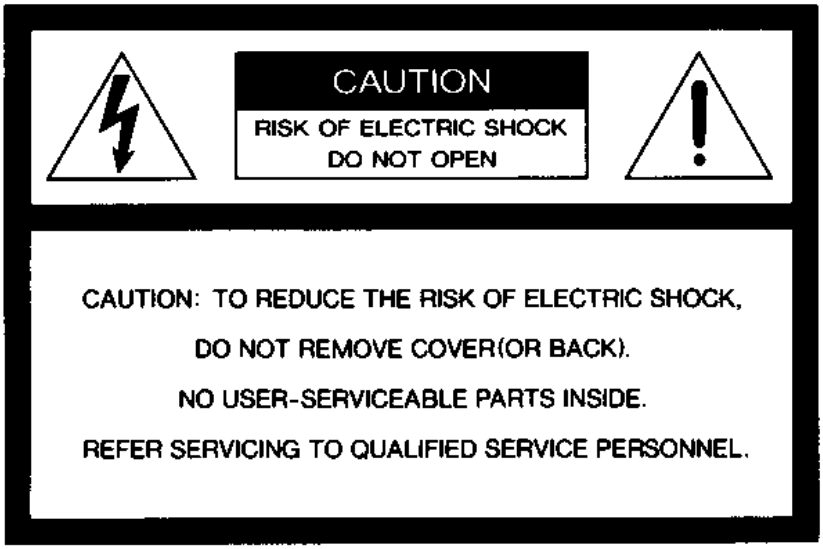
Owner's Manual

X-18/X-18H

MULTITRACKER

FOSTEX®



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

"WARNING"

"TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE."

SAFETY INSTRUCTIONS

1. Read Instructions – All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions – The safety and operating instructions should be retained for future reference.
3. Heed Warnings – All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow Instructions – All operating and use instructions should be followed.
5. Water and Moisture – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. Carts and Stands – The appliance should be used only with a cart or stand that is recommended by the manufacturer.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

7. Wall or Ceiling Mounting – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. Ventilation – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. Heat – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. Power Sources – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. Grounding or Polarization – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. Power Cord Protection – Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. Cleaning – The appliance should be cleaned only as recommended by the manufacturer.
14. Nonuse Periods – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. Object and Liquid Entry – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. Damage Requiring Service – The appliance should be serviced by qualified service personnel when:
    A. The power supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
17. Servicing – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

INTRODUCTION

The Fostex Model X-18 is a multitrack recorder that combines a four input (two for microphones) mixer and a high performance four track cassette recorder. The recorder is configured in normal (X-18) and high speed (X-18H) speed versions.
Both models are able to punch in or out using the footswitch.

Other features include ping pong recording, multiple track overdubbing, as well as, tape sync mixdown linked to MIDI equipment. This manual is common for both the X-18 and X-18H. For simplicity, we will only use the term X-18. However, please keep in mind that there are some specification differences between the two recorders.

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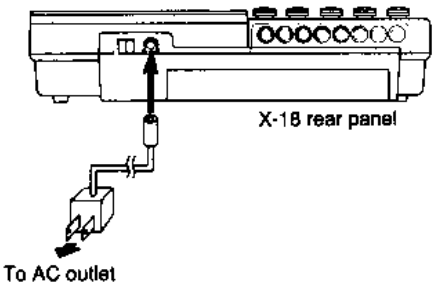
SAFETY PRECAUTIONS

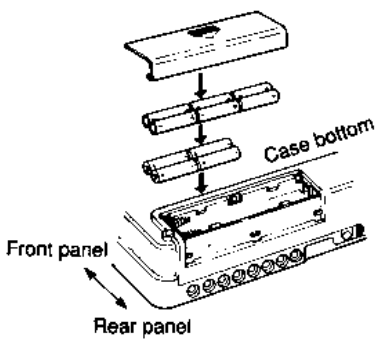
- Connect the X-18 to a standard AC outlet using the supplied AC adapter. Never use this adapter with a voltage other than specified. Should you wish to power the X-18 with a different voltage, consult your nearest Fostex dealer or service center. In no case should you use an AC adapter made by another manufacturer.

Connecting the AC Adaptor



- Always grasp the AC adapter directly when removing it from the AC outlet. Never pull the cord of the AC adapter to unplug it from the outlet, as doing so can cause damage to the cord.
- To avoid the risk of electrical shock, never plug or unplug the AC adapter when your hands are wet. Also, do not use the X-18 should the insulation of the AC adapter cord become damaged or worn.
- Never open the X-18's case or touch the components inside. Also, be careful not to spill water or liquids on the unit, or drop metal objects inside the case. All of these actions pose the danger of electrical shock. If water or some foreign object should accidentally get inside the unit, disconnect the AC adapter from the outlet immediately and contact your Fostex dealer or service center.
- Never connect the output of an amplifier (or any other equipment with output rated in watts) directly to an X-18 input, as doing so could seriously damage the recorder. Refer to the *Specifications* (inside rear cover) for details regarding the unit's input and output impedances.
- Turn the X-18's power switch on before switching on the power to connected equipment, in order to avoid damage due to power surges. Also, when connecting or disconnecting input or output plugs while the X-18's power is turned on, be sure to turn the corresponding volume control to the minimum setting.
- The X-18 can also be powered using ten type A alkali dry cell batteries. Be sure to align the batteries as indicated. Never combine new and used batteries, and always remove batteries from the X-18 if you do not intend to use it for a prolonged period of time. The X-18 can be operated for approximately 2 hours on battery power under normal operating conditions.

Inserting the Batteries



Insert four batteries below and six above, being careful to align the batteries as shown in the diagram. Use only alkali type A dry cell batteries.

INTRODUCTION TO MULTITRACK RECORDING

Before we start explaining how to use the X-18, we thought we'd answer some of the basic questions you may have about the multitrack recording process.

What is multitrack recording?

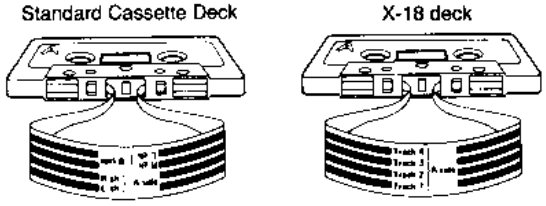
Put simply, multitrack recording is the process of recording individual parts of an ensemble performance separately on independent tracks, and then mixing them together to create a completed recording.

While this process may be more complex than single-track recording, it offers several advantages. First, since each musician's part is recorded separately, it is not necessary to get everyone together at the same place and time. The recording team can concentrate on the individual elements of the recording, ensuring that each part is the best it can be. And the mixing process allows for subtle modifications to the balance of individual parts, something that is not possible with a one-take group recording.

Perhaps best of all, multitrack recording lets you do it all by yourself. Your X-18 Multitracker will allow you to make highly professional recordings on your own, especially when you combine it with other sophisticated technologies such as MIDI and digital effects processing. If you've got some interesting ensemble ideas but have had a hard time getting a band together to try them, you're sure to find multitrack recording a key to greater artistic freedom.

But what are "tracks?"

Good question. The X-18 records on standard cassette tapes, just like the ones you use in your stereo cassette deck. Stereo tapes have a total of four tracks, as shown in the illustration below. The two tracks that comprise side A of the tape are recorded in one direction, whereas the tracks of side B are recorded in the opposite direction.



The X-18 also records in four tracks, but in this case the tracks all run in the same direction. This means that the four-track tapes you record will have only one side. If you flip one over and play it, all you'll hear is a recording played in reverse.

By the way, since four-track cassette tapes have only one side, you'll find that a 60-minute tape will give you only 30 minutes (15 minutes for Model X-18H) of recording time. You'll also want to remove the tabs from *both* side A and side B of a recorded tape to protect it against inadvertent recording.

Are channels the same as tracks?

No. A track is a physical feature of the recording tape, whereas a channel is a signal pathway through the mixer. The X-18 records in four tracks. It also has four mixer channels, each of which leads from the corresponding input jack to the deck. But there is no intrinsic relationship between the channels and tracks: you can record a signal input to any channel on whichever of the four tracks you specify. In fact, you can record all four of the tracks using input to the same channel, as long as you record the tracks one at a time.

Then why does the X-18 have four input channels?

The overdubbing process allows you to get by with only one input channel if you want to. But there may be times when you'd prefer to record more than one track simultaneously. Many digital instruments, for example, feature stereo output that you'll want to record to separate tracks. The X-18's four input channels let you simultaneously record stereo output from two different instruments to two separate tracks (see *Recording Two Tracks at Once*, page 14).

So how do I know which channel to use?

The choice is yours. Remember, you can send the input from any channel to any of the four tracks. The only factor that should influence your choice of a channel is the level of the signal you are recording. You should use channel 1 or channel 2 when recording from a microphone or a low-output instrument: channels 3 and 4 are for use exclusively with line-level equipment such as synthesizers or drum machines.

What is "overdubbing?"

Overdubbing is the heart of multitrack recording. It is the process of recording a track while listening to previously recorded tracks. Overdubbing was invented by Les Paul in collaboration with Ampex audio engineers in the 1950's, and has had a greater effect on music than even the guitar which bears his name.

How about "mixdown?"

Mixdown is the final operation in the multitrack recording process. During mixdown you combine the parts you have recorded, adjusting the volume and setting the "pan" or stereo placement of each. You can also add effects such as reverb at this time, for even greater polish. When you are satisfied with your settings, send the combined sound to another recorder (a stereo cassette deck will do) to prepare the master stereo recording.

