MODULE.



Field	Options	Function
Channel Source	analog/track	Selects the input source to each mixer channel. Use "analog" to record or mix from inputs on the MULTICHANNEL I/O MODULE. Use "track" to send audio from the disk to the L-R bus.
Trim	-∞ to +18 dB	Adjusts the input trim; not available when the channel source is "track."
Track Source	direct/L-R	Selects the signal to record on the disk. Use "direct" to record from inputs on the MULTICHANNEL I/O MODULE. Use "L-R" to record the L-R mix or to record from the 2-CHANNEL I/O MODULE. Odd tracks record the *left* channel of the L-R bus; even tracks record the *right*.

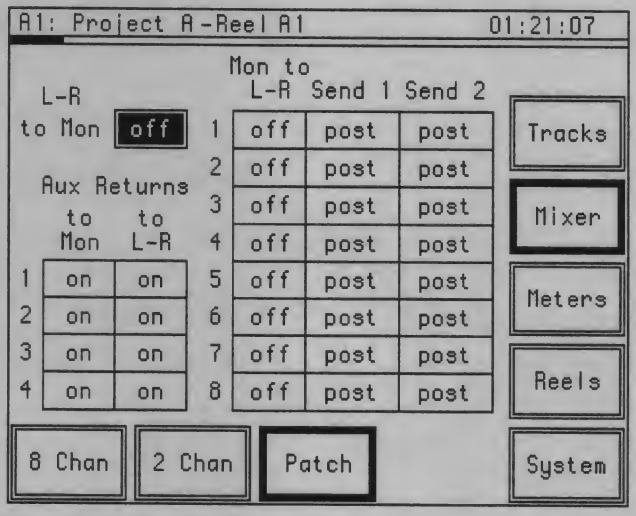
Inputs on the MULTICHANNEL I/O MODULE are sent to *both* the L-R bus and the individual channel outputs, with the following exception. If the Track Source is "direct," the multichannel input is *not* sent to the L-R bus.

For example, you could set the Channel Source to "analog" and the Track Source to "direct" to record multichannel input 1 to track 1, multichannel input 2 to track 2, and so on.



Patch display

Use the *Patch* display for routing channels, aux returns and the L-R bus.



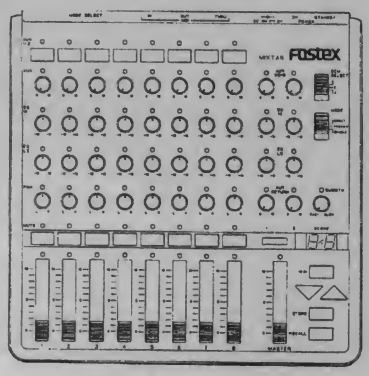
Field	Options	Function
L-R to Mon	on/off	Replaces the Monitor bus with the L-R bus; the L-R mix is routed to the Monitor outputs.
Aux Returns to Mon to L-R	on/off	 Sends the selected aux return to the Monitor bus. Sends the selected aux return to the L-R bus.
Mon to L-R	on/off	Sends the selected monitor channel to the L-R bus.
Send 1	pre/post	Sets the source of Aux Send 1 to pre-fader or post-fader.
Send 2	pre/post	Sets the source of Aux Send 2 to pre-fader or post-fader.



Aux Return levels and pans, Aux Send levels, and Monitor levels and pans are set on the MixTab.

MixTab

You can use the Fostex MixTab to control many of the *Foundation 2000* mixer parameters. The MixTab is an assignable mixing surface; its DCM SELECT switch determines whether you're controlling channels, monitor parameters, or aux returns. When you turn on the MixTab, all its controls are at the default settings regardless of their physical position. When you move a knob or fader, its setting is updated.

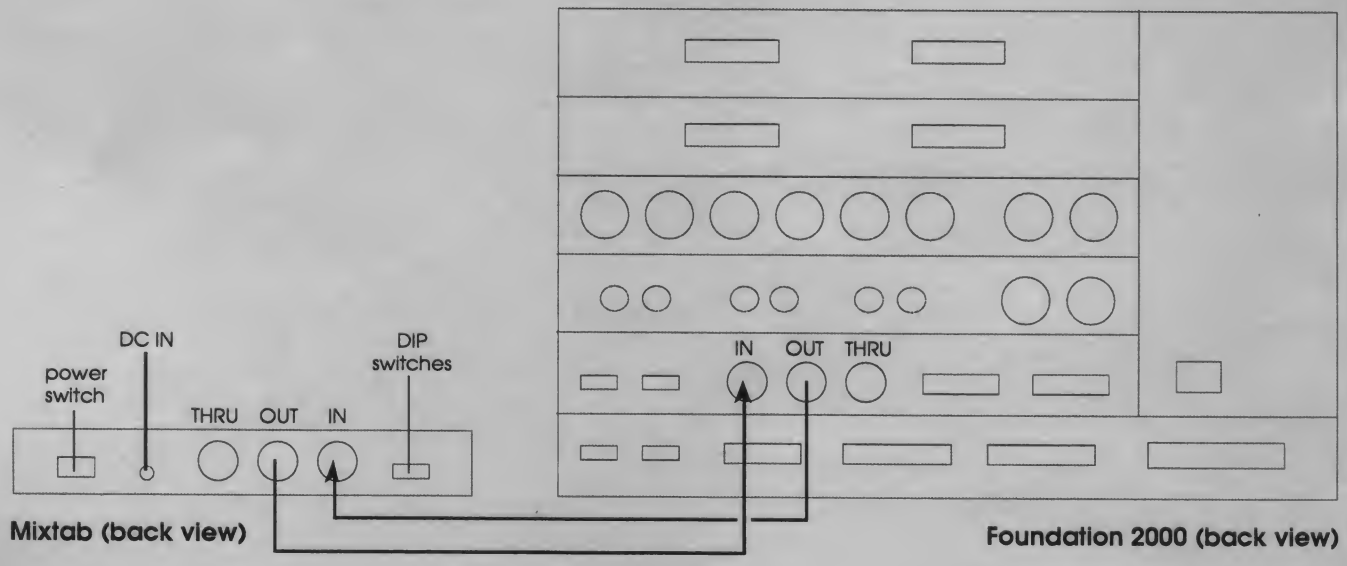


Setting up

Connecting the MixTab

1. **Connect the DC cord from the AC power adapter to the DC IN port on the MixTab.**
2. **Plug the AC power adapter into an AC outlet.**
3. **Connect the MIDI IN port of the MixTab to the MIDI OUT port of the *Foundation 2000*.**
4. **Connect the MIDI OUT port of the MixTab to the MIDI IN port of the *Foundation 2000*.**

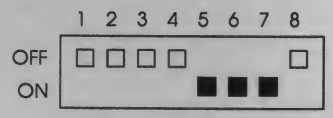
   Foundation 2000 MIDI ports are on CONTROL MODULE B in the back of the Main Unit.

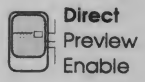


Configuring the MixTab

The DIP switches on the back of the MixTab are set at the factory.

1 Verify that the DIP switches on the back of the MixTab are set to these positions—





2 Turn on the MixTab power switch.

3 Set the MODE switch to "Direct."

The MODE switch determines the relationship between the actual mixer settings and what the MixTab displays. Direct mode lets you use the MixTab as a conventional mixer. Preview and Enable modes are useful when recalling mixer settings you previously stored as a snapshot.

Direct	Moving a MixTab knob or fader immediately sends MIDI control data to the *Foundation 2000* mixer. The corresponding MixTab LED lights orange to indicate that the MixTab is sending MIDI data.
Preview	When you recall a mixer snapshot, the MixTab LEDs blink to indicate discrepancies between the *Foundation 2000* mixer settings and the corresponding MixTab settings. To make the MixTab and mixer settings equal, adjust the MixTab knobs and faders until the LEDs stop blinking. The MixTab does *not* send any MIDI control data in Preview mode.
Enable	This is the same as Preview mode until the MixTab and mixer settings are equal. Once the settings match, the LED lights orange and the MixTab sends MIDI control data to the *Foundation 2000* mixer.

4 Set the DCM SELECT switch to 1, 2 or 3.

When the MixTab is used with the *Foundation 2000*, the DCM SELECT switch indicates whether the MixTab faders and knobs control channel parameters, monitor settings or aux returns.

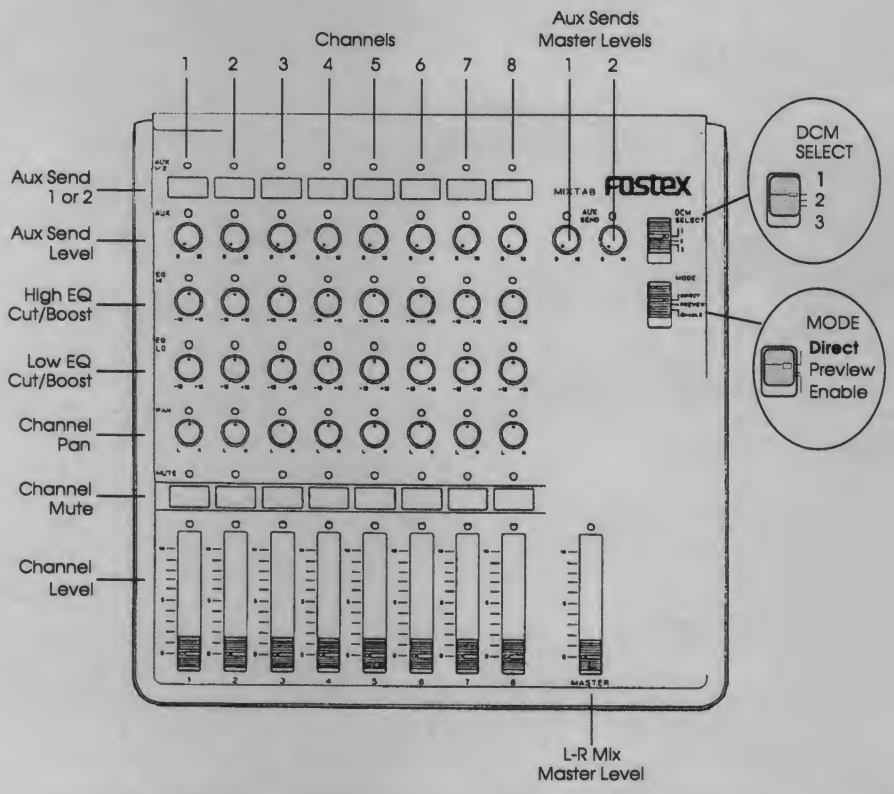
1	8-channel inputs master level (L-R mix) aux sends
2	8-channel monitor controls master level (Monitor mix)
3	2-channel inputs aux returns



For more details about the Mode switch and recalling mixer settings, see "Storing and recalling snapshots" later in this chapter.

Channel controls—DCM 1

When the DCM SELECT switch is set to 1, the MixTab strips control parameters for the 8 channels of the *Foundation 2000* mixer. The Master fader sets the overall level of the L-R mix. The aux send knobs next to DCM SELECT control the overall levels of Aux Sends 1 and 2. All other knobs are ignored.



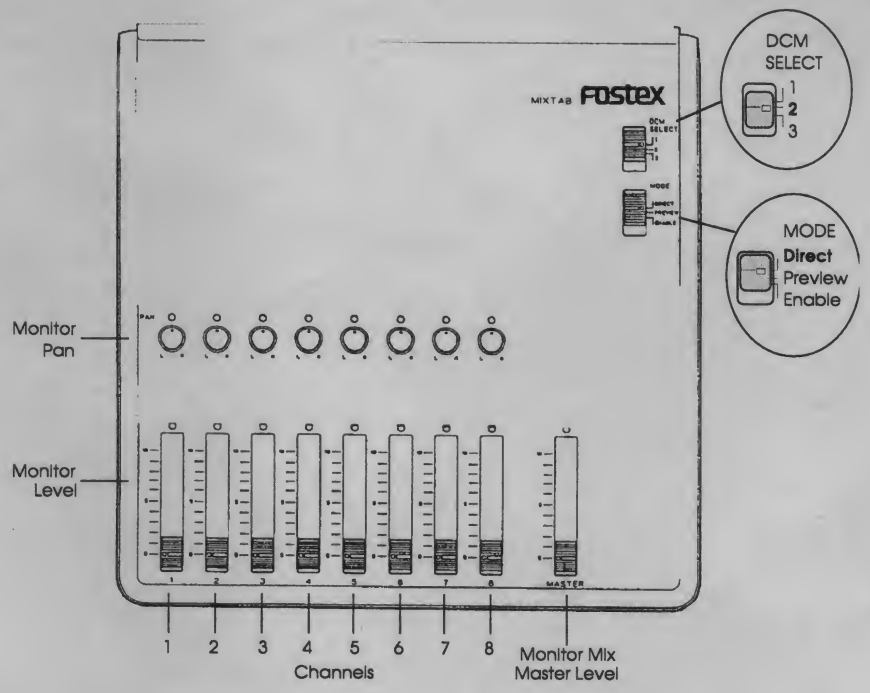
Control	Function
AUX 1/2 button	Sends the current position of the AUX knob to either Aux Send 1 (LED off) or Aux Send 2 (LED on).
AUX knob	Sets the channel level sent to the selected Aux Send. 0 corresponds to -∞; 10 represents +18 dB.
EQ HI knob	Cut/boost (±18 dB) for high-band EQ. The center frequency is 7 kHz; the bandwidth is 3 octaves.
EQ LO knob	Cut/boost (±18 dB) for low-band EQ. The center frequency is 70 Hz; the bandwidth is 3 octaves.
PAN knob	Sets the channel pan position in the L-R mix.
MUTE button	Mutes all output from the channel.
Fader	Sets the channel level in the L-R mix. 0 corresponds to -∞; 7 represents unity gain; 10 is +18 dB.



The channel source and input trim for the 8-channel inputs are set on the Edit Controller's Mixer (8 Chan) display.

Monitor controls—DCM 2

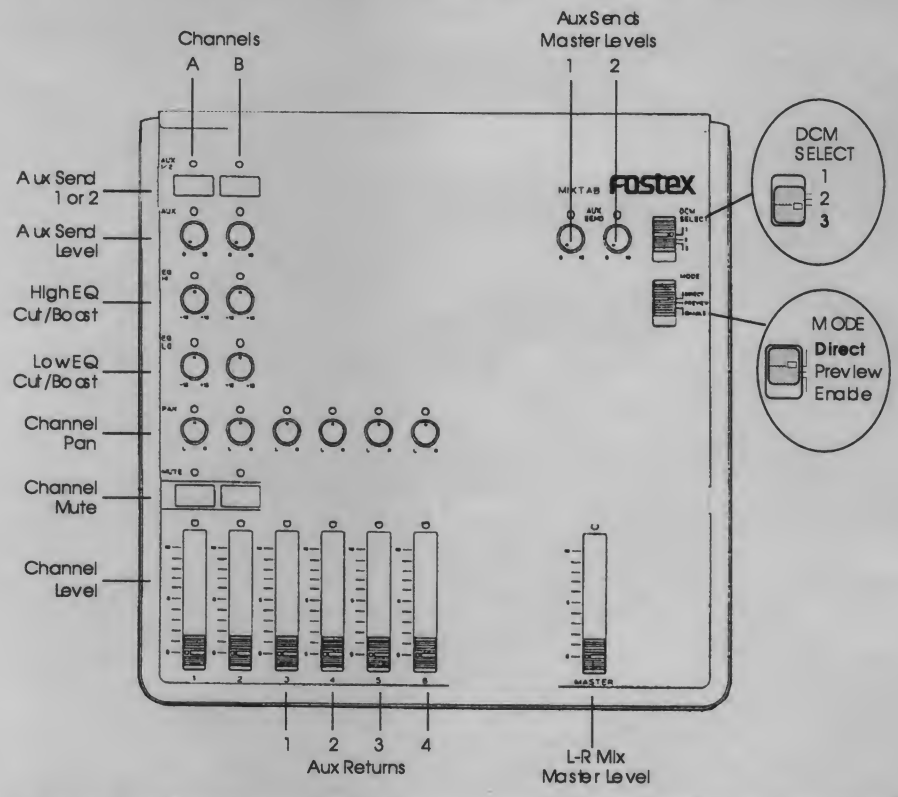
When the DCM SELECT switch is set to 2, faders 1–8 and pan knobs 1–8 control the level and pan position of each channel in the Monitor mix. The Master fader sets the overall level of the Monitor mix.



Control	Function
PAN knob	Sets the channel pan position in the Monitor mix.
Fader	Sets the channel level in the Monitor mix. 0 corresponds to -∞; 7 represents unity gain; 10 is +18 dB.

A-B inputs and aux returns—DCM 3

When the DCM SELECT switch is set to 3, the first two MixTab strips control parameters for the 2-channel inputs (in the 2-CHANNEL I/O MODULE). If you have MULTICHANNEL I/O MODULES installed, faders 3–6 control the aux return levels; pan knobs 3–6 set the pan positions of the aux returns. The Master fader sets the overall level of the L-R mix. The aux send knobs next to DCM SELECT control the overall levels of Aux Sends 1 and 2. All other knobs are ignored.

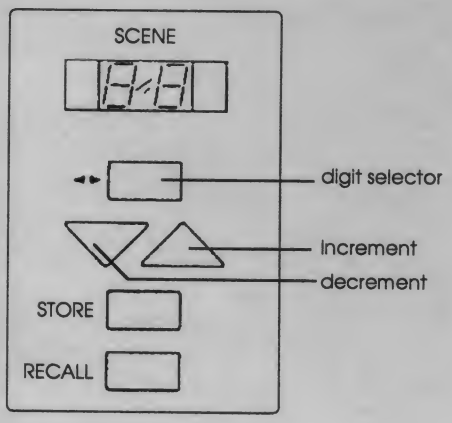


Control	Function
AUX 1/2 button	Sends the current position of the AUX knob to either Aux Send 1 (LED off) or Aux Send 2 (LED on).
AUX knob	Sets the channel level sent to the selected Aux Send. 0 corresponds to -∞; 10 represents +18 dB.
EQ HI knob	Cut/boost (±18 dB) for high-band EQ. The center frequency is 7 kHz; the bandwidth is 3 octaves.
EQ LO knob	Cut/boost (±18 dB) for low-band EQ. The center frequency is 70 Hz; the bandwidth is 3 octaves.
PAN knob	Sets the channel pan position in the L-R mix.
MUTE button	Removes the channel from the L-R mix.
Fader	Sets the channel level in the L-R mix. 0 corresponds to -∞; 7 represents unity gain; 10 is +18 dB.

The channel source and input trim for the 2-channel inputs are set on the Edit Controller's Mixer (2 Chan) view. Use the Patch view to send the aux returns to the L-R mix and/or Monitor mix.

Storing and recalling snapshots

A set of buttons at the bottom right corner of the MixTab let you store a snapshot of the current mixer settings. You can store and recall up to 100 different snapshots or "scenes." Mixer snapshots are stored in the current reel.



Storing a snapshot

1 **Use the digit selector and increment/decrement buttons to change the displayed scene number.**

For each snapshot, you can assign any number from 0 to 99.

2 **Press the STORE button.**

The scene number blinks while the mixer data is being stored. Wait until it stops blinking before moving any MixTab controls.

Storing a snapshot saves only the actual mixer settings. If you're using Preview or Enable mode, the stored settings may not correspond to the current MixTab settings.

Recalling a snapshot

1 **Use the digit selector and increment/decrement buttons to select the snapshot you want to recall.**

2 **Press the RECALL button again.**

The scene number blinks while the mixer data is being recalled. Wait until it stops blinking before moving any MixTab controls.

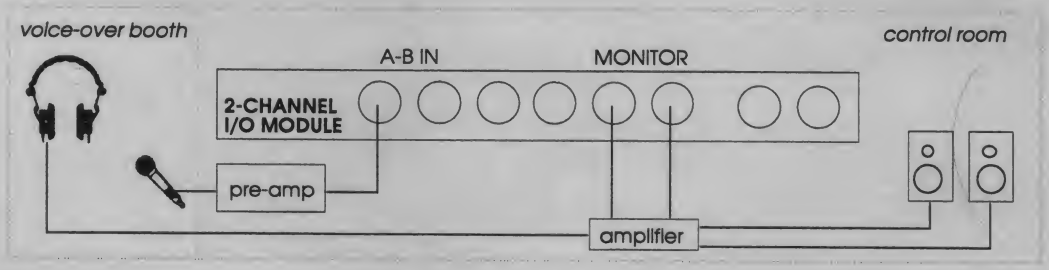
If you're using Preview or Enable mode, blinking LEDs indicate discrepancies between the stored mixer settings and the current MixTab settings. To make the settings equal, adjust each MixTab control until its LED stops blinking.

Mixing applications

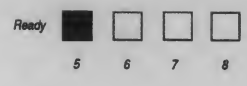
This section illustrates how to use the *Foundation 2000* mixer for overdubbing, mixdown and premixing. It also describes how to use aux sends and returns.

Overdubbing

The L-R bus is used for recording through the A-B inputs. You can use the Monitor bus to generate a separate mix for monitoring. For example, suppose you've already recorded a music bed and sound effects on tracks 1–4, and now you're ready to record a voice track. You can monitor a mix of tracks 1–4 while recording the voice on track 5.



Creating a monitor mix



1 Connect the Monitor outputs to the studio headphones and control room speakers.

2 Set up to record the voice on track 5 (connect the microphone, set the channel source, ready the track, turn on input monitoring, check the input level).



3 On the MixTab, set the DCM SELECT switch to 2 and the MODE switch to "Direct."

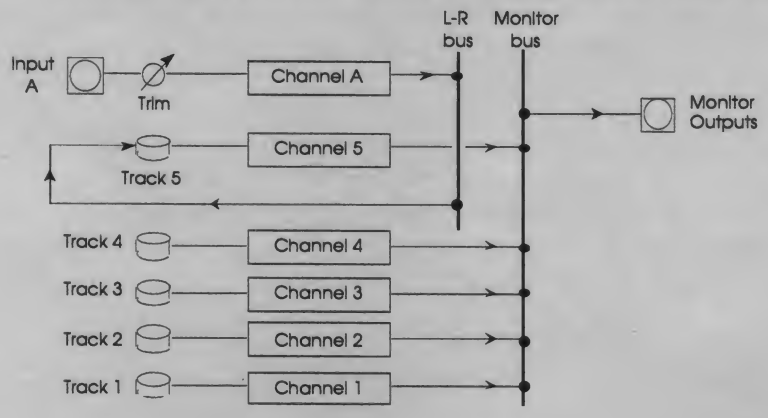
When DCM SELECT is 2, the MixTab controls monitor parameters.

4 Adjust faders 1–4 to set the levels of the music and effects channels in the Monitor mix. Adjust fader 5 to set the voice level in the Monitor mix.

5 Adjust pan knobs 1–5 to set the position of each channel in the Monitor mix.

6 Use the Master fader to adjust the overall level of the Monitor mix.

7 To display meters for the Monitor mix and the tracks, touch the Meters button on the Edit Controller screen and then touch Main.



Enhancing the voice track

You can also add EQ and adjust the input level of the voice you're recording on track 5.

1 **Make sure track 5 is ready, and input monitoring is on.**

DCM SELECT 1 2 3

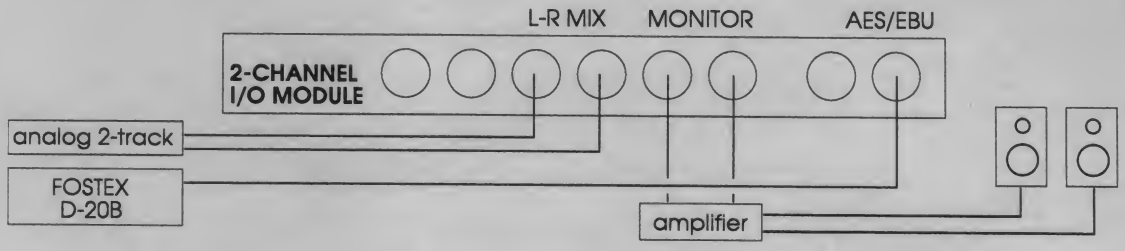
2 **On the MixTab, set the DCM SELECT switch to 3.**

When DCM SELECT is 3, the first two MixTab strips control parameters for the A-B channels.

3 **Adjust the fader and EQ knobs in strip 1 to set the level and add EQ to channel A.**

Mixdown

You can mix down audio you've already recorded on the tracks. The stereo mix is sent to both analog and digital L-R Mix outputs, which can be connected to a DAT or other mastering device. For example, suppose you want to mix down tracks 1–6.



