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TEAC Professional Division
PORTA ONE

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TASCAM
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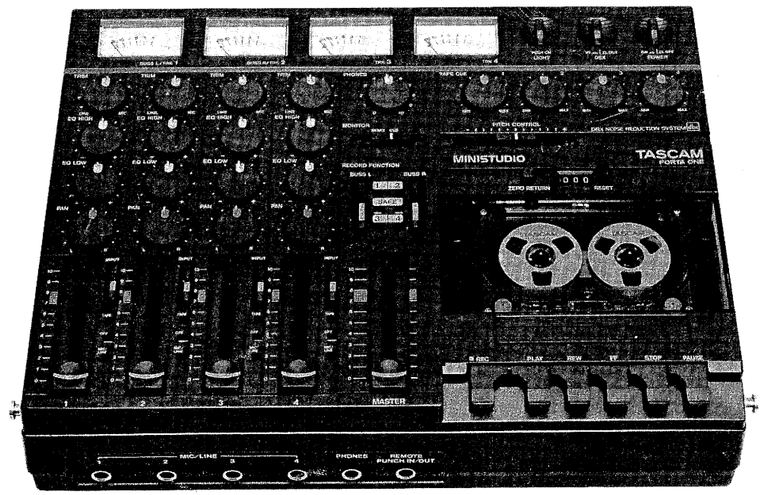
MINISTUDIO PORTA ONE



OWNER'S MANUAL

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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 ONE *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.

TABLE OF CONTENTS

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

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

This apparatus 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_____

CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	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 of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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 ONE is the result of years of design and manufacturing experience in the multi-track recording field. TASCAM, the professional division of TEAC Corporation, has been producing professional production equipment for over a decade. TEAC has been building electronic equipment for over three decades. We are responsible for bringing the field of multi-track recording out of the realm of mystery and high prices and into the real world, making quality and professional features affordable! In 1980, TASCAM introduced the 144 PORTASTUDIO; a 4-track recording studio, in a single package, which literally put a small studio into the hands of thousands of musicians, producers, and composers. In 1982, TASCAM introduced the 244, an advanced version of the original design, which offered even more convenience and flexibility. Now TASCAM is proud to introduce the MINISTUDIO PORTA ONE, a smaller, more portable basic 4-track recording studio. The PORTA ONE can be easily carried in one hand, making it an extremely valuable and flexible tool for anyone involved in multi-track production; music, multi-image, interviews, a general purpose electronic notebook. The PORTA ONE can also be patched into existing hi-fi and studio systems, further expanding its possible use.

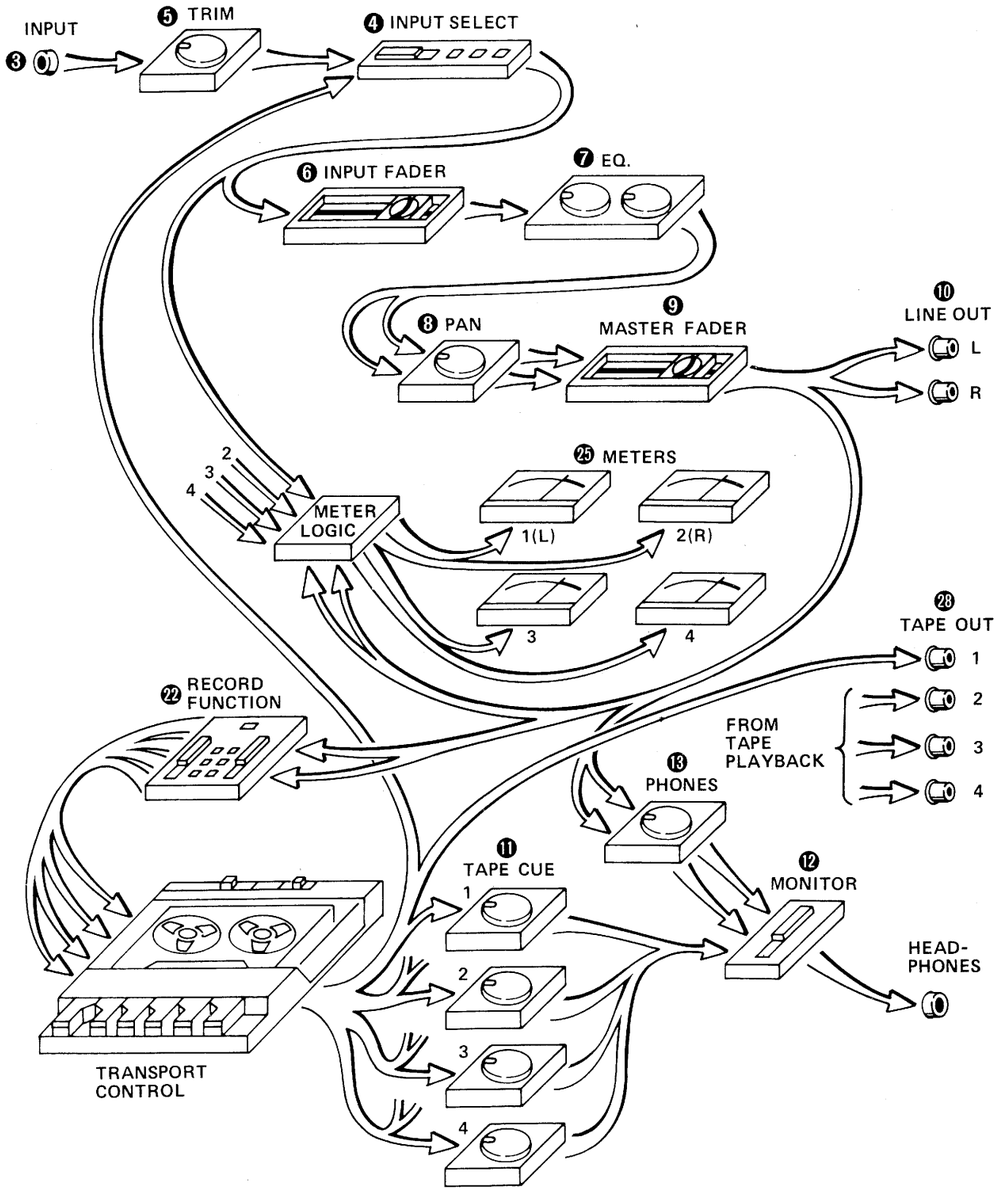
The PORTA ONE comprises two major sections: The RECORDER section and the MIXER section. Since the RECORDER section is more straightforward, we will cover it first.

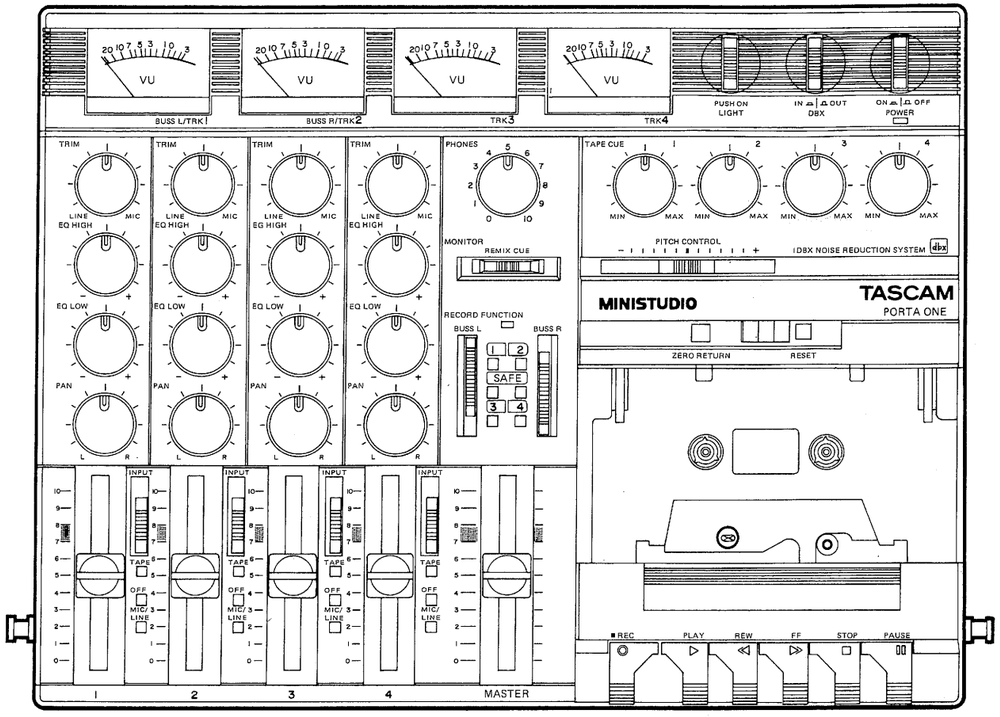
THE RECORDER SECTION

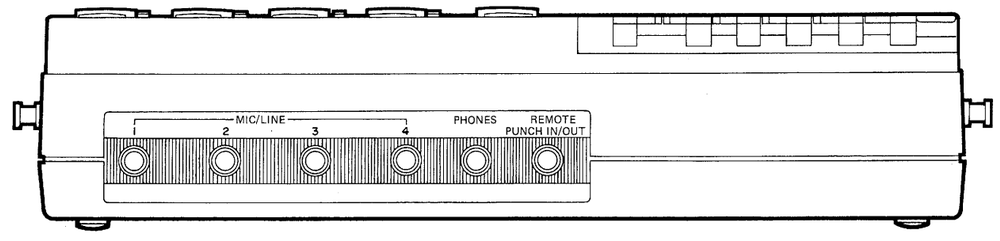
The PORTA ONE is basically a mixer and a multi-track recorder which are internally connected. Like its larger relatives, the PORTA ONE can perform all the basic multi-track functions; multi-track recording, Simul-sync recording/overdubbing, ping-ponging and remixing. The PORTA ONE has many convenience features found on reel-to-reel recorders plus a number of others to make it simple and easy to operate.

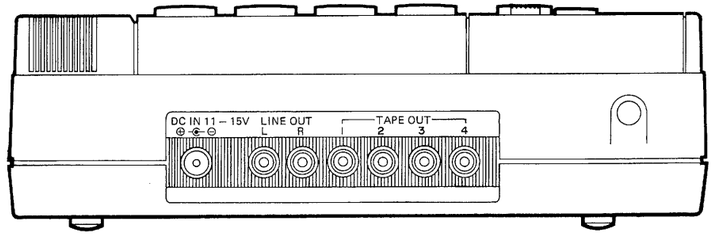
The PORTA ONE has single button record capability. There's no need to hit two buttons at once, just press RECord. This reduces the risk of "losing" a good track by mispunching the control keys.