HINTS FOR SUCCESSFUL RECORDING

Successful multitrack recording involves a combination of artistic sense and technical expertise. Of course, we can't teach you all you need to know about recording—you'll find that experience is the best teacher. But here are a few suggestions that will help get you on the way.

Use the right tapes.

The X-18 is designed for use with High Bias tapes bearing the 70 µsec EQ designation. Maxell UD-XLII, TDK SA, and equivalent brands are suitable. Metal tape should not be used. Avoid 120-minute cassettes, as they can stretch easily. Sixty-minute tapes are stronger, and therefore much better suited to the recording process.

Keep tapes at least three feet away from strong magnetic fields, such as those generated by speakers, telephones, televisions, and computer monitors. Magnetic fields can damage or even erase your recordings.

The right cables will help, too.

Always use the highest quality cable that you can afford. Inexpensive cables often have poor shielding, unusual impedances, or poor signal-to-distortion characteristics. Using good cable is one simple way to improve your sound.

Choose an appropriate location.

You don't need a studio to put the X-18 to work. Still, you should choose your recording area with care. If you're recording with microphones, you'll want to pick a room with suitable acoustics. Even if you don't use mikes, there are certain things you should look out for: Beware of rheostats—those electric switches that let you gradually dim your lights. They may make for a pleasant ambience, but they can add a terrible hum to your recording. Never plug your recorder (or other electronic equipment) into an AC circuit controlled by a rheostat.

Also avoid air conditioners, refrigerators, and fluorescent or neon lights. These, too, are sources of electronic noise and hum.

Zero the controls before you start.

Begin by turning all of the X-18's controls to their minimum or OFF positions before you record each track. Then adjust only those controls which pertain to the operation at hand.

Check your input levels.

Synthesizers and rhythm machines are generally line-level devices, and can be input to any channel of the X-18. Microphones, on the other hand, usually deliver low-level signals, and so should only be connected to input jacks 1 and 2. Guitars are often customized and used in combination with effect devices, so it is hard to state a general rule. When in doubt about an instrument's output level, connect it to channel 1 or 2 and check the level at the lowest setting. (For details, refer to the explanation of the input level switches ❷ on page 6.)

Record from low to high frequencies.

Plan your recordings so that each successive track moves up in frequency range. Record bass parts first, guitar solos and vocals last. (You'll want to make an exception to this rule only when a song begins with the guitars or vocals.) Recording from low to high frequencies will improve the quality of any recording; but it is especially important if you intend to bounce tracks using the ping-pong method, as high frequency sounds are the first to disappear when bouncing.

You should also try to keep similar frequencies together when combining tracks. Put bass and drums together, rhythm guitar parts with keyboards, and so on.

Don't be afraid to experiment with microphones.

If you use microphones to record, try positioning them in different ways. With electric guitar and bass amps, for example, you might want to put the mike closer to the speaker or point it at an angle away from the center of the speaker cone. Small changes can have big effects on the recorded sound.

If you record in your own home, you can even try recording in different rooms. This is particularly helpful when recording acoustic instruments or vocals. Each room has different acoustic characteristics, so a recording you make in the living room will sound different from one taken in the garage.

Don't use too many effects.

Use signal processor effects—phasing, echo, compression, distortion, and so on—sparingly. A little can go a long way; too much can clutter the recording.

Don't overdo the reverb.

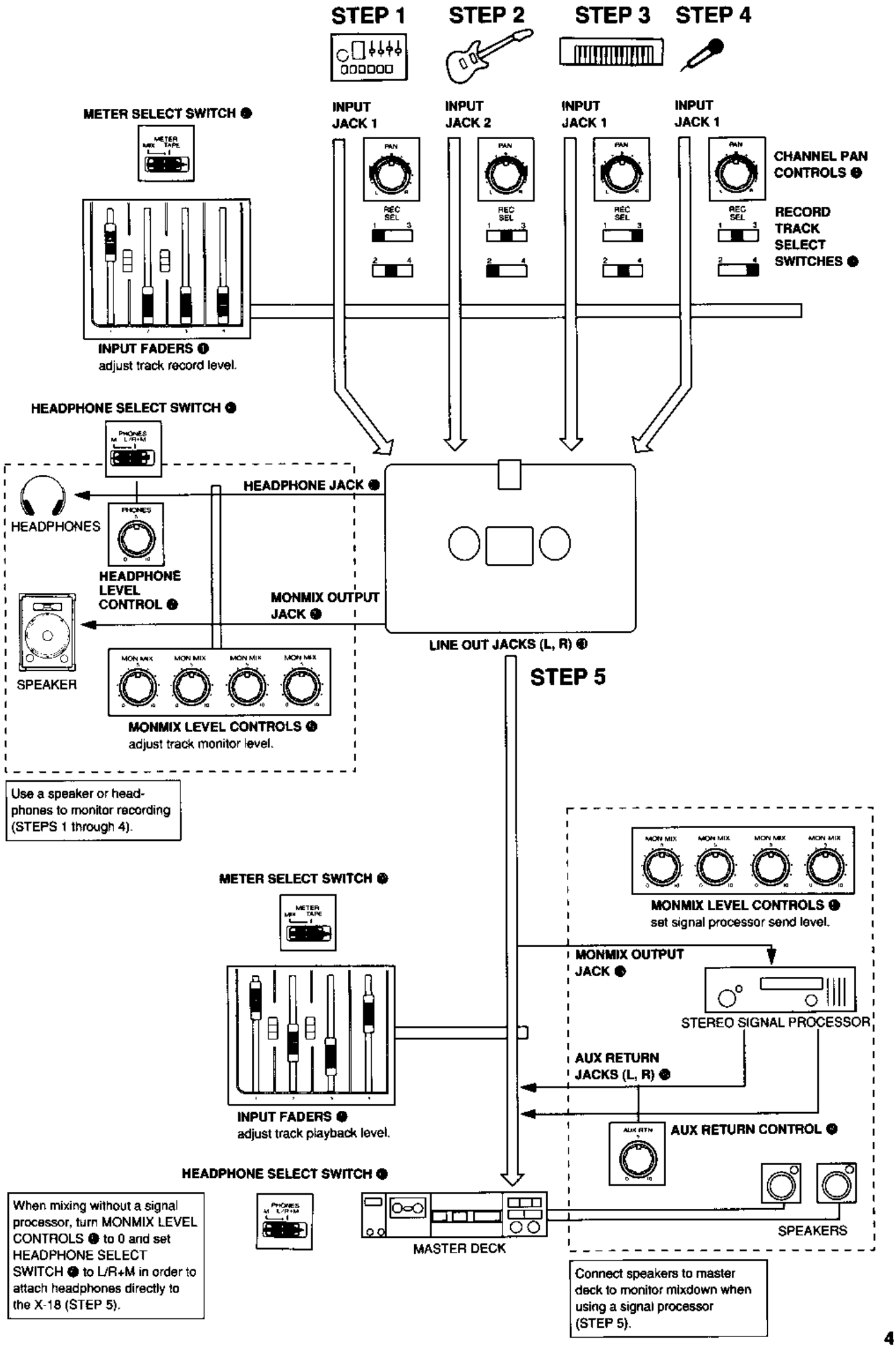
Reverb is essential to a polished, professional-sounding recording. . .but be careful not to overdo it. If you add reverb to each part individually, the cumulative effect is likely to sound muddy. And once you record reverb on a track, you can't get rid of it.

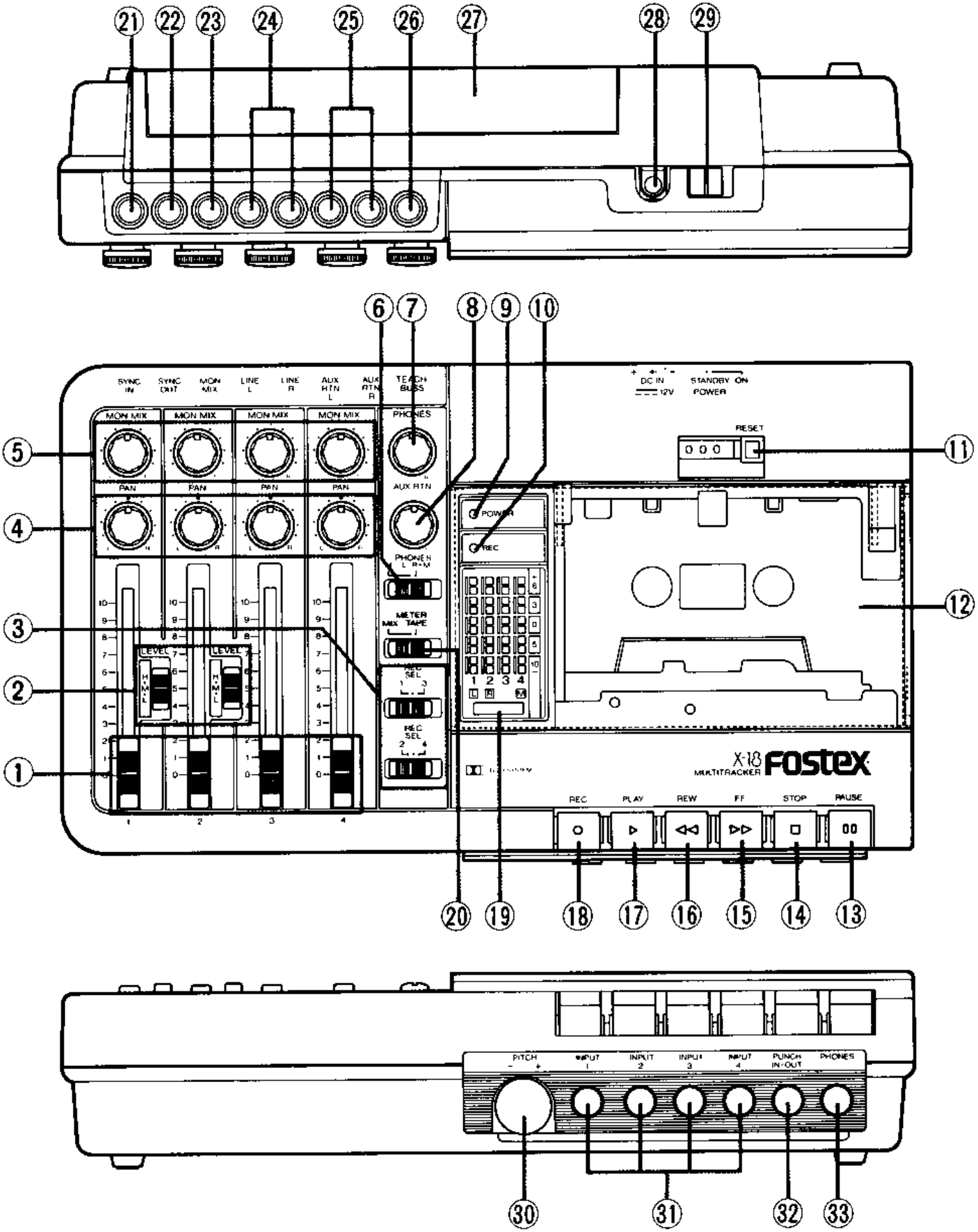
As a rule of thumb, it's best to leave the reverb until mixdown. At that point you can apply reverb to all of the tracks at once, adjusting the amount you add to each part for optimum effect. It's also a good idea to use speakers rather than headphones to monitor the mix, as speakers tend to present a clearer image of the final sound.