Mixing

1 **Connect your mastering device to either the analog (L-R Mix) or digital (AES/EBU or S/PDIF) outputs in the 2-CHANNEL I/O MODULE.**

2 **Touch the Mixer button on the Edit Controller screen.**

3 **If you're using a digital output, touch the 2 Chan button and select the appropriate digital output format.**

4 **Touch the 8 Chan button and set the Channel Source for channels 1–6 to "track."**

5 **If you want to hear the L-R mix through the Monitor outputs, touch the Patch button and turn on "L-R to Mon."**

6 **To display meters for the tracks and the L-R mix, touch the Meters button and then touch Main.**

DCM SELECT 1 2 3

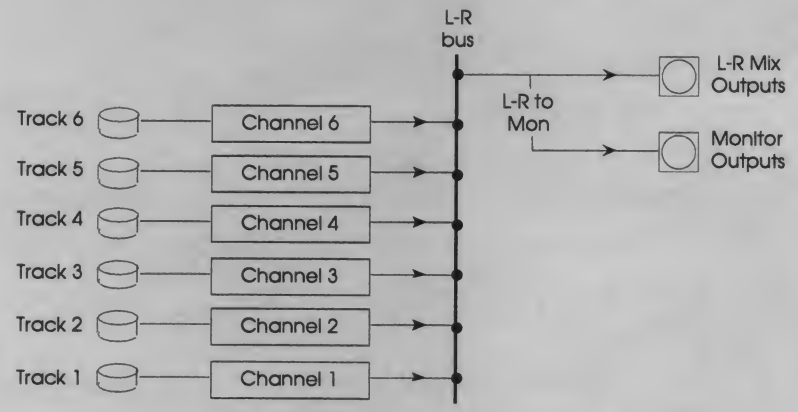
7 **On the MixTab, set the DCM SELECT switch to 1 and the MODE switch to "Direct."**

When DCM SELECT is 1, the MixTab controls channel parameters.

8 **Play back the tracks while you adjust the EQ, pans and faders for channels 1–6.**

9 **Use the Master fader to adjust the overall level of the L-R mix.**

continued ⇨



Bouncing down

You can also record the mix on two available tracks of the *Foundation 2000*. For example, you could mix tracks 1–6 and record the mix on tracks 7 and 8.



1 **Ready tracks 7 & 8.**

2 **Turn on input monitoring.**

3 **Touch the Mixer button on the Edit Controller screen.**

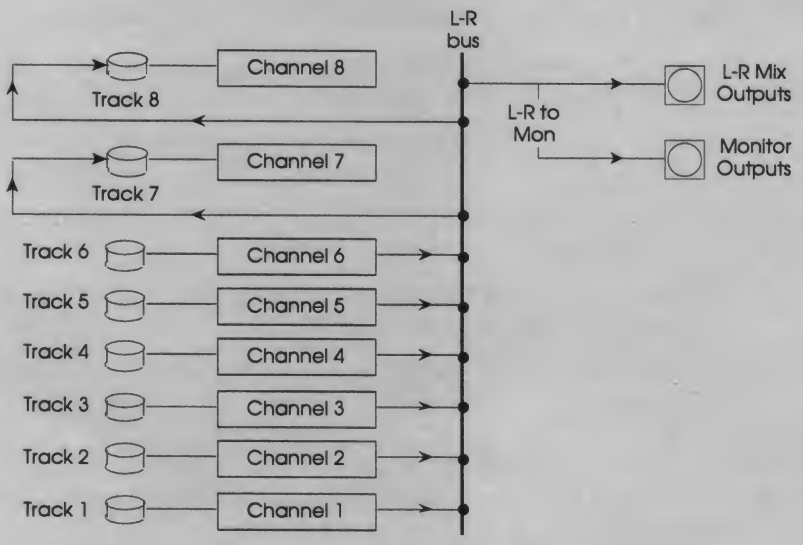
4 **Touch the 8 Chan button.**

5 **Set the Track Source for tracks 7 & 8 to "L-R."**

6 **Set up the mix as described in the previous example.**

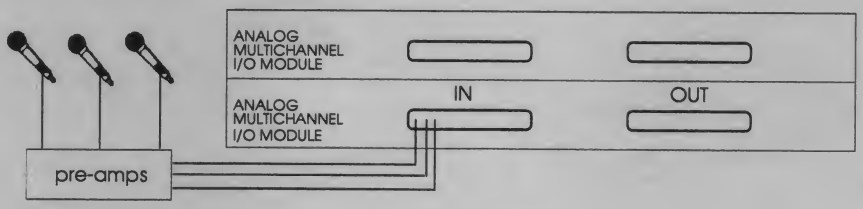
7 **Press** *Record* ● **and** *Play* ▶ **to begin recording.**

The left channel of the L-R mix is recorded on track 7. The right channel is recorded on track 8.



Premixing inputs

You can use the ANALOG MULTICHANNEL I/O MODULE to premix multiple inputs onto a single track. For example, suppose you want to premix the input from three microphones onto track 1.



Setting up

Multichannel inputs 1, 2, 3 are the first three input channels of the *bottom* ANALOG MULTICHANNEL I/O MODULE.

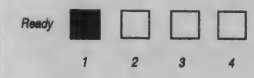
1 Connect the microphones to multichannel inputs 1, 2, 3.

2 Touch the Mixer button on the Edit Controller screen.

3 Touch the 8 Chan button.

4 Set the Channel Source for channels 1, 2, 3 to "analog."

5 Set the Track Source for track 1 to "L-R."



6 Ready track 1, and turn on input monitoring.

7 Check the level for each channel, and adjust the Trim if necessary.

8 To display meters for the tracks and the L-R mix, touch the Meters button and then touch Main.

Premixing



1 On the MixTab, set the DCM SELECT switch to 1.

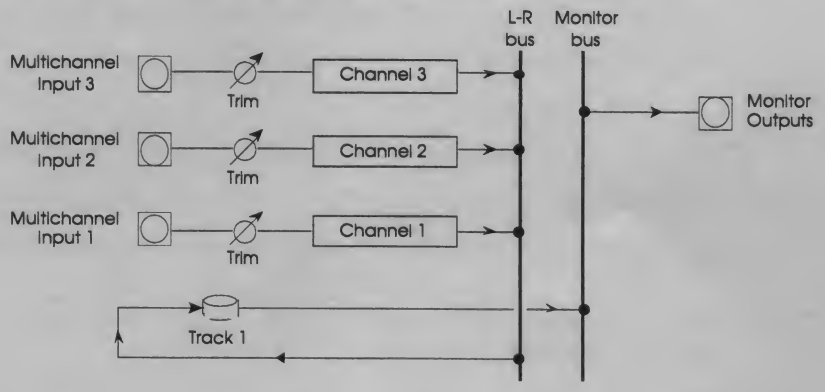
2 Adjust the EQ and faders for channels 1, 2, 3.

3 Pan all three channels to the left.

Track 1, like all odd-numbered tracks, records only the left channel of the L-R mix.

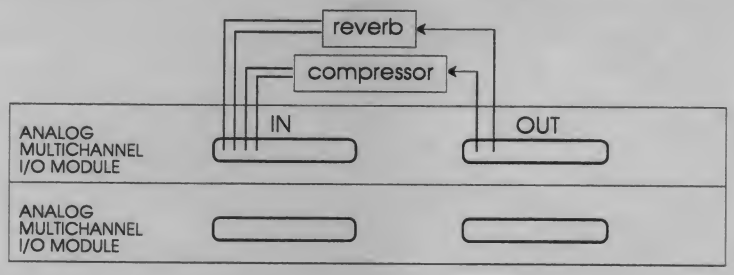
4 Use the Master fader to adjust the overall level of the L-R mix.

5 Press RECORD and PLAY to begin recording.



Aux sends and returns

Installing an ANALOG MULTICHANNEL I/O MODULE in the top I/O slot adds 2 aux sends and 4 aux returns to your *Foundation 2000* mixer.



Aux sends

Aux Sends 1 & 2 are the first two output channels of the *top* ANALOG MULTICHANNEL I/O MODULE.

1 Connect the Aux Sends to a reverb unit or other external device.

2 Touch the Mixer button on the Edit Controller screen.

3 Touch the Patch button.

4 Indicate whether you want to send each channel pre-fader or post-fader.

DCM SELECT 1 2 3

5 To meter the aux sends, touch the Meters button and then touch Aux.

6 On the MixTab, set the DCM SELECT switch to 1 and the MODE switch to "Direct."

7 Press the AUX 1/2 button to select whether the AUX knob applies to Aux Send 1 or Aux Send 2.

The LED is off when Aux Send 1 is selected, and on when Aux Send 2 is selected.

8 Turn the AUX knob to set the channel level to the selected aux send.

9 Use the AUX SEND knobs to adjust the overall levels of Aux Send 1 and Aux Send 2.

Aux returns

Each of the four aux returns can be routed to the L-R bus and/or the Monitor bus. Aux Returns 1–4 are the first four input channels of the *top* ANALOG MULTICHANNEL I/O MODULE.

1 Connect a reverb unit or other external device to the Aux Return inputs.

2 Touch the Mixer button on the Edit Controller screen.

3 Touch the Patch button.

4 Set each Aux Return routing "to Mon" and "to L-R" on or off.

DCM SELECT 1 2 3

5 To meter the aux returns, touch the Meters button and then touch Aux.

6 On the MixTab, set the DCM SELECT switch to 3 and the MODE switch to "Direct."

7 Use faders 3–6 and pan knobs 3–6 to adjust the level and pan position of the aux returns.

MIDI implementation

Function	Channel	Controller	Value
A-B Channels			
channel source	3	119–120	1=analog 3=S/PDIF (RCA) 2=AES/EBU 4=S/PDIF (optical)
trim	3	117–118	0,1=-∞ 96=unity 127=+18dB
level	3	16–17	0,1=-∞ 96=unity 127=+18dB
mute	3	16–17	0=mute
pan	3	24–25	0=left 64=center 127=right
solo	3	1–2	0=off other=solo
high EQ cut/boost	3	91–92	0,1=-18dB 64=flat 127=+18dB
high EQ center frequency	3	93–94	0,1=625Hz 64=3.5kHz 127=20kHz
high EQ bandwidth	3	95–96	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
mid EQ cut/boost	3	97–98	0,1=-18dB 64=flat 127=+18dB
mid EQ center frequency	3	99–100	0,1=125Hz 64=707Hz 127=4kHz
mid EQ bandwidth	3	101–102	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
low EQ cut/boost	3	103–104	0,1=-18dB 64=flat 127=+18dB
low EQ center frequency	3	105–106	0,1=25Hz 64=141Hz 127=800Hz
low EQ bandwidth	3	107–108	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
aux send 1 pre/post fader	3	113–114	0=post other=pre
aux send 1 level	3	109–110	0,1=-∞ 96=unity 127=+18dB
aux send 2 pre/post fader	3	115–116	0=post other=pre
aux send 2 level	3	111–112	0,1=-∞ 96=unity 127=+18dB
digital output format	3	60	0=AES/EBU other=SPDIF
Channels 1-8			
channel source	4	120–127	0=track 1=analog 2=digital
trim	4	8–15	0,1=-∞ 96=unity 127=+18dB
level	1	16–23	0,1=-∞ 96=unity 127=+18dB
mute	1	16–23	0=mute
pan	1	24–31	0=left 64=center 127=right
solo	1	120–127	0=off other=solo
destructive solo	1	112–119	0=off other=solo

continued ⇨

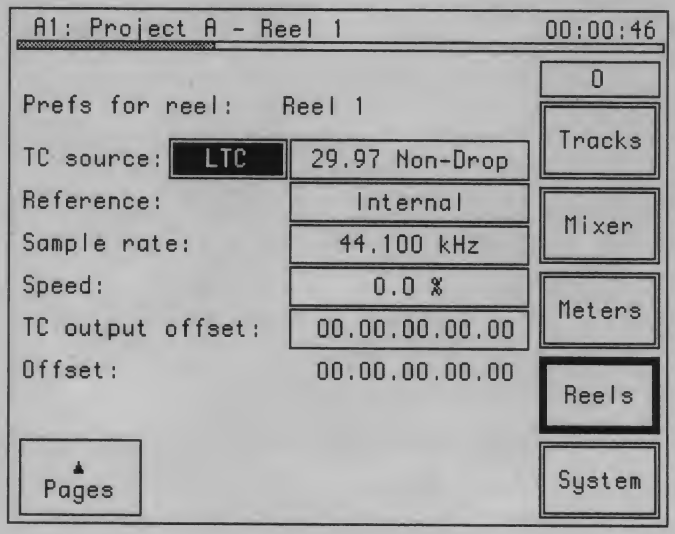
Function	Channel	Controller	Value
Channels 1-8 (continued)			
high EQ cut/boost	4	16–23	0,1=-18dB 64=flat 127=+18dB
high EQ center frequency	4	24–31	0,1=625Hz 64=3.5kHz 127=20kHz
high EQ bandwidth	4	32–39	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
mid EQ cut/boost	4	40–47	0,1=-18dB 64=flat 127=+18dB
mid EQ center frequency	4	48–55	0,1=125Hz 64=707Hz 127=4kHz
mid EQ bandwidth	4	56–63	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
low EQ cut/boost	4	64–71	0,1=-18dB 64=flat 127=+18dB
low EQ center frequency	4	72–79	0,1=25Hz 64=141Hz 127=800Hz
low EQ bandwidth	4	80–87	0–3=0.1 octave 64=1.5 octaves 127=3 octaves
aux send 1 pre/post fader	4	104–111	0=post other=pre
aux send 1 level	4	88–95	0,1=-∞ 96=unity 127=+18dB
aux send 2 pre/post fader	4	112–119	0=post other=pre
aux send 2 level	4	96–103	0,1=-∞ 96=unity 127=+18dB
track source	1	8–15	0=L-R other=direct
monitor level	2	16–23	0,1=-∞ 96=unity 127=+18dB
monitor pan	2	24–31	0=left 64=center 127=right
monitor to L-R bus	2	104–111	0=off other=on
Aux Returns 1–4			
level	3	18–21	0,1=-∞ 96=unity 127=+18dB
pan	3	26–29	0=left 64=center 127=right
solo	3	3–6	0=off other=solo
aux return to L-R bus	3	8–11	0=off other=on
aux return to Monitor bus	3	12–15	0=off other=on
Master Controls			
L-R bus master level	1	7	0,1=-∞ 96=unity 127=+18dB
Monitor bus master level	2	7	0,1=-∞ 96=unity 127=+18dB
solo aux send 1	1	4	0=off other=solo
aux send 1 master level	1	74	0,1=-∞ 96=unity 127=+18dB
solo aux send 2	1	5	0=off other=solo
aux send 2 master level	1	75	0,1=-∞ 96=unity 127=+18dB
L-R bus to Monitor bus	1	6	0=off other=on
Dump request	4	1	127
Scene store	4	2	scene #s 0–99

SYNCHRONIZATION

Synchronization preferences 135
The sync reference 136
Machine control 137
Foundation 2000 as a controller 137
Controlling a Foundaiton 2000 139
General Purpose Interface (GPI) 140
Timecode 141
SMPTE format 141
Timecode offsets 142
Chase 144
Status lights 144
Digital transfer 145
Sync reference 145
Transferring audio 146
De-emphasis 148

Synchronization preferences

Each reel has synchronization parameters which are set from the *Prefs* page of the *Reels* display. You can change the preferences of an individual reel, or the default reel, by selecting the reel and opening its preferences. (For more information on the default reel, see the chapter "Project Management.")



Reel Preferences

Setting	Definition	Options
TC Source	Timecode port	LTC, VITC
	Timecode format	30 Non Drop, 30 Drop, 29.97 Non Drop, 29.97 Drop, 25 fps, 24 fps
Reference	Select incoming synchronization reference	Word Clock, Timecode, Video, Digital In, Internal
Sample rate	Record or playback sample rate of the reel.	32, 44.056, 44.1, 44.144, 48 and 48.048 kHz
Speed	Varispeed adjustment for recording and playback.	± 12.5 %
TC output offset	Timecode offset between internal Foundation 2000 time and timecode output.	00:00:00:00—23:59:59:29
Offset	Timecode offset between incoming timecode and internal Foundation 2000 time.	00:00:00:00—23:59:59:29 Set using the *Offset* button on the keypad.

The sync reference

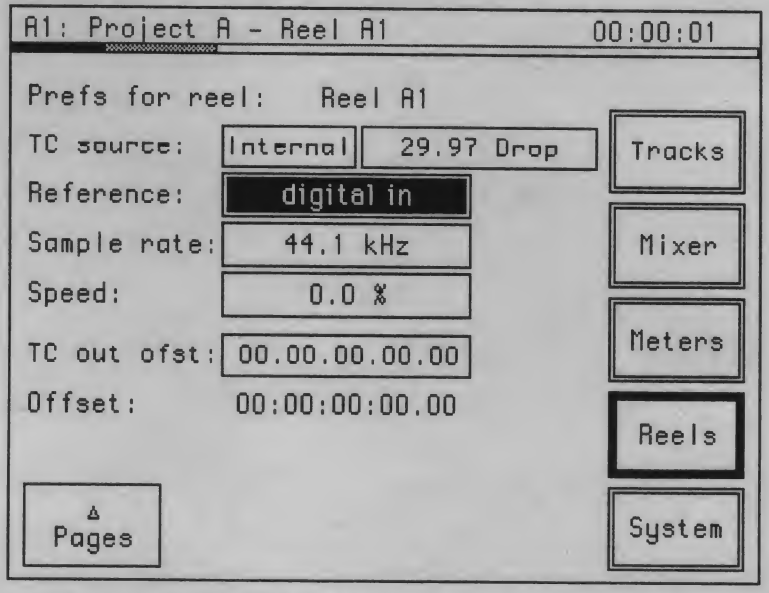
The type of sync signal you use depends on the type of work you are doing.

Name	Function
Video Sync	Composite video or black burst video input
Timecode	LTC or VITC input
Word Clock	Word clock signal
Digital In	AES/EBU or SPDIF input
Internal	Foundation 2000 internal clock reference

Setting a sync reference

1 **Touch the Reels button and make sure the mounted reel is selected.**

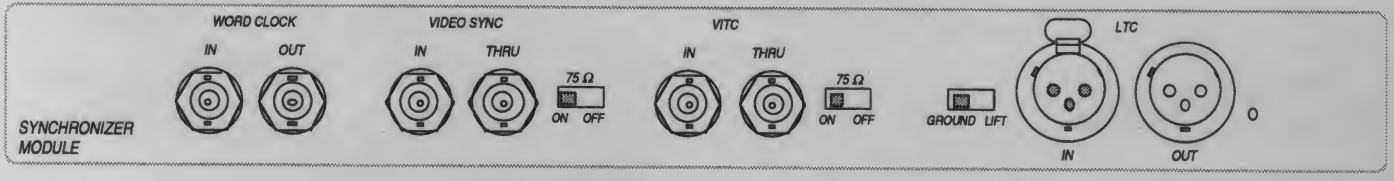
2 **Touch the Pages button and then Prefs.**



3 **Open the Reference field and select the appropriate sync reference.**

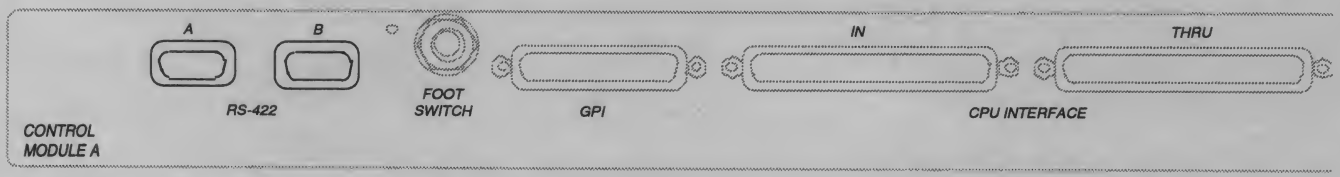
4 **Connect the sync source to the appropriate *Foundation 2000*'s sync port.**

There are four connectors on the back of the Main Unit SYNCHRONIZER MODULE that are used to receive and transmit sync signals: Word Clock, Video Sync, VITC, LTC and Internal. The "Reference" that you set indicates which of these connectors your *Foundation 2000* looks to for its sync signal.



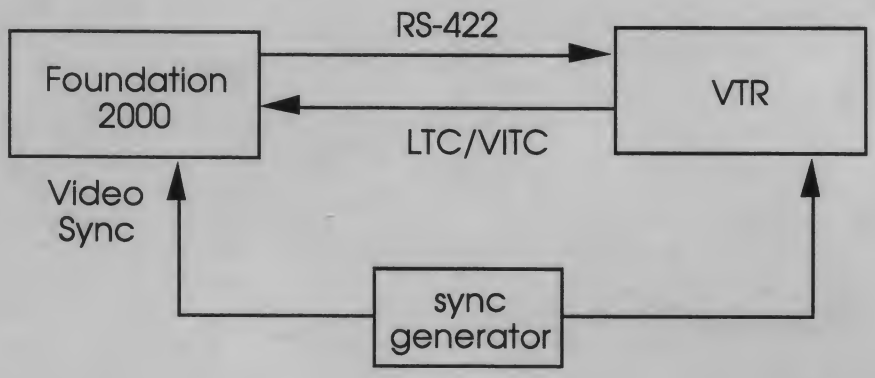
Machine control

Machine control is the ability to control external devices or to be controlled by external devices. *Foundation 2000* can do either, using the dual 9-pin RS-422 Sony serial protocol connectors on the Main Unit's CONTROL MODULE A.



Foundation 2000 as a controller

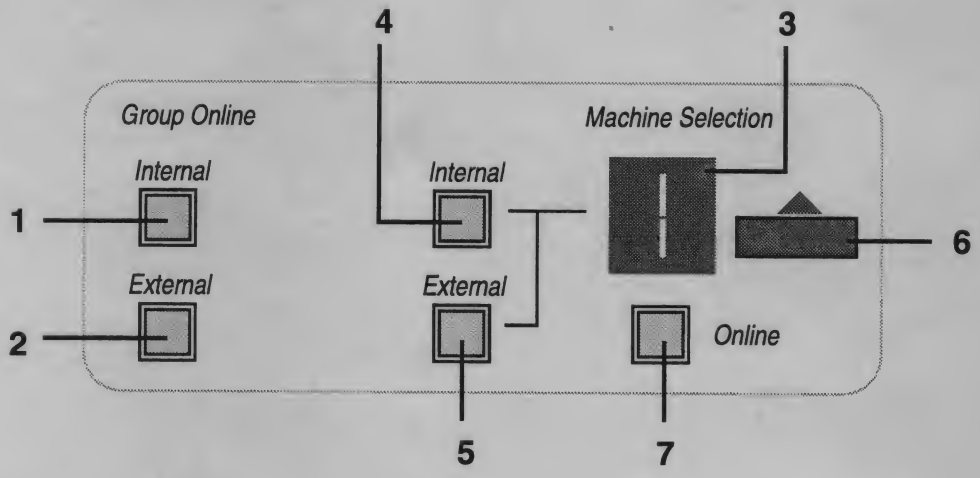
The *Foundation 2000* can control an external device, such as a video deck or a DAT machine, by connecting the *Foundation 2000*'s RS-422 A port to the external device's RS-422 in port.



A group of buttons located in the upper left corner of the *Foundation 2000*'s Edit Controller are used for putting devices online so that they can be controlled via RS-422, or for taking them offline, which means that they do not respond to commands executed by *Foundation 2000* via RS-422.



When the videodeck locates, Foundation 2000 locates to the beginning (zero subframes) of the same video frame. Likewise, once the jog/shuttle knob is released, Foundation 2000 cues up to the beginning of the frame at which the videotape is paused.



Button	Name	Function
1	Group Online Internal	Toggles *Foundation 2000*s online and offline. (Currently, only one unit can be online.)
2	Group Online External	Toggles external machines, such as video recorders and editors, online and offline. (Currently, only one unit can be online.)
3	Number Display	Displays which individual external/internal machine is selected.
4	Machine Selection Internal	When lit, number display designates which *Foundation 2000* is controlled. (Currently, only one *Foundation 2000* can be online.)
5	Machine Selection External	When lit, number display designates which individual external machine is selected.
6	▲	Increments machine number. (Currently, only one external or internal machine can be online.)
7	Machine Selection Online	Toggles selected machine—indicated by internal/external buttons and machine number—online or offline; lit indicates online.



Since currently only one external and one internal (Foundation 2000) *machine can be connected, only buttons 1 and 2 are used frequently.*

Group Online
Internal
External
External machine online

Setting up to control an external machine

1 **Connect the external machine's RS-422 port to the *Foundation 2000*'s RS-422 A port.**

2 **If it is not lighted, press and light Group Online** (Internal) ☐

This assures that the *Foundation 2000* is online.

