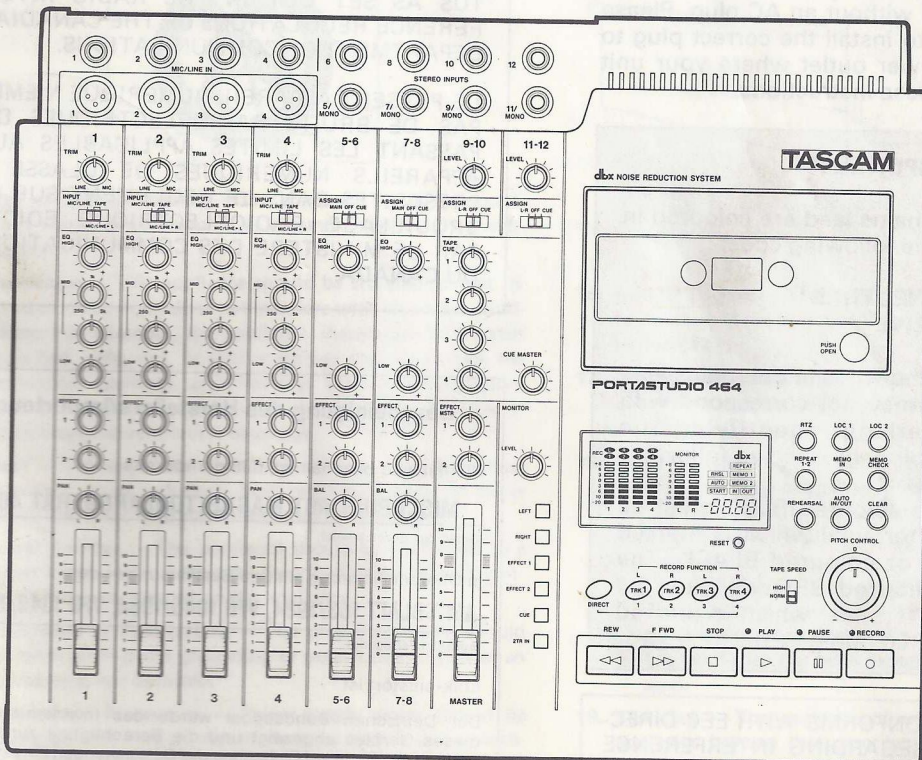


# TASCAM

TEAC Professional Division

# 464

# PORTASTUDIO



OWNER'S MANUAL

5700132200



## Important Safety Precautions

"The following marking is located on the bottom of the unit".



**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 to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

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 \_\_\_\_\_

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

### NOTE FOR U.K. CUSTOMERS

#### U.K. Customers Only:

Due to the variety of plugs being used in the U.K., this unit 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.

#### IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

**BLUE: NEUTRAL**  
**BROWN: LIVE**

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals of your plug, proceed as follows:

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989  
DIRETTIVA CEE/87/308

THIS DIGITAL APPARATUS DOES NOT EXCEED THE CLASS B LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS AS SET OUT IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE CLASSE B PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

#### Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

**MISCHPULT MIT MAGNETTONBANDGERÄT 464**

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

**AMTSBLATT 163/1984, VFG 1045/1984, VFG 1046/1984**

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

**TEAC CORPORATION**

Name des Herstellers/Importeurs



# Safety Instructions

## CAUTION:

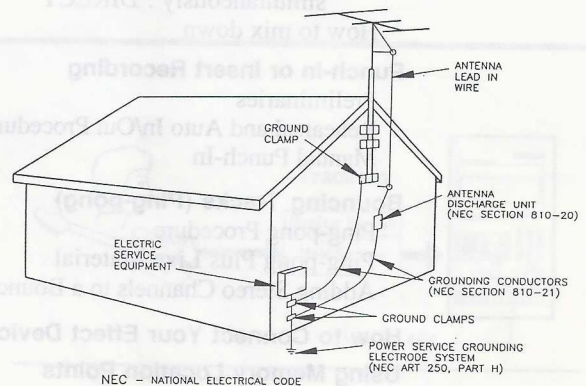
- Read all of these instructions.
  - Save these instructions for later use.
  - Follow all warnings and instructions marked on the audio equipment.
1. **Read Instructions** — All the safety and operating instructions should be read before the appliance is operated.
  2. **Retain Instructions** — The safety and operating instructions should be retained for future reference.
  3. **Heed Warnings** — All warnings on the appliance and in the operating instructions should be adhered to.
  4. **Follow Instructions** — All operating and use instructions should be followed.
  5. **Water and Moisture** — The appliance should not be used near water — for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, etc.
  6. **Carts and Stands** — The appliance should be used only with a cart or stand that is recommended by the manufacturer.
  - 6A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.



7. **Wall or Ceiling Mounting** — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** — The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** — The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** — The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** — The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power-Cord Protection** — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

13. **Cleaning** — The appliance should be cleaned only as recommended by the manufacturer.
14. **Power Lines** — An outdoor antenna should be located away from power lines.
15. **Outdoor Antenna Grounding** — If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70 — 1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure below.

EXAMPLE OF ANTENNA GROUNDING  
AS PER NATIONAL  
ELECTRICAL CODE



16. **Nonuse Periods** — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
17. **Object and Liquid Entry** — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
18. **Damage Requiring Service** — The appliance should be serviced by qualified service personnel when:
  - A. The power-supply cord or the plug has been damaged; or
  - B. Objects have fallen, or liquid has been spilled into the appliance; or
  - C. The appliance has been exposed to rain; or
  - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
  - E. The appliance has been dropped, or the enclosure damaged.
19. **Servicing** — The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.



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## The PORTASTUDIO 464 is...

The PORTASTUDIO 464 is a 4-track "Multitrack Master" cassette tape recorder and a full-function 12x2 mixer combined into a single workstation.

Its high audio quality and creative flexibility reflect the experience and innovation that have allowed TASCAM to earn its reputation in professional audio production fields, and its user-friendly design makes the 464 suitable for anyone, from expert to novice.

**Using this manual :** To get the most out of your 464, please take the time to read through this manual. Some time spent now will keep you from overlooking some of the features that make the 464 a more creative tool. You may discover some new tricks you haven't tried before.

**Use of capital letters :** In general, we use all upper case type to designate a particular switch, control, jack name or label (like PAN). Transport modes and some features are described with an upper case first letter (like Record mode).

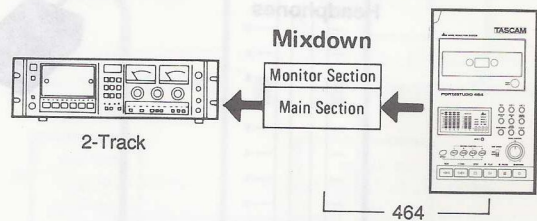
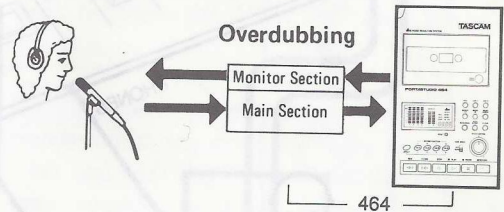
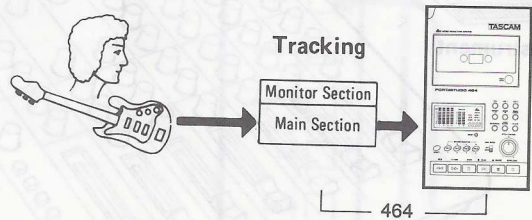
## The Recording System

The PORTASTUDIO 464 is a complete audio production facility in a single box. It is divided into two major sections: a full-function mixer and an 4-channel, multitrack cassette recorder. To complete the recording system, you'll additionally need these: Input devices (microphones, instruments), Output devices (headphones), 2 track recorder, Effects processors, etc.

### The Three Steps to Multitrack

The diagram on the right depicts how signals from equipment connected to the 464 can be routed.

In TRACKING and Overdubbing, the mixer inputs are usually microphones or instruments, going to different tracks of the recorder. In OVERDUBBING, the MONITOR section and TAPE CUE of the mixer must be used to listen to previous tracks while you record new ones, so there is a two-way flow through the console. In MIXDOWN, signal comes from the multitrack and is sent to an external 2-track recorder.





Using the Transport Control Panel out of your 464, please refer to the manual. Some time spent now will keep you from overlooking some of the features that make the 464 a more creative tool. You may discover some new

creative flexibility reflect reputation in professional audio production. The friendly design makes the 464 an expert to novices.

Recording more on a track.

Production for the two major sections: channel multitrack, the recording system (input devices (microphones), devices (headphones), processor, etc.

The Three Steps to Multitrack

The diagram on the right depicts the equipment connected to the 464 can be used at TR/CKING and OVERDUBBING. The monitor section and FADER CUE of the mixer must be used to listen to previous tracks while you record new ones, so there is a two-way flow through the console. In MONITOR signal comes from the multitrack and is sent to an external 2-track recorder.