FUNCTIONAL SEQUENCE PICTOGRAM









When the recorder is in PLAY, the FAST FORWARD (FF) and REWIND (REW) keys can be used to CUE and REVIEW previously recorded material. This ability eases the task of making creative mixing decisions, as the desired material can be audibly located at high speed.

The PITCH CONTROL on the PORTA ONE allows the tape speed to be increased or decreased by 15 % when recording or playing back. This allows you to match pitch with new material or for creating special effects.

Remote Punch-ins and Punch-outs can be easily done by using the optional RC-30P remote foot switch. When overdubbing all or just portions of a track, this feature provides you with an "extra" hand.

The track record/status selectors provide simple, effective control over the signal to be recorded. The selectors visually indicate the status of the tracks: SAFE — no signal can be recorded; Record Ready — record track(s) have been selected; Record — recording is in progress.

Using the PAN control and the RECORD FUNCTION switches, any input or combination of inputs can be routed to any single track or to selected track pairs (1&2, 3&2, 1&4, 3&4). This provides the user with the ability to record mono, stereo or multiple inputs discretely and simultaneously.

The ZERO RETURN and RESET buttons provide the capability to "mark" a specific tape position, by pressing the RESET, then the ZERO RETURN at the start of a session. The tape will return to the selected point each time you rewind. This system simplifies the remixing and overdubbing processes by identifying a specific starting point, thus reducing the time spent searching for "the right spot".

Since the PORTA ONE has built-in dbx* noise reduction, undesired tape noise is virtually eliminated. This circuitry is switchable, allowing the PORTA ONE to play non-encoded tapes from other machines.

Now that we've seen the recorder section, let's turn our attention to the MIXER and see how the signal gets to and from the recorder.

*dbx is a trademark of dbx Incorporated. dbx noise reduction system manufactured under license from dbx Incorporated.

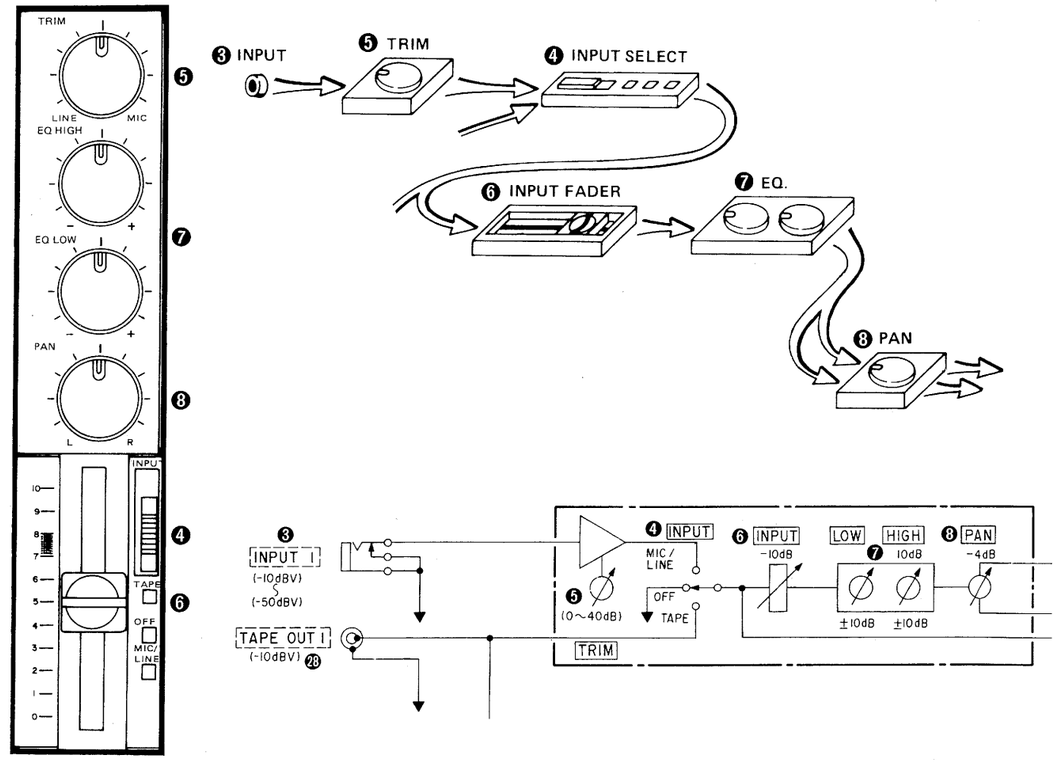
THE MIXER SECTION

The value and usefulness of any mixer can be determined by its flexibility. The more flexible, the greater its value to you. This flexibility, however, can make the mixer hard to understand at first. With a little study and practice, you will find the PORTA ONE's mixer very understandable and easy to use. It is important to realize the PORTA ONE's mixer is comprised of three submix systems. The three systems are designed to perform specific functions and yet still retain the flexibility needed to make the PORTA ONE adaptable to many different applications.

The submix systems are; the MAIN MIX, the MONITOR or CUE MIX, and the REMIX systems. Each performs the same basic job; it takes signals into its inputs, performs a function (processes them), and sends the resulting signals out through its outputs. These three illustrations will help you understand the three submix systems. The first is an illustration of the front panel controls. The second is a pictogram. It shows the controls laid out according to how they are wired (their FUNCTIONAL sequence). Notice the functional sequence is NOT the same as how the controls are laid out on the front panel. The third, a simplified electrical sequence illustration called a BLOCK DIAGRAM, is the same thing as illustrated by the pictogram except it has a little more detail and it uses different symbols. Using the numbers on the illustrations, you can see how a control knob in the first drawing relates to a function in the second drawing, and to a symbol in the third. This will help you learn how to read a Block Diagram. This is a valuable skill which will help you get the most out of your PORTA ONE. Experienced engineers can operate a mixer by using the block diagram alone.

Each function is explained in the FEATURES AND CONTROLS section of this manual. Whenever possible, we will provide an example of when and why you would use a particular feature or control.

The MAIN MIX system is the most used of the three, and is capable of accepting a number of different types of signals, while processing them in a number of ways. It is the primary mixing system and is used to mix signal sources such

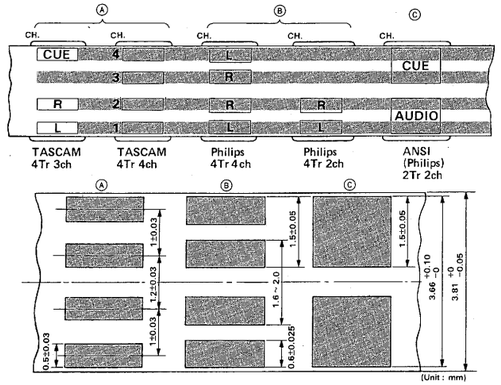


as mics or instruments and send the resulting mix to the recorder section or the other mix systems.

The CUE SUBMIX system takes its signal from the 4 tape tracks, when they are played back. They are combined with the L/R BUSS MASTER signals, then are summed to a mono output signal which is available at the headphone output jack. Cue mixes are used to allow the performers to hear previously recorded tracks and new material in time and in tune while recording. This technique is called OVERDUBBING.

The third mixing system, the REMIX system, takes its signal from the RECORDER section, through the MAIN MIX system, and out to the L & R LINE OUT jacks (L & R BUSS OUTPUTS). This allows the finished 4-track tape to be mixed down to a stereo signal for re-recording onto another tape machine, hence the name, REMIX. Another feature of this submix system is the ability to mix up to three previously recorded tracks down to one signal, which can be recorded onto the remaining fourth track. This technique, known as PING-PONGING or TRACK COLLAPSING, in effect gives you more than four tracks on which to record. In fact, the PORTA ONE is capable of recording and mixing up to ten sources without going past a second generation signal. More about this later.

1. TRACK FORMAT AND COMPATIBILITY
The track format of the PORTA ONE 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 ONE.



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

2. COMPATIBILITY WITH OTHER TASCAM MODELS
144, 122, 122B, 133, 133B, 225 Tapes with Dolby B Noise Reduction will not reproduce satisfactorily.

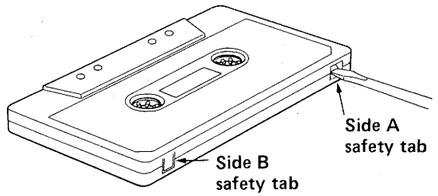
234, 244 Tapes are recorded at 3 3/4 ips (9.5 cm/sec). So, they are not compatible because of speed difference.

Here is a suggestion for overcoming tape compatibility problems.
If you need to playback tapes recorded with Dolby B NR.:
1. Set the dbx switch to off.
2. Turn EQ HIGH counterclockwise until the sound is acceptable.

If you need to playback Normal Bias (120 μs) tapes:
Turn EQ HIGH clockwise until the sound is acceptable.
Using these methods should produce playback quality satisfactory for reviewing your tapes.

3. THE PORTA ONE RECORDS AND PLAYS IN ONLY ONE DIRECTION USING THE ENTIRE WIDTH OF THE TAPE.
Therefore, never turn over the tape — always use only "one side". Otherwise, you will erase your previous work.

4. 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 ONE "upside down" and erase the tracks of your master.



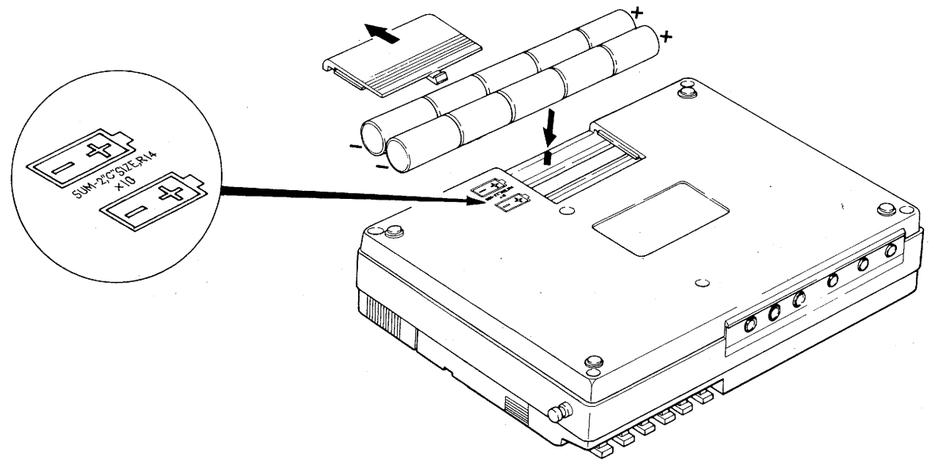
5. THE USE OF C-120 CASSETTES IS NOT RECOMMENDED
The extremely thin tape used in C-120 cassettes can lead to winding troubles, crimping, wrinkling and other damage to the oxide coating which will destroy your work.