3 **Press and light Group Online** (External) ☐

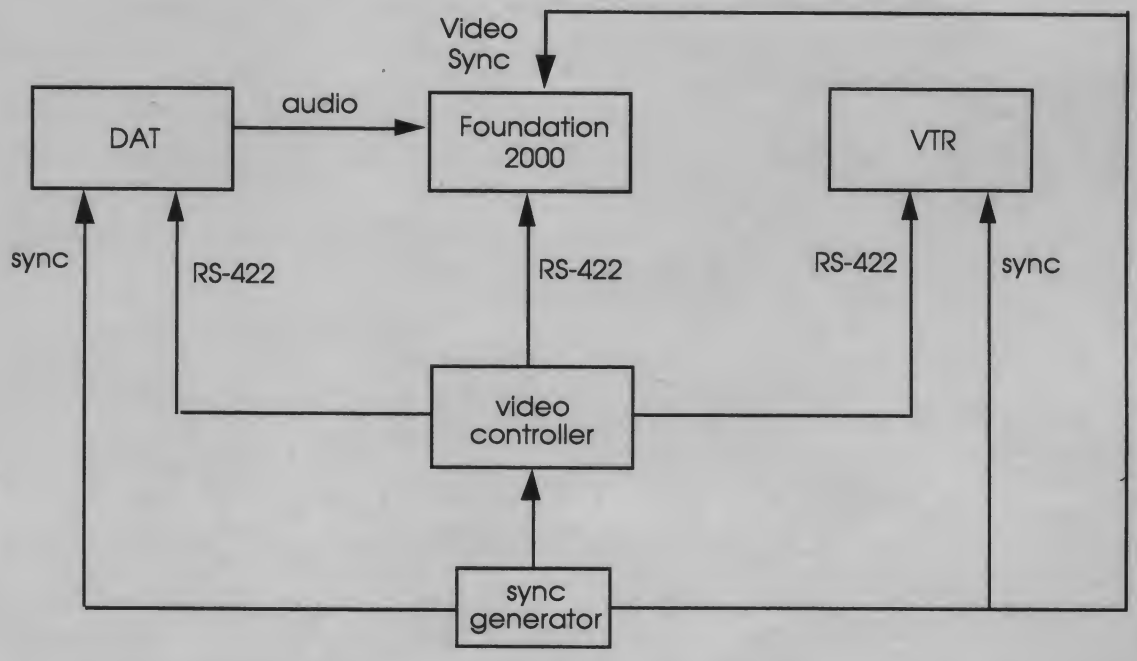
This puts the external machine online.

Group Online
Internal
External
External machine offline

4 **When you want to take the external machine offline temporarily, press Group Online** (External) ☐ **again to turn it off.**

Controlling *Foundation 2000*

The *Foundation 2000* can be controlled by an external machine, such as a video controller, by connecting the *Foundation 2000*'s RS-422 B port to the external device's RS-422 out port.



If Foundation 2000 is being controlled by an external video edit controller, Foundation 2000 performs edits at exact frame boundaries (zero subframes).

A three-state *Local/Remote* button located on the front panel of the Main Unit controls the Foundation 2000's responsiveness to commands from an external machine.

Setting the Local/Remote state

- **Press the Local/Remote button on the front of the Main Unit to toggle through the three states described below. LEDs indicate which state is selected. When Local and Remote are both selected, both LEDs are lit.**

State	Function
Local control	*Foundation 2000* does not respond to commands from the external machine. *Foundation 2000* does respond to commands executed by pressing its own buttons.
Remote control	The external machine controls *Foundation 2000*. *Foundation 2000* does not respond to its own button commands.
Local & Remote control	*Foundation 2000* responds to commands from the external machine as well as from its own buttons.

General Purpose Interface (GPI)

You can use an external switch panel to control the *Foundation 2000* through the General Purpose Interface (GPI) connector on CONTROL MODULE A. Currently, eight GPI input functions are available; the GPI output functions are not yet implemented.

Each GPI input is triggered by applying ground (0 volts) to the GPI input pin. Most GPI inputs perform a single action whenever they are triggered.



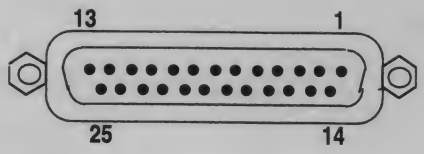
The Foundation 2000 *Service Manual describes how to create custom switch panels for the GPI inputs.*

GPI
General Purpose Interface for triggering Edit Controller functions.

GPI Inputs	Pin #	Function
Stop	4	Stops transport.
Play	16	Plays at 1x.
Rewind	17	Plays in reverse at 4x.
Fast Forward	18	Plays forward at 4x.
Punch In/Out	14	Toggles recording on and off.
Locate	6	Locates to the time in the edit time display.
In	19	Sets the In point to the current time.
Out	20	Sets the Out point to the current time.

GPI Outputs	Pin #
not yet implemented	21, 9, 22, 10, 11, 24, 12, 25

Common Pins	Pin #
VCC	15
Ground	1, 5, 13, 23
Reserved	2, 3, 7, 8



Using the GPI inputs, the *Foundation 2000* can be controlled by devices that are not capable of RS-422 machine control. The GPI inputs can also be connected to foot switches, and other devices that act as a single-pole, single-throw switch electrically.



Never connect the GPI inputs to negative voltages or voltages greater than 5 volts DC. Damage to your Foundation 2000 *could result.*

Timecode

SMPTE format

Foundation 2000 can read and generate various SMPTE timecode formats: 24 fps (frames per second), 25 fps, 30 fps Non Drop, 30 fps Drop, 29.97 Non Drop, 29.97 Drop. You set the SMPTE source and format from the *Prefs* page of the *Reels* display.

Setting the SMPTE source and format

1. **Touch the Reels button and select a reel.**
2. **Touch the Pages and then Prefs buttons.**
3. **Open the first "TC source" field and select the type of timecode that you are using.**



4. **Open the second "TC source" field and select the timecode format.**



Timecode offset

There are two offsets that you can set: the offset to the incoming timecode and the offset applied to the outgoing timecode. The incoming offset synchronizes the position of the *Foundation 2000* relative to an external machine's timecode when *Foundation 2000* is in chase mode.

Setting an incoming timecode offset

Offset
User-defined numerical difference between the running timecodes of two machines.

1 **Locate the controlling device to a time.**

2 **Locate the *Foundation 2000* to the time at which you want it to sync up with the external device.**

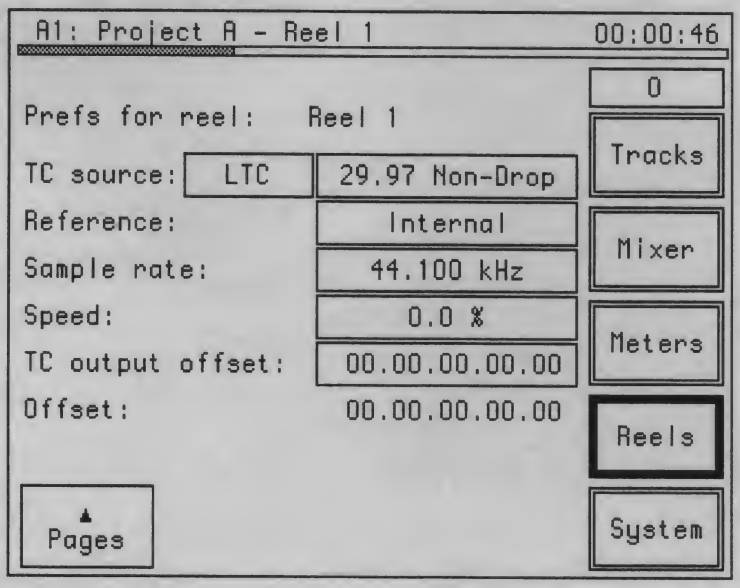
3 **Press** ○ *Offset*, *Hold* **and then** ○ *Offset* **again.**

The two machines are locked in a time relationship.

4 **Touch the Reels button and make sure the mounted reel is selected.**

5 **Touch the Pages and then Prefs buttons.**

The amount of time that the two machines are offset from each other is shown in the "Offset" field. This is a display field only; it cannot be selected and changed. To change the offset, repeat Steps 1-3 above.



Setting an offset from the keypad

1 **Press** *Hold* **and then** ○ *Offset*

The offset time appears in the Edit Time field.

2 **Edit the time using the keypad buttons.**

3 **Press** ○ *Store* **and then** ○ *Offset*

Setting a timecode output offset

The output offset synchronizes an external machine which is chasing *Foundation 2000*.

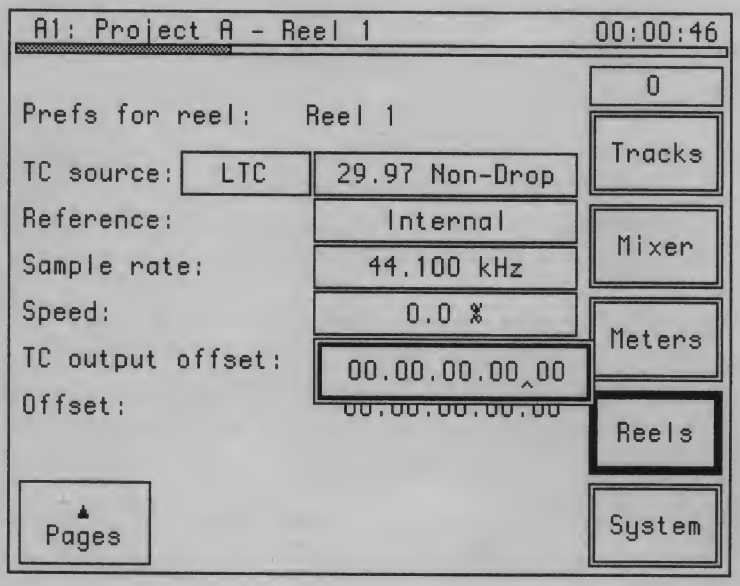
1 **Locate *Foundation 2000* to a time.**

2 **Enter the corresponding time on the external machine into the Edit Time field.**

4 **Touch the Reels button.**

5 **Touch the Pages and then Prefs buttons.**

6 **Open the "TC output offset" field by pressing** *Data*



7 **Press** *Hold*

The timecode offset is entered into the "TC output offset" field.

8 **To edit the offset time, use the** + **and** − **buttons.**

9 **Close the "TC output offset" field by pressing** *Data* **again.**

Chase

Chase ☐

When *Chase* button is activated, the *Foundation 2000* Edit Controller follows the incoming timecode reference from an external machine, such as a video recorder.

Locking to an external machine

Chase

■ **Press** ☐

The button lights. *Foundation 2000* locks to the timecode entering the LTC or VITC port. If an offset it set, this is included in the display time.

Chase
The ability to lock and sync playback to incoming timecode.

During the time that it takes for the two machines to lock up, the *Lock* LED blinks. When the two machines are locked and in sync, the *Lock* LED lights solid.

● *Timecode* ○ *Word Clock* ○ *Video Sync* ● *Lock*



If you take the Foundation 2000 *out of Chase, it does not following the timecode reference of the external machine. Consequently, the two machines are no longer in sync.*

Status lights

When *Foundation 2000* is receiving a sync signal, the status of that signal is indicated by a row of LEDs under the time displays.

○ *Timecode* ○ *Word Clock* ○ *Video Sync* ○ *Lock*

Name	Indication
Timecode	Timecode signal is received at the LTC or VITC input. Blinks if drop-out occurs or timecode sent does not match timecode expected.
Word Clock	Word clock signal is received at Work Clock or digital input. Blinks if drop-out occurs or sampling rate is not correct. Slow blinking: due to improperly set channel status bits, data errors may be occurring during an AES/EBU digital transfer.
Video Sync	Sync signal is received at Video Sync input. Blinks if reference is set to House Sync or Timecode and no sync signal is received.
Lock	Indicates *Foundation 2000* is in Chase and tracking LTC or VITC. Blinks if timecode drifts from selected sync reference signal.

The status lights have four states:

State	Meaning
off	No signal is present at the input.
lit solid	A signal is present at the input.
fast blinking	Error condition. Sync signal is expected but not present, or in error.
slow blinking	Error condition concerning digital transfer. Word Clock only. (See previous page)

Digital transfer

Foundation 2000 can act as the source or destination device during the digital transfer of audio. The ability to accurately transfer audio between digital devices means that you can record mixes or tracks on *Foundation 2000* to another digital device, and you can transfer audio from a digital device, such as a DAT with a digital input, to *Foundation 2000.*

Sync reference

The sync reference determines the word clock source during transfer. *Foundation 2000* can act as either the master clock source, or it can reference an external sync source.

Setting the sync reference

Sync reference
Source of word clock during a transfer.

1 **Touch the Reels button and make sure the mounted reel is selected.**

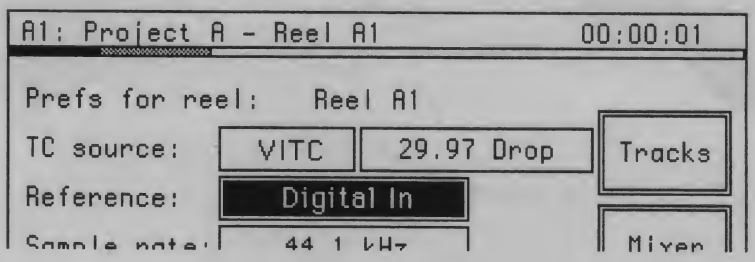
2 **Touch the Pages and then Prefs buttons.**

3 **Open the "Reference" field and select "Digital In" or "Word Clock."**

If you select Word Clock, you must connect the word clock output from an external device to the word clock input on the 2-CHANNEL I/O MODULE.

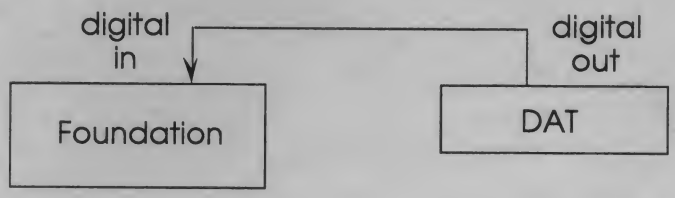
OR

If you select Digital Input, you must connect an audio cable to one of the AES/EBU or SPDIF inputs on the 2-CHANNEL I/O MODULE.



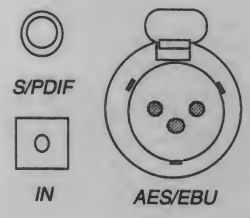
Transferring audio

Digital audio can be transferred to *Foundation 2000* in AES/EBU or SPDIF formats.



Transferring digital audio to *Foundation 2000*

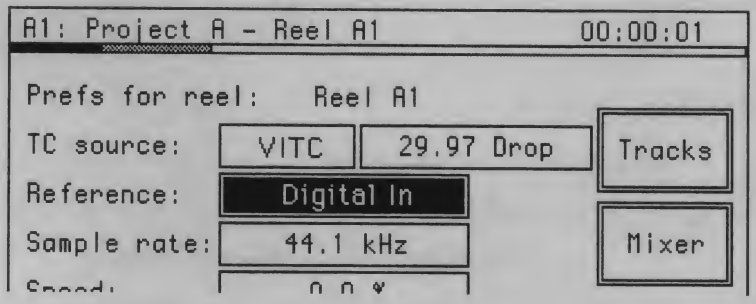
1 Connect the source machine's digital output to the *Foundation 2000*'s digital input.



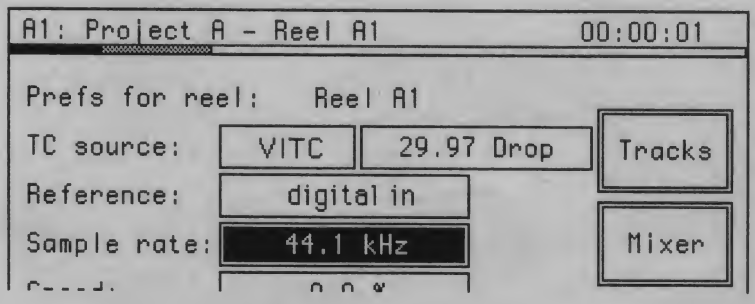
2-CHANNEL I/O MODULE digital input

port	connector type
AES/EBU In	XLR
SPDIF In	RCA or Optical

2 Set the sync reference to "Digital In" (see above).



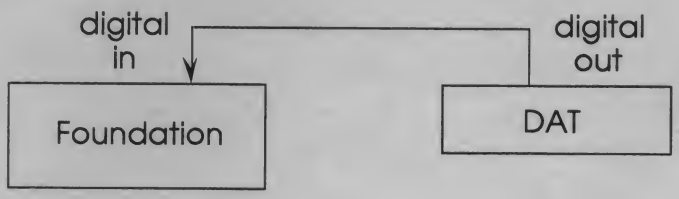
3 Set the "Sample rate" field to the rate of the digital input.



continued ⇨

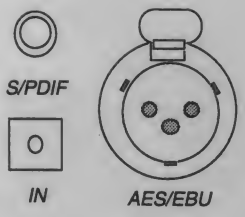
Transferring audio

Digital audio can be transferred to *Foundation 2000* in AES/EBU or SPDIF formats.



Transferring digital audio to *Foundation 2000*

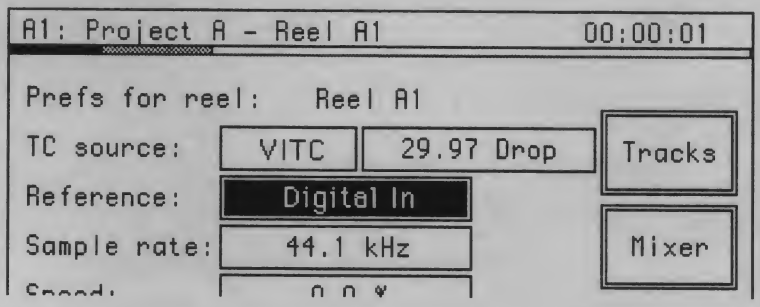
1 Connect the source machine's digital output to the *Foundation 2000*'s digital input.



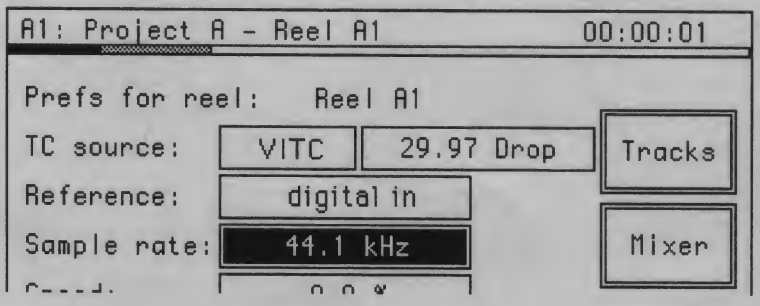
2-CHANNEL I/O MODULE digital input

port	connector type
AES/EBU In	XLR
SPDIF In	RCA or Optical

2 Set the sync reference to "Digital In" (see above).

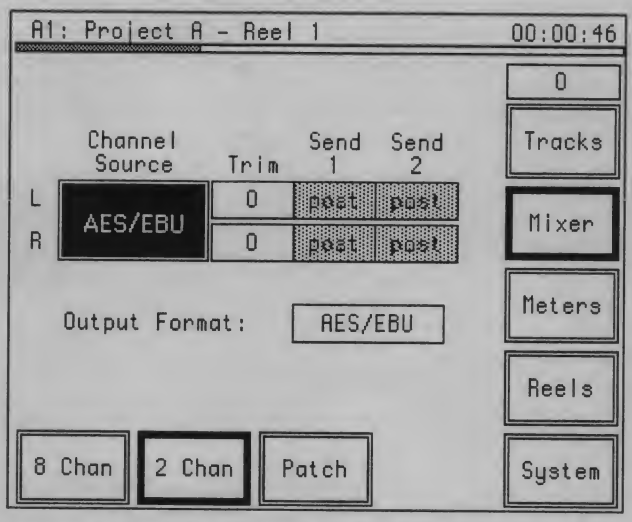


3 Set the "Sample rate" field to the rate of the digital input.



continued ⇨

4 **Touch Mixer and display 2 Chan view.**



5 **Open the "Channel Source" field and select the appropriate digital input connector.**

6 **Ready the *Foundation 2000* tracks on which you want to record.**

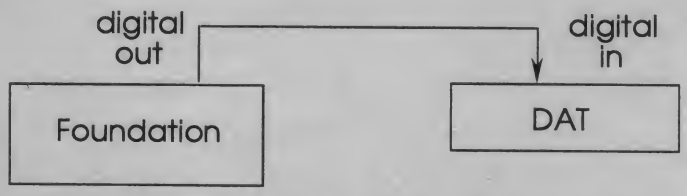
7 **Press** *Record* ● **and** *Play* ▶ **on the *Foundation 2000* to start recording.**

8 **Put the source machine into play.**

9 **Press Stop on both machines when you are finished transferring audio.**

Transferring digital audio from the *Foundation 2000*

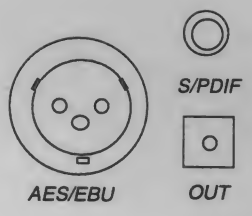
All audio on the L-R bus is sent out the digital output port of the *Foundation 2000*. When transferring from the *Foundation 2000* to an external device, only the audio is transferred.



1 **Connect one end of the cable to the appropriate digital audio output port of the *Foundation 2000*.**

2-CHANNEL I/O MODULE digital output

AES/EBU	Plug an XLR cable into the AES/EBU Out port.
SPDIF	Plug an RCA cable into the SPDIF Out port.
SPDIF(O)	Plug an optical connector into the SPDIF Out optical port.

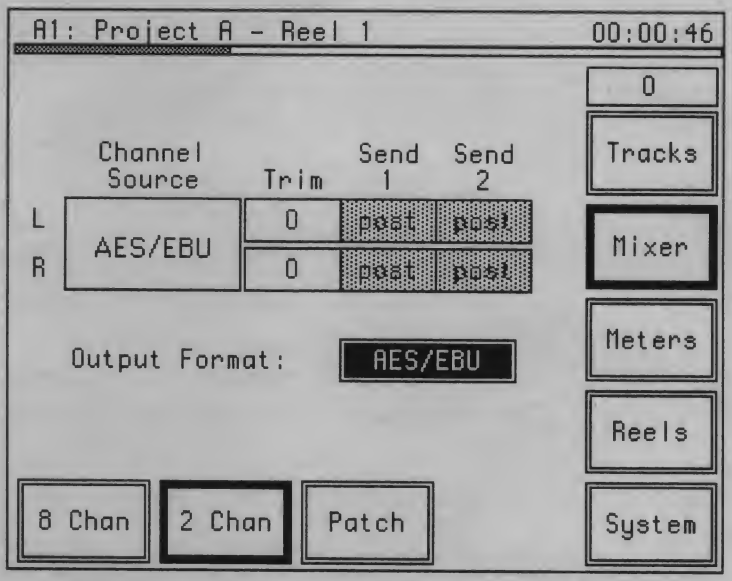


continued ⇨

2 **Connect the other end of the cable to the destination machine's digital audio input port.**

3 **Set the destination device to external clock.**

4 **Touch Mixer and display 2 Chan view.**



5 **Open the "Output Format" field and select the appropriate digital format.**

6 **Record enable tracks on the destination device.**

7 **Put the destination device into record.**

8 **Press** Play ▶ **on the *Foundation 2000*.**

9 **Press Stop on both machines when you are finished transferring audio.**



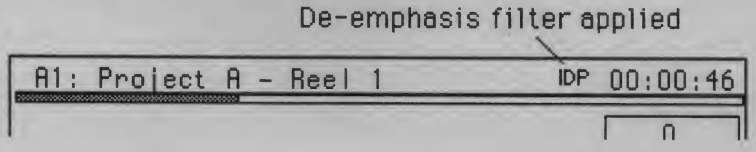
If you do not want to mix all tracks onto the L-R bus for a transfer, solo only the tracks that you want to transfer. Only soloed tracks are sent to the L-R bus.



In order to preserve U/C data, only transfer one pair of tracks at a time to the destination device. Otherwise, the U/C data is stripped from the signal as the tracks are mixed and transferred to the external device.

De-emphasis

When digitally transferring audio, *Foundation 2000* applies a filter, called Intelligent De-emphasis Process (IDP)™, to the audio data stream. IDP detects if emphasis is on and de-emphasizes the digital audio signal before it is stored to disk. The emphasis bit is turned off. When the IDP filter is being applied, the IDP icon appears in the status bar next to disk time.

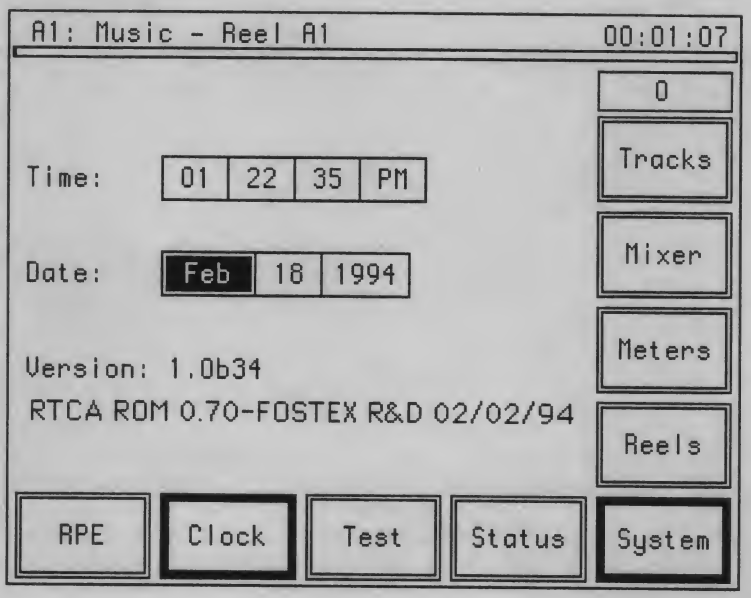


Time and date

The *System Clock* display allows you to set the current time and date. It also displays the version number of the application software installed in the Main Unit and the version number of the RTCA ROM, the chip that contains the software necessary for booting the system.

