CX-8

Digital

Multitrack

Recorder

User's Guide

FOSTEX

FOSTEX

User's Guide for the CX-8

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If you have any suggestions or comments concerning this document, please contact Fostex, 15431 Blackburn Ave., Norwalk, CA 90650.

Version 1.0

The lightning flash with arrow symbol within an equalateral triangle means "electrical caution!" Be alert to all electrical caution messages. They include information about operating voltage and potential risks of electrical shock.

The exclamation point within an equalateral triangle means "caution!" Important operating information is included within caution messages. Read the information next to all caution signs.

fety instructions

Please read the following safety instructions before operating the *CX-8*.

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 & circuit damage, replace only with fuse of the same specified voltage and current ratings.**

12 **Do not perform service operations beyond those described in the *User's Guide.* 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 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.

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Unpacking the CX-8

Package Contents

BEFORE CONNECTING YOUR CX-8, take inventory of the items in your package. Here is a list of standard equipment shipped with your CX-8.

Package Contents	
CX-8	8-track Digital Multitrack Recorder
User's Guide	Operational manual for users
Registration Card	Official registration of ownership
Warranty Info	Warranty information
Power Cable	Cable for connecting CX-8 to power source
Optical Cable	Cable for connecting digital I/O bus
8315 Remote	Remote control unit
S-VHS Tape	Blank S-VHS cassette

Registration Card

Included with your CX-8 package is a registration card. Please take time right now to fill this out and return it. This ensures that you will be notified of all software and hardware upgrades and new products as they become available.

About This Manual

This reference manual contains all the information you need for using the CX-8 in a variety of production environments. This manual is designed to be as user-friendly as possible, organizing the various features of the CX-8 in an intuitive manner. We ask that you take the time to read it thoroughly once, and familiarize yourself with the table of contents and indices, so that in the future you will know where to find the information you need. In a hurry? We recommend you go to chapter 2, "Instant Gratification" and get started.

Conventions

All front panel buttons, LEDs, display icons and rear panel connectors are referred to in this manual just as their names appear on the CX-8, using all capital letters and in brackets (*Examples:* **[PLAY]** button, **[AUTO INPUT]** button, **EDIT** icon, etc.).

The following icons appear periodically in the left column. They indicate special information.

Name	Description
Note	Additional, peripheral information concerning the topic being discussed.
Hint	These are shortcuts or ways for more experienced users to perform a particular operation.
Caution	Be careful! Important operating information is included within caution messages. Read the information next to all caution signs.
Electrical Caution	Be alert to all electrical caution messages. They include information about operating voltage and potential risks of electrical shock.

AC Power Hookup

With the CX-8 off, plug the female end of the power cord into the CX-8's **[POWER INPUT]** socket and the male (plug) end into a source of AC power. It's good practice to not turn on the CX-8 until all other cables are hooked up.

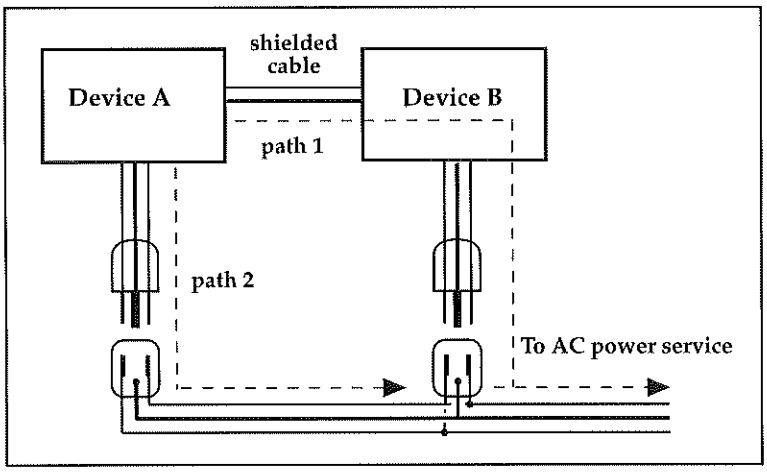
The CX-8 works with *any* AC voltage from 90 to 250 volts, 50 to 60 Hz. This eliminates the need for transformers or voltage switches. Your CX-8 was supplied with the correct power cord for your country or local area.

The CX-8's IEC-spec AC cord (do not substitute any other AC cord) is designed to feed an outlet that includes three pins, with the third, round pin connected to ground. The ground connection is an important safety feature designed to keep the chassis at ground potential. Unfortunately, the presence of a third ground pin does not always indicate that an outlet is properly grounded. Use an AC line tester to determine this. If the outlet is not grounded, consult with a licensed electrician. When AC currents are suspect of being highly unstable in VAC and Hz, a professional power conditioner should be used.

Fostex cannot be responsible for problems caused by using the CX-8 or any associated equipment with improper AC wiring.

Avoiding Ground Loops

In today's studio, where it seems every piece of gear has a computer in it, there are many opportunities for ground loop problems to occur. These show up as hums, buzzes, or sometimes radio reception and can occur if a piece of equipment "sees" two or more different paths to ground, as shown below.



One path goes from device A to ground via the ground terminal of the three-conductor AC power cord, but A also sees a path to ground through the shielded cable and AC ground of device B. Because ground wires have a small amount of resistance, small amounts of current can flow through ground and generate a voltage along the cable shield. This signal may end up getting induced into the hot conductor.

The loop can also act like an antenna into which hum is induced, or can even pick up radio frequencies. Furthermore, many components in a circuit connect to ground. If that ground is "dirty" and contains noise, it might get picked up by the circuit. Ground loops cause the most problems with high-gain circuits, since massive amplification of even a couple millivolts of noise can give an audible signal.

Most ground loop problems can be solved by plugging all equipment into the same grounded AC source. However, it is important to make sure that the AC source is not overloaded and is properly rated to handle the gear plugged into it.

For really tough cases, you may need to break the connection that causes the loop condition. One way to do this is to simply break the shield **of the shielded audio cable** at some point, usually by disconnecting it from ground at one jack. (The other end should remain connected so that the shielding properties are retained, even if there is no direct path for ground.)

Please note that not all hums and buzzes are caused by ground loops; your cables must be of very high quality, particularly with -10 dBV setups.

Line Conditioners and Protectors

Although the CX-8 is designed to tolerate typical voltage variations, in today's world the voltage coming from the AC line may contain spikes or transients that can possibly stress your gear and, over time, cause a failure. There are three main ways to protect against this, listed in ascending order of cost and complexity:

- Line spike/surge protectors. Relatively inexpensive, these are designed to protect against strong surges and spikes, acting somewhat like fuses in that they need to be replaced if they've been hit by an extremely strong spike.

- Line filters. These generally combine spike/surge protection with filters that remove some line noise (dimmer hash, transients from other appliances, etc.).

- Uninterruptible power supply (UPS). This is the most sophisticated option. A UPS provides power even if the AC power line fails completely. Intended for computer applications, a UPS allows you to complete an orderly shutdown of a computer system in the event of a power outage, and the isolation it provides from the power line minimizes all forms of interference—spikes, noise, etc.

About Audio Cables

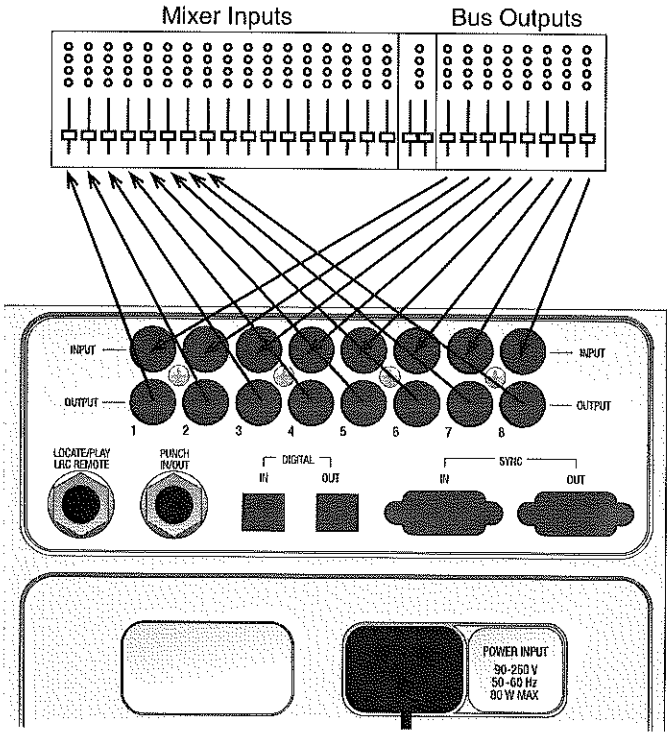
The connections between the CX-8 and your studio are your music's lifeline, so use only high quality cables. These should be low-capacitance shielded cables with a stranded (not solid) internal conductor and a low-resistance shield. Although quality cables cost more, they do make a difference. Route cables to the CX-8 correctly by observing the following precautions:

- Do not bundle audio cables with AC power cords.
- Avoid running audio cables near sources of electromagnetic interference such as transformers, monitors, computers, etc.
- Do not place cables where they can be stepped on. Stepping on a cable may not cause immediate damage, but it can compress the insulation between the center conductor and shield (degrading performance) or reduce the cable's reliability.
- Avoid twisting the cable or having it make sharp, right angle turns.
- Never unplug a cable by pulling on the wire itself. Always unplug by firmly grasping the body of the plug and pulling directly outward.
- Although Fostex does not endorse any specific product, chemicals such as Tweek and Cramolin, when applied to electrical connectors, are claimed to improve the electrical contact between connectors.

Basic Audio Hookup

When connecting audio cables and/or turning power on and off, make sure that all devices in your system are turned off and the volume controls are turned down.

The CX-8 provides eight -10dBV analog outputs via phono connectors. These should be connected to your mixer's tape or line inputs. Alternatively, a multi-pin connector can be used with the CX-8's +4dBu analog inputs and outputs (see the chapter entitled "Connections").



Input Normaling

The CX-8 has eight -10 dBV analog inputs, but you can choose between three different Input Modes: 2-Input Mode, 4-Input Mode and 8-Input Mode. These can provide three different analog audio input hookup options, and are available for both -10 dBV and +4dBu analog inputs:

- **2 Bus Mixer.** Connect the mixer's two bus outputs to the CX-8's INPUTS **[1]** and **[2]**. Select 2-Input Mode on the CX-8 by holding the **[ANALOG INPUT]** button and pressing either Track Select buttons **[1]** or **[2]**; notice that the **INPUT** LEDs for tracks 1 and 2 remain lit until you release the **[ANALOG INPUT]** button.

- **4 Bus Mixer.** Connect the mixer's four bus outputs to the CX-8's INPUTS **[1]** through **[4]**. Select 4-Input Mode by holding the **[ANALOG INPUT]** button and pressing either Track Select buttons **[3]** or **[4]**; notice that the **INPUT** LEDs for tracks 1 through 4 remain lit until you release the **[ANALOG INPUT]** button.

- **8 Bus Mixer/Direct Outputs.** Connect the mixer's eight bus outputs (or 8 direct outputs) to the CX-8's INPUTS **[1]** through **[8]**. Select 8-Input Mode by holding the **[ANALOG INPUT]** button and pressing any Track Select button from **[5]** - **[8]**; notice that the **INPUT** LEDs for tracks 1 through 8 remain lit until you release the **[ANALOG INPUT]** button.

"Threaded" vs. "Unthreaded"

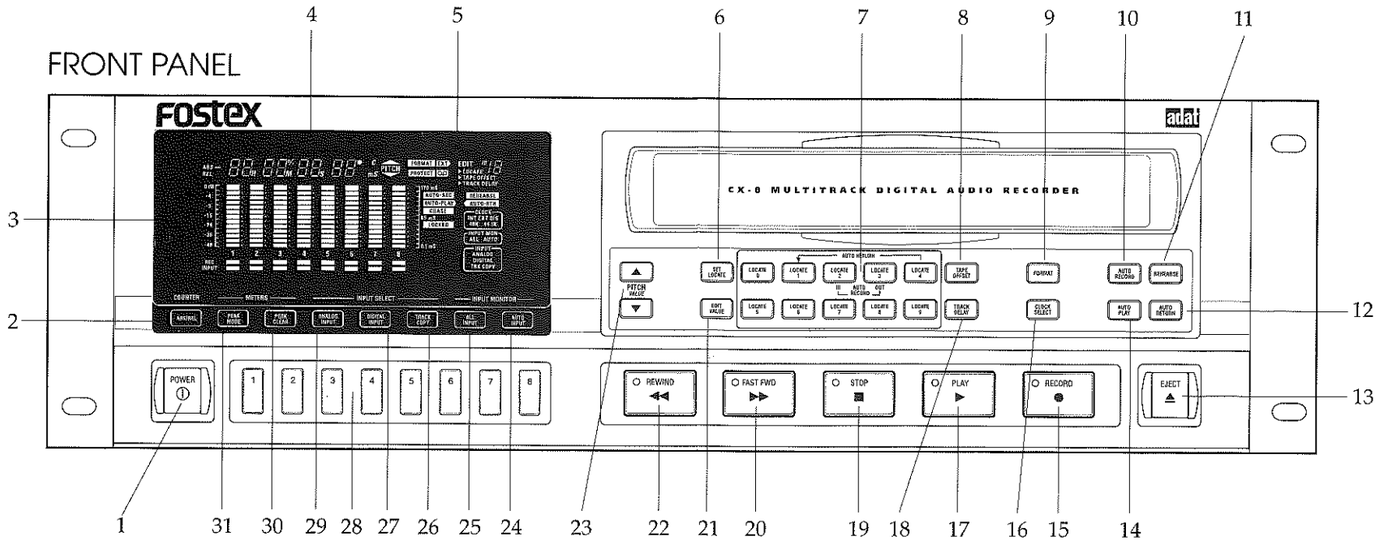
Analog audio recorders typically move tape past the heads at anywhere from 1-7/8 to 30 inches per second. Higher speeds result in a higher *bandwidth*, or an ability to record high-frequency signals. The CX-8's digital audio signals require much higher bandwidth than analog audio signals. In addition to moving the tape faster than standard S-VHS VCRs, the CX-8 increased the head/drum speed for increased bandwidth. In contrast to analog multi-track recorders, the tape and rotating heads of the CX-8 remain in contact when the tape is stopped. This allows for going into play or record faster, as well as "cue" and "review" functions that let you monitor the tape audio in fast forward or rewind.

When the tape is unthreaded (the **[STOP]** LED will be flashing), the head is not spinning and it takes slightly longer to go into play or record. This is because the tape moves away from the head automatically after being stopped for 4 minutes, in order to prolong tape and head life. When a tape is threaded, rewinding or fast forwarding will operate 40 times faster than normal play speed. Cue and review functions are not possible while the tape is unthreaded.

When the tape is threaded and stopped (the **[STOP]** LED will remain lit), you can manually unthread it by pressing the **[STOP]** button. The **[STOP]** LED will flash, indicating the tape is now unthreaded. Pressing either **[PLAY]** or **[STOP]** will re-thread the tape (or by simultaneously pressing **[PLAY]** and **[RECORD]** to engage recording).

If the tape is threaded, and no transport activity (play, record, rewind, etc.) occurs for 4 minutes, the tape will automatically unthread itself to minimize tape wear.

FRONT PANEL



1 **POWER switch** turns the unit on and off.

2 **ABS/REL** button switches the TIME counter between Absolute Time and Relative Time modes.

3 **Peak Meters** indicate the input and playback levels for all eight tracks.
When editing Track Delay, the meters will indicate each track's delay amount.

4 **TIME counter** displays tape position. When the **PITCH ▲/▼** buttons are used, the pitch setting is momentarily displayed here. In Edit mode, it displays parameter values.

5 **The display** contains many icons which indicate the status of various features. In Edit mode, some of these icons indicate which feature is selected for editing.

6 **SET LOCATE button** is used to store tape positions into any of the 10 **LOCATE** buttons.

7 **LOCATE buttons** store tape positions for instant access. In Edit mode, these buttons select and display their stored tape positions for editing in the display. When the **EDIT VALUE** button is held, these buttons act as a 10-digit keypad (0-9) for editing parameter values in the display.

8 **TAPE OFFSET button** turns on and off the Tape Offset feature (for use in a multiple ADAT system only). In Edit mode, this button selects the Tape Offset amount for editing.

9 **FORMAT button** turns on and off Format mode.

10 **AUTO RECORD button** turns on and off the Auto Record feature. This lets you automatically record (punch in/out) between the stored **LOCATE 2** and **LOCATE 3** tape positions.

11 **REHEARSE button** turns on and off Rehearse mode. This allows you to audition and automatic recording (punch in/out) without actually recording.

12 **AUTO RETURN button** turns on and off the Auto Return feature. This makes the transport automatically return to the stored **LOCATE 1** position upon reaching the stored **LOCATE 4** tape position.

13 **EJECT button** ejects the tape.

14 **AUTO PLAY button** turns on and off the Auto Play function. This makes the transport automatically enter play mode after completing a locate command.

15 **RECORD button** initiates recording, when pressed while **PLAY** is held.

16 **CLOCK SELECT button** lets you choose between two different internal clock sample rates (48 kHz and 44.1 kHz) and a digital clock (for recording from the **DIGITAL IN**.

17 **PLAY button** initiates play mode. During record mode, pressing **PLAY** will punch-out of record.

18 **TRACK DELAY button** turns on and off the Track Delay feature. In Edit mode, this selects the Track Delay amounts for editing in the display.

19 **STOP button** stops the transport.

20 **FAST FWD button** initiates fast forwarding of the tape. If pressed while **PLAY** is held, cue mode is initiated.

21 **EDIT VALUE button** turns Edit mode on and off. When this button is held, the **LOCATE** buttons may be used as a 10-digit keypad (0–9) for editing parameter values in the display, and the **▲/▼** buttons may be used to select a specific digit in the display for editing with the 10 **LOCATE** buttons.

22 **REWIND button** initiates rewinding of the tape. If pressed while **PLAY** is held, review mode is initiated.

23 **PITCH ▲/▼ buttons** are used to adjust the Pitch amount. When held, the Pitch amount is changed either up or down.

24 **AUTO INPUT button** turns on and off Auto Input mode. When off, any record-enable tracks will always monitor their input. When on, record-ready tracks will only monitor their input while in record or stop modes. This is a useful feature when punching in and out over a previous recording.

25 **ALL INPUT button** turns on and off All Input mode. When on, all tracks will monitor their inputs, regardless of their record-ready status.

26 **TRACK COPY buttons** selects Track Copy mode. This allows you to bounce the audio between tracks on the CX-8 without the need for external patching.

27 **DIGITAL INPUT buttons** selects Digital Input mode. This allows you to record from the **DIGITAL IN**.

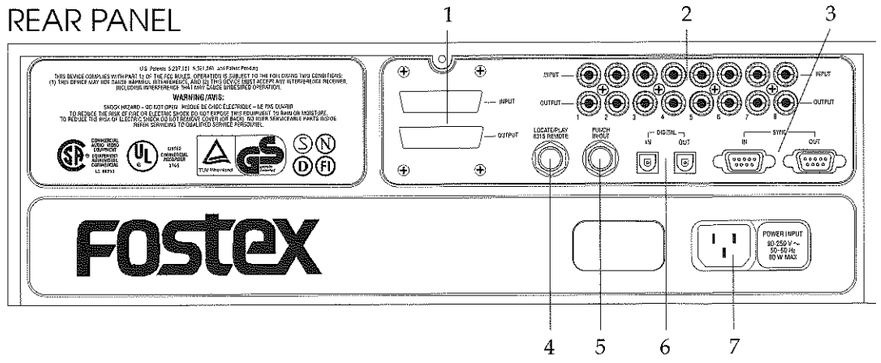
28 **RECORD ENABLE buttons [1] – [8]** toggle each of the eight tracks between record-ready mode and safe mode. This may be done before or while recording. When editing Track Delays, these buttons select one of the eight tracks for editing its Track Delay amount in the display.