Most importantly. . .rehearse before you record.

You may be tempted to speed up the process by recording immediately; or you may want to make a trial recording just to check out the recorded sound. Even so, you should take time to run over the part before each take. Sometimes an hour of rehearsal will do more to improve a recording than fancy recording techniques or expensive outboard equipment can accomplish.

FIVE STEPS TO MULTITRACK RECORDING

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32
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SYNC IN
SYNC OUT
MON MIX
LINE L
LINE R
AUX RTN L
AUX RTN R
TEAC ON BUSS
MON MIX
PAN
LEVEL
PHONES
AUX RTN
PHONES L R+M
METER MIX TAPE
REC SEL 1 3
REC SEL 2 4
DC IN 12V
STANDBY ON POWER
RESET
POWER
REC
1 2 3 4
X-18
MULTITRACKER
FOSTEX
REC
PLAY
REW
FF
STOP
PAUSE
PITCH
INPUT 1
INPUT 2
INPUT 3
INPUT 4
PUNCH IN-OUT
PHONES

PANEL CONTROLS AND TERMINALS

Upper Panel

❶ INPUT FADERS (1–4)

Use the input faders during recording to adjust the levels of signals from the instruments (or microphones) connected to the corresponding input jacks ⓫.

You will also use the input faders during mixdown (when no instruments are connected to the input jacks) to adjust the playback levels of the recorded tracks.

❷ INPUT LEVEL SWITCHES (1–2)

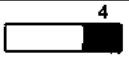
You can use input jacks 1 and 2 ⓫ to input signals from microphones as well as from electric or digital instruments. Since the output levels of microphones tend to be lower than those of electric or digital instruments, you should set the input level switches to select an input level appropriate to the sound source.

Input Level	Used For
Hi	Line-level input from digital instruments, audio equipment, etc.
Mid	High-output microphones and low-output instruments (such as some guitars and basses)
Low	Low-output microphones and instruments with very low output

Some types of equipment have idiosyncratic output levels which are not indicated on this table. If you find that the setting you select does not produce a suitable input level, simply try a different setting.

❸ RECORD TRACK SELECT SWITCHES

Use these switches, in combination with the pan control ❹ for the input channel(s) you are using, to select the track you wish to record. Use the settings in the table below to select a single track for recording:

Track	REC SEL	Channel PAN
1		
2		
3		
4		

As this table shows, you must turn the pan control all the way to the left to record Tracks 1 or 3, or all the way to the right to record Tracks 2 or 4. (You can also leave the pan control centered if you wish to record two tracks at once.)

When you set a record track select switch to the middle position, no track will be selected for recording.

❹ CHANNEL PAN CONTROLS (1–4)

You can use the pan controls during mixdown to determine the stereo placement (or pan) of each track. The balance of the sound from each track shifts between the left and right line out channels depending on the position of the pan control.

You must also use these controls during recording to select the track to be recorded. (Refer to the explanation of the record track select switches ❸, above.)

❺ MONMIX LEVEL CONTROLS (1–4)

The monmix level controls let you adjust the playback levels of recorded tracks, which are mixed together and output (in mono) from the monmix output ㉘ and headphone ㉝ jacks. You will find this playback useful during overdub recording, as it allows you to listen to the tracks you have already completed as you record new tracks.

During mixdown, you may wish to output a signal from the monmix output jack ㉘ for effects processing by a signal processor. In such a case, the monmix level controls let you adjust the amount of each track that is sent to the effect processor.

*It is important to note that the monmix level controls are particular to **tracks**, not channels. That is, the monmix control positioned over the fader for channel 1 controls the playback volume of track 1; that over the channel 2 fader controls the volume of track 2; and so on.*

❻ HEADPHONE SELECT SWITCH

Use this switch to select the signal mixture to output from the headphone jack ㉝.

Setting	Signal Output to Headphones
M	Same as signal output from monmix output jack ㉘
L/R+M	Mixture of signals from monmix output ㉘ and line out ㉔ jacks

Generally speaking, you will wish to use the "M" setting during recording, and the "L/R+M" setting during rehearsal and mixdown.

❼ HEADPHONE LEVEL CONTROL

The headphone level control lets you adjust the volume of the sound output via the headphone jack ㉝.

❽ AUX RETURN CONTROL

This control lets you adjust the levels of the signals input via the aux return jacks ㉕. It adjusts the levels of the right and left channels equally.

❾ POWER INDICATOR

This green LED lights when the power switch ㉙ is turned on.

⑩ RECORD INDICATOR
This red LED lights when the X-18 is in record mode—that is, when the record button ⑱ has been pressed.

⑪ TAPE COUNTER and RESET BUTTON
This mechanical counter indicates the current tape position. Press the reset button to reset the counter to 000.

⑫ TAPE DECK
This is the tape transport mechanism. Aside from the fact that it records and plays four tracks rather than two, the mechanism operates in much the same manner as the familiar stereo tape deck.

⑬ PAUSE BUTTON
Press this button to pause tape playback or recording in progress. You can press the pause button before pressing the record button ⑱ to put the X-18 in record mode without recording. (Refer to the explanation of the record button ⑱, below.)

⑭ STOP BUTTON
Press this button to stop tape playback or recording in progress.

⑮ FAST FORWARD BUTTON
Press this button to advance the tape at high speed. The deck will stop advancing automatically when it reaches the end of the tape.

⑯ REWIND BUTTON
Press this button to advance the tape at high speed. The deck will stop rewinding automatically when it reaches the end of the tape.

⑰ PLAY BUTTON
Press this button to play back recorded tracks. (You need not press this button when recording.) The deck will stop playing automatically when it reaches the end of the tape.

⑱ RECORD BUTTON
Press this button to begin recording. (You don't have to press the play button ⑰—it is pressed automatically when you start recording.) While the X-18 is recording, you will be able to output the track you are recording, together with the tracks you have already recorded, from the monmix output ㉘ and headphone ㉙ jacks.

If you press the record button after first pressing the pause button ⑬, the X-18 will enter record mode but it will not begin recording. This allows you to set input levels and adjust the monmix and headphone volumes before you begin actual recording.

⑲ LEVEL METERS
These bar graph level meters indicate the output levels of recorded tracks, or the levels of signals output to the line out ㉔ and monmix output ㉘ jacks, depending on the position of the meter select switch ⑳.

⑳ METER SELECT SWITCH
Use this switch to select the output levels you wish to have displayed by the level meters ⑲.

Setting	Output Levels	Displayed By
TAPE	Tracks 1–4	columns 1–4
MIX	Line out ㉔	columns 1–2
	Monmix output ㉘	column 4

Rear Panel

㉑ SYNC INPUT JACK

This jack is only used with the MIDI tape sync function. (Refer to *MIDI/Tape Synchronization*, page 18.)

You can input sync signals via this standard RCA pin jack for recording on track 4. However, you will not be able to record sound sources on track 4 when there is a plug in the sync input jack. Be careful not to put a plug in this jack unless you are actually using track 4 to record sync signals.

㉒ SYNC OUTPUT JACK

This jack is only used with the MIDI tape sync function. (Refer to *MIDI/Tape Synchronization*, page 18.)

You can output sync signals from track 4 via this standard RCA pin jack. You will not be able to monitor sound source signals recorded on track 4 when there is a plug in the sync output jack. (However, the level meter ⑲ will indicate the level of any signals recorded on track 4 if the meter select switch ⑳ is set to the TAPE position.) Be careful not to put a plug in this jack unless you are actually using the MIDI/tape sync function.

㉓ MONMIX OUTPUT JACK

This jack outputs the signals from tape Tracks 1–4, which are mixed using the monmix level controls ❺. You can connect a speaker to this standard RCA pin jack to monitor the tracks as you record. During mixdown, you may wish to send a signal from this jack to a signal processor, to serve as the source sound for reverb and other effects.

㉔ LINE OUT JACKS (L, R)

These standard RCA pin jacks output the mixed stereo sound of the tracks you record. You will normally use these jacks during mixdown to send the output to a stereo tape recorder to create a stereo master tape.