Setting the current time and date

1 Touch the System button and then Clock.



2 Select the time or date entry.

3 Press *Data* **to open.**

4 Press the arrow keys to increment or decrement the time or date.

5 Press OK when you are done.

Loading the datacard

The datacard contains a copy of *Foundation 2000* software. The Main Unit comes with the current software already loaded; you do not need to load software from the datacard unless you encounter a software problem, or you receive a software update.

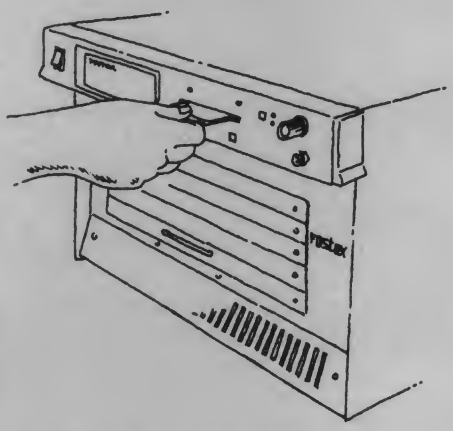
You have a choice of either running the software resident in RAM, running the software off the datacard, or replacing the sotware in RAM with the software on the datacard.

Replacing software

Software updates are distributed to customers on a datacard. When you receive a software update, you will want to replace the software in RAM with the software update on the new datacard. Once the software is loaded, you do NOT need to use the datacard again when starting up.

1 **Power down *Foundation 2000*.**

2 **Insert the datacard all the way into the datacard slot on the front of the Main Unit.**



3 **Turn the power on.**

4 **During power up, press and hold the LOAD button next to the datacard slot until the LOAD button lights. This may take a minute.**

5 **Press the EJECT button next to the datacard slot when you are ready to eject the datacard. This can be done any time after software is finished loading.**

Running software off the datacard

Sometime you may want to temporarily run the software on the datacard, without replacing software in RAM. For example, if you want to try out new software, or it seems your installed software is corrupted in some way. Running the software from the datacard does not permanently replace the software in RAM; it just temporarily supercedes it. The next time you power up without the datacard, the software in RAM is used.

1 **Power down *Foundation 2000*.**

2 **Insert the datacard all the way into the datacard slot on the front of the Main Unit.**

3 **Turn the power on.**

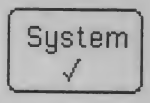
4 **Leave the card in the datacard slot until the software is booted up. (The Edit Controller screen displays the current reel.)**

5 **Press the EJECT button next to the datacard slot to unload the datacard.**

Status messages

Status messages explain the state of the machine or errors which may have occurred during operation. Status messages appear on the *System Status* display. when a new status message is posted to the display, a check mark appears in the *System* button to alert you.

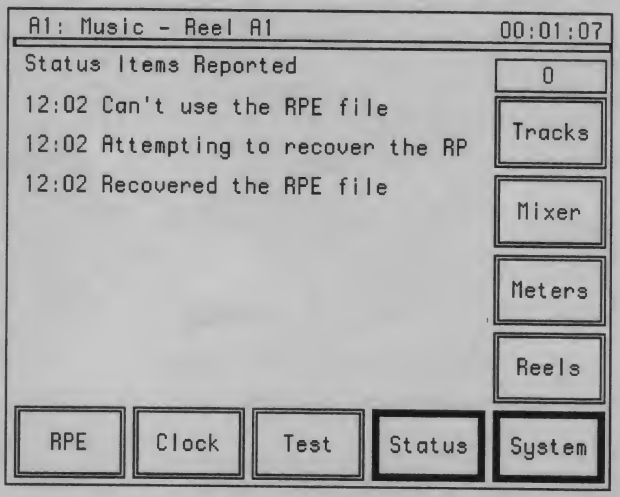
Displaying status messages



1 **When a new status message is posted, a check mark appears in the System button.**

2 **Touch the System button and then Status.**

A list of status messages appears on the screen.

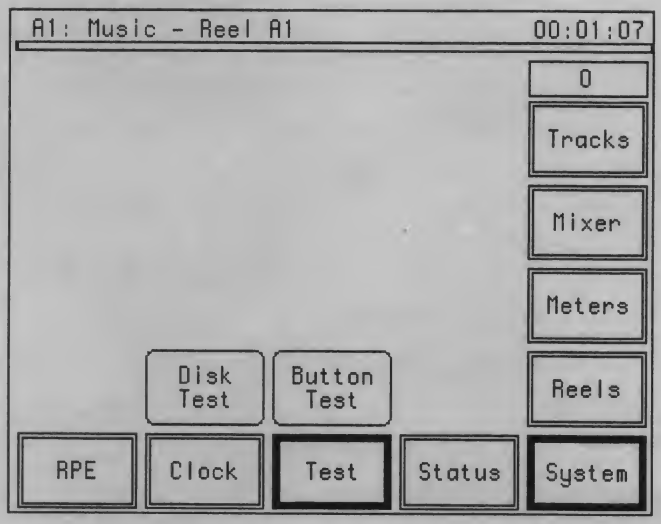


2 **For further information about a specific status message, touch the status message and press** *Data* ☐

Diagnostics

Diagnostic tests are designed to test the internal workings of the Edit Controller and Main Unit. You do not have to be a service representative to run these tests. The diagnostic tests are on the *System Test* display.

Diagnostics	Description
Disk Test	Tests the playback and record capacity of a disk. WARNING: This test erases your disk.
Button Test	Tests all touch screen and Edit Controller buttons as well as all LEDs.



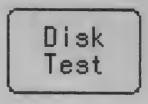


Running the Disk Test

The Disk Test erases your disk, and tells you its playback and record capacity. Be careful when running this test. You can lose information that cannot be recovered.

1 **Touch the System button and then Test.**

2 **Touch Disk Test.**



The following message appears:

This test tells you the average number of tracks that your disk can play or record. The test erases your disk. It takes 1 to 2 hours.

3 **Touch OK.**

The following message appears:

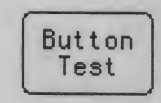
WARNING: This ERASES your disk and can take a couple of hours. Press CANCEL to abort.

4 **Touch OK to continue, or Cancel to abort.**

Running the Button Test

The Button Test runs several test concurrently. It tests the screen buttons and the Edit Controller buttons and LEDs.

1 **Touch the System button and then Test.**



2 **Touch Button Test.**

All functional LEDs light.

All functional Edit Controller buttons beep when you press them.

The touch sensitive display is made up 120 buttons arranged in a 10x12 grid. Not all of these buttons are active all the time, but during the diagnostic they all should light when you touch them.

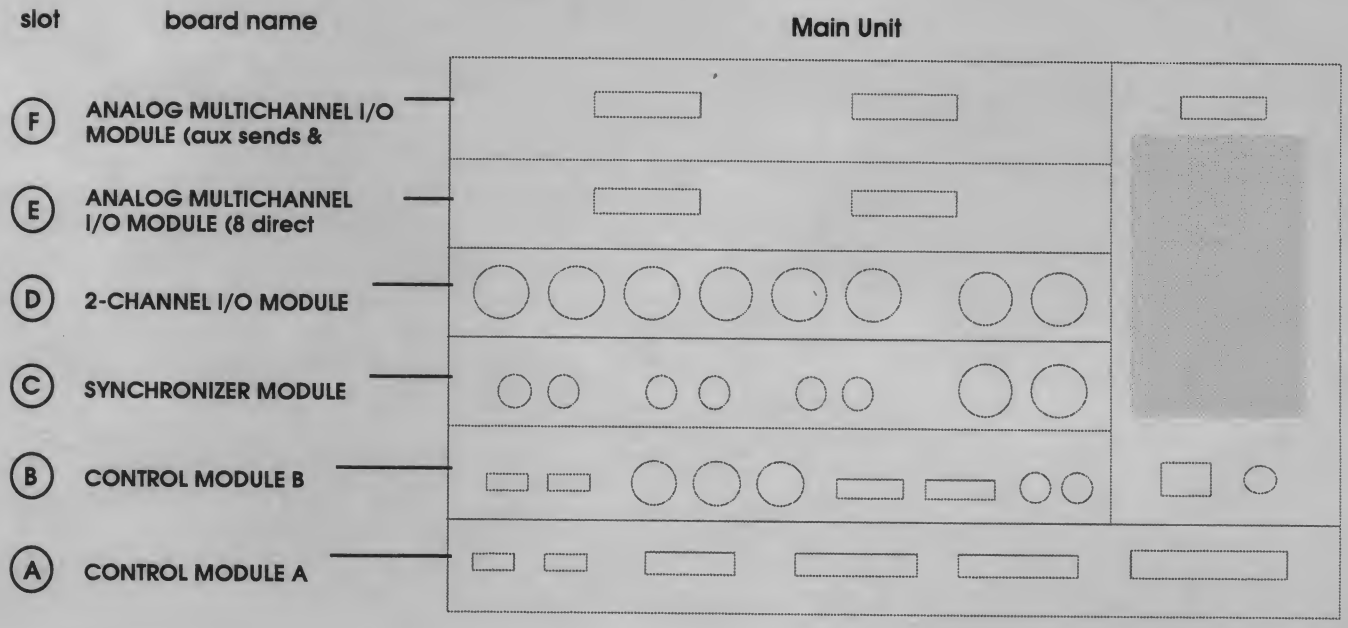
If any of the above buttons or LEDs does not respond as described above, there is a problem with it.

3 **Touch the OK button in the lower right corner of the display to stop the test.**

Main unit module placement

The circuit board modules installed in the rear of the Main Unit must be placed in a specific slot configuration. The proper slot configuration is shown below. The modules will not work if placed in a different configuration.

The Analog Multichannel I/O module functions differently depending on whether it is installed in slot 5 or slot 6. If it is installed in slot 5, it provides 8 direct inputs and 8 direct outputs. If it is installed in slot 6, it provides 2 aux sends and 4 aux returns.



SPECIFICATIONS

General specifications 159
Audio specifications 160
Analog audio I/O 160
Digital audio I/O 160
Synchronization 161
Word clock 161
Video sync 161
VITC 161
LTC 161

General specifications

Sampling rates	32kHz (with varispeed ±1.0%) 44.056, 44.1, 44.144kHz, 47.592, 48, 48.048kHz (with varispeed ±12.5%)
Internal ssmple clock accuracy	10 ppm
Emphasis	Intelligent De-emphasis Processing (IDP™) automatic de-emphasis on input; no emphasis on output
Power requirements	110–240V; 50/60Hz
Power consumption	600W maximum
Operating environment	
temperature	0–29°C (32–85°F)
humidity	20–80%
Dimensions	
Main Unit (6U)	482 x 590 x 290mm (19 x 23 x 11.5in)
Edit Controller with armrest	482 x 285 x 87mm (19 x 11.3 x 3.5in)
Weight	
Main Unit	29kg (64 lb)
Edit Controller with armrest	4.5kg (10 lb)
RPE	
cartridge dimensions	125mm x 211mm x 38mm (4.9 x 8.3 x 1.5in)
recording media	Seagate ST3610N
disk capacity	525MB formatted
storage time	about 45 stereo minutes, expandable with additional or larger disks
interface	SCSI
audio channels per drive	16
Archival devices	
recording media	WangDAT (model 1300, 3100, 3200) 4mm tape, ExaByte (model 8200SX) 8mm tape
capacity	1.3GB WangDAT, 2.5GB ExaByte
interface	SCSI
Datacard	
compliance	PCMCIA
capacity	1 MB
Edit Controller	
cable type	shielded twisted pair
cable length	7.62m (25 ft); maximum 76.2m (250 ft)

continued ⇨

Interfaces	
machine control	2 DB-9 connectors, Sony 9-pin protocol
MIDI	in, thru, out
GPI	DB-25 and 1/4" phone jack for foot switch
serial	2 DB-9 connectors, RS-422 or RS-232
ASCII keyboard	5-pin DIN connector
audio I/O expansion	2 DB-37 connectors for cascaded audio bus
CPU interface	2 DB-37 connectors for computer interface
SCSI/SCSI 2	50-pin connector

Audio specifications

Analog audio I/O

Number of channels	
2-CHANNEL MODULE	2 inputs; 4 outputs
MULTICHANNEL MODULE	8 inputs; 8 outputs
Frequency response	20Hz to 20kHz (+0.1dB, -0.6dB)
Nominal level	
2-channel module	+4dBu/-10dBV; can be calibrated
Multichannel module	+4dBu; can be calibrated
Maximum level	+22dBu
Dynamic range	94dB
THD	0.007% @ 1kHz, +18dBu
Signal-to-noise ratio	100dB
Input impedance	greater than 10kΩ
Output impedance	less than 50Ω
Connector	
2-CHANNEL MODULE	balanced XLR; pin 2 is hot, switchable to pin 3 hot
MULTICHANNEL MODULE	balanced DB-25; pin 2 is hot
A/D converter	18-bit oversampling converter, 64 Fs, digital anti-aliasing filter
D/A converter	18-bit interpolating converter, 8 Fs, digital anti-imaging filter

Digital audio I/O

Data formats	AES/EBU, SPDIF
Channel status implementation	automatic emphasis detection
Connector	XLR, RCA or Toslink optical

Synchronization

Word clock

Signal levels	TTL compatible
Signal type	50% duty cycle signal at sample frequency
Input impedance	75Ω
Output	loop through or internal word clock
Output impedance	drives a 75Ω line
Connector	BNC

Video sync

Input signal type	composite video, negative sync; NTSC, PAL or SECAM
Input level	0.5–2.0Vp-p
Input circuit	unbalanced; 75Ω or high impedance (10kΩ) switchable on panel
Output	loop through
Connector	BNC

VITC

Formats	SMPTE/EBU VITC; 24, 25, 29.97, 30 fps; non-drop and drop frame
Input signal type	composite video, negative sync; NTSC, PAL or SECAM
Input level	0.8–1.2V p-p
Input circuit	unbalanced; 75Ω or high impedance (10kΩ) switchable on panel
Output	loop through
Connector	BNC

LTC

Formats	SMPTE/EBU LTC; 24, 25, 29.97, 30 fps; non-drop and drop frame
Speed	wideband timecode reader; 1/30 to 32 times play speed
Input level	100mV to 30Vp-p
Input circuit	balanced; 50kΩ
Output level	0 to 6Vp-p; adjustable from panel
Output circuit	balanced; low impedance (600Ω load permissible)
Connector	XLR; input ground-lift switch on panel; output ground-lift jumper on circuit board

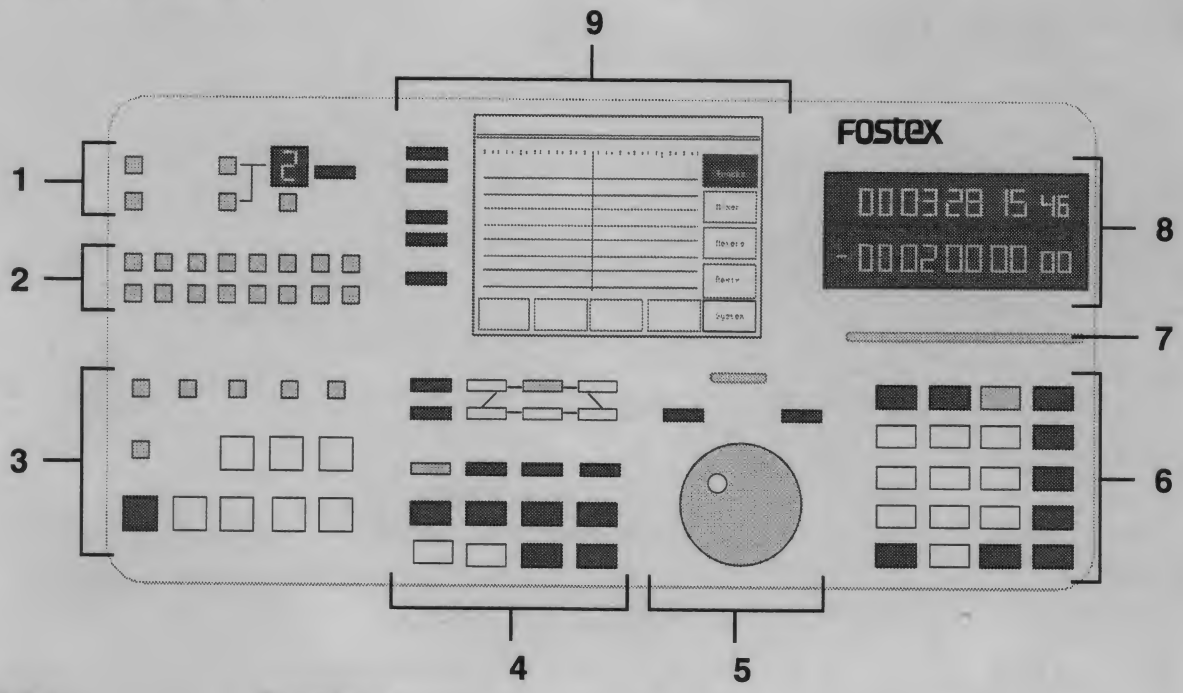
Controls and Connectors

Edit Controller 165
- Machine selection 166
- Track buttons 166
- Transport controls 167
- Edit buttons 168
- Synchronization indicators 170
- Time displays 170
- Keypad 171
- Jog/shuttle knob 172
- Screen controls 173

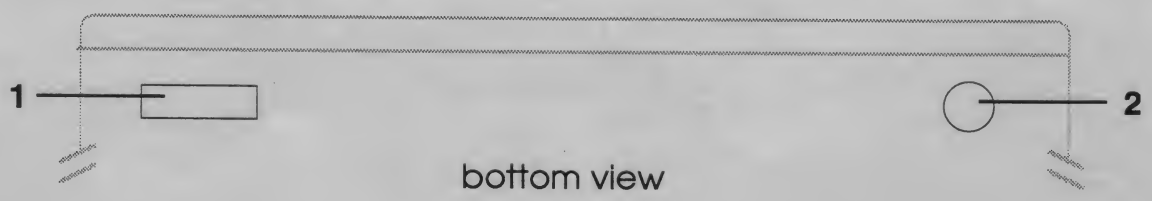
Main Unit (front) 174
- DSP card 174
- Front panel 175

Main Unit (back) 176
- Analog multichannel I/O modules 177
- 2-channel I/O module 178
- Synchronizer module 179
- Control module A 180
- Control module B 180

Edit Controller

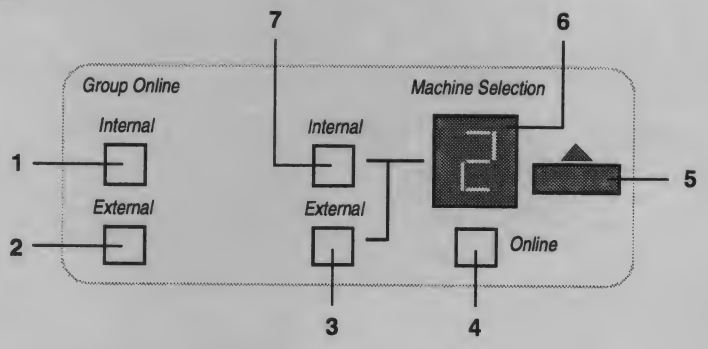


	Group	Functions
1	Machine selection	Selects which RS-422 devices are controlled by the *Foundation 2000*.
2	Track buttons	Solo and ready buttons for each track.
3	Transport buttons	Controls for recording, playback and locating.
4	Edit buttons	Set In and Out points and perform edits on selected tracks.
5	Jog/Shuttle knob	Provides variable-speed playback or data entry, depending on the selected knob mode.
6	Keypad	Stores and recalls locators, offset, preroll, postroll, delay.
7	Synchronization indicators	Indicates when the *Foundation 2000* receives and locks to timecode, word clock or video sync signals.
8	Time displays	Shows the current time and the edit time.
9	Screen controls	A touch sensitive screen with five displays. Buttons next to the screen are for navigation and data entry.



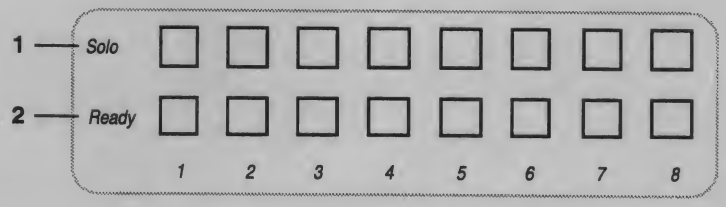
	Connector	Functions
1	24-pin connector	Edit Controller cable input.
2	DIN5	ASCII keyboard cable input.

Machine selection



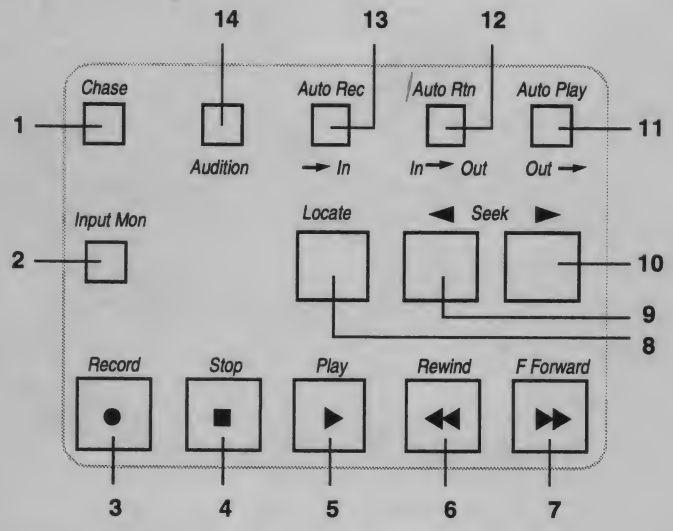
	Label	Functions
1	Group Online Internal	(not yet implemented)
2	Group Online External	Toggles *all* selected RS-422 devices online or offline. Online devices respond to commands from the Edit Controller.
3	Machine Selection External	Indicates that the displayed number represents an RS-422 device rather than a *Foundation 2000*.
4	Online	Toggles the selected device online or offline. Online devices respond to commands from the Edit Controller; offline devices do not respond.
5	▲	Selects individual devices. Each press displays the next machine number.
6	(numeric display)	Displays an individual machine number.
7	Machine Selection Internal	Indicates that the displayed number represents a *Foundation 2000* rather than an RS-422 device.

Track buttons



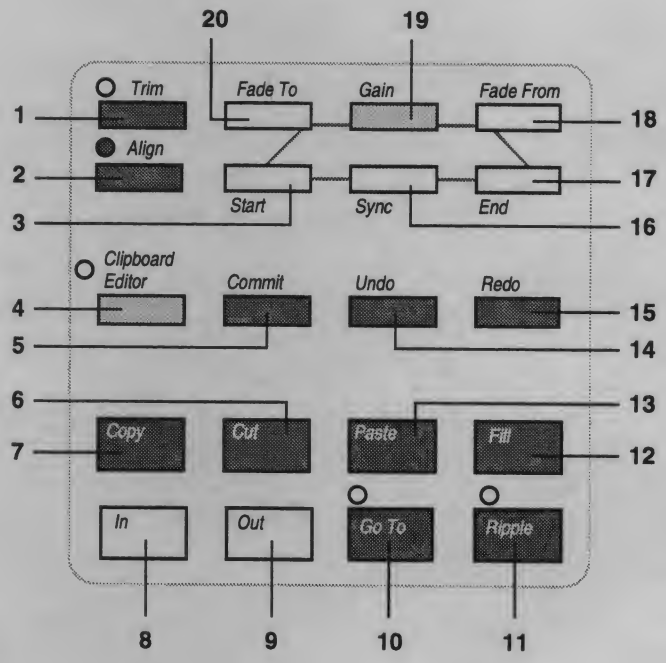
	Label	Functions
1	Solo (1–8 green)	Toggles track solos on and off. These are destructive solos.
2	Ready (1–8 red)	Toggles tracks between safe (light off) and ready for recording or editing (light on).