29 **ANALOG INPUT button** selects Analog Input mode. This allows you to record from both the unbalanced and balanced analog inputs.

30 **PEAK CLEAR button** clears the meters' peak LED when either Continuous or Momentary Peak modes are selected.

31 **PEAK MODE button** lets you select between three Peak Modes for the meters: Continuous, Momentary, or Off.

REAR PANEL



1 **+4 dBu Balanced inputs/outputs** (DB25 multipin connectors).

2 **-10 dBV Unbalanced inputs/outputs** (RCA connectors).

3 **SYNC IN/OUT connectors** for linking multiple ADATs.

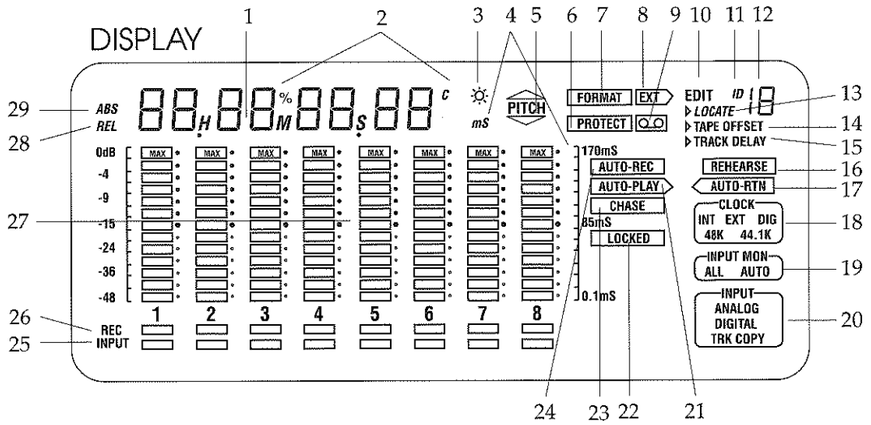
4 **LOCATE/PLAY/LRC REMOTE jack** is for footswitch controlled locating or playing, or for use with the 8315 hand-held remote control.

5 **PUNCH IN/OUT jack** is for footswitch controlled punching, or for use with the 8315 hand-held remote control.

6 **DIGITAL IN/OUT connectors** for recording and playing back digital audio from/to other CX-8s or ADAT Compatible™ devices.

7 **POWER INPUT AC power connector.**

DISPLAY



1 **TIME counter** displays tape position. When the **PITCH** ▲/▼ buttons are used, the pitch setting is momentarily displayed here. In Edit mode, it displays parameter values.

2 **Cents** and **%** icons light when adjusting Pitch controls using the **PITCH** ▲/▼ buttons.

3 **Interpolation Indicator** flashes when errors have been detected and corrected using a proprietary interpolation method. It is a good idea to clean the tape heads and/or make a backup copy of your tape if you ever see this icon light.

4 **Milliseconds** icons light when adjusting Track Delay amounts.

5 **PITCH** icon lights when editing Pitch controls and the Pitch amount displayed in the TIME counter.
▲ icon lights whenever the Pitch amount is greater than 0.
▼ icon lights whenever the Pitch amount is less than 0.

6 **PROTECT** icon lights when a tape is inserted that has its write-protect tab removed.

7 **FORMAT** icon flashes when a blank, unformatted tape is inserted, and lights solid when Format mode is turned on (by pressing the **FORMAT** button).

8 **EXT** icon will light along with the **FORMAT** icon whenever performing a format extend.

9 icon will light whenever a tape is inserted.

10 **EDIT** icon will light whenever Edit mode is selected (by pressing the **EDIT VALUE** button). Below it are three icons, only one of which will be lit at any one time. These include: ***LOCATE***, **TAPE OFFSET** and **TRACK DELAY**.

11 ***ID*** icon lights when the CX-8 is first turned on, if it is connected to a multi-ADAT system. The number appearing to the right of the ***ID*** icon will indicate the ID number of the unit (1–16).

12 **Edit Number.** In Edit mode, this indicates either the selected track (1–8) when editing Track Delay amounts or the selected Locate (0–9) being edited. If connected to a multi-ADAT system, this will indicate the ID number of the unit (1–16) on power-up.

13 ***LOCATE*** icon indicates that you are editing a Locate Point's address, which will appear in the TIME counter. A number (from 0 to 9) will appear next to the **EDIT** icon to indicate which Locate Point is being edited.

14 **TAPE OFFSET** icon lights when the Tape Offset function turned on with a value that is not equal to 0:00:00.00. This function is only available when the CX-8 is used within a multi-ADAT system. When in Edit Mode, this icon indicates that you are editing the Tape Offset amount, which will appear in the TIME counter.

15 **TRACK DELAY** icon lights when the Track Delay function is turned on. When in Edit Mode, this icon indicates that you are editing a track's delay amount, which will appear in the TIME counter. A number (from 1 to 8) will appear next to the **EDIT** icon to indicate which track is being edited. The peak meters will also show a bar-graph representation of the current delay values for all eight tracks.

16 **REHEARSE** icon lights when the Rehearse function has been turned on

17 **AUTO RETURN** icon lights when the Auto Return function has been turned on.

18 **CLOCK** group of icons indicates which clock source is being used. The **[CLOCK SELECT]** button lets you toggle through the various options, including: **INT 48K** (internal clock at 48kHz), **INT 44.1K** (internal clock at 44.1 kHz), **DIG 48K** and **DIG 44.1K** (external clock source connected to the **[DIGITAL IN]** connector on the rear panel). If the CX-8 is a slave in a multiple ADAT system, the **EXT** icon will light, indicating that the CX-8 is deriving its clock from the master ADAT in the system.

19 **INPUT MON** group includes two icons: **ALL** and **AUTO**. The **ALL** icon will light whenever the All Input function is enabled (by pressing the **[ALL INPUT]** button). The **AUTO** icon will light whenever the Auto Input function is enabled (by pressing the **[AUTO INPUT]** button).

20 **INPUT** group of icons indicates which input source is being used. The **ANALOG** icon will light whenever the Analog Inputs are selected (by pressing the **[ANALOG INPUT]** button). The **DIGITAL** icon will light whenever the Digital Inputs are selected (by pressing the **[DIGITAL INPUT]** button). The **TRK COPY** icon will light whenever the Track Copy function is selected (by pressing the **[TRACK COPY]** button).

21 **AUTO PLAY** icon lights when the Auto Play function has been turned on.

22 **LOCKED** icon lights when the transport is properly engaged in either playback or recording.

23 **CHASE** icon lights when the CX-8 is slaving to an external timecode source coming from the master ADAT in a multiple ADAT system.

24 **AUTO RECORD** icon lights when the Auto Record function has been turned on.

25 **INPUT** LEDs (1–8) indicate which tracks are monitoring their inputs (on) and which are monitoring tape (off).

26 **REC** LEDs (1–8) indicate which tracks are in record-ready (flashing) or in record (on), and which tracks are safe (off).

27 **13-segment Peak Meters** (1–8) indicate the levels of each of the eight tracks. **MAX** LED will light to indicating clipping.

28 ***ABS*** icon lights whenever Absolute Time mode is selected (by pressing the **[ABS/REL]** button)

29 ***REL*** icon lights whenever Relative Time mode is selected (by pressing the **[ABS/REL]** button)

A Word on S-VHS Cassette Tape

Fostex recommends you use only *premium quality, name brand* S-VHS cassettes. We cannot overemphasize the importance of this. We recommend using AMPEX 489 DM Digital Mastering Audio Tape. Other acceptable brands include Maxell XR-S Black, JVC XZ, 3M Master Broadcast and ASD 40+, and TDK SP Super Pro. The cassette shell, hubs, rollers and tape guides in S-VHS cassettes are precision devices that properly handle and protect the tape within them.

Do not use inexpensive, budget VHS tapes. ONLY USE S-VHS TAPES.

We do not recommend that you use inexpensive, budget VHS cassettes. While they may work technically, their unpredictable quality and less than premium formulation will decrease the reliability of your recording. Inferior tapes not only jeopardize the recordings made on them, they may shed oxide and leave behind a coating of dirt that will interfere with future recordings, even if you switch back to premium quality tape. Defective tape may even clog the head, requiring service. Don't trust your work to anything less than premium quality S-VHS tape.

Accidents can happen – so, like computer floppy disks and hard disks, your CX-8 tapes should be backed up to prevent loss. Back up your tapes to another CX-8 or ADAT using the fiber optic digital connector (see *Making Backups* on page 103).

Treat your tapes as the precision, fragile components that they are. Do not expose them to extremes of heat, cold, or humidity (in other words, don't leave them in your car). Never place tapes near magnetic fields (such as power amps, TVs, monitors, magnets, etc.) and handle tapes gently.

Operating Environment

Thermal Considerations in Rack Mounting

The CX-8 can be mounted in an equipment rack (taking up 3 rack spaces) or placed on a table or shelf. When you install it, keep in mind that *heat is the major enemy of electronic equipment*. Please observe the following:

- The CX-8 is designed to perform properly over a range of ambient temperatures from 10° C to +40° C (50° F to 104° F), in up to 80% non-condensing humidity. These are not absolute limits, but Fostex cannot guarantee that the CX-8 will meet its published specs or remain reliable if operated outside of these ranges.

- Always allow adequate ventilation behind the CX-8 . Do not seal any enclosure that holds the CX-8 . It is not necessary to leave an empty rack space above or below the CX-8 unless it runs hot enough to affect equipment above or below it.

Mounting on a Shelf or Non-Rack Enclosure

To mount the CX-8 on a shelf or other flat surface, Fostex recommends using the enclosed stick-on feet to avoid scratching the shelf's surface with the deck's bottom.

Please observe the general comments on thermal considerations given under "Thermal Considerations in Rack Mounting" no matter where or how the deck is mounted.

Avoiding Electromagnetic Interference

Like all tape machines, the CX-8 uses magnetic tape that can be sensitive to electromagnetic interference. Generally this is not a problem, but avoid mounting the CX-8 next to devices that generate strong magnetic fields such as power amplifiers, monitors and video display devices, speakers, etc.

INSTANT GRATIFICATION

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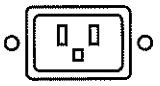
Overview

INSTANT GRATIFICATION is designed to quickly help you setup the CX-8 so you can be up and running. It contains a basic overview of the main features so you can get familiar with the unit's operation. The CX-8 has more functionality than what is covered in this section. Consult the remainder of this manual for detailed information on topics such as digital bouncing, auto-locating, auto-recording and synchronizing.

Power-up, and Tape Insertion



Connect the power cord which accompanies the CX-8 between the three-prong power socket on the back panel and an AC outlet receptacle. Please note that there are grounding considerations to be aware of. See pages 14–16 for more information.

The CX-8 can produce a transient audio signal during power up and power down. When turning the CX-8 on or off, be sure to keep monitor levels low.

Turn the CX-8's power on by pressing the **[POWER]** button. At power-up, the look of the display will depend on the status of the tape chamber.

- If a formatted tape is present, the TIME counter will show the elapsed time since the beginning of the tape (unless it is somewhere in the first two minutes of tape, called the "lead" and "data" sections):

- If an unformatted tape is present, the **FORMAT** icon will flash and the TIME counter will read:

- If there is no tape, the display shows:

Insert the tape with the hinged door end first, label side up, until you encounter a slight bit of resistance. Push gently on the center of the tape cassette until the CX-8 draws the tape inward; never force the tape into the cassette door.

Formatting A Tape – A MUST!

Formatting prepares a tape for 8 channels of audio, and adds a master timecode reference and sample rate information to the data section. Similar to formatting a floppy disk to use on a computer or sampler, formatting an CX-8 tape time-stamps the tape to single-sample accuracy so that audio is referenced to an accurate time base. This makes the synchronization process between CX-8 and ADAT compatible machines possible and provides both accurate tape counter readings and intelligent autolocation functions.

For more information, see *Tape Formatting* in the "Basic Operations" chapter. After completing the following exercise, we recommend you perform a complete format.

Formatting a tape erases audio on all eight tracks. Be sure to check that the tape is either blank or contains unwanted material before formatting. We recommend that you format your tapes completely from beginning to end.

Sample Rate Selection

Before formatting, select the sample rate you will be using (either 48 kHz or 44.1 kHz). This is done by pressing the **[CLOCK SELECT]** button.

Each time **[CLOCK SELECT]** is pressed, the CX-8 will cycle between **INT 48K**, **INT 44.1K** and **DIG** (the section on the right side of the display labeled **CLOCK** will indicate the currently selected sample rate). *Note:* For more information about the **DIG** option (Digital Audio Clock), see page 77.

Formatting a New tape

To Format a new tape:

① Insert a fresh, blank tape.
The CX-8 will acknowledge that this is an unformatted tape; the **FORMAT** *icon will flash in the display while the counter display reads "noFO."*

② Press the **[FORMAT]** button.
The word **[FORMAT]** *in the display will stop flashing and remain lit. The* **[RECORD]** *LEDs for tracks 1 through 8 will now be flashing.*

③ Hold **[RECORD]**, and then press **[PLAY]**.
If the tape was not completely rewound, the CX-8 will automatically rewind it to the beginning. The CX-8 then performs a complete format by recording 15 seconds of leader (the LED display will read "LEAd"), followed by two minutes of data (the display will read "dAtA"), then timecode starting at 0:00:00.00 and continuing to the end of the tape.

Recording While Formatting

You can record onto tape *while* formatting. Simply press any of the RECORD ENABLE buttons **[1]**–**[8]** for any track(s) you wish to record on before pressing the **[FORMAT]** button. Prepare your source material to start playback at 0:00:00.00 on the CX-8 or later (do not begin recording before 0:00:00.00). See next section for more information on setting levels and recording.

Making A Recording

Recording on the CX-8 is very similar to most multitrack tape machines. The process involves formatting a tape (see previous tutorial), putting one or more tracks into record-ready, adjusting record levels on your mixer, setting the input monitor mode, locating to the start tape address and engaging record. In this tutorial, we will be recording from the analog audio inputs at the start of the audio portion of the tape (0:00:00.00). For more information on this and recording from the digital bus, see pages 65 through 72.

Track Selection and Setting Levels

You'll find the RECORD ENABLE buttons ([**1**]–[**8**]) for all eight tracks on the left side of the front panel, beneath the display. A track is considered "safe" when its [**REC**] LED is off, in "record-ready" when its [**REC**] LED is flashing, and in record when its [**REC**] LED is lit solid.

To record-enable a track:

① Choose a track to record on, and press the track's associated RECORD ENABLE button [**1**]–[**8**].
The selected track's [**REC**] *LED will flash to indicate it is in record-ready.*

② Send an audio signal to the track(s) you have placed into record-ready.
Adjust the levels on your mixer so that the "average" level is at -15 dB on the peak meters of the CX-8 and the loudest section never goes beyond 0 dB. Digital audio recording is different from analog recording, and therefore requires a different method when setting levels. For more information, see Setting Levels *on page 72.*

③ To take a track out of record-ready (safe), press its associated RECORD ENABLE button again.
The selected track's [**REC**] *LED will turn off to indicate it is safe.*

Time Counter

Before recording, you should familiarize yourself with the transport buttons, and the 7-segment TIME counter in the top left corner of the display. Ordinarily, the TIME counter will show Absolute (ABS) time, which is the exact time reference being read directly off a formatted tape.

The tape position is displayed as hours:minutes:seconds.hundredths-of-a-second.

Pressing the [**ABS/REL**] button will toggle the display between ABS Time and Relative Time. The display will either indicate **ABS** or **REL** to the left of the TIME counter.

Relative Time reflects the current tape position *relative* to where you set the Relative 0:00:00.00 position. This is similar to resetting the tape counter on a cassette deck. However, the CX-8 gives you the option of reading the actual tape position (ABS Time) or the tape position relative to the location you marked as 0:00:00.00 (Relative Time).

Before you start recording, for the first time be sure the TIME counter is set to ABS Time to avoid confusion. *For more information, see page 61.*

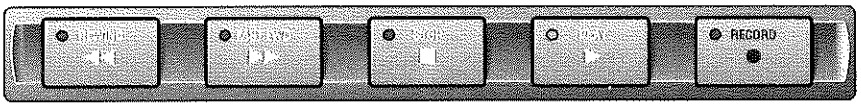
To set the Relative 0:00:00.00 position (Locate 0):

① Press [**PLAY**], [**FAST FWD**] or [**REWIND**] as required to move the tape to the position you wish to regard as "0:00:00.00" (Relative Time). *Remember, ABS Time is the timecode being read from tape. Setting the Locate 0 position is always done in Relative Time.*

② Press [**SET LOCATE**], immediately followed by pressing [**LOCATE 0**]. *The current tape position is stored into Locate 0, and the TIME counter will display :*

Transport Buttons

During recording and playback, the following transport buttons are used frequently. Get familiar with them by using them while watching the TIME counter.



REWIND	High speed reverse. Press with [**PLAY**] to initiate *review*.
FAST FWD	High speed forward. Press with [**PLAY**] to initiate *cue*.
STOP	Stops transport and disables recording. While the transport is stopped, this button toggles between threaded (LED lit) and unthreaded modes (LED flashing).
PLAY	Starts playback. Initiates recording when pressed with [**RECORD**]. Stops recording when in record mode while continuing to play. Press with [**FAST FWD**] to initiate *Cue*. Press with [**REWIND**] to initiate *Review*.
RECORD	Press with [**PLAY**] to initiate recording.

Recording

Recording takes place only on tracks that are in record-ready. When you start recording, the [**RECORD**] LED lights, and the [**REC**] LEDs for those tracks in record-ready will stop flashing and remain lit. If no tracks are in record-ready when recording takes place, the [**RECORD**] LED will flash to indicate that pressing any of the RECORD ENABLE buttons will initiate recording on the selected track.

To make a recording:

① Use the [**REWIND**] or [**FAST FWD**] button to locate to the desired tape position.
Either the [**REWIND**] *or* [**FAST FWD**] *LED will light (depending on which button was pressed), indicating that the transport is moving in that direction. The TIME counter will indicate the current tape location status while the transport is in motion.*

② When you've arrived at the desired tape address, press [**STOP**].
The [**STOP**] *LED lights.*

③ Hold **[PLAY]**, and then press **[RECORD]**.
Both the **[PLAY]** *and* **[RECORD]** *LEDs light to indicate you are recording.*

④ To go in and out of record on individual tracks while record mode is engaged, press any of the RECORD ENABLE buttons **[1]** – **[8]**.
Record-enabled tracks will have their **REC** *LED lit. If no tracks are record-enabled during recording, the* **[RECORD]** *LED will flash.*

⑤ To punch out without stopping, press **[PLAY]**.
The **[RECORD]** *LED turns off, while the* **[PLAY]** *LED remains lit.*

⑥ To punch out and stop the transport, press **[STOP]**
The **[RECORD]** *and* **[PLAY]** *LEDs turn off; the* **[STOP]** *LED lights.*

When recording for the first time, be sure the Auto Input function is off. When recording over previous material (also known as punching), turn the Auto Input function on. Use the **[AUTO INPUT]** button to turn Auto Input on and off. The **AUTO INPUT** icon will light in the display when Auto Input is on. See page 68 for more info.

Playback

There are several ways to quickly play back your recording. You'll use the transport buttons first.