㉕ AUX RETURN JACKS (L, R)

If you use a signal processor during mixdown, you will want to input the processed sound to these jacks. Two standard RCA pin jacks are provided, to accommodate signal processors with stereo output.

You can also use these jacks as auxiliary inputs, giving the X-18 an effective total of six inputs.

㉖ TEACHER'S BUSS INPUT JACK

This standard RCA pin jack inputs a signal directly to the headphone circuit. Signals input here are output to the headphone jack ㉝, but not recorded.

This input jack is mainly used to connect the X-18 to a teacher's buss when the recorder is used as a station in a language lab system or recording school.

㉗ BATTERY COVER

The X-18 can operate for about 2 hours on ten type A alkali dry cell batteries. (See *Safety Precautions*, page 1.) Always be sure to replace the battery cover after installing or removing batteries.

㉘ AC ADAPTER CONNECTOR

Connect the DC cord of the supplied AC adapter here.

㉙ POWER SWITCH

The power indicator ❾ will light up when you turn this switch to the ON position. Be sure to turn this switch off (that is, to the STANDBY position) when not using the X-18.

Front Panel

㉚ PITCH CONTROL

The pitch control lets you make fine adjustments to the pitch (or tape speed) during playback. You can adjust the pitch within a range of ±10%.

㉛ INPUT JACKS (1 –4)

Use these standard 1/4" phone jacks to connect the instruments or microphones from which signals are to be recorded. Input jacks 1 and 2 have corresponding input level switches ❷ and can be used to input signals from virtually any sound source, from low-output microphones and electric guitars to digital instruments. Jacks 3 and 4 are designed for use with line level instruments only.

Each of these jacks is equipped with a switch which tells the X-18 whether a plug has been inserted or not. When no plug is inserted to a jack, the tape track bearing the same number is assigned to the corresponding mixer channel for playback monitoring.

㉜ REMOTE PUNCH IN/OUT JACK

You can connect an optional footswitch (Fostex 8051) to this standard 1/4" phone jack for remote foot control of punch-in recording. (Refer to *Punch-in Recording*, page 16.)

㉝ HEADPHONE JACK

You can connect a set of stereo headphones to this standard 1/4" stereo phone jack to monitor your recording.

BASIC OVERDUB RECORDING

Now it's time to put the X-18 to work. In this section we will present an example of multitrack recording using basic overdubbing and mixdown techniques. This simple four-track recording may be broken down into the five steps which we outlined on page 4.

Step 1	Recording a Drum Machine to Track 1
Step 2	Overdubbing a Bass Guitar to Track 2
Step 3	Overdubbing a Rhythm Guitar to Track 3
Step 4	Overdubbing a Lead Vocal to Track 4
Step 5	Final Mixdown and Effects Processing

This example illustrates the most rudimentary approach to recording with the X-18. Of course there are many advanced techniques which you will want to try eventually—but all of these techniques are founded on the basics presented here. We recommend that you follow along with the example and get the essentials down pat before you move on to more difficult operations.

The basic recording procedure is the same for every track. You should of course begin by connecting the AC adapter and turning on the power switch ㉘. Connect headphones to the headphone jack ㉝. Set the meter select switch ⑳ to TAPE and the headphone select switch ❻ to MONMIX. Then follow the procedure below for each track you record:

1. Zero the controls.

   Set all of the faders ❶ and the monmix level controls ❺ for any unused tracks to 0, and the input level switches ❷ to L. Center the record track select switches ❸.

2. Connect an instrument or microphone.

   Plug the cable from the instrument or microphone into an input jack ㉑. If the instrument or mike has a volume control, you should set it to an appropriate level (usually around 70%) at this time.

   Be sure not to connect any instruments that you don't want to record. Whenever you insert a plug in one of the input jacks, the X-18 automatically assumes that you want to input a signal to that channel and will not output the signal from the corresponding track.

3. Select a track to record.

   Set the record track select switches ❸ and the channel pan control ❹ for the input channel you're using as described on page 6.

4. Place the X-18 in record mode.

   Press the pause button ❽, then the record button ⑱. The record indicator ⑩ will light up, indicating that the X-18 is ready to record.

5. Set the input and monitor levels.

   If you're using input channel 1 or 2, be sure to set the channel's input level switch ❷ to a position appropriate to the instrument or mike. Start playing the instrument or testing the mike, and raise the fader ❶ corresponding to the input channel until the level meter ⑲ for the track you've selected peaks at around +3.

   The fader should be set at around 7 when the input level reaches a satisfactory point. If the fader is much higher or lower, try setting the input level switch at a different level and trying again.
   Turn the monmix level control ❺ for the track you are recording to an appropriate level, and adjust the headphone level control ❼ if necessary.

6. Record the part.

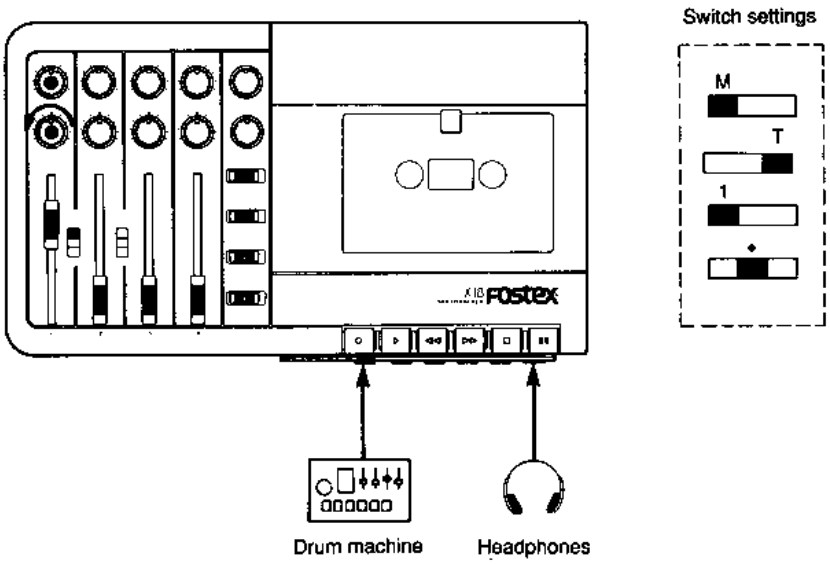
   Press the pause button ⑱ once again when you are ready to record. If you are recording the first track, you can start playing anytime once the tape's past its leader. If you are overdubbing additional tracks, start playing in time with the tracks you've already recorded.

7. Check the results.

   When you're done recording, press the stop button ⑱ to stop the tape deck. (If the other tracks have not finished playing yet, it's a good idea to wait until a few seconds after the song is done to stop the recorder.) Then rewind the tape and press the play button ❼ to play back your recording.

   The level meter ⑲ will indicate the level of the signal you recorded on the tape. The level should tend to peak at around +3. If you find that the recorded level is too low or too high, adjust the level settings and re-record the track. If you're satisfied with the recording, rewind the tape and move on to the next track.

Step 1 Recording a Drum Machine to Track 1

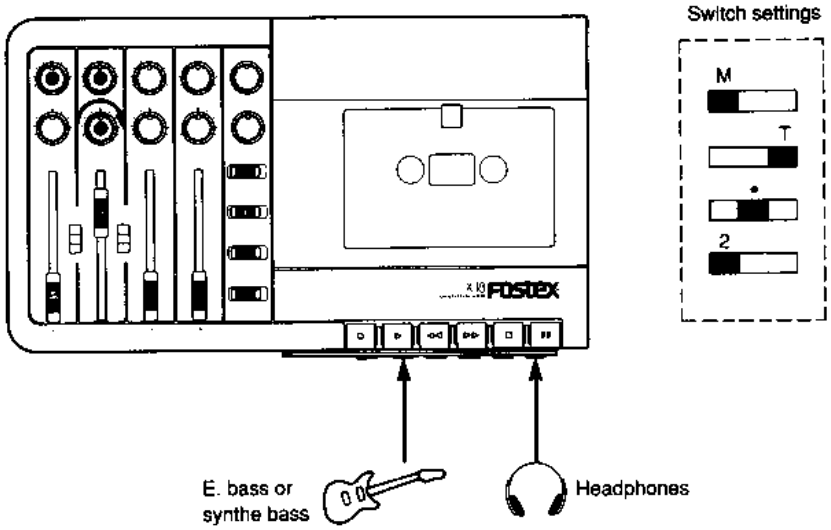


1. Zero the controls.
2. Connect the drum machine to input jack 1.
3. Select track 1.
   Turn pan control 1 all the way to the left, and set the upper record track select switch to 1.
4. Place the X-18 in record mode.
5. Set the input and monitor levels.
   Set the input level switch to H. Start the drum machine playing, and raise fader 1 until level meter 1 peaks at around +3.
   Turn monmix level control 1 to a level of 5 or so. Raise the headphone volume to a comfortable level.
6. Record the part.
7. Check the results.

Using an Amp to Monitor Playback

You can connect an amp to the monmix output jack ㉘ during playback to hear how the recording sounds when played through a speaker. Remember to disconnect the amp before you record the next track, though—especially if you're going to be recording from a microphone!

Step 2 Overdubbing a Bass Guitar to Track 2



1. Zero the controls.
2. Plug the bass guitar into input jack 2.
3. Select track 2 for recording.
   Turn pan control 2 all the way to the right, and set the lower record track select switch to 2.
4. Place the X-18 in record mode.

5. Set the input and monitor levels.

   Set input level switch 2 to M. Raise fader 2 while playing the guitar until level meter 2 peaks at around +3.