Transport controls



	Label	Functions
1	Chase	Locks transport controls to the incoming external timecode source.
2	Input Mon	Toggles input monitoring on and off.
3	Record	Initiates recording (when pressed with *Play*).
4	Stop	Stops playback, recording or winding.
5	Play	Initiates playback from current location. Initiates cueing when pressed with *Rewind* or *F Forward*.
6	Rewind	Scans in reverse at 2x when pressed once. Scans in reverse at 4x when pressed twice. Locates to 00:00:00:00 when pressed three times.
7	F Forward	Scans forward at 2x when pressed once. Scans forward at 4x when pressed twice. Locates to the end of the longest track when pressed three times.
8	Locate	Locates to the time shown in the bottom time display.
9	◀ Seek	Locates to the previous significant point (the start or end point of recorded audio) on the selected tracks.
10	Seek ▶	Locates to the next significant point (the start or end point of recorded audio) on the selected tracks.
11	Auto Play	Automatically begins playback after every locate. If the Audition function is on, this button plays to the In point.
12	Auto Rtn	Automatically locates to the In point (minus the Preroll) whenever the Out point (plus the Postroll) is reached. If the Audition function is on, this button plays from In to Out.
13	Auto Rec	Automatically begins recording at the In point and stops recording at the Out point. If the Audition function is on, this button plays from the Out point.
14	Audition	(not yet implemented)

Edit buttons

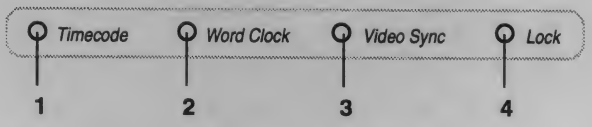


	Label	Functions
1	Trim	(not yet implemented)
2	Align	(not yet implemented)
3	Start	(not yet implemented)
4	Clipboard Editor	(not yet implemented)
5	Commit	(not yet implemented)
6	Cut	Removes audio from the edit region and places it in the Clipboard.
7	Copy	Copies the edit region from the track to the Clipboard.
8	In	Sets the In point to the current time.
9	Out	Sets the Out point to the current time.
10	Go To	Locates to the time stored in the next pressed button (*In, Out, Locate* or any numbered keypad button). The Preroll is ignored.
11	Ripple	Turns on the Ripple function. If Ripple is on, subsequent audio automatically "slides" on the track to close the gap after a Cut or to make room for a Paste.

continued ⇨

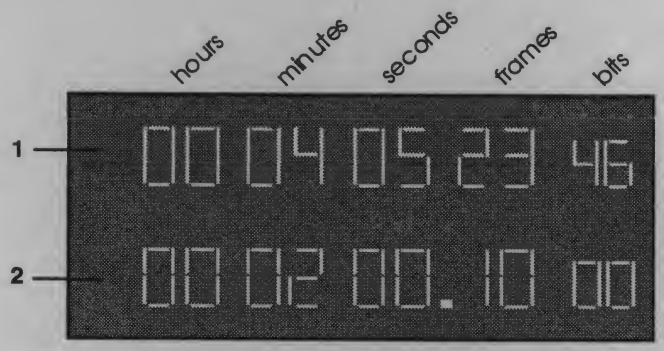
	Label	Functions
12	Fill	Places the Clipboard audio onto the track, between the In and Out points. If the Clipboard is longer than the edit region, the audio is automatically trimmed. If the Clipboard is shorter than the edit region, the audio is automatically looped to fill the region.
13	Paste	Places the Clipboard audio onto the track at the In point, replacing any existing audio at that location.
14	Undo	Restores the previous state of the reel by reversing the most recent edit or record action. The button can be pressed up to 10 times to undo up to 10 actions.
15	Redo	Restores the state of the reel by reversing the most recent Undo. The button can be pressed up to 10 times to redo up to 10 actions.
16	Sync	(not yet implemented)
17	End	(not yet implemented)
18	Fade From	(not yet implemented)
19	Gain	(not yet implemented)
20	Fade To	(not yet implemented)

Synchronization indicators



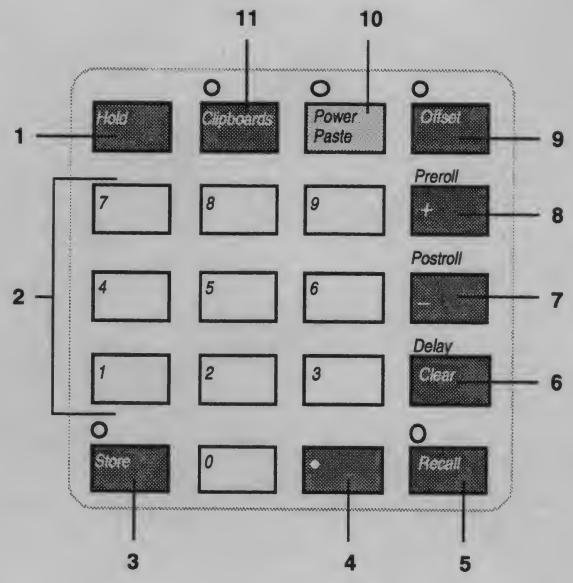
	Label	Functions
1	Timecode	Indicates that a timecode signal is being received at the LTC, VITC or AES/EBU input.
2	Word Clock	Indicates that a word clock signal is being received at the WORD CLOCK or AES/EBU input.
3	Video Sync	Indicates that a composite sync signal is being received at the VIDEO SYNC input.
4	Lock	Indicates that the *Foundation 2000* is locked to the selected sync reference.

Time displays



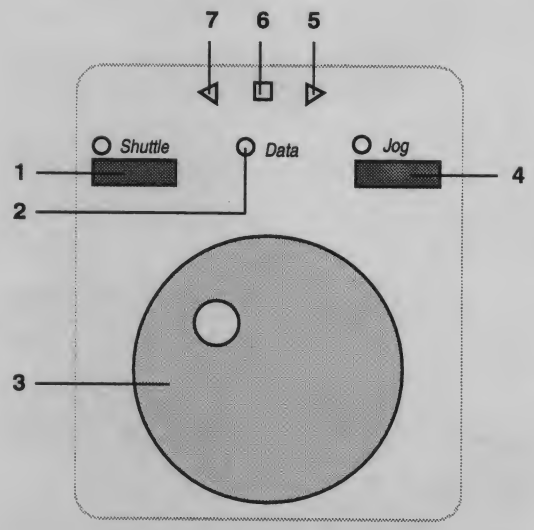
	Display	Functions
1	Current Time	Always displays the current time, which corresponds to the vertical "now" line on the *Tracks* screen.
2	Edit Time	Usually displays the current locator point. Sometimes displays other information, such as the current preroll amount. The "•" indicates the selected field (hours, minutes, seconds, frames or bits).

Keypad



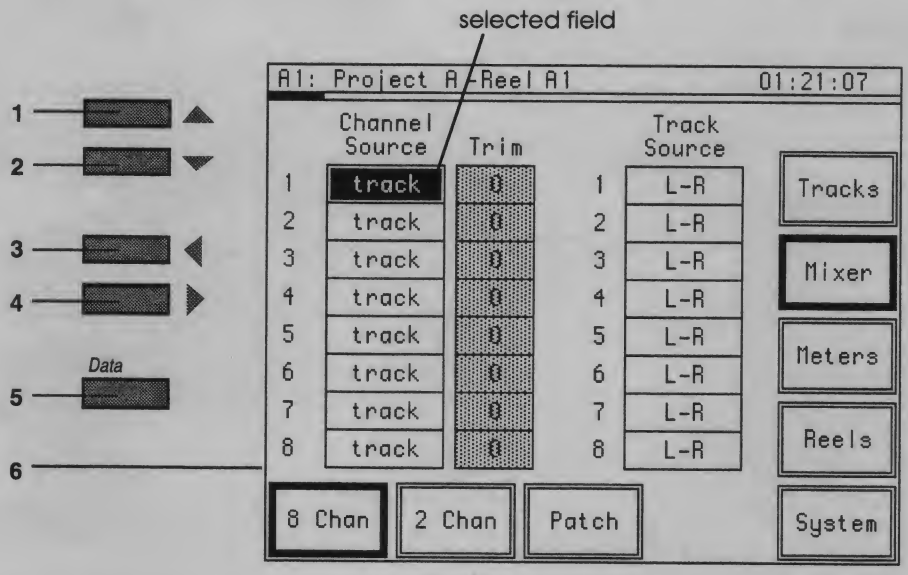
	Label	Functions
1	Hold	Copies the current time into the edit time display.
2	0 – 9	These buttons provide multiple functions. As a numeric keypad, they update the displayed edit time. When used with the *Store, Recall* or *Go To* button, they save and retrieve up to 10 locators.
3	Store	Toggles the Store function on and off. When Store is on, pressing a numbered button or *Preroll, Postroll, Delay, In* or *Out* saves the edit time in the selected button.
4	•	Selects the next field (hours:minutes:seconds:frames:bits) in the edit time display.
5	Recall	Toggles the Recall function on and off. When Recall is on, pressing a numbered button or *Preroll, Postroll, Delay, In* or *Out* recalls the stored time from the button to the edit time display.
6	Clear/Delay	Clear sets the edit time display to zero. When pressed after Store, the edit time is stored as the Delay. When pressed after Recall, the Delay is shown in the edit time display.
7	–/Postroll	"–" decrements the selected edit time field. When pressed after Store, the edit time is stored as the Postroll. When pressed after Recall, the Postroll is shown in the edit time display.
8	+/Preroll	"+" increments the selected edit time field. When pressed after Store, the edit time is stored as the Preroll. When pressed after Recall, the Preroll is shown in the edit time display.
9	Offset	Shows the current offset (between the *Foundation 2000* and an RS-422 device) in the edit time display.
10	Power Paste	(not yet implemented)
11	Clipboards	(not yet implemented)

Jog/shuttle knob



	Item	Functions
1	Shuttle button and indicator	Activates shuttle mode. Turning the knob farther increases the playback speed up to 32x. See the playback indicator on the Edit Controller screen.
2	Data indicator	Indicates that the knob is in Data mode rather than audio playback mode. Data mode occurs when an arrow button or the *Data* button (next to the screen) is pressed.
3	Knob	When the Shuttle or Jog indicator is on, turning the knob clockwise plays forward and turning counterclockwise rewinds. When the Data indicator is on, turning the knob scrolls through options in the selected data field on the screen.
4	Jog button and indicator	Activates jog mode. Turning the knob plays back audio at less than play speed. See the playback indicator on the Edit Controller screen.
5	▷ indicator	Lights during forward motion.
6	□ indicator	Lights when the transport is stopped.
7	◁ indicator	Lights during reverse motion.

Screen controls



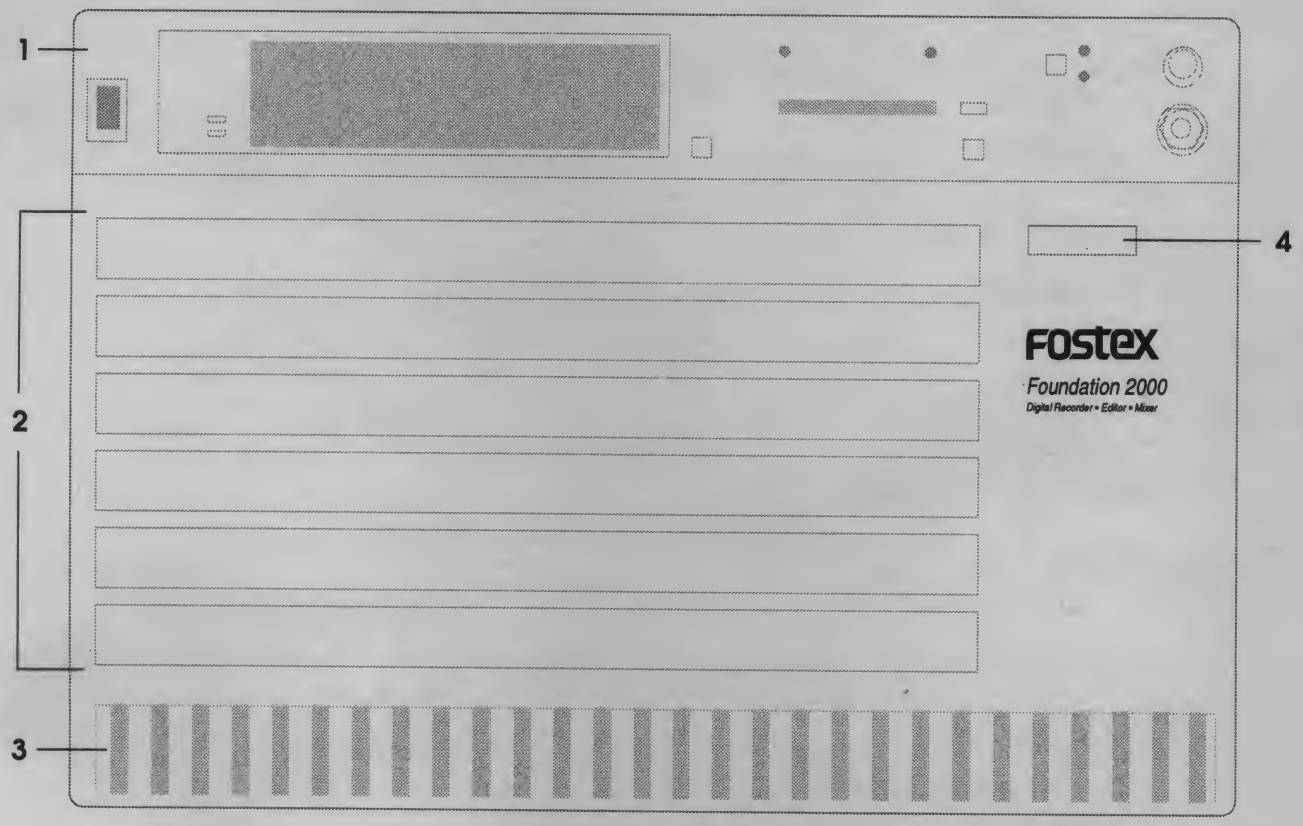
	Label	Functions
1	▲	Moves the screen cursor up to select the previous field. When pressed after *Data*, selects the previous option for the selected field or increments a numeric entry.
2	▼	Moves the screen cursor down to select the next field. When pressed after *Data*, selects the next option for the selected field or decrements a numeric entry.
3	◀	Moves the screen cursor left to select the previous field. When pressed after *Data*, selects the previous option for the selected field or decrements a numeric entry.
4	▶	Moves the screen cursor right to select the next field. When pressed after *Data*, selects the next option for the selected field or increments a numeric entry.
5	Data	Opens the selected field on the screen to allow data entry. After *Data* is pressed, the jog and shuttle functions of the knob are disabled so the knob can be used to scroll through available options for the field.
6	(screen)	An electroluminescent touch sensitive screen, with five major displays—

- *Tracks:* a graphical representation of the audio recorded on 8 tracks.
- *Mixer:* an interface for setting some mixing parameters.
- *Meters:* peak-hold meters for the 8 tracks, L-R mix, Monitor mix, Aux Sends and Aux Returns.
- *Reels:* a list of the projects and reels for the current RPE, and an interface for project management functions.
- *System:* an interface for setting system parameters.



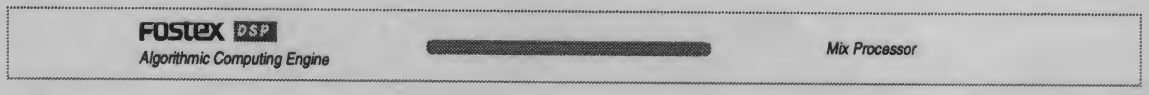
For information on the contents of specific screens, see the following chapter, Displays.

Main Unit (front)



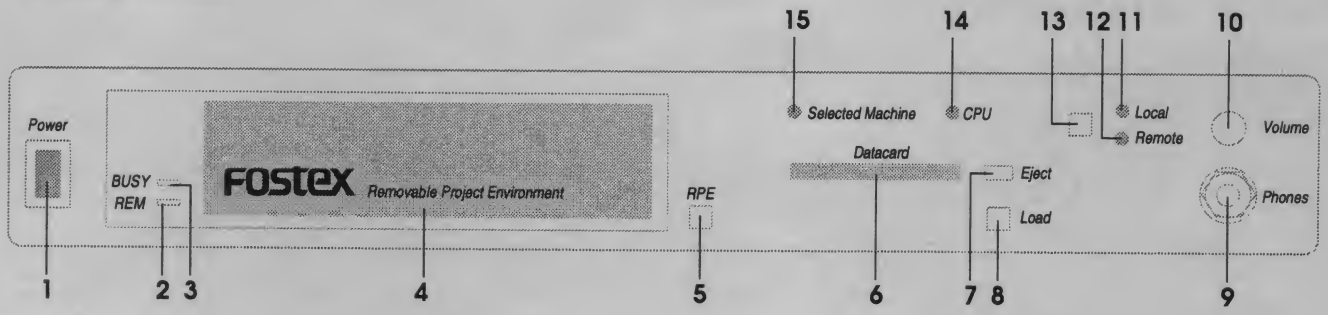
	Item	Functions
1	front panel	Includes the power switch, RPE (Removable Project Environment™), datacard reader and headphone jack.
2	DSP cards	Modular, expandable ACE (Algorithmic Computing Engine™) cards provide digital signal processing.
3	ventilation	Air intake vents.
4	Edit Controller port	Connects the Edit Controller or its cable to the Main Unit.

DSP card



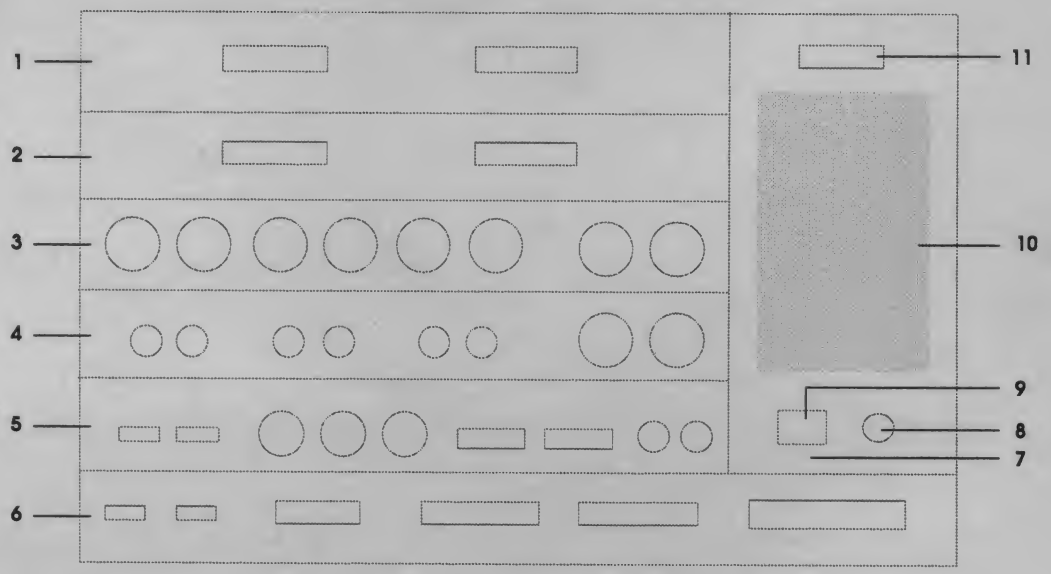
The Mix Processor supports the summing and EQ functions available in the minimum configuration of the *Foundation 2000*. Up to five additional Mix Processors or other DSP cards can be added to each Main Unit.

Front panel



	Item	Function
1	Power switch	Turns on power for the *Foundation 2000* Main Unit and Edit Controller.
2	REM indicator	Not functional.
3	BUSY indicator	Not functional.
4	RPE	The Removable Project Environment™ is a hard disk that stores all the recorded audio, editing and mixing information, and other parameters for a set of projects.
5	RPE button	Instructs the *Foundation 2000* to load or unload the RPE after insertion or before removal. Blinks while loading and unloading. Goes off when it is safe to remove the RPE.
6	Datacard	The datacard contains software upgrades for the *Foundation 2000*.
7	Eject button	Ejects the datacard.
8	Load button	Instructs the *Foundation 2000* to copy software from the datacard to ROM.
9	Phones jack	1/4" headphone output.
10	Volume knob	Headphone volume control.
11	Local indicator	If Local is on and Remote is off, the *Foundation 2000* does *not* respond to external RS-422 devices.
12	Remote indicator	If Remote is on, the *Foundation 2000* responds to external RS-422 devices.
13	Local/Remote button	Cycles between selecting Local only, Remote only, and Local & Remote.
14	CPU indicator	Indicates that the *Foundation 2000* central processing unit is functioning properly.
15	Selected Machine indicator	Indicates which *Foundation 2000*s currently selected for recording and editing. The corresponding machine number is displayed under Machine Selection on the Edit Controller (when Internal is lit).

Main Unit (back)

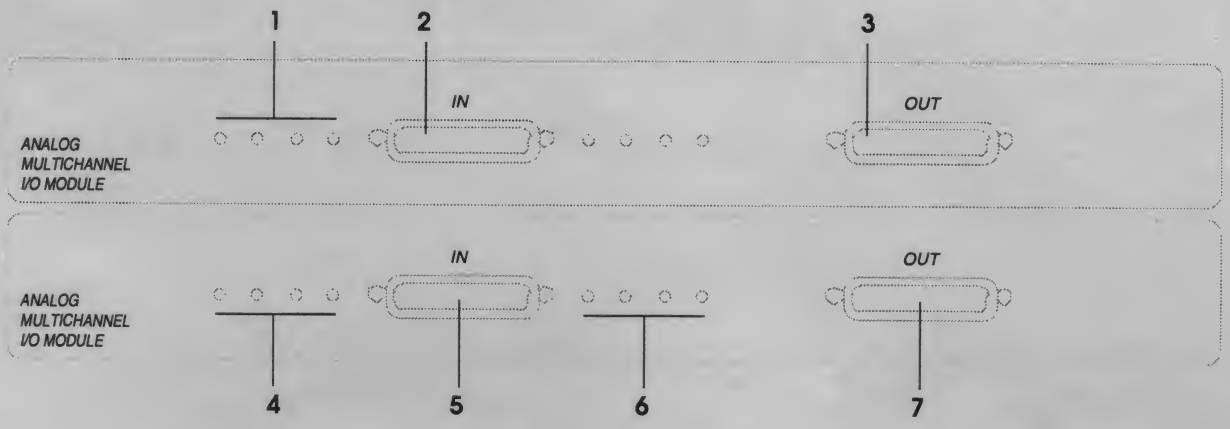


	Module or Component	Functions
1	ANALOG MULTICHANNEL I/O MODULE	Optional module that provides 2 aux sends and 4 aux returns when installed in the top slot.
2	ANALOG MULTICHANNEL I/O MODULE	Optional module that provides 8 analog inputs and 8 analog outputs when installed in the second slot from the top.
3	2-CHANNEL I/O MODULE	Provides 2 channels of analog input, 4 channels of analog output (L-R Mix and Monitor), and 2 channels of digital I/O.
4	SYNCHRONIZER MODULE	Contains I/O connectors for word clock, video sync, VITC, LTC.
5	CONTROL MODULE B	Contains connectors for communication (not yet implemented), MIDI I/O, and cascade ports (not yet implemented). This module has two DSPs; it handles all disk I/O, crossfades and audio scrubbing
6	CONTROL MODULE A	Contains connectors for RS-422, GPI and SCSI devices, and CPU interface ports (not yet implemented). This module contains the main real-time computer; it handles all scheduling and system control, including the Edit Controller
7	serial number of Main Unit	unique identification
8	voltage selector *or* fuse (see warnings below)	Selects the voltage range for operating the *Foundation 2000*. *or* Protects the *Foundation 2000* from excessive current.
9	AC socket	AC power input for both the Main Unit and Edit Controller.
10	ventilation	Exhaust vents.
11	Edit Controller port	16-pin connector for Edit Controller cable.

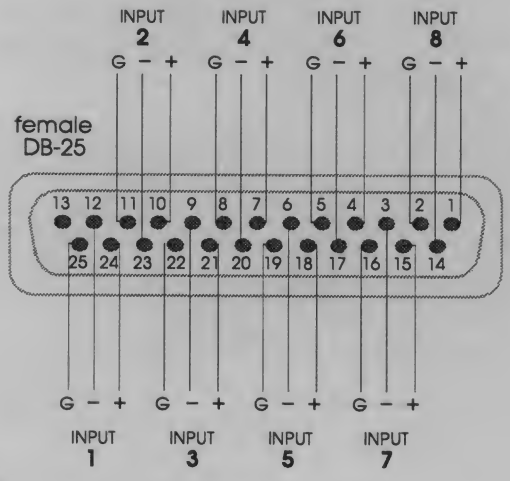


Any Foundation 2000 *with a serial number greater than 02074 has a voltage selector. Any Foundation 2000 with a serial number 02074 or lower has a fuse. Be sure to select the correct voltage setting or install the correct fuse for the power source in your area before powering up the unit.*

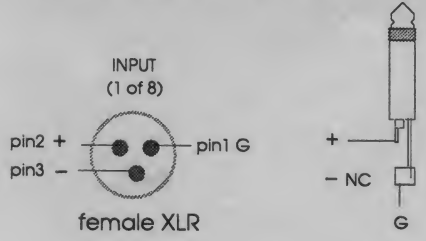
ANALOG MULTICHANNEL I/O MODULES

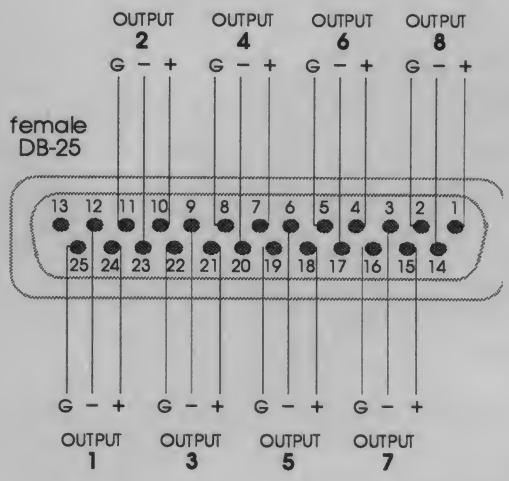


	Label	Connector	Function
1	(none)	potentiometer	trims aux return levels
2	In	DB-25	4 aux return inputs
3	Out	DB-25	2 aux send outputs
4	(none)	potentiometer	trims levels of analog inputs
5	In	DB-25	8 analog inputs
6	(none)	potentiometer	trims levels of analog inputs
7	Out	DB-25	8 analog outputs

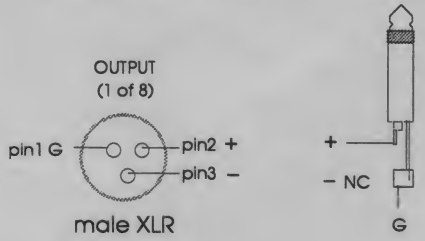


Input breakout cables have female XLR or 1/4" connectors.