To play back a recording:

① Press **[REWIND]** to locate back to a tape position before you engaged recording.
The **[REWIND]** *LED will light and the TIME counter will roll backward to indicate the current tape location status while the transport is in motion.*

② Once you have arrived at the desired tape address, press **[STOP]**.
The **[REWIND]** *LED will turn off and the* **[STOP]** *LED will light.*

③ Press **[PLAY]**.
The **[PLAY]** *LED will flash briefly, and then will light to indicate play mode has been engaged.*

④ Press **[STOP]** to stop playback.
The **[PLAY]** *LED will turn off and the* **[STOP]** *LED will light.*

Reviewing and Cueing

When you are trying to locate a particular section of a recording, it is often helpful to use the *review* and *cue* modes on the CX-8. Review mode lets you play the tape in reverse at a speed 3 times faster than play while hearing "fragments" of audio. Cue mode, on the other hand, plays forward at a speed 3 times faster than Play mode while also letting you hear "chunks" of audio. By listening to the audio in either mode, you can quickly find the section you are looking for.

To engage Review mode:

① Simultaneously press [**REWIND**] and [**PLAY**].
The [**PLAY**] *LED will light and the* [**REWIND**] *LED will flash.*

② Press [**PLAY**] to resume Play mode.
The [**PLAY**] *LED will remain lit while the* [**REWIND**] *LED will turn off.*

③ Alternatively, you can press [**STOP**] to stop the transport.
Both the [**PLAY**] *and* [**REWIND**] *LEDs will turn off, and the* [**STOP**] *LED will turn on.*

To engage Cue mode:

① Simultaneously press [**FAST FWD**] and [**PLAY**].
The [**PLAY**] *LED will light and the* [**FAST FWD**] *LED will flash.*

② Press [**PLAY**] to resume Play mode.
The [**PLAY**] *LED will remain lit while the* [**FAST FWD**] *LED will turn off.*

③ Alternatively, you can press [**STOP**] to stop the transport.
Both the [**PLAY**] *and* [**FAST FWD**] *LEDs will turn off, and the* [**STOP**] *LED will turn on.*

Locating

Up to 10 tape positions can be stored for easy recall. These are called *Locate Points*, and can be stored either "on the fly" while the transport is engaged, or when the transport is stopped. Once a Locate Point is stored, its corresponding tape position can be edited. For more info about locating and editing Locate Points, see page 84.

Each Locate Points' tape position will be shown in either ABS Time or Relative Time, depending on which is selected. The tape positions themselves, however, do not move when switching between these modes.

To store locate points "on the fly":

① Press [**PLAY**], [**FAST FWD**] or [**REWIND**] to set the transport in motion.

② Press or hold [**SET LOCATE**].
The **LOCATE** *icon will appear in the display immediately followed by a flashing dash (–).*

③ While holding [**SET LOCATE**] (or within two seconds after releasing [**SET LOCATE**]), press one of the [**LOCATE 1**] – [**LOCATE 9**] buttons.
The current tape position is transferred into the selected Locate Point.

To edit locate points:

① Press the [**EDIT VALUE**]button.
The **EDIT** *icon will appear in the display along with one of three icons appearing below it:* ***LOCATE****,* **TAPE OFFSET** *or* **TRACK DELAY**.

② Use [**LOCATE 0**] – [**LOCATE 9**] buttons to select a Locate Point Memory.
The ***LOCATE*** *icon will appear (if not already present) and a number from 0 to 9 will appear to its right to reflect the button you have pressed.*

③ Hold [**EDIT VALUE**] and use the [**LOCATE 0**] – [**LOCATE 9**] buttons as a numeric key-pad (0-9) to enter a tape position
Enter the tape position from left to right. Example: To enter 0:05:00.00, you would hold [**EDIT VALUE**] *and type* [**LOCATE 5**], [**LOCATE 0**], [**LOCATE 0**], [**LOCATE 0**], [**LOCATE 0**].

④ Use the [▲] and [▼] buttons to fine adjust the Locate Point address as desired.

To recall a locate point:

① Press one of the [**LOCATE 1**] through [**LOCATE 9**] buttons.
Either fast forward or rewind will engage, as indicated by either button's LED. When the locate function is complete, the transport will stop, and the [**STOP**] *LED will light. If you wish the transport to automatically go into play after the locate function is complete, turn on Auto Play (see next section).*

To set the Relative 0:00:00.00 position (Locate 0):

① Press [**PLAY**], [**FAST FWD**] or [**REWIND**] as required to move the tape to the position you wish to regard as "0:00:00.00" (Relative Time).
Remember, ABS Time is the timecode being read from tape. Setting the Locate 0 position is always done in Relative Time.

② Press [**SET LOCATE**], immediately followed by pressing [**LOCATE 0**].
The current tape position is stored into Locate 0, and the TIME counter will display :

Creating A Loop

The Auto Return function causes the CX-8 to automatically rewind back to a specified tape position (Locate 1) when playback or recording has reached a specified position (Locate 4). Both Locates 1 and 4 are assignable to any tape position using the methods described in the previous section.

The Auto Play function is used to automatically engage playback whenever a locate function is completed. By using both the Auto Return and Auto Play functions, a loop can be created whereby the same region of tape is repeatedly played back. For more information on related functions, see the section entitled *Autolocation Controls* in Chapter 4.

To loop a section of tape:

① Store the position where you want the loop to begin into **[LOCATE 1]**.
Refer to the previous section for instructions.

② Store the position where you want the loop to end into **[LOCATE 4]**.

③ Press [**AUTO RETURN**] to enable Auto Return.
In the right side of the display, the **AUTO-RETURN** *icon will appear. The CX-8 will now automatically rewind back to the tape position stored in Locate 1 upon reaching the tape position stored in Locate 4.*

④ Press [**AUTO PLAY**] to enable Auto Play.
In the right side of the display, the **AUTO-PLAY** *icon will appear. The CX-8 will now automatically engage playback upon completing a locate.*

⑤ If necessary, press [**REWIND**] to rewind the tape to a location that is before Locate 4's position. Or, you can press **[LOCATE 1]** to locate directly to its stored tape position.

⑥ Press [**PLAY**] to engage playback.
The [**PLAY**] *LED will light and the transport will go into Play mode. When Locate 4's position is reached, the tape will automatically rewind back to Locate 1's position and then automatically go back into Play mode.*

If the current Locate 1 position is set beyond the current Locate 4 position and Auto Return is turned on, the **AUTO-RTN** *icon in the display will flash to indicate that Locate 1 or 4 will have to be set properly before this function will operate.*

Automated Recording

So far, all of your recording has been done manually — you pressed the transport buttons when you wanted to start and stop recording. Auto recording stops and starts recording automatically at predetermined times. This is useful when you want to precisely punch in to a specific place on one or more tracks.

In this section, we will be storing the punch points (called Punch In and Punch Out) "on the fly" while playback is engaged. You can, however, manually modify the precise Punch In and Out points. Auto Return and Auto Play (described in the previous section) help make Auto Recording more functional. For more information, see page 88.

To automatically punch in and out:

① Store the tape position where you want to begin recording into **[LOCATE 2]**.
Refer to page 32 for instructions.

② Store the tape position where you want to end recording into **[LOCATE 3]**.

③ Press **[AUTO RECORD]** to enable Auto Record
In the right side of the display, the **AUTO-REC** *icon will appear. Note: If Locate 2's position is past Locate 3's position, the TIME counter will temporarily read "* inAL id*".*

④ Press **[REWIND]** to rewind the tape before Locate 2's position.

⑤ Record enable the track(s) you wish to record on.
The selected tracks' **[REC]** *LEDs flashes.*

⑥ Simultaneously press **[PLAY]** and **[RECORD]**.
The **[PLAY]** *LED lights, the* **[RECORD]** *LED flashes and the transport will engage Play mode. When Locate 2's position is reached, the CX-8 will automatically punch-in (*[PLAY], **[RECORD]** *and track* **[REC]** *LED(s) stop flashing and remain lit). Recording will continue until Locate 3's position is reached, at which point the CX-8 will automatically punch-out, returning to play mode (*[PLAY] *LED lit,* **[RECORD]** *LED off, track* **[REC]** *LEDs flashing).*

⑦ Press **[STOP]** to stop the transport.

If none of the tracks are in record-ready (all eight **[REC]** *LEDs off) when the punch-in point is reached, the* **[RECORD]** *LED will continue flashing instead of lighting solid.*

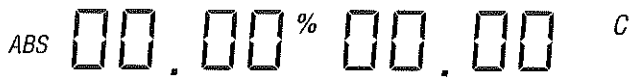
If a record is initiated past Locate 2's position, but before Locate 3's position, then record is entered immediately. If the record is initiated after Locate 3's position, then the record command is ignored and the transport is left in play mode.

Rehearsing

By pressing the **[REHEARSE]** button (the **REHEARSE** icon will light in the display), you can run through the Auto-Record process without actually recording anything. However, the input monitors on the tracks that enabled for recording will switch from tape to input when the punch-in occurs, and back to tape when the punch-out occurs (this requires that the Auto Input function be turned on, see page 68). The **[RECORD]** LED will continue flashing throughout the punch in and out. This way you can try out your punch locations first without recording over anything. In other words, you can measure twice (or more), and cut only once!

Pitch Control

The Pitch function controls the speed of the tape, and thus the pitch of the audio recorded on tape. The CX-8's Pitch control has a range of -300 to +100 cents when using a sample rate of 48kHz, and a range of -200 to +200 cents when using 44.1 kHz. Use the **PITCH** [▲] and [▼] buttons to control the amount of pitch change. When either button is pressed once, the **PITCH** icon lights in the display, and the TIME counter immediately displays the current amount of Pitch change. The Pitch amount is displayed both as a percentage (%) and as cents.



(Percentage) / (Cents)

To set the Pitch amount:

① Press and hold either **PITCH** [▲] or [▼].
After holding for more than two seconds, the Pitch amount will start either increasing or decreasing, depending on which button was pressed.

Track Delay

The CX-8 allows you to delay the playback of any track in relation to the other tracks (and the TIME counter) by a maximum of 170 milliseconds. This can be very useful when some tracks are slightly "off", or when you need to move a particular instrument to get it "in the pocket", or when you just want to create an interesting effect (like copying a track and delaying the copy).

To delay a track:

① Press [**EDIT VALUE**].
The **EDIT** *icon will light in the display.*

② Press [**TRACK DELAY**].
The **TRACK DELAY** *icon will light, just below the* **EDIT** *icon.*

③ Choose a track by pressing a RECORD ENABLE button [**1**]–[**8**].
A number will appear to the left of the **EDIT** *icon representing the track you are editing.*

④ Use the [▲] and [▼] buttons to adjust the delay amount in .1 ms steps.

⑤ Hold the [**EDIT VALUE**] button and enter a specific delay value using the [**LOCATE 0**] thought [**LOCATE 9**] buttons.
The TIME counter will display the selected track's delay amount.

Simultaneously, the peak meter for the selected track will rise to indicate the amount of track delay you have selected.

⑥ Repeat steps **3** and **4** for any other tracks you wish to delay.

⑦ Press [**EDIT VALUE**] to exit Edit mode.
The **EDIT** *icon will turn off.*

⑧ Press [**TRACK DELAY**] to enable the Track Delay feature.
The **TRACK DELAY** *icon will light, indicating that track delays are now in effect.*

⑨ If necessary, repeat steps ① through ⑤ to edit the delay value of any track.

Track Copy

It is possible to copy the audio material from one track to another on the same tape within the CX-8 without leaving the digital domain and without the need for any audio cables. In fact, you can copy up to 4 tracks at a time using the Track Copy feature. For more information on using the Track Copy function, see page 66.

To bounce audio from one track to another:

① Press and hold [**TRACK COPY**].
The **TRK COPY** *icon will light in the display.*

② While holding [**TRACK COPY**], select a source track (up to 4) by pressing any of the RECORD ENABLE buttons [**1**]–[**8**].
The **INPUT** *LEDs for the selected track(s) will light. Note: You can't select a track that is already in record-ready (***REC** *LED lit) as a source track; if its RECORD ENABLE is pressed, its* **INPUT** *LED won't light while holding the* [**TRACK COPY**] *button.*

③ Release [**TRACK COPY**], and choose a destination track (up to 4) by pressing one of the RECORD ENABLE buttons [**1**]–[**8**].
The **REC** *LEDs for the selected track(s) will light. Note: You cannot select a source track as a destination track; if its RECORD ENABLE is pressed, its* **REC** *LED won't light.*

④ Use the [**REWIND**], [**FAST FWD**] or [**LOCATE 0**] through [**LOCATE 9**] buttons to move to the section of tape which holds the audio you wish to copy.

⑤ Simultaneously press [**RECORD**] and [**PLAY**] to initiate recording.
The [**RECORD**] *and* [**PLAY**] *LEDs will light and recording will begin.*

⑥ When you are finished, press [**STOP**].
The [**STOP**] *LED will light and the transport will stop.*

While the **TRK COPY** *icon is lit (indicating that Track Copy mode is selected) you will not be able to record any audio being fed to the analog or digital inputs. To record from the analog inputs, you must press the* [**ANALOG INPUT**] *button (the* **ANALOG** *icon will light in the display).*

Display Brightness

If necessary, the brightness of the CX-8's display may be adjusted to allow more suitable viewing under various lighting conditions.

To adjust the display brightness:

① Hold the [**PEAK CLEAR**] button.

② While still holding [**PEAK CLEAR**], press either **PITCH** [▲] or [▼] to dim or brighten.
The display will immediately respond by either dimming or brightening, depending on which button was pressed.

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Overview

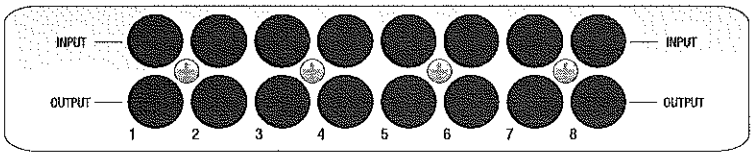
THIS CHAPTER CONTAINS EVERYTHING you need to know to connect the CX-8. While great care is taken during design to ensure that installations are as trouble-free as possible, the following guidelines should be noted:

- Keep audio cables separate from AC power cables.
- Avoid running audio cables near sources of electromagnetic interference.
- Avoid multiple earth connections, which can result in hums, buzzes or sometimes radio reception.

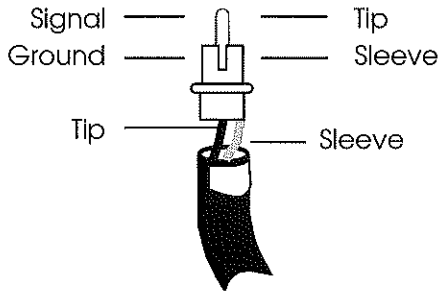
Analog Audio – Unbalanced Inputs

Input jack characteristics

The CX-8 includes eight unbalanced, phono jack inputs. These are compatible with low-impedance, unbalanced, -10 dBV outputs typical of equipment such as mixers, synthesizers, samplers, direct boxes, etc.



The unbalanced input jack wiring convention is as follows:



Typical input jack hookups

The input jacks are typically hooked up in one of three ways:

- **To the console's direct tape outs (these patch a single channel directly to tape, bypassing most mixer circuitry).** This is preferred when the signals going to tape require none of the mixer's features (effects, grouping, routing, etc.).

- **To eight mixer bus outputs.** You can use the mixer for grouping, premixing, effects, etc. This puts more circuitry between the input signals and CX-8, although since most routing can be done at the mixer, you'll seldom need to do any repatching.

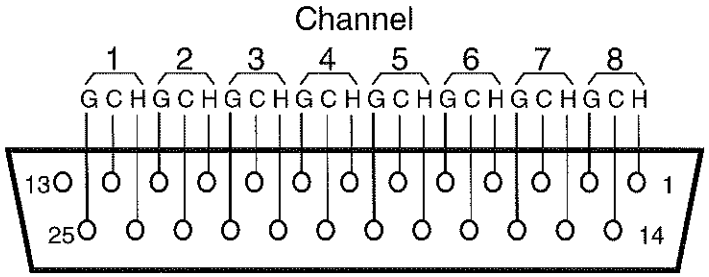
- **To a combination of direct outputs and bus outputs.** Some situations require a combination of the two approaches. *Example:* Consider a live gig you want to record with two vocal mics, four mics on drums, two direct feeds from guitar and bass amps, and one direct feed from keyboards. The vocals, bass, guitar, and keyboards could be taken direct and go to five CX-8 tracks. The four drum mics can be mixed to stereo within your mixer sent to the submix outs, then go to two CX-8 tracks. The remaining CX-8 track could be used to record audience sounds or capture one of the instruments in stereo, if applicable.

Analog Audio – Unbalanced Outputs

The -10 dBV outputs use RCA jacks, and carry signals at a nominal -10 dBV level. These should be connected to your mixer's channel line inputs or tape returns. The unbalanced outputs wiring scheme is similar to that of the unbalanced inputs (see previous section).

Analog Audio – Balanced Inputs and Outputs

The +4 dBu balanced line inputs and outputs use DB25 multipin connectors. Both the unbalanced and balanced inputs and outputs may be used simultaneously. The balanced in/out connector wiring scheme is as follows (G = ground, C = cold, H = hot):



Both the unbalanced and balanced inputs and outputs may be used simultaneously.

Input Mode

The CX-8 lets you choose one of three Input Modes for both the Unbalanced and Balanced inputs:

2-Input Mode	Input 1 feeds Tracks 1, 3, 5 and 7. Input 2 feeds Tracks 2, 4 , 6 and 8.
4-Input Mode	Input 1 feeds Tracks 1 and 5. Input 2 feeds Tracks 2 and 6. Input 3 feeds tracks 3 and 7. Input 4 feeds tracks 4 and 8.
8-Input Mode	Each Input feeds its own track.

The reason for these three modes is to take equal advantage of 2, 4 and 8 bus mixing consoles. If you have two buses, connect them to inputs 1 and 2. If using four buses, connect them to inputs 1 through 4.

To select the appropriate Input Mode, hold the **[ANALOG INPUT]** button and press one of the RECORD ENABLE buttons ([**1**]–[**8**]). The [**INPUT**] LEDs, located along the bottom of the display below the VU meters, will light up to indicate the Input Mode you have selected.

Holding **[ANALOG INPUT]**	Result	**(INPUT)** LED lit
Press [**1**] or [**2**]...	...to select 2-Input Mode	Tracks 1 and 2
Press [**3**] or [**4**]...	...to select 4-Input Mode	Tracks 1 through 4
Press [**5**], [**6**], [**7**] or [**8**]...	...to select 8-Input Mode	All Tracks (1 – 8)

When using a 2 bus mixer, connect its two outputs to the CX-8's unbalanced inputs 1 and 2 and select 2-Input Mode. Anytime you want to record on an odd number track you will route the signal(s) to bus #1 or left. Likewise, to record onto an even number track, route the signal(s) to bus #2 or right. By simply putting the desired track into record, the proper signal will get there, although not directly connected to the track's input jack.

When using a 4 bus mixer, connect its four outputs to the CX-8's unbalanced inputs 1 through 4 and select 4-Input Mode. Anytime you want to record on tracks 1 or 5 you will route the signal(s) to bus #1. Likewise, to record onto tracks 2 or 6, route the signal(s) to bus #2, and so on.

Sync In/Out

The two DB 9 connectors marked **[SYNC IN]** and **[SYNC OUT]** are used for synchronizing two or more CX-8s together, or a combination of CX-8s and ADATs. This requires a male-to-male, 9-pin D connector cable for each additional machine in the chain. In such a system, you are basically treating all connected machines as though they were a large multitrack unit. The first CX-8 or ADAT in the chain is called the "master", and all other connected units are referred to as "slaves". However, each slave can also be used independently when the master machine is stopped.