6. USE THE SHORTEST POSSIBLE TAPE FOR A GIVEN JOB
It is not unusual to play a tape numerous times before you achieve the most satisfactory result, so select a cassette length that is as close as possible to the length of the program you plan on recording. The shorter cassettes use thicker and more durable tape. Besides, a short recording on a long cassette will force you to waste the unused portion of the tape if you choose to protect your master by removing the safety tabs. Shortest is best! Remember that the normal speed and the "one side only" 4 track, one-way format mean 1/2 of "regular" recording/playing time, i.e. a C-90 cassette will play for 45 minutes.

7. THE PORTA ONE 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 TEAC CRC (U.S.A. only), hdx, COBALT (except U.S.A.);TDK SA X; MAXELL UD XL IIS or equivalent formulations.

LOADING THE BATTERIES

To install or remove the batteries turn the PORTA ONE up-side down on a soft surface (a chair cushion). When installing new batteries be sure that their polarity is correct. Only use Carbon or Alkaline SUM-2 ("C" Size) batteries. When the PORTA ONE is being used on battery power the POWER LED will blink when the batteries need to be replaced.



CAUTION

If you intend to use the PORTA ONE with an external power supply, we strongly urge that you acquire the TASCAM Model PS-P1 AC Adapter. The PS-P1 is designed to provide a convenient connection and polarity to the PORTA ONE.

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 ONE and *such damage would not be covered by the limited warranty on the product.*

When using the PORTA ONE with internally placed batteries (only carbon or alkaline types should 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.

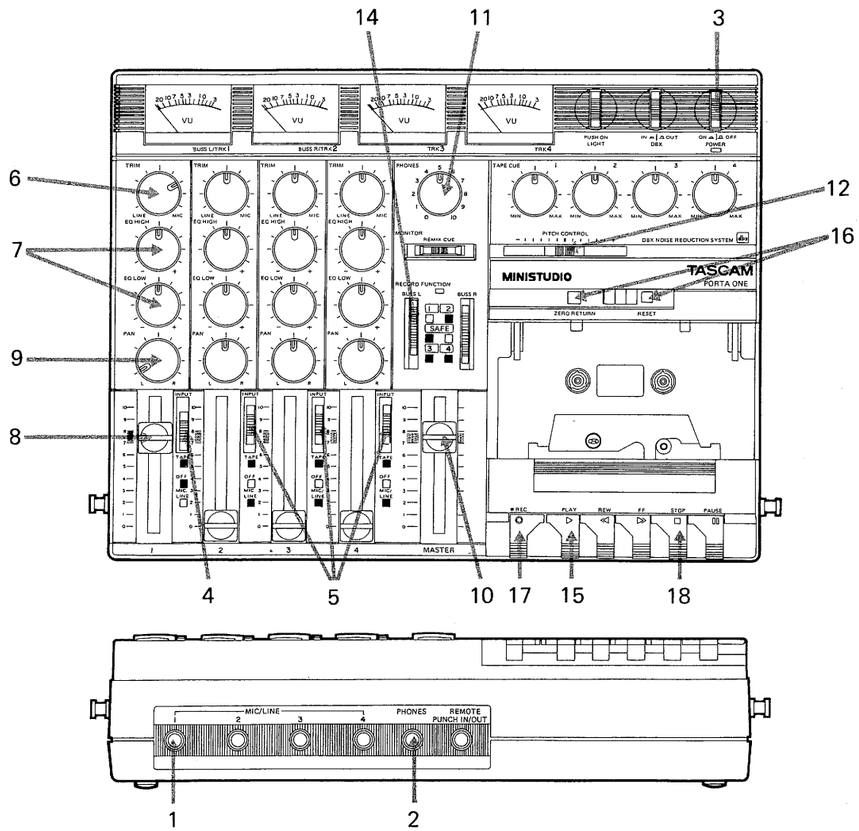
3 — Do not use old batteries together with new ones. When necessary, change both batteries at the same time with a new set.

4 — If the PORTA ONE is to be powered from an AC line over a lengthy period (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 ONE 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 ONE on and depress the dbx switch.
4. Set the channel 1 INPUT select switch to the MIC/LINE position.
5. Set the other three channel INPUT select switches 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 channel 1 PAN control to the full LEFT position, fully counterclockwise.
10. Set the MASTER fader to about 7 or 8, the shaded area.
11. Put the headphones on and, while speaking into the mic, adjust the PHONES level control to a comfortable listening level.
12. Set the PITCH CONTROL to the center detented 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. For a more detailed instruction on setting the proper level, see page 20.



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 BUSS L RECORD FUNCTION switch to track 3 and BUSS R switch to SAFE.
2. Turn the channel PAN control all the way to the left.

For recording on track 4, the method is reversed;

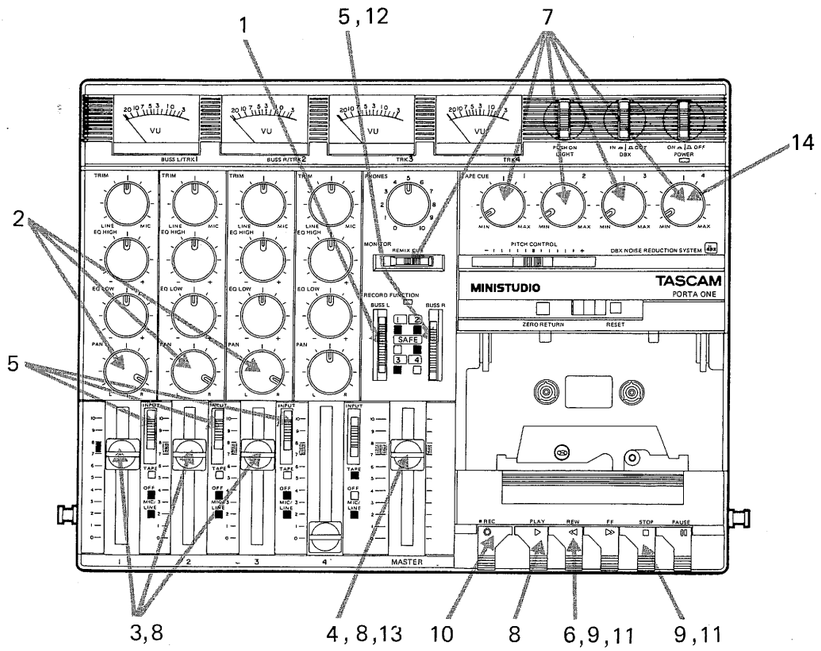
1. Set the BUSS R RECORD FUNCTION switch to track 4 and the BUSS L switch to SAFE.
2. Turn the channel PAN control all the way to the right.

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 ONE 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 BUSS R RECORD FUNCTION switch to track 4 and the BUSS L switch to SAFE. The RECORD FUNCTION LED will begin blinking.
2. Set the PAN controls all the way to the right (fully clockwise).



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14. Set the BUSS L (a buss is a circuit) RECORD FUNCTION switch to the TRACK 1 position. The RECORD FUNCTION LED (Light Emitting Diode) will begin to flash. Set the BUSS R RECORD FUNCTION switch to the SAFE position.

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

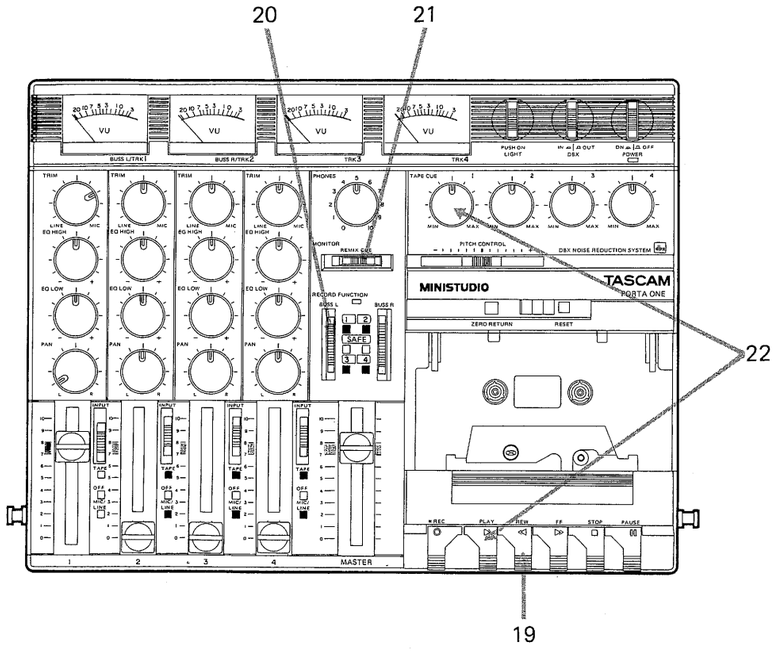
19. Press the REWind key. The tape will rewind to 000 and stop, since the ZERO RETURN button is in the down (on) position.

20. Set the BUSS L RECORD FUNCTION switch to SAFE. The LED will turn off.

21. Set the MONITOR select switch to the CUE position.

22. 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.



Recording the Second Track (Overdubbing)

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

1. Set the BUSS R RECORD FUNCTION switch to the track 2 position. The RECORD FUNCTION LED will begin to blink.

2. Turn the channel 1 PAN control all the way to the right (clockwise).

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.