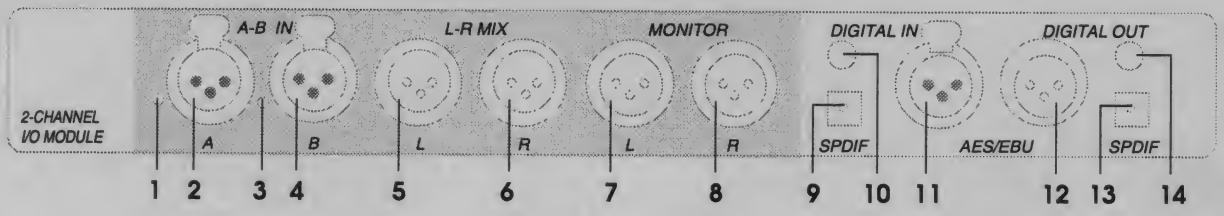




Output breakout cables have male XLR or 1/4" connectors.



2-CHANNEL I/O MODULE



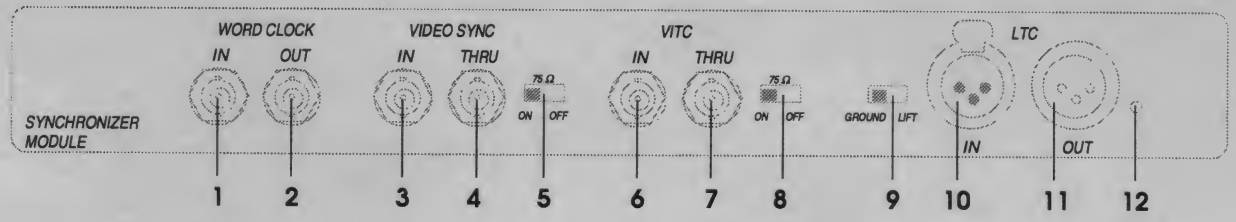
Analog I/O

	Label	Connector	Function
1	(none)	potentiometers	trims level of analog input A
2	A-B In (A)	balanced XLR	analog input A
3	(none)	potentiometers	trims level of analog input B
4	A-B In (B)	balanced XLR	analog input B
5	L-R Mix (L)	balanced XLR	left channel of stereo mix analog output (L-R bus)
6	L-R Mix (R)	balanced XLR	right channel of stereo mix analog output (L-R bus)
7	Monitor (L)	balanced XLR	left channel of stereo monitor mix analog output (Monitor bus)
8	Monitor (R)	balanced XLR	right channel of stereo monitor mix analog output (Monitor bus)

Digital I/O

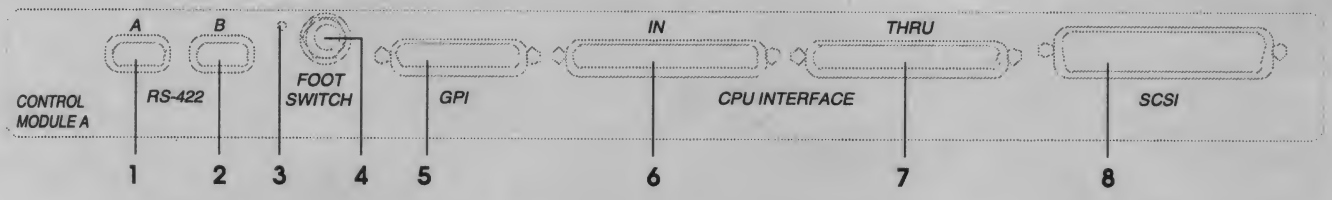
	Label	Connector	Function
9	SPDIF In	Toslink optical	2-channel digital input for SPDIF format (not yet implemented)
10	SPDIF In	RCA	2-channel digital input for SPDIF format
11	AES/EBU In	balanced XLR	2-channel digital input for AES/EBU format
12	AES/EBU Out	balanced XLR	digital output of stereo mix (L-R bus) for AES/EBU format
13	SPDIF Out	Toslink optical	digital output of stereo mix (L-R bus) for SPDIF format (not yet implemented)
14	SPDIF Out	RCA	digital output of stereo mix (L-R bus) for SPDIF format

SYNCHRONIZER MODULE



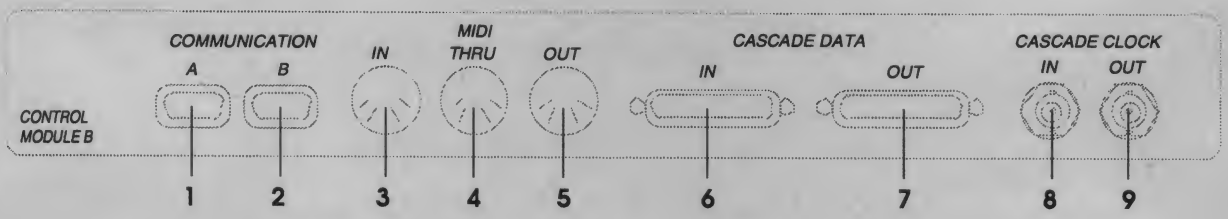
	Label	Connector	Function
1	Word Clock In	BNC	word clock input
2	Word Clock Out	BNC	word clock output
3	Video Sync In	BNC	video sync (house sync) input
4	Video Sync Thru	BNC	video sync input pass-through
5	75Ω on/off	switch	termination switch for video sync signal
6	VITC In	BNC	VITC input
7	VITC Thru	BNC	VITC input pass-through
8	75Ω on/off	switch	termination switch for VITC signal
9	Ground/Lift	switch	ground lift switch for LTC input
10	LTC In	balanced XLR	LTC input
11	LTC Out	balanced XLR	LTC output
12	(none)	potentiometer	trims LTC output level

CONTROL MODULE A



	Label	Connector	Function
1	RS-422 A	DB-9	RS-422 output
2	RS-422 B	DB-9	RS-422 input
3	(none)	hole	view internal diagnostic LED
4	Foot Switch	1/4" mono phone jack	punch in/out via foot switch
5	GPI	DB-25	GPI inputs
6	CPU Interface In	DB-37	(not yet implemented)
7	CPU Interface Out	DB-37	(not yet implemented)
8	SCSI	50-pin SCSI connector	archive device I/O

CONTROL MODULE B



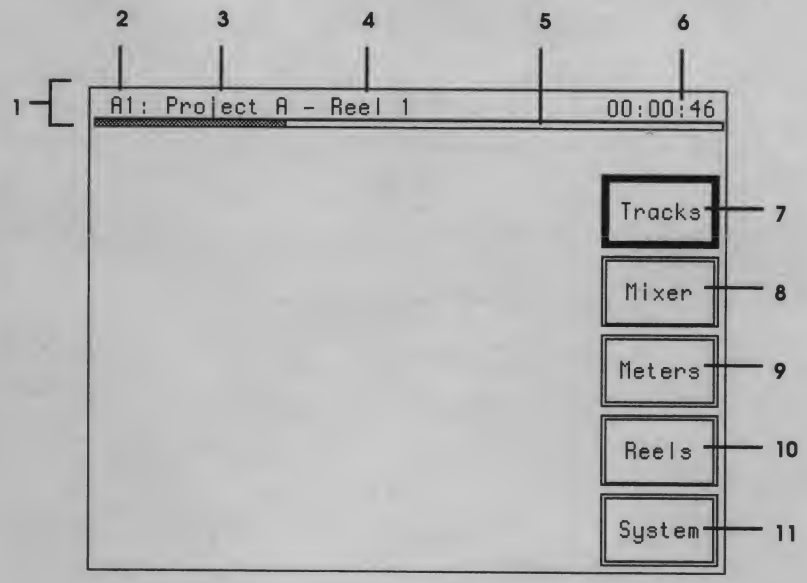
	Label	Connector	Function
1	Communication A	DB-9	(not yet implemented)
2	Communication B	DB-9	(not yet implemented)
3	MIDI In	5-pin DIN	MIDI input
4	MIDI Thru	5-pin DIN	MIDI input pass-through
5	MIDI Out	5-pin DIN	MIDI output
6	Cascade Data In	DB-25	(not yet implemented)
7	Cascade Data Out	DB-25	(not yet implemented)
8	Cascade Clock In	BNC	(not yet implemented)
9	Cascade Clock Out	BNC	(not yet implemented)

DISPLAY REFERENCE

Standard display features 183
Tracks Display 184
Mix Displays 185
8 Channel display 185
2 Channel display 186
Patch display 187
Meters Displays 188
Main display 188
Aux display 189
Preferences display 190
Reels Display 191
Index display 191
Archive display 193
Restore displays 194
Preferences display 196
System Display 197
RPE display 197
Clock display 198
Diagnostics display 199
Status display 200
Keyboard Display 201

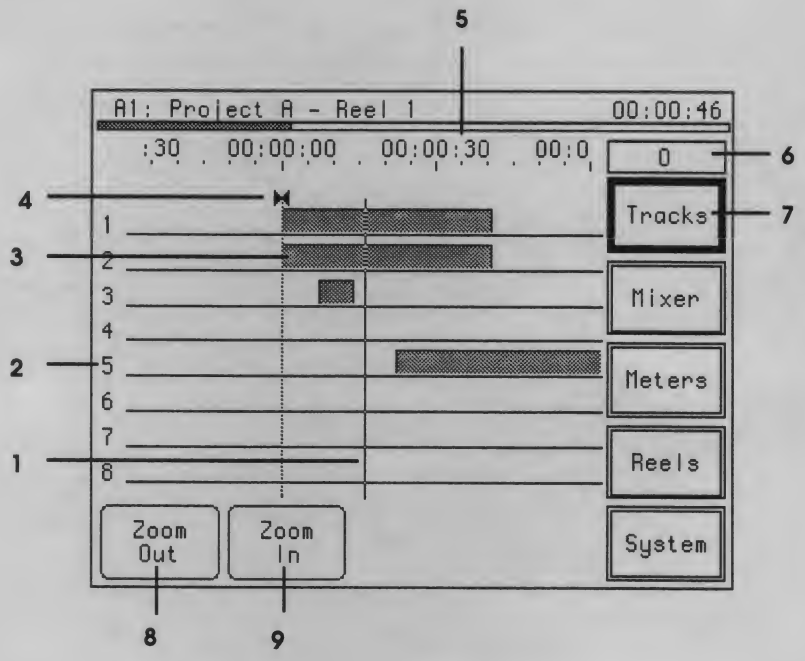
Standard display features

Standard display features are always visible, except when you are on the Keyboard Display or during diagnostic testing.



	Item	Description
1	Status bar	Project/reel information which is always displayed, except when Keyboard Display is shown or during diagnostic testing.
2	Default project/reel name	Current default project (A-G) and reel (1-6) name.
3	Assigned project name	Default or user-defined name of the current project.
4	Assigned reel name	Default or user-defined name of the current reel.
5	Disk space	Bar indicating proportion of disk space used and unused for recording and editing. Filled portion on left indicates disk space used. Empty portion on right indicates disk space available.
6	Disk time available	The amount of disk time available for recording and editing. Decreases as you record/edit and ready more tracks.
7	Tracks	Button for viewing Tracks display.
8	Mixer	Button for viewing Mixer displays.
9	Meters	Button for viewing Meters displays.
10	Reels	Button for viewing Reels displays.
11	System	Button for viewing System displays.

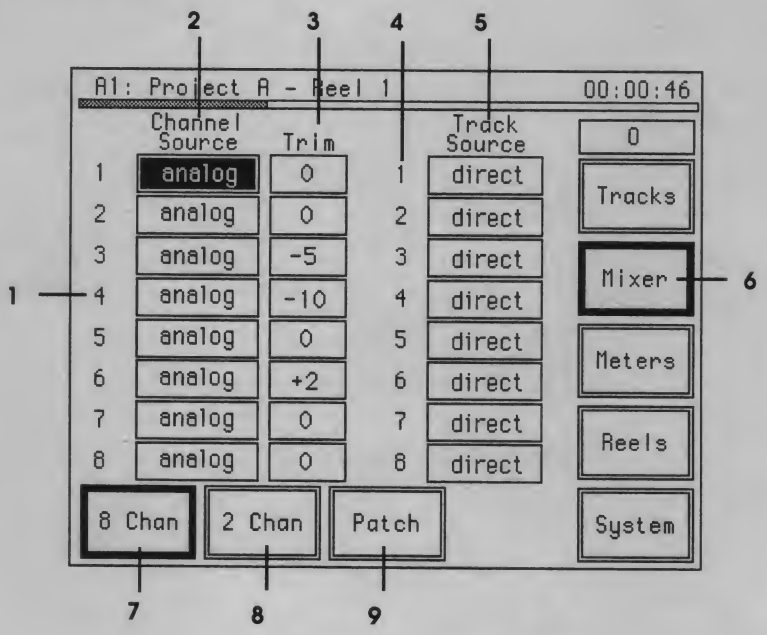
Tracks Display



	Item	Description
1	Current time	Current time. Time appears in top time display on Edit Controller.
2	Track number	Track number. Highlights when ready.
3	Audio	Recorded audio on tracks of current reel.
4	In and Out times	Region boundaries. In is beginning of region. Out is end of region.
5	Time line	Time reference for the current reel.
6	Speed indicator	Indicates direction and speed of transport (1/32, 1/16, 1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 4, 8, 16, 32x play speed). Dot (•) indicates exact speed. No dot indicates play is between displayed and next faster speed. Single arrow indicates direction. Double arrow indicates direction and wind speed (no audio).
7	Tracks	Button for viewing Tracks display.
8	Zoom Out	Button for viewing more track time.
9	Zoom In	Button for viewing greater track detail.

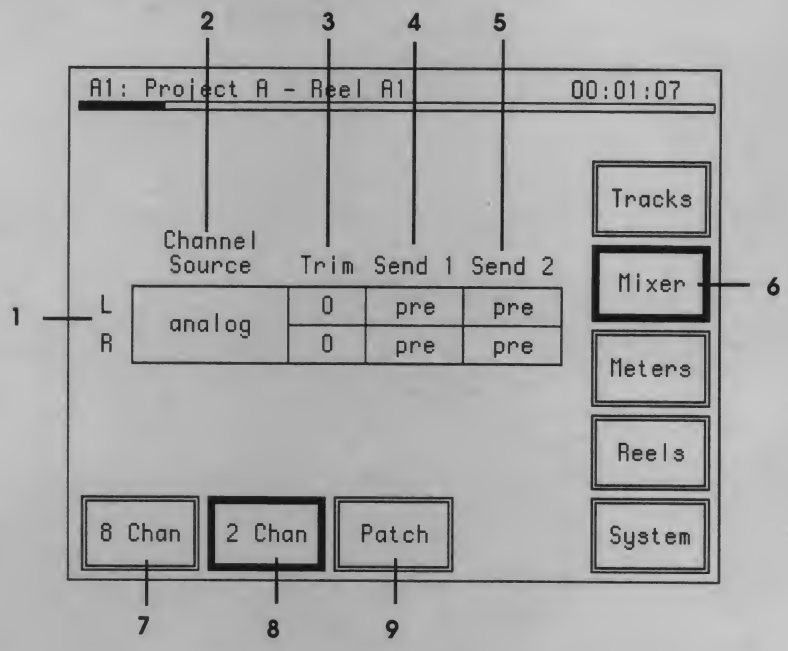
Mixer Displays

8 Channel display



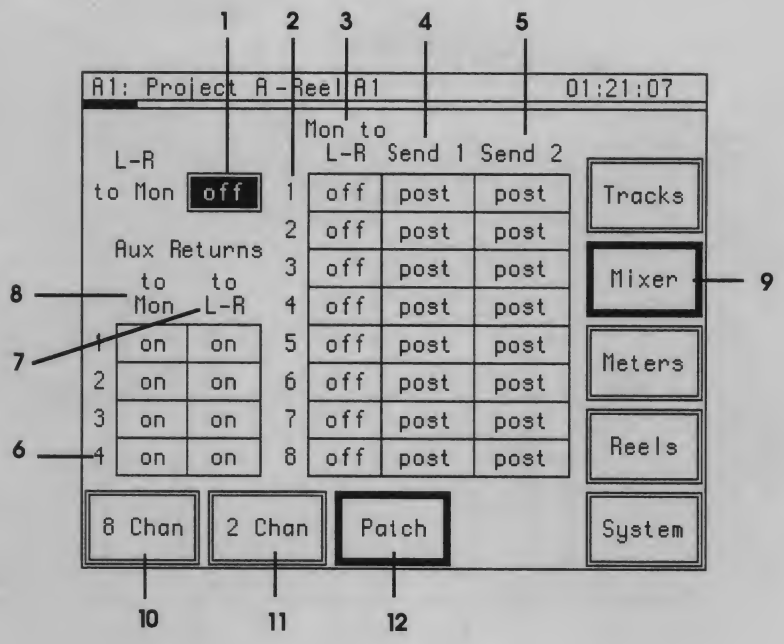
	Item	Description
1	Channel number	Channel numbers (1-8) associated with the settings.
2	Channel source	Selects the input source to each internal mixer channel. Options: analog/track. Use "analog" to record or mix from multichannel inputs. Use "track" to send audio from the disk to the L-R bus.
3	Trim	Adjusts the input trim (-∞ to +18dB); not available when channel source is "track."
4	Track number	Track numbers (1-8) associated with current reel.
5	Track source	Selects signal to record on disk. Options: direct/L-R. Use "direct" to record from multichannel inputs. Use "L-R" to record the L-R mix or to record from the 2-channel inputs. Odd tracks record the left channel of the L-R bus; even tracks record the right channel of the L-R bus.
6	Mixer	Button for viewing Mixer displays.
7	8 Chan	Button for viewing 8 Chan Mixer display.
8	2 Chan	Button for viewing 2 Chan Mixer display.
9	Patch	Button for viewing Patch Mixer display. Routing channels, L-R bus, aux sends and returns (multichannel only) parameters.

2 Channel display



	Item	Description
1	L-R	Left and right channels of the 2-CHANNEL I/O MODULE.
2	Channel source	Selects inputs on the 2-Channel I/O Module. Options: analog, AES/EBU, SPDIF, SPDIF(O). Use "analog" to record from A-B inputs. Use "AES/EBU" to record digital input from XLR connector. Use "SPDIF" to record digital input from RCA connector. Use "SPDIF(O)" to record digital input from optical connector.
3	Trim	Adjusts the input trim (-∞ to +18dB).
4	Send 1	Send source to aux send 1 before or after signal reaches fader. Options: pre/post. (Only available with multichannel module.)
5	Send 2	Send source to aux send 2 before or after signal reaches fader. Options: pre/post. (Only available with multichannel module.)
6	Mixer	Button for viewing Mixer displays.
7	8 Chan	Button for viewing 8 Chan Mixer display.
8	2 Chan	Button for viewing 2 Chan Mixer display.
9	Patch	Button for viewing Patch Mixer display.

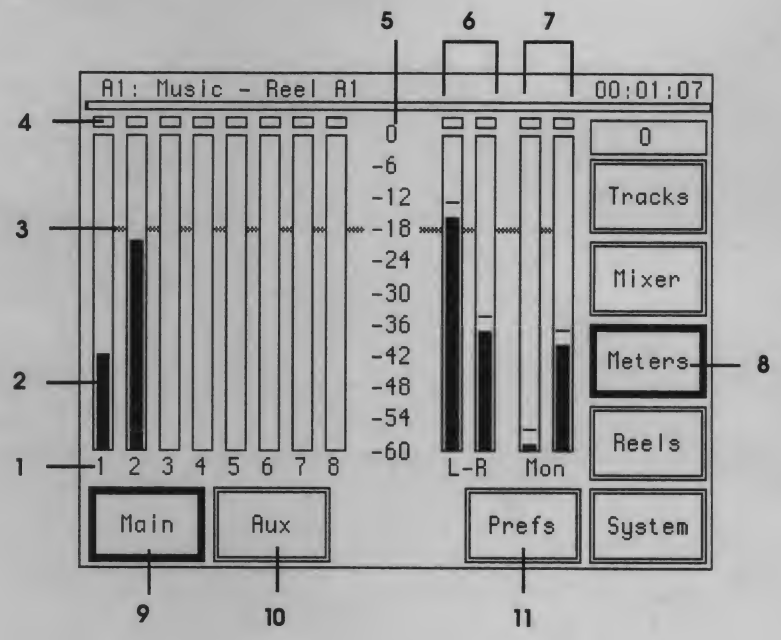
Patch display



	Item	Description
1	L-R to Mon	Replaces Monitor bus with L-R bus; L-R mix routed to Monitor outputs. Options: on/off
2	Channel number	Internal mixer channels (1-8).
3	Mon to L-R	Sends selected monitor channel to L-R bus. Options: on/off
4	Send 1	Send source to aux send 1 before or after signal reaches fader. Options: pre/post. (Only available with multichannel module.)
5	Send 2	Send source to aux send 2 before or after signal reaches fader. Options: pre/post. (Only available with multichannel module.)
6	Axu return number	Aux returns (1-4).
7	Aux Returns to L-R	Sends aux return to L-R bus.
8	Aux Returns to Mon	Sends aux return to Monitor bus.
9	Mixer	Button for viewing Mixer displays.
10	8 Chan	Button for viewing 8 Chan Mixer display.
11	2 Chan	Button for viewing 2 Chan Mixer display.
12	Patch	Button for viewing Patch Mixer display.

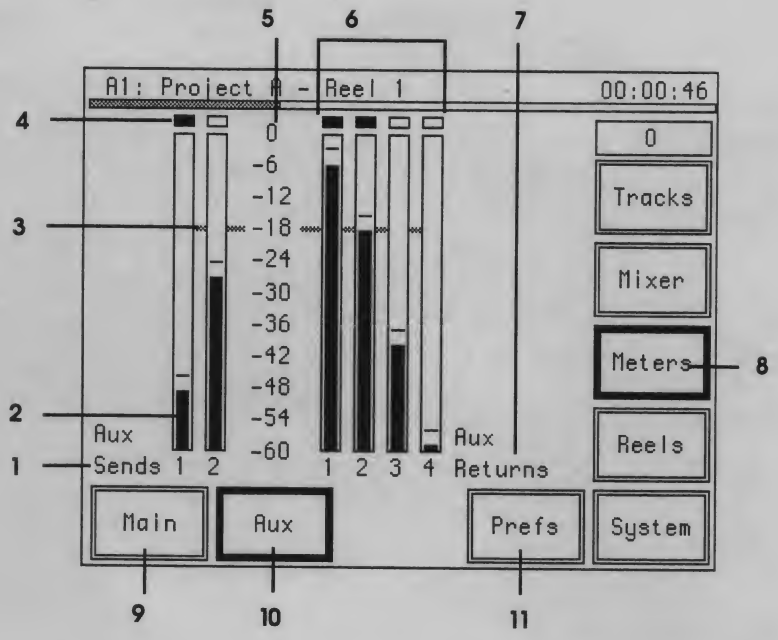
Meters Displays

Main display



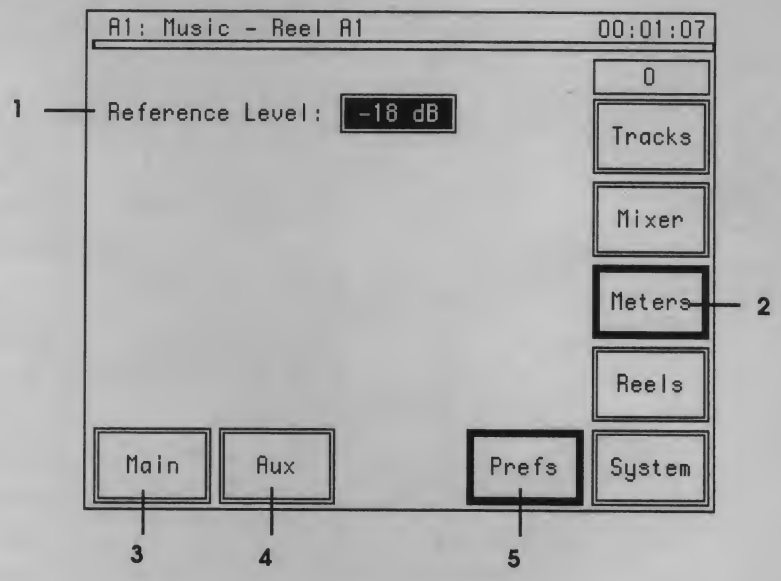
	Item	Description
1	Channel number	Internal mixer channels (1-8).
2	Channel level	Input or track playback level.
3	Level indicator	Horizontal line indicating the reference level set on the Prefs display.
4	Clip indicator	Lights when clipping occurs.
5	Reference level	Configurable to unit's nominal operating level (0 to -24dB in 2dB steps). Default is -18dB.
6	L-R level	Level of audio on L-R bus.
7	Mon level	Level of audio on Monitor bus.
8	Meters	Button for viewing Meters displays.
9	Main	Button for viewing Main Meters display.
10	Aux	Button for viewing Aux Meters display.
11	Prefs	Button for viewing Prefs Meters display.