For more information about using multiple CX-8s and/or ADATs, refer to chapter 5.

To synchronize multiple CX-8s and/or ADATs:

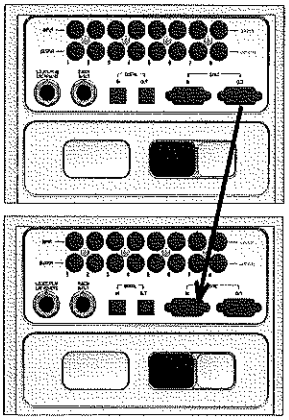
① Locate the **[SYNC IN]** and **[SYNC OUT]** connectors.

② Connect one end of a male-to-male, 9 pin connector cable to the master's **[SYNC OUT]** jack.

③ Connect the other end of the cable to the first slave's **[SYNC IN]** jack.

④ For additional slaves, connect one end of a male-to-male, 9 pin D connector cable to the first slave's **[SYNC OUT]** jack, and the other end to the second slave's **[SYNC IN]** jack. Its **[SYNC OUT]** jack then connects to the third slave's **[SYNC IN]** jack, and so on.

The following illustration depicts two CX-8s synchronized together.



Digital Audio In/Out

The Digital input and output carries all eight tracks on a single fiber optical cable. This allows you to bounce audio between multiple machines within the digital domain. This also lets you route digital audio between multiple CX-8s and RD-8s, and to other ADAT Compatible™ products. Since the fiber optic connector carries the digital information for all 8 tracks, it is also useful for backing up all tracks in one pass (see Chapter 6 for more on digital audio).

Digital bussing requires a fiber optical cable (included) for each CX-8 in the system (or any other ADAT compatible product). This connection can be made while power is on or off, and the machines do not need to be turned on in any particular order. *Note:* To bounce tracks within a single CX-8, it is not necessary to connect the optical network.

To connect the digital optical network:

① Locate the **[DIGITAL IN]** and **[DIGITAL OUT]** connectors.
Remove the connectors' plugs (if present) and store for later use.

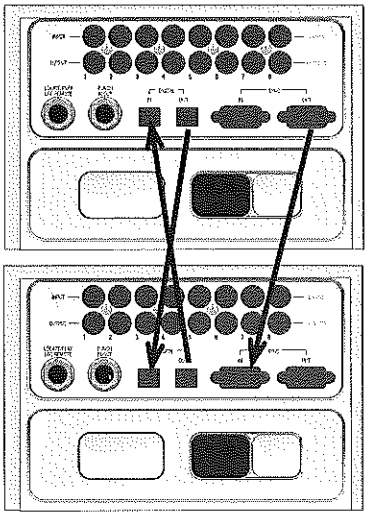
② Connect one end of the fiber optic cable into the **[DIGITAL OUT]** jack of the first machine in the system.
Remove the clear, plastic tube covering each end of the cable (if present). The cable is non-polarized, so either end can be inserted into the optical output.

③ Connect the other end of the fiber optic cable to the **[DIGITAL IN]** of the second machine in the system.

④ For each additional machine, connect one end of an additional fiber optic cable to the second machine's **[DIGITAL OUT]** jack, and the other end to the third machine's **[DIGITAL IN]** jack. Its **[DIGITAL OUT]** jack then connects to the fourth machine's **[DIGITAL IN]** jack, and so on.

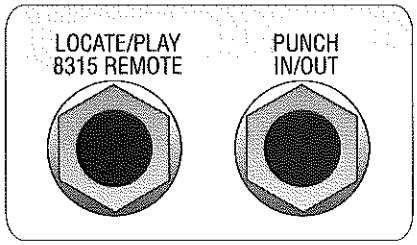
⑤ Lastly, connect a fiber optic cable between the last machine's **[DIGITAL OUT]** jack, and the first machine's **[DIGITAL IN]** jack.
This last step creates a loop, and thus makes the digital bus accessible to all machines that are connected to it.

When connecting more than two machines, always connect the optical cables in the same order as the sync cables (1 to 2, 2 to 3, etc.), so that the digital routing will work correctly.



Footswitches

The CX-8 provides two footswitch connectors using 1/4" mono (T/S) jacks. One, labeled **[LOCATE/PLAY/8315 REMOTE]**, allows locate and play commands; the other, labeled **[PUNCH IN/OUT]**, is for punch in/out control.



The two footswitch jack functions are designed to be used with any momentary single-pole/single-throw footswitch (either normally open or normally closed). These should be plugged in prior to power-up so that the CX-8 can configure itself for the type of footswitch being used.

The Punch In/Out footswitch and 8315 Remote both work in conjunction with the Rehearse and Auto Record features.

The 8315 Remote

Both the **[LOCATE/PLAY/8315 REMOTE]** and **[PUNCH IN/OUT]** footswitch connectors can be used to connect the hand-held 8315 remote control unit to provide remote access of transport functions. You can even connect two 8315 remotes into the CX-8, one in each footswitch jack.

If using a normally open footswitch, the footswitch and remote control can be interchanged, or used simultaneously with a Y-cord, without restarting the CX-8 (powering down and powering up). However, if using a normally closed footswitch, the CX-8 should be restarted after switching from footswitch to remote control or vice-versa.

Alternatively, it is also possible to use the 8311 remote which accompanies the RD-8, or the LRC which accompanies the ADAT or the ADAT-XT remote, or the MDA-1 remote which accompanies the Panasonic MDA-1. These remotes are all designed exactly the same internally, however their buttons serve different purposes depending on what they are connected to. For example, if you press the **[AUTO INPUT MONITOR]** on the LRC when connected to the CX-8, it will toggle the Auto Record function on or off. The main transport buttons will of course function exactly as you would assume.

If you are using one of these other remotes with the CX-8, you may find it helpful to place substitute labels next to the buttons which serve functions different from what they would if connected to their intended model.

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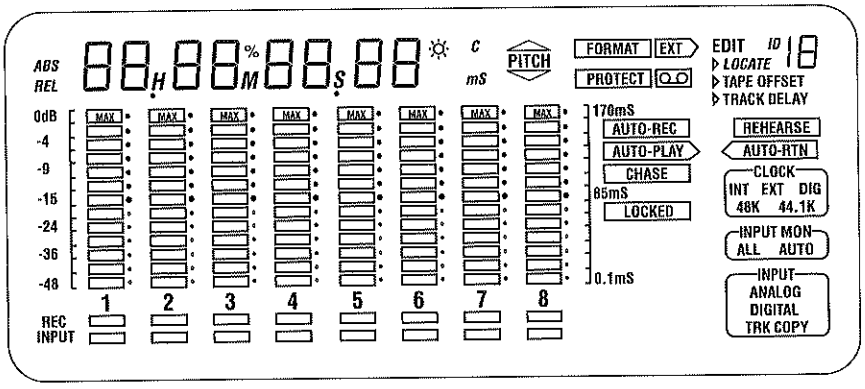
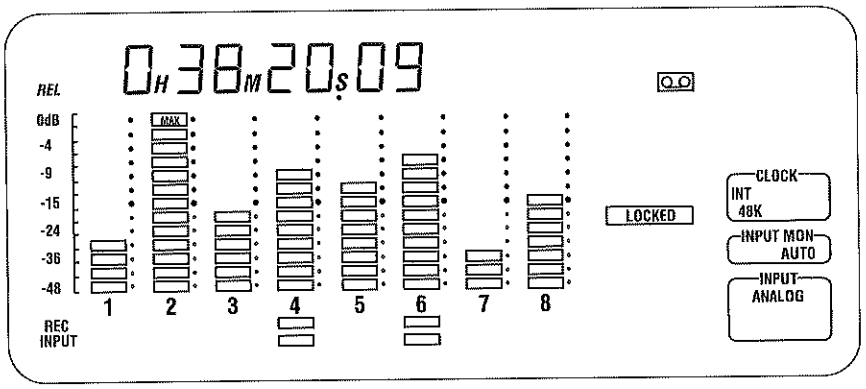
Reading The Display

The CX-8's display serves many functions. It shows the current level of each of the eight audio tracks, it shows the current tape position numerically in hours, minutes, seconds, and 100ths of seconds, and shows the current modes of the many parameters available. It also is used as a window for editing parameters such as pitch, track delay, tape offset, and locate points. With all segments lit (which would not happen in normal operation), the display looks as follows:



When in a typical play situation, the display may look like this:



The display example above indicates that the tape position is currently 38 minutes, 20 seconds and 9/100 of a second. The meters show the current level of each playback track. Tracks **4** and **6** are both in

record (as indicated by the **REC** LEDs) and monitoring their inputs (as indicated by the **INPUT** LEDs). The TIME counter (directly above the meters) shows the current tape position, in this case relative to the user-defined 0:00:00.00 point (**REL**ative Time). The **CLOCK** is currently set to **INT**ernal and **48K**Hz, the **AUTO INPUT MON**itor is on, and the Analog input is selected. The icon indicates that a tape is detected, and the **LOCKED** icon tells us that playback is engaged.

Display Icons

The following icons appear in the display at different times. They indicate that the parameter for which they are named has been selected or turned on. These icons are:

ABS This icon lights whenever Absolute Time mode is selected (by pressing the [**ABS/REL**] button).

REL This icon lights whenever Relative Time mode is selected (by pressing the [**ABS/REL**] button).

PITCH The **PITCH** group of icons relates information regarding pitch change. Whenever the Pitch setting is above 0, the upper triangle will appear. Whenever the Pitch setting is below 0, the lower triangle will appear. When either PITCH buttons ([▲] or [▼]) are pressed, the **PITCH** icon will appear indicating that the TIME counter is now displaying the current Pitch setting using two values: Percentage (**%**) and Cents (***C***). See page 80.

This icon will light whenever a tape is inserted.

FORMAT Indicates whether Format mode is turned on or off. The **FORMAT** icon will flash whenever an unformatted tape is inserted. If the [**FORMAT**] button is pressed, the **FORMAT** icon will light. If the [**FORMAT**] button is pressed again, the **FORMAT** icon will turn off. See page 53.

EXT This icon will light when performing a *format extend*. See page 56.

PROTECT This icon will light whenever a tape is inserted which has its write-protect tab removed, indicating it cannot be recorded on. This, however, can be overridden using the Protect Overwrite function. See page 56.

EDIT This icon will light whenever edit mode is selected (by pressing the [**EDIT VALUE**] button). See page 63.

▷*LOCATE* Indicates that the transport is shuttling to a Locate Point (0–9). When in Edit mode, this icon indicates that you are editing a Locate Point's

address, which will appear in the TIME counter. A number (from 0 to 9) will appear next to the **EDIT** icon to indicate which Locate Point is being edited. See page 85.

▷TAPE OFFSET — This icon indicates that you have the Tape Offset function turned on with a value that is not equal to 0:00:00.00. This function is only available when the CX-8 is used as a slave within a multiple ADAT/CX-8 system. When in Edit Mode, this icon indicates that you are editing the Tape Offset amount, which will appear in the TIME counter. See page 107.

▷TRACK DELAY — This icon indicates that you have the Track Delay function turned on. When in Edit Mode, this icon indicates that you are editing a tracks delay amount, which will appear in the TIME counter. A number (from 1 to 8) will appear next to the **EDIT** icon to indicate which track is being edited. The VU meters will also show a bar-graph representation of the current delay values for all eight tracks. See page 82.

ID — If connected to a multiple ADAT system, the ***ID*** icon lights when the CX-8 is turned on. The number appearing to the right of the ***ID*** icon will indicate the ID number of the unit (1–16). You can check the unit's ID without turning the unit on and off by holding **[SET LOCATE]** and pressing **[PLAY]**. See page 97.

AUTO-REC — When this icon appears, it indicates that the Auto Record function has been turned on. See page 88.

REHEARSE — This icon indicates that the Rehearse function is turned on. See page 89.

AUTO-PLAY — This icon indicates that the Auto Play function is turned on. See page 87.

AUTO-RTN — This icon indicates that the Auto Return function is turned on. See page 87.

CHASE — When this icon appears, it indicates that the CX-8 is slaving to an external timecode source coming from the master ADAT in a multiple ADAT system. See page 98.

LOCKED — When this icon appears, it indicates that the transport is properly engaged in either playback or recording. When the CX-8 is a slave in a multiple ADAT system, this icon will light to indicate that the tape is properly synchronized and the audio is sample locked to the timecode of the master ADAT machine. See page 98.

CLOCK INT EXT DIG 48K 44.1K — The **CLOCK** group of icons indicates which clock source is being used. The **[CLOCK SELECT]** button lets you toggle through the various options, including: **INT 48K** (internal clock at 48kHz), **INT 44.1K** (internal clock at 44.1 kHz), **DIG 48K** and **DIG 44.1K** (external clock source connected to the

[**DIGITAL IN**] connector on the rear panel). Additionally, if the CX-8 is being used as a slave in a multi-ADAT system, the **EXT** icon will light, indicating that the CX-8 is deriving its clock from the master ADAT in the system. See page 77.

The **INPUT MON** group includes two icons: **ALL** and **AUTO**. The **ALL** icon will light whenever the All Input function is enabled (by pressing the [**ALL INPUT**] button). The **AUTO** icon will light whenever the Auto Input function is enabled (by pressing the [**AUTO INPUT**] button). See page 68.

The **INPUT** group of icons indicates which input source is being used. The **ANALOG** icon will light whenever the Analog Inputs are selected (by pressing the [**ANALOG INPUT**] button). The **DIGITAL** icon will light whenever the Digital Inputs are selected (by pressing the [**DIGITAL INPUT**] button). The **TRK COPY** icon will light whenever the Track Copy function is selected (by pressing the [**TRACK COPY**] button). See page 65 & 66.

☼ This is the Interpolation Indicator. When it flashes, it indicates that errors have been detected and corrected using an interpolation scheme. It is a good idea to clean the tape heads and/or make a backup copy of your tape if you ever see this icon light. See Appendix C for more information.

TIME Counter & ABS/REL Button

The TIME Counter (found at the top left section of the display) is used to indicate the current tape position.

The [**ABS/REL**] button toggles the TIME counter between Absolute Time mode and Relative Time mode. The CX-8 will indicate which Time mode is selected by either displaying **ABS** (for Absolute Time) or **REL** (for Relative Time) just to the left of the TIME counter.

ABS **Absolute Time:** This is the CX-8's time reference, which is created when a tape is formatted.

REL **Relative Time:** This is based on the CX-8's time reference of a formatted tape, but is relative to where the tape was positioned when LOCATE 0 was stored.

- To choose 4-input mode: Press RECORD ENABLE button 3 or 4 while holding the [**ANALOG INPUT**] button. This will cause channels 1 through 4 **INPUT** LEDs to light up, indicating that only input channels 1 thru 4 will be used. In this case, channels 5 through 8 receive their input from channels 1 through 4, respectively.

- To choose 8-input (the most common) mode: Press RECORD ENABLE button 5 thru 8 while holding the [**ANALOG INPUT**] button. This will cause all eight track **INPUT** LEDs to light. In this mode, each track receives its signal from its own input.

In 2-input mode, inputs 3-8 are disconnected and cannot be recorded or heard. In 4-input mode, inputs 5-8 are similarly disconnected. To use all inputs, 8-input mode must be selected.

Digital Input

To record from the digital input, press the [**DIGITAL INPUT**] button; the **DIGITAL** icon in the **INPUT** icon group will light. The digital input can be used to record from another CX-8 or ADAT-compatible optical signal. All eight channels will be received via the fiber optic connection (see *Digital In/Out* in Chapter 3) and the analog inputs will be ignored. However, by holding the [**DIGITAL INPUT**] button, you may reroute incoming channels to record on different tracks; *Example:* Digital audio received on channels 1 and 2 can be rerouted and recorded onto tracks 3 and 4. For more information about recording from the digital input and digital track bouncing, see pages 103—106.

Track Copy

The [**TRACK COPY**] button is used to digitally bounce tracks within a single CX-8. To digitally bounce tracks, you must first press [**TRACK COPY**]; the **TRK COPY** icon in the **INPUT** icon group will light. Next, select the source tracks, select (record enable) the destination tracks, and initiate recording. The track copies will be an exact duplicate of the original (i.e. it is exactly aligned with the original and is an exact clone).

While holding the [**TRACK COPY**] button, the track's **INPUT** LEDs will indicate the selected source channel(s). While still holding the [**TRACK COPY**] button, the source tracks may be selected and de-selected by pressing the RECORD ENABLE buttons [**1**] – [**8**]. Releasing the [**TRACK**

COPY] button will return the channel **REC** and **INPUT** indicators and RECORD ENABLE buttons to their normal status. At this point, you may record-enable the destination tracks (see next section).

When copying tracks:

- The source tracks will be recorded onto the destination tracks in ascending order. *Example:* If source tracks 1 and 3 are selected and tracks 5 and 6 are record enabled, then track 1 will be copied to track 5 and track 3 to track 6.

- If more destination tracks are selected than source tracks, the source tracks will repeat (cycle). *Example:* If tracks 7 and 8 were added to the destination tracks of the previous example, then track 1 would be copied to tracks 5 and 7 and track 3 would be copied to tracks 6 and 8. This scheme also allows for copying a single track to multiple tracks.

- Since no more than 4 tracks may be copied within a single machine, a maximum of 4 source tracks will be allowed. This means that if 4 source tracks are already selected, then no other tracks can be selected until one of the 4 tracks is de-selected.

- A digital source track cannot be selected as a digital destination track (i.e. digital source tracks will not be allowed to be record enabled when Track Copy is enabled).

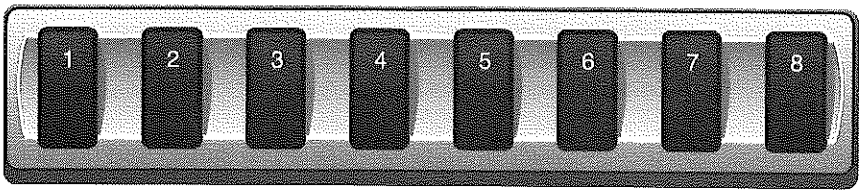
- If no source tracks are selected, you will not be able to place any tracks into record-ready. If user attempt to record enable a track, the track will not be enabled (**REC** LED will not light) and "noSourcE" will be temporarily displayed in the TIME counter.

- When Track Copy mode is enabled (**TRK COPY** icon lit), the All Input Monitor will not function. If the All Input Monitor is on when Track Copy is enabled, it will automatically be turned off (**ALL** icon in the **INPUT MON** icon group will turn off). See page 69 for more information about the All Input Monitor.

- Any track delays that you have programmed will be in effect.

Record Enable

To record enable a track, press the track's RECORD ENABLE button.



When you press a track's RECORD ENABLE button for the first time, the track's red **REC** LED will flash, indicating the track is in record-ready, and its **INPUT** LED will light (unless Auto Input is on and the transport is in play), indicating you will be able to monitor that track's input. If the transport is put into record mode (see *Transport Controls* in this chapter), recording will begin on this track; the track's **REC** LED will stop flashing and remain lit. To disable record-ready, press the track's RECORD ENABLE button once again. The track's **REC** LED will turn off.

RECORD ENABLE buttons can be turned on or off while you are in record mode.

Setting Levels

Unlike analog tape recorders, where signals routinely exceed 0 dB with no apparent ill effects, 0 dB on the CX-8 represents the maximum possible signal level. Signals above 0 dB will be clipped and lead to digital distortion.

Because of the limitations of analog tape, there is always a tradeoff between noise, level and distortion. More level improves the signal-to-noise ratio, but also increases distortion. This distortion increases linearly, which is why signal-to-noise is often specified for a certain amount of distortion (typically 3%). You can always record with hotter levels or softer levels, but either more distortion or more noise will result—with analog, you can't have low noise, high levels and low distortion.