4. Rewind the tape.

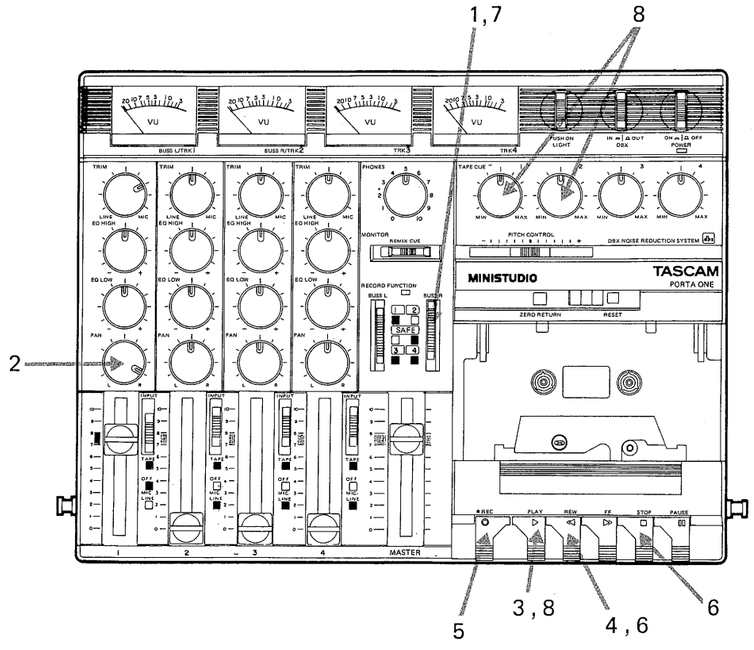
5. Press RECord. The RECORD FUNCTION LED will stay on. The second track is now being recorded. Since track 1 can be heard through the headphones along with the new signal, the second track can be recorded "in sync" with the first.

    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 BUSS R 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.



3. Set the channel faders to 7.

4. Set the MASTER fader to 7.

5. 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.

6. Rewind the tape to 000.

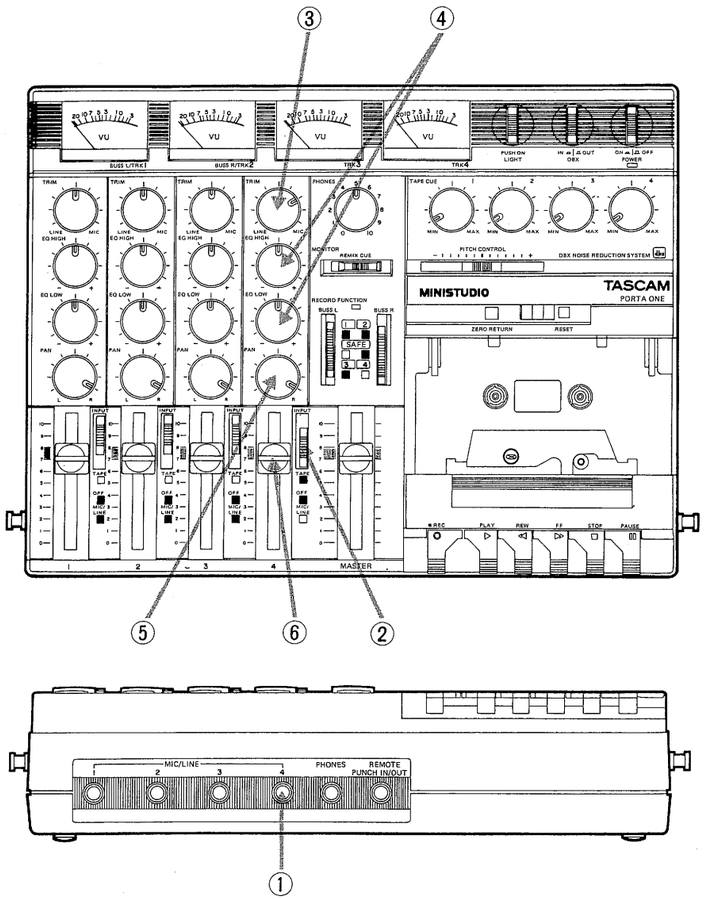
7. Set the MONITOR switch to the CUE position, turn the TAPE CUE controls all the way down.

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 2 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 BUSS R RECORD FUNCTION switch to SAFE. The LED will stop blinking.

13. Set the MASTER fader to zero (off).

14. 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 ONE 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 channel 4 and following the steps below:

① **After Step 3 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.

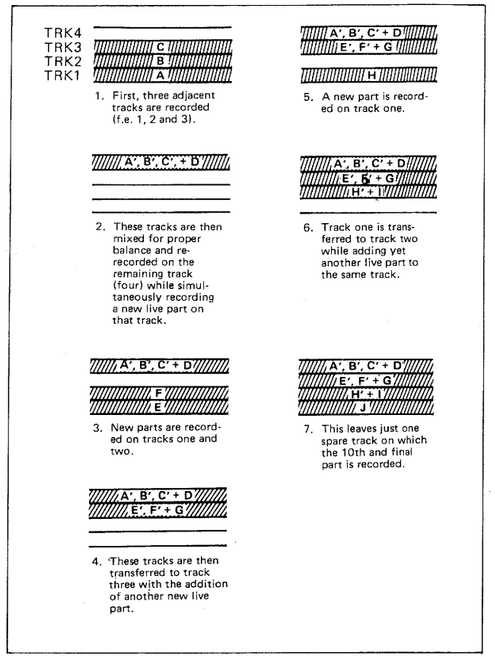
④ Set the EQualizers to 12 o'clock.

⑤ Set the PAN fully right.

⑥ Set the channel 4 fader to 7.

Now, continue on with Steps 1, 4, 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 – 14. 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 four 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. If you add a live source during each collapse, you can record up to 10 tracks of material on the PORTA ONE 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.



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 ONE to the line inputs of the mastering deck.

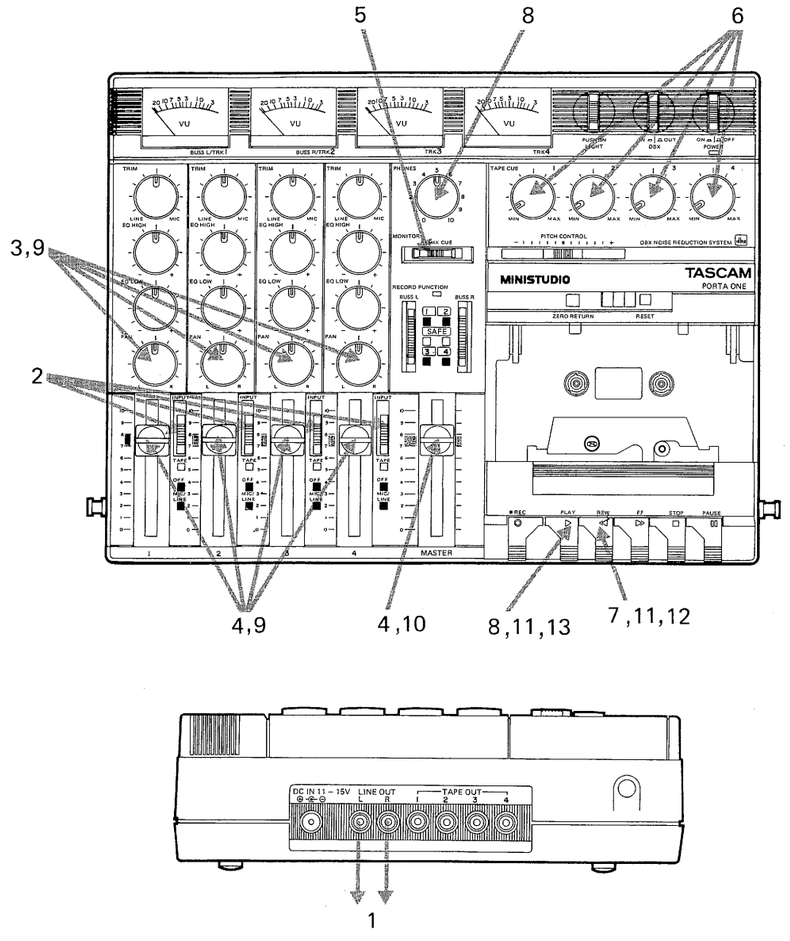
2. Set the channel INPUT select switches of all four inputs to TAPE.

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.



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.

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 ONE. 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.

NOTE: During recording or remixing, the signals can be monitored, or heard, two ways:

1. through headphones, which we have discussed previously, and

2. through monitor speakers.

This latter approach requires some care and common sense, as using speakers when an open microphone is used as a signal input can, and usually does, cause feedback or howling.

In order to use your PORTA ONE with speakers, you will need an external stereo amplifier. Plug a dual RCA plug cable into the LINE OUT jacks (L and R). Connect each to the corresponding tape or Aux Inputs on the amplifier. Set its volume to 0 *before* you connect the PORTA ONE to it. When you are ready to monitor, make sure you turn the PORTA ONE on *before* turning on the amplifier. When finished, turn the amplifier off *before* turning off the PORTA ONE.

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 ONE 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 channel 2, 3 and 4 to OFF.

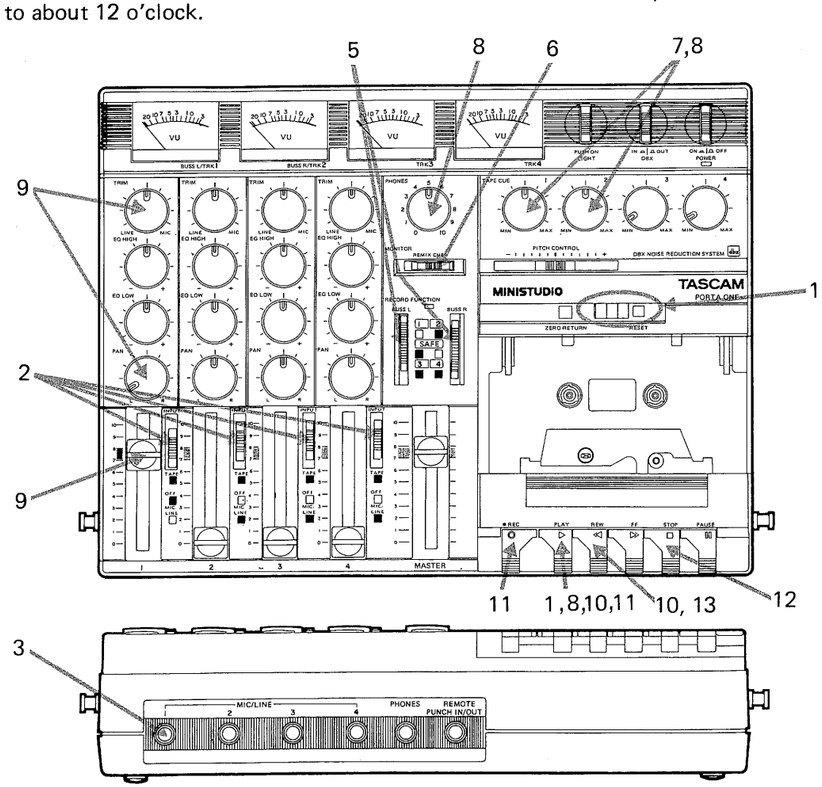
3. Plug the mic into channel 1.