   If the fader is much lower than 7 when the level meter reaches +3, switch the input level to L and raise the fader some more. If, on the other hand, you raise the fader all the way and the level still doesn't reach +3, lower the fader to 0, switch the input level to H, and try again.

   Turn monmix level control 2 to a level of 5 or so. Adjust the headphone volume and monmix level control 1 if necessary.

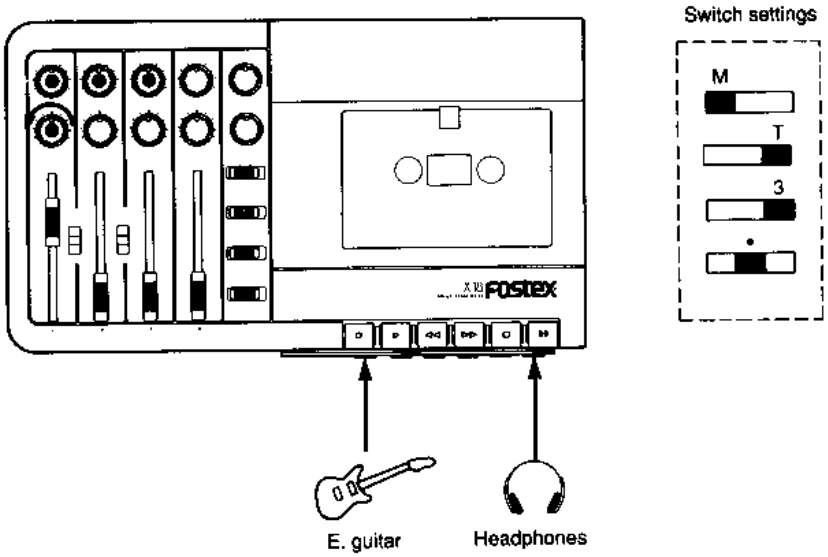
6. Record the part.
7. Check the results.

Rehearsing an Overdub Track

You may want to rehearse a track together with the tracks you have already recorded before you begin actual overdub recording. To do so, switch the headphone select switch ❻ to L/R+M. Turn all of the monmix level controls to zero, and adjust the pan control and input fader settings for each track as described in the *Final Mixdown and Effects Processing* section on page 13. Then press the play button to start the previous tracks playing, and start your rehearsal.

When you're done rehearsing, remember to rewind the tape, return the headphone select switch to the M position, and readjust the pan, input fader, and monmix level settings before you place the X-18 in record mode.

Step 3 Overdubbing a Guitar to Track 3



1. Zero the controls.
2. Plug the guitar into input jack 1.
3. Select track 3 for recording.

   Turn pan control 1 all the way to the left, and set the upper record track select switch to 3.

4. Place the X-18 in record mode.
5. Set the input and monitor levels.

   Set input level switch 1 to M. Raise fader 1 while playing the guitar until level meter 3 peaks at around +3.

   If the fader is much lower than 7 when the level meter reaches +3, switch the input level to L and raise the fader some more. If, on the other hand, you raise the fader all the way and the level still doesn't reach +3, lower the fader to 0, switch the input level to H, and try again.

   Turn monmix level control 3 to a level of 5 or so. Adjust the headphone volume and monmix level controls 1 and 2 if necessary.

6. Record the part.
7. Check the results.

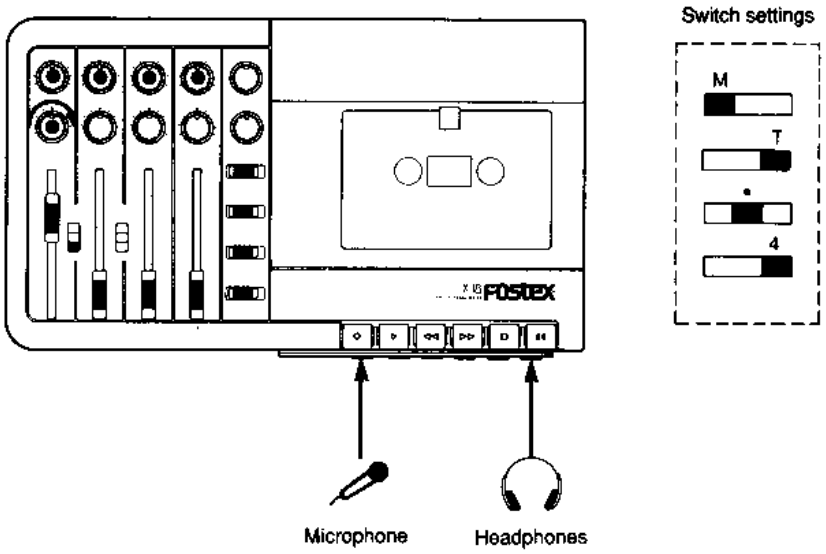
Recording a Synthesizer

This example assumes that you will be recording a rhythm guitar part to track 3. You can easily record a synthesizer or digital keyboard instead, so long as you remember that the output level of the instrument is likely to be higher than that of an electric guitar.

Digital keyboards, like the drum machine you recorded in the first step, are a line-level devices. You'll probably want to set input level switch 1 to H before you raise the input fader.

Many digital keyboards (and drum machines, for that matter) feature two-channel stereo output. You may want to take advantage of this feature by using the X-18 to record the output from such instruments to two tracks. If so, have a look at *Recording Two Tracks at Once* on page 14.

Step 4 Overdubbing a Lead Vocal to Track 4



1. Zero the controls.
2. Plug the microphone into input jack 1.
3. Select track 4 for recording.

   Turn pan control 1 all the way to the right, and set the lower record track select switch to 4.
4. Place the X-18 in record mode.
5. Set the input and monitor levels.

   Set input level switch 1 to L. Raise fader 1 while testing the mike until level meter 4 peaks at around +3. (It's very important that you test the microphone at the same volume you will use when singing the vocal.)

   The fader should be set at around 7 when the input level reaches a satisfactory point. If you raise the fader all the way and the input level still doesn't reach +3, lower the fader to 0, switch the input level to M, and try again. If you still can't get a satisfactory input level, try setting the input level switch to H.

   Turn monmix level control 4 to a level of 5 or so. Adjust the headphone volume and monmix controls 1, 2, and 3 if necessary.
6. Record the part.
7. Check the results.

Recording a Guitar Solo

You may be wondering when you can record that sizzling lead guitar solo you've been practicing. Since the X-18 can only record four tracks, it looks like one of the tracks is going to have to do double duty.

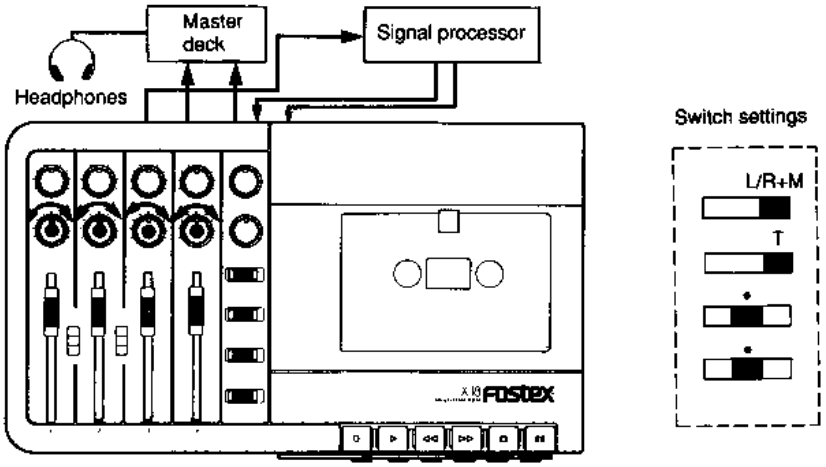
Since the X-18 has a total of four inputs, you can mix two inputs on a track easily enough. Just plug the guitar into input jack 2, turn pan control 2 all the way to the right, set the lower record track select switch to 4, and adjust the input level as described above for the rhythm guitar.

This technique will work best if you do not sing and play the guitar at the same time. If the vocal and your guitar solo overlap, then you'll want to turn the guitar's volume down a little so as not to send the meter into the red.

Step 5 Final Mixdown and Effects Processing

Once you've finished recording all the parts, you're ready to move on to the final stage of the multitrack recording process: mixdown.

During the mixdown process you will adjust the balance of individual tracks in terms of level and stereo placement. If you have a signal processing unit, you will also want to add a little reverb at this time. When you've found the mixture that sounds the best, you can record the resulting stereo signal using a master tape recorder—any stereo cassette deck will do—to create a stereo master tape. You can then use this master tape to make distribution copies of your recording.



1. Connect the line out jacks ㉔ to the corresponding line input jacks of the master tape recorder. Make sure that your master tape recorder is connected to a pair of good speakers; you will use these speakers to mix the recording. (Should you wish to use headphones to monitor the mixdown, be sure to connect them to the master recorder. If you connect them to the X-18 while sending sound to a signal processor via the monmix output jack, you will hear an unbalanced mixture of mono and stereo signals that will only confuse the mixdown process.)

   Make sure that no cables are connected to the X-18's input jacks ㉛. If a plug is in one of these jacks, the X-18 will think you are trying to input a signal to that channel, and so it will not output the signal from the corresponding track.