With digital recording, there is a much wider dynamic range, and distortion does not increase with increasing level. Yet once a digital system runs out of headroom and hits 0 dB, that's it—the onset of distortion is immediate and very noticeable if the signal is sustained

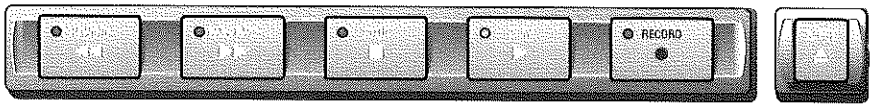
several dB above the limit. Even though very short peaks above 0 may not last long enough to cause audible distortion, you aren't capturing the signal in its original form. As a result, because of the CX-8's signal to noise characteristics, it's better to err on the side of setting levels not quite high enough rather than having them distort, especially during live recording when you don't get a second chance. In the studio, where you have more control over levels or are using compressor/ limiters, it's OK to light up the MAX LED on the meter on the very loudest peaks, as long as you're sure that signals aren't going beyond that point (by using the meters on your console, if they go beyond +15 dB).

However, since 0 dB on the CX-8 equals the maximum level, the input reference level is set below 0 VU. With the CX-8, a 0 VU signal on a +4 dBu mixer plugged into the CX-8's +4 dBu connectors (or a 0 VU signal on a -10 dBV mixer plugged into the CX-8's -10 dBV connectors) will register -15 dB on the CX-8's meters. Therefore, you can run the mixer over 0 VU and still have 15 dB of headroom on the CX-8 before distortion occurs. Just remember that no matter what, if the CX-8's meters indicate over 0 dB, distortion is occurring or is on the verge of occurring.

Be sure the output level of your mixer matches the inputs connected to the CX-8 (+4 or -10).

Transport Controls

The CX-8's six transport control buttons resemble those of a conventional tape recorder, although there are several extra features.



Eject

Press the **[EJECT]** button to eject the tape from the CX-8. If the tape is moving, it will stop before ejecting. In a multiple CX-8 system where there is one master and one or more slave CX-8s and/or ADATs, pressing **[EJECT]** on the master will eject the tapes on all machines; pressing **[EJECT]** on a slave machine will only eject the tape on that machine.

The **[EJECT]** *button will not operate while recording or formatting to avoid interrupting these processes.*

Rewind/Review

Press the **[REWIND]** button to rewind the tape; the **[REWIND]** LED lights. When fully rewound, the **[REWIND]** LED turns off and the **[STOP]** LED lights.

- Pressing **[REWIND]** while recording punches out before rewinding.
- Threaded tapes rewind at about 40 times normal play speed. Unthreaded tapes rewind slightly faster.
- Pressing **[REWIND]** while holding the **[PLAY]** button initiates "Review" mode. The tape rewinds at about 3 times normal play speed, and you can hear chunks of attenuated audio so you know where you are on the tape. The **[PLAY]** LED will be lit, and the **[REWIND]** LED will be flashing. Pressing the **[PLAY]** button alone returns the transport to normal play mode.

Fast Forward/Cue

Press the [**FAST FWD**] button to fast forward the tape; the [**FAST FWD**] LED lights. Upon reaching the tape's end, the [**FAST FWD**] LED turns off, and the [**STOP**] LED lights.

- Press [**FAST FWD**] while recording to punch out before fast forwarding.
- Threaded tapes fast forward at about 40 times normal play speed. Unthreaded tapes fast forward slightly faster.
- Pressing [**FAST FWD**] while holding the [**PLAY**] button initiates "Cue" mode. The tape fast forwards at about 3 times normal play speed, and you can hear chunks of attenuated audio so you know where you are on the tape. The [**PLAY**] LED will be lit, and the [**FAST FWD**] LED will be flashing. Pressing the [**PLAY**] button alone returns the transport to normal play mode.

Play

Press the [**PLAY**] button to play the tape ([**PLAY**] LED will light). The [**PLAY**] button by itself has no effect while playing, but it will terminate recording. While locating, pressing [**PLAY**] will cause the CX-8 to start playing after it arrives at the corresponding tape location ([**PLAY**] LED will flash to indicate *deferred* play mode).

Pressing [**PLAY**] while recording causes the CX-8 to punch out (recording stops and playback continues). Pressing [**PLAY**] in any mode other than locating causes the transport to enter play mode, and the [**PLAY**] LED lights.

What occurs when you press [**PLAY**] after inserting a tape in the CX-8 depends on whether the tape being played is formatted or not.

- **Formatted.** The tape plays normally and the tape counter shows elapsed time since the beginning of the tape.
- **Unformatted tape.** The CX-8 will detect the lack of a format and flash the **FORMAT** icon while reading "noFO" in the TIME counter.
- **Tape transitions from a formatted to unformatted section while playing back.** The CX-8 will detect the lack of a format and flash the **FORMAT** icon while reading "noFO" in the TIME counter.
- **Tape transitions from a formatted to unformatted section while recording.** The CX-8 will detect the lack of a format and stop.

Record/Punch In or Out

Use the [**RECORD**] button to enter or exit record mode, and to format a tape. There are two methods of entering record mode. You can first enable the tracks you wish to record on and then engage recording using the [**PLAY**] and [**RECORD**] buttons. Or you can engage record mode and then use the RECORD ENABLE buttons to place tracks in or out of record. If no tracks are enabled for recording and record mode is engaged, the [**RECORD**] LED will flash to indicate that pressing any RECORD ENABLE button will immediately initiate recording on that track.

To start recording:

- Hold [**PLAY**] and press [**RECORD**] to cause any record-enabled track to enter record mode. This is recommended for punching "on the fly."

- Hold [**RECORD**] and press [**PLAY**] to cause any record-enabled track to enter record mode. This is recommended for initiating recording when the tape is stopped, or for punching "on the fly."

To punch out and stop the transport, simply press [**STOP**]. There are three ways to exit record mode (punch out) yet have the transport continue to play; use whichever method is most natural to you.

- Press [**PLAY**].

- Hold [**RECORD**] , and then press [**PLAY**].

- Use the RECORD ENABLE buttons [**1**] – [**8**] to take tracks out of record.

Stop

The **[STOP]** button performs three functions.

- **Stop the transport.** Push **[STOP]** to stop any function involving tape motion. A lit **[STOP]** LED indicates that the tape is not moving and is threaded. A flashing **[STOP]** LED indicates that the tape is not moving and is unthreaded.

- **Thread/Unthread the tape.** While the **[STOP]** LED is lit, press **[STOP]** to unthread the tape (**[STOP]** LED flashes). While the **[STOP]** LED is flashing, press **[STOP]** to thread the tape (**[STOP]** LED is lit). Entering play or record more will also thread the tape, if it was previously unthreaded.

- **Punch out.** When recording, pressing **[STOP]** will exit record mode and stop the transport.

Sample Rate (Clock)

The CX-8 records digital audio in a similar manner as a DAT recorder or digital sampler. You may select between two sample rates when using the CX-8's internal clock: 48 kHz and 44.1 kHz. Select the sample rate to match the balance of the recording system you are connected to.

The currently selected sample rate is indicated by the **CLOCK** group of icons in the display. When the **INT** and **44.1K** icons are lit, the CX-8 is set to an internal 44.1 kHz clock. When the **INT** and **48K** icons are lit, the internal 48 kHz clock setting is in use. The default setting is internal 48 kHz (**INT 48K**).

Changing the clock from 48kHz to 44.1 kHz, or vice-versa, will change the reference point upon which the Pitch controls are based. This will also cause the TIME counter to change; the Locate Points (see pages 84 & 85) will be referenced to different time positions (when viewed), although they still correspond to the same physical tape positions as before.

To select the sample rate:

① Press the **[CLOCK SELECT]** button.
Each time the **[CLOCK SELECT]** *button is pressed, the right side of the display will cycle through the following settings:* **INT 48K**, **INT 44.1K**, **DIG 48K**, *and* **DIG 44.1K**.

For more info on **DIG** and **EXT** clock settings, see chapter 5.

It is recommended that you select the sample rate you want to use *before* you format a tape. During the formatting process, the sample rate information is written onto the tape. This information allows the CX-8 to know what sample rate the tape was originally formatted at. When inserting a tape that was formatted at 48 kHz, the CX-8 reads the timecode from tape for a moment and automatically selects the 48 kHz clock setting. If the clock is then manually changed to 44 .1 kHz, the **44.1K** icon will flash, to indicate that you are using 44.1 kHz but it isn't the original sample rate used when the tape was formatted. The same goes when you play a tape formatted using 44.1 kHz with the clock set to 48 kHz; the **48K** icon will flash.

If you play back a tape that was formatted on an original ADAT, it will not have any sample rate information written on it (since this is a new feature not found on the ADAT). In this case, the CX-8 will assume the tape was formatted at 48 kHz. Therefore, if you had been pitching-down such a tape on an ADAT to play at 44.1 kHz, you must press the ***[CLOCK SELECT]*** *button to manually change the clock to 44.1 kHz.*

Record Crossfade Time

Crossfading is the process of fading out the original audio on tape while fading in the new audio when punching in (or vice-versa when punching out). Whenever recording begins or ends, the CX-8 provides a smooth transition between the audio on tape and the audio being recorded. This prevents gaps and/or noises when punching in and out of record.

The Record Crossfade Time setting determines how long it takes for the audio to completely transition from the previous audio to the current audio when recording. The default is 11 milliseconds but can be increased to 43 ms. The faster crossfade time allows you to punch in and out quicker, and is best used when the audio on tape is similar to the audio you are recording. The longer crossfade time allows for a smoother transition and is more useful when punching in new material that is very different from what is already on tape, or when punching in low-frequency signals. Crossfading always begins at the punch point and continues for the amount of time you have specified.

To set the Crossfade Time:

① Press and hold the [**SET LOCATE**] button.

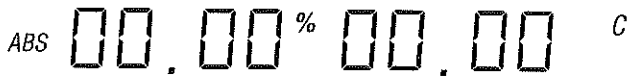
② While holding the [**SET LOCATE**] button, press the [**RECORD**] button
This will advance Crossfade setting to its next value, in this case it is 21 ms. The TIME counter will briefly read:

③ While still holding [**SET LOCATE**], each time you press [**RECORD**] will advance the Crossfade setting to the next value.
Select either 11 ms, 21 ms, 32 ms and 43 ms. These time values assume a playback rate of 48kHz, and are therefore not exact if the Pitch amount is changed, or an external clock source is used. If the Clock is set to 44.1 kHz, the available crossfade times are actually 12 ms, 23 ms, 35 ms and 46 ms (although they will not be labeled this way). To select the sample rate (48 kHz or 44.1 kHz), see previous section.

Pitch Control

The Pitch function controls the speed of the tape, and thus the pitch of the audio recorded on tape. It displays speed as percentage and as cents. A cent is 1/100th of a semitone. For example, if a song is originally recorded in the key of C, then played back with the pitch raised 100 cents, it will be in the key of C#. The CX-8's Pitch control has a range of -300 to +100 cents when using a sample rate of 48 kHz, and a range of -200 to +200 when using 44.1 kHz. The Pitch controls will not function while locking to an external clock (i.e. while the CX-8 is slaved to another ADAT or is locking to an external digital clock).

The **PITCH** [▲] and [▼] buttons control the amount of pitch change. When either button is pressed once, the **PITCH** icon lights in the display, and the TIME counter immediately displays the current amount of Pitch change. The Pitch amount is displayed both as a percentage (%) and as cents. After a few seconds, the TIME counter reverts back to its normal mode.



(Percentage) / (Cents)

To set the Pitch amount:

① If Edit mode is currently on (**EDIT** icon lit), press [**EDIT VALUE**] to exit Edit mode.
The **EDIT** *icon should be off.*

② Press and hold either **PITCH** [▲] or [▼].
After holding for more than .5 seconds, the Pitch amount will start either increasing or decreasing, depending on which button was pressed.

③ To instantly set the Pitch to +100, hold [**SET LOCATE**] and press [▲].

④ To instantly set the Pitch to -300, hold [**SET LOCATE**] and press [▼].

⑤ To reset the Pitch to 0, simultaneously press both [▲] and [▼].
Note: This is not possible while recording.

About Pitch Changing

Here are a few things to consider when chaning the CX-8's pitch:

- One of the **PITCH** arrow icons will remain lit in the display to remind you that the pitch has been changed from standard pitch.
- The counter will not elapse in real time when the pitch is set to a value other than zero.
- When you change the pitch on CX-8, the sampling rate will also change. The lowest sampling rate is 40.4 kHz, the highest is 50.8 kHz.
- If the internal clock is set to 48 kHz, but the pitch is lowered -147 cents, the sampling rate is 44.1 kHz. However, for accurate TIME counter display it is better to set the pitch to 0 and change the clock rate (see page 77).

Track Delay

Track Delay lets you delay individual tracks up to 170 ms, in order to achieve a more desirable "feel." For example, if the bass track is anticipating the beat, you can push it back so it's "in the pocket" by delaying it a few milliseconds. If you need one track to play back earlier than the others, try offsetting all other tracks by the same amount. This will make the remaining track appear to be playing ahead of the others.

Track Delay times are set individually per track (or for a group of tracks) in the Track Delay Edit page. Track Delay for all eight tracks may be turned on and off without altering the Track Delay settings of each track.

To turn Track Delay on and off:

① If Edit mode is currently on (**EDIT** icon lit), press **[EDIT VALUE]** to exit Edit mode.
The **EDIT** *icon should be off.*

② Press the **[TRACK DELAY]** button.
The **TRACK DELAY** *icon will light, indicating that Track Delay values are in effect.*

③ Press **[TRACK DELAY]** again.
The **TRACK DELAY** *icon will turn off, indicating that Track Delay values are disabled.*

To set the Track Delay amount:

① Press **[EDIT VALUE]**, to turn on Edit mode.
The **EDIT** *icon will light.*

② Press **[TRACK DELAY]**.
The **TRACK DELAY** *icon will light (if not already turned on).*

③ Press one of the eight RECORD ENABLE buttons **[1]**–**[8]**.
The selected track's **REC** *LED will light and the display will indicate the current Track Delay amount for the selected track. Press a different RECORD ENABLE button to select another track (1–8) to edit.*

④ Use the [▲] and [▼] buttons to adjust the amount of delay for the selected track.

⑤ Alternatively, you may select a specific digit by holding **[EDIT VALUE]** and using the [▲] and [▼] buttons.
The selected digit will flash.

⑥ While holding **[EDIT VALUE]**, press any **[LOCATE]** button to enter a value.
The next digit to the right is automatically selected, so that you may continue entering digits in this way. Releasing the **[EDIT VALUE]** *button deselects the digit, and the selected digit will stop flashing.*

⑦ To reset the Track Delay time to 000.0 ms, press both the [▲] and [▼] buttons simultaneously; or, hold **[EDIT VALUE]** and press **[LOCATE 0]** .

⑧ Repeat steps ③ through ⑦ to edit the Track Delay times of any other tracks.

To set multiple tracks to the same Track Delay value:

If you need to "advance" a single track, you can set all other tracks to the same delay value by selecting multiple tracks in step ③ above. Simply press and hold one RECORD ENABLE button while pressing others you wish to adjust to the same amount, then proceed with steps ④ through ⑦.

To edit a Locate Point memory:

① Press **[EDIT VALUE]** to enter Edit mode.
The **EDIT** *icon will light.*

② Press one of the **[LOCATE 0]** – **[LOCATE 9]** buttons to select a Locate Point address.
The ***LOCATE*** *icon will light, the selected Locate Point's number (0-9) will appear next to it, and the address of the selected Locate Point will be displayed in the TIME counter.*

③ Use [▲] and [▼] buttons to fine tune the Locate Point's address.

④ Alternatively, you may select a specific digit by holding **[EDIT VALUE]** and using the [▲] and [▼] buttons.
The selected digit will flash.

⑤ While still holding **[EDIT VALUE]**, press any of the **[LOCATE 0]** – **[LOCATE 9]** buttons to replace the selected digit with.
The next digit to the right is automatically selected, so you may continue entering digits.

Locating

Once you have stored one or more tape positions into the Locate Point memories, pressing any of the **[LOCATE 0]** – **[LOCATE 9]** buttons while Edit mode is *not* selected will initiate a locate to its respective address. The TIME counter will momentarily display the selected Locate Point's address and the Locate Point's number (0–9) will appear in the upper-right corner of the display; the transport will either fast forward or rewind to the selected Locate Point's address.

Auto Looping

Auto Looping is not a feature in and of itself, but is made up of two important features that, when used together, provide a very useful tool. These two features are: Auto Return and Auto Play. When both are enabled, and set correctly, a section of tape of any length may be continuously repeated.

Auto Return

When Auto Return is enabled, and the transport reaches the Locate 4 point (the end of the loop), it will automatically rewind to the Locate 1 point (the start of the loop). Notice the arrow on the front panel connecting the **[LOCATE 1]** and **[LOCATE 4]** buttons.

To turn Auto Return on or off, press the **[AUTO RETURN]** button. The **AUTO-RTN** icon will light when turned on. If Locate 1's position is after Locate 4, the **AUTO-RTN** icon will flash, and the transport won't rewind as it passes through Locate 4. For Auto Return to work, Locate 1 must be before Locate 4.

Auto Play

The Auto Play function determines whether or not the transport will automatically go into play when a locate function is completed. This function can also be used in conjunction with the Auto Return function (see above) to create a "loop", whereby a section of tape is played over and over.

To turn Auto Play on or off, press the **[AUTO PLAY]** button. The **AUTO PLAY** icon will light when turned on.

Auto Record

The Auto Record function lets you determine exactly where recording should begin and end beforehand, so that the machine automatically takes you in and out of record. Locate Points 2 and 3 determine the in and out points.

After setting both Locate Points 2 and 3, press the [**AUTO REC**] button to enable this function; the **AUTO REC** icon will light. To execute a "take", rewind to a position *before* Locate Point 2, then hold [**RECORD**] and press [**PLAY**], just as you would to record normally. When the Locate 2 position is reached, recording will begin. When the Locate 3 position is reached, recording stops while the transport continues.

To execute an Auto Record take:

① Record-enable the track(s) you wish to record on (see page 72).

② Press [**AUTO RECORD**].
The **AUTO REC** *icon will light.*

If [**AUTO REC**] *is pressed when the Locate 2 position is set beyond or at the same position as the Locate 3 position, the TIME counter will momentarily read "* inuAL id*" indicating that this is not possible, and you will not be able to enable the Auto Record function until you change either Locate 2 or 3's position.*

③ Rewind the tape to a position prior to the Locate 2 position.

④ Hold [**PLAY**] and then press [**RECORD**].
The [**PLAY**] *LED will light, and the* [**RECORD**] *LED will flash.*

Upon reaching the Locate 2 position, recording will begin on any record enabled tracks and the [**RECORD**] *LED will light solid. If no tracks are record enabled when the Locate 2 position is reached, the* [**RECORD**] *LED will continue flashing and no recording will take place. At any time before the Locate 3 position, a track may be record enabled, which will cause the track to immediately enter record and the* [**RECORD**] *LED will light solid. Upon reaching the Locate 3 position, recording will cease and the* [**RECORD**] *LED will turn off.*

Whenever the CX-8 is put into play, it requires a brief moment to locate the timecode reference on tape and "lock." If the Locate 2 position is reached while

the **AUTO REC** *icon is lit before the CX-8 establishes a lock, the punch in will not take place until a lock has been established (after the* **LOCKED** *icon turns on).*

Looped Recording

The Auto Return and Auto Play functions can be used along with Auto Record to create a recording loop. So, you can record a take over and over until you get it right. Simply set Locate 1 to a position several seconds before Locate 2, and Locate 4 to a position after Locate 3. Refer to page 87 for more information.