4. Set the channel controls just as before.

5. Set the RECORD FUNCTION switches. The BUSS L switch to track 1, the BUSS R 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. Set the PAN control all the way to the left. Balance the new signal with the recorded one.

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.

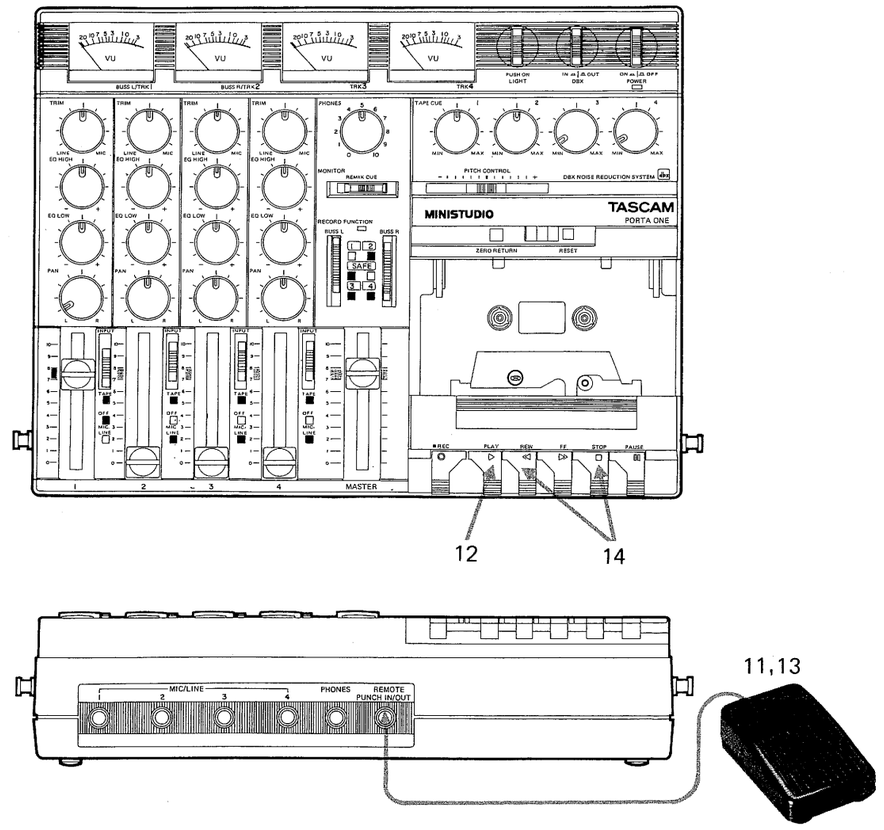
The PORTA ONE can also perform the Punch-In process another way. On the front of the unit you will find a 1/4" phone jack marked REMOTE PUNCH IN/OUT. By using the optional remote foot switch, model RC-30P, the process can be accomplished without having to manually press the RECord and STOP keys. This 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 ONE.

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 ONE is recording. Make the necessary corrections to the track, then;

13. Press the foot switch again. This takes the PORTA ONE 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.

Getting Satisfactory Recording Quality

There are a number of things that can cause a recording to have low quality. One of the most important things needed to get high quality is to use the best quality tape available. A poor tape will not allow the PORTA ONE to deliver optimum performance. Also, damaged tape can cause poor recording quality. If the tape is wrinkled or creased, if the edges are scalloped or if the tape is stretched, it will not deliver quality performance. If your tape is damaged, it is important to replace it. In addition to causing poor performance, a damaged tape may cause physical damage to the recorder. This type of damage can be very expensive to repair.

Another common source of poor recording performance can come from the PORTA ONE needing routine maintenance. Be sure the heads and guides have been cleaned and demagnetized. Symptoms of needing cleaning can be a "muddy" sound and/or a loss of highs. Also, if your recorder needs demagnetizing, it may exhibit a loss of highs and may produce a crackling sound during playback. These crackling sounds may have been recorded. Perform routine cleaning and demagnetizing to avoid having these problems. Refer to Section "Care and Maintanance" for information on how to clean and demagnetize the PORTA ONE.

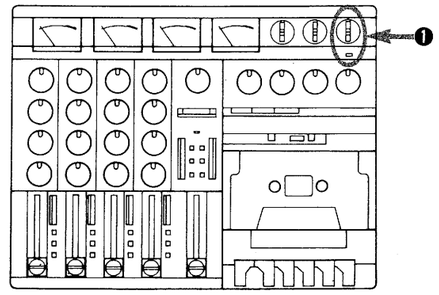
Recording at the proper levels is important. Setting proper levels is discussed in Section "Recording the Frist Track". If your levels are recorded too low, turning up the playback volume to compensate may result in a noisy sound. If your record levels are too high, you may overload or saturate the tape. Tape saturation often presents itself in the form of fuzzy or unnatural sounding high-frequency information, such as cymbals, synthesizers, or "S" sounds in speech or singing.

We have to give you another caution regarding ping-pong recording. When you transfer signals to an adjacent track, set the playback faders to the shaded area. Set the Master Fader below the shaded area. Set the playback EQ controls to the 12 o'clock position. If you feel you need to change the EQ on a track, it's best, during ping-pong recording, to get the result you want by reducing the high or low EQ setting on the other tracks. For more information on EQ, see page 29. Using this approach will reduce feedback (oscillation) during ping-pong recording.

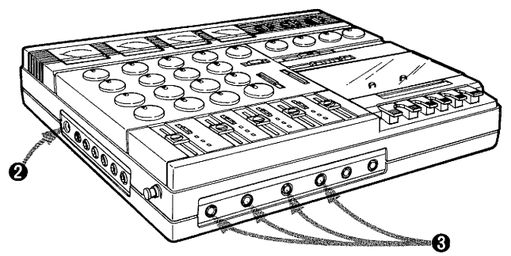
Certain instruments can fool you while you are reading the VU meters. Instruments with percussive attacks, for example, require less meter deflection to avoid tape saturation. Because the meter takes a little time to start moving, a sharp attack can come and go before the needle has a chance to move very far. It ends up indicating only a fraction of the actual signal. Under conditions like this, it is possible to saturate the tape while the meter appears to indicate an acceptable level. You can accommodate this by reading percussive instruments at a lower indicated level, such as -7 VU or -10 VU.

Finally, if these potential sources of poor quality recording have been tried and eliminated as the cause of the problem, your recorder may need to be aligned. Over time, head wear may cause record, bias, and playback levels to need adjustment, affecting the performance of your recorder. These adjustments are set internally and need to be done by qualified service technicians. You should take your recorder to an authorized TASCAM Service Station for alignment or repair.

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



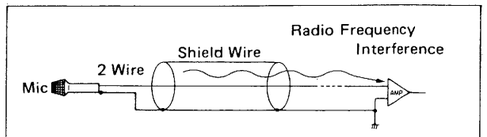
❷ EXTernal DC IN Jack
This (DC IN) jack is to connect the AC power adaptor. When using the PORTA ONE for extended periods, we recommend use of the PS-P1 (optional) AC adaptor instead of batteries.



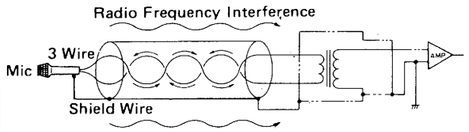
❸ MIC/LINE Input Connector
This 1/4" phone jack accepts unbalanced signals from any type of microphone having any impedance from 150 ohms to 10,000 ohms. You can also connect any magnetic instrument pickup, electric guitar or bass, or an electronic keyboard. There is usually no need for a "direct box" or transformer. However, some situations may require such a device.

This applies primarily to mics used with cable runs exceeding 3 m (10 feet). Sometimes, the low power signal mics (and some instrument pickups) generate must be protected and isolated from other low power signals in the real world. Radio, power line hum, buzz, crackles and switching noise when motors start up (do you have an air conditioner on your AC line or maybe an old fridge?) — all these unwanted signals must be kept out of the very high gain amplifiers that are needed to raise the mic signals to a working level. The balanced or 3-wire mic circuit and input isolation transformer become the only sure way to deal with these problems.

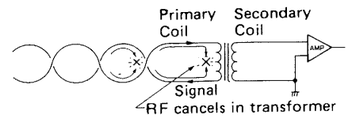
Here's how it works:



Any signal will pass to amplifier, no rejection.



Audio signals from mic have opposite polarity. Buzz, hum, and RFI have common polarity.

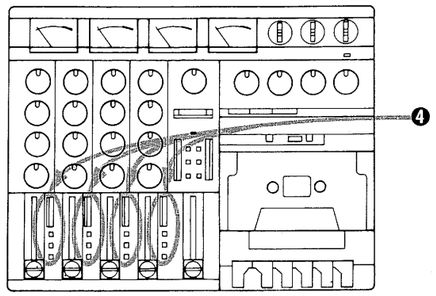


Signals with opposite polarity in the primary coil will generate current in the secondary coil. Signals with common polarity will cancel out in the primary coil and will not pass to the secondary coil. No signal in the secondary coil means no signal in the amplifier. You leave the "interference" behind and get only the mic signal.

❹ INPUT Select Switch
This switch has three positions.

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

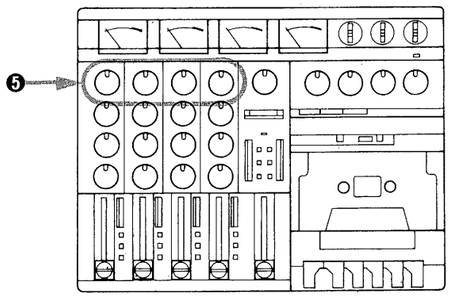
center-OFF: Acts as a "mute".
This "mute" can be useful in many ways. When used on MIC/LINE signals it will allow you to turn on a signal accurately without having to



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 to 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 RCA connector marked TAPE OUT.

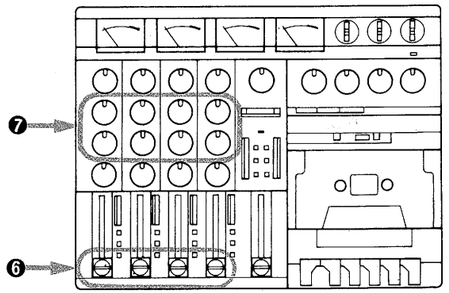
❺ TRIM



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.