1-track recorder

12

13

14

15

The PORTASTUDIO 464 is a 4-track Multitrack Master, cassette tape recorder and a full-function 12x2 mixer combined into a single workstation.

creative flexibility reflect reputation in professional audio production. The friendly design makes the 464 an expert to novices.

Recording more on a track.

Production for the two major sections: channel multitrack, the recording system (input devices (microphones), devices (headphones), processor, etc.

The Three Steps to Multitrack

The diagram on the right depicts the equipment connected to the 464 can be used at TR/CKING and OVERDUBBING. The monitor section and FADER CUE of the mixer must be used to listen to previous tracks while you record new ones, so there is a two-way flow through the console. In MONITOR signal comes from the multitrack and is sent to an external 2-track recorder.

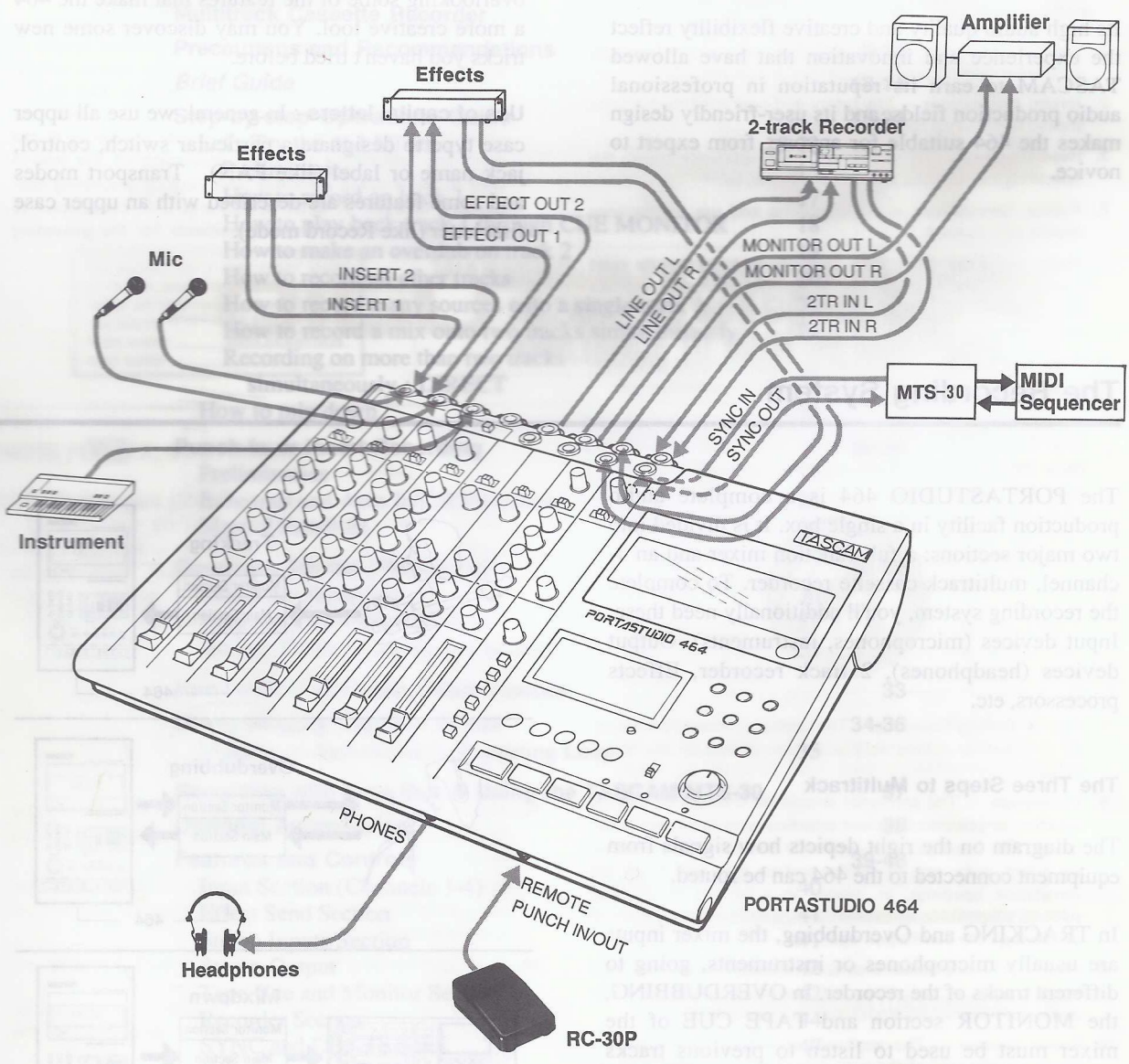
1-track recorder

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13

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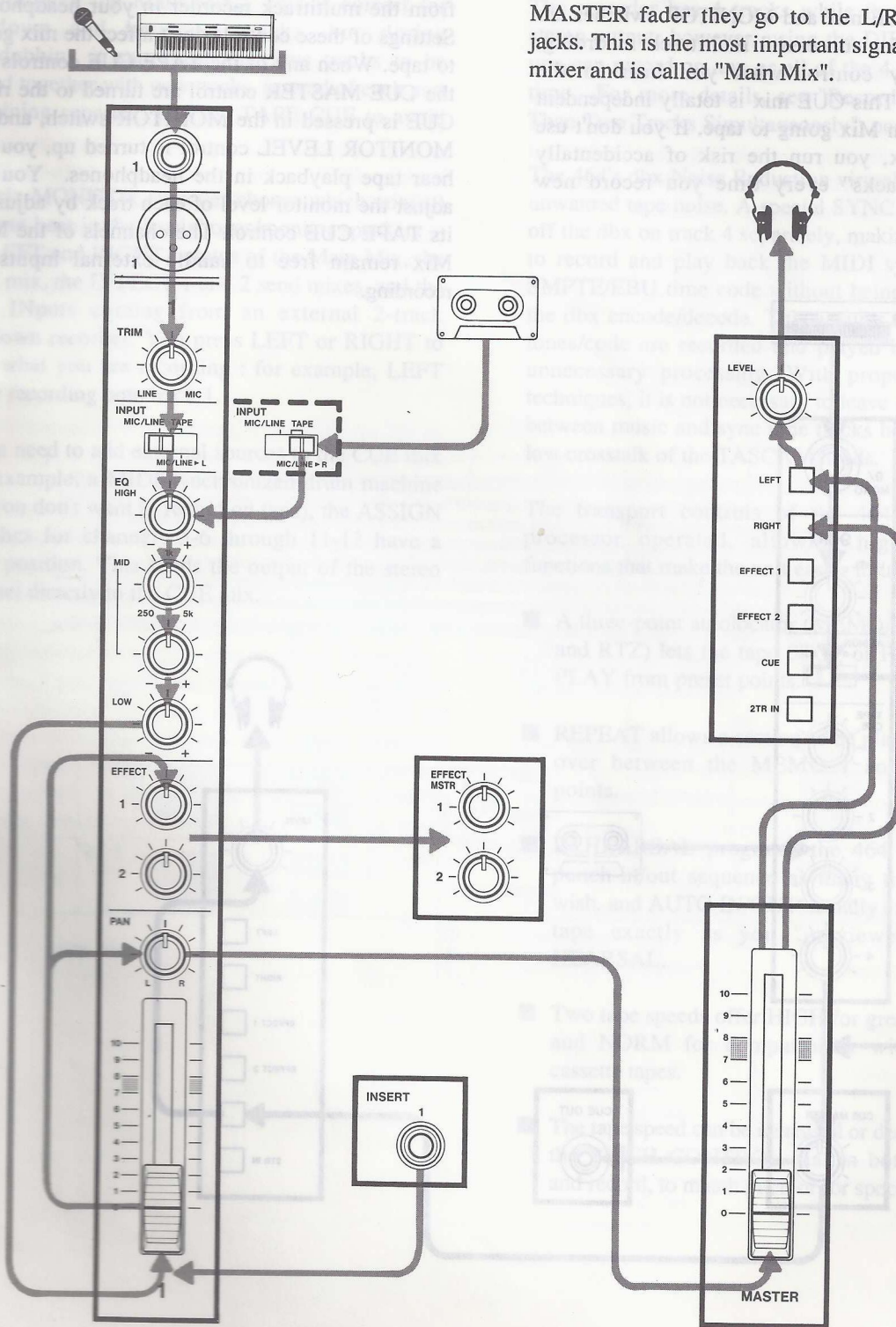
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# Understanding the Mixer

Signal Flow in the 464 Mixer



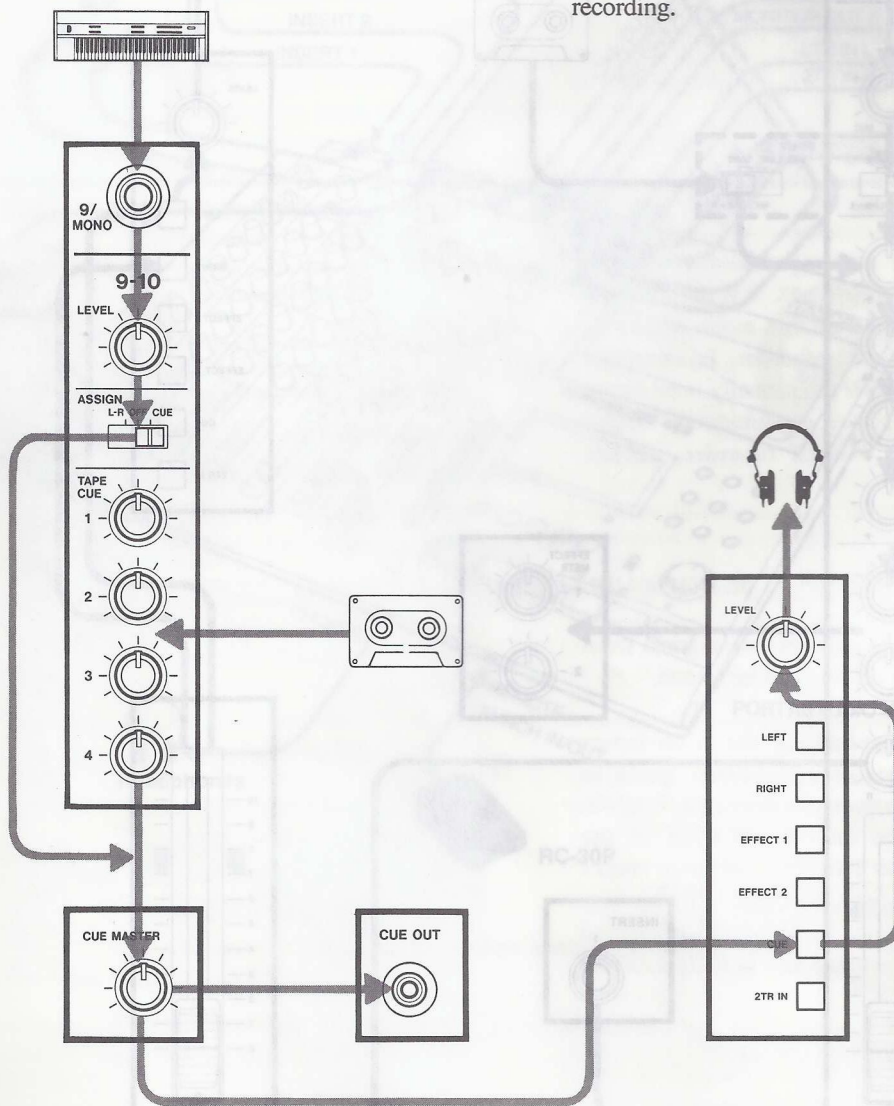
The illustration below shows how the input signal passes through the 464 Mixer section. After the MASTER fader they go to the L/R LINE OUT jacks. This is the most important signal route in the mixer and is called "Main Mix".



## Tape Cue Monitor System

The TAPE CUE mix and MONITOR switches are also crucial for successful multitrack recording, because they control what you hear in the headphones. This CUE mix is totally independent from the Main Mix going to tape. If you don't use the CUE mix, you run the risk of accidentally "bouncing tracks" every time you record new material.

The 4 TAPE CUE controls act like a separate 4x1 mixer, dedicated solely so you can hear playback from the multitrack recorder in your headphones. Settings of these controls don't affect the mix going to tape. When any of the TAPE CUE controls and the CUE MASTER control are turned to the right, CUE is pressed in the MONITOR switch, and the MONITOR LEVEL control is turned up, you can hear tape playback in the headphones. You can adjust the monitor level of each track by adjusting its TAPE CUE control. The channels of the Main Mix remain free to handle external inputs for recording.





If you can hear tape playback in your headphones when CUE is not pressed, it means you're hearing tape through the Main Mix. This is correct for mixdown and bouncing tracks, but during overdubbing it can cause previous tracks to be mixed together with new tracks, instead of each part remaining separate. Use the TAPE CUE to avoid this.

The six MONITOR switches choose which mix(es) you can hear in the headphones/monitor speakers -- the LEFT and RIGHT outputs of the Main Mix, the CUE mix, the EFFECT 1 and 2 send mixes, and the 2TR INPUTS coming from an external 2-track mixdown recorder. You press LEFT or RIGHT to hear what you are recording: for example, LEFT while recording onto track 1.

If you need to add external sources to the CUE mix (for example, a MIDI-synchronized drum machine that you don't want to record on tape), the ASSIGN switches for channels 5-6 through 11-12 have a CUE position. This sends the output of the stereo channel directly to the CUE mix.

The 464 records on readily available standard (Philips) Compact Cassette tape, high bias Type II. The recorder has 4 tracks while the mixer has a stereo output; however, using the DIRECT feature you can record on any or all of the 4 tracks at one time. For more details, see "Recording on More Than Two Tracks Simultaneously", page 23.

The 464's dbx Noise Reduction virtually eliminates unwanted tape noise. A special SYNC feature turns off the dbx on track 4 separately, making it possible to record and play back the MIDI sync tones or SMPTE/EBU time code without being affected by the dbx encode/decode. This ensures that the sync tones/code are recorded and played back without unnecessary processing. With proper operating techniques, it is not necessary to leave a guard band between music and sync tone tracks because of the low crosstalk of the TASCAM heads.

The transport controls of the 464 are micro-processor operated, allowing highly reliable functions that make the unit easier to use:

- A three-point autolocator (MEMO/LOC 1 and 2 and RTZ) lets the tape STOP or PAUSE at, or PLAY from preset points.
- REPEAT allows a section to be played over and over between the MEMO 1 and MEMO 2 points.
- REHEARSAL programs the 464 to repeat a punch-in/out sequence as many times as you wish, and AUTO IN/OUT actually executes it on tape exactly as you "previewed" in REHEARSAL.
- Two tape speeds offer HIGH for greater fidelity, and NORM for compatibility with standard cassette tapes.
- The tape speed can be increased or decreased with the PITCH CONTROL dial in both playback and record, to match pitch or for special effects.

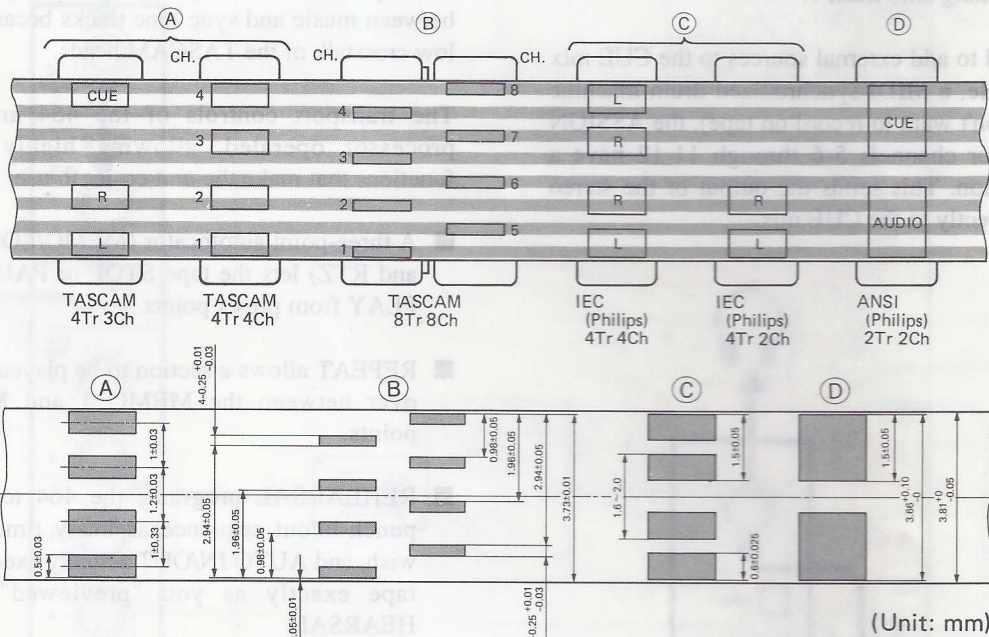


# Precautions and Recommendations

## Tape Speed and Track Format

The Portastudio 464 uses a HIGH speed of 9.5 cm/sec. (3-3/4 inches per second) which is two times (2X) the normal speed of a standard audio cassette. Its NORMAL speed is 4.8 cm/sec (1-7/8 i.p.s.), the same as that used by conventional recorders. It also employs a discrete 4-channel format head developed especially by TEAC for TASCAM multitrack cassette recorders. Here is a comparison of various cassette formats:

Playing back standard (stereo) prerecorded tapes : Tapes recorded on stereo cassette recorders can play back properly on the 464 if you set the track playback, tape speed, and noise reduction type correctly. Tracks 1 and 2 roughly follow the standard "stereo" format, but tracks 3 and 4 use the "Side B" (reverse side) tracks. So you must turn off Track 3-4 playback to avoid hearing the flip side playing backwards. If the cassette was recorded with Dolby noise reduction, the DBX NR switch should be set to OFF. It cannot correctly be heard unless decoded by the same type of Dolby noise reduction system.





For the same reasons, tapes recorded on the Portastudio 464 will not playback properly on stereo cassette recorders. Material recorded on the 464 must be mixed down to stereo for final distribution.

The 464 needs the entire width of the tape to record its four tracks, eliminating the option of recording on both sides (actually, it's both directions). Therefore, you should decide which side (side "A" or side "B") you want to use and use that side exclusively. It's a good idea to get into habit of consistently using the same side on all multitrack tapes.

**Tape Type**

The Portastudio 464 is internally adjusted for HIGH BIAS "Type II" tape. This means that for best results, you should only use tapes of this type. TDK SA, Maxell XL-II or equivalent formulations are recommended. We strongly suggest that you select one good quality brand and use it exclusively. The time you spend creating your multitrack master is much more valuable than the money you save by buying inferior tape. The cassette shell essentially becomes a part of the 464's transport. Poor quality shells can cause wrinkles, snarls and shredding of the edges of the tape with use. Even small scratches on the tape oxide can cause "dropouts" (temporary loss of signal) on one or more tracks. High quality tapes are less likely to cause problems in the long run.

**Accidental Erase/Record Protection**

To protect a finished master tape, it is necessary to punch out both record protect tabs. Even though you are recording in only one direction, the 464 uses the entire width of the tape, as mentioned above. If, for example, you remove only one of the tabs, you could accidentally insert the cassette into the 464 backwards and erase all four tracks of the master.



**Tape Length**

Use the shortest possible tape for a given work. It is not unusual to play a tape 100 times before you are finished, so select a cassette length that is as close as possible to the length of the program you plan to record. Cassettes C-60 length and shorter are often made from thicker stock than longer cassettes.

The tape used in C-120 cassettes is extremely thin and can cause winding problems, crimping, wrinkling, and other damage to the oxide coating of the tape which will destroy your work. Don't use C-120s in the 464.

Remember that at 2X normal speed (HIGH), and the "one-side-only" 4-track single direction format means that you have only 1/4X normal play time:

(Approx.)

C-30	7.5 min.
C-46	11.5 min.
C-60	15 min.
C-90	22.5 min.

## Precautions and Recommendations

### The Tape Counter is Not a Clock

The tape counter reading is calculated from the reel tables and rotation of the tables depends on the tape length, cassette hub diameter and other mechanical factors. If you assume the tape counter is a clock, you'll find it not as accurate as your wrist watch or clock on the wall. Table below shows approximately how much discrepancies gather when tapes are made to run from their beginning all the way to the end (one-way run).

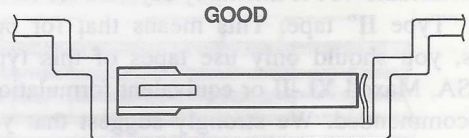
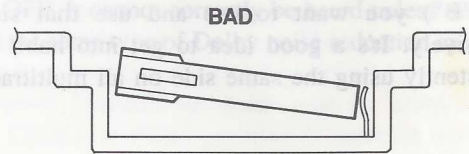
	HIGH Speed	NORM Speed
C-46	+30" to +1'30"	+1'30" to +2'45"
C-60	-30" to +30"	-45' to +30"
C-90	-1'00" to 0"	-1'30" to -30"

**NOTE:** Tapes belonging to the same types but fabricated by different manufacturers offer different numbers.

- When you need to measure the correct length of a particular program, use a stop watch.
- All the discussion above concerns the tape counter reading only in its relation to elapsed time as read from your watch or clock. It has nothing to do with the accuracy of the Auto Punch-In/Out functions at all.

### When Loading a Cassette Tape

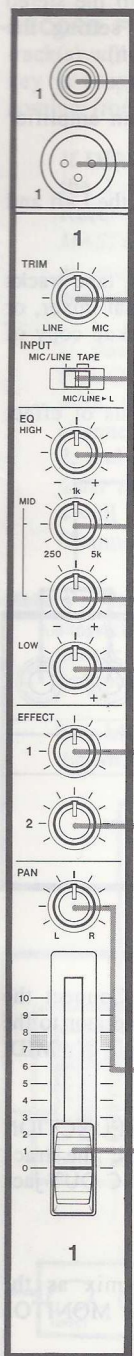
**ATTENTION !** Be sure to press the cassette shell so it is fully seated in place. If its open edge (or the spine : the opposite closed edge) is up as shown and PLAY or other transport keys are pressed, the cassette shell might get stuck in the transport mechanism and will not remove.





**Input Selection and Adjustment**

**Ch.1-4**



**MIC/LINE IN :** These are the input jacks for the mixer channels. Primarily, the 3-contact, XLR-type connectors are for connection to balanced microphones, and the 1/4" jacks are for line-level, unbalanced signal sources (such as electronic instruments). But you can also connect lower-level signals (down to -50 dBV) to these 1/4" jacks and use the TRIM control to amplify them.

**NOTE**

DO NOT use both the MIC and LINE IN jacks in the same channel at one time. Disconnect one when the other is used.

**TRIM :** Sets how much preamplification will be added to the MIC/LINE IN jack. Turn to the right if the signal needs amplification, to the left if the signal is so loud it is distorting the mixer electronics.

**INPUT :** Determines where the signal of the channel comes from, and where the source of the channel will go to.

**MIC/LINE (left)** set the external input as the channel source.

**TAPE (center)** makes tape playback the channel source, and is used during a typical mixdown or bouncing tracks.

**TAPE and MIC/LINE > L (R)** makes tape playback the channel source, and sends the external input directly to the designated Master output (left or right). This is used during mixdown if you want to add external inputs (from MIDI-controlled instruments or an external mixer) while using the channel of the 464 to control tape playback. The input signal goes directly to the LEFT or RIGHT mix, bypassing the channel controls--this makes the MIC/LINE IN jack work as a "buss input".

**EQ HIGH :** Cuts or boosts treble frequencies. Shelving point is at 10 kHz.

**EQ MID sweep :** The upper control sets the frequency range that will be cut or boosted by the lower control, centered from 250 Hz to 5 kHz.

**EQ LOW :** Cuts or boosts bass frequencies. Shelving point is at 100 Hz.

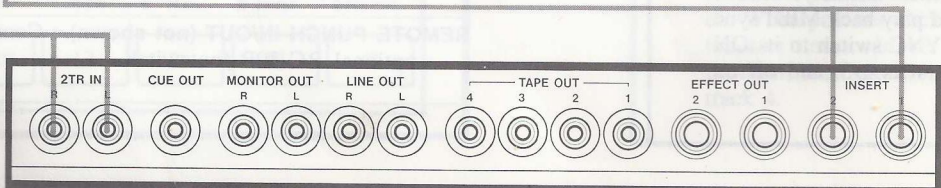
**EFFECT 1 and 2 :** These control how much signal will go to EFFECT MSTR 1 and 2. They get their signal from a point just after the channel fader.

**PAN:** Sets the pan position (left-right balance) of the channel. Note that the Left Mix can be recorded on tracks 1 and 3, and the Right Mix onto tracks 2 and 4.

**Channel fader:** Sets the volume of the channel feeding the MASTER fader.

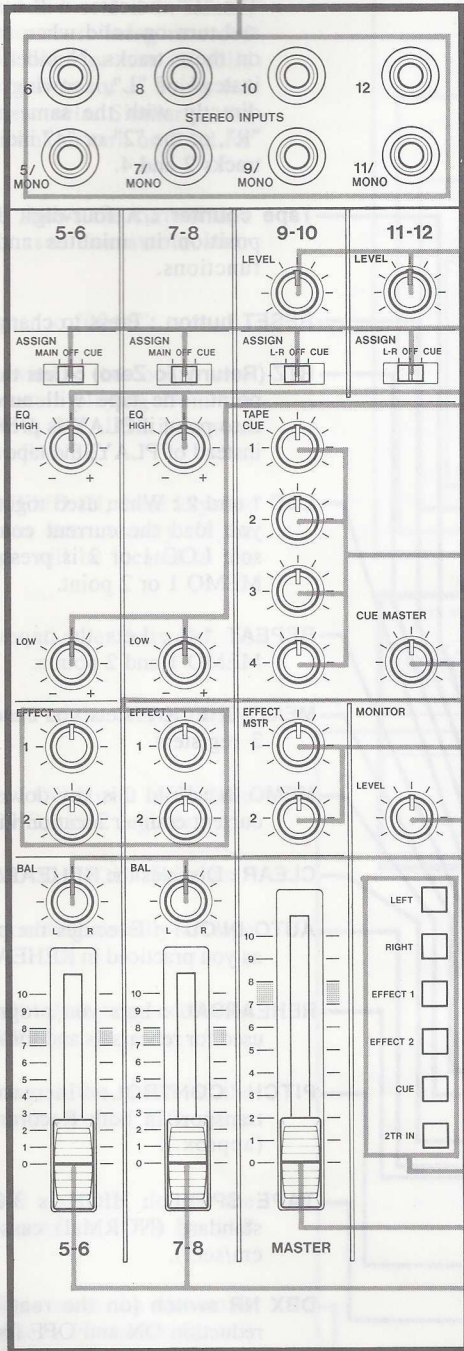
**2TR IN L and R :** These provide a route from an external 2-track mixdown recorder directly to the 2TR IN switch in the MONITOR section.

**INSERT (Ch.1-2) :** Connect outboard compressors, equalizers, etc. to this jack using an insertion cable such as the TASCAM PW-2Y/4Y. The insert point is after the EQ and before the channel fader.





**Ch.5-12**



**STEREO INPUTS (Ch. 5-12) :** Connect any line-level signal (such as an effect return, or electronic instrument) here.

**Mono Feature :** Plug a mono signal into the MONO (odd numbered) jack and leave their companion Right (even numbered) jack empty. The signal is automatically taken into both the odd and even channels (5 and 6, 7 and 8, 9 and 10, or 11 and 12).

**LEVEL (Ch.9-12) :** Controls the volume of both Left and Right inputs simultaneously. It sends signal to the ASSIGN switch in the respective channels.

**ASSIGN (Ch.5-12) :** Sends the stereo channel to either the MAIN L-R mix for recording, or the CUE mix for monitoring. If you are using MIDI-sequenced "virtual tracks", connect them to channels 5-12, so they can be sent directly to the CUE mix without being recorded.

**EQ HIGH (Ch.5-8) :** Cuts or boosts treble frequencies. Shelving point is at 10 kHz.

**EQ LOW (Ch.5-8) :** Cuts or boosts bass frequencies. Shelving point is at 100 Hz.

**BAL(ance) (Ch.5-8) :** Controls the relative level of the left and right inputs, similar to a pan pot.

**Channel Fader (Ch.5-8) :** Sets the volume of the two pairs of stereo channels feeding the MASTER fader.

**EFFECT (Ch.5-8) :** A post-fader effect send from the upper two pairs of stereo channels (5-6 and 7-8).

**Master Section**

**CUE MASTER :** This controls the overall level of the TAPE CUE mix, and of the stereo channel CUE mix.

**EFFECT MSTR:** These are the master controls for the two effect send outputs.

**MASTER fader :** This sets the total output level of the stereo mix.

**Tape Cue, Monitor, and Phones**

**TAPE CUE 1-4 :** This section controls tape playback in the headphones, when CUE is pressed in the MONITOR section.

**LEVEL :** This sets the output level of the monitor mix feeding the MONITOR OUT and PHONES jacks.

**MONITOR switches :** These select the source of the MONITOR OUT and PHONES jacks.

- The LEFT or the RIGHT switch MUST be Up/Off when only either Left or Right output buss is fed with signal, so you can hear that at the center in the headphones/monitor speakers.
- The CUE monitor mix is always mono (center) regardless of where it comes from. (It comes from the TAPE CUE controls and the stereo channels.)
- Press EFFECT 1/2 to hear the Effect Send mix.
- The 2TR IN switch receives signal directly from the corresponding jacks and lets you hear a final stereo mix recorded on an external 2-track recorder.



## Recorder Controls

**Transport keys :** Principally these work the same as on any cassette recorder.

**RECORD FUNCTION 1-4 and DIRECT :** These control which track(s) will be recorded when the master RECORD and the PLAY key is pressed, and choose where the signal to be recorded is coming from.

If DIRECT is not used, tracks 1 and 3 will be recorded with the Left mix, and tracks 2 and 4 with the Right mix. Recording level is adjusted by the Channel Faders and the MASTER fader. Any combination of inputs can be recorded at once onto a track, in a mix determined by their PAN controls and faders.

If you hold DIRECT and press any of the RECORD FUNCTION switches, the selected tracks will be recorded with the direct output from the same-numbered mono channels (channel 1 goes to track 1, channel 2 goes to track 2, and so on). Recording level is adjusted by the Channel fader only. If the SYNC switch is set to its ON position, track 4 will record signal from the SYNC IN jack instead of from Channel 4.

**Meters :** The meters numbered 1-4 show the recorded level of the respective tape tracks. The average level should be in the center (0), but occasional peaks up to +6 scale are acceptable.

The MONITOR meters show the level of mixes selected by the MONITOR switches.

**REC indicators :** These show the current status of tracks and where the signal to be recorded is coming from.

The "L" indicator will blink when tracks 1 and 3 will be recorded, and turn on solid when the "Left" mix is selected on these tracks. Number 1 or 3 will blink instead of "L", showing the tracks will be recorded directly with the same-numbered channels. "R", or the "2" or "4" indicator will blink when tracks 2 and 4.

**Tape counter :** A four-digit display that shows the current position in minutes and seconds, and has several functions.

**RESET button :** Press to change the counter to zero.

**RTZ (Return To Zero) :** Lets the tape fast forward to the zero point. The tape will automatically stop at the zero point if PLAY is pressed after RTZ. If REHEARSAL is pressed instead of PLAY, the tape will park in REHEARSAL.

**LOC 1 and 2 :** When used together with MEMO 1 and 2, you load the current counter location into the MEMORY registers. If sole LOC 1 or 2 is pressed, the tape will park in MEMO 1 or 2 point.

**REPEAT 1-2 :** Lets the tape play over a section of MEMO 1 and 2 points.

**MEMO CHECK :** Lets you check the content of MEMO 1 and 2 registers.

**MEMO IN :** Hold this key down and press LOC 1 or 2 to load current counter location into the MEMORY registers.

**CLEAR :** Disables the REHEARSAL and AUTO IN/OUT.

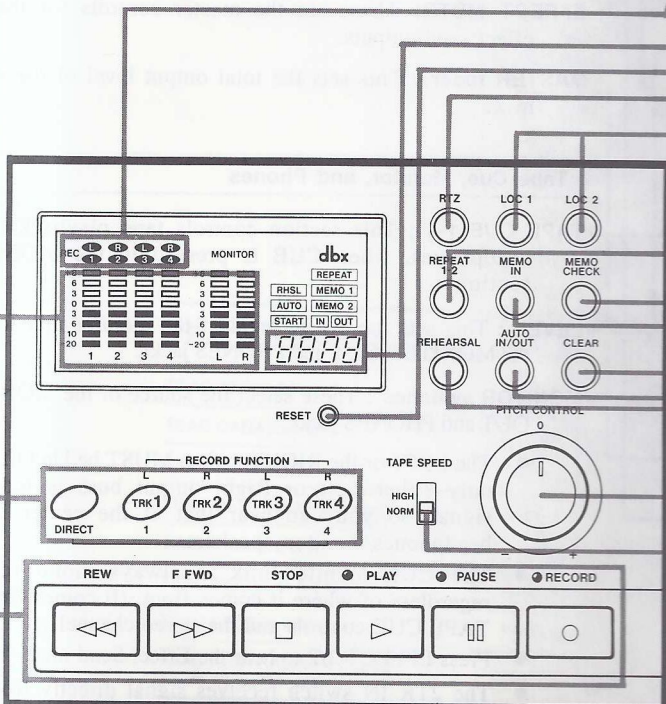
**AUTO IN/OUT :** Executes the punch-in recording as you practiced in REHEARSAL.

**REHEARSAL :** Lets you program a punch-in recording used for rehearsals and for AUTO IN/OUT.

**PITCH CONTROL :** Increases or decreases the tape transport in both Record or Play mode (approx.).

**TAPE SPEED :** HIGH is 3-3/4 ips (9.5 cm/sec), standard (NORMAL) cassette tape speed is 1.875 ips (4.75 cm/sec).

**DBX NR switch (on the rear panel) :** This switch reduces noise reduction ON and OFF for all four tracks. When you use track 4 to record and monitor, set the adjacent SYNC switch to its ON position, then the dbx NR is on for track 4.





## Output Jacks: Rear Panel

how the current status of each of the four signal to be recorded will come from.

will blink when track 1 or 3 is in Ready, when the "Left" mix starts being recorded number 1 or 3 will blink or turn on solid during the tracks will be or is being fed same-numbered channels. Similarly, the indicator will blink or turn on solid for

digit display that shows the current tape seconds and seconds, used for autolocation

change the counter to "00.00".

lets the tape fast wind to the counter zero and will automatically start playing from the point is pressed after RTZ. If PAUSE is pressed the tape will park in PAUSE.

together with MEMO IN, these keys let you store counter location into memory. If the LOC key is pressed, the tape will be located to the

to tape play over and over between the two

to check the content of the MEMO 1 and

to down and press LOC 1 or 2 to load the location into the MEMO 1 or 2 register.

to HEARSAL and AUTO IN/OUT functions.

to is the punch-in recording actually on tape and HEARSAL.

to program a punch-in/out sequence to be used for AUTO IN/OUT.

to increases or decreases the speed of the tape record or Play mode, over a 12% range

to is 3-3/4 ips (9.5 cm/sec.), double the standard cassette tape speed of 1-7/8 ips (4.8

to rear panel) : This turns the dbx noise reduction OFF for all four tracks. Normally, leave it ON. Track 4 to record and play back MIDI sync set the adjacent SYNC switch to its ON position. dbx NR is on for tracks 1-3, and off on

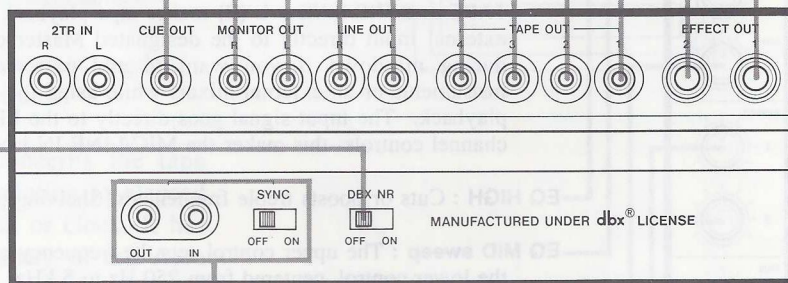
**CUE OUT** : This jack carries tape playback signal and may be connected to the input of a studio speaker amplifier. Alternatively, you can send signals plugged into the stereo channels to an additional effect device (by setting the channels' ASSIGN switches to their CUE position).

**MONITOR OUT L and R** : These are connected to an amplifier powering the control room speakers.

**LINE OUT L and R** : Normally, connect these jacks to the Left and Right inputs of your mixdown deck.

**TAPE OUT 1-4** : These jacks get signal directly from tape tracks 1-4 and are connected to the inputs of an external mixer, or of another multitrack recorder for making a backup copy of your 4-track master, as required.

**EFFECT OUT 1 and 2** : Connect these to the inputs of effect devices.



**SYNC, IN and OUT jacks and ON/OFF switch** : Connect the output of a MIDI sync or SMPTE time code generator to the SYNC IN jack, and the SYNC OUT jack to the input of a MIDI or SMPTE time code reader.

When track 4 is put into DIRECT RECORD FUNCTION position and the SYNC switch is set to ON, the track connects directly to the SYNC IN jack. The SYNC OUT jack always gets signal directly from track 4.

**PHONES (not shown)** : This carries the same mix as the MONITOR OUTPUT jacks, as selected by the MONITOR switches.

**REMOTE PUNCH IN/OUT (not shown)** : Connect to this jack the optional RC-30P footswitch.



# Step-by-step Operations Guide

## LET'S TRY THE 464 MIXER

### Preliminaries

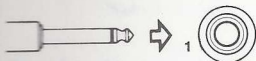
To learn how the mixer works, first you need to plug a signal source into one of the sixteen jacks located at upper top of the 464, in your easy reach.

As an example, we'll use a microphone as the source.

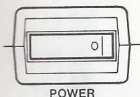
Before anything else, make the following settings:

- Turn all the TRIM controls all the way to the left/LINE position.
  - Turn all the EQ controls to their center "0" position.
  - Bring all the faders down.
  - Turn all the TAPE CUE, EFFECT, and MONITOR LEVEL controls full counterclockwise, and set all the MONITOR switches to OFF (their Up position).
1. Have in hand a dynamic or a electret microphone and a set of stereo headphones.
  2. Plug your microphone into channel 1 - into the leftmost 1/4" jack or XLR-type connector, depending on the plug on the microphone cable.
  3. Press the POWER switch. (The switch is located on the back.)
  4. Plug your headphones into the front PHONES jack.
  5. Set the channel 1 INPUT switch to the left MIC/LINE position.
  6. Turn the channel 1 PAN control all the way to the left position.

### Source connection



### Powering on



### Headphones connection



### Input



### Panning



channel level

master level

monitor selection



RIGHT

listening level



TRIM adjustment

1



7. Raise the channel fader to "7-8" on the scale.
8. Raise the MASTER fader to "7-8".
9. Press the MONITOR LEFT switch. The RIGHT switch must be OFF, so you can hear the Left mix at the center in the headphones.
10. Turn the PHONES level control up to the 12 o'clock position.

11. While speaking into the mic, slowly turn the TRIM control in channel 1 to the right. You will hear your voice in the headphones.

When using a line level source (such as electronic instruments) instead of the mic, the TRIM does not need to be turned up very far, if at all.

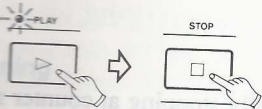


## How to Record on Track 1

As a trial, let's record your voice on tape.

### Loading a cassette

### Getting past the leader tape



### Resetting the counter



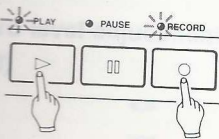
### Selecting tracks



### Mic level adjustment



### Beginning to record

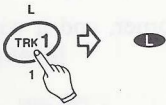


1. Have in hand a new cassette tape (Type II, C-90 length or shorter). Make sure the DBX NR switch is set to ON.
2. Press on the cassette door's lower right hand corner, and it will spring open. Insert your cassette tape. Close the door.
3. Press PLAY and allow the tape to run for about 10 seconds. This will run the tape leader onto the takeup reel, and put the beginning of the tape in front of the heads.
4. Press the RESET button, so you can use the RTZ (Return To Zero) function to get back to this point.
5. Press the TRK 1 RECORD FUNCTION switch. The REC "L" indicator will start flashing above meter 1 in the display, showing that track 1 is Ready to be recorded with what you panned to the Left side of the stereo mix.
6. Speak into the mic. You will see meter 1 move. If no level or too low a level is shown, continue to speak into the mic and slowly turn the channel 1 TRIM control to the right until the meter averages at "0" and peaks at "+6".
7. Hold RECORD and press PLAY to initiate recording. The REC "L" indicator that was flashing will turn on solid.
8. Speak into the mic.

### Stopping recording



### Putting track 1 into "Safe"



9. Press STOP to stop the tape and terminate recording.

10. Press the TRK 1 RECORD FUNCTION switch again. The REC "L" indicator will turn off.

## How to Play Back Track 1 through CUE MONITOR

### Locating tape to 00.00



### Monitor Selection



### Begin playback



### TAPE CUE level adjustment



### Stop playback



1. Press RTZ. The tape will rewind, automatically stopping at counter zero point.

2. Press CUE in the MONITOR select switches, so you can hear the tape. Turn all other MONITOR switches Off/Up, so you don't hear the noise from the microphone or instrument in the phones.

3. Press PLAY.

4. Check to see that the MONITOR LEVEL control is in its center position, and slowly turn the TAPE CUE 1 control to the right. You will hear what you have recorded on track 1 in your headphones.

5. Press STOP to stop play.



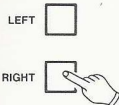
## How to Make an Overdub on Track 2

### Same levels

### Panning



### Monitor selection



### Locating tape to 00.00



### Track selection



### Record level adjustment (TRIM)

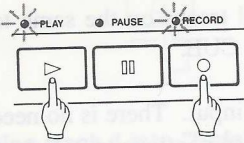


Overdubbing is recording one or more additional tracks on the same tape, while listening to previously recorded tracks using CUE.

Leave the microphone connected to the channel 1 input. There is no need to repatch it to channel 2 to record on track 2. You can continue to use channel 1 because the channel's PAN makes it possible to send any channel to any track of the recorder.

1. All level controls should be set the same as they were for the first track : the channel 1 fader and MASTER fader at about 7, the TRIM undisturbed, the INPUT at MIC/LINE. All other channel faders, including 5-6 and 7-8, should be off.
2. Turn the channel 1 PAN control all the way to the right position.
3. Press the MONITOR RIGHT switch (down position). The MONITOR CUE switch should also be on. All other MONITOR switches should be off.
4. Press the RTZ key, so the tape will rewind to the beginning of the track 1 recording.
5. Press the TRK 2 RECORD FUNCTION switch. The REC "R" indicator will start flashing above meter 2.
6. Speak into the mic to check to see meter 2 move. If no level or too low a level is shown, continue to speak into the mic and slowly turn the channel 1 TRIM control to the right until the meter averages at "0" and peaks at "+6".

## Begin to record



## Monitoring input/tape

7. Hold RECORD and press PLAY to initiate recording.

8. You will hear track 1 play, together with the new signal going in the headphones, monophonic (centered).

### NOTE

Adjust only the TAPE CUE 1 control or the MONITOR LEVEL when you need to change the balance between the old and the new in your headphones. Leave the Channel and MASTER faders because they control the level being recorded.

## Stop recording



## Putting track 2 into "Safe"



9. Press STOP to stop recording.

10. Press the TRK 2 RECORD FUNCTION switch again, so the indicator turns off.

## How to Record All Other Tracks

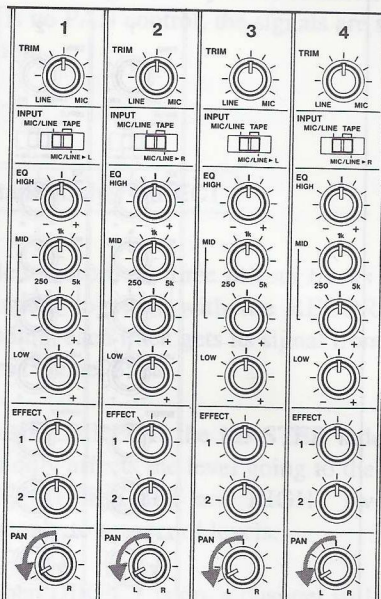
Tracks 3 and 4 can be recorded using almost the same procedure for tracks 1 and 2. Just use the applicable RECORD FUNCTION and the PAN controls should be rotated to the LEFT for recording and to the RIGHT for Track 4.



## How to Record Many Sources onto a Single Track

In the first example, we recorded one source onto one track at a time for simplicity. But the mixer of the Portastudio 464 can take multiple channels and mix them onto a single track. To do this :

- Set the PAN control of each channel to the same setting, for example :



In this example, all instruments plugged into channels 1-4 will be recorded onto Track 1 or 3.

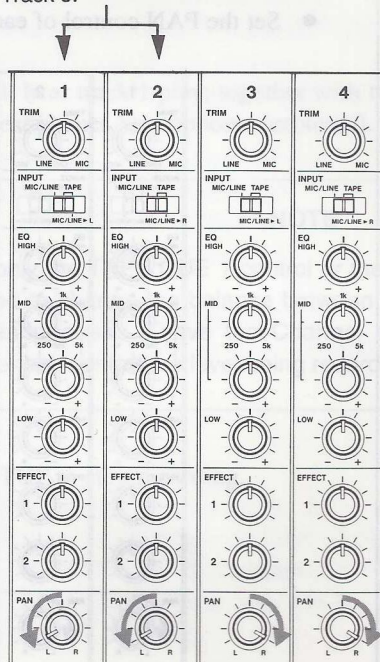
- Lower the MASTER fader to make overall level adjustments once you have each channel's TRIM and fader level set.
- Make sure the INPUT switch of every channel you want to record is set to MIC/LINE.
- *You can't record the stereo channels onto a single track. See also page 32.*

## How to Record a Mix onto Two Tracks Simultaneously

If you want to record multiple sources onto two tracks, you use the channel PAN controls to send them to LEFT or RIGHT (or anywhere in between, if you're making a stereo mix). The track RECORD FUNCTION switches choose what track the Left and Right mixes will be recorded on. Note that in

this method, the mixer channel number has nothing to do with what track the instrument winds up on. Any mixer channel can be panned to any track.

These mixer channels are being sent to the LEFT, for recording on either Track 1 or Track 3.



These mixer channels are being sent to the RIGHT, for recording on either Track 2 or Track 4.

- Press both the LEFT and RIGHT MONITOR switches (plus CUE if you need to hear tape tracks or MIDI virtual tracks).

Recording is the same procedure as for one track. In the example above, press both the TRK 3 and TRK 4 RECORD FUNCTION switches to record on tracks 3 and 4 simultaneously.

**Restrictions :** The 464's mixer section has only two main mixes , Left and Right. For this reason, *you can record only two tracks at once while you're recording a mix of instruments* (for example, two instruments on track 1, three instruments on track 2). Also, *you can record a mix only on combinations of even/odd numbered tracks* (1 & 2, 1 & 4, 2 & 3 etc.). If the TRK 1 and TRK 3 RECORD FUNCTION switches are pressed, the two tracks will both record the same mix.



**Recording the stereo channels (5-6, 7-8, 9-10, and 11-12) :** It is possible to record up to eight sources simultaneously, using the four standard mixer channels plus the four pairs of stereo channels. Set the ASSIGN switch to its MAIN (ch.5-6 and 7-8) or L-R (ch.9-10 and 11-12) position, and adjust the BAL control to set the relative level of the left and right signals fed into channels 5-6 or 7-8, and use the LEVEL control to set both the left and right signals fed into channels 9-10 or 11-12, so that the stereo channel signals will be recorded along with any other channels sent to the Left or Right mix. Since there is no PAN control, the signals are set to the "hard left" and "hard right" position.

**Recording on More than Two Tracks Simultaneously : DIRECT**

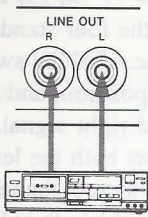
It is possible to record on three or four tracks at the same time by using the DIRECT switch together with the RECORD FUNCTION switches. In Direct recording, each track gets its signal from a single mixer channel only-- Track 3 from channel 3, etc.

- When using DIRECT, the MASTER fader has no effect on the record level. It only affects the level going to the headphones/monitor speakers (via MONITOR LEFT and RIGHT switches). Use the CHANNEL FADER only to set record levels.
- Even when DIRECT is on, a channel still goes to the Left/Right mix. If you record another track with LEFT or RIGHT at the same time, you must check your PAN settings. For example, you can record a vocal DIRECT onto Track 3, and record multiple instruments on Track 1 via LEFT at the same time. But Channel 3's PAN control must be turned hard right, otherwise you'll wind up with vocals "bleeding through" onto Track 1's instruments.
- DIRECT can be used anytime you want to record a single channel to a single track.

**HOW TO MIX DOWN**

When the four tracks are all recorded, the final step is mixing them into a standard stereo format. This procedure is known as Remixing or Mixing down. During this procedure the tracks are blended together and balanced to create the desired sound.

## Connections



## Master level

## Monitor source

## Channel source to tape

## Playback level

## Review

## Record level

1. Connect the LINE OUT L jack of the 464 to the left line input of the mixdown deck, and the LINE OUT R jack, to the right line input. Then, connect the outputs of the mixdown deck to the 2TR IN jacks of the 464.
2. Raise the MASTER fader to the shaded area between 7 and 8.
3. Press the LEFT and RIGHT MONITOR selector switches. The CUE and other MONITOR switches must be UP.
4. Set all the INPUT switches on the four input channels to their center TAPE position.
5. Press PLAY and, while listening to the tape play, use the channel faders to set each track's relative level for the desired balance. The channel 1 fader is being fed with track 1, the channel 2 fader, with track 2, and so on.
6. Adjust the PAN controls to set each track's left-to-right position for the desired stereo image. You may also want to use the EQ controls to adjust the individual tracks for the desired tonality. (For using effects, see page 33.)
7. When the signal balance, level, and tonality sound right, rewind the tape, and press PLAY again to check the result.
8. Rewind the Multitrack tape again. Put a blank tape in the mixdown deck and let it play for 10 to 15 seconds, then stop it and reset the mixdown deck's counter to zero.
9. Press PLAY on the 464.
10. Put the mixdown deck into its "Record Ready" mode, and adjust its input level controls for the desired record level.
11. Rewind the multitrack tape to the beginning of the recording.
12. Put the mixdown deck into Record mode then press PLAY on the 464.
13. When the recording is done, stop both machines, rewind the mixdown tape, press the 2TR IN MONITOR switch, let the mixdown tape start playing and listen to it.

If the mixdown tape does not sound right, make the necessary corrections and re-do from the beginning.



## Punch-in or Insert Recording

"Punching in" or "insert recording" is when you record over a small section of a previously recorded track in order to fix a mistake or improve a performance, while keeping the rest of the track as before. The mixer settings should be exactly the same as they were during the original recording.

### Preliminaries

In the following example, we'll use track 2 as the punch-in track.

1. Either plug the source into Channel 2 if you're using DIRECT recording, or turn the PAN control all the way to the right if you're recording using the Right side of the stereo mix.

No resetting of the mixer is necessary if you're punching into a track you've just recorded.

2. To hear the tape, use the TAPE CUE. Press the CUE switch in the MONITOR switch rack. Press PLAY to play the tape. Turn up the TAPE CUE 2 control to the desired level.
3. To hear the instrument, press the MONITOR RIGHT switch, and play the instrument. You'll hear it together with the tape signals in the headphones, in mono (centered) if the MONITOR LEFT switch is Off/Up. Adjust the MONITOR LEVEL and TAPE CUE controls for the desired listening level of the headphones. Stopping the tape will allow you to hear only the instrument.
4. Press the TRK 2 RECORD FUNCTION switch. The REC "R" indicator will start blinking in the display and meter 2 will show the level from your instrument. If your previous settings were disturbed, adjust the channel fader and the MASTER fader for a level matching that of the original recording.

Use the TAPE CUE 2 control to set the balance between the new signal and the recorded one in the headphones.

### Tape monitor

### Live monitor

## Rehearsal and Auto In/Out Procedures

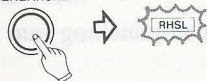
### Rehearsing Punch-in (Insert) recording

You can rehearse your punch-in as many times as you need without affecting the existing recording at all. During a rehearsal, what you hear in the monitor mix and read on the level meters will be the same as during recording, but signal won't be recorded on tape.

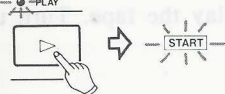
### Storing the punch-in and out points into memory



REHEARSAL



PLAY



RECORD



PLAY



### Rehearsal



1. Cue the tape up a few seconds before you reach the expected punch-in point.
2. Press the REHEARSAL switch. The "RHSL" indicator will start blinking in the display.
3. Press PLAY to let the tape start playing ("preroll"). The "START" indicator will light on solid in the display.
4. When you reach JUST BEFORE the error, press RECORD to start recording (punch in). The "IN" indicator will turn on solid in the display and an LED will start flashing above the RECORD button.
5. When the tape reaches the expected punch-out point, press PLAY. The "OUT" indicator will turn on instead of the "IN" indicator and the LED above the RECORD button will turn off.
6. The tape will play for about 3 seconds ("postroll"), then it will automatically rewind, stopping at the START point. The "RHSL" indicator that was blinking in the display will turn on solid.
7. Press PLAY. When the tape reaches the preset punch-in point, the monitor will switch from tape to "live" instrument on the punch-in track (in our example, on track 2).

The RECORD LED will be blinking, showing that you are "rehearsing" your punch-in recording and are not actually recording.



When the tape reaches the preset punch-out point, you will be able to hear the old material existing on track 2, letting you check that the new material is smoothly followed by the old one. The RECORD LED will turn off, indicating that the "dry-run" record is over.

After a 3-second play ("postroll") the tape will automatically rewind, stopping at the START point, so you can again go through the rehearsal procedure.

- To change the punch-in and out points, press CLEAR, and redo from the beginning.
- If you want to quit Rehearsal mode for any reason, press CLEAR. "RHSL" goes out and the punch-in and out points are cleared from memory.
- Practice the performance until you are sure that you will get it right when actually recording. Remember, once you punch-in over existing material, that original signal is erased.

Once you're sure your performance and the in/out points selected are correct, you're ready to actually record the insert using the Auto Punch-In/Out feature.

- Before proceeding to the next step, #8, check to see that the RHSL indicator is on solid in the display, showing that your punch-in and out points are in memory, and that all REC indicators above the meters are off (except the one for the punch-in track), showing that all non-punch-in tracks are in Safe mode.

8. Press the AUTO IN/OUT switch. "RHSL" will turn off and "AUTO" will start blinking in the display.

9. Press PLAY.

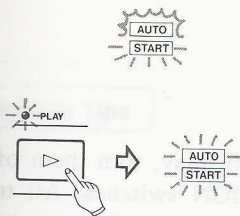
What you have anticipated in REHEARSAL will automatically take place in sequence : preroll, punch in, punch out, postroll, rewind, and stop.

"AUTO" will turn on solid when the 464 punches out of record.

10. Press PLAY (or the optional footswitch). The tape will play the entire length of insert and rewind to the START point.

- **To Disable AUTO IN/OUT Mode**, press CLEAR. The memory points will be cleared and "AUTO" will turn off in the display.

### Actual, Auto Punch In/Out



### Auto Review



## Manual Punch-in

The 464 lets you manually punch in, too. There are 3 ways to initiate the punch-in recording. The first is with the transport RECORD button, the second, with the track RECORD FUNCTION switch, and the third, with the optional footswitch.

We continuously use track 2 as the punch-in track in the following example.

Perform the "Preliminaries" above if you didn't yet.

### Punching-in/out with RECORD



1. Check to see the REC "R" indicator is blinking above meter 2. If not, press the TRK 2 RECORD FUNCTION switch.
2. Cue the tape up a few seconds before you reach the expected punch-in point.
3. Press PLAY.
4. When you reach JUST BEFORE the error, press RECORD. Track 2 starts recording.

The old material on track 2 is being erased and you'll hear the new material going to that track, along with other already recorded tracks through the corresponding TAPE CUE controls.

5. To punch out of record, press PLAY. You will hear the output of track 2 again in the monitor mix.
6. To stop the tape, press STOP.

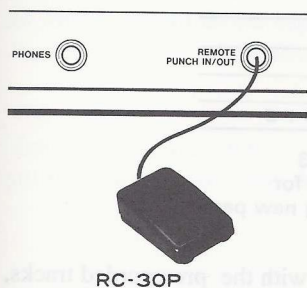
### Using the RECORD FUNCTION Switch



1. If any REC indicators are blinking in the display, turn them off by pressing the respective RECORD FUNCTION switches. All tracks should be in Safe mode, especially the punch-in track, in our example, track 2.
2. Cue the tape up a few seconds before you reach the error.
3. Hold RECORD pressed and press PLAY to let the tape start playing. The LED above the RECORD button will start flashing.
4. When you reach JUST BEFORE the error, press the TRK 2 RECORD FUNCTION switch, to let record start on track 2. The REC "R" indicator will turn on solid above meter 2.



### Using the Remote Footswitch (RC-30P)



### Punch-in Tips

5. To punch-out of record, press the TRK 2 RECORD FUNCTION switch again (you could also press PLAY). The tape will stop the instant record stops.

If you are recording alone and are too busy playing an instrument to push the switches, the use of the optional remote foot switch is really handy.

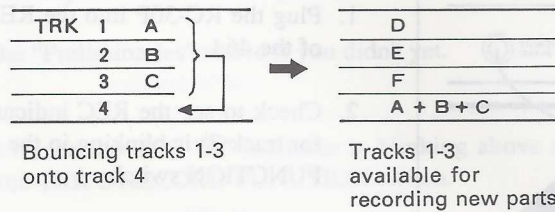
1. Plug the RC-30P into the REMOTE PUNCH IN/OUT jack on the front of the 464.
2. Check to see the REC indicator for the punch-in track (in our example, for track 2) is blinking in the display. If not, press the TRK 2 RECORD FUNCTION switch.
3. Cue the tape up a few seconds before you hear the error.
4. Press PLAY to let the tape start playing.
5. When you reach JUST BEFORE the error, press the footswitch. It has the same effect as pressing RECORD and Track 2 starts recording.
6. To punch out of record, press the footswitch again. It has the same effect as pressing PLAY. You will hear the output from track 2 again in the monitor mix.
7. To stop the tape, press STOP.

**Selecting In and Out Points :** For both musical and technical reasons, when punching in or out of a track, you must select points that are "in the clear", i.e., in the pauses between phrases or notes. It sounds unnatural and makes the insert noticeable if you record a new note before the old one has ended, or are holding a note as you punch in or out. Making inserts well requires some practice. Because of the spacing between the erase and record heads, you need to anticipate your in/out points by a fraction of a second for extremely tight cues.

## Bouncing Tracks (Ping-Pong)

The recording capability of the PORTASTUDIO 464 is not limited to four tracks. You can "bounce" or combine tracks you have recorded to an empty track, and then replace the original tracks with new material. A bounce is like a mixdown, except you are recording to one of the tracks of the 464 instead of to an external recorder.

The following diagrams depict the process.



During a bounce you can add live sources along with the prerecorded tracks, using the "empty" mixer channels not being used for tape playback. This gives you even more ways to add layers to a composition. For example, you can bounce tracks 1-3 along with another "live" part onto track 4, for a total of four parts on one track.

### Ping-pong Procedure

In this example, we will combine material from tracks 1, 2 and 3 onto track 4 without live material or effects.

1. Set the INPUT switch of channels 1-3 to the TAPE (center) position, and that of channel 4, to the MIC/LINE position.
2. Turn all the PAN controls all the way to the Right.
3. Set the Channel Faders 1 through 3 to the shaded area between 7 and 8. All unused faders should be OFF.
4. Raise the MASTER fader to 7-8.
5. Press the MONITOR RIGHT switch, and make sure all other MONITOR switches are OFF.
6. Press the TRK 4 RECORD FUNCTION switch. The REC "R" indicator will start flashing above meter 4. Make sure that the REC indicator for all other tracks are off.
7. Rewind the tape to the beginning of the song, and press PLAY.



8. Use channel faders 1 through 3 to make any necessary level adjustments.

You may want to repeat this step several times to get the balance correct. When the balance is right and the level is peaking at "+6" on the TRK 4 meter -- :

9. Stop and rewind the tape to the beginning of the track.
10. Hold RECORD and press PLAY. Track 4 will record a copy of what is on tracks 1-3.
11. You'll hear the mix being recorded on track 4 in the headphones.
12. Once the recording is done, press STOP.
13. Press the TRK 4 RECORD FUNCTION switch again. The REC indicator for track 4 will turn off, showing that the track is in Safe mode.

### Ping-pong plus Live Material

You may use any open channels to add "live" material to the tracks being recorded. In our example, Channel 4 of the mixer is open, as are the stereo channels. To make use of this :

1. Plug the source into the MIC/LINE IN jack 4.
2. Set Channel 4's INPUT switch to MIC/LINE.