Rehearsal

With Auto Record turned on, you can rehearse before actually recording (or erasing what's already on tape). If you engage Auto Record while Rehearse and Auto Input are enabled, when the Locate Point 2 position is reached, any tracks that are in record-ready will be in input monitor mode and the **[RECORD]** LED will continue flashing. When the Locate Point 3 position is reached, any tracks that are in record-ready may return to tape monitor mode. The **[REHEARSE]** button turns Rehearse mode on and off; the **REHEARSE** icon will light when enabled. Note that if Auto Input is not enabled, Rehease will have no effect on what you hear in your monitor mix.

Tape Length

The CX-8 can take advantage of the extra recording time on tapes longer than the standard ST-120 length. You can use ST-180 tapes, for over one full hour of recording time. ST-60 tapes can also be used for shorter projects; the CX-8 automatically recognizes the shorter length of the ST-60 because the hubs used in this cassette are larger. However, there is no way for the CX-8 to tell apart an ST-120, ST-160 or ST-180 tape, since these all use the same, smaller size hubs. In this situation, the CX-8 assumes the tape length to be that of a ST-120 tape. Therefore, when using either ST-160 or ST-180 length tape, you should set the tape length on the CX-8.

To set the tape length:

① Hold the **[SET LOCATE]** button and press the **[FORMAT]** button;
This display will briefly read "St-60".

② Repeat step ① to advance through the available tape length choices.
The display will cycle through the following choices:
"St- 120", "St-60", "St- 160" and "St- 180".

- The tape length setting is not reset when a tape is ejected. However, if you power down and up again, the tape length setting will revert to T-120.
- If connected to a BRC, and you set the tape length from the BRC, the CX-8 "remembers" the tape length setting, even after power down.
- If you insert a tape while the Tape Length setting is set to something other than "St- 120", the display will briefly flash the selected Tape Length setting. This is to remind you that you are using a non-standard setting.
- If using more than one CX-8/ADAT, you must make sure all connected CX-8s/ADATs are loaded with tapes of the same length.

It is important that the Tape Length setting and the actual tape's length are the same. Never use a shorter tape length than what you have indicated on the CX-8.

Below is a list of the four S-VHS tapes which can be used with the CX-8, with their European equivalents and approximate recording times:

Type	Euro	Rec. Time
ST-60	n/a	22 min.
ST-120	SE-180	40 min.
ST-160	SE-240	54 min.
ST-180	SE-260	62 min.

Note: European tapes are actually slightly longer than their US equivalents. Therefore, you may get a few more minutes of recording time if using European tape.

If using tapes longer than the standard ST-120, when locating for the first time past the 39 minute position, the transport will slow down (but not stop) and then speed up again. Each time thereafter that you locate beyond this point, the transport will not slow down. This safeguard is suited for the unlikely event that a longer tape length is erroneously selected, to avoid damage to the tape.

If the CX-8 is connected to a BRC, and the tape length is set from the BRC, the individual CX-8 slaves will retain their tape length setting after power down.

Footswitch Controls

The CX-8 provides two footswitch jacks: **[LOCATE/PLAY/8315 REMOTE]** and **[PUNCH IN/OUT]**. Both accept any momentary, single pole/single throw, 1/4-inch mono (T/S) footswitch. During power-up, the CX-8 checks the footswitch to determine whether it is normally open or normally closed type, and calibrates itself accordingly. If you use a footswitch and its operation seems "reversed," make sure it is firmly plugged into the jack, then turn off the CX-8, wait a few seconds, and turn the CX-8 on again. It will calibrate itself to work with the footswitch.

Either the **[PUNCH IN/OUT]** or **[LOCATE/PLAY/8315 REMOTE]** jack can also be used for connecting an 8315 Remote Control. The PUNCH footswitch and the 8315 cannot be used at the same time, since they occupy the same jack, unless you connect them with a Y-cord. However, you can interchange them if you observe certain precautions (see next section).

Footswitch Controlled Punching

The [**PUNCH IN/OUT**] footswitch is used to enable and disable recording.

- If a track (or tracks) is record-enabled, and the tape is playing, pressing the punch footswitch puts the track(s) into record mode at the instant you punch. This is equivalent to pressing [**PLAY**] and [**RECORD**] to enter record mode.

- If the CX-8 is already in record mode, pressing the footswitch punches out of record (the track(s) will remain record-enabled should you need to punch in again later on) and the tape will continue to play. This is equivalent to pressing [**PLAY**].

Footswitch Controlled Autolocating

The [**LOCATE/PLAY**] footswitch has three functions:

- If the transport is currently stopped, pressing the Locate/Play footswitch is the equivalent to pressing the [**PLAY**] button.

- If the transport is currently playing or recording, pressing the Locate/Play footswitch causes the transport to punch out of record, fast wind to the Locate 1 point (this may be entered by pressing [**SET LOCATE**] followed by the [**LOCATE 1**] button; see page 85), and then either Stop or Play, depending on the setting of the Auto-Play function.

- If the CX-8 is in the process of locating, pressing the Locate/Play footswitch will stop the transport.

Using the 8315 Remote

The 8315 hand-held remote provides the following functions:

- **Transport functions:** Rewind, Fast Forward, Stop, Play and Record.
- **Autolocation functions:** Locate 1, Locate 2, Locate 3, Locate 4, Set Locate and Auto Loop
- **Track functions:** Auto Record and Rehearse.

All buttons function as if pressed from the CX-8's front panel.

The **[AUTO LOOP]** button, which does not exist on the CX-8 front panel, toggles both Auto Play and Auto Return functions on and off simultaneously with one button press.

Note: If you wish to enable the Auto Play function without the Auto Return function being enabled (i.e. without looping), you can initiate a deferred play with the Play button — that is, press any of the **[LOCATE 1]** – **[LOCATE 4]** buttons followed by the **[PLAY]** button.

To use the 8315 Remote, plug it into the **[LOCATE/PLAY/8315 REMOTE]** jack or the **[PUNCH IN/OUT]** jack, depending on which one is not being used. If connected to the master CX-8 in a multiple ADAT system, the 8315 Remote can control the entire chain of ADATs.

If using a normally open footswitch, the footswitch and remote control can be interchanged, or used simultaneously with a Y-cord, without restarting the CX-8 (powering down and powering up). However, if using a normally closed footswitch, the CX-8 should be restarted after switching from footswitch to remote control or vice-versa.

Alternatively, it is also possible to use the 8311 remote which accompanies the RD-8, or the LRC which accompanies the ADAT or the ADAT-XT, or the MDA-1 remote which accompanies the Panasonic MDA-1. These remotes are all designed exactly the same internally, however their buttons serve different purposes depending on what they are connected to. For example, if you press the **[AUTO INPUT MONITOR]** on the LRC when connected to the CX-8, it will toggle the Auto Record

function on or off. The main transport buttons will of course function exactly as you would assume.

If you are using one of these other remotes with the CX-8, you may find it helpful to place substitute labels next to the buttons which serve functions different from what they would if connected to their intended model.

MULTIPLE MACHINE OPERATION

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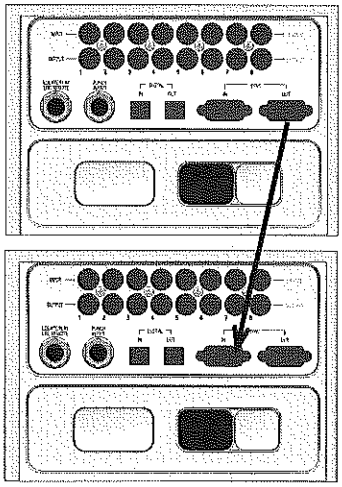
Overview

BY ITSELF, A SINGLE CX-8 provides a lot of flexibility. However, in a multiple CX-8 system presents a whole new set of possibilities. Keep in mind that since the CX-8 is an ADAT-compatible machine[1] , you can intermingle any number of CX-8s and ADATs together—up to 16 machines total for 128 tracks (see the section entitled *Combining CX-8s and RD-8/ADATs* on page 109). When linking multiple CX-8s and/or ADATs together, the first ADAT in the chain is referred to as the "master", and the rest are called "slaves". Each slave is locked to the master, and relies on the time reference from the master machine to keep the system synchronized.

Connections are easy to make; one 9 pin D connector for each slave. A slave will automatically detect a master and go into slave mode.



Using the 8-channel proprietary digital bus, you can also bounce tracks between machines in the digital realm. Not only does this result in a perfect copy, but one that is perfectly synchronized with the original. This means you can make perfect safety backups and archives of recordings. One creative way of using a multiple machine system (though it can be done with just one CX-8) is to dedicate two tracks of one machine for stereo

[1] Other ADAT-compatible machines include the Fostex RD-8, Alesis ADAT and ADAT-XT, and Panasonic MDA-1.

mix-down. Since these mix tracks are always in sync with the rest of the system, you can execute a seamless punch at any time. For example, you could mix-down different sections of a recording independent from one another, making changes in the mix as you go along.

Each CX-8 can have its own tape offset, with respect to the other machines in the system. Combine this feature with the ability to bounce tracks in the digital domain, and you have the ability to perform cut-and-paste style assembly editing.

Synchronizing Machines

Synchronization requires a dual male, 9 pin D connector cable for each slave to be synchronized. Use only professional sync cables, such as those made by Alesis and Hosa. Such cables are available in a variety of lengths from your dealer. Other types of cables may cause incorrect commands to be received, and erratic sync performance. This connection should be made while power is off, but the machines do not need to be turned on in any particular order. For more about connections, refer to the section entitled *Sync In/Out* in Chapter 3.

After you've connected multiple CX-8s and/or ADATs together and turned them on, the master's display will show "***ID* 1**" (identifying itself as the number 1 machine in the system). The second machine will display ***ID* 2**, the third ***ID* 3**, and so on. The ID order is automatically assigned according to how the cables are hooked up. You can re-check a machine's ID at any time by holding [**SET LOCATE**] and pressing [**PLAY**].

If a slave does not display an ID number on power-up, then it does not see anything connected to the [**SYNC IN**] *jack. Check the cables and connections.*

If needed, the machines will renumber their IDs if more CX-8s or ADATs are connected later. *Example:* Suppose you have three CX-8s hooked up so that machine 1 is the master, and machines 2 and 3 are slaves. If you turn on only machines 2 and 3, machine 1 will not be active so machine 2 decides it's the master (***ID* 1**) and machine three the only slave (***ID* 2**). If you then turn on machine 1, the machines will renumber themselves so that machine 1 becomes the master (***ID* 1**), and machines 2 and 3 become the slaves (***ID* 2** and **3**, respectively). Note that in this example, if machines 1 and 3 are turned on but machine 2 is turned off,

machine 3 will not slave to machine 1 because machine 2 is turned off, so the sync signal cannot pass through it from 1 to 3.

All slave CX-8s will automatically be placed in External Clock mode (the **EXT** icon will be lit in the **CLOCK** icon group). The **[CLOCK SELECT]** button will not function on the slave CX-8s since External Clock is their only option. Simultaneously, each slave's **CHASE** icon will light whenever it is *chasing* the location of the master.

Master/Slave Interaction

Pressing any of the transport buttons (**[PLAY]**, **[STOP]**, etc.), or **[AUTO REC]**, **[LOCATE 0]** – **[LOCATE 9]**, **[ALL INPUT]**, **[AUTO INPUT]**, **PITCH [▲]** or **[▼]** will automatically trigger the same functions on the slave machine(s) as well. Alesis recommends that you always initiate operations from the master, including all transport control functions, to minimize confusion. When you press **[PLAY]** on the master, the slave(s) will locate to the same timecode point and begin playing once sync is achieved (indicated by the **LOCKED** icon being lit). Pressing **[EJECT]** on the master ejects all slave's tapes as well. To eject only the master's tape, hold **[SET LOCATE]** and press **[EJECT]** on the master.

When recording or punching in on the slaves, initiate recording on the master *but do not have any master tracks record-enabled* (unless, of course, you need to record tracks on the master). Any tracks that are record-enabled on the slaves will go into record, while the master will simply *play*. This is why record enable is an independent function for each slave. There are two other functions when the slave(s) act independently. Formatting is initiated independently on each slave for a number of reasons, as detailed in the next section; however, simultaneous formatting on all slaves is possible. Digital Input can also be set independently for the slave(s) since you may want to record via the analog inputs on some machines and via the digital inputs on others.

Achieving Lock

In a multiple machine system, the slaves will "chase" the master (**CHASE** icon will light on the CX-8) and can only enter record once they are in perfect sample-lock. Audio will not appear at the outputs of an ADAT until sample-lock sync is achieved. When an CX-8 is in lock, the **LOCKED** icon will light. To achieve the fastest chase-lock performance from a multiple machine system, use the Locate points whenever possible.

Independent Slave Mode

If the master CX-8 is stopped, each of the slaves will function independently. For example, press **[PLAY]** on one of the slaves and it will go into play mode (or press the **[AUTO INPUT]** button on a slave, etc.); the other slaves and the master will not respond to this command. However, any time you press **[PLAY]** on the master or initiate any transport function, it will take over and control all the slaves.

Formatting Multiple Tapes

Formatting works similarly to formatting on a single CX-8. However, it is necessary to consider what the slave does when formatting is initiated on the master. See the section entitled *Tape Formatting* in Chapter 4 for more information.

Master Format Enabled, Complete Format

If the master's **FORMAT** icon is on, performing a complete start-to-finish format, and the slave tape *is not* already formatted:

- If the slave's **FORMAT** icon is on, the slave rewinds to the start of the tape and does a complete format along with the master.
- If the slave's **FORMAT** icon is off, the slave rewinds to the start of the tape and plays, but the TIME counter reads "noFO" (no format) while flashing the **FORMAT** icon.

If the master's **FORMAT** icon is on, performing a complete start-to-finish format, and the slave tape *is* already formatted:

- If the slave's **FORMAT** icon is on, the slave rewinds to the start of the tape and does a complete format with the master.
- If the slave's **FORMAT** icon is off, the slave rewinds to the start of the tape and plays in sync with the master.

If any channels are record-enabled, they will start recording at time 0:00:00.00.

Master Format Enabled, Format Extend

If the master's **FORMAT** icon is on, and you are extending the format, and the slave tape *is not* formatted:

- The slave plays, but the TIME counter reads "noFO" (no format) while flashing the **FORMAT** icon.

If the master's **FORMAT** icon is on, and you are extending the format, and the slave tape *is* formatted:

- If the slave's **FORMAT** icon is on, the slave autolocates to the same time as the master, then format extension begins with the master.
- If the slave's **FORMAT** icon is off, the slave autolocates to the same time as the master and plays or records in sync.

To properly extend the format, the master and slaves should be playing in sync before punching into format record.

Master Format Disabled

If the master's **FORMAT** icon is off and initiates a *record* command anywhere in the tape and the slave's **FORMAT** icon is off:

- If the slave tape is unformatted, the slave plays, but the TIME counter reads "noFO" (no format) while flashing the **FORMAT** icon.
- If the slave tape is formatted, the slave autolocates to the same time as the master and plays or records in sync,

To properly punch in, the master and slave should be in sync before punching. Otherwise, the master will punch in immediately, but the slaves won't punch in until sync is achieved.

Master Format Disabled, Format Extend

If the master initiates recording from the audio portion of the tape and the slave's **FORMAT** icon is on:

- If the slave tape is unformatted, the slave plays, but the TIME counter reads "noFO" (no format) while flashing the **FORMAT** icon.
- If the slave's tape is formatted, the slave autolocates to the same time as the master and then format extension begins.

If the master initiates recording from the start of the tape and the slave's **FORMAT** icon is on, start-to-finish formatting begins regardless of whether the slave tape is formatted or not.

Recording Digital Audio

Bouncing Tracks Between ADATs

Tracks can be bounced between machines in a multiple ADAT system by using the digital bus. The digital bus is connected in much the same way as the sync cables, and should be done in the same order. Refer to the section entitled *Digital In/Out* on page 47 for more information on connecting the digital bus. It is also possible to bounce tracks within a single CX-8 *without* the need for connecting the digital bus. See page 66 for more information.

If the [**DIGITAL INPUT**] button is pressed, the CX-8 will record from the [**DIGITAL IN**] connector, and the analog inputs will be ignored (both balanced and unbalanced). Alesis' multi-channel digital bus carries the 8 tracks of a source CX-8 or ADAT. These 8 channels are routed in a one-to-one relationship to the 8 tracks of the target CX-8 which can record the digital audio.

Note that to create an *exact* (sample-accurate) digital copy from a master to a slave, *both* master and slave machines must have their [**DIGITAL INPUT**] button's enabled. This is necessary so that the master knows you are making a digital copy and will offset its digital output so that it matches that of the slave machine.

If [**DIGITAL INPUT**] *is selected and there is no optical input, the* **DIGITAL** *icon (located in the* **INPUT** *icon group) will flash.*

When bouncing audio from a master CX-8 to a slave CX-8, the slave does not need to have its Clock set to **DIG** since it is already getting accurate clock information from the master, so it is sample-locked to the digital audio it is recording.

Reassigning Channels to Different Tracks

It is possible to reroute the channel/track assignments so that any incoming channel of digital audio can be recorded onto any track, or multiple tracks. This is done by first holding the [**DIGITAL INPUT**] button and pressing any of the RECORD ENABLE buttons [**1**] – [**8**] to select which source channels you wish to record (while holding the [**DIGITAL INPUT**] button, the blue **INPUT** LEDs will light to indicate the selected

source channels; by default, all eight **INPUT** LEDs will be lit). Then, after releasing the [**DIGITAL INPUT**] button, use the RECORD ENABLE buttons to select the tracks you wish to record the source channels onto (the **INPUT** LEDs return to their normal status).

- The selected source channels are re-routed to the record-enabled destination tracks, in ascending order. *Example:* If source channels 1 and 5 are selected and tracks 3 and 4 are record enabled, then incoming audio on channel 1 will be routed to track 3 and incoming audio on channel 5 will be routed to track 4.

- If more destination tracks are selected than source tracks, the source tracks will repeat (cycle). *Example:* If tracks 7 and 8 were added to the destination tracks of the previous example, then incoming track 1 would be routed to tracks 3 and 7 and incoming track 5 would be routed to tracks 4 and 8. This scheme allows for copying a single incoming channel to multiple tracks.

- If all 8 channels are selected as source tracks, no digital routing will occur as this gives a one-to-one relationship (and is the power-on default). If no source channels are selected, then digital silence will be input to any record-enabled tracks.

Making Digital Backups

CX-8 tapes can be backed up for safety by copying all eight tracks to another CX-8 (or ADAT compatible machine) via the digital bus. The result is a perfect digital duplication of the original. It's a good idea to make backups on a regular basis, whenever you finish work for the day, or complete a project. The backup can either be sample accurate to the time reference or not. This depends on whether or not the two machines are synchronized together via a 9-pin connector cable. It is recommended, however, that you do have the Sync cables connected between the machines, as described in the section entitled *Synchronizing Machines* on page 97.

When making a backup, the tape you are backing up is normally inserted into the master machine. The tape you are backing up to is inserted into one of the slave machines. This is recommended since the slave machine comes after the master machine in the system chain.

NOTE: **[TRACK COPY]** is not used to make digital tape backups from machine to machine. Track Copy is only used to copy between tracks on the same machine.