❻ Input Fader

This linear, or slide, fader varies the amount of signal going from the input channel to the Left and Right (L/R) Program (PGM) 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).



❼ EQualizer

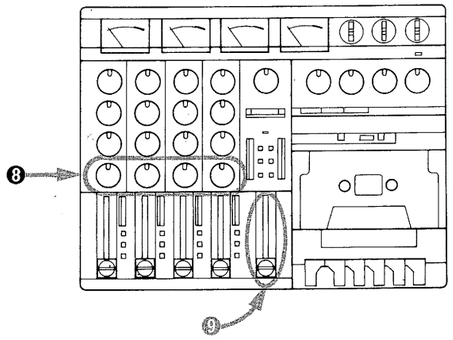
The equalizer or EQ is the circuitry that allows you to adjust the tonality of the signal going through the input channel. It is a two-knob type, with the upper knob allowing a boost or cut of 10 dB at 10 kHz for the high frequencies, and the lower knob allowing a boost or cut of 10 dB at 100 Hz for 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 to PORTA ONE's Equalizer on page 29.

❽ PAN

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

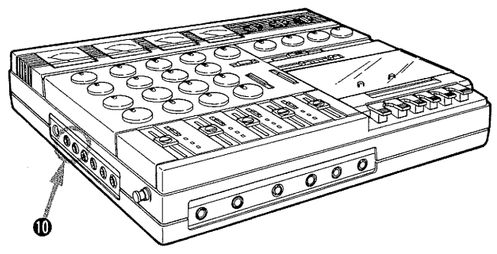


❾ MASTER (L/R) Fader

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

1. LINE OUT jacks Left and Right.
2. The BUSS L/TRK 1 and BUSS R/TRK 2 meters when the PORTA ONE is in the Record Ready or Record modes.
3. RECORD FUNCTION select switch.
4. MONITOR switch/PHONES level control.

❿ LINE OUT Jacks (L/R)

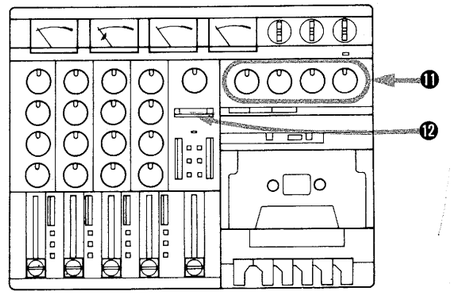


This pair of RCA jacks feed a line-level program mix (from the Left and Right PGM Busses) to a monitor amp or tape recorder. This is the same mix you hear in the headphones when the PORTA ONE's monitor select switch is in REMIX, except the LINE OUT level is controlled only by the L/R MASTER Fader and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

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

⓫ 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.



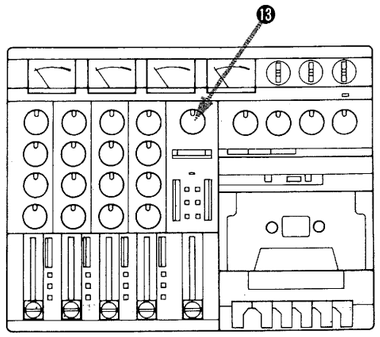
⓬ MONITOR (Headphones) Select Switch

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 PGM 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.

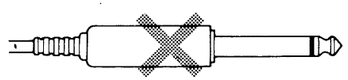
CUE – You will hear a Mono combination of the MASTER L/R signal plus the Tape Cue signals, one for each track. The TAPE CUE controls have signals available to them only after the track has been recorded. To hear them you must be in the CUE (mono) mode.

⓭ PHONES

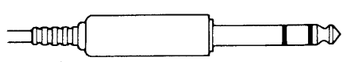


The PHONES control adjusts the overall level of your headphones, plugged into the front panel jack. Any change in the setting of the TRIM, Input Faders, MASTER Fader or the TAPE CUE controls will change the signal level in the phones.

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)

Your headphone connector must have 3 sections to be safe. While accidents do happen, and protection circuits have been built in, use of mono/2-wire headphones will eventually cause circuit failure (2 to 3 minutes). Using the 2-wire connector shorts out one of the amplifiers driving the headphones, which will cause it to burn out.

TRANSPORT SECTION

⓮ 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.

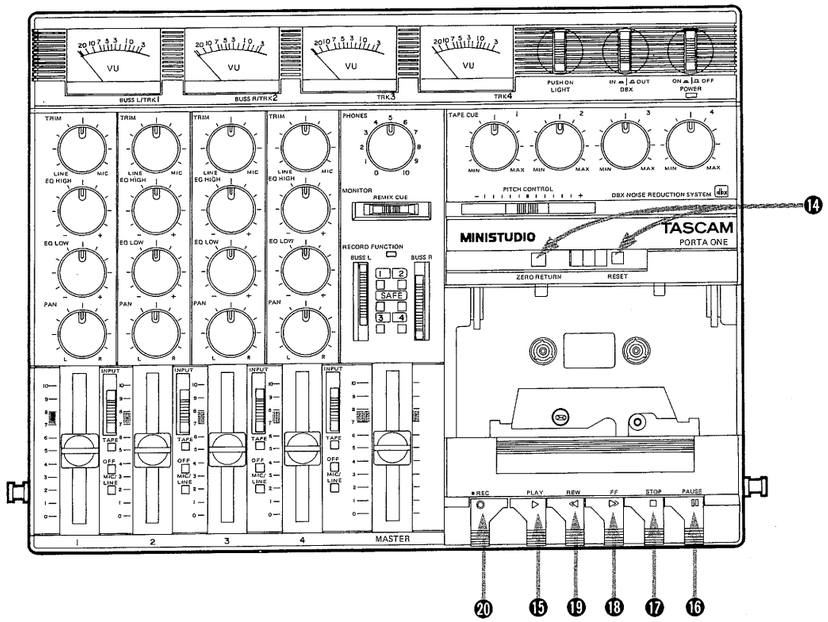
⓯ PLAY Button

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.

⓰ 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.



⓱ STOP Button

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

⓲ FF Button

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

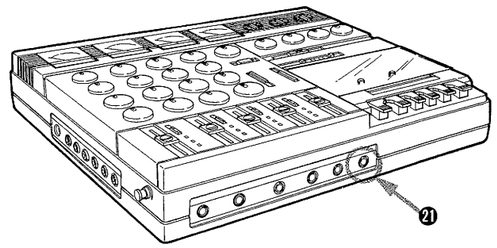
⓳ REW Button

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.

⓴ 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 ONE does not enter Record.

㉑ REMOTE PUNCH IN/OUT Jack



This 1/4" (6.3 mm) phone jack, on the front of the PORTA ONE, 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 con-

junction 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.

㉒ RECORD FUNCTION Switches

The PORTA ONE mixer has only two Output Busses. (Left and Right) which are internally connected to the RECORD FUNCTION switches. The Left switch assigns the L Buss to either Track 1 or Track 3 and Right switch, R Buss to either Tracks 2 or 4. Setting either of the RECORD FUNCTION switches to a track, makes the RECORD FUNCTION LED flash to indicate that the PORTA ONE is in "Record Ready" mode.

Switch Position	Buss L	Buss R	Indicator
UP	1	2	Red
Center	Safe	Safe	Green
Down	3	4	Red

㉓ RECORD FUNCTION LED

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

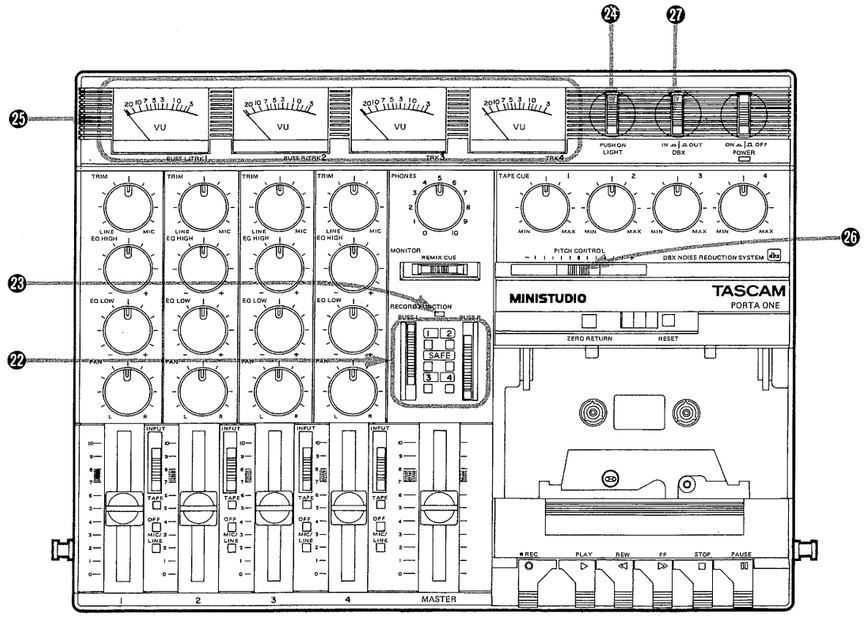
a). LED off: "Record Safe" mode – no recording can take place.

b). LED blinks: "Record Ready" mode – indicates that one or both busses have been assigned to a track. Whether the tape is stopped or in play, the PORTA ONE 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.

㉔ LIGHT Switch

When you use the PORTA ONE with batteries, the meters will not light. This is to save battery power. If necessary, you can light the meters by depressing the LIGHT switch button. When using the PS-P1 AC adaptor, the meters will light.



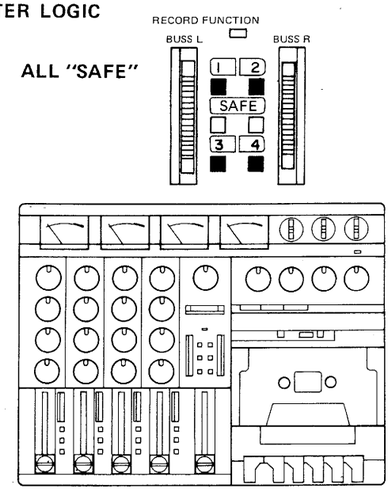
㉕ VU Meters and Switching Logic

The PORTA ONE has VU (Volume Unit) meters. They respond to the average signal level and do NOT show peak levels. Most percussive material, kick drum, latin percussion, such as castanets, generates high peak or transient signals, that can be much as 20 dB louder than the "average" signal level shown on the VU meter. Short-term peak distortion may be hard to detect. Use discretion and experiment with the final meter level. For example, castanets should be recorded with no more than -20 indication showing on the averaging VU meter. Even when the meter reads this low you can still get a good recording. Judge the recording by what you hear, the meters are only a guide.