2. Connect the monmix output jack ㉘ to the input jack of your signal processor, and connect the processor's stereo output to the aux return jacks ㉕. Turn the processor on and set its input and output levels to appropriate values. (See the note below if you do not have a signal processor, or if your signal processor does not feature stereo output.)
3. Set the meter select switch ㉙ to MIX.
4. Zero the controls as described for the overdubbing process, above. Be sure to zero the aux return control ❽ as well.
5. Temporarily center all of the pan controls ❹ and bring the input faders ❶ up to a level of 7. These settings give you a good starting point to begin the actual mixdown process.
6. Press the play button ⓱ to start playback.
7. Adjust the level of each track using the corresponding input fader ❶. Refer to columns 1 and 2 of the level meter ⓳ to make sure that the line output is peaking at an optimum level of around +3.
8. Adjust the stereo placement of each track using the corresponding pan control.
9. Adjust the amount of reverb added to each track using the monmix level controls ❺. Check column 4 of the level meter to make sure that the monmix output is peaking at an optimum level of around +3. Adjust the overall reverb level using the aux return control ❽.
10. Repeat steps 6, 7, and 8 above until you are satisfied with your settings. If necessary, rewind the tape and play it again.
11. When you're satisfied with your settings, play the tape through to "rehearse" the mixdown recording. Practice any fade-ins or fade-outs you would like to add to the recording at this time. When you feel you've got it down just right, you're ready to record.
12. Place the master tape recorder in record mode, press the play button, and record your mixdown.

Mixing Without Reverb

The example of mixdown above assumes that you will be adding reverb. If you don't have a signal processing unit, or don't want to add reverb to your recording, leave the monmix level controls ❺ and the aux return control ❽ set at 0 throughout the mixdown process. You will then be able to monitor mixdown by attaching headphones directly to the X-18.

The X-18 accepts only stereo effect input. This means that if you plug an effect cable into only one of the aux return jacks ㉕, the reverb will appear on only one channel of the final stereo recording. If you want to use a monophonic signal processor with the X-18, you should get a Y cable that will split the mono signal from your processor.

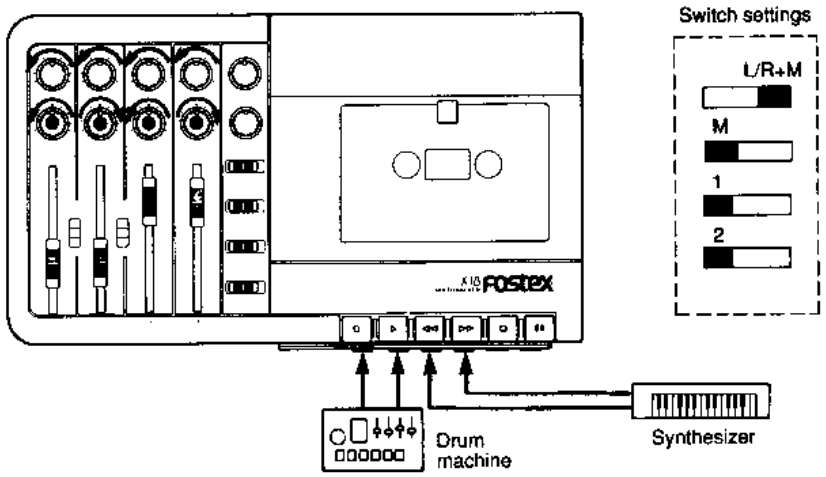
ADVANCED RECORDING TECHNIQUES

Now that you've mastered the basics of multitrack recording, you might be interested in checking out a few of the more advanced techniques the X-18 makes available. The X-18 lets you record two tracks at once, edit tracks with punch-in recording, and combine tracks using a technique known as "ping-pong" recording. You can also synchronize the X-18 with MIDI instruments using the MIDI tape sync function. Let's look at these advanced techniques one at a time.

Recording Two Tracks at Once

Sometimes it's useful to record two tracks at the same time. You might use the setup below, for example, to record a song which features parts for a drum machine and a multi-timbral synthesizer, as well as guitar and vocal parts.

You *could* overdub these four parts, one to each track, as described in the basic example on pages 10 to 12. But you'll recall that your choices of stereo placement were limited in that example. Of course, you could pan the drum machine to any position you liked. . .but doing so meant that *all* the sounds produced by the drum machine had the same stereo placement.



If you've taken the time to assign different pan positions to all of the sounds produced by your drum machine and multi-timbral synthesizer, however, you'll want to record each of these parts to two tracks, in order to preserve their stereo placement. But if you use two tracks each for the drum machine and the synthesizer, the two parts will take up a total of four tracks—leaving no room for the guitar or vocals!

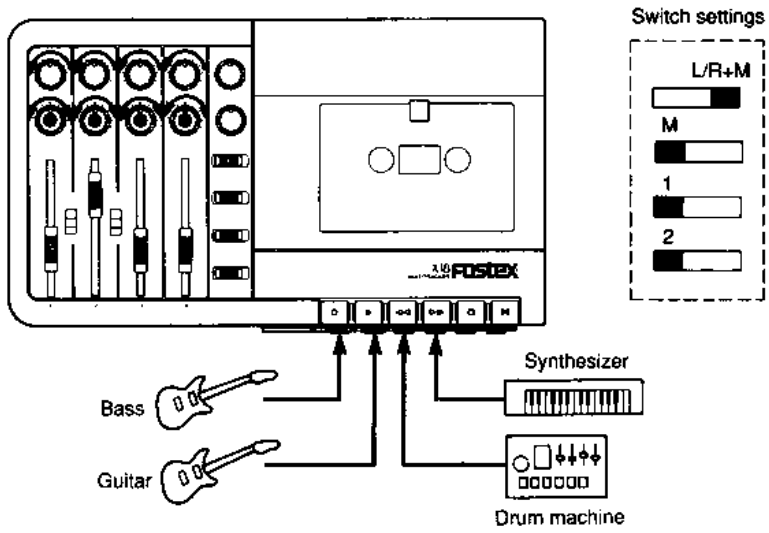
The solution to this problem is to record the left channel output of both the drum machine and the synth on one track, and the right channel output of both the instruments to a second track. This leaves the other two tracks open for the remaining parts.

In this example we've connected the left and right outputs from the drum machine to input jacks 1 and 2, and the left and right outputs of the synthesizer to input jacks 3 and 4, respectively. The pan controls for channels 1 and 3 are turned to the left, whereas those for channels 2 and 4 are turned to the right. The upper record tract select switch is set to 1, and the lower switch is set to 2. This setup ensures that the left channel output of both instruments will be recorded to track 1, and the right channel output will be recorded to track 2.

After checking the input levels and recording the parts as normal, you could go ahead and record the guitar and vocal parts to tracks 3 and 4. Then, during mixdown, you would pan track 1 all the way to the left, and track 2 all the way to the right, to preserve the original pan settings of the various timbres.

One-take Group Recording

You can use a similar technique to record the sound from four instruments at once, something you might want to do if you perform with a band. For example, you could record parts for a drum machine, a synthesizer, and bass and rhythm guitars on tracks 1 and 2, leaving tracks 3 and 4 open for vocals and additional solos.



Begin by connecting an instrument to each jack. Set the headphone select switch to L/R+M, and turn the monmix level controls all the way down. (You will be using line output rather than monmix output to monitor the recording.) Set the upper and lower record track select switches to 1 and 2, respectively. Finally, adjust the input level switches and input faders to appropriate levels, and set the pan controls so that each instrument has the desired stereo placement. When you're ready, begin recording.

This recording technique lets you set the stereo placement of each part as you record. As with the two-track recording method described above, you'll want to pan track 1 all the way to the left and track 2 all the way to the right during mixdown in order to maintain these pan settings. This method thus simplifies mixdown in exchange for a little extra complexity at the recording stage.

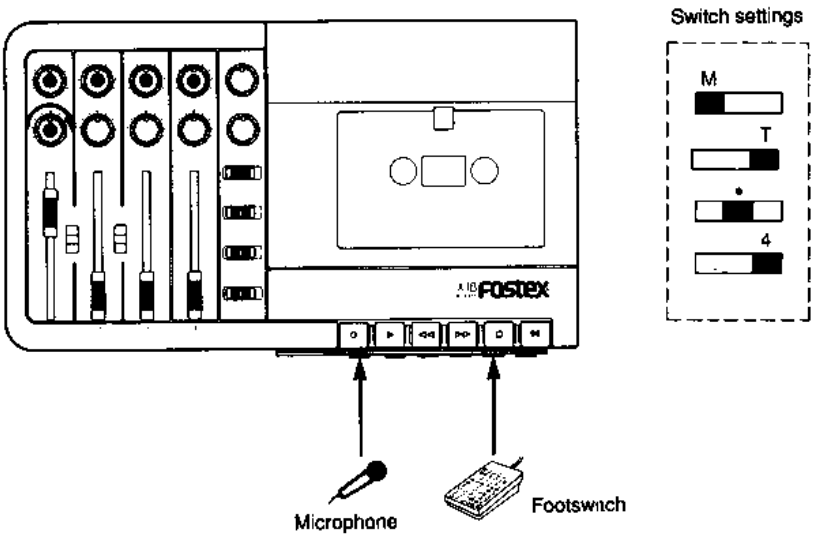
The true advantage of this technique is that it allows you to record up to four sound sources on two tracks. You can use the same technique to record tracks 3 and 4, for a full stereo recording of as many as eight sound sources!

Punch-in Recording

You may be wondering what you can do if you've made a small mistake in a part you've recorded. Rather than record the track all over again, taking the chance that the performance as a whole will suffer, you would prefer to fix only the mistake. But you can't just press the record button in the middle of performance. . .can you?

The punch-in recording technique allows you to fix a part by re-recording over a specific portion of a recorded track. To use this technique, you must first purchase an optional footswitch (Fostex 8051) which will give you remote control of the punch-in process while you perform.