To make a backup tape:

① Connect a male/male, 9-pin D connector cable between the **[SYNC OUT]** of the master CX-8 and the **[SYNC IN]** of the slave CX-8.
This synchronizes the two machines; the master CX-8 becomes the master (ID 1) and the slave machine becomes the slave (ID 2).

② Connect a fiber optic cable between the **[DIGITAL OUT]** of the master CX-8 and the **[DIGITAL IN]** of the slave CX-8.
This routes the digital audio from the master CX-8 to the slave machine.

③ Connect a fiber optic cable between the **[DIGITAL OUT]** of the slave CX-8 and the **[DIGITAL IN]** of the master CX-8.
This routes the digital audio back from the slave CX-8 to the master machine.

④ Insert the tape to be backed up into the master CX-8.

⑤ Insert a blank tape into the slave machine.

⑥ Press the **[DIGITAL INPUT]** button on both the master CX-8 and the slave CX-8.
The **DIGITAL** *icon will be lit on both machines.*

⑦ Press all RECORD ENABLE buttons **[1]** – **[8]** on the slave CX-8.
The **RECORD** *LEDs for tracks 9–16 (all eight of the slave machine's tracks) will flash.*

Be sure that the RECORD ENABLE buttons are switched ***off*** *for tracks 1–8 of the master CX-8 and the write-protect tab (or record tab) is removed (open).*

⑧ Press both **[PLAY]** and **[RECORD]** on the master CX-8.
Since this is the master machine (ID 1), it will simply enter play (since none of its tracks are in record-ready) while engaging record on the slave machine.

⑨ Press **[STOP]** on the master CX-8 after backing up is complete.
Both machines will stop.

If a tape is in very bad condition, you may have difficulty copying it from the master CX-8 to a slave. If the error count is so high that the CX-8 momentarily loses sync during playback, all following slaves will be taken out of record automatically. In this case, put the new tape into the master, and the damaged tape in the slave, and copy from the slave to the master.

Recording Digital Audio from Other Sources

Recording digital audio onto the CX-8 from a source other than an ADAT Compatible device requires a digital audio interface, like the Alesis AI-1. The AI-1 converts either AES/EBU or S/PDIF digital audio protocols into the Alesis Multichannel Optical protocol which the CX-8 uses, and vice-versa. Refer to the User's Manual of the digital interface you are using for more information.

When recording digital audio into the CX-8 from another CX-8, RD-8 or ADAT in a multiple machine system, the CX-8 recording the audio is already synchronized with the other machines, so the digital audio is sample-locked when recorded. This is because all slave machines are automatically set to External Clock mode (**EXT** icon lights in the **CLOCK** icon group). However, when recording digital audio from some other source, it is necessary to have the CX-8 synchronize to the incoming digital audio. This can be done differently depending on whether you are using a single CX-8 by itself or a multiple machine system.

If using a single CX-8, you must connect the AI-1's ADAT OPTICAL [OUT] to the CX-8's **[DIGITAL IN]** using a single fiber optic connector. Press the **[DIGITAL INPUT]** button on the CX-8, and set its Clock Source to Digital (press **[CLOCK SELECT]** until the **DIG** icon lights in the **CLOCK** icon group). Now the CX-8 will synchronize to the clock information which accompanies the digital audio coming from the AI-1, which is originating from the digital audio device connected to the DIGITAL [IN] of the AI-1.

In a multiple machine system, you have two choices: synchronize the digital audio source to the ADAT system, or sync the ADAT system to the digital audio source.

If the source does not have any kind of clock input (i.e., it cannot be synchronized to an external clock), you have little choice but to choose the later option. This means you must connect the AI-1's ADAT OPTICAL [OUT] to the **[DIGITAL IN]** of the master ADAT, which of course has its **[DIGITAL OUT]** already connected to the next slave, and so on. You must then set the master's Clock Source to Digital (press **[CLOCK SELECT]**

⑤ While still holding **[EDIT VALUE]**, press any of the **[LOCATE 0]** – **[LOCATE 9]** buttons to replace the selected digit with.
The next digit to the right is automatically selected, so you may continue entering digits.

⑥ To change the current value from a positive offset to a negative offset (−), hold **[EDIT VALUE]** and press **[SET LOCATE]**.
The offset digits will remain exactly the same. However, this step will toggle between positive and negative values by either displaying a "−" or not.

⑦ To reset the Tape Offset amount to 0:00:00.00, press both [▲] and [▼] simultaneously.

Combining CX-8 and RD-8/ADATs

CX-8 Transport Speed

The CX-8's transport speed has been improved to be four times faster in engaged mode than the RD-8 and the original ADAT. Because of this and other unique features, it is recommended that you make the CX-8 the master (ID 1) in your system and your ADAT(s) should be the slave(s). Until you need more than 8 tracks, you may want to avoid inserting tape(s) into the slave unit(s). This is because when locating, the ADATs will move slower than the CX-8. The result is the CX-8 will locate to a specific tape position, stop and wait for the ADAT(s) to get there before going into play.

Make RD-8 the Master

If you are adding the CX-8 to a system with one or more RD-8s, make sure the CX-8 is connected as a slave, and that an RD-8 is the master. This setup provides you with all of the features of the RD-8 (including synchronization controls, MIDI, RS-422) along with with its other features which are found in the CX-8 (track delay, tape offset, auto record, rehearse).

Due to its increased transport speed, however, the CX-8 will almost always reach its destination before the RD-8 does. In fact, it is possible for the CX-8 to reach the end of its tape when fast forwarding (or the beginning of the tape when rewinding) before the master RD-8 has reached the location you are going to. Once the RD-8 is stopped, it sends out a locate command to the slave(s), which then returns the CX-8 back to the same position as the master RD-8.

In this situation, we recommend that you issue a manual locate command from the RD-8. This will cause the CX-8 to fast forward or rewind as required to the desired location and wait for the RD-8 to arrive.

Input Monitoring

The original ADAT and RD-8 were designed so that when you were monitoring a track's input signal, what you heard was the actual analog input being fed directly to the analog output—the signal did not pass through the A/D and D/A converters. There was an advanced feature

on the RD-8 whereby, if you held [**HOME**] and pressed [**ALL INPUT**], it would then allow you to monitor the input *after* the converters, so as to hear exactly how the signal would sound when played back from tape.

The CX-8 lets you monitor the input signals through the converters at all times. Because of this, there is an extremely minimal delay as the digital audio passes through the converters' buffers. If you were to listen to both the original signal on your mixer and the tape return of the same signal coming back from the CX-8, the delay of the signal coming from the CX-8 would cause some phase cancellation when combined with the original signal. Therefore, it is important that you either monitor the original signal or the tape's input signal on your mixer, but not both.

Polarity Differences

The original ADAT and RD-8 were designed to invert its analog input signal internally before the audio was sent through the A/D (analog-to-digital) converter and recorded onto tape. The digital representation of the data (as stored on tape) was therefore inverted relative to the analog input (i.e., a positive voltage at the analog input is stored as a negative number on the tape). When this digital signal was played back from tape, the data was sent to a D/A (digital-to-analog) converter, and the analog signal output of the D/A was inverted once again before going to the output jacks. This resulted in the input to output phase being correct, and no phase problems were experienced when using a single or a multiple machine system.

However, neither the digital input nor the digital output was inverted. Therefore, if one transfers the RD-8's/ADAT's digital audio data to a DAT machine or hard disk recording system (using the AI-1 or a similar digital interface), the audio output from the other device would likely be out of phase with the RD-8/ADAT, since it probably does not invert the analog signal after its D/A converters. Although this in and of itself will not usually be a problem, it may cause some confusion if multiple correlated audio signals are combined from multiple sources since there is a possibility that signals could become out of phase.

To prevent this from occurring, the CX-8 design has been improved so that the polarity remains constant from the analog to digital, and back to analog, domain. Like the original ADAT, the result from one machine, or multiples of the same machine, is the same: The input to output phase is correct. However, if two cloned tapes (copied digitally either with

RD-8s, CX-8s, or both) are played back in sync on both an RD-8 and a CX-8, the outputs of the two machines will be out of phase relative to each other. Since it does not usually serve any practical purpose to play the same signal from two different tapes with two different model machines simultaneously, this should not present a problem for you. This design improvement is only mentioned here to explain this possible situation should you happen to experience it.

Possible problem: Let's say you had been using a multiple machine system and you recorded a stereo signal across two machines (a stereo drum recording on tracks 8 and 9), where there is a common element to each track (i.e. center signal). If you replace one of these machines with an CX-8, the result would be that the track being played back on the CX-8 will be out of phase from the track played on the RD-8/ADAT, canceling the center signal.

Here are some possible solutions:

- Use a phase switch on your mixer (if your mixing board provides this) to invert the phase of the problem track to compensate.

- Wire your patchbay or DB25 cable to reverse the input and output polarity of the CX-8s in the system, but use standard cables on the RD-8s/ADATs in the system. This is recommended only for studios where master tapes will be exchanged between units or sent out of house.

- Digitally bounce one of the stereo tracks to the other RD-8/ADAT so that both sides play back from the same machine.

- Most importantly, it is better to plan recording sessions so that stereo tracks reside on the same physical tape in a multiple machine system.

Connections

If you are replacing one or more of your RD-8s/ADATs with CX-8s and have been using the short, 8" sync cables, you will need to use 1 meter cables (or longer) to make the connection between RD-8s/ADATs and CX-8s. This is because the **[SYNC IN]** and **[SYNC OUT]** connectors have been moved on the CX-8 rear panel to the opposite side, and the shorter cables will no longer reach.

Displaying Frames vs. 100ths/Seconds

If you are using the CX-8 with an RD-8 or the Alesis BRC, you will notice the RD-8/BRC's TIME display uses the "hours:minutes:seconds: frames" format, while the CX-8 normally uses the "hours:minutes: seconds:100ths/second" format. This may cause some confusion when locating to a specific position on the RD-8/BRC, since the CX-8 will read a slightly different position when looking at the last two digits of the TIME counter. The CX-8 will locate to the same physical position, it is simply displaying 100ths/second instead of frames.

It is possible, however, to switch the CX-8's TIME display so that it counts frames (30 frames per second), instead of 100ths/second. This is done by holding [**SET LOCATE**] and pressing RECORD ENABLE [**4**]. Repeat this process to toggle back and forth between these two modes. When set to "frames-per-second" mode, the TIME counter will briefly read "d ISP FPS". When switched back to "100ths-of-a-second" mode, the TIME counter will briefly read "d ISP rEG". This feature is designed for the sole purpose of aligning the displays of the CX-8 and the RD-8/BRC. The selected mode also affects how the Locate Points are displayed and edited.

APPLICATIONS

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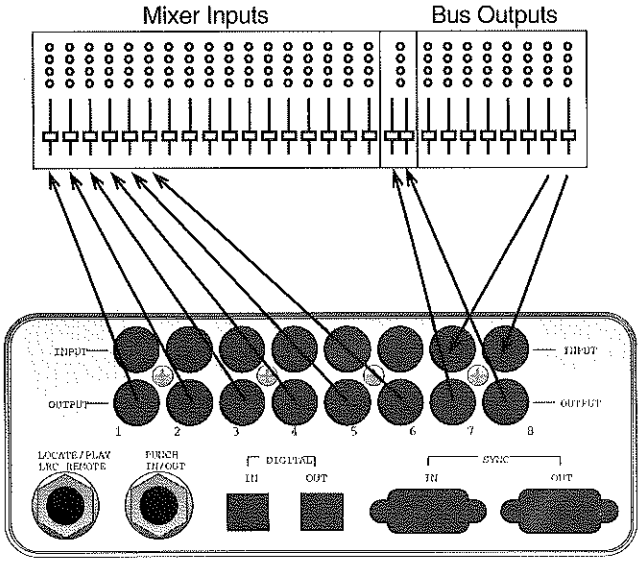
Overview

THIS CHAPTER IS DESIGNED to give you an idea of the multitude of applications for the CX-8. These applications are not broken down into great detail. Therefore, where applicable you will need to refer to other sections of this manual for instructions on how to setup the CX-8 for a particular job.

Combined Multitrack/Mastering

The CX-8 can serve as a combination 6-track multitrack recorder and 2-track mastering deck. Record your audio onto tracks 1–6, then run them through a mixer, using the sub or group outs to send them back to tracks 7 and 8. Tracks 7 and 8 will contain the stereo master recording; their outputs should then be connected back to the mixer's 2-track playback inputs.



In addition, an external synchronizer connected to the CX-8's **[SYNC OUT]** can output SMPTE or MTC to simultaneously synchronize a MIDI sequencer to tape. This way, you can mix down not only the first 6 tracks

from the CX-8 but your "virtual" tracks on the sequencer as well, all onto tracks 7 and 8.

If you are using a multiple machine system (with one or more CX-8s and/or ADATs), you can dedicate any two tracks in the system for a stereo mix. Because all machines are perfectly synchronized to one another, you can punch-in and -out of the mix itself. This opens up all sorts of possibilities, like changing the EQ, effects and other mix settings for different sections of the mix.

Live/Long-Term Recording

The CX-8 is excellent for live recording because of its compact size and easy operation. Eight tracks allow for recording audience sounds, ambience, and individual soloists as well as a stereo mix of the PA. Of course, multiple machines may be interconnected and synchronized to allow for more tracks.

When using more than one CX-8, you can increase the recording time by manually placing the second machine into record just before the first machine is at the end of its tape. Naturally, the audio signals would need to be split and connected to both sets of inputs.

If you are using an Alesis BRC with a multiple machine system, you can take advantage of a feature called *continuous recording*. By splitting the system into two (or into two sets of machines), you can offset the second set by a specific amount of time. *Example:* A 35 minute offset would provide 5 minutes of overlap. The second set of machines would automatically kick into record just before the first set's tape ran out. Refer to chapter 5 for more details on connecting multiple ADATs; refer to the BRC Reference Manual for more information about continuous recording.

Besides the typical 120 minute type of S-VHS tapes (which provide 40 minutes of digital audio recording time), 160 minute tapes are also available (which provide over 53 minutes recording time). And the new 3-hour (180 minute) tapes provide over an hour of digital recording time. The CX-8 must be setup for the length of tape being used. This is done within the Main Function Menu.

ST-60 tapes can also be used for shorter projects; the CX-8 automatically recognizes the shorter length of the ST-60 because the hubs used in this cassette are larger. However, there is no way for the CX-8 to

tell apart an ST-120, ST-160 or ST-180 tape, since these all use the same, smaller size hubs. In this situation, the CX-8 assumes the tape length to be that of a ST-120 tape. Therefore, when using either ST-160 or ST-180 length tape, you should set the tape length on the CX-8.

Refer to page 90 for more information about tape length.

To set the tape length:

① Hold the **[SET LOCATE]** button and press the **[FORMAT]** button; *This display will briefly read "5t-60".*

② Repeat step **1** to advance through the available tape length choices. *The display will cycle through the following choices:"5t- 120", "5t- 60", "5t- 160" and "5t- 180".*

Below is a list of the four S-VHS tapes which can be used with CX-8, with their European equivalents and approximate recording times:

Type	Euro	Rec. Time
ST-60	n/a	22 min.
ST-120	SE-180	40 min.
ST-160	SE-240	54 min.
ST-180	SE-260	62 min.

Note: European tapes are actually slightly longer than their US equivalents. Therefore, you may get a few more minutes if using European tape.

Locking to Video: Code Only Master

A common application in the audio post-production environment is locking to video using the timecode on the video tape as a locate reference and the video signal itself as a clock source. This requires a synchronizer interface, such as the Alesis AI-2 or BRC. The connections consist of running a balanced 1/4" TRS cable between the AI-2's [SMPTE IN] connector and the VTR's SMPTE OUT (if timecode is recorded onto either the left or right audio track of the tape, connect the cable to the proper channel's output connector) and a BNC connector from the house sync being provided to the VTR (such as a black-burst generator), or the

VTR's video out to the AI-2 [VIDEO IN]. The AI-2's [SYNC OUT] to the CX-8's [**SYNC IN**] connector.

When the CX-8 detects an on-line AI-2, it will ID itself as a slave (***ID 1***) and the Clock will automatically switch to External (the **EXT** icon will light in the **CLOCK** icon group). Refer to your AI-2 Reference Manual for more information.

Computer Control

MIDI Systems: Virtual Tracking

Lately, many sequencing software manufacturers have been integrating digital audio hard disk recording and playback into their sequencers. However, the CX-8 can offer much of the same flexibility without the added expense of a new program (or upgrade) or the hardware that accompanies a hard disk recording system. This requires a timecode interface, such as Steinberg's ACI or JLCooper's DataSync 2, which will convert the CX-8's timecode (which is recorded when a tape is formatted) into MIDI Timecode (MTC) which a sequencer can synchronize to.

Connect the [**SYNC OUT**] from the CX-8 (or from the last slave in a multiple machine system) to the [SYNC IN] of the timecode interface you are using. Connect the timecode interface's [MIDI OUT] to the [MIDI IN] of you sequencer. Set your sequencer to synchronize to the MTC being received from the timecode interface. As you control the CX-8's tape motion with the transport controls, the sequencer will automatically follow along, letting you mix digital recordings with virtual MIDI tracks on a MIDI sequencer.

MIDI Machine Control: Virtual Remote Control

Many of the computer-based sequencing software programs today have implemented MIDI Machine Control (MMC) into their sequencers. MMC is a specification implemented by the MIDI Manufacturers Association (MMA) and the Japan MIDI Standards Committee (JMSC) which details a set of messages that provide a universal way of having sequencers and tape machines speak to one another (not to mention tape machines talking to each other). These messages include: basic transport functions (like Play, Stop and Record), Locate functions (go to a specific

tape location), Track functions (record-enable, input monitor, track delay), and many other types of messages. However, not all sequencers send out all these messages; some even send only basic transport commands. The total amount of control you have over your CX-8 depends entirely on how much of the MMC specification has been implemented in the software you use.

First, make sure your sequencer is receiving MTC from the CX-8 (see previous section). In addition, connect the [MIDI OUT] from your computer's MIDI interface to the [MIDI IN] of the timecode interface; then connect the [SYNC OUT] of the timecode interface to the **[SYNC IN]** of the CX-8 (of the master in a multiple machine system). Refer to the manuals for the timecode interface and your computer-based sequencer for instructions on how to set them up for MMC applications.

If your sequencer generates MMC commands, you should be able to put your sequencer into play and have the CX-8 follow along. However, don't be surprised if the CX-8 does not immediately go into play. When a PLAY command is sent from the sequencer, the CX-8 is issued a locate command, telling it where the sequencer is positioned (in timecode). The CX-8 may first have to fast forward or rewind to get to the same location as the sequencer. Once this is done, the CX-8 should resume playback which is when timecode is sent to the timecode interface, which converts it into MTC, which causes the sequencer to go into play. In essence, the sequencer is always locking to the CX-8's timecode, while the transport commands you issue from the sequencer act as remote functions.

Libraries and Archives

The CX-8 is superb for archiving purposes, such as speeches and broadcasts, stereo mixes or libraries of stereo samples. The CX-8 can record over eight hours of mono material by recording approx. 60 minutes on each track (using ST-180 tape). Over four hours of stereo mixes or samples can be recorded by mixing down to four sets of stereo pairs (1/2, 3/4, 5/6, and 7/8).

Modular Recording

Collaborations work particularly well with a system or two or more CX-8s (and/or ADATs). You can record your tracks onto the master

machine, then do a premix onto two tracks of a slave machine, which is of course perfectly synchronized to the master. Send this tape to your partner, who adds parts on the other tracks. When the tape comes back, just pop it into one of your machines, and your partner's parts will be in sync with the original tracks you laid down.