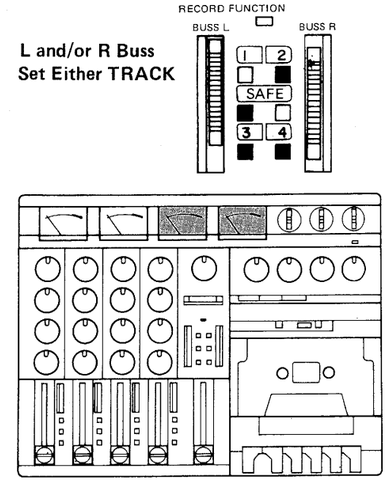
The first two meters have dual labels, BUSS L/TRK 1 – BUSS R/TRK 2 which show that they serve two functions. When the light switch is depressed (battery operation) or when operating with the PS-P1 AC adaptor the meter light switching and RECORD FUNCTION LED will help you see at a glance what mode you are in.

METER LOGIC

ALL "SAFE"



L and/or R Buss Set Either TRACK



	RECORD FUNCTION LED	METER LIGHTS		
		BUSS L/TRK 1 BUSS R/TRK 2	TRK 3 TRK 4	
SAFE	OFF	ON	ON	Meter reflects input level of source selected on each channel
READY	Blink	ON	OFF	BUSS L/TRK 1 – BUSS R/TRK 2 meters show level of signals assigned to the L and/or R Buss. TRK 3 and TRK 4 meters show no signals.
RECORD	ON	ON	OFF	

CAUTION: The position of RECORD FUNCTION switches does not affect the monitor logic for the L/R Buss signals. If signal is present on a buss you will hear it in the headphones when you use REMIX or CUE. This can cause a problem when you are recording one track at a time, if you are "panned" to the wrong side (R Buss assigned, but you are panned to L Buss) you will "hear" the signal in the headset, but the recorder won't have anything to record. Always check the meter for the Buss you plan to record on for a good indication of level before "punching in" and you will avoid disappointment.

㉖ PITCH CONTROL

Sliding this control allows you to adjust the speed of the PORTA ONE 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 at least a 3rd to a 5th. 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.

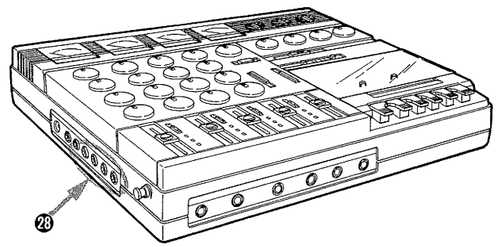
Also, it is recommended to make a run of several seconds in the play mode for the speed to stabilize, especially when the change in speed is large. Before beginning to record again, check the pitch carefully with a short playback, and you will have less trouble with drift.

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.

㉗ DBX NR Switch

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

㉘ TAPE OUT Jacks



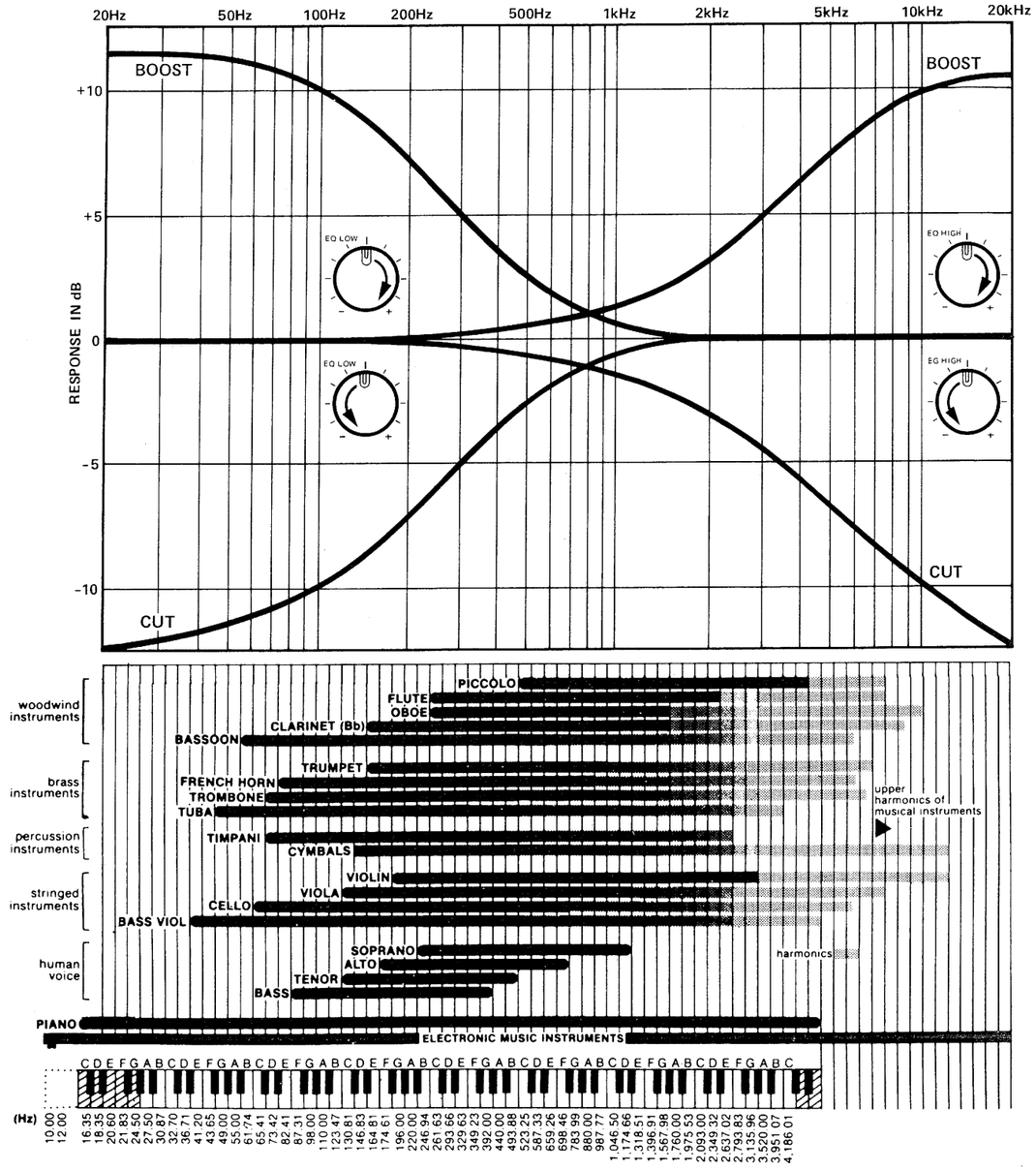
These RCA-type jacks provide output signals from each corresponding channel in playback. The TAPE CUE level control does not affect these jacks.

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.

How to Use the PORTA ONE's Equalizer

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 ONE 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 preceding page to see the relationship between the frequency range of various instruments, and the range of control of the PORTA ONE'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.

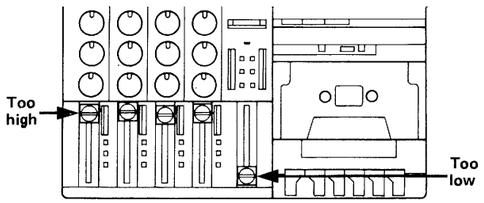
Likewise, if you want to accentuate or diminish the cymbals in a drum kit, you can do so using the 10 kHz control. Turn it up for more and down for less. This, too, will affect any other source (signal) that has frequency content in that range. Experience will show you that there is a limit to how much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

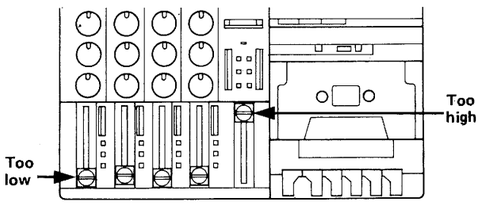
A Word of Mixing Advice

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.

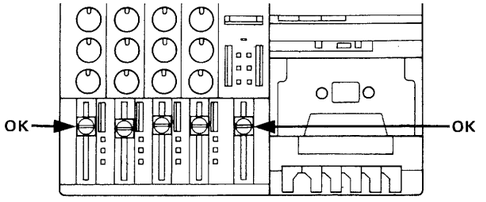
1. If your console faders always wind up like this, you are likely to be over-loading your outputs. Pull down the inputs and raise the master.



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.

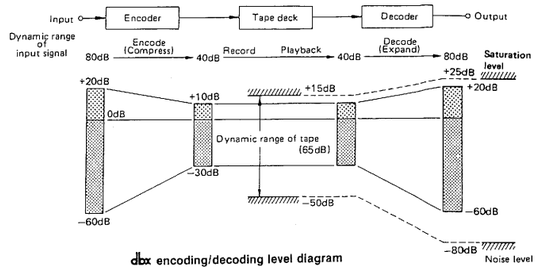
To achieve a large reduction in audible tape hiss, without danger of overload or high-frequency self-erasure on the tape, frequency pre-emphasis and de-emphasis are added to the signal and RMS level sensors.

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.

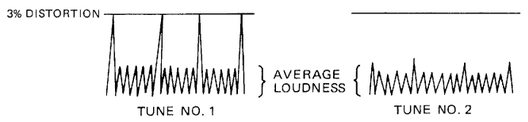
When DBX is added to a tape recording system, we have to give our "0" reference level a real electrical value. Any significant difference between the record and playback signal levels will produce decoding errors. The problem here is not electrical, it's human. An understanding of the system will help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



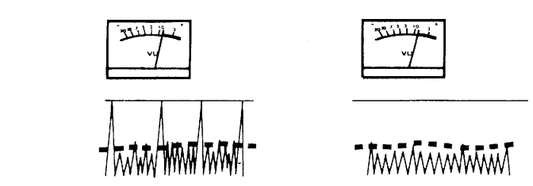
dbx encoding/decoding level diagram

The PORTA ONE 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.

Even though the head used in the PORTA ONE 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 ONE 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 ONE, 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.