Aux display



	Item	Description
1	Aux sends	Aux sends 1 and 2.
2	Level	Level of aux send 1 and 2.
3	Level indicator	Horizontal line indicating the reference level set on the Prefs display.
4	Clip indicator	Lights when clipping occurs.
5	Reference level	Configurable to unit's nominal operating level (0 to -24dB in 2dB steps). Default is -18dB.
6	Level	Level of aux sends 1-4.
7	Aux returns	Aux returns 1-4.
8	Meters	Button for viewing Meters displays.
9	Main	Button for viewing Main Meters display.
10	Aux	Button for viewing Aux Meters display.
11	Prefs	Button for viewing Prefs Meters display.

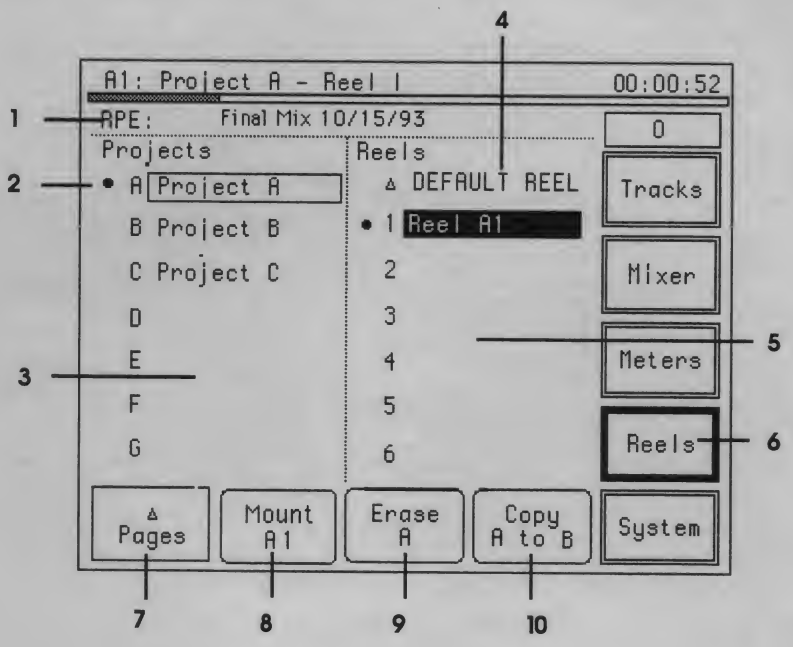
Preferences display



	Item	Description
1	Reference level	Configurable to unit's nominal operating level (0 to -24dB in 2dB steps). Default is -18dB. Appears on Main and Aux displays.
2	Meters	Button for viewing Meters displays.
3	Main	Button for viewing Main Meters display.
4	Aux	Button for viewing Aux Meters display.
5	Prefs	Button for viewing Prefs Meters display.

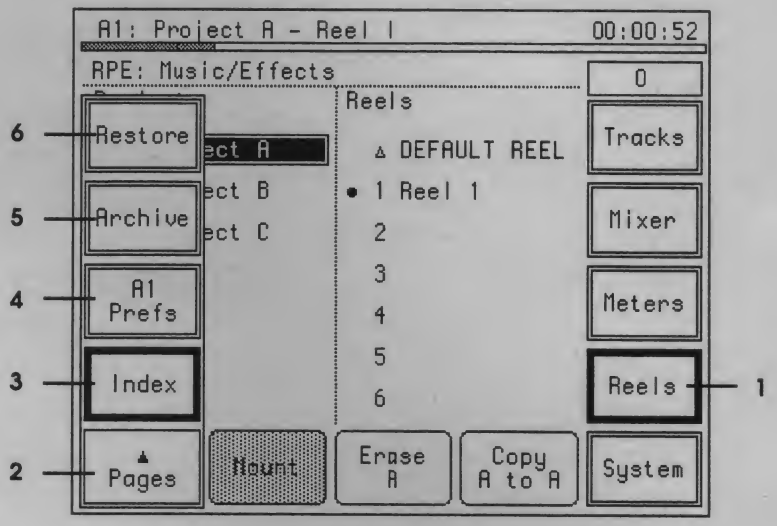
Reels Displays

Index display



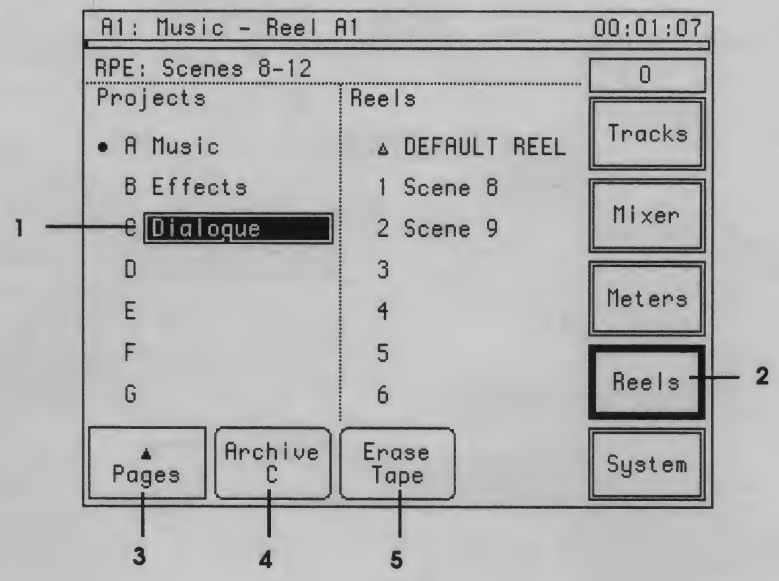
	Item	Description
1	RPE name	Name of currently mounted RPE.
2	Dot	Indicates currently mounted project or reel.
3	Project list	List of projects on the RPE by default name (A-G) and user-defined name.
4	Default reel	Contains default settings for all newly opened reels.
5	Reels list	List of reels in the current project by default name (1-6) and user-defined name.
6	Reels	Buttons for viewing Reels displays.
7	Pages	Button for popping up Pages menu. (see below)
8	Mount	Button for mounting selected reel.
9	Erase	Button for erasing selected reel.
10	Copy	Button for copying mounted reel to selected reel.

Pages popup on Reels Display:



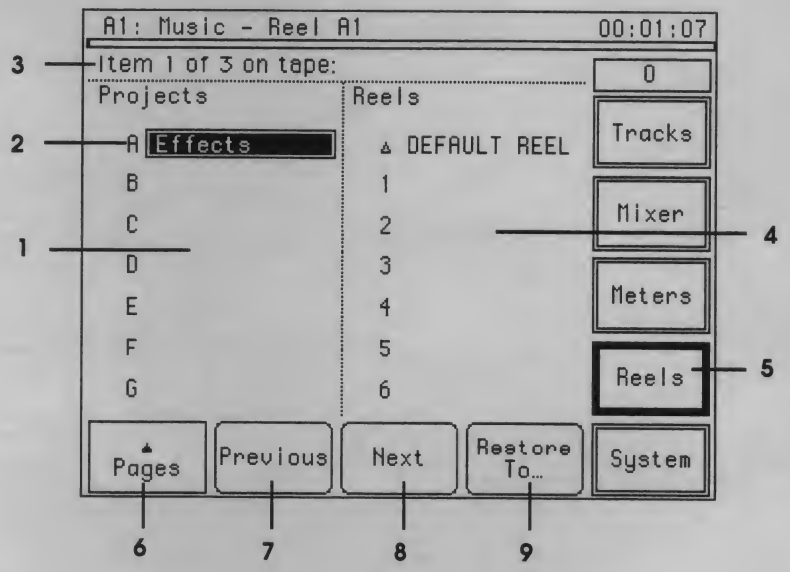
	Item	Description
1	Reels	Button for viewing Reels displays.
2	Pages	Button for popping up Pages menu.
3	Index	Button for viewing Index Reels display.
4	Prefs	Button for viewing Prefs Reels display.
5	Archive	Button for viewing Archive Reels display.
6	Restore	Button for viewing Restore Reels display.

Archive display

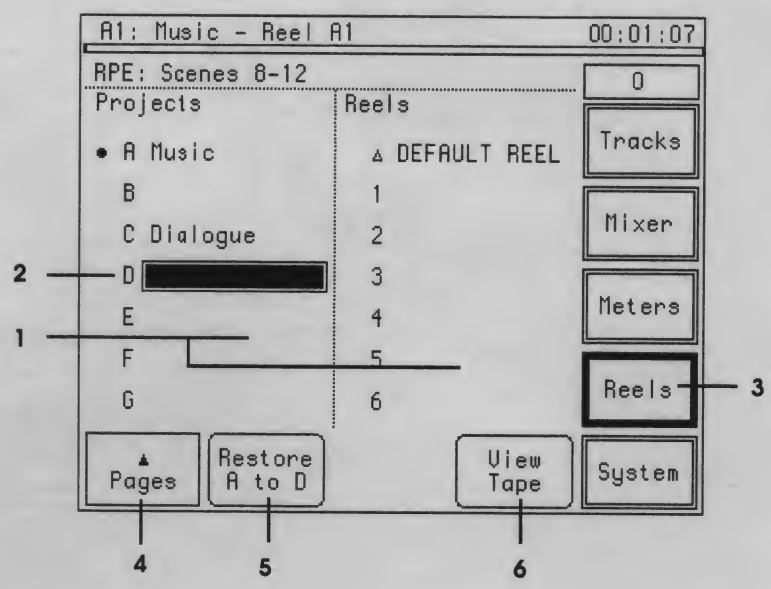


	Item	Description
1	Selected project	Project selected for archiving to an external device.
2	Reels	Button for viewing Reels displays.
3	Pages	Button for popping up Pages menu. (see above)
4	Archive	Button for archiving selected project, reel, or RPE to an external device.
5	Erase Tape	Button for erasing tape currently inserted in archival device.

Restore displays

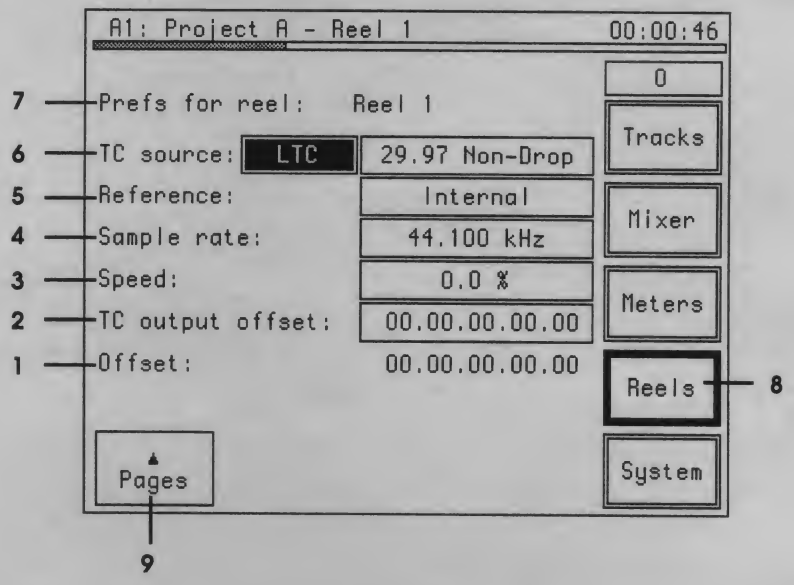


	Item	Description
1	Projects list	List of projects archived to this location on tape.
2	Archived item	Currently selected item on tape to restore to RPE.
3	Item number	Position on tape of currently displayed item.
4	Reels list	List of reels archived to this location on tape.
5	Reels	Button for viewing Reels displays.
6	Pages	Button for popping up Pages menu. (see above)
7	Previous	Button for viewing previous item on tape.
8	Next	Button for viewing next item on tape.
9	Restore To ...	Button for viewing the RPE. Press this button to select destination. (see next display)



	Item	Description
1	Index	Index view of current RPE.
2	Restore location	Location to which selected item on archive tape will be restored. The destination.
3	Reels	Button for viewing Reels displays.
4	Pages	Button for popping up Pages menu. (see above)
5	Restore	Button for restoring selected item on archive tape to selected location on RPE.
6	View Tape	Button for viewing archive tape. (see previous display)

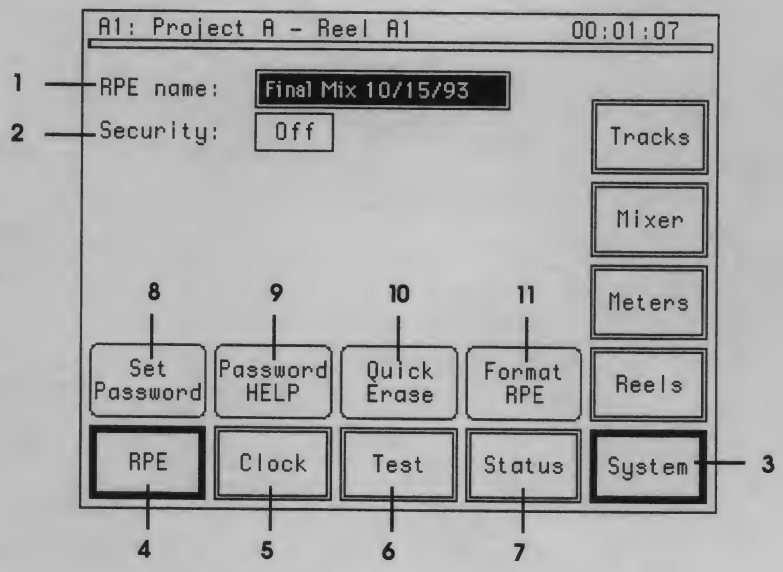
Preferences display



	Item	Description
1	Offset	Timecode offset between incoming timecode and internal *Foundation 2000* time. Set using *Offset* button on keypad. 00:00:00:00-23:59:59:29
2	TC output offset	Timecode offset between internal *Foundation 2000* time and timecode output. 00:00:00:00-23:59:59:29
3	Speed	Varispeed adjustment for recording and playback. ± 12.5%
4	Sample rate	Record or playback sample rate of reel. Options: 32, 44.056, 44.1, 44.144, 48 and 48.048 kHz
5	Reference	Incoming synchronization reference. Options: word clock, timecode, video, digital input, internal
6	TC source	Timecode port. Options: LTC, VITC
		Timecode format. Options: 30 Non Drop, 30 Drop, 29.97 Non Drop, 29.97 Drop, 25 fps, 24 fps
7	Title	Indicates which reel preferences you are viewing.
8	Reels	Button for viewing Reels displays.
9	Pages	Button for popping up Pages menu. (see above)

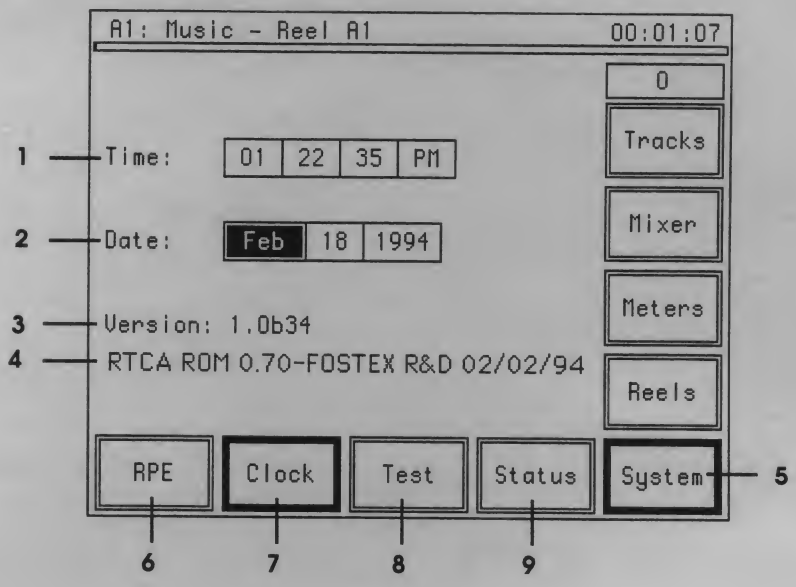
System Displays

RPE display



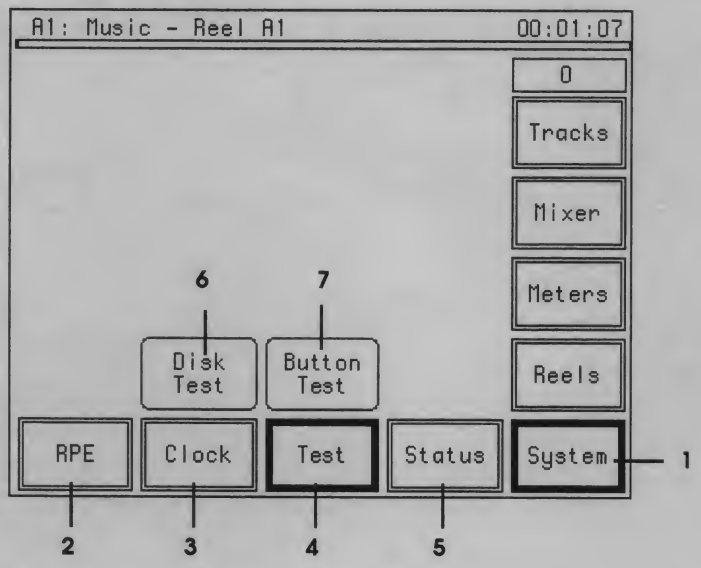
	Item	Description
1	RPE name	Field for naming the current RPE.
2	Security	Field for turning RPE pasword protection on and off. When security is on, a password is required for opening RPE. (If you forget your password, touch Password HELP button.)
3	System	Button for viewing System displays.
4	RPE	Button for viewing RPE display.
5	Clock	Button for viewing Clock display.
6	Test	Button for viewing Test display.
7	Status	Button for viewing Status messages.
8	Set Password	Button for setting RPE password. Password is required when security is turned on.
9	Password HELP	Button for getting help setting RPE password or when you've forgotten your password.
10	Quick Erase	Button for removing all audio from current RPE. (Be careful. Operation cannot be undone.)
11	Format RPE	Button for removing all audio from current RPE and formatting disk. Takes longer than a Quick Erase, but fixes many RPE problems. (Be careful. Operation cannot be undone.)

Clock display



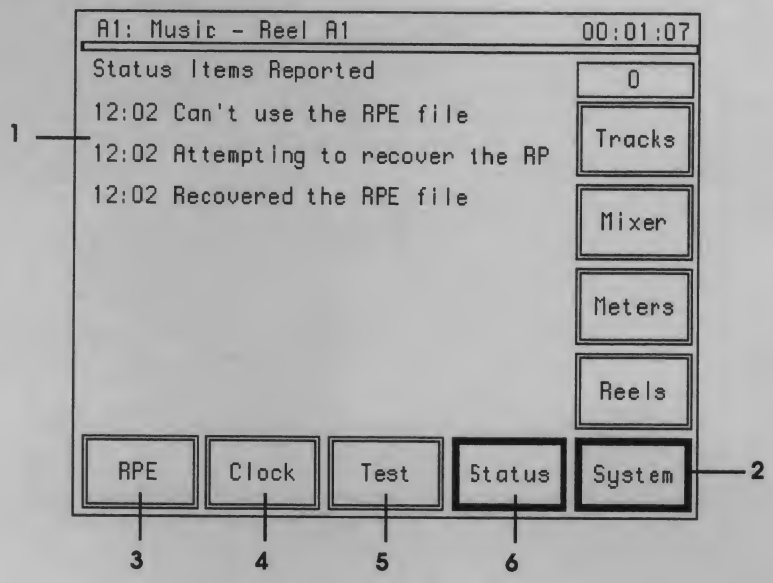
	Item	Description
1	Time	Field for setting current time.
2	Date	Field for setting current date.
3	Software version	Version number of software installed in Main Unit.
4	ROM version	Version number of chip used for starting up *Foundation 2000*.
5	System	Button for viewing System displays.
6	RPE	Button for viewing RPE display.
7	Clock	Button for viewing Clock display.
8	Test	Button for viewing Test display.
9	Status	Button for viewing Status messages.

Diagnostics display



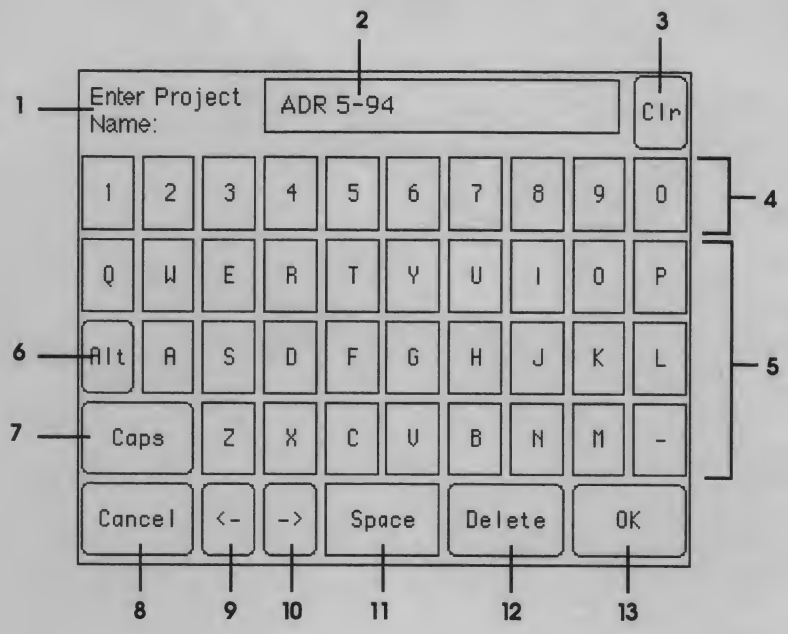
	Item	Description
1	System	Button for viewing System displays.
2	RPE	Button for viewing RPE display.
3	Clock	Button for viewing Clock display.
4	Test	Button for viewing Test display.
5	Status	Button for viewing Status messages.
6	Disk Test	Button for testing record capacity of RPE. (Be careful. This test erases the disk. Test can take 1-2 hours.)
7	Button Test	Button for testing touch screen buttons, Edit Controller buttons, and LEDs.

Status display



	Item	Description
1	Status messages	Time sorted list of error and status messages. When a new message is posted, a check mark appears in the System button.
2	System	Button for viewing System displays. A check mark appears when a new status message is posted.
3	RPE	Button for viewing RPE display.
4	Clock	Button for viewing Clock display.
5	Test	Button for viewing Test display.
6	Status	Button for viewing Status messages.

Keyboard Display



	Item	Description
1	Instruction	Indicates what name you are changing.
2	Name field	Displays name as entered.
3	Clr	Button for clearing name field.
4	Number keys	Buttons for entering numbers (0-9) into name field.
5	Letter keys	Buttons for entering letters (A-Z) into name field.
6	Alt	Button for displaying a set of additional characters. Touch again to enter letters.
7	Caps	Button for shifting to uppercase characters. Touch again to access lower case characters.
8	Cancel	Closes the keyboard display without changing name field
9	<--	Button for moving cursor to left without deleting characters.
10	-->	Button for moving cursor to right without deleting characters.
11	Space	Button for placing a space in name field.
12	Delete	Button for deleting character to left of cursor.
13	OK	Closes the keyboard display and updates the field.

GLOSSARY

A

ADR

ADR (automatic dialog replacement) means replacing audio from a location shoot. It often utilizes one of a number of systems which automates the process to one level or another. It is also known as "looping."

AES/EBU

A standard specified by a group of representatives of the Audio Engineering Society and European Broadcast Union for the transmission of digital audio signals. AES/EBU uses a standard balanced XLR cable to carry a stereo pair in one direction.

Aliasing

Aliasing is a form of distortion which occurs during the analog-to-digital conversion process when frequencies greater than half the sampling frequency are converted.

Arm

To arm a track means to set the system so that the track will go into record when you press the record button.

Assign

Assign means connecting mixer channels to mix busses. Assigning channels is sometimes referred to as bussing. It also means using a switch or alpha-numeric entry to connect a signal to one of multiple paths.

Automation

Generally, automation means using a machine or computer to perform or repeat one or more tasks. In recording systems, automation refers to the process of recording and playing back mixer movements such as faders and mute buttons. In sophisticated systems, all controls can be automated.

B

Balance

Balance controls the levels of the two channels of a stereo signal.

Bin

A bin is a temporary storage area for segments of audio. In computer-based systems, bins are perceived and imaginary.

Bounce

Bouncing means taking audio from one track and placing it on another. The term, sometimes called "bouncing down," also describes the process of mixing several tracks onto one or two.

Bus/Buss

A bus generally refers to any common signal pathway. In a mixer, a bus is usually a wire that is or can be made common to the outputs of any or all channels in the mixer. Examples of busses are the main stereo mix, sub-mixes, monitor busses and sends.

Butt Splice

A butt splice connects two segments of audio with no perceived crossfade or volume envelope at the splice point.

C

Channel

In audio, a channel is an internal audio path maintained separately from other audio paths of identical function. Mixer input strips are examples of channels, but an audio snake also has channels.