You may wish to include documentation with your tape which indicates the Track Delays values, Tape Offset amount and/or Locate Point positions, so your partner can recreate the same parameter settings you were using. Or, if you're both using BRC remotes, save your setup to the "data" section of tape (this is called saving the Table of Contents, or TOC). This way, you partner can pick up right where you left off.

Using Track Copy as a Digital Router

In a multiple machine system which combines one or more CX-8s and one or more ADATs, you can use the CX-8's Track Copy function as a way to reroute its digital output to different tracks on the ADATs.

Let's say you have one CX-8 which is the master, and one ADAT which is the slave. When you normally record the digital output of the CX-8 to the ADAT, the tracks are transferred on a one-to-one basis. In other words, track 1 of the CX-8 is recorded onto track 1 of the ADAT, track 2 goes to track 2, and so on. By using the Track Copy function on the CX-8 , you can have any track on the CX-8 be sent on a different channel. For example, you could have track 1 transmitted as channel 8, which means you can record it onto track 8 (16) of the ADAT.

In the following steps , we will illustrate how to do this:

① On the CX-8 , press and hold [**TRACK COPY**].

② Press RECORD ENABLE [**1**] to select track #1 as the source track.

③ Release the [**TRACK COPY**] button.

④ Press RECORD ENABLE [**8**] to record enable track #8 on the CX-8 .

⑤ Press [**DIGITAL IN**] on the ADAT and press RECORD ENABLE [**8**] to record enable track #8 (16) on the ADAT.

⑥ Press [**PLAY**] on the CX-8 .

⑦ Press [**PLAY**] and [**RECORD**] on the slave ADAT.

Calculating Tape Offset with Locates

The Alesis BRC provides a way of setting tape offsets using any of the 20 Locate memories in a song. This means you can set a Locate at one point, another Locate at another position, then have one of the slave ADATs offset by the amount of time between those two Locate positions.

The CX-8 allows you to set a Tape Offset by entering a time reference. For example, if you were to set a Tape Offset of 5 minutes (0:05:00.00) and the rest of the ADATs were at 0:03:23.15, the CX-8 would be at 0:08:23.15.

But let's say you don't know the time difference (i.e. the offset amount) between two sections of music. How many minutes, seconds and hundredths-of-a-second away is chorus 2 from chorus 1? Here's a way to find out by using the Locate Points.

① Play the tape(s) back from just before chorus #1.

② Press and hold [**SET LOCATE**].

③ When you get to the downbeat of chorus #1, press [**LOCATE 0**].
This sets the TIME counter to 0:00:00.00, *and automatically selects Relative Time mode (the* ***REL*** *icon will light to the left of the TIME counter).*

④ While still holding [**SET LOCATE**], press [**LOCATE 5**] when you get to the downbeat of chorus #2 .

⑤ Press [**STOP**].

⑥ Press [**EDIT VALUE**], then press [**LOCATE 5**].
Edit Mode will now be selected. The TIME counter will display a time for Locate 5 (like 0:00:47.30*). Write this number down or memorize it.*

⑦ Press [**TAPE OFFSET**] (while still in Edit Mode) and enter the value that was displayed for Locate 5 (0:00:47.30).
To do this, press and hold the [**EDIT VALUE**] *button and press* [**LOCATE 4**], [**LOCATE 7**], [**LOCATE 3**] *then* [**LOCATE 0**]*; then release* [**EDIT VALUE**].

⑧ Press [**EDIT VALUE**] to exit Edit Mode.

⑨ Press [**TAPE OFFSET**] to turn the Tape Offset function on.

APPENDICES

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APPENDIX 1:

Digital Recording Concepts

Analog Recording Basics

DIGITAL RECORDING WORKS VERY differently from analog recording. With analog recording, tape containing millions of tiny magnetizable particles move past a record head. The magnetic field around this head fluctuates according to the audio signal present at the tape recorder's input. These fluctuations permanently rearrange the particles on the tape to form a pattern that is analogous to the original audio signal.

On playback, the patterns on tape are red by a separate playback head (or from the record head, set up to read instead of record signals) that converts the magnetic fluctuations back into an audio signal.

The biggest problem with analog recording is that the tape itself alters the sound originally recorded on tape. Tape hiss is one problem; it superimposes a low-level rushing noise onto the audio signal. Although there are ways to minimize noise, such as noise reduction circuitry, this colors the sound in the process of masking the noise.

Tape's frequency response is also an issue. Tape has a hard time "absorbing" higher frequencies, which can dullen the sound. moving tape faster allows the heads to magnetize more particles and extends the high frequency response, but the tradeoff is increased tape costs, and heftier transports to move bigger reels of tape.

Digital Recording Basics

With digital recording, the technology is very similar — tape moves past a record head, and plays back through a playback head. However, the signal recorded on tape is very different.

Audio signals entering each channel of the CX-8 first pass through an analog-to-digital (A/D) converter, a device that takes 48,000 samples or "snapshots" of the signal level every second[1]. Each sample is assigned a specific numeric value that corresponds to its level.

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[1]48,000 samples are taken per second at a sampling rate of 48 kHz; 44,100 samples are taken per second at a sampling rate of 44.1 kHz.

extreme temperature fluctuations or any kind of physical abuse (drops, shocks).

Under no circumstances should you remove the top or bottom cover of the CX-8. You already know that there are NO user serviceable parts inside. However, you should also be aware that it is extremely easy to damage your heads and other sensitive parts of your CX-8. Do not open up your CX-8 to clean the heads.

What it comes to is this: The CX-8 is a very sophisticated piece of digital technology. It is going to be used for your important projects so take the best care of your CX-8 and your CX-8 heads possible.

Head Maintenance

The heads of each CX-8 are pre-aligned at Fostex. No user adjustment is necessary. Over the course of time, depending on the quality of the tapes used and the environmental conditions where the CX-8 and its tapes are stored, head cleaning may become necessary. Unlike analog or even video tape recorders, the actual sound quality of an CX-8 recording will not be affected until there is quite a bit of dirt on the drum and heads. When the Interpolation Indicator (the sunburst at the end of the location display) starts appearing frequently, even on brand new tapes, we recommend that you bring your CX-8 to an authorized Fostex Service Center for cleaning. If the indicator is not appearing and the unit is performing normally, there is no reason to clean the heads. Periodic or preventative maintenance should not be over done to prevent premature wear on the headstack.

If head cleaning is necessary and you are unable to bring your CX-8 to a service center, you may try using a DRY VHS head cleaning cassette. We recommend

3M VHSHC Black Watch Head Cleaner Video Cassette or 3M ASD HC Digital Audio Head Cleaning Cassette.

- Do NOT use any other type of head cleaning cassette. They are abrasive and will damage or wear out your heads.
- Do NOT use head cleaning cassettes that require any kind of liquid.
- Do not use the Black Watch cassette any more often than necessary. Over-cleaning the heads wears them down, reducing their life span.

- Do NOT attempt to clean the heads yourself unless you are a skilled technician experienced in the maintenance of video cassette recorders. Information for such technicians is available from Fostex Product Support. CX-8 head cleaning requires different materials and procedures from analog head cleaning, similar to VCR maintenance. **Cleaning the heads with a cotton swab, or rubbing in the wrong direction, will destroy them. Opening the case of your CX-8 will void the warranty.**

Maintenance of the CX-8 should be based on the Interpolation Indicator (or Error Count Display, see p. 74) or if the unit begins to behave erratically. To determine if these symptoms are caused by dirty heads, (not a defective or worn tape), keep a "benchmark" tape from the first weeks of operation set aside in a safe place (see page 71). If the Interpolation Indicator lights frequently when playing back this tape, it is likely that head cleaning is needed, particularly if several hundred drum-on hours have elapsed since the last cleaning.

Call Fostex Product Support for more information about head cleaning and authorized Fostex Service Centers.

Tape Maintenance: Safe Tape

CX-8/ADAT tapes are no different than any standard tape: they must be treated with care. Never expose CX-8 tapes to temperature extremes, strong magnetic fields (such as speakers), high humidity, dust and so on.

<u>You should always practice SAFE TAPE:</u>

- At the end of every session you should rewind the tape all the way to the leader, stop, eject the tape, remove it from the CX-8 and place it in its protective case. This cuts down on the amount of dust that can enter the transport and keeps wear on the tape at a minimum.

- Don't leave your tapes near speakers, power amps or other potential magnetic fields such as televisions or electrical devices.

- Don't subject your tapes to extreme temperatures or wild temperature fluctuations.

- Don't expose your tapes to high humidity, moisture or high dust levels.

- Don't leave your tapes on the dashboard of your car. (In fact, never leave CX-8 tapes in a car **EVER**. Keep them with you at all times!)

- Certainly, no matter how tempted you are to open the shutter to see what is inside, **NEVER TOUCH THE TAPE**. The magnetic particles on your CX-8 tape need to be preserved in the condition in which they were recorded. The oils from your fingers WILL damage your tapes as well as get on the heads and damage them.

- Never turn off the CX-8 power while the tape is threaded. This leaves the tape bent around the rollers and head. Press **[STOP]** until the tape is unthreaded before turning off power.

Practice "safe tape" at all times because you can never retrieve lost data.

If you are archiving your tapes, make sure they are stored in environmentally stable conditions, i.e. a cool dry place. If you do archive your tapes, you need to check them once a year. Run each tape through your CX-8 from end to end. This will prevent buildup that can occur when a tape is left simply "sitting".

Of course, for your super sensitive or important material, nothing beats making multiple digital backups. Every year or so, simply do another digital backup onto a brand new tape.

APPENDIX 3: Error Codes

The following errors codes may appear from time to time in the TIME counter display. Use this reference to learn the possible cause of the error code before attempting to contact Fostex Product Support.

dU	**Dew Sensor:** The unit has been subjected to overly high humidity. Do not operate the unit. Turn on the power without installing a tape. This will allow the unit to warm up and disperse the moisture. If the "dU" message does not go out after 2 hours contact Fostex for service.
noFo	**No Format:** The tape is located at a point that has not been formatted. Rewind the tape to the beginning. Press play. If the tape is formatted the message will change to "LEAd" for 15 seconds then "dAtA" for 2 minutes prior to the beginning of the audio section. If these messages do not appear, the tape should be formatted.
FULL	**Serial Buffer Full:** Not seen very often. "FULL" occurs when a slave CX-8 is slow to sync to the master CX-8. The serial buffer within the micro controller has become full of data. This could be the result of unlike versions of software within each unit. Sometimes the problem is related to the sync cable itself. It is recommended that only shielded and grounded cables be used as sync cables. Finally, this error may occur in slave machines that are playing damaged tapes. The edges of the tape have become damaged. If only one tape is found to cause this problem, don't use it. If the problem is seen with several tapes, the machine should be taken in for service. Contact Fostex for service.
Er 0	**Tape Load Error:** This may be a problem with the TAPE LOAD or (insert) switch. This can be caused by labels that have been applied to the cassette outside of the designated area. If this error message is displayed with only one tape, the cassette may be at fault. If the message is displayed with several tapes, with and without labels, you should contact Fostex for service.

Er 1
Er 4

Tape Threading: These error codes are usually related to tape threading. Eject the tape and load it again. If this error message is displayed with only one tape, the cassette may be at fault. If the message is displayed with several tapes, with and without labels, you should contact Fostex for service.

Er 5

Drum/Capstan: This error points to the head drum and capstan servos. The problem is caused by anything creating extra resistance in the tape path, an unevenly wound cassette or a misalligned cassette shell. You should fast forward and rewind the cassette from end to end to flex the tape then try the tape again. If this error message is displayed with only one tape the cassette may be at fault. If the message is displayed with several tapes, with and without labels, you should contact Fostex for service.

Er 7

Clean Heads: If this error message is seen, it may indicate that the heads are in need of cleaning. See page 126 for information about cleaning your heads.

Er 8

Sync Lost: Error message 8 normally occurs when the tape reaches the end while formatting or recording. It is caused by the fact that the CX-8 cannot read timing data from the leader. The error is caused by the unit loosing sync. If the unit is being run in the slave mode check the sync cable connection. It is recommended that only shielded and grounded cables be used as sync cables.

Er 9

Take-up Reel. This error indicates that the take-up reel didn't move after PLAY or RECORD was engaged. This can spool tape out of the cassette, so the CX-8 stops the tape immediately. It's possible that the take up reel of the tape is jammed; try a blank or unimportant tape to see if the error recurs. The idler wheel that turns the take-up reel may need cleaning or replacement.

Note: If these errors occur only with a certain tape, or display once in a while, it's probably not cause for concern. Errors 1 through 3 and 9 can indicate conditions that may damage a tape; the other errors won't damage the tape or the machine. Backup the data from that tape to another machine, if possible, and continue working from the backup copy.

Steps To Take Before Calling For Help

If an error message is displayed or if an CX-8 starts behaving strangely, then please follow the suggested steps below:

① Stop the tape playing (or recording). Does the error go away?

② Rewind the tape a minute or two. Press [**PLAY**]. Does the error recur?

③ Eject the tape. Place it back in the CX-8 and press [**PLAY**]. Does the error recur?

④ Turn down the volume of any mixer or amplifier you have connected to the outputs of the CX-8. Turn the power of the CX-8 off, wait a minute and then re-power the CX-8. Repeat steps **1** to **3**. Does the error come back?

⑤ If it does, then try a different tape. Repeat steps **1** to **3**. Does the problem recur?

⑥ Try the tape in a different CX-8 or ADAT. (If you are using a single CX-8, see if you can visit your dealer.) It does not make sense to send your CX-8 in for service when there may be only a problem with, for example, some tapes that you are using. If the same problems occur in another CX-8 or ADAT, then either the tape is faulty or it was formatted on an out of alignment CX-8 or ADAT. At this point, you should call Fostex Product Support. If the problem does not occur, and the tape works fine, then we need to look at your CX-8. You need to call Fostex Product Support.

Whatever happens, the answers to all these questions are useful information for our Product Support representatives. The more we know, the faster we can discover the cause of your problems. You will help us isolate whether the problem lies in the CX-8, the tape or somewhere else.

APPENDIX 4: Advanced Features

Below is a list of advanced features which may be accessed using a combination of front panel buttons.

Hold...	and press...	to select action...
[SET LOCATE]	RECORD ENABLE **[1]**	**Write-Protect Override:** Temporarily allows recording onto a tape which has its write-protect tab removed.
[SET LOCATE]	RECORD ENABLE **[3]**	**Display Error Rate:** Switches the TIME counter to display the number of sync block errors per 14 drum revolutions (every 280ms) while in Play mode only.
[SET LOCATE]	RECORD ENABLE **[4]**	**Display FPS:** Toggles the TIME counter between frames-per- second (fps) or 1/100ths-of-a-second.
[SET LOCATE]	**[FORMAT]**	**Select Tape Length:** Cycles through the four different tape length settings.
[SET LOCATE]	**[PLAY]**	**Display ID:** Temporarily displays unit's ID number (only if connected to a multiple-ADAT system.
[SET LOCATE]	**[EJECT]**	**Eject Master Tape Only:** Ejects only the master machine's tape in a multiple ADAT system.
[SET LOCATE]	**[RECORD]**	**Set Record Crossfade Time:** Cycles through the four different crossfade time settings.
[SET LOCATE]	**[FAST FWD]**	**Software Version:** Displays the current software version.
[PEAK MODE]	**[PEAK CLEAR]**	**Fine Meter Mode:** Switches the Peak Meters to fine mode. Press **[PEAK CLEAR]** to exit.
[PEAK CLEAR]	**PITCH [▲]/[▼]**	**Display Brightness:** Adjusts the brightness of the display.
[RECORD] and **[PLAY]**	**[POWER]**	**Re-initialize:** Resets all parameters to default settings and clears memory.

APPENDIX 5: Specifications

Transport

Recording Format:	ADAT Rotary head digital recording
Tape Format:	S-VHS cartridge
Heads: 4 (2 Read, 2 Write); Read before Write	
Approximate Recording Times:	
ST-60:	22 minutes
ST-120/SE-180:	40 minutes
ST-160/SE-240:	54 minutes
ST-180/SE-260:	62 minutes
Fast Wind Rate:	40 x play speed (Threaded)

Audio

Number of Audio Channels:	Eight
Audio Conversion:	
Record (A/D):	18 bit liner audio, 128 times oversampling, single converter per chan.
Playback (D/A):	20 bit linear, 8 times oversampling, single converter per chan.
Sample Rate:	44.1 /48kHz, Selectable
Vari Speed Range:	+100/-300 cents (48kHz), ±200 cents (44.1kHz)
Frequency Response:	20Hz– 20 kHz, ± 0.5dB
Dynamic Range:	92 dB, A weighted
Distortion:	.009% THD
Channel Crosstalk:	Better than -90 dB @ 1kHz
Wow and Flutter:	Unmeasurable
Reference Level:	-15dB

Analog Inputs/Outputs

Connectors:	
Balanced:	Two DB25 connectors (1 in, 1 out)
Unbalanced:	Sixteen RCA jacks (8 input, 8 output)
Input Impedance:	
Balanced:	10kΩ
Unbalanced:	10kΩ

Output Impedance:	
Balanced:	600Ω
Unbalanced:	10k Ω
Nominal Input levels:	
Balanced:	+4 dBu (1.23V)
Unbalanced:	-10 dBV (3.17V)
Maximum Input levels:	
Balanced:	+19 dBu (6.90V)
Unbalanced:	+5 dBV (1.78V)

Digital Inputs/Outputs

Connectors:	Two EIAJ fiber optical jacks (1 in, 1 out)
Communications Protocol:	8-Channel Serial Communication

General

Power Requirements:	90V–250V AC, 50/60 Hz
Power Consumption:	50W
Operating Temperature:	10–40° C for specified performance
Operating Humidity:	80% maximum with no dew condensation for specified performance
Dimensions (H x W x D):	5.25" x 19" x 11" (133.3 x 482 x 279.5mm)
Weight:	20 lbs. (9 kg)

GLOSSARY

A

A/D or Analog-to-Digital Converter

The device that converts an analog audio signal to digital audio. Once encoded, all audio is stored or processed as a series of numbers rather than as the audio itself.

AES/EBU Interface

A two-channel, digital audio hardware/software standard. The AES/EBU interface allows for data communication between professionally-oriented digital devices (such as digital signal processors, hard disk recording systems, synthesizers with AES/EBU outputs, digital audio workstations, etc.).

Autolocation

The process of automatically rewinding or fast forwarding, as necessary, to find a specific point on tape. Autolocation is usually initiated by pressing a button that tells the machine the point to which you want it to autolocate.

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 many sophisticated systems, all controls can be automated.

Auto Loop

A combination of two functions, *Auto Return* and *Auto Play*, which allows a specific section of tape to be played over and over again; particularly useful for *looped recording* whe used along with the *Auto Record* function.

Auto Play

A function whereby playback is automatically engaged upon completing a locate.

Auto Record

A function whereby recording is carried out automatically. The point where recording begins is determined by the Mark In point. The point where recording ends is determined by the Mark Out point.

H

House Sync

A video signal distributed to any device that requires a reference to maintain proper sync relationship with other devices. The signal comes in several forms: Blackburst results in a black video screen when fed to a video monitor; Color bars are the standard reference for adjusting video equipment. Color bars can be seen on many stations just before they come on the air.

I

Input

An input is a path through which audio passes from one electronic device into another. types of inputs vary in connector type, level, use (sends, monitor, mix), and electrical characteristics (impedance, balanced or unbalanced). They can be analog or digital.

J

K

L

M

MIDI

Musical Instrument Digital Interface (MIDI). A protocol whereby various MIDI-compatible products can communicate various musical and non-musical messages (such as notes, controls, etc.).

MMC

MIDI Machine Control (MMC). A subset of MIDI messages which correspond to tape machine's transport controls and other functions.

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.