Connect the footswitch to the remote punch in/out jack ⓯, and the line from your instrument or mike to the appropriate input jack. (In our example, we'll imagine that you've just finished recording a vocal to track 4—via channel 1—and want to re-record a line to correct a flat note somewhere in the middle of the song.)



1. Zero the controls as described for the overdubbing process, above. Be particularly careful to zero the input faders for any channels you are not using.
2. Press the pause and record buttons to place the X-18 in record mode.
3. Set the input and monitor levels as before. It's very important that you punch in the correction at the same level as the original recording. If the punch-in level is much different from the original, it will be obvious to listeners that the recording was not made continuously.
4. When you're satisfied with your settings, press the stop button to take the X-18 out of record mode. Press the play button and run through the song once to rehearse the punch-in and punch-out technique. Practice tapping your foot and singing at the right time, but *don't* press the footswitch until you are ready to record.
5. When you've got the hang of it, play the song one more time. Press the footswitch at the point you wish to start recording (or "punch in"). The line you sing will replace the line you recorded previously.
6. Press the footswitch again when you're done singing to stop recording (or "punch out").
7. Rewind the tape and check the results.

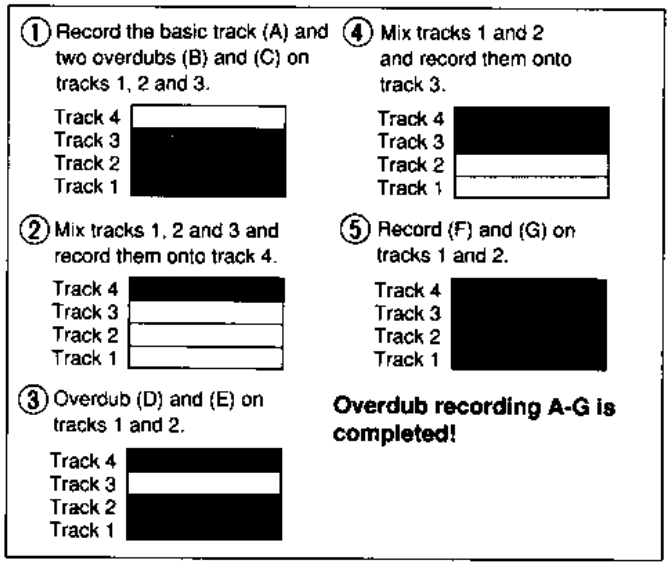
Punch-in Timing

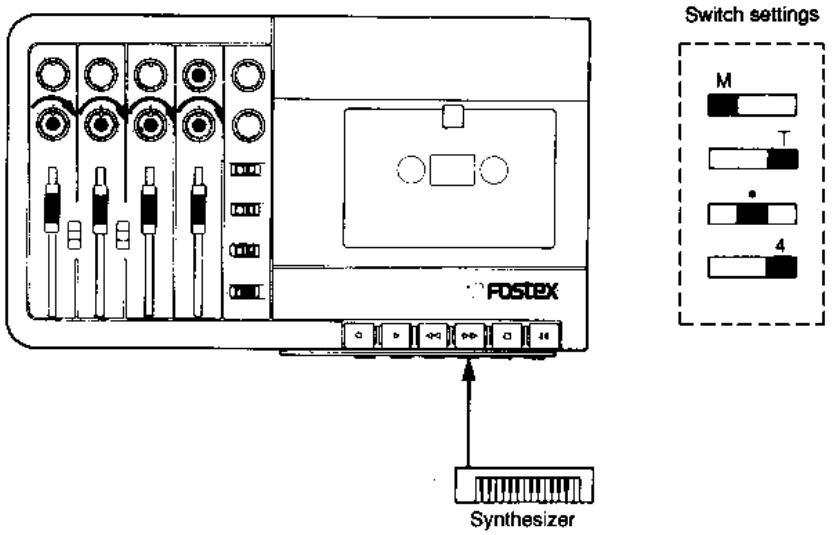
It is very important that you punch in and out with careful timing. Remember that the X-18 is recording all the time you are punched in. If you punch in too soon—or punch out too late—you can inadvertently erase portions of the recording that you wanted to keep.

Ping-pong Recording

Ping-pong recording is a special recording technique which allows you to mix two or more recorded tracks onto an unrecorded tracks. By "bouncing" two or three parts onto a single track, you can free up the track space you need to overdub additional parts.

The X-18 lets you bounce three tracks to the fourth, then bounce two more tracks to a third, then record parts on the remaining two tracks, for a total of seven parts on two tracks. You can even record while you're bouncing, for a grand total of nine parts!





To bounce tracks 1, 2, and 3 to track 4, you would have to start with a mini mixdown of the three tracks to be bounced. You don't have to record the mix—just make sure that the output levels of the tracks are balanced with respect to one another. Then, when you're satisfied, set the monmix level controls for tracks 1, 2, and 3 to 0, turn the pan controls for all four channels to the right, and set the lower record track select switch to 4.

Set the headphone select switch to MONMIX, and the meter select switch to TAPE. If you want to record a part while you bounce, plug the instrument into input jack 4, press the pause and record buttons, and check the level as for a normal overdub. Then, when you're ready to record, release the pause button and go to it! If you like the results, feel free to record new parts over tracks 1, 2, and 3.

Better Not Bounce More than Twice

It might seem as though you could bounce tracks back and forth indefinitely, recording as many parts as you like. Unfortunately, there are limits to the quality of sound when you start bouncing tracks. It's best to limit yourself to two bounces, as described above.

MIDI/Tape Synchronization

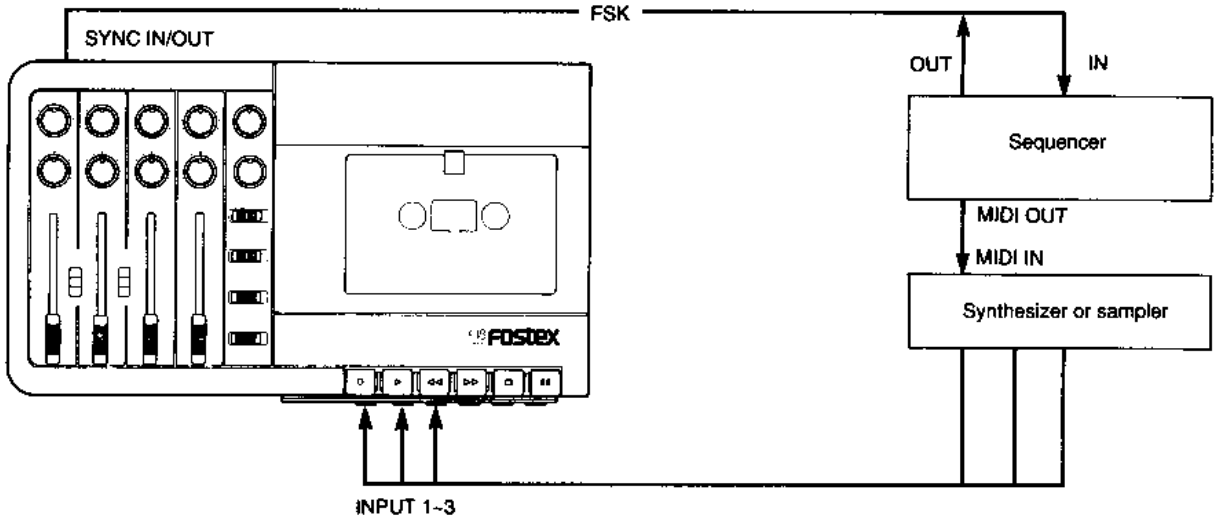
Like the name says, the MIDI tape sync function lets you synchronize playback by your X-18 with performances by MIDI devices such as sequencers and drum machines.

There are a number of valid uses for this function:

- MIDI-controlled instruments need not be recorded on tape. This frees up track space for non-digital instruments and vocals.
- You can pass the audio signal from the MIDI instruments directly to the stereo master tape recorder during mixdown, for better overall sound quality.
- If you're recording MIDI instruments, the function lets you change or replace their parts at any time before mixdown so long as the tempo remains the same.

To use the MIDI tape sync function, connect the sync out jack of the MIDI instrument to the sync input jack ㉑ on the rear of the X-18. Record a sync signal all the way to the end of the song. (This signal is recorded on track 4.) When you're done recording, remove the plug from the sync input jack. Connect the sync in jack of the MIDI instrument to the X-18's sync output jack ㉒. You can now use the signal you recorded on track 4 to control playback by the MIDI instrument.

The illustration below shows how you might use the tape sync function to regulate playback by MIDI system consisting of a sequencer and a synthesizer. In the example, the sound from the synthesizer is being passed through the X-18 via the aux return jacks during mixdown,.



Notes on the Tape Sync Function

Remember that you will not be able to record sound sources to track 4 while there is a plug is inserted in the sync input jack; nor will you be able to monitor the signals from track 4 while there is a plug inserted in the sync output jack. It's a good idea to take the plugs out of these two jacks if you're not actually using the tape sync function.

Some sequencers and drum machines are not capable of outputting a tape sync signal which can be recorded by the X-18. To use the function with these instruments, you will need to purchase a device known as a MIDI/FSK converter. Check the user's manual of your drum machine or sequencer for specifics.

MAINTENANCE TIPS

Your X-18 Multitracker needs the same care required by all electronic equipment. Keep the X-18 dry, clean, and free of dust, and protect the unit from extremes of temperature and humidity. In addition, you should clean the deck mechanism and demagnetize the heads *before every session* in order to keep the X-18 in top operating condition.

Cleaning the Head, Rollers, and Capstans

As you use the X-18, its head, pinch rollers, and capstans will naturally become coated with oxide residue from the tapes as they pass over these mechanisms. This residue can inhibit the performance of the head. Even invisibly small amounts of oxide buildup can cause noticeable decreases in high-range response. At the same time, buildups of residue and dust on the rollers and capstans can lead to increased wow and flutter—in extreme cases, they can even destroy your tapes.

To remove tape residue from the head, guides, and capstans, wipe the parts with a cotton swab soaked in an isopropyl alcohol-based cleaning solution. Use a rubber cleaning solution to clean the pinch rollers. Be very careful not to get any of the alcohol-based cleaner on the pinch roller, since it will corrode the rubber. These cleaning agents are available at most audio equipment and musical instrument stores. Be sure to use only cotton swabs designed for cleaning audio equipment, as swabs with too small a cotton content will scratch the heads, while swabs that are packed too loosely can leave damaging cotton fibers in the mechanism.

Never use organic solvents (such as lacquer thinners) on the heads, capstans, or guides. Also, do not use silicone lubricants on the pinch roller, as doing so will increase wow and flutter.

Demagnetizing the Head

After long periods of use, the head begins to develop a magnetic field in addition to the oxide residue described above. This magnetism can degrade the response of the head and lead to increased noise during recording or playback. If left unchecked, it can even create noise on tapes that you play, rendering them useless.

Use a hand demagnetizer to demagnetize the record/playback head of your X-18 Multitracker. Always exercise caution when demagnetizing the head: while demagnetizing is vital to the life of the head, it is also a potentially dangerous operation that can ruin the head and destroy the X-18's circuits if performed improperly. Follow the instructions included with your demagnetizer to the letter; and keep recorded tapes away from the demagnetizer when it is in use, since it can destroy them.

General Cautions

Demagnetize the head and clean the transport mechanism of your X-18 as described above before every session. If you tend to hold marathon recording sessions, you should clean and demagnetize the deck every eight hours.

Above all, don't smoke near the X-18! Large studios forbid smoking in the control room, and for a very good reason: the particles of dust produced by burning tobacco may be invisible to you, but they are as obstructive as rocks and boulders to your sensitive electronic equipment.

TROUBLESHOOTING GUIDE

	Problem	Solution
SOUND QUALITY OR VOLUME	**WOW OR FLUTTER**	1. Clean the pinch rollers and capstans thoroughly. 2. Try a new tape. (Use a high-quality brand.)
	POOR RECORDED SOUND QUALITY	1. Clean the record/playback head. 2. Check to be sure you're using the right kind of tape (70 μsec EQ).
	POOR SOUND OUTPUT OR EXCESSIVE NOISE	Check input fader ❶ and level switch ❷ settings. The level meter ❾ should not peak above +3 or lower than -5 constantly.
	PLAYBACK AT DIFFERENT PITCH	Check whether the position of the pitch control ❿ has been changed.
	NO SOUND FROM TRACK	1. Check the position of the monmix control ❺ for the track in question. 2. Check to see if a plug is inserted in the corresponding input jack ⓫.
	NO SOUND FROM HEADPHONES	Check the position of the headphone level control ❼.
RECORDING	**CAN'T RECORD TO TRACK**	Check pan control ❹ and record track select switch ❸ settings.
	CAN'T PRESS RECORD BUTTON	Check whether record protect tabs have been removed from cassette.
DECK OPERATION	**TAPE DOESN'T MOVE**	Check to be sure tape is properly set in deck.
	CAN'T TURN POWER ON	1. Check to be sure AC adapter is properly connected. 2. Check to be sure batteries have been inserted properly.

SPECIFICATIONS (Specs in [ ] are for Model X-18H)

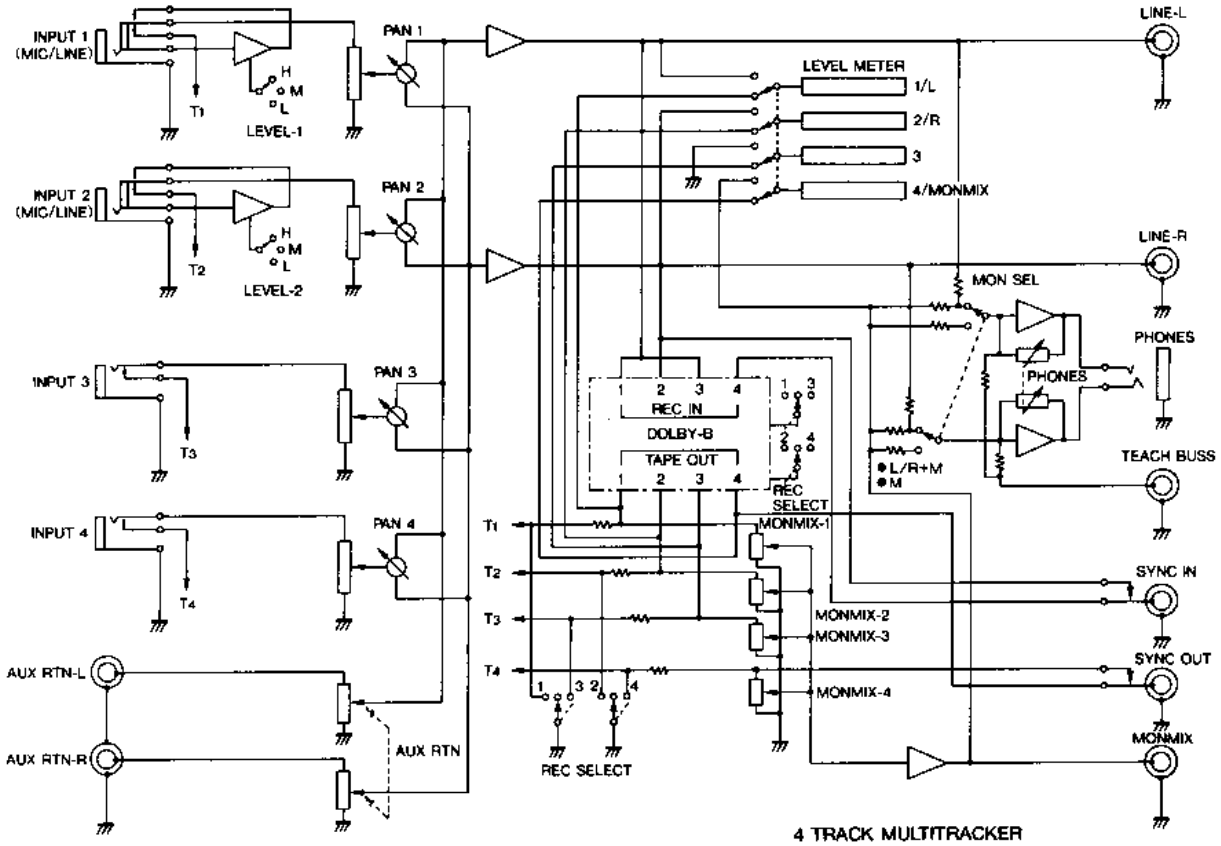
INPUTS 1-2	
Microphone impedance	Less than 10 kΩ
Input impedance	20 kΩ
Normal input level	H: -10 dBV (0.3 V) M: -30 dBV (30 mV) L: -50 dBV (3 mV)
INPUTS 3-4	
Input impedance	10 kΩ
Normal input level	-10 dBV (0.3 V)
AUX RTN (L,R)	
Input impedance	20 kΩ
Normal input level	-20 dBV (0.1 V)
TEACH BUSS IN	
Input impedance	50kΩ
Normal input level	-10 dBV (0.3 V)
SYNC IN	
Input impedance	10 kΩ
Normal input level	-10 dBV (0.3 V)
SYNC OUT	
Output load impedance	10 kΩ or greater
Normal output level	-10 dBV (0.3 V)
LINE OUT (L,R)	
Output impedance	10 kΩ or greater
Normal output level	-10 dBV (0.3 V)
MONMIX OUT	
Output impedance	10 kΩ or greater
Normal output level	-10 dBV (0.3 V)
HEADPHONE OUT (STEREO)	
Load impedance	40 Ω
RECORDING TAPE	
Length	C-60 or C90 cassette
Type	IEC Type II high-bias position (TDK SA, Maxell XL-II, etc.)

RECORD TRACKS	4 tracks, one direction (simultaneous recording of up to two tracks possible)
NOISE REDUCTION	Dolby* B
TAPE SPEED	4.75 cm/sec (1 7/8 ips) [9.5 cm/sec (3-3/4 ips)]
WOW/FLUTTER	±0.17% (IEC/ANSI) [±0.12% (IEC/ANSI)]
FAST WIND TIME	120 sec (C-60 tape)
PITCH CONTROL	±10%
RECORDING TIME	30 min (C-60 tape) [15 min. (C-60 tape)]
FREQUENCY RESPONSE	
Mixer	20 Hz–20 kHz
Recorder	40 Hz–12.5 kHz [40 Hz–14 kHz]
SIGNAL/NOISE RATIO	58 dB or greater
CROSSTALK	50 dB or greater (at 1 kHz)
ERASURE RATIO	70 dB or greater (at 1 kHz)
HEADS	
Rec/Play	4-channel hard permalloy
Erase	4-channel ferrite
POWER REQUIREMENT	
AC Adaptor	DC 12 V (11–15 V), 9 W (Fostex AD-12T)
Battery	10 type A alkali dry cell
DIMENSIONS (W x D x H)	298.5 x 171 x 56 mm
WEIGHT	1.24 kg (excludes AC adapter and batteries)

Specifications subject to change without notice.

* Dolby B noise reduction manufactured under license from Dolby Laboratories Licensing Corporation. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

BLOCK DIAGRAM



4 TRACK MULTITRACKER

FOSTEX

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