Chase/Lock

Chase/lock refers to a tape deck's ability to read incoming timecode, locate its tape to the position indicated by the timecode, and synchronize playback to the incoming timecode.

Clip

In the analog world, clipping occurs when the input to a circuit exceeds the gain of the circuit. The circuit passes the signal at its maximum value. All input values exceeding the maximum value are "clipped." The result is audio distortion.

In digital audio, clipping occurs when the input to an A/D exceeds the voltage represented by the maximum number the A/D is capable of transmitting. In digital signal processing (DSP), clipping can occur when an addition or multiplication causes an internal overflow or underflow of a numeric value.

Conform

Conforming is the process of analyzing an edited picture, locating the corresponding audio from source reels, and extracting and synchronizing the correct audio segments with the edited picture. The process of conforming may be repeated as subsequent picture edits are performed.

Crossfade

A crossfade is a gradual "dissolve" between two portions of audio; one segment of audio fades out while the other fades in. Crossfades can be linear, or they can have various logarithmic shapes. Generally, logarithmic or exponential fades are preferred to linear ones.

Cue

Used as a noun, the term "cue" has different meanings for different contexts. In a film, video or theater, a cue is a segment of audio corresponding to a specific segment of the picture or script. For example, a show may have cues for the opening and closing music in addition to sound effects, dialog and other music cues. It generally refers to a finished piece of audio, rather than unedited source.

From a data structure viewpoint, a cue is a transparent layer between a take and an event. Essentially, it is a name (which the user never needs to see) that connects the event with a particular take.

Used as a verb, "cue" means hearing audio while performing some operation. On analog tape and DAT machines, it refers to the ability to hear audio while fast winding a tape.

In a recording or mixing session, the "cue mix" (also called "headphone mix") is the audio signal sent back to the performers in the studio. The cue mix is used for "cueing" the artist's performance in relation to previously recorded material.

D

Drop-frame/Non-drop Frame

Counting methods in time code systems. In non-drop frame, there are *n* frames counted in every second. In drop-frame, 2 frames are dropped every minute except every 10th minute. Drop-frame timecode was developed to compensate for the fact that 30-frame timecode was running at the NTSC rate (29.97), so that it would match the actual time-of-day clock at the end of the day.

Ducking

Reducing the level of ongoing audio in response to an intermittent sound. For example, a radio announcer could manually turn down the music while speaking, and turn it up between sentences or phrases. In automatic ducking circuits, signal at one input causes a reduction in volume on another input.

E

Editing

The process of removing or rearranging audio segments. In most cases some kind of cut and splice, which may or may not include a crossfade. Editing also refers to a series of actions which result in a single continuous segment of audio, such as (1) selecting a region of audio, (2) selecting a destination point, (3) moving the selected audio to the destination point and (4) filling the remaining space with some other selected audio.

EDL

An EDL (Edit Decision List) is an ASCII (text) file that contains all the information necessary to recreate an electronic picture edit. CMX Corporation, now owned by Chyron, developed one of the first electronic video editing systems which utilized an EDL. It has now become one of a number of list formats which are supported by major video editing systems. A Lartec system is a computerized ADR system that uses a subset of an EDL.

Emphasis

Pre-emphasis is an analog EQ curve applied to the audio as it recorded. During playback, an opposite curve is applied to compensate for the original one in a process called "de-emphasis." In the digital audio stream, a bit is set if the audio is recorded with the curve.

Environment

An environment is all data—other than projects, sequences or sound elements—necessary to restore the working state of the system at the time the project was last used. The environment includes information such as user preferences, setup, configuration, window locations, key assignments.

EQ (Equalization)

Equalization is the process of changing the volume of selected frequencies or ranges of frequencies within an audio signal.

ESAM

ESAM (Edit Suite Audio Mixer) is a communications protocol developed by Graham-Patten for controlling their mixer automation systems. It has since become an industry standard, and is supported by major video editing systems.

Insert

In the context of a mixer, insert refers to breaking the normal audio path between an input/output pair to insert some kind of signal processor.

Insert is also a type of edit. When you insert audio into a sequence, all audio after the insertion point is placed after the inserted audio.

In video editing, an Insert Edit punches in over selected channels, replacing the information on those channels. A video insert punches over the video, and an audio insert punches over the audio.

J

Jog

Moving tape forward or backward by a fixed amount, usually one frame. The jog function is a very fine version of the shuttle function. Unlike a shuttle knob, a jog knob is not spring-loaded, but turns continuously in either direction.

K

L

M

MADI

Multitrack Audio Digital Interface (MADI) is a standard specified by the AES and EBU groups, who also specified the AES/EBU stereo digital format. MADI carries 56 channels of digital audio on a single cable in one direction. Obviously, the data rate is very high.

Mix

As a verb, to mix means to control the summing of signals. As a noun, mix refers to the resulting signal.

Mute

Used as a verb, to "mute a channel" means to turn off the audio for that channel. Used as a noun, "mutes" are the buttons which turn off a particular channel. Mutes are usually non-destructive, though not always. Mutes are often automated as part of mixer automation systems.

N

NTSC/PAL

National Television Standards Committee (NTSC) refers to the U.S. standard format for color video running at 29.97 frames per second. Phase Alternating Line (PAL) refers to the European standard format for color video running at 25 frames per second.

O

Output

A path through which audio passes from one device to another. Types of outputs vary in connector type, level, use (sends, monitor, mix), and electrical characteristics (impedance, balanced or unbalanced). They can be analog or digital.

P

Pan
A pan control places a mono signal into a certain position within a stereo image.

Parametric EQ
A sophisticated "tone control." The user can select the center frequency and width of the frequency band, and can boost or cut the signal in that band by a specified amount. "Parametric" refers to the fact that the center frequency, bandwidth and boost/cut factor are separate parameters.

Peak EQ
An EQ that cuts or boosts audio around a fixed center frequency. The bandwidth each band is also fixed. The number of bands is the same as the number of boost/cut controls, which are usually either linear or rotary faders. Peak EQ is sometimes called "haystack" EQ.

Post-production
Begins after the location shoot and is the process of combining, editing and processing audio elements into a final product to be married with the picture.

Postroll
The amount of time that a system continues to play after the punch-out point has been reached.

Pre-lay
Also called pre-mix, the process of combining a number of similar elements into single elements which will eventually be mixed together. Examples of pre-lays are a set of car sound effects, such as screeches, engine sounds, spring squeaks and horn honks which are all discrete elements that total a fairly complicated mix. A pre-lay could combine these into a single stereo element which would be added to the final mix at a later point.

Preroll
The amount of time between the moment playback begins and a pre-defined mark point. Typically, the pre-defined point is used for punching in. Many auto-locators have pre-roll settings which determine how far before a particular cue point the tape deck is positioned. You can also set pre-roll using some machine control protocols.

Project
A project is an organization of reels, takes and environment data perceived by the user as a single "job."

Q

R

Ready
A track mode, often called "armed." When you want to record on a track, you "ready" or "arm" the track. When you push the record button, all tracks that are ready or armed will go into record mode.

Reel
In the context of Fostex hard disk products, a reel is a group of takes assembled in time, similar to a multitrack tape reel. Each project can contain multiple reels.

Repro

One of several track "monitor" modes, which determine what audio is sent through the outputs of a tape deck. On a tape deck, typical track modes are Repro, Input and Auto. When the deck is in Repro, only audio recorded on the tape is sent to the outputs. When the deck is in Input, only audio fed to the tape inputs is sent to the outputs. In Auto mode, audio at the inputs is sent to the outputs only when the tracks are armed and the system is either stopped or recording.

Resolve

A tape deck's ability to adjust its speed to the rate of incoming timecode. This is essentially a varispeed capability. Resolve is a subset of chase/lock.

Return

Inputs to the mixing console, usually separate from the normal input strips. They are used in conjunction with the sends, but can be used for any appropriate application, such as inputs from a CD or tape deck. Returns generally provide less functionality than an input strip. For example, returns may not include trim or EQ. Some consoles have the ability to solo the returns automatically whenever an input strip is soloed.

Ripple Edit

Editing audio at one place on a track affects everything past that point. For example, if you move an event 10 frames back, all subsequent events also move 10 frames back. In tape-based or track-based editing, cutting or inserting are essentially ripple edits.

Routing

Routing and bussing are essentially the same. Routing means choosing a signal path from a selection of possibilities. A patch bay is often used to route signals.

S

Safe

A track mode. When a track is safe, it is *not* ready for recording.

Sample

The smallest element in the representation of digital audio. It is a number that corresponds to the sound's voltage at one instant in time. If the sampling rate is 48 kHz, the sample represents a voltage for 1/48000th of a second.

Sampling rate

A digital representation of an analog signal created by checking, or sampling, the analog voltage a fixed number of times per second. The greater the number of samples, the more accurate the representation of the analog signal. The CD uses a sampling rate of 44.1kHz; it checks the analog signal 44,100 times per second.

Sample Rate Conversion

Sample rate conversion (SRC) is the process by which audio originally recorded at one sample rate is converted to another sample rate. The audio is "harmonized" by shifting its pitch up or down, and then played back at the new sample rate.

Scrubbing

Locating audio by moving tape back and forth in front of the tape head. In digital systems, scrubbing mimics this function for the purpose of locating edit points.

Send

Also called "Aux Send," it is a separate mix usually sent to a reverb or other effects processor. Most consoles have at least two sends; some have many more. Almost all consoles have a group of rotary faders that control the level of each input strip in any of the send mixes. Sometimes the send is a stereo pair, in which case a pan control is provided or the signal is panned according to the position of the channel strip's pan knob. Sends can also be used for headphone mixes.

Sequence

A list of takes and other events in time. Sequences can include audio events, mixer automation data and other information.

Shave, Scrape

Shaving or scraping means removing some of the magnetic oxide from the film or tape. For example, oxide can be scraped with a razor blade to soften the attack in a portion of audio. Oxide can also be removed by acetone to create a smooth fade over a portion of the film. These are essentially editing functions that control a portion of a volume envelope.

Shelf EQ

Equally boosts or cuts all frequencies above or below a selected "shoulder frequency." A high-pass shelf EQ affects all frequencies above the specified frequency; a low-pass shelf EQ affects all frequencies below that frequency.

Sweep EQ

A sweep EQ is a parametric EQ that does not provide a Q, or bandwidth control. Sweep EQ is becoming very common on consoles.

Shuttle

Shuttling refers to moving tape forward or backward to locate a particular point in a recording. Usually, shuttling is controlled by turning a spring-loaded rotary knob that automatically returns to a center position. The farther the knob is turned, the faster the tape moves.

SMPTE/LTC

Society of Motion Picture and Television Engineers (SMPTE) and Longitudinal Time Code (LTC). A standard format for LTC was specified by the SMPTE, and has been adopted by the motion picture and television industries. A complete description of LTC can be found in *The Time Code Handbook*, by Walter Hickman.

Solo

Used as a verb, to "solo a channel" means to turn off the audio for all other channels so you can hear just the soloed channel. Used as a noun, "solos" are the buttons which solo a particular channel. Usually, solos are non-destructive—they do not affect the signal that is being recorded; they only affect the audio fed to the control room speakers.

Source Audio

Usually refers to audio which was recorded on a location shoot or on a set, and usually is associated with a segment of film or video.

T

Take
A segment of audio, *n* tracks wide, recorded on tape or disk.

Track
An area of tape or disk on which audio is recorded. A track can be thought of as a picture of an output over time.

Trim
The first level control after the input to a mixer. On some consoles, the trim control is a passive attenuator for reducing the level prior to the input amplifiers. Other consoles have an attenuation circuit prior to the trim; the trim is then part of the input amplifier stage.

U

V

VITC
Vertical Interval Time Code (VITC) is timecode information encoded in the vertical retrace interval of the video signal (this is the time when the beam is getting back to the top of the screen). The advantage of VITC is that the timecode value can be read when the video deck is paused, and is accurate to the frame.

Voice
Voices indicate the number of sounds a system can play simultaneously. For example, an 8-voice system can play 8 sounds at one time.

W

Voice-Over
Voice recordings, usually of announcers, used in commercials or other productions.

Waveform
A graphic depiction of a sound's amplitude over time. There are two methods of displaying waveforms. Full-wave displays show both positive and negative amplitudes. Half-wave displays show only half of the wave.

WordFit™
A trademark of DAR (Digital Audio Research, Inc.), WordFit is the process by which ADR tracks are automatically edited to match an original dialog track.

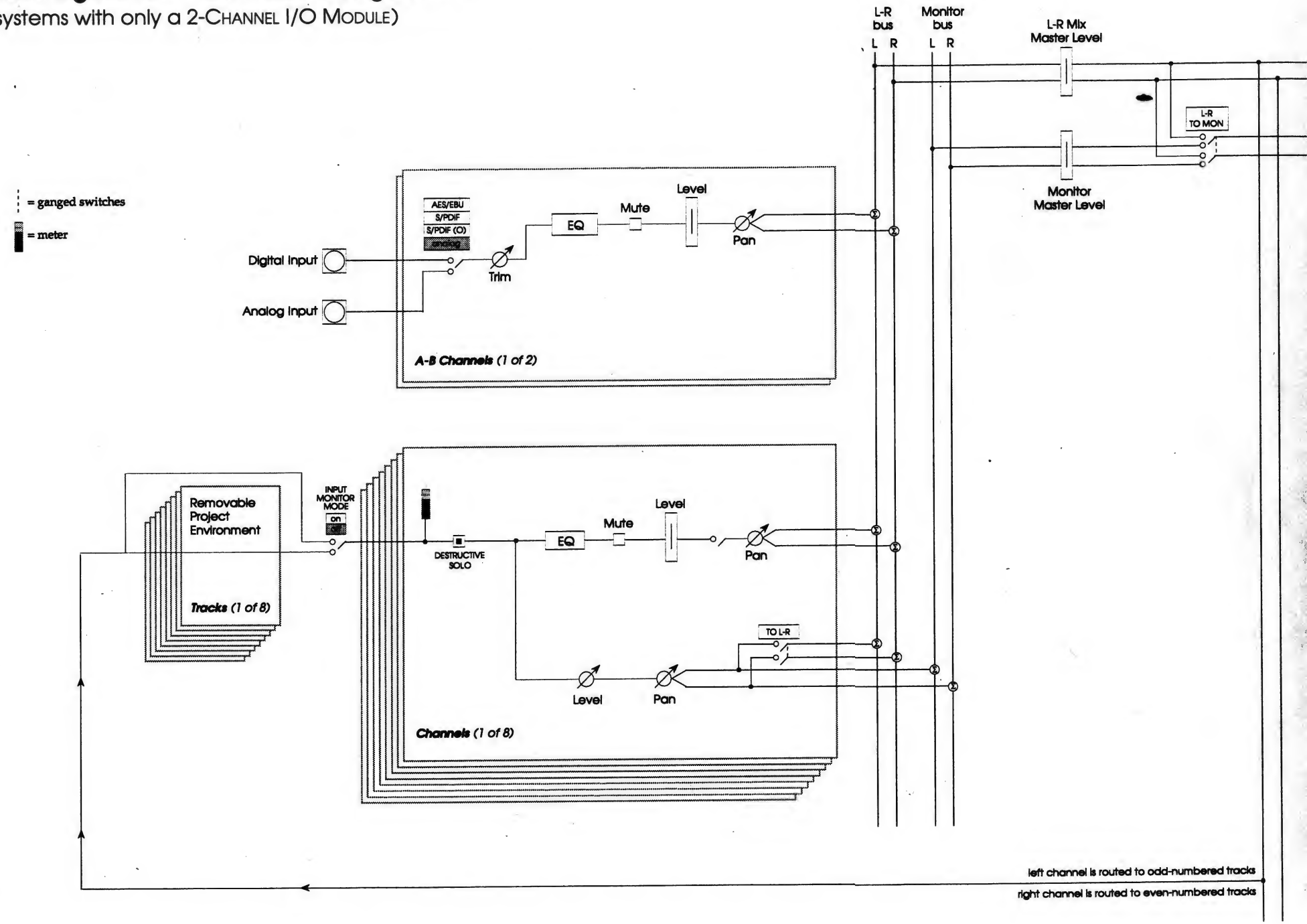
X

Y

Z

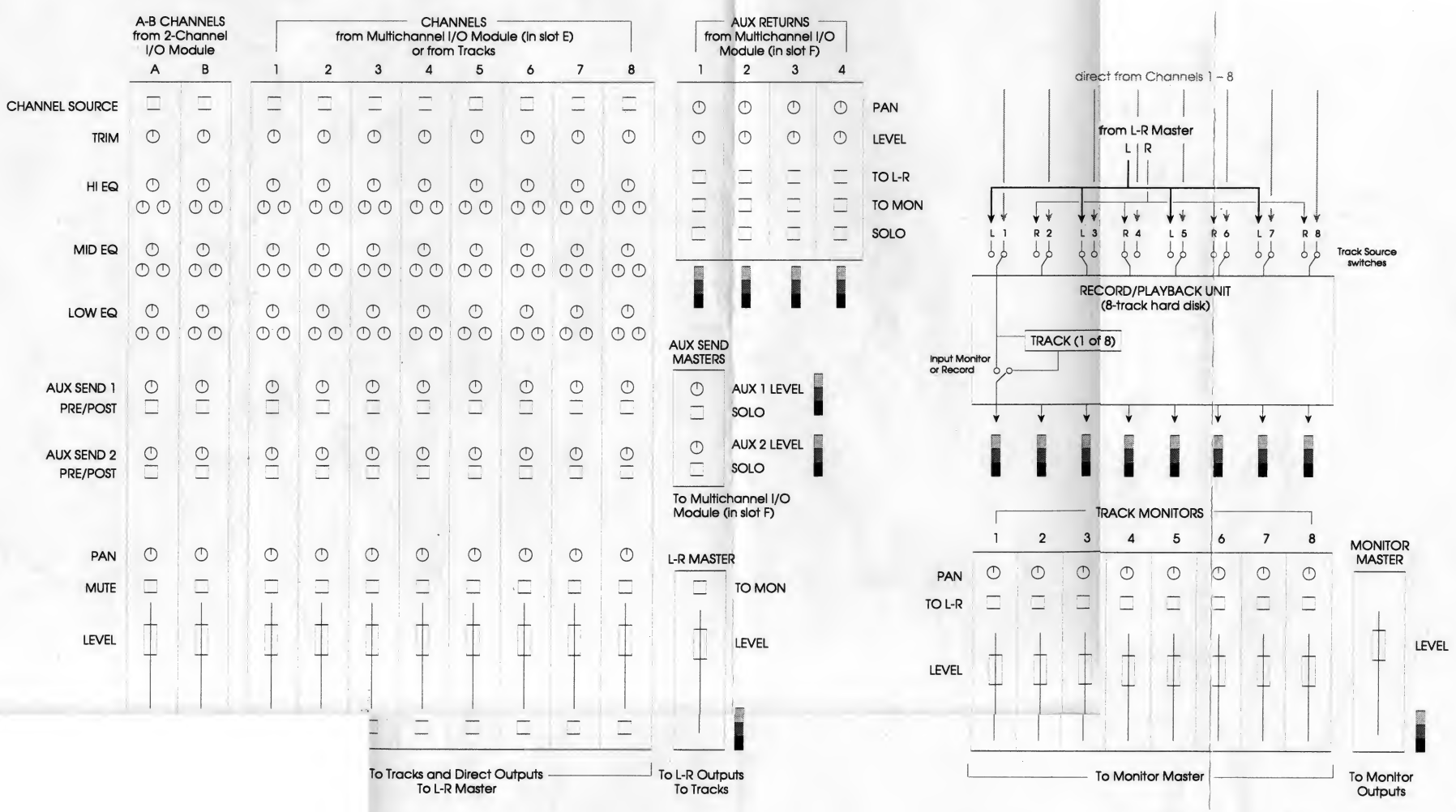
Mixer signal flow—minimum configuration

(systems with only a 2-CHANNEL I/O MODULE)

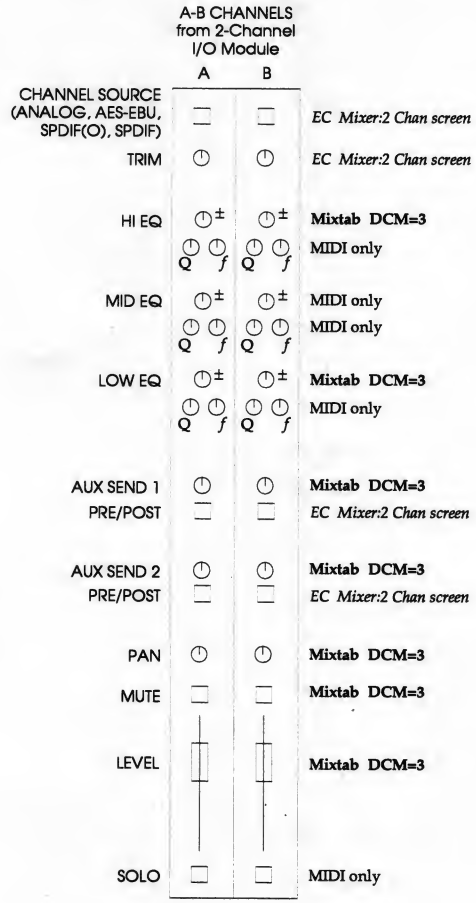


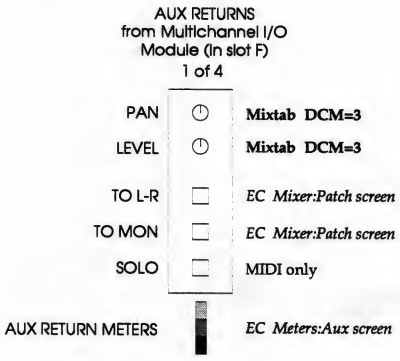
Conceptual console

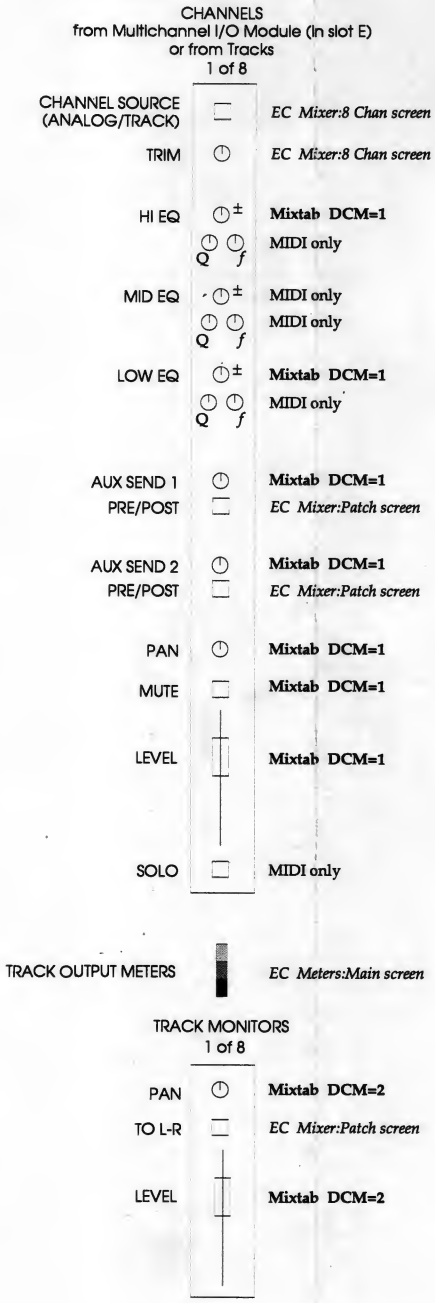
This page illustrates how the *Foundation 2000* mixer would appear if its controls were arranged on a console.



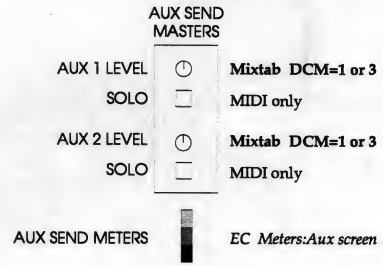
Mixer map

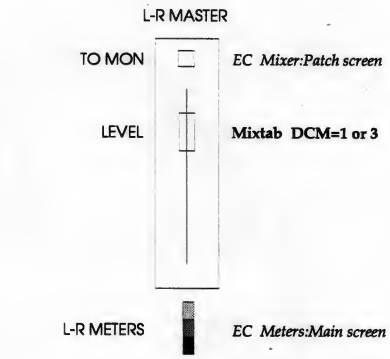


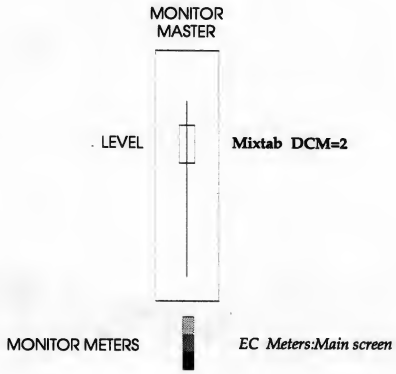




This page maps controls on the Conceptual console illustration to actual controls on the MixTab and Edit Controller (EC) Mixer screens.







MixTab implementation

This page shows the mixer controls available on the MixTab for each position of its DCM SELECT switch.