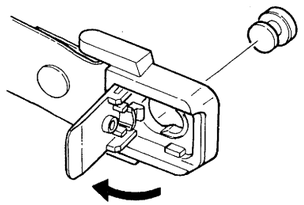
CAUTION: If the surface of the unit gets dirty, wipe the surface with a soft cloth or use a diluted neutral cleaning fluid. Clean off thoroughly. Do not use thinner, benzine, or alcohol, as they may damage the surface of the unit.

Accessories for the MINISTUDIO PORTA ONE

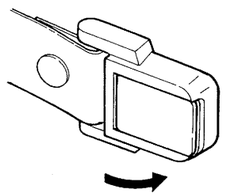
ATTACHING THE SHOULDER STRAP

The shoulder strap can be attached to the PORTA ONE 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 ONE.



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

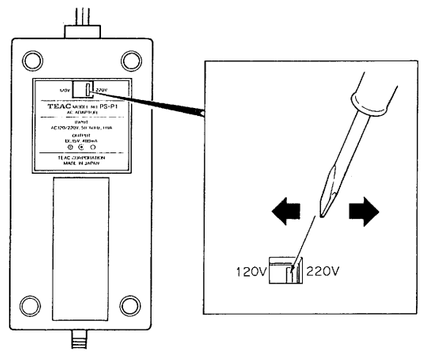
PS-P1 AC Adaptor

The PS-P1 AC adaptor is designed especially for the PORTA ONE.

When the PS-P1 is connected to the PORTA ONE, the batteries are automatically disconnected. When you power the PORTA ONE 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 ONE 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-P1.



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.

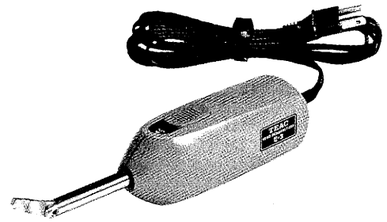
II. This voltage conversion is NOT possible on units sold in the North America, U.K., Australia or Europe.

III. U.K. Customers
Due to the variety of plugs used in the U.K., the PS-P1 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.

Carrying Cases

As its name implies the PORTA ONE is very portable and there will be times when you will want to take it with you. Two optional cases are available to protect the PORTA ONE: a flight case, CS-P1H and a soft carrying bag, CS-P1S.

E-3 Head Demagnetizer

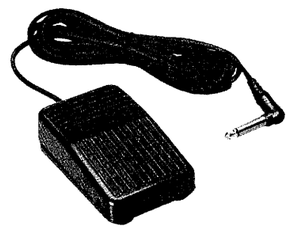


The E-3 is essential for eliminating the residual magnetism that builds up on the heads, as well as other metal parts along the tape path. Demagnetization is part of regular recorder maintenance, and the TEAC E-3 is the right tool for the job.

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.

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 ONE. This permits "hands free" entry and exit from the record mode.

109B Input Transformer

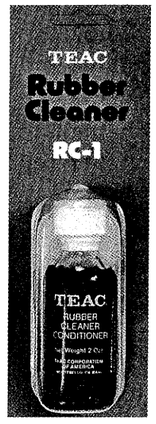
The TASCAM 109B Input Transformer is an adaptor that matches balanced low impedance microphones with XLR connectors to unbalanced high impedance 1/4" phone jack inputs. This adaptor enables a long cable from the low impedance mic to remain balanced for rejection of hum and buzz. The male XLR connector 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 nosie (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.

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Specifications

MECHANICAL CHARACTERISTICS

Tape	Compact cassette C-30 to C-90, 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 %
Wow and Flutter [1]	0.05 % (NAB weighted) ±0.1 % peak (DIN/IEC/ANSI weighted)
Fast Winding Time	Approx. 100 seconds for C-60
Dimensions (W x H x D)	330 x 250 x 70 mm (13" x 9-13/16" x 2-3/4")
Weight	3.0 kg (6,6 lbs) without batteries 3.5 kg (7.7 lbs) with batteries

ELECTRICAL CHARACTERISTICS

MIXER SECTION	
Mic/Line Input	
Source Impedance	10k ohms or less
Input Impedance	10 k ohms
Nominal Input Level	Mic, -50 dBV (3.16 mV), Trim Max. Line, -10 dBV (0.3 V), Trim Min.
Minimum Input Level	-58 dBV (1.26 mV)
Maximum Input Level	-2 dBV (0.8 mV)
Line Output	
Output Impedance	1 k ohms
Nominal Load Impedance	50 k ohms
Minimum Load Impedance	10 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Headphone Output	
Nominal Load Impedance	8 ohm, stereophones
Maximum Output Level	100 mW
Equalizer	
Type	Shelving
Frequencies	LOW: 100 Hz HIGH: 10 kHz
Boost/Cut Range	±10 dB
RECORDER SECTION	
Record Channel	2 (2 dbx II NR, switchable)
Playback Channel	4 (4 dbx II NR, switchable)
Bias Frequency	60 kHz
Equalization	3180 μs + 70 μs
Record Level Calibration	160 nWb/m tape flux level (0 VU reference)
Tape Out	
Output Impedance	1 k ohms
Nominal Load Impedance	50 k ohms
Minimum Load Impedance	10 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Power Requirements	DC 11 – 15 V, 350 mA max.
Batteries	SUM-2, "C" size, R14 or equivalent

PERFORMANCE CHARACTERISTICS

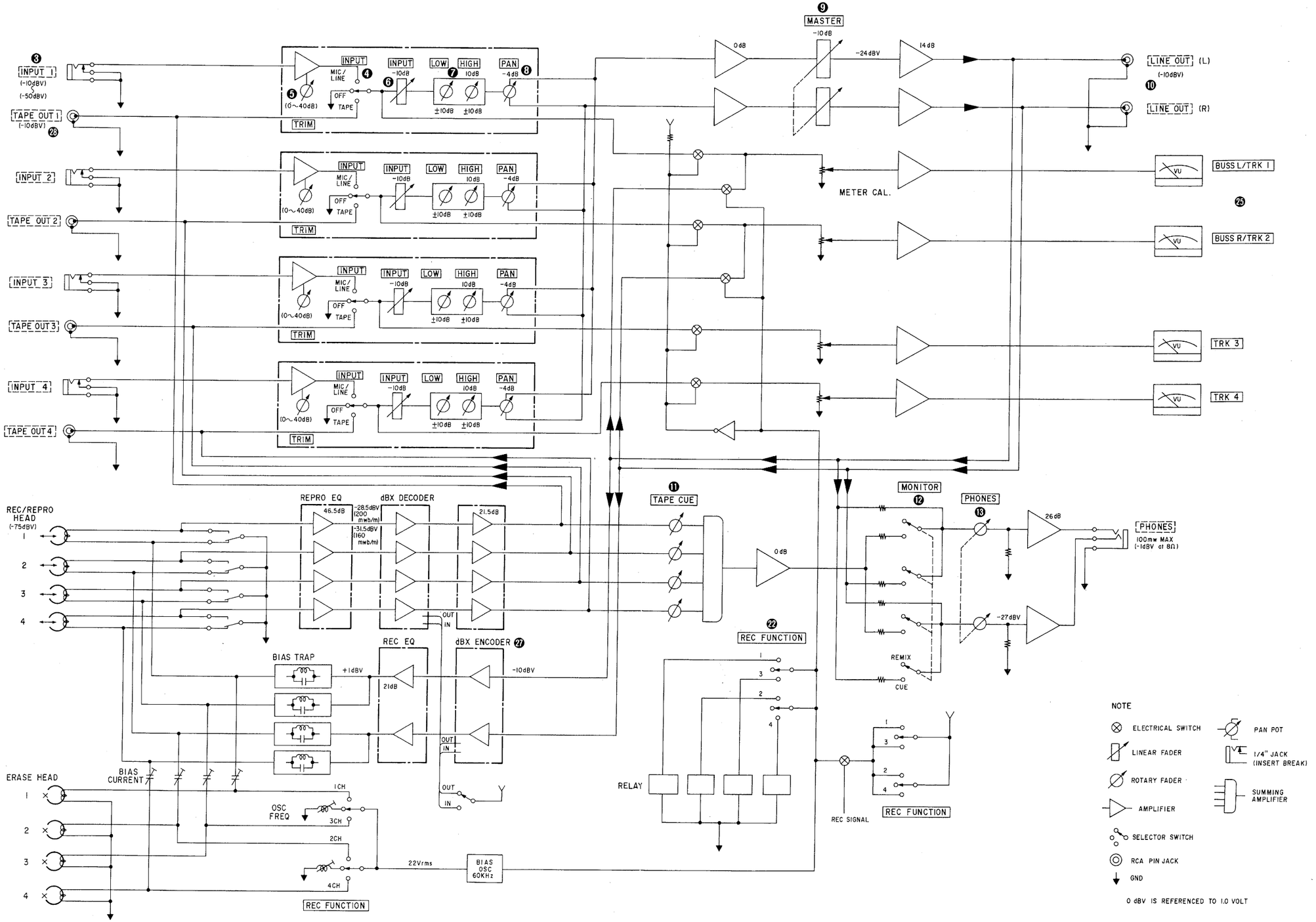
Frequency Response [2] **(Record/Reproduce)**	40 Hz – 12.5 kHz, ±3 dB
Total Harmonic Distortion [2]	1.0 %, 0 VU, 1 kHz, with dbx 3.0 %, 8 dB above 0 VU, 315 Hz, with dbx
Signal-to-Noise Ratio [2] **(Referenced to 3 % THD level at 315 Hz)**	85 dB weighted, with dbx 80 dB unweighted, with dbx 57 dB weighted, without dbx 54 dB unweighted, without dbx
Adjacent Channel Separation	55 dB, 1 kHz, 0 VU, with dbx 50 dB, 1 kHz, 0 VU, without dbx
Erasure (Referenced to 3 % THD)	70 dB at 1 kHz
Battery Life (Alkaline)	More than 8 hours, continuous record/playback, with dbx, nominal input level, headphone output 10 mW + 10 mW

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-111.
2) Specifications were determined using TEAC Test Tape MTT-5061 (blank tape).

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

Block Diagram



Specifications

MECHANICAL CHARACTERISTICS

Tape	Compact cassette C-30 to C-90, 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 %
Wow and Flutter[1]	0.05 % (NAB weighted) ±0.1 % peak (DIN/IEC/ANSI weighted)
Fast Winding Time	Approx. 100 seconds for C-60
Dimensions (W x H x D)	330 x 250 x 70 mm (13" x 9-13/16" x 2-3/4")
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RECORDER SECTION

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Level Diagram