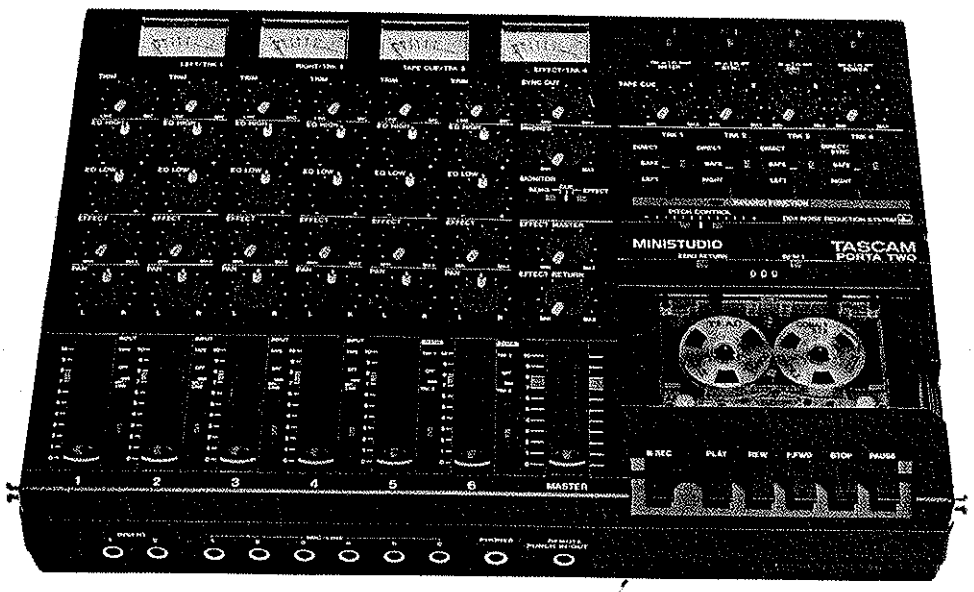
TASCAM

TEAC Professional Division

MINI STUDIO PORTA TWO



OWNER'S MANUAL

5700087400

Recording is an art as well as a science. A successful recording is often judged primarily on the quality of sound as art, and we obviously cannot guarantee that. A company that makes paint and brushes for artists cannot say that the paintings made with their products will be well received critically. The art is the province of the artist. TASCAM can make no guarantee that the PORTA TWO *by itself* will assure the quality of the recordings you make.
Your skill as a technician and your abilities as an artist will be significant factors in the results you achieve.

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WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

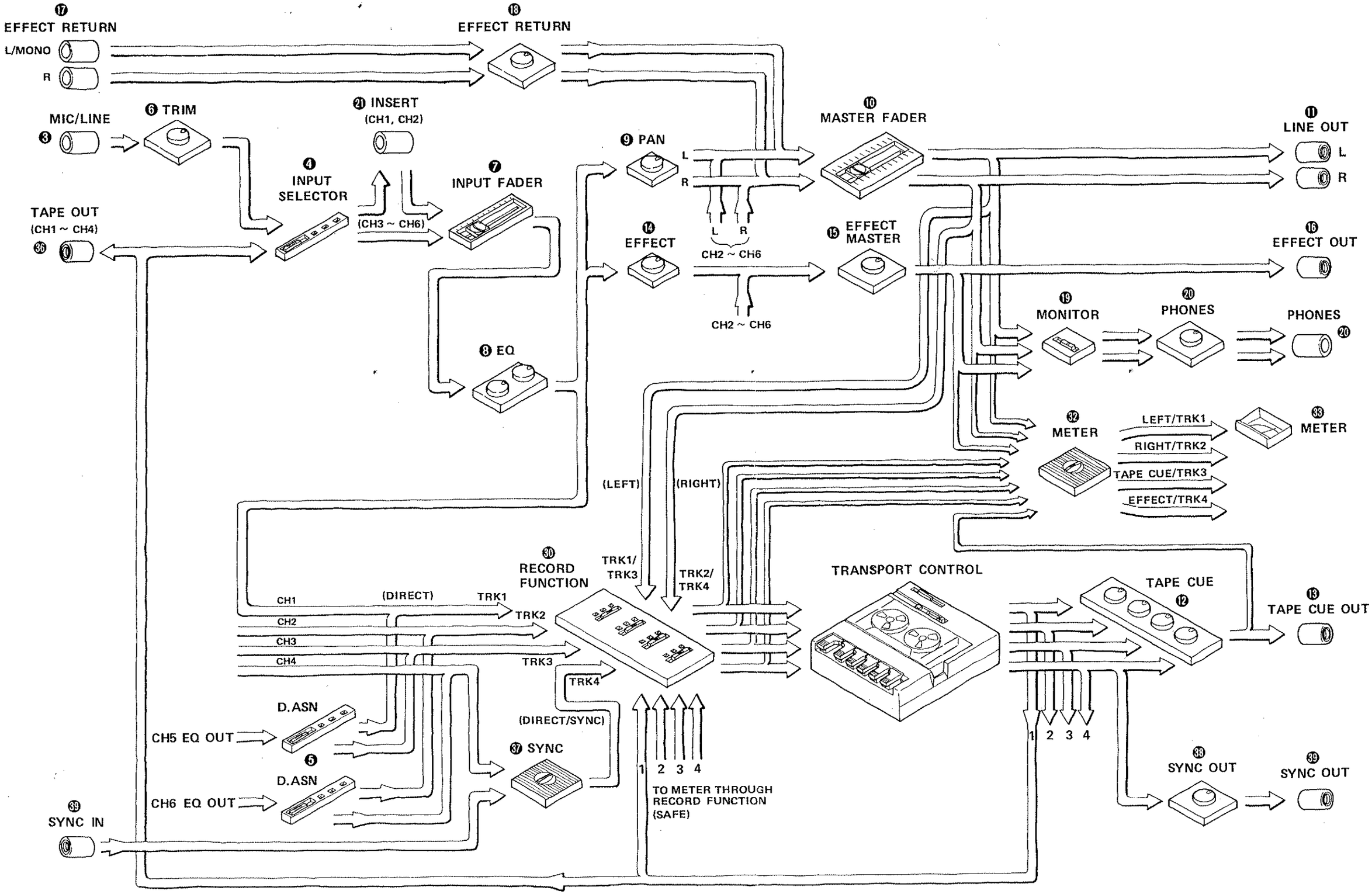
This product is manufactured to comply with the radio interference of EEC directive "82/499/EEC."

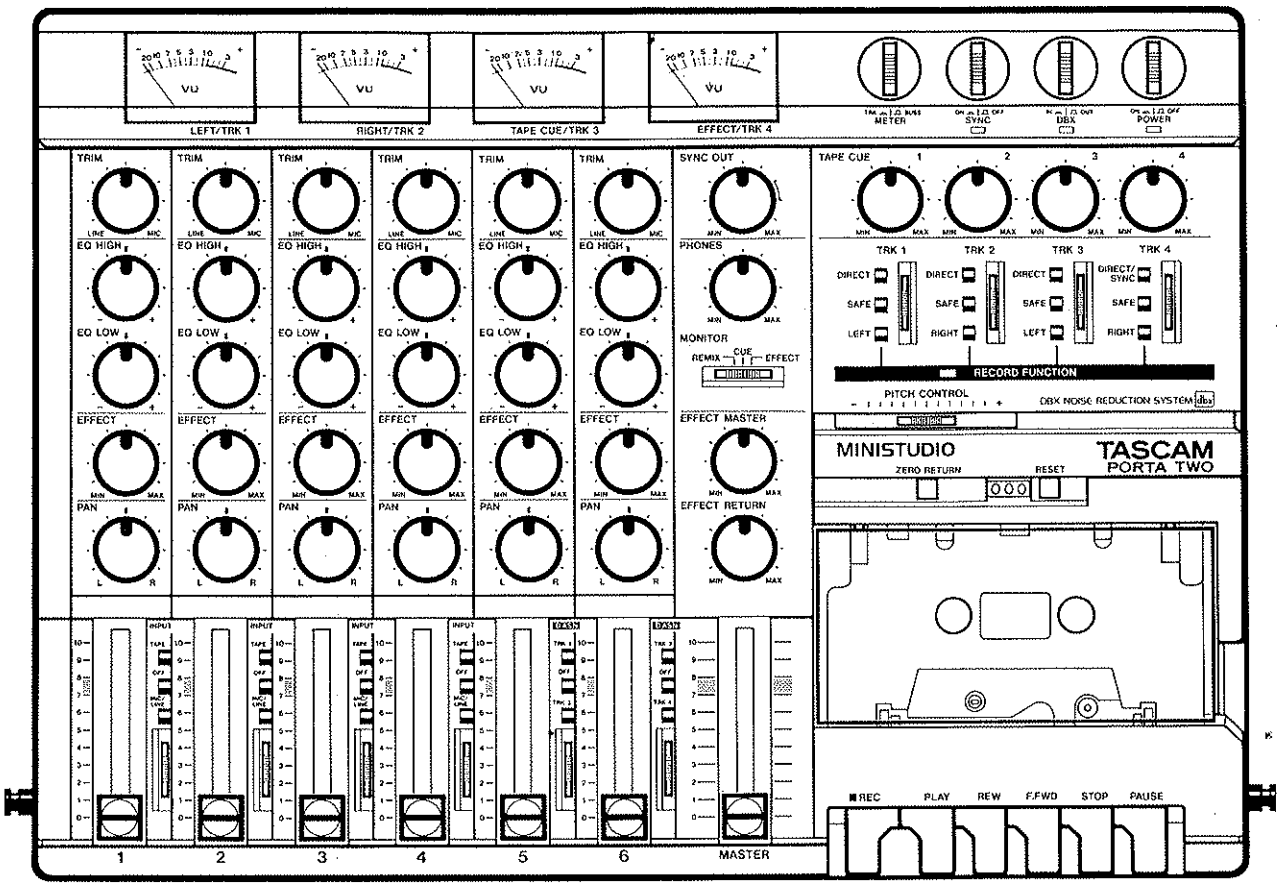
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

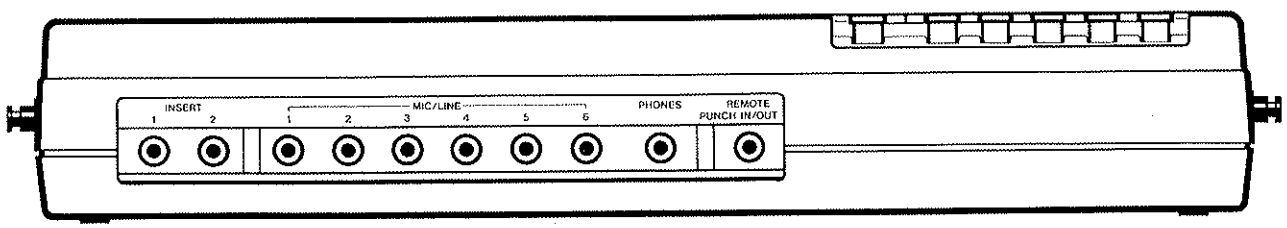
The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

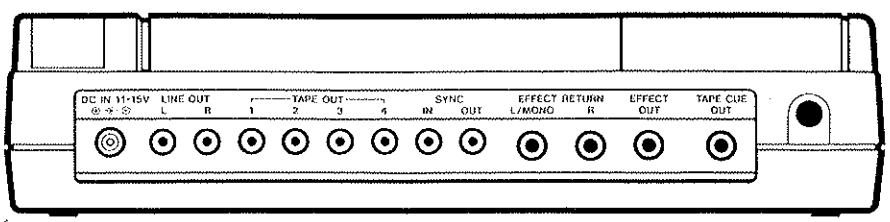
The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

FUNCTIONAL SEQUENCE PICTOGRAM




LEFT/TRK 1
RIGHT/TRK 2
TAPE CUE/TRK 3
EFFECT/TRK 4
METER
SYNC
DBX
POWER
TRIM
EQ HIGH
EQ LOW
EFFECT
PAN
SYNC OUT
PHONES
MONITOR
REMIX
CUE
EFFECT
EFFECT MASTER
EFFECT RETURN
TAPE CUE
TRK 1
TRK 2
TRK 3
TRK 4
DIRECT
SAFE
LEFT
RIGHT
DIRECT/SYNC
RECORD FUNCTION
PITCH CONTROL
dbx NOISE REDUCTION SYSTEM
MINISTUDIO
PORTA TWO
TASCAM
ZERO RETURN
RESET
REC
PLAY
REW
F.FWD
STOP
PAUSE
1
2
3
4
5
6
MASTER


INSERT
MIC/LINE
PHONES
REMOTE
PUNCH IN/OUT


DC IN 11-15V
LINE OUT
L
R
TAPE OUT
SYNC
IN
OUT
EFFECT RETURN
L/MONO
R
EFFECT
OUT
TAPE CUE
OUT

Understanding what is going on inside your equipment will help improve your sound. Think of this manual as a reference handbook. You won't need all of what is here to begin, and it is certainly not necessary to memorize it, but do try to find the time to read it thoroughly at least once, that way you will be familiar with its contents and if you need answers they will be here waiting.

INTRODUCTION

The MINISTUDIO PORTA TWO is a complete audio production facility in a single box. It contains a full-function mixer with six input channels, an Effects submixer, a Cue (monitor) submixer, four Direct program busses, and a Master stereo buss. Also included in the MINISTUDIO is a fourtrack, four-channel cassette recorder with dbx noise reduction, Pitch Control, and Zero Return. The recorder also features a special Sync In/Out that ensures that the sychronizing codes used by electronic musical instruments and computer interfaces will be recorded and reproduced in the most efficient way.

Using your PORTA TWO, you can:

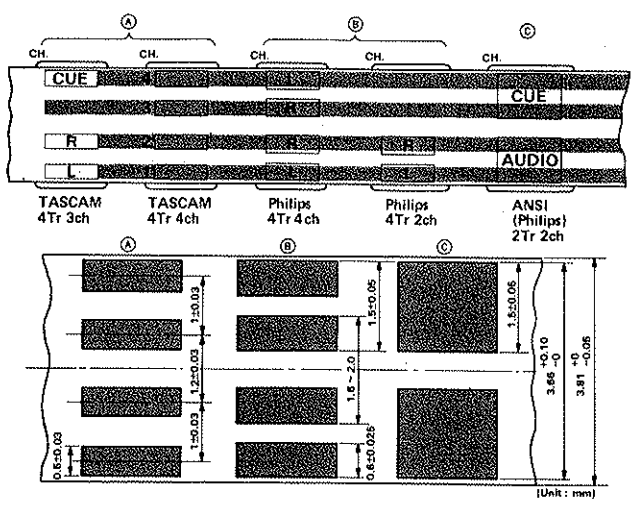
*Record a four-track "Multitrack Master" tape.
*Mixdown your multitrack master tape to a stereo master using L/R outputs and a stereo recorder.
*Record six mixer channels onto a single recorder track.
*Overdub new signal while listening to prerecorded tracks.
*Ping-Pong (bounce) up to 3 tracks down to one.
*Record 3 or 4 new signals while ping-ponging tracks.
*Synchronize electronic musical instrument ("Virtual Tracks") during any recording process using the Sync In/Out.
*Add different effects to channels 1 and 2 of mixer using Insert.
*Add stereo effects to any combination of 6 mixer channels using the Effect submixer and Effects Returns.
*Add stereo effects and EQ to any combination of 4 mixer channels using the Effect submixer and channels 5 & 6 as effects returns.

Precautions and Recommendations

1. TRACK FORMAT AND COMPATIBILITY
The track format of the PORTA TWO is compatible with standard (Philips) stereo format tapes that were recorded at 1 7/8 ips (4.75 cm/sec). Noise reduction is a consideration for compatibility. Tapes that have been recorded without noise reduction, or those that have been recorded with dbx type II can be played on the PORTA TWO.

If you are in doubt about the compatibility of a tape, you can use this chart of various track layouts as a guide.

The PORTA TWO records and plays in one direction using the whole width of the tape.



2. USE THE SHORTEST POSSIBLE TAPE FOR A GIVEN JOB
Don't use C-120 tapes under any circumstances; the tape stock is too thin and is not sturdy enough for multitrack recording.

3. THE PORTA TWO IS INTERNALLY ADJUSTED FOR HIGH BIAS, 70 μs EQ, TYPE II TAPE

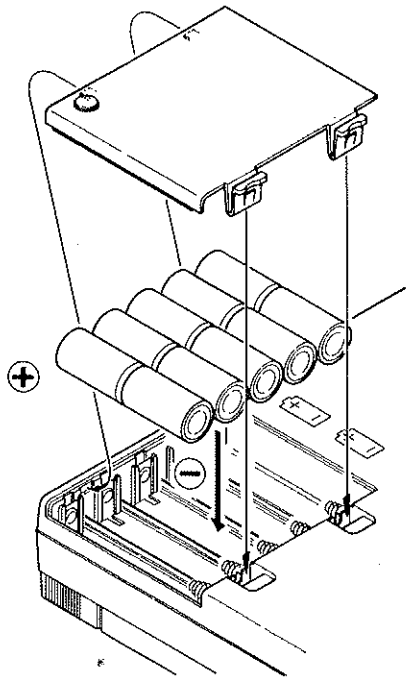
This means that you can only use 70 μs, High Bias, Type II tapes such as TDK SAX; MAXELL UD XL IIS or equivalent formulations.

To protect the finished master, remove both safety tabs of the cassette.

If you break out only one tab, you could still put the tape into the PORTA TWO "upside down" and erase the tracks of your master.

NOTE: The optional RC-30P Remote Punch In/Out pedal is effective regardless of the removal of safety tabs.

LOADING THE BATTERIES



CAUTION

To power the PORTA TWO from an external power supply, use the provided AC adapter PS-P2 which is designed especially for the PORTA TWO and provides a convenient connection and polarity to this.
Should you attempt to employ an AC-DC converter of any other brand or manufacture, you will have to make sure that the connection provides the proper polarity as shown by the symbols ⊕—◎—⊖ above the connector on the left side of the unit. Furthermore, the specified voltage of 11 — 15 V and amperage of 350 mA must be properly observed. Otherwise, damage may occur to the PORTA TWO and *such damage would not be covered by the limited warranty on the product.*

When using the PORTA TWO with internally placed batteries (only carbon or alkaline types shoud be used), here are important points to remember :

1 — When inserting batteries, be sure of their direction (polarity). Refer to the diagram beside the battery compartment.

2 — Do not combine batteries of different types.

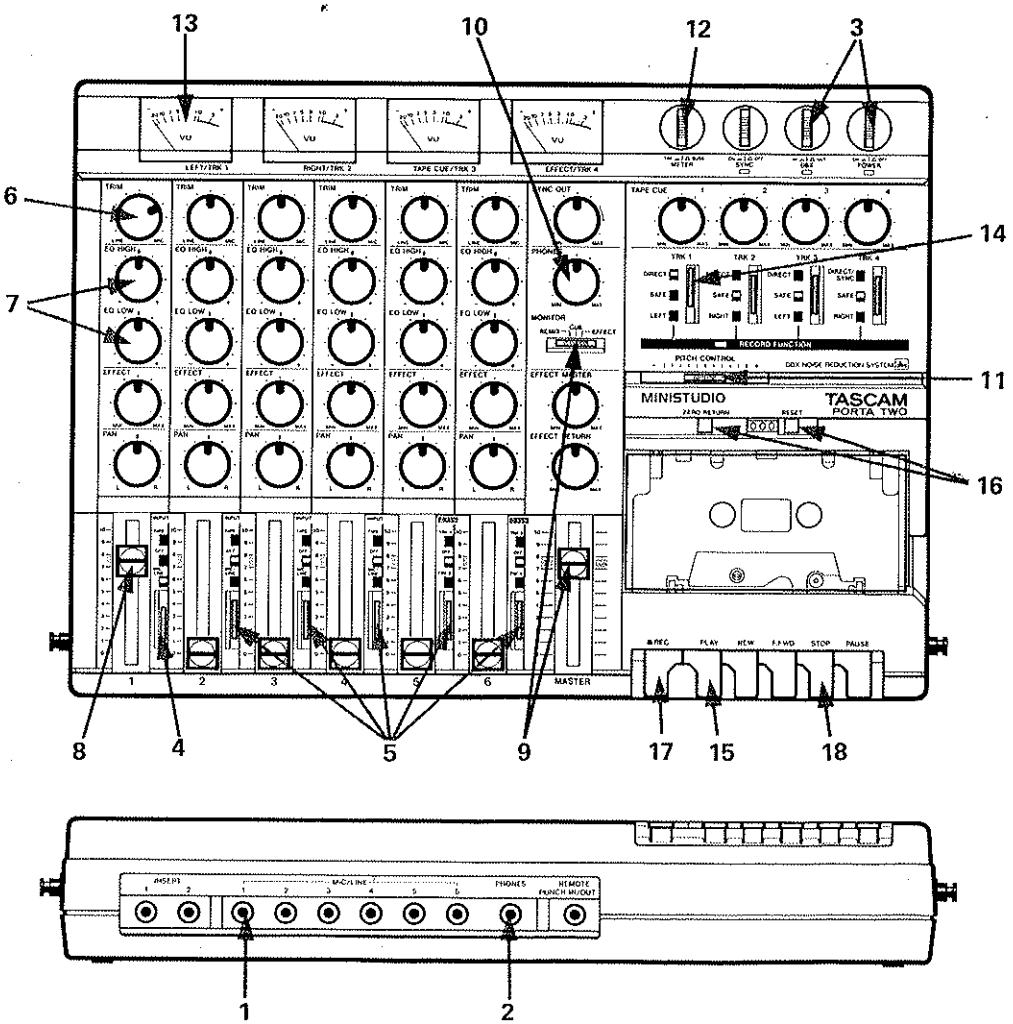
3 — Do not use old batteries together with new one. When necessary, change all batteries at the same time with a new set.

4 — If the PORTA TWO is to be powered from an AC line over a lengthy peirod (one month or more), remove the batteries to eliminate the possibility of battery leakage which would result in damage to the unit. Should leakage occur, wipe it off thoroughly with a soft cloth before installing a new set of batteries.

5 — When the PORTA TWO is to be powered by batteries, be sure to disconnect the AC adapter; otherwise, no power is supplied.

Recording the First Track

1. Plug a Microphone into channel 1.
2. Plug your headphones into the PHONES output jack. Do not put them on yet.
3. Turn the PORTA TWO on and depress the dbx switch.
4. Set the channel 1 INPUT select switch to the MIC/LINE position.
5. Set the other channel INPUT select switches (channels 2 thru 4) and the D.ASN switches on channels 5 & 6 to the OFF position.
6. Set the TRIM control to the 2 o'clock position.
7. Set the EQualizer controls to the 12 o'clock position.
8. Set the channel 1 fader to about 7 or 8, the shaded area.
9. Set the MASTER fader to about 7 or 8, the shaded area and the MONITOR selector switch to CUE.
10. Put the headphones on and, while speaking into the mic, adjust the PHONES level control to a comfortable listening level.
11. Set the PITCH CONTROL to the center detented position.
12. Set the METER select switch to the TRK position (⊓).
13. Test the signal level by speaking into the mic at a normal volume. If the level is correct, TRK 1 meter should read between −10 and 0.



14. Set th TRK 1 RECORD FUNCTION switch to the DIRECT position. The RECORD FUNCTION LED (Light Emitting Diode) will begin to flash. Set other RECORD FUNCTION switches to the SAFE position.

    A RECORD FUNCTION button (Direct or L/R) *MUST* be used or no signal will get to the recorder.

15. Push the PLAY key and allow the tape to run for about 15 seconds. This will run the tape leader onto the take up reel, and put the beginning of the tape in front of the heads.

16. Push the RESET button and press the ZERO RETURN switch. This, 1) locates the beginning point of your recording, and 2) allows you to quickly return to this point by simply pressing the REWind key.

17. Press the RECord key. You are now recording on track 1. The RECORD FUNCTION LED will stop blinking and stay on steadily.

    NOTE: As a suggestion, try recording yourself counting only the odd numbers from 1 to 59, pausing briefly between each.

18. Once you have recorded for about a minute, or you reach 59, push the STOP key. The tape will stop moving, and the RECORD FUNCTION LED will begin to blink again.

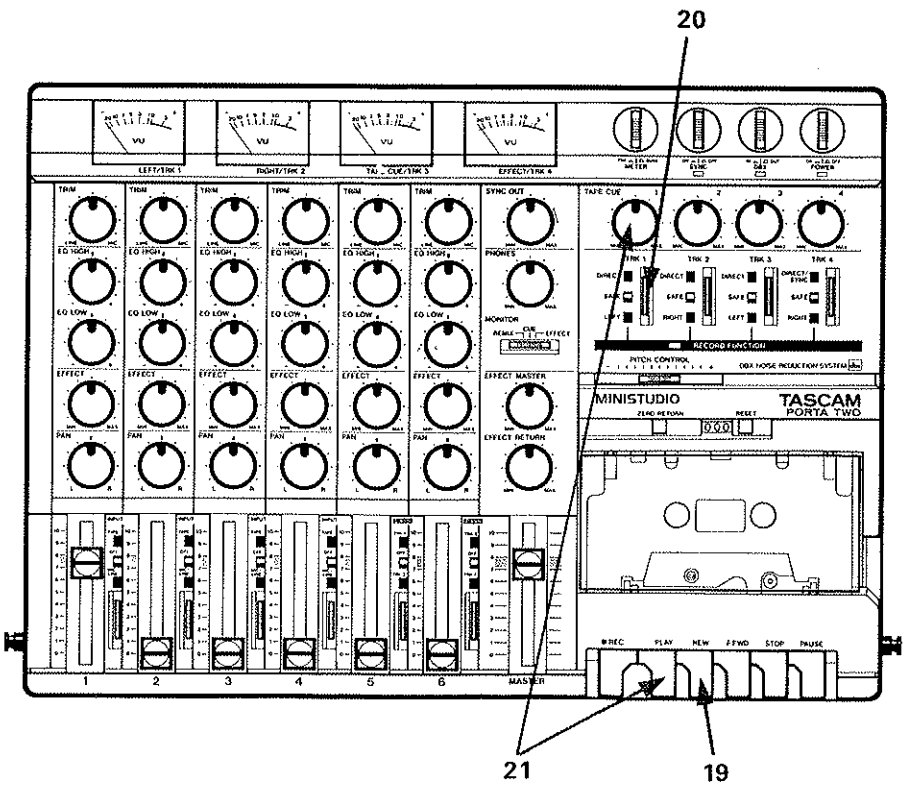
FIRST PLAYBACK

19. Press the REWind key. The tape will rewind to 000 and stop, since the ZERO RETURN button is in the down (on) position.

20. Set the TRK 1 RECORD FUNCTION switch to SAFE. The LED will turn off.

21. Play the tape and adjust the track 1 TAPE CUE control until the headphone volume is comfortable.

At this point, you have completed the first track, also called a take or pass. If the recording quality and level is OK, proceed to the next step, recording the second track.

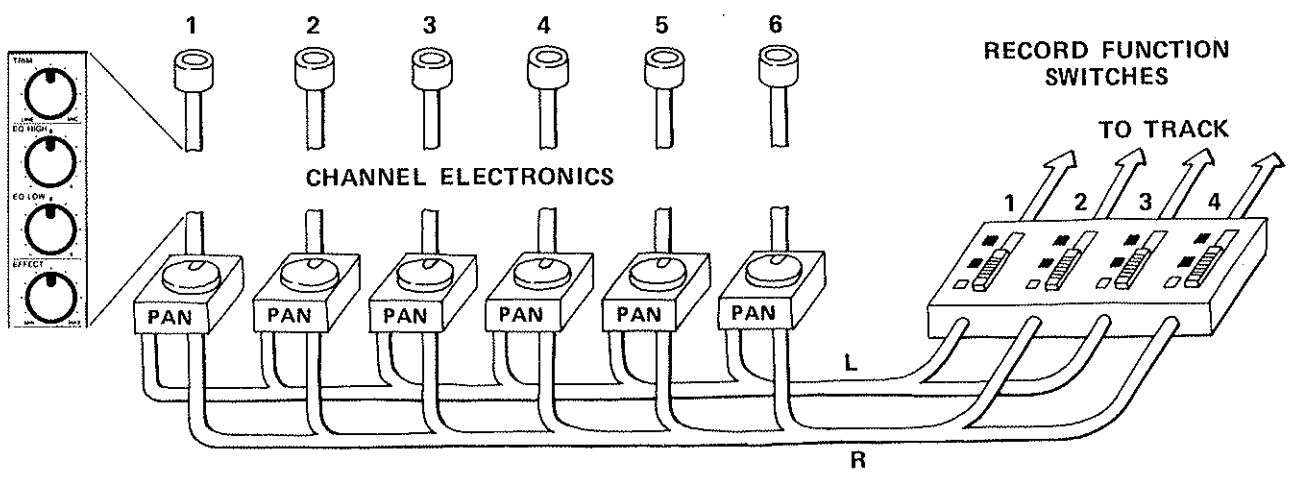


MINISTUDIO's Recording Buss System

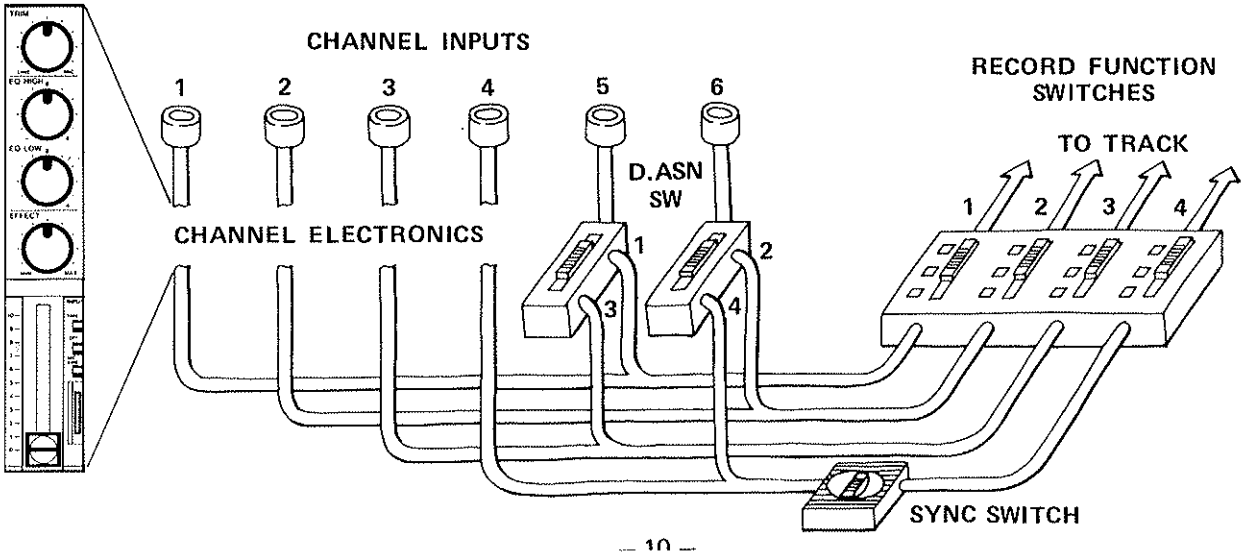
Your PORTA TWO uses a sophisticated "Recording Buss System" just like expensive recording studio mixers. A mixer takes its may channels and "mixes" them to fewer signal paths called busses. Your MINISTUDIO has two major recording buss systems called the Direct Busses and the Master Stereo Busses. In your PORTA TWO, the Direct Busses and Stereo Busses are sent to the recorder by means of the RECORD FUNCTION buttons and the D. ASN buttons (in channels 5 & 6). In other words, your RECORD FUNCTION and D. ASN buttons are the doors that let signals go to the record heads of your tape recorder. When SAFE is used, it means the door to this track of the recorder is closed.

How do the mixer channels pass their signals to the recording busses? Channels 1 thru 4 send their respective signals two places, to both the direct buss corresponding to their channel number and to the L/R buss. The amount of signal going to the left or right side of the L/R buss depends upon the PAN control. Channels 5 & 6 feed the L/R buss via PAN, just as the first four channels do, but channels 5 & 6 have their own switching system to assign their signals to the direct recording buss. Channel 5 may be assigned (sent) to either buss 1 or 3, while channel 6 can be assigned to either buss 2 or 4. Since the direct buss is routed "directly" to the recorder, the assign buttons are labelled "Track 1," etc. The word track, in recording, refers to the actual path that your signal makes on the magnetic tape. So your material is a channel or buss until it becomes a track by being recorded.

L/R BUSS MAP



DIRECT BUSS MAP



Recording the Second Track (Overdubbing)

Because the MINISTUDIO has both the Direct and Stereo busses, most recording procedures can be done two ways. You will notice that our basic track (track 1) was recorded using the Direct buss. Track 2, our overdub track, will be recorded using the L/R buss. Since channel 2 of the mixer is routed directly to track 2 of the recorder in the Direct buss, you must use L/R if you want to send channel 1 to track 2. If we were recording channel 2 to track 2, we could use the Direct buss for our overdubs as well.

Using the same basic set-up as before, make the following changes :

1. Set the TRK 2 RECORD FUNCTION switch to the RIGHT position. The RECORD FUNCTION LED will begin to blink. Set other RECORD FUNCTION switches to SAFE.

2. Turn the channel 1 PAN control all the way to the right (clockwise). Make sure the MASTER fader is in the shaded area between 7 and 8. Note: Changing the MASTER setting will change your record level.

3. Listening through the headphones, push PLAY and begin speaking into the mic. Balance the volume setting of the new signal to that of the track 1 playback level by using TAPE CUE 1 and PHONES controls.

4. Rewind the tape.

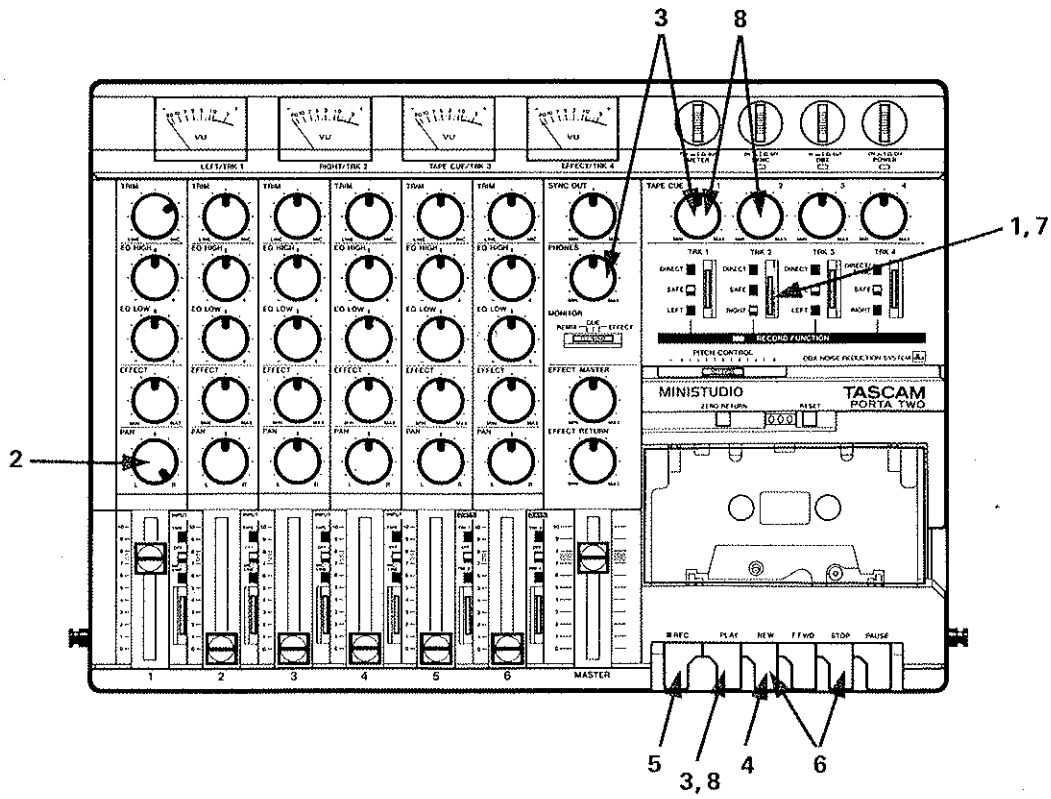
5. Press RECord. The RECORD FUNCTION LED will stay on. The second track is now being recorded. Since track 1 can be heard through the headphones along with the new signal, the second track can be recorded "in sync" with the first.

   NOTE: If you followed our suggestion and recorded odd numbers on track 1, you can now record the even numbers on track 2. Since you can hear the pauses between the odd numbers, you should try to record the even numbers during these pauses.

6. Once you have recorded to the end of the first track, or have counted to 60, push STOP and then REWind. This will return the tape to the beginning.

7. Set the TRK 2 RECORD FUNCTION switch to SAFE.

8. Push PLAY and listen to the two tracks. Adjust the track 1 and 2 TAPE CUE controls to the desired level and balance.



Recording Tracks 3 and 4, and Ping-Ponging or Collapsing Tracks

The method used for recording the third and fourth tracks is virtually the same as the first and second. The differences are in the PAN settings and the RECORD FUNCTION switch positions. To record on track 3, all the basic settings are the same as before, with the following changes :

1. Set the TRK 3 RECORD FUNCTION switch to LEFT and all others to SAFE.

2. Turn the channel PAN control all the way to the left.

For recording on track 4;

1. Set the TRK 4 RECORD FUNCTION switch to RIGHT and all others to SAFE.

2. Turn the channel PAN control all the way to the right.

3. Make sure the SYNC switch is set to the OFF position.

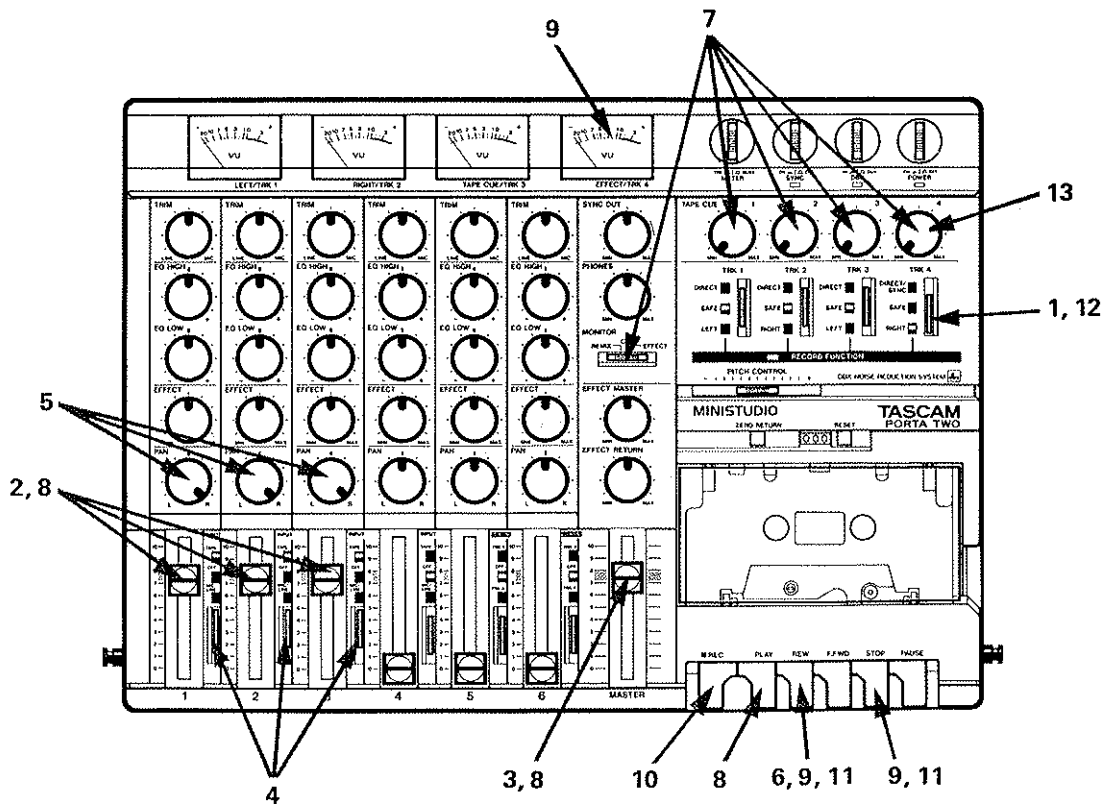
Once these steps are done, the rest is merely balancing the levels of the playback signals with the new material.

The recording capability of the PORTA TWO is not limited to just the four tracks, however. As you progress with your recording, you may reach a point where you need more than four tracks of material. This is where PING-PONGING or COLLAPSING tracks is invaluable. This allows you to combine two or three tracks onto the remaining blank track while recording new material.

If you have recorded tracks 1 and 2, and, perhaps, track 3 as well, follow the steps below to put them all onto track 4.

1. Set the TRK 4 RECORD FUNCTION switch to RIGHT and other switches to SAFE. The RECORD FUNCTION LED will begin blinking. Make sure the SYNC switch is set to OFF.

2. Set channel faders 1 through 3 to the shaded area between 7 and 8.



3. Set the MASTER fader to 7.

4. Set the INPUT switches on the corresponding channels to the TAPE position (Track 1 is on channel 1, track 2 on channel 2, track 3 on channel 3 and track 4 on channel 4). For this example, we assume you will ping-pong the first three tracks onto track 4, so channels 1, 2 and 3 will be switched to the TAPE position.

5. Set the PAN controls all the way to the right (fully clockwise).

6. Rewind the tape to 000.

7. Set the MONITOR switch to the CUE position, turn the TAPE CUE controls all the way down.

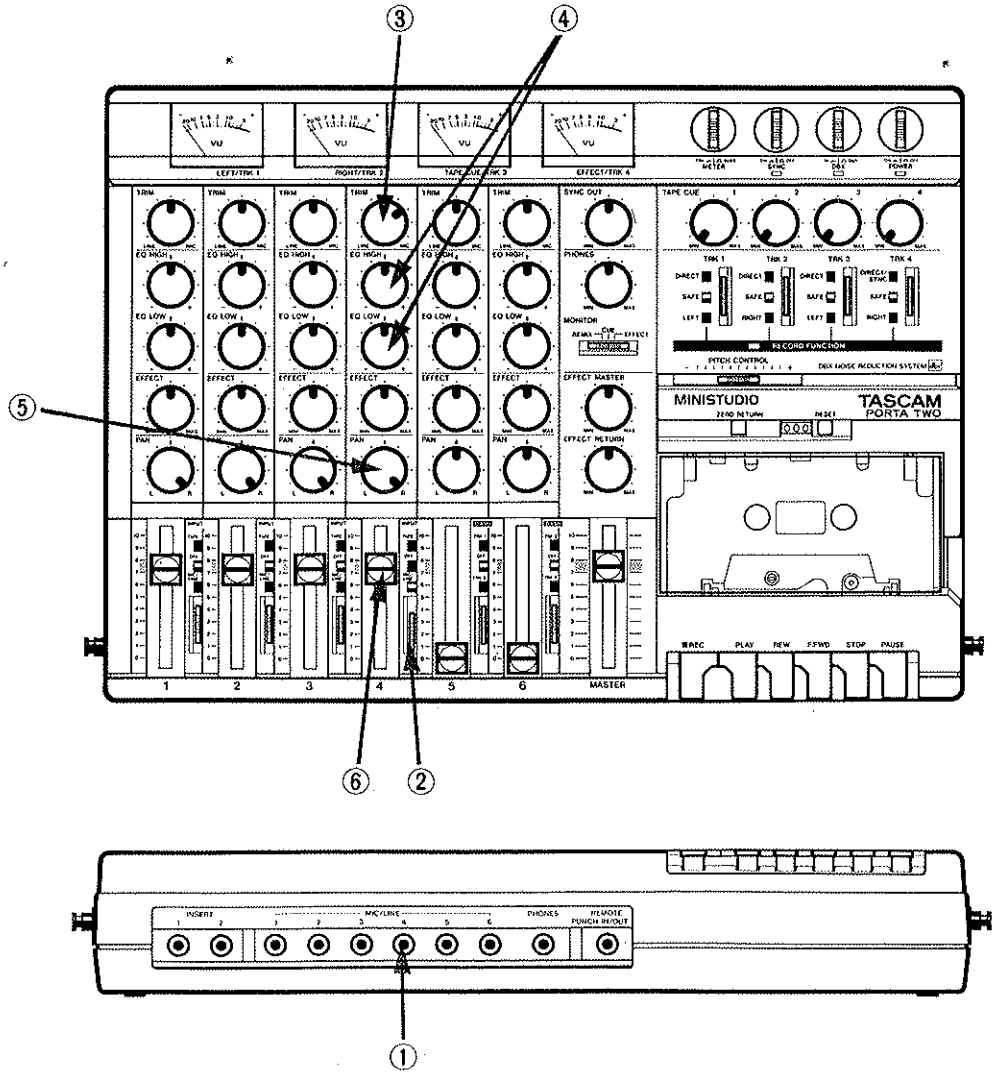
8. Push the PLAY key and listen to the mix. make any necessary level adjustments using the channel and MASTER faders. You may want to repeat this step several times to get the balance correct.

9. When the balance is right and the level is between −10 and 0 on TRK 4 meter, stop and rewind the tape to 000.

10. Push the RECord key. The first three tracks are now being recorded onto track 4. The RECORD FUNCTION LED will stay on.

11. Once the recording is done, press STOP then REWind.

12. Set the TRK 4 RECORD FUNCTION switch to SAFE. The LED will stop blinking.



13. With the MONITOR switch in the CUE position, adjust the track 4 TAPE CUE control to the proper level and listen to the results.

Another feature of the PORTA TWO is the ability to mix a new signal or signals with the tracks being PING-PONGED. The method is simply a combination of steps previously explained. Using the example above, we can add the new signal by using input channels 4 – 6 and following the steps below :

① After Step 5 above, plug the mic into channel 4.

② Set the channel 4 INPUT select switch to the MIC/LINE position.

③ Set the TRIM to 2 o'clock.

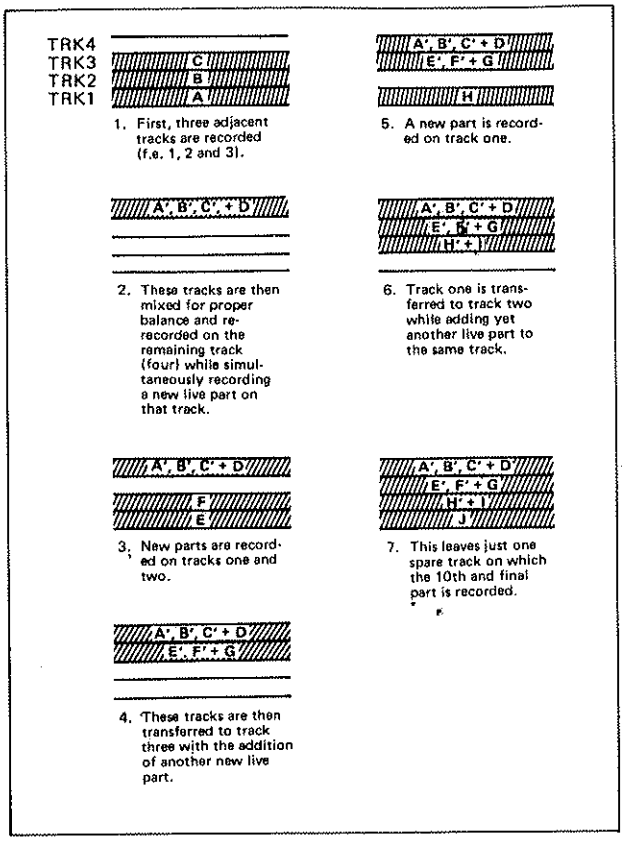
④ Set the EQualizers to 12 o'clock.

⑤ Set the PAN fully right.

⑥ Set the channel 4 fader to 7.

Now, continue on with Steps 1, 3, 6 and 7 of the PING-PONG section. When you reach Step 8, balance the new signal with the previous tracks and rehearse the new material until the balance and timing are right. Then proceed with steps 9 – 13. Once the PING-PONG is completed to your satisfaction, you can re-record over the material on Tracks 1, 2 and 3.

With this technique you can record up to six different sounds on track 4. Once you have mixed the first three tracks plus the new, live material onto track 4, you can re-record and PING-PONG new material on tracks 1, 2 and 3. Even if you record only one live source during each collapse, you can record up to 10 tracks of material on the PORTA TWO without re-recording any track more than once (see the chart). For example, we've just shown you how to record three tracks (1, 2 and 3) plus a live signal onto the fourth track. Since 1, 2 and 3 are now available for recording again, use 1 and 2 for new overdubs, then collapse them, with a live source, onto 3. Already you have seven signals or tracks on only 2 tracks! Go back to track 1, overdub, then PING-PONG it with a new source onto track 2 (this makes 9). Finally use track 1 again for the tenth signal. Ten track recording – not bad for a cassette.



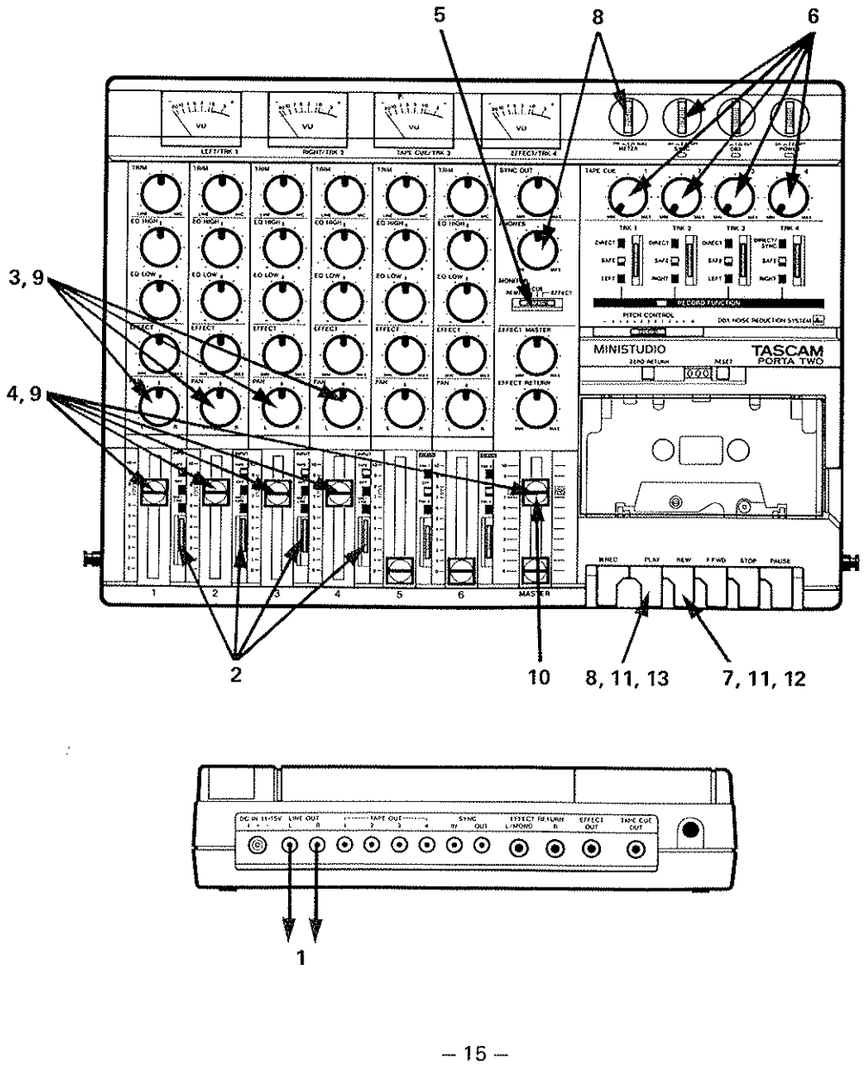
NOTE: Your MINISTUDIO can record signals from channels 5 and 6 during each ping-pong, so your total first generation tracks can be higher.

Remix or Mixdown

The last step in any basic recording is mixing the finished multi-track master tape into a standard stereo format. This process is known as REMIXING or MIXING DOWN. During this procedure the tracks are blended together and balanced to create the desired sound. Other procedures or techniques can also be used during this process, but first we will describe the basics, then we will show you another trick, called PUNCH-IN.

Since the idea of mixing is to bring the four tracks down to two, you need another, two-track, cassette recorder which will act as the MASTERING deck.

1. Connect the Left and Right LINE OUT jacks of the PORTA TWO to the line inputs of the mastering deck.
2. Set the channel INPUT select switches of channels 1 through 4 to TAPE.
3. Set the PAN controls to the center (12 o'clock) position.
4. Set the channel and MASTER faders to 7.
5. Set the MONITOR switch to REMIX.
6. Turn the TAPE CUE controls all the way to the left or off. Make sure SYNC is in its OFF position with LED off.



7. Rewind the recorded tape to 000.
8. Push PLAY and, with the headphones on, adjust the PHONES level control to a comfortable listening level. Set the METER switch to the BUSS (⊓) position.
9. Using the channel PAN and fader controls, set each track's level and left-to-right position for the desired balance. You will have to decide what "sounds right" at this step, we can only tell you what controls to adjust, but not where to set them.
10. When the signal balance and level sounds right, set the overall level using the MASTER fader.
11. Rewind the tape and push PLAY. Adjust the input levels on the MASTERING deck until its meters read between about -3 to 0.
12. Rewind the tape again. Put a fresh tape in the MASTERING deck and let it play for 10 to 15 seconds, then stop it and reset the MASTERING deck's counter to 000.
13. You are now ready to record the mix. Put the MASTERING deck into its RECORD mode, then push PLAY on the PORTA TWO. Continue to monitor the process through the headphones. When the recording is done, stop both machines, rewind the stereo MASTER and listen to the mix.

Quite often, during either the initial track recording or remix, it becomes apparent that the recorded material contains a mistake or could be improved. One obvious way to correct this problem is to re-record the entire track, but, if the mistake is minor, this is not practical or necessary. The PORTA TWO was designed to allow you to easily correct or add material using the technique known as punch-in or insert recording. This provides a way to re-record only a small portion of a track, thus covering the mistake, or to record additional material on a blank spot of another track, augmenting the original material. The technique used has, for the most part, already been covered. Only the way in which it is accomplished is different. There are two ways of performing the punch-in or insert. We will describe both.

Punch-In or Insert Recording

Using our original first track recording, let's say we've discovered a small error. There wasn't enough of a pause between two odd numbers, thus the track two material, the even numbers, overlaps and audibly "steps on" track 1 at that one small point. Here's how to fix it:

1. Play the tape up to a point several seconds before the error. Push the RESET button to mark this point.

2. Set input 1 to the MIC/LINE position, set channels 2 through 6 to OFF.

3. Plug the mic into channel 1.

4. Set the channel controls just as before.

5. Set the TRK 1 RECORD FUNCTION switch to DIRECT and other switches to SAFE.

6. Set the MONITOR switch to CUE.

7. Turn the TAPE CUE controls for tracks 1 and 2 to about 12 o'clock.

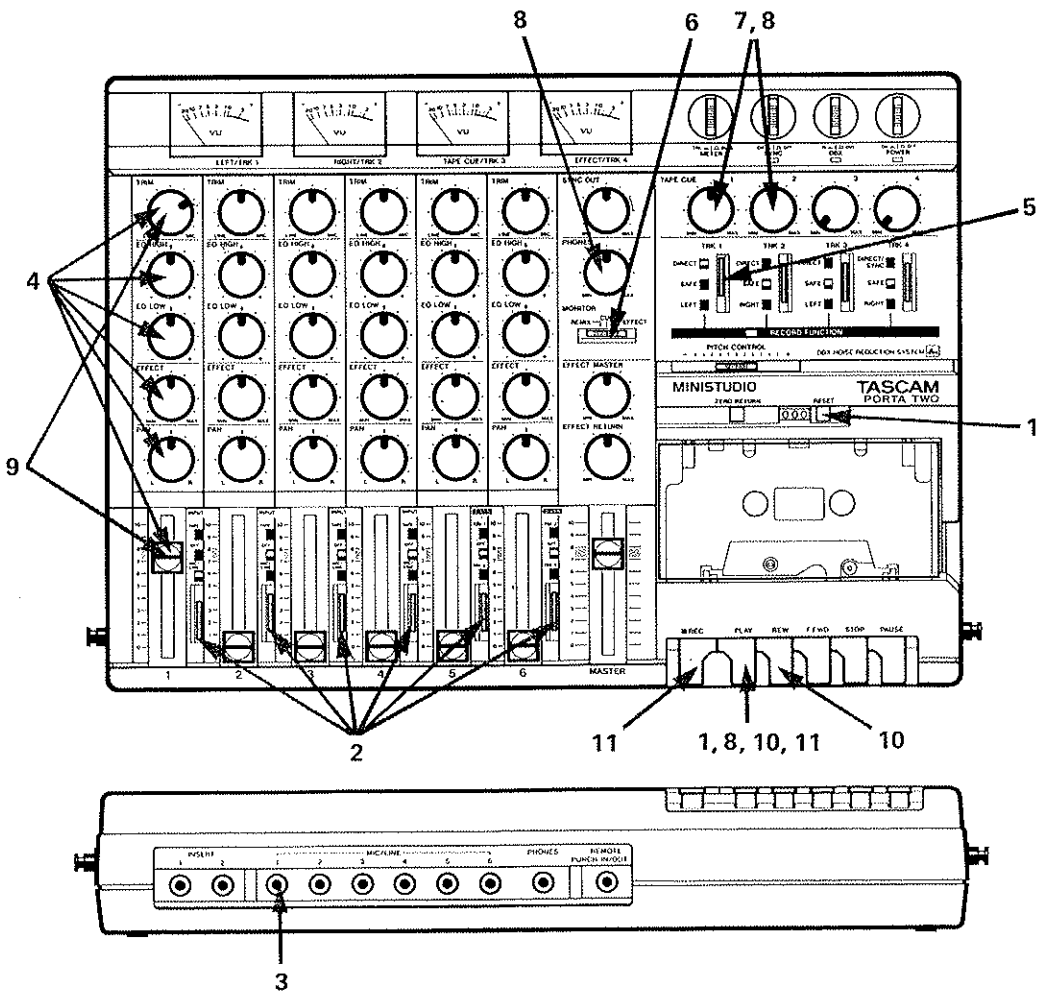
8. Press PLAY. The two tracks should be heard through the headphones. Adjust the PHONES control and TAPE CUE controls to the desired volume and balance.

9. Adjust the fader and TRIM controls on channel 1 while speaking into the mic.

10. Rehearse the Punch-In by rewinding the tape and pressing PLAY. Speak along with the recorded signal, making the necessary corrections.

    Once you are satisfied with the rehearsals, rewind the tape and perform the actual Punch-In.

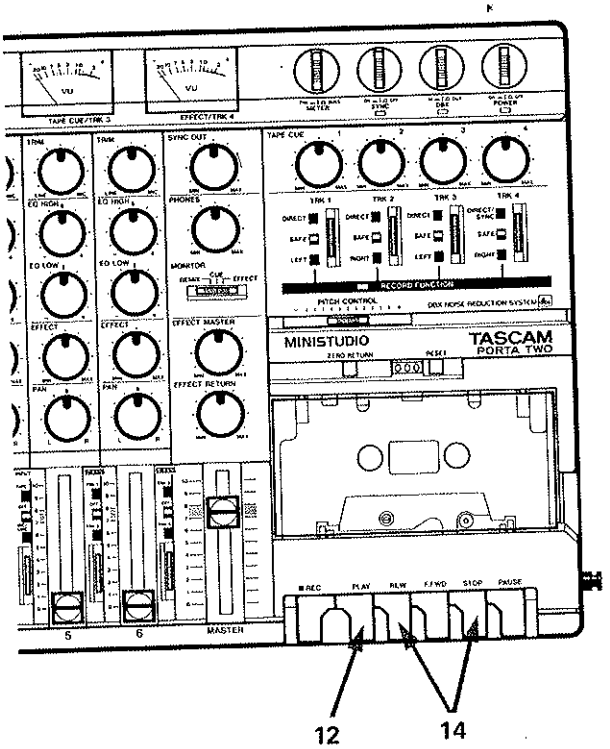
11. Press PLAY and, as in the rehearsal, speak along with the material. When you reach the point JUST BEFORE the error, press RECord. Continue speaking, making the corrections required.



12. When the Punch-In has been performed correctly, press STOP.

13. Rewind the tape and listen to the Punch-In. If the results are satisfactory, continue with your recording. If the PUNCH-IN is not to your liking, go back and try again.

The PORTA TWO can also perform the Punch-In process another way. On the front of the unit you will find a 1/4" phone jack marked REMOTE PUNCH IN/OUT. By using the optional remote foot switch, model RC-30P, the process can be accomplished without having to manually press the RECord and STOP keys. This is really handy if you are recording alone and are too busy playing an instrument to push the switches. Here's how it's done:



Follow steps 1—10 as described above. When you get to Step 11, follow the instruction below:

11. Plug the foot switch into the PORTA TWO.

12. Press PLAY and, as in rehearsal, speak along with the material. When you reach the point just before the error, press the RC-30P foot switch. The RECORD FUNCTION LED should stay on, indicating the PORTA TWO is recording. Make the necessary correction to the track, then;

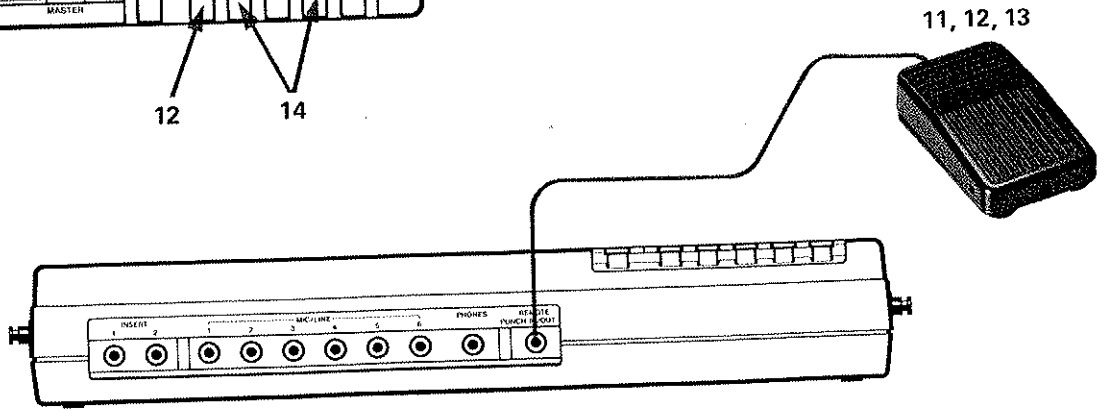
13. Press the foot switch again. This takes the PORTA TWO out of RECORD and into PLAY. The RECORD FUNCTION LED should begin to flash.

14. As before, STOP and REWind the tape and listen to the results.

Before we finish this portion of the manual, here are a couple of tips for performing quality Punch-Ins.

Always try to punch-in when there is a signal present on another track. This will mask any slight noise from the electronics. The same applies to punching-out.

Always rehearse your punch-in until it's PERFECT. Remember, once you punch-in over existing material, that recorded signal is erased. Make your mistakes in the rehearsal, not on tape.

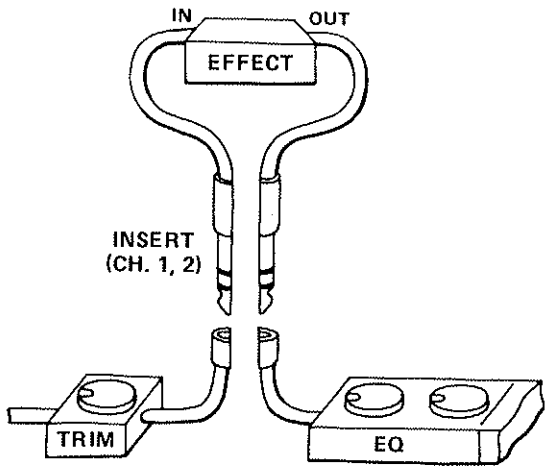


Recording with Effects

Reverb, delay, compressor, overdrive, chorus, phaser, sampler, flanger, echo, limiter, de-esser; the list goes on and on. Recording today requires the extensive use of signal processors, effects, that come in various shapes and sizes from footpedal "squash boxes" to professional rack-mount units. Your PORTA TWO is very flexible and powerful in the way it handles signal processing and effects.

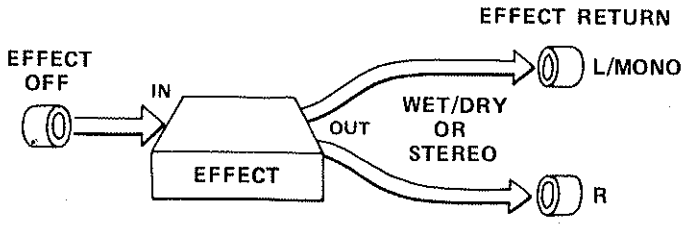
With your PORTA TWO you can use effects on a signal channel without affecting the signals in other channels by using the insert function.

INSERT jacks on channels 1 and 2 tap the signal in the channel so that it can be sent out to an effect or an effects "loop" made up of a series of effects devices. INSERT is a two way jack so that the return signal from the effects devices can be brought back into mixer channel at this same point. As a two way jack, it requires a special Insertion Cable available from your TASCAM dealer.

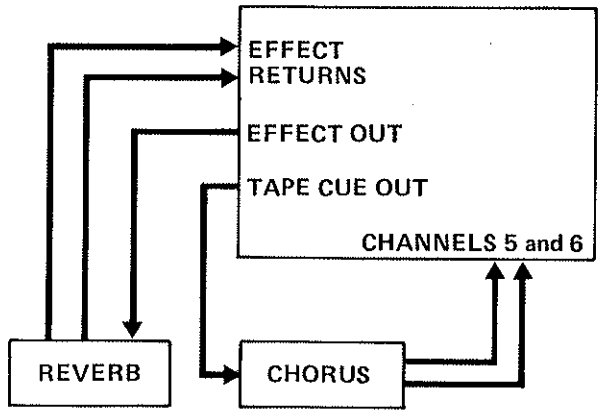


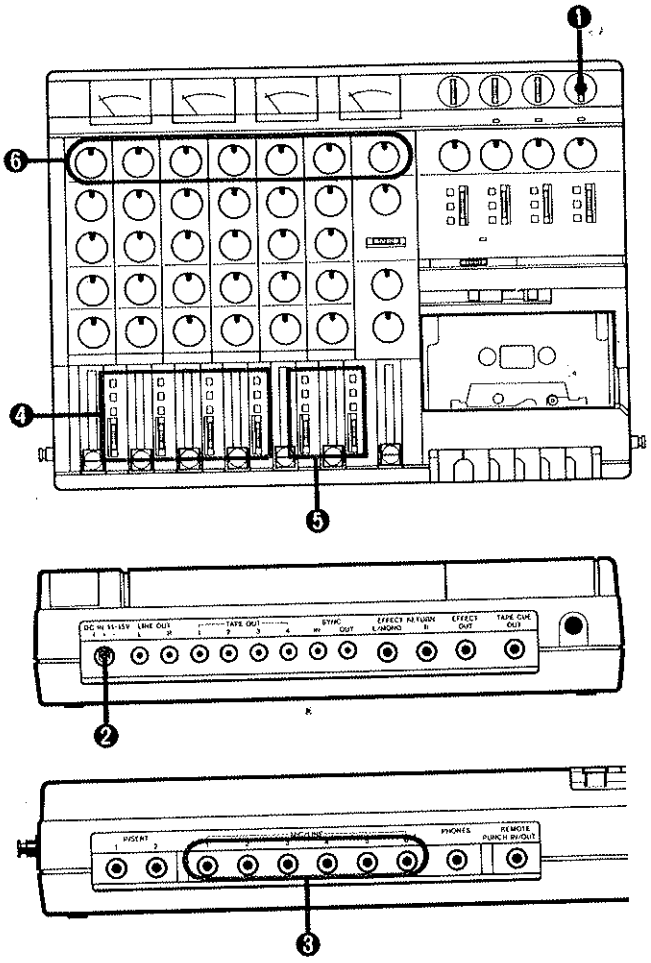
Your MINISTUDIO can process all, or any combination of, your mixer channels with effect using its built-in Effects submix system. The EFFECT control in each of the channels of your mixer is used to send, in amounts varied by the control, signal to the Effects submixer. Signals from the channels are summed together and sent to the EFFECT MASTER control, which is another level control. From the EFFECT MASTER signal is sent to an output connector, EFFECT OUT. Just as in INSERT, the EFFECT OUT can be sent to a single effect or an effects loop. Unlike INSERT, EFFECT OUT is a one-way jack.

Your PORTA TWO has dedicated EFFECT RETURN jacks to bring the signals from your effects loop back into the unit. Two EFFECT RETURNs are provided so that effects that generate both wet (effected) and dry (non-effected) signals can be used to their fullest. Some effects will even generate a simulated stereo signal from a mono source. Your two EFFECT RETURNs can be used for these devices as well. If you are using a stereo device like this, you may still get a wet/dry recording by also recording the signal from your input channel. The signal is still there in the channel, the Effects submixer doesn't steal it all. You can, therefore, still assign the uneffected signal in your channel to be recorded along with effected signal coming in the EFFECT RETURNs.



During Mixdown (Remix), you can use the TAPE CUE OUT as a second Effect Send, in addition to the EFFECT SEND system. You may return even stereo outputs from your effects devices to Channels 5 and/or 6 of the mixer. Be sure to assign Channels 5 and 6 to the appropriate buss using the PAN controls.





❶ POWER switch and LED
Pressing it switches the PORTA TWO on and the LED lights, pressing it again turns the PORTA TWO off. When the PORTA TWO is used with batteries, this LED will blink when the batteries need to be replaced.

❷ EXTernal DC IN Jack
This (DC IN) jack is to connect the AC power adaptor. When using the PORTA TWO for extended periods, we recommend use of the PS-P2 AC adaptor instead of batteries.

❸ MIC/LINE Input Connector
This 1/4" phone jack accepts unbalanced signals from any type of microphone having any impedance from 150 ohms to 10,000 ohms. You can also connect any magnetic instrument pick-up, electric guitar or bass or an electronic keyboard. There may be a need for "direct box" transformer.

❹ INPUT Select Switch – Channels 1 Through 4
This switch has three positions.

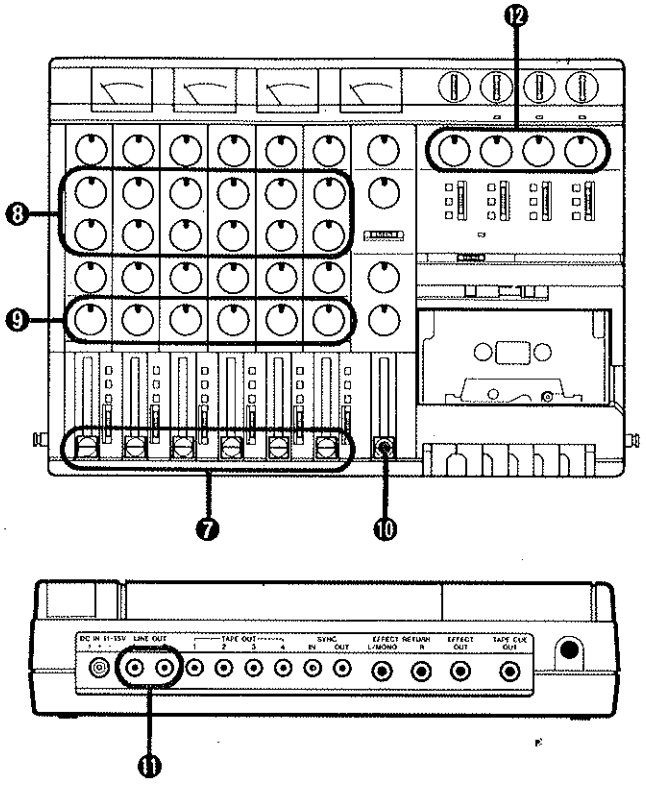
down-MIC/LINE: Select the MIC/LINE input connector on the front panel of the PORTA TWO.

center-OFF: Acts as a "mute".
This "mute"can be useful in many ways. When used on MIC/LINE signals it will allow you to turn on a signal accurately without having to move the fader to a preset mark. This "drop-in" function with all controls preset can be used to edit out undesirable sections from a track when you are remixing. Prior to your final mix, the use of this mute function will allow you to hold all your preliminary mix settings including the level set by the fader, and still silence an input while you "fine tune" another.

up-TAPE: Selects an internal connection from the recorder's input channel 1 corresponding to tape track 1; channel 2 to track 2; channel 3 tape track 3 and channel 4 to track 4. Nothing will be available at this switch point unless there are signals on the tape. The large block diagram and pictogram on page 3 show the entire playback signal path from the recorder to this connection, and that the signal also appears at a side panel 1/4" phone connector marked TAPE OUT.

❺ D. ASN (Direct Assign) Switches – Channels 5 And 6 Only
When used, these switches route signal from the channel to the labelled buss (busses 1 or 3 for channel 5 and busses 2 or 4 for channel 6). If the appropriate RECORD FUNCTION switch is used, channels 5 and 6 can be recorded in the Direct Mode as can channels 1–4. Channels 5 and 6 can also be recorded using the PAN and L/R buss as in channels 1–4. The OFF switch in channels 5 and 6 turns off the Direct buss feed, but the Pan and L/R buss can still be recorded if the appropriate LEFT and/or RIGHT RECORD FUNCTION switches are used.

❻ TRIM
This control alters the gain of the first amplifier, it will affect the level of MIC/LINE signals but has no effect on the TAPE signals. The amount of increase or gain that the amplifier gives the signal is determined by TRIM control. The TRIM control allows you to adjust the amplifier to handle a wide variety of signal levels. Turning the TRIM control clockwise (right) causes the amp to give more gain when working with mic's or softer sound sources.



Turning the TRIM counterclockwise (left) reduces the amount of gain when working with line level signals or louder sound sources.

❼ Input Fader
This linear, or slide, fader varies the amount of signal going from the input channel to the Stereo Left and Right (L/R) Output Busses via the PAN control. This channel fader is the main mixing control for adjusting how much of the input appears at the output(s).

❽ EQualizer
The equalizer or EQ is the circuitry that allows you to adjust the tonality of the signal going through the input channel. It is a two-knob type, with the upper knob allowing a boost or cut of 10 dB at 10 kHz for the high frequencies, and the lower knob allowing a boost or cut of 10 dB at 100 Hz for the low frequencies. They work similarly to the bass and treble knobs on other audio equipment.

We've included a chart of the frequency characteristics of some musical instruments so you can get a better idea of how these tone controls can be used to the best artistic advantage. Of course, using them and hearing the results will tell you exactly how they work.

For more information on EQ, see How to Use the PORTA TWO Equalizer on page 29.

❾ PAN
The PAN control is used to assign (send) the input channel's signal to the Stereo Busses. The PAN provides continuously variable assignment to the L Buss (full counterclockwise rotation) and the R Buss (full clockwise rotation). This allows you to make stereo mixes and locate an input channel's signal anywhere in the stereo panorama.

❿ MASTER (L/R) Fader
This linear (slide) fader controls the level of the signal or mix of signals assigned to the L and R Busses. It simultaneously adjusts the signal level at the:

1. LINE OUT jacks Left and Right.

2. The LEFT/TRK 1 and RIGHT/TRK 2 meters when the METER select switch is in the BUSS (up) position.

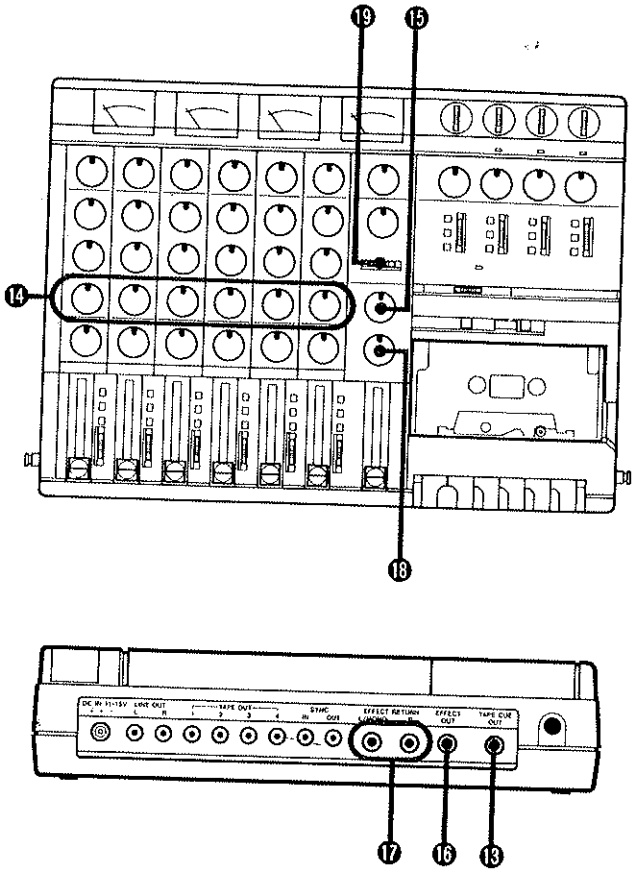
3. RECORD FUNCTION select switch.

4. MONITOR switch/PHONES level control.

⓫ LINE OUT Jacks (L/R)
This pair of RCA jacks feed a line-level program mix (from the Stereo Left and Right Busses) to a monitor amp or tape recorder. This is the same mix you hear in the headphones when the PORTA TWO's monitor select switch is in REMIX, except the LINE OUT level is controlled only by the L/R MASTER Fader and not by the PHONES control.

CAUTION: Never connect two PORTA TWO outputs directly together via a "Y" adaptor or similar method. Doing so would connect both output amps together leading to circuit failure.

⓬ TAPE CUE
These 4 knobs, corresponding to Tracks 1 through 4, are used to create a mono mix of any existing tracks (already recorded tracks) during playback. The Tape Cue mix is always fed to the MONITOR Select switch and the TAPE CUE OUT jack.



⓭ TAPE CUE OUT
This 1/4" jack is the summed signal that is controlled (mixed) by the TAPE CUE level controls.

During Mixdown (Remix), you can use the TAPE CUE OUT as a second Effect Send, in addition to the EFFECT SEND system.

NOTE: Consult "Recording With Effects" found on page 19.

⓮ EFFECT
These 6 controls determine how much signal in the corresponding channels will be routed to the EFFECT MASTER control, to create effect send mixes. Take-off point is after fader and EQ and before PAN.

⓯ EFFECT MASTER
This control adjusts the overall level of the summed (total number added together) signal from the indivisual channels' EFFECT controls.

The mix thus obtained is then sent to the EFFECT OUT jack.

⓰ EFFECT OUT
The signal from this jack is usually taken to a signal processor or effects loop.

NOTE: Consult "Recording With Effects" found on page 19.

⓱ EFFECT RETURN (L/MONO and R)
The signal(s) originating at the EFFECT OUT and processed by your effects devices are usually returned to the PORTA TWO at these jacks. A mono signal may be returned to the L/MONO jack. Stereo returns can be connected to the L and R jacks.

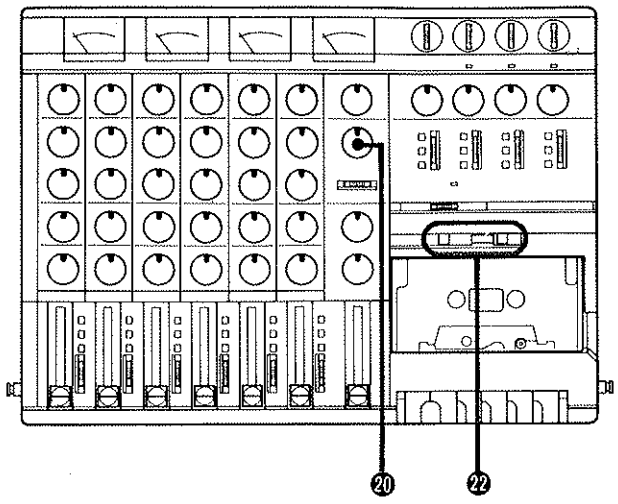
⓲ EFFECT RETURN Level Control
This control is used to adjust the signals plugged into the EFFECT RETURN jack before those signals reach the MASTER fader.

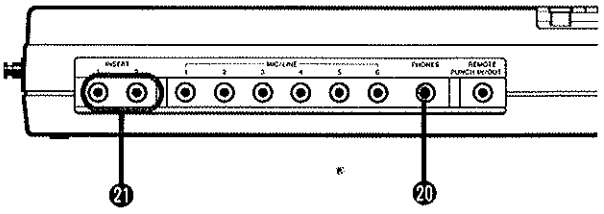
⓳ MONITOR (Headphones) Select Switch
What you will hear in the headphone circuit will be controlled by this switch.

REMIX – You will hear the stereo output of the L/R Busses. The levels you will hear are affected by the settings of the MASTER L/R Fader and the PHONES level control. In this position the TAPE CUE controls have no effect on what you hear in the headphones.

CUE – You will hear a Mono combination of the MASTER L/R signal plus the Tape Cue signals, one for each track. The TAPE CUE controls have signals available to them only after the track has been recorded. To hear them you must be in the CUE (mono) mode.

EFFECT – You will hear the EFFECT OUT (mono). The listening level in the headphones is affected by the setting of the Input Channel Fader, the EFFECT send level control, the EFFECT MASTER control, and the PHONES volume control.

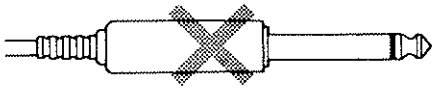




⑳ PHONES

The PHONES control adjusts the overall level of your headphones, plugged into the front panel jack. Any change in the setting of the TRIM, Input Faders, MASTER Fader or the TAPE CUE controls will change the signal level in the phones.

CAUTION: MONO (2-WIRE) HEADPHONES WILL CAUSE CIRCUIT FAILURE. If your headphones have this connector, don't use them.



(1/4" phone 2-connector)

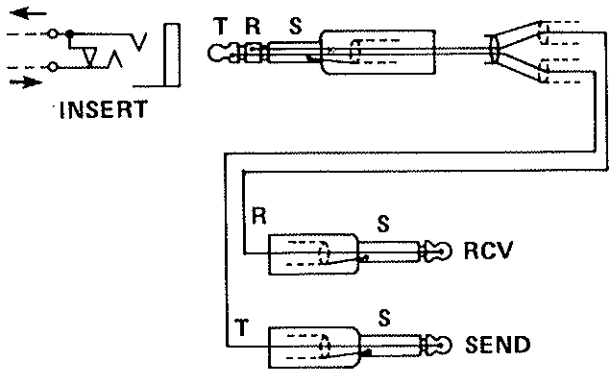
(1/4" phone 3-connector)

Using the 2-wire connector shorts out one of the amplifiers driving the headphones, which will cause it to burn out.

㉑ INSERTion – Channels 1 And 2 Only

This 1/4" Phone jack is actually two connectors in one. The jack is a stereo "break" design and is wired in a standard TIP-RING-SLEEVE configuration. The channel's signal, or SEND, is wired to the connectors TIP contact. The INSERT or RECEIVE, which allows outside signals back into the channel path, is wired to the RING (middle) contact. The shield connection for both signals is the SLEEVE. The jack contains a mechanical switch, or break, which opens, or "breaks", the normal contact between the TIP and RING portions, whenever a plug is inserted into the jack. This mechanical switching technique is called "normalling". A connector is "normalled" if it provides the signal to be disconnected when a plug is inserted, but allows normal signal flow if no connector is plugged in.

Use the TASCAM PW-2Y/4Y Insertion Cables.



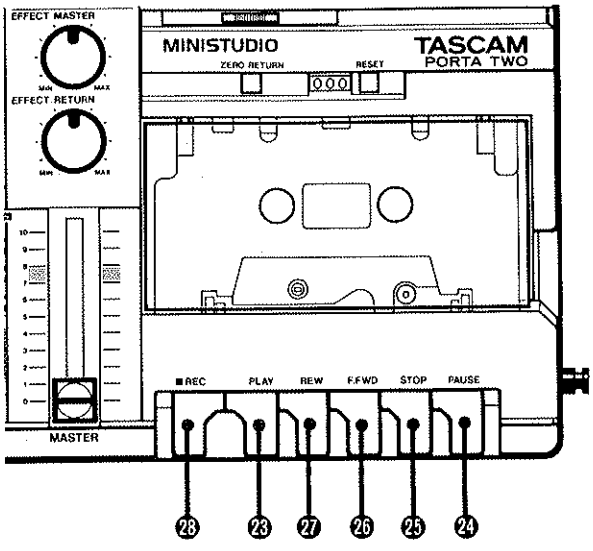
T – Tip, send signal
R – Ring, receive signal
S – Sleeve, ground

TRANSPORT SECTION

㉒ RESET and ZERO RETURN

The Tape Counter is useful for locating any specific point on a tape. The Tape Counter can be reset to 000 at any time by pressing the RESET button located to the right of the counter.

Being able to return to any desired point on a tape can be very helpful. If the ZERO RETURN button is depressed, the tape will automatically stop during REWind when the Tape Counter reaches 000. All you have to do to return



to a specific point is reset the Tape Counter to 000 at the point you wish to return to, and depress the ZERO RETURN button. The tape will always stop at that point when you use the REWind function.

After the tape has stopped when using ZERO RETURN, pressing the REW button again starts rewinding beyond the 000 point. The tape will automatically stop at its beginning.

NOTE: ZERO RETURN works only in rewind, tape motion will not stop at 000 in the Fast Forward mode.

㉓ PLAY Button
Pressing this button places the transport in the PLAY mode. The end stop mechanism releases all functions when the tape reaches its end. Pressing the FF or REW button during playback will enable you to locate at high speed by monitoring the tape, a desired recorded portion or the end of a program.

NOTE: Monitoring the tape at a high speed will cause high level, very high-frequency audio signals to appear at the outputs. Be sure that you turn down the output/monitoring level prior to using this function, so that the headphones or speaker units will not be damaged by excess high frequency.

㉔ PAUSE Button
Disengages the pinch roller from the capstan while playing or recording a cassette, which causes the tape to stop running. The electronics remain engaged. To enter RECORD/PAUSE, press PAUSE, then REC. To resume playing or recording, press the PAUSE button again.

㉕ STOP Button
Pressing this button stops any tape motion, and cancels the Record mode.

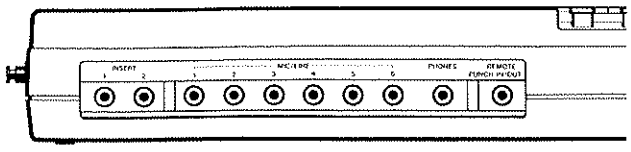
㉖ F. FWD Button
Pressing this button winds the tape forward at high speed. When the tape reaches its end, the transport will automatically stop.

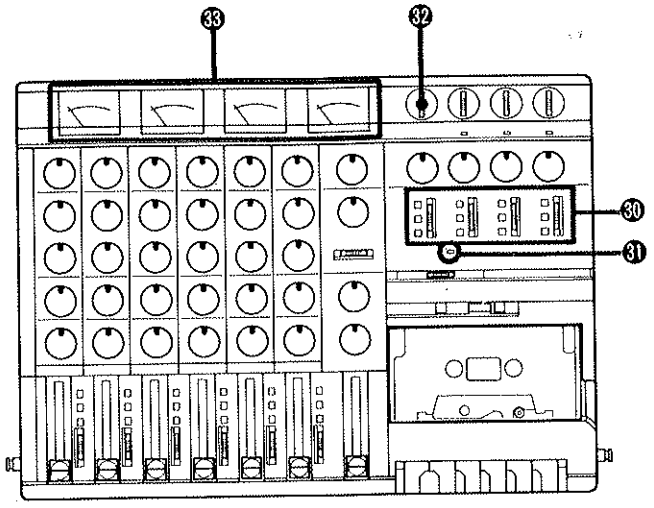
㉗ REW Button
Pressing this button rewinds the tape at high speed. When the tape reaches its beginning, or when the ZERO RETURN stop position is reached, the transport will automatically stop.

㉘ REC Button
Pressing this button begins the recording process by activating the record electronics selected by the RECORD FUNCTION switches and starting tape motion. Recording cannot be done if both RECORD FUNCTION switches are set to the SAFE position or the record protection tabs are missing on a cassette. Check the RECORD FUNCTION switches or the cassette tabs if the PORTA TWO does not enter Record.

㉙ REMOTE PUNCH IN/OUT Jack
This 1/4"-(6.3 mm) phone jack, on the front of the PORTA TWO, is for the optional RC-30P Remote Punch In/Out pedal. Whether you're a busy engineer, producer, or a musician with both hands on an instrument, there are those times when you can't drop what your doing to press the RECord button. You need a third hand! The RC-30P can be that third hand. It lets you punch in and out of RECORD with a tap of your foot.

NOTE: The RC-30P does NOT work in conjunction with the REC button. If you enter the Record mode with the REC button you cannot terminate the Record mode with the RC-30P you must use the STOP button.





㉚ RECORD FUNCTION Switches and Indicators

These switches open their respective tracks of the recorder (1–4) to be recorded. If the transport is in the Record Ready mode, recording will begin when a RECORD FUNCTION switch is turned on. Track 1 in its DIRECT position will send the signals from channel 1 of the mixer and channel 5, if it has been assigned (D.ASN) to track 1, to track 1 of the recorder. Track 1 in the LEFT position will send the summed signal in the Left buss to track 1 of the recorder. Track 1 in the SAFE position blocks any signals from being passed to track 1 of the recorder. The RECORD FUNCTION switches for Tracks 2 — 4 operate in a similar manner. Consult "MINI-STUDIO's Recording Buss System" found on page 10.

㉛ RECORD FUNCTION LED

This LED indicates any of the tracks'record status ("Record Safe", "Record Ready" or "Record" mode):

a) LED off: "Record Safe" mode — no recording can take place.

b) LED blinks: "Record Ready" mode — indicates that more than one of 4 tracks is ready to be recorded. Whether the tape is stopped or in play, the PORTA TWO is ready to go into record, but not yet recording.

c) LED on: Record or Record/Pause — the recorder is recording or is ready to begin recording by releasing the PAUSE button.

㉜ METER Select Switch

Each of the VU meters of the PORTA TWO has, as their labels show, double function, and the METER select switch is used to switch the meters to either of the functions. Pressing the METER switch to the TRK position will switch the meters to their corresponding tracks. If released to the BUSS position, the left two meters will switch to the Stereo Buss, the third to the tape, through the TAPE CUE controls, and the rightmost, forth meter to the EFFECT OUT.

㉝ VU Meters

When you are the PORTA TWO with batteries, the meter will not light to save battery power. When using the PS-P2 AC adaptor, the meter will light.

These VU (Volume Unit) meters respond to the average signal level and do not show peak levels.

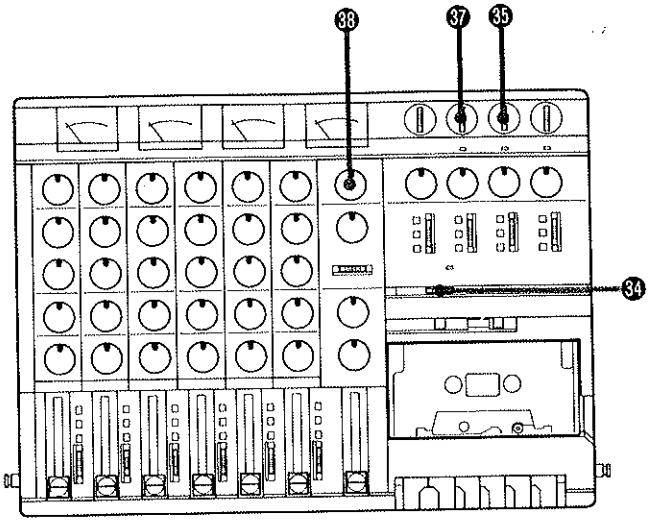
The VU meters indicate levels as follows.

TRK (⎓)

1. The VU meter will register the level of the tape output during playback when the RECORD FUNCTION switches are set to OFF (center).
2. The VU meter will always show the record levels coming from your input sources if the RECORD FUNCTION switches are set to ON (DIRECT or LEFT/RIGHT).

BUSS (⊓)

Your VU meters will now register the levels in the mixer busses. In this position, your meters will not be affected by the status of the recorder section.
The LEFT/TRK 1 meter shows the Left Buss output, the RIGHT/TRK 2 the Right Buss output, the TAPE CUE/TRK 3 the Tape Cue Buss output, and the EFFECT/TRK 4 the Effect Send Buss output.



㉞ PITCH CONTROL

Sliding this control allows you to adjust the speed of the PORTA TWO by approximately ±15 % in both record and playback modes. Sliding the knob to the left (-) slows the tape, while sliding it to the right (+) speeds up the tape. You can return to the basic speed of 1 7/8 ips (4.8 cm/sec) by setting it at the center detented position.

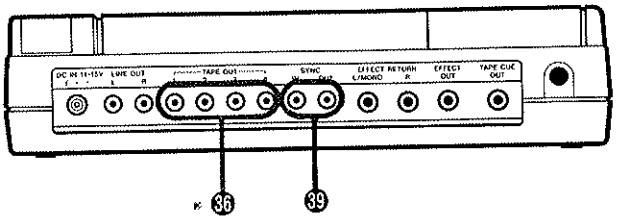
The PITCH CONTROL offers you a variety of creative possibilities. It may prove somewhat tricky to adjust because we wanted to give you the greatest possible range of speeds, and thus had to compromise on "fine tuning". For use with musical material this allows pitch changes of about one and quater whole tone. Which provides a convenient way to add difficult vocal harmonies. In any case, we suggest that you use "full slow" or "full fast" only during final playback, as minor drifts in this control circuit from hour to hour may result in slight speed variations. If, for example, you use "maximum" during recording, you will not be able to make a minor "upward" correction during playback because you will have no leeway.

Also, it is recommended to make a run of several seconds in the play mode for the speed to stabilize, especially when the change in speed is large. Before beginning to record again, check the pitch carefully with a short playback, and you will have less trouble with drift.

CAUTION: dbx NR calibration will only be accurate at the basic speed of 1 7/8 ips (4.8 cm/sec). Recording at one speed and playing back at another may cause dbx decoding errors to have an effect on the dynamics of the signal. Since changing the speed of the tape will also alter the pitch (frequency) of recorded sounds, the use of this speed shift circuitry will be an artistic judgement we must leave to you. The specifications on page 38 for the unit may not be achievable when this circuit is used on extremes.

㉟ DBX NR Switch

When playing a dbx-encoded tape or making a dbx NR recording, this switch must be depressed (▬).



㊱ TAPE OUT Jacks

These RCA-type jacks provide output signals from each corresponding track in playback. The TAPE CUE level control does not affect these jacks.

These jacks can be used to transfer, or "dub", your tapes onto another multi-track machine without remixing to a stereo format. This is desirable if you want to make a second generation copy of your original multi-track master. You can also dub the 4 tracks onto a larger format machine, such as an 8 track, then continue working with the 8 track to finish your project.

㊲ SYNC Switch

Its OFF position allows the channel 4 signal to be routed to the recorder head for track 4 through the direct buss. In its ON position, direct buss 4 is disconnected and signals plugged into the SYNC IN jack are instead routed to track 4 (via the DIRECT/SYNC contact of the TRK 4 RECORD FUNCTION switch). This is the optimum way to record synchronizing codes such as SMPTE, Clock, or FSK (which is usually used with MIDI instruments.) Consult "Recording With Tape Sync" on the next page.

㊳ SYNC OUT Level Control
This controls the level of the sync signal recorded on track 4 that will appear at the SYNC OUT Jack.

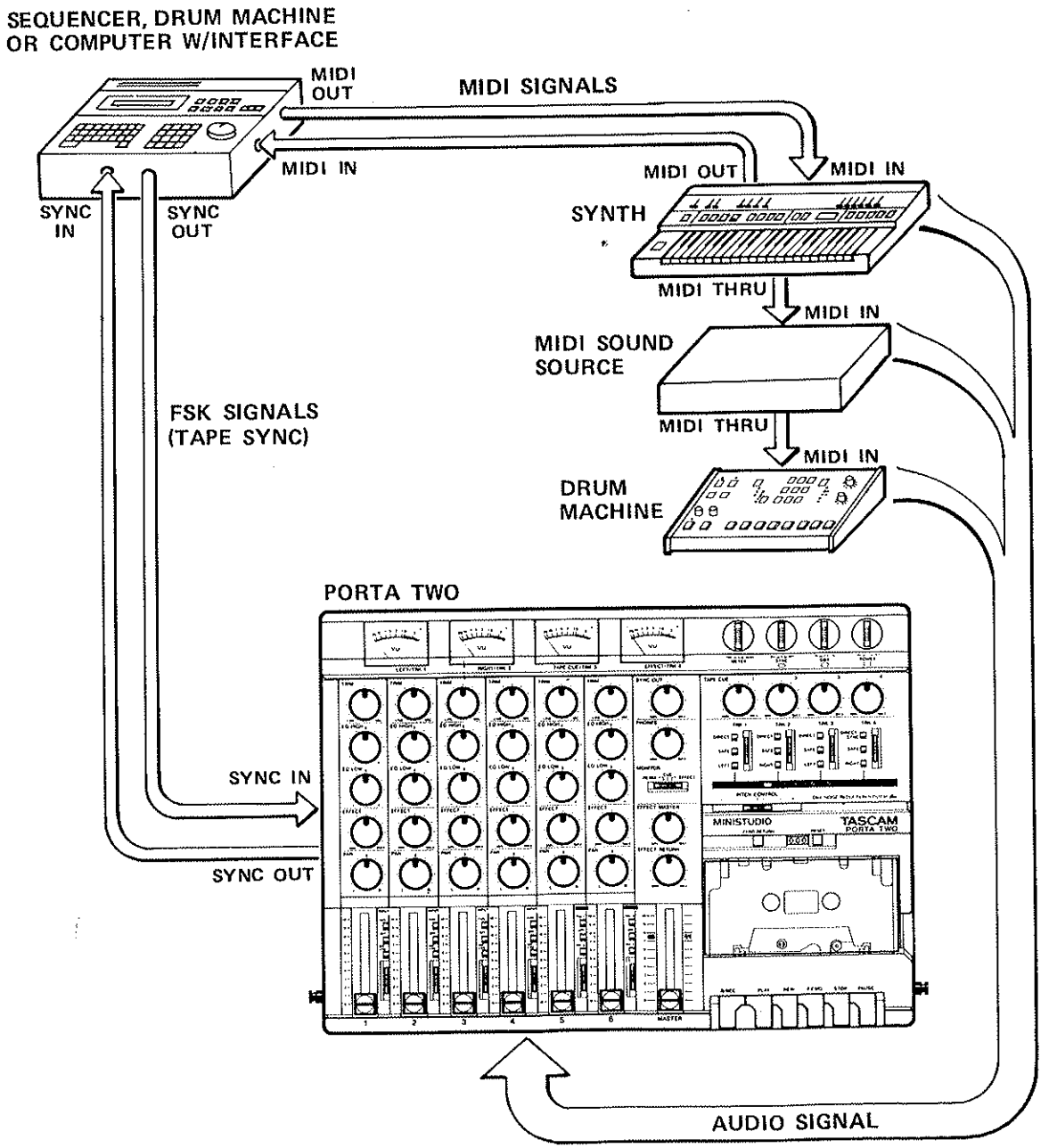
㊴ SYNC IN/OUT Jacks
These jacks should be used to connect the sync signals coming into and going out of your PORTA TWO. Before the sync signal reaches the output it will be conditioned by a band-pass filter, which optimizes the quality of the sync signal.

Recording with Tape Sync

Your PORTA TWO has a special feature designed to make it an ideal recorder to be used with electronic musical instruments. SYNC IN/OUT is specifically designed to be used with the recordable synchronizing codes used by MIDI (Musical Instrument Digital Interface) and some other instrument systems. While MIDI itself is a computer type digital language, it is necessary to convert MIDI sync signal to recordable sync signal such as FSK (Frequency Shift Keying) using a MIDI FSK converter. Sometimes this type of converter is implemented on sequencers, drum machines and computer interfaces.
Your may record your sync signal via SYNC IN either before you lay any tracks, or as you lay your first basic track(s). Connect the FSK output of your MIDI FSK converter, drum machine, sequencer, computer interface (whatever you're using to generate your sync code) to the SYNC IN. This output might be labelled "Sync Out" or "Tape Out". Set the transport to Record Sync on track 4. Consult the owner's manuals of your electronic instruments for specifics. To record new synchronized tracks using your sequencers etc., reverse the process. Connect SYNC OUT of the PORTA TWO to the "Sync In" (or "Tape In") of your converter. Use the SYNC OUT Level Control to make sure the sequencer is getting a sync signal it can read. Put track 4 into play mode and any tracks you want to record into Record Ready mode. Your converter will translate the sync code playing back from track 4 into MIDI clock information which, in turn, will drive the MIDI program in the sequencer (notes, rhythm, bends, etc.). The synthesizers, drum machines, and other sources and processors connected to your sequencer will now operate in perfect sync with any track(s) you might have laid while you were also recording your sync track. In this way you can continue to record the audio signals from your sound sources on the MINISTUDIO's tracks during Overdubs, Ping-pongs, and Remix. Consult sections of this manual with these headings for more information. Tracks created electronically using sequencers etc. are called "Virtual Tracks". Combing virtual tracks with the normal tracking

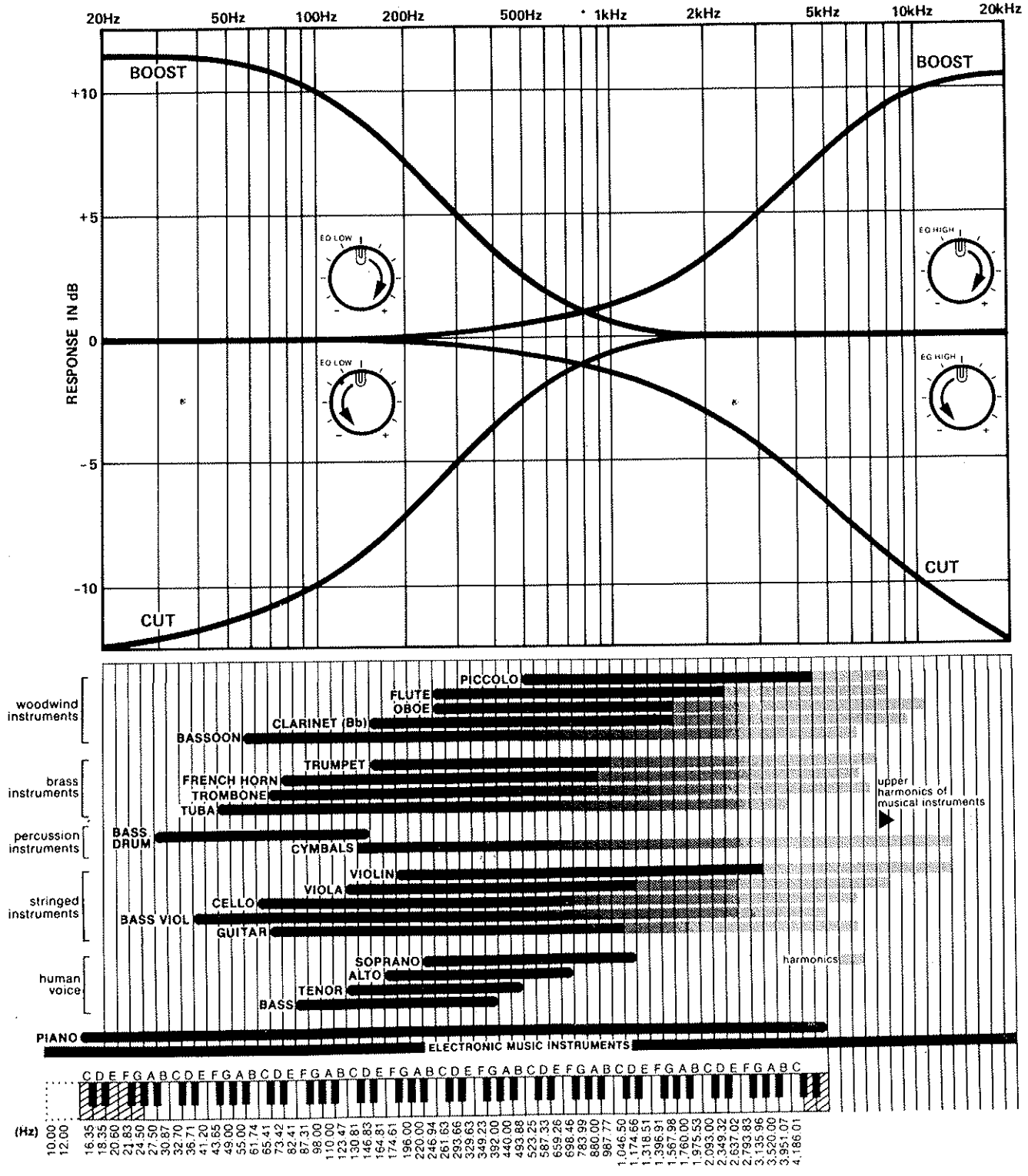
procedures used in recording makes it possible to record a tremendous number of different instrument sounds on a very small number of tape tracks. Your only real limitation is the number of sound sources and the capacity of your sequencer.

NOTE: When recording sync signals, make sure you have sufficient level, which should register between -10 and 0 on the VU Meter. Sync signals vary depending upon the type of devices used to generate them. If the sync level is too low or too high, then use the direct buss for recording your sync signals. Plug the sync signal into the channel 4 MIC/LINE jack and set the TRK 4 RECORD FUNCTION switch to the DIRECT/SYNC position. In this way, necessary level adjustments can be made using the TRIM control and fader in channel 4. Turn the SYNC switch to its off position when the SYNC IN jack is not being used.



EQ can be used to change the tonality of an individual instrument. The 10 kHz control affects the "brightness' or "brilliance" of an instrument, and the 100 Hz control affects the "boominess" or "bassiness" of an instrument.

It is important to remember that there are two ways to make a given tonal change. If you want to add 10 kHz, for example, you can get a similar effect by turning down the 100 Hz. If you want more in the low frequency range, you



can turn down the 10 kHz and get a similar tonality change.

In general terms, you get a desired tonal change in two ways. Either make the appropriate change on the control that affects the range you want to alter, or make the opposite change on the control that affects the opposite frequency range.

The equalizer on the PORTA TWO is a two-knob shelving type, and its range of control covers the low and high frequencies. To use an equalizer, it is important to understand the frequency range of the sound sources you will be processing and the control range of the equalizer. Refer to the illustration on the proceding page to see the relationship between the frequency range of various instruments, and the range of control of the PORTA TWO's equalizer.

This illustration shows how different instruments will be affected by changes in the EQ settings. You can see how certain instruments will be unaffected by changes on one of the EQ controls. Cymbals and flutes, for example, will not be affected very much by the 100 Hz EQ. This is because these instruments have little or no frequency content in that range. On the other hand, you can boost or cut a certain part of an instrument without boosting or cutting other parts of that instrument. On drums, for example, you can bring out the kick drum relative to the other drums by turning up the 100 Hz control. On the other drums that have a little frequency content in that range there will be some effect. Because the kick drum has a large amount of energy in the 100 Hz range, it will be the most affected by changes on the 100 Hz control.

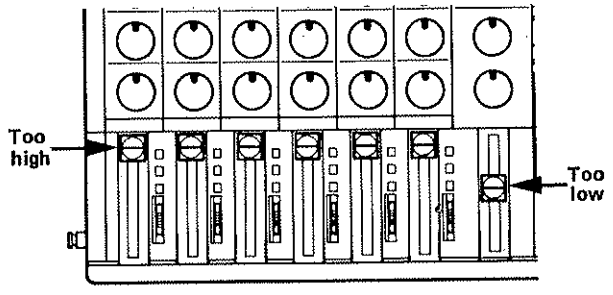
Likewise, if you want to accentuate or diminish the cymbals in a drum kit, you can do so using the 10 kHz control. Turn it up for more and down for less. This, too, will affect any other source (signal) that has frequency content in that range. Experience will show you that there is a limit to how much cut or boost you can do before its effects on the other signals become undesirable.

As before, experience will help you learn the capabilities and limits of this method.

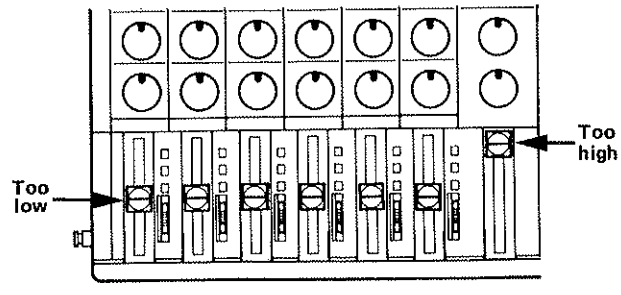
A Word of Mixing Advice

All finished tapes must be balanced — one sound and its tone judged by blending with others. Don't depend on EQ to set up a "perfect" tone, because the minute you add your perfect sound back to the "mix" the tone may not be so "perfect". Always try to get the levels as close to "right" as possible before using EQ. If the mix is close, you will know which tracks need fine EQ tuning to be heard. Less EQ means less distortion and full boost on every pot will also boost the noise in your mix as well as the signal.

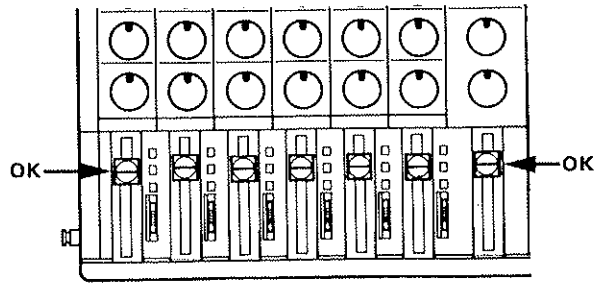
1. If your console faders always wind up like this, you are likely to be over-loading your outputs. Pull down the inputs and raise the master.



2. Conversely, if this is what you usually have, you are getting too much gain from your master. Your mix is clean, but noisy.



3. This picture is a reasonable compromise and is probably better all around.



How the dbx Works

The DBX is a wide-band compression-expansion system which provides a net noise reduction (broadband, not just hiss) of a little more than 30 dB. In addition, the compression during recording permits a net gain in tape headroom of about 10 dB.

A compression factor of 2:1 is used before recording; then, 1:2 expansion on reproduce. These compression and expansion factors are linear in decibels and allow the system to produce tape recordings with over a 90 dB dynamic range – an important feature, especially when you're making live recordings. The DBX employs RMS level sensors to eliminate compressor-expander tracking errors due to phase shifts in the tape recorder, and provides excellent transient tracking capabilities.

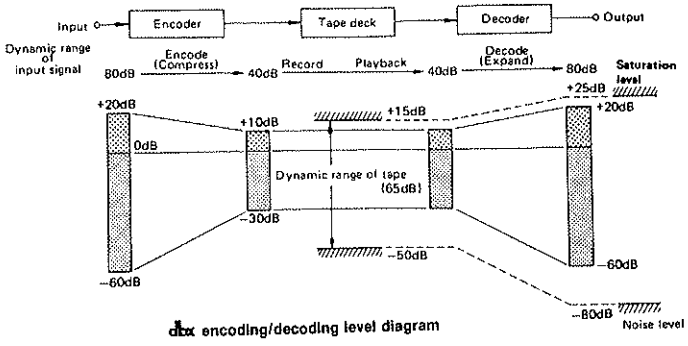
To achieve a large reduction in audible tape hiss, without danger of overload or high-frequency self-erasure on the tape, frequency pre-emphasis and de-emphasis are added to the signal and RMS level sensors.

If you're an electronics engineer, all of the above may tell you the whole story of what's going on in the DBX, but if you're not, to make things a little easier to understand we'll ask you to use your imagination.

Imagine four little recording engineers in the box with each of their hands on a volume control. They are incredibly fast but very stupid, so you must give them a set of rules. First you must tell them what their "0" reference level is. Then you must tell them to do nothing if the signal level equals the "0" reference. You tell them that during recording they must raise the signals that are below "0" and reduce the signals that are higher than "0".

When you playback the tape you tell them to do everything opposite of what they did during recording. Levels above "0" are increased and levels below are decreased. Follow the rules in reverse. As long as you don't confuse the engineers by shifting the "0" reference point, they work just great.

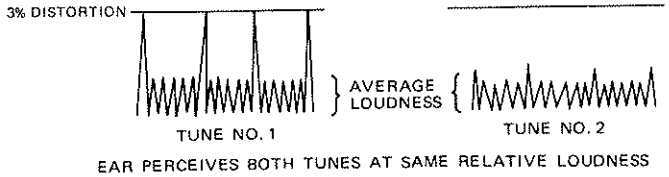
When DBX is added to a tape recording system, we have to give our "0" reference level a real electrical value. Any significant difference between the record and playback signal levels will produce decoding errors. The problem here is not electrical, it's human. An understanding of the system will help you get much better results.



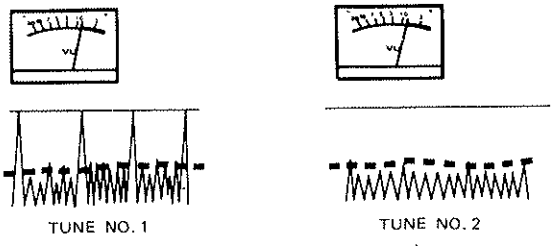
dbx encoding/decoding level diagram

The PORTA TWO meters are VU or average type. And, anyone who has ever watched VU meters bounce around while recording knows that "real sound" is not a fixed value of energy (or voltage). It varies with time from "no recording" to "good grief" in less time than it takes to blink.

Most percussive material such as snare or kick drums, latin percussion or castanets generate very high peaks (transients) for very short periods of time. Generally, these transients do not greatly affect the overall perceived average loudness of the music. However, these transients must be taken into consideration. They can be as much as 20 dB louder than the average signal shown on the meters. These transients are difficult for tape to record; they can cause tape



EAR PERCEIVES BOTH TUNES AT SAME RELATIVE LOUDNESS



VU METER INDICATES BOTH TUNES AT SAME RELATIVE LEVEL

saturation or short-term peak distortion which may be hard to detect. Even though you may not be able to hear it, the DBX circuit can sense that the playback level is not equal to the record level. This difference will produce decoding errors.

These errors may not be objectionable because a small change in the sound quality won't be as noticeable as a mistake. When all the tracks are finished and mixed together they will usually cover a small change on any single track.

Use discretion and experiment with the meter levels. For example, castanets should be recorded with no more than -10 indication showing on the averaging VU meter. Even when the meter reads this low, you can still get a good recording. Since, DBX provides at least a 30 dB signal-to-noise improvement over traditional noise reduction systems, even recording at -20 VU will still give you a quiet tape. You must remember that the system is level sensitive although it is realistic to say that it is "artistically" forgiving. Judge the recording by what you hear, the meters are only a guide.

SUBSONICS AND INTERFERENCE

The DBX incorporates an effective bandpass filter. This filter suppresses undersirable subsonic frequencies to keep them from introducing errors into the encode or decode process. However, if rumble from trains or trucks is picked up by your microphone and fed to the DBX-modulation of the program material during low level passages may occur. This low-frequency component will not itself be passed through the recorder and so, will not be present at reproduce for proper decoding. If this low-level decoding error is encountered, and subsonics are suspected, we suggest the addition of a suitable high-pass filter in the Microphone Line.

Care and Maintenance

Even though the head used in the PORTA TWO has high wear resistance and is rigidly constructed, performance degradation or electro-mechanical failure can be prevented if maintenance is performed regularly. Periodically follow the check items below:

CLEANING

The first things you will need for maintenance are not expensive. The whole kit with the swabs and fluids you will need for months will cost less than a couple of high-quality cassettes.

We cannot stress the importance of cleaning too much. Clean up before each session. Clean up after every session. Clean up every time you take a break in the middle of a session.

Here's why:

1. Any dirt or oxide build-up on the heads will force the tape away from the gaps that record and playback. This will drastically affect the response. Even so small a layer of dirt as one thousandth of an inch will result in degraded performance. All the money you have paid for high performance will be wiped out by a bit of oxide. Wipe it off with head cleaner and you're back to normal.

2. Tape and tape oxide act very much the same way as fine sandpaper. The combination will slowly grind down the tape path. If you do not clean off this abrasive material on a regular basis, the wear will be much more rapid and will become irregular. Even wear on heads can be compensated for with electronic adjustments for a while, but uneven wear can produce notches on heads and guides that will cause the tape to "skew" and skip around, making adjustment impossible. This ragged pathway also chews up the tape, producing more abrasive material, which in turn causes more uneven wear. This begins a vicious circle that cannot be stopped once it gets a good start. The only solution to this will be to replace not only the heads, but the tape guides as well. Being conscientious about cleaning the tape path on your PORTA TWO will more than double the life of the heads and tape guides.

Cleaning the Heads and Tape Guides
All heads and metal parts in the tape path must be cleaned after every 6 hours of operation, or before starting and after ending a recording session. Using a good head cleaning fluid and a cotton swab, clean the heads and tape guides until the swab comes off clean. Wipe off any excess cleaning fluid with a dry swab.

Cleaning the Pinch Roller
Clean the pinch roller at least once each day the deck is used. Use a good rubber cleaner.

1. Open the cassette door.

2. Press PLAY.

3. Lightly press a cotton swab moistened with rubber cleaner to the pinch roller on the right-hand side of the capstan shaft. This will prevent the swab from becoming entangled. Clean it until there is no visible residue on the pinch roller or coming off a clean swab.

4. Using a clean cotton swab, wipe off all excess rubber cleaner from the pinch roller. Make certain that there is no foreign matter remaining on either the pinch roller or the capstan shaft.

Cleaning the Capstan Shaft
After cleaning the pinch roller, clean the capstan shaft. Lightly press a cotton swab moistened with head cleaning fluid to the rotating capstan shaft.

DEGAUSSING (DEMAGNETIZING)

A little stray magnetism can become quite a big nuisance in tape recording. It only takes a small amount (.2 Gauss) to cause trouble on the record head. Playing 10 cassettes will put about that much charge on the heads. A little more than that (.7 Gauss) will start to erase high-frequency signals on previously recorded tapes. You can see that it's worth taking the trouble to degauss regularly.

DEGAUSSING IS ALWAYS DONE WITH THE RECORDER TURNED OFF. If you try it with the electronics on, the current pulses produced by the degausser will look just like audio signals to the heads. These pulses are around 10,000 Gauss, and will seriously damage the electronics and/or meters. Turn off your PORTA TWO, then turn on the degausser at least 1 m (3 feet) away from the recorder.

Be certain that your degausser has either a plastic cover or plastic tape covering the tip. Make sure that no metal ever touches the tape heads as it will scar them and ruin them.

Slowly move in to the tape path. Move the degausser slowly up and down, touching lightly all metal parts in the tape path. Slowly move it away again to at least 1 m (3 feet) from the recorder before turning it off.

Be sure to concentrate while you are degaussing. Don't try to hold a conversation or think of anything else but the job you are doing. If the degausser is turned on or off by accident while it is near the heads, you may put a permanent magnetic charge on them that no amount of careful degaussing will remove. You will have to get the heads replaced. Make sure you are wide awake for this job.

A clean and properly demagnetized tape recorder will maintain its performance without any other attention for quite a while. It won't ruin previously recorded material, nor will getting it back to original specifications be difficult.

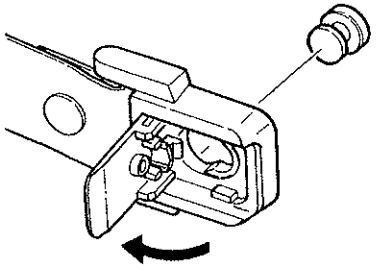
CAUTION: If the surface of the unit gets dirty, wipe the surface with a soft cloth or use a diluted neutral cleaning fluid. Clean off thoroughly. Do not use thinner, benzine, or alcohol, as they may damage the surface of the unit.

Use of the Standard Accessories

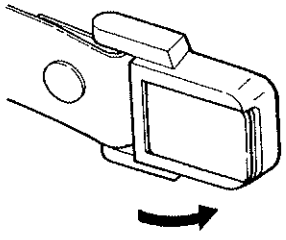
ATTACHING THE SHOULDER STRAP

The shoulder strap can be attached to the PORTA TWO by using the following simple procedure :

1. Pull open the retainer latch in the direction indicated by the arrow.



2. Slip the buckle over the stud on the side of the PORTA TWO.



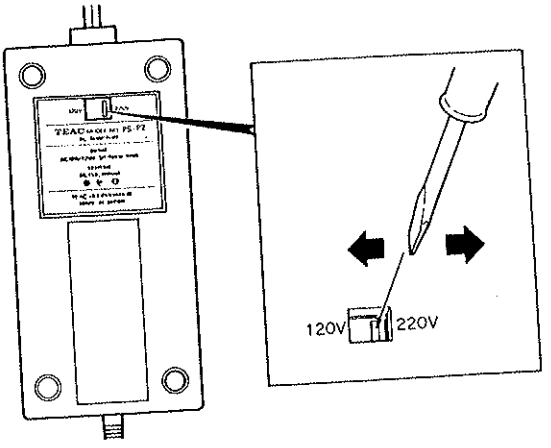
3. Snap the retainer latch shut to secure the buckle.

USE OF THE PS-P2 AC ADAPTOR

When the PS-P2 is connected to the PORTA TWO the batteries are automatically disconnected. When you power the PORTA TWO for a long time, be sure to remove the batteries to prevent possible damage which can be caused by battery leakage. If for any reason you won't be using the PORTA TWO for a period of time, it's always a good idea to remove the batteries and disconnect the AC adaptor from the unit and the AC line.

Notes: I. For General Export units the voltage setting can be changed to match your mains power. ALWAYS DISCONNECT THE AC LINE BEFORE MAKING THE CHANGE.

1. Locate the voltage selector on the top panel of the PS-P2.



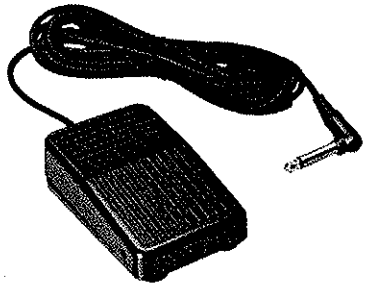
2. Two voltage ranges are available: 120 V (110 – 120 V) and 220 V (220 – 240 V). Using a regular (slot-bladed) screwdriver, set the selector to the indication corresponding to the voltage requirements of your area.

II. This voltage conversion is NOT possible on units sold in the North America, U.K., Australia or Europe.

III. U.K. Customers
Due to the variety of plugs used in the U.K., the PS-P2 is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

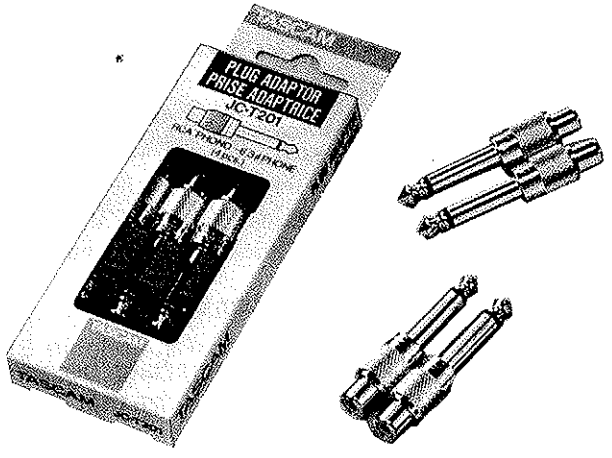
Optional Accessories for the MINISTUDIO PORTA TWO

RC-30P Remote Punch-In/Out Pedal



The RC-30P is a durable footswitch that connects to the REMOTE PUNCH IN/OUT jack on the front panel of the PORTA TWO. This permits "hands free" entry and exit from the record mode.

JC-T201 Plug Adaptor (RCA Phono → 1/4" Phone)

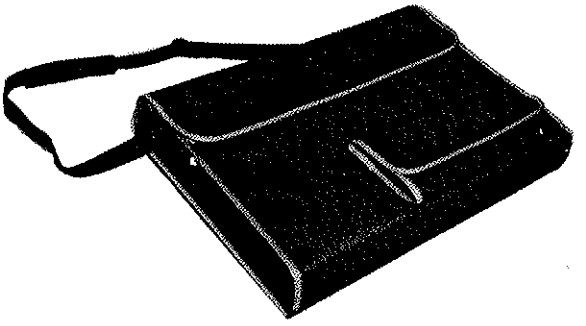


Designed to pro standard for optimum strength and sound quality with the male and female connectors machined out of one piece of metal.

M-06 Mixer

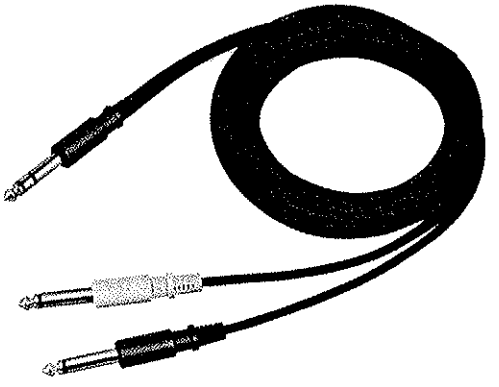
The M-06 is a handy "transparent" mixer with 6 inputs, effect send mix/stereo return, direct access to the channel path, and phono inputs. It will enhance versatility of the PORTA TWO.

CS-P2 Carrying Case



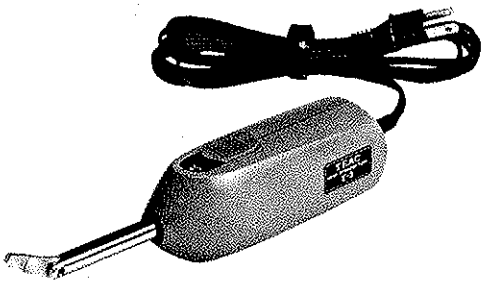
As its name implies the PORTA TWO is very portable and there will be times when you will want to take it with you. Use the CS-P2 to protect the PORTA TWO.

PW-2Y/PW-4Y Insertion Cable



The TASCAM PW-2Y/PW-4Y is a connecting cable that allows signal processing such as a graphic equalizer to be inserted at specific points of the signal path of the PORTA TWO. Its tip-ring-sleeve plug connects to the INSERT jack while its "Y'ed" end accommodates connection to the input and output terminals of the outboard equipment being used. Available in two lengths — 2 m (PW-2Y) and 4 m (PW-4Y).

E-3 Head Demagnetizer

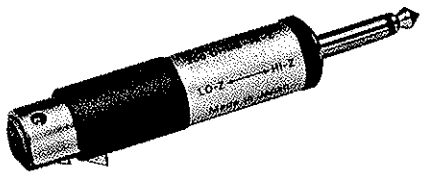


The E-3 is essential for eliminating the residual magnetism that builds up on the heads, as well as other metal parts along the tape path. Demagnetization is part of regular recorder maintenance, and the TEAC E-3 is the right tool for the job.

E-2 Bulk Eraser

The E-2A allows you to erase cassettes, as well as 7" and 10" reels of tape, quickly and completely. It comes with a pilot light and integral circuit breaker to protect against overheating.

109B Input Transformer



The TASCAM 109B Input Transformer is an adaptor that matches balanced low impedance microphones with XLR connectors to unbalanced high impedance 1/4" phone jack inputs. This adaptor enables a long cable from the low impedance mic to remain balanced for rejection of hum and buzz. The male XLR connector on the end of the cable farthest from the mic is then connected to the 109B, and the 109B's phone plug is connected to the 1/4" phone jack. This approach is far superior to simply wiring a phone plug onto a 3-wire cable from the mic. The 109B not only maintains the noise rejection of the balanced low impedance mic, it also properly loads the mic to preserve correct frequency response. If you have an unbalanced input and a professional mic, the 109B is the ideal transformer.

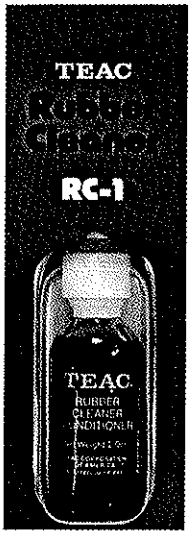
TZ-261 Cleaning Kit (Except U.S.)

HC Head Cleaner & RC Rubber Cleaner (U.S. Only)

Using the right chemicals is important because strong solvents can dissolve the binder that holds the head laminations together. Isopropyl alcohol can leave a residue and is not always adequate for cleaning desposits from modern tape formulations. Beware of rubbing alcohol; while it is isopropyl, it also contains oil and water that leave a heavy film on the heads. TEAC HC head cleaner is formulated to clean tape heads, tape guides, and capstans without leaving a film or damaging head integrity.

Since pinch rollers are made of special rubber compound, not metal, a different solvent is needed for cleaning them. Even a mild solvent like alcohol can cause drying and cracking of pinch rollers. TEAC RC rubber cleaner contains no alcohol. Its special solvents wipe off tape oxide, and other chemicals in RC actually rejuvenate the rubber. This increases its resiliency and enhances its ability to pull tape without slippage. HC and RC can be purchased with

swabs in a tape recorder cleaning kit (part #TRC).



TASCAM Cables

Cable, because of its inherent capacitance and resistance, is an active component in an audio system. There are vast differences in cable design and performance that have significant effect on the sound quality you'll get from your equipment. TASCAM Professional Audio Cables are the best available.

Our cables feature very low capacitance (under 15 picofarads/foot) so they don't act as low-pass filters and roll off high frequencies. The capacitance is also consistent; it doesn't change when the cable is bent or compressed. You don't get noise or degraded results when the cable has been used a while. Our cable's long-term stability is provided by a special insulator that is as flexible as foam core dielectrics, but far more resistant to extreme cold or heat, and it doesn't let the center strands migrate. It also avoids the possibility of shearing the center conductor when the cable is crushed, so that cable does not suddenly fail.

Rather than loosely braided shield or spiral wrapped shield that can open up, we use bare copper braided shield with 97 % coverage. This excludes electrostatic noise (buzz) and RFI (CB interference, etc.). We also use a 7-strand center conductor: 4 pure copper strands for minimum resistance and 3 copper weld stainless steel strands for strength. The multiple strands increase flexibility and strength while offering less resistance at ultra high frequencies due to increased surface area for the "skin effect." This improves transient response.

The outer PVC insulating jacket resists abrasion, and is tightly fitted to the shield so it will not elongate. The connectors are special, too. Their nickel-plated brass center pins are a bit longer than most to establish good contact in all RCA jacks. The cadmium-plated steel outer shell includes a gentle ridge which burnishes the mating jack when the connector is twisted to ensure good contact. For maximum RF shielding, the braid is terminated inside the shell and 2-radian soldered, not just spot soldered, for maximum strength. The plugs are clad with an oval jacket of molded plastic to further increase strength and make the ends easier to handle. TASCAM cable is available in lengths from 6 inches to 20 feet, or in color-coded sets of 8 for fast channel or function identification. TASCAM cable is also available in 500 foot spools.

If TASCAM professional cables are not available in your area, please try to find the next best cables. It really does make a difference in system performance.

Specifications

MECHANICAL CHARACTERISTICS

Tape	Compact Cassette, 70 μs, Hi-bias (Type II) Tape
Track Format	4-track, 4-channel
Head Configuration	2 heads (erase and record/reproduce)
Motor	1 servo motor
Tape Speed[1)]	4.8 cm/s (1-7/8 ips) ± 1 %
Pitch Control	±15 %
Fast Winding Time	Approx. 100 seconds for C-60
Wow and Flutter[1)]	0.05 % (NAB weighted) ±0.1 % peak (DIN/IEC/ANSI weighted)
Dimensions (WxHxD)	410x68x299 mm (16.1"x2.7"x11.8")
Weight (net)	3.5 kg (7.7 lbs) (without batteries)

ELECTRICAL CHARACTERISTICS

MIXER SECTION

Mic/Line Input (x6)	
Source Impedance	10 kohms or less
Input Impedance	50 kohms
Nominal Input Level	Mic, -50 dBV (1.26 mV), Trim Max. Line, -10 dBV (0.3 V), Trim Min.
Minimum Input Level	-60 dBV (1 mV), Trim Max. Channel Fader Max.
Maximum Input Level	+6 dBV (2.0 V), Trim Min.
Insert (x2)	
— Send (tip)	
Output Impedance	100 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 kohms
Nominal Output Level	-10 dBV (0.3 V)
— Receive (ring)	
Input Impedance	50 kohms
Nominal Input Level	-10 dBV (0.3 V)
Effect Return (x2)	
Input Impedance	5 kohms (L/MONO), 10 kohms (L, R)
Nominal Input Level	-10 dBV (0.3 V)
Line Output (x2)/Effect Output (x1)	
Output Impedance	100 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 kohms
Nominal Output Level	-10 dBV (0.3 V)
Tape Cue Out (x1)	
Output Impedance	150 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 kohms
Nominal Output Level	-10 dBV (0.3 V)
Headphone Output (Stereo x1)	
Nominal Output Impedance	8 ohms
Maximum Output Level	100 mW + 100 mW (8 ohms)
Equalizer	
Type	Shelving
Frequencies	LOW: 100 Hz HIGH: 10 KHz
Boost/Cut Range	±10 dB

RECORDER SECTION

Record Channel	4
Playback Channel	4
Noise Reduction	dbx* Type II NR (all tracks)
Tape Out (x4)	
Output Impedance	150 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 kohms
Nominal Output Level	-10 dBV (0.3 V)
Sync Input (x1)	
Input Impedance	10 kohms
Nominal Input Level	-10 dBV (0.3 V)
Sync Output	
Output Impedance	100 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 kohms
Nominal Output Level	-10 dBV (0.3 V)
Power Requirement	
Batteries	SUM-2, "C" size, R14 or equivalent x10, 11V-15V DC 450 mA Max.
AC Adaptor (supplied PS-P2)	
USA/CANADA	120 V AC 60 Hz, 11 W
GENERAL EXPORT	120/220 V AC 50/60 Hz, 12 VA.
EUROPE	220 V AC 50 Hz, 12 VA.
U.K./AUSTRALIA	240 V AC 50 Hz, 12 VA.

PERFORMANCE CHARACTERISTICS

Frequency Response[2]	40 Hz to 12.5 kHz, ±3 dB (dbx OUT)
Signal-to-Noise Ratio[2] (Referenced to 3 % THD)	85 dB (IHF "A" WTD) (dbx IN)
Total Harmonic Distortion (THD)	1.0 % (1 kHz, 0 VU, dbx IN)
Channel Separation	55 dB (1 kHz, 0 VU, dbx IN)
Erasure	70 dB (1 kHz)
Battery Life (Alkaline)	More than 8 hours, continuous 2 channel recording, with dbx, nominal input level, headphone output 10 mW + 10 mW

SUPPLIED ACCESSORIES

AC adaptor PS-P2
Shoulder strap

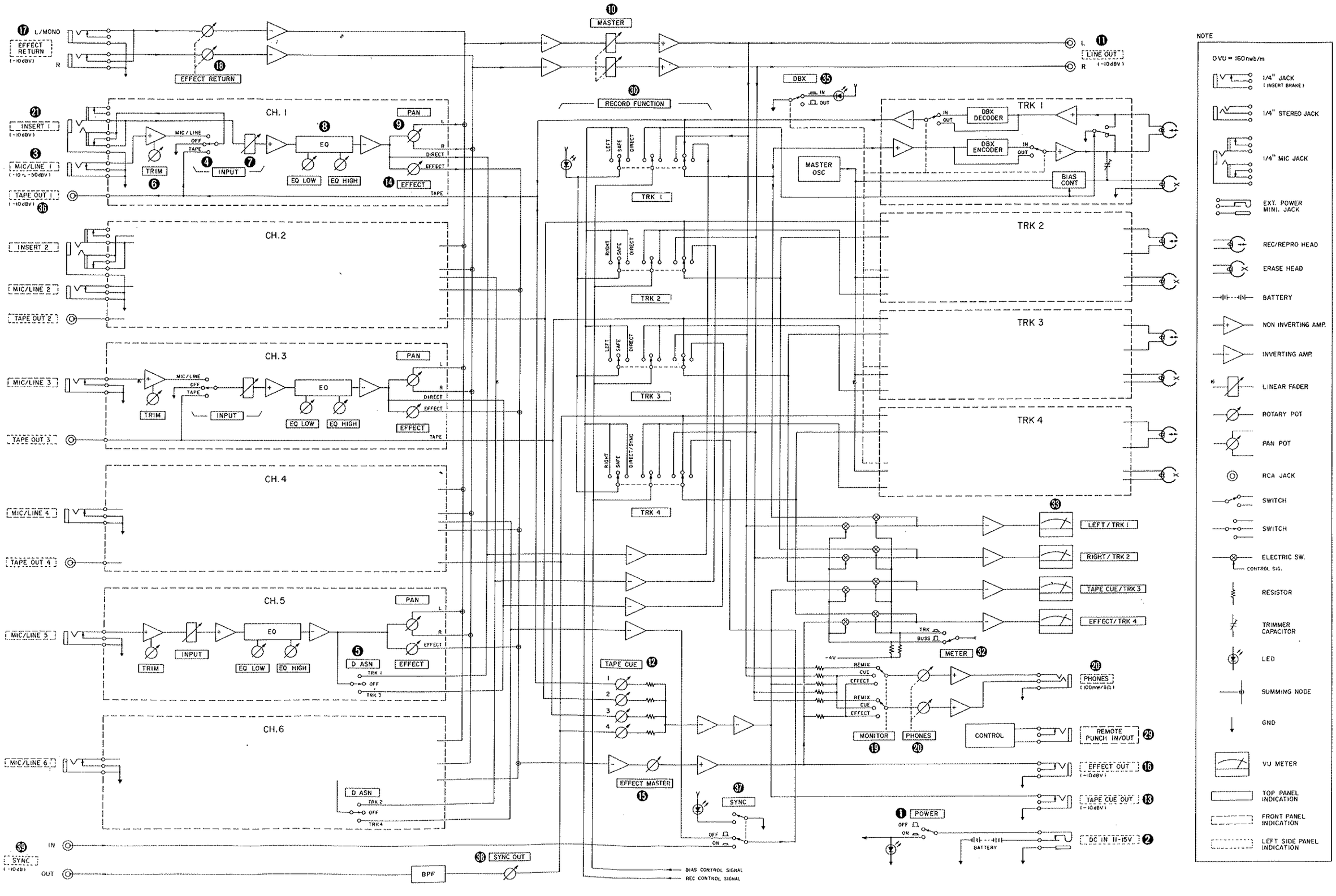
In these specifications, 0 dBV is referenced to 1.0 Volt. Actual voltage levels are also given in parenthesis (0.316 V for -10 dBV is rounded of and given as 0.3 V). To calculate the 0 dB = 0.775 Volt reference level (i.e., 0 dBm in a 600-ohm circuit), add 2.2 dB to the listed dB value; i.e., -10 dB re: 1 V = -7.8 dB re: 0.775 V.

1) Specifications were determined using TEAC Test Tape MTT-111N.
2) Specifications were determined using TEAC Test Tape MTT-5561 (blank tape).

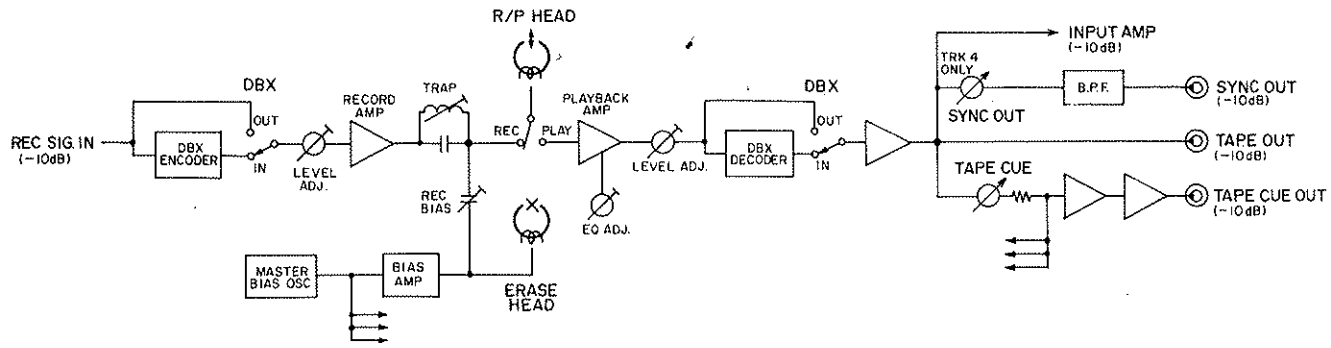
Changes in specifications and features may be made without notice or obligation.

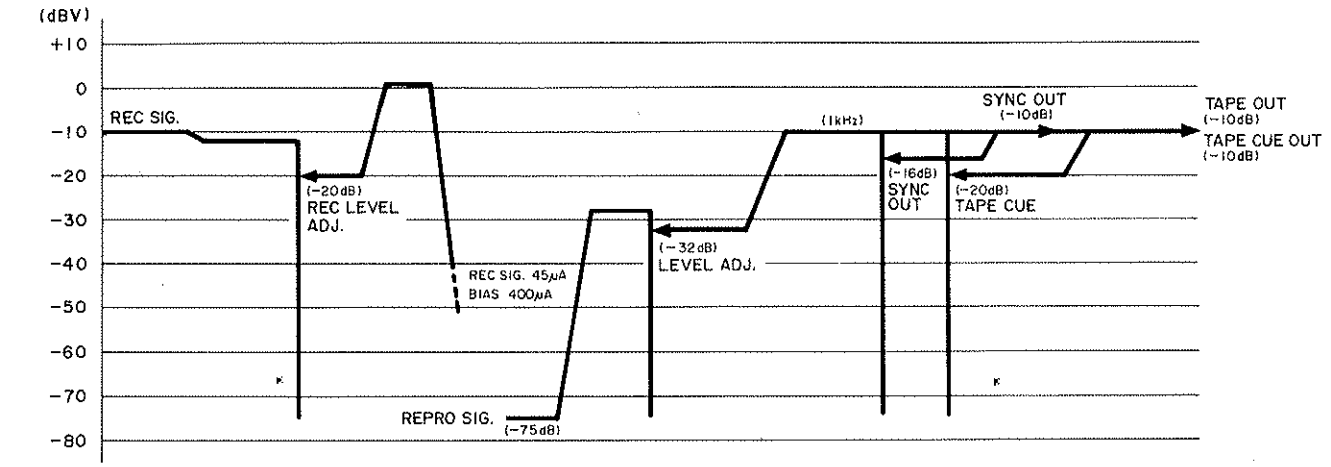
*dbx is a registered trademark of dbx Incorporated.

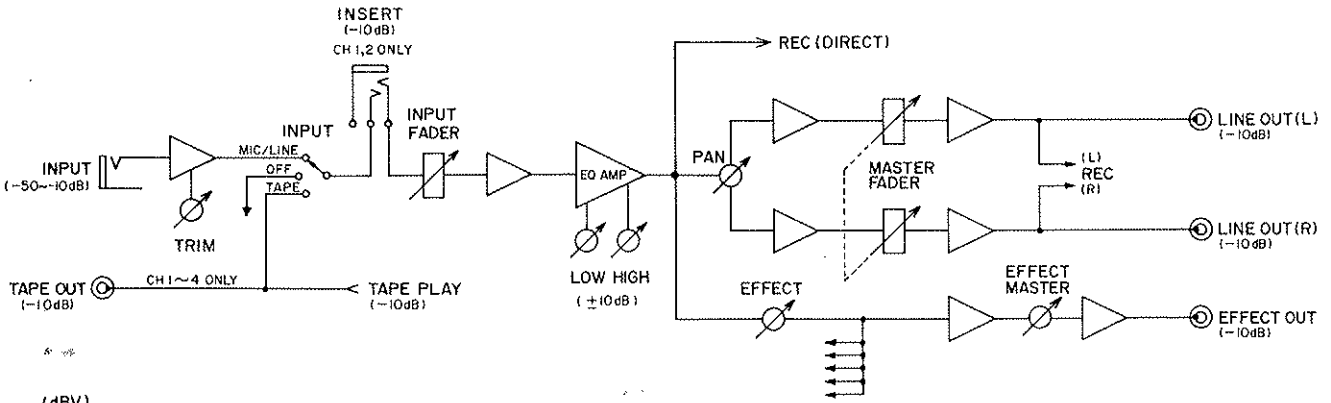
Block Diagram

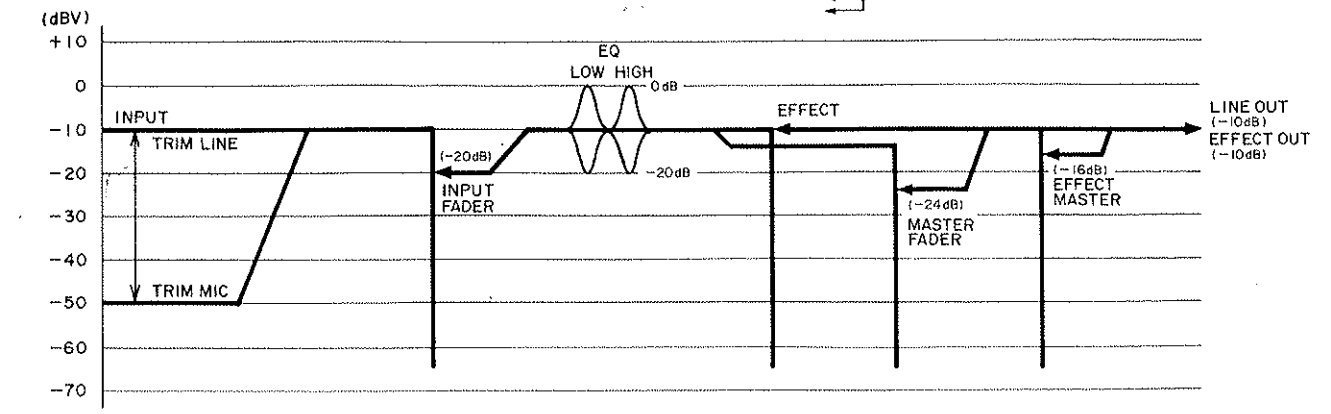


Level Diagrams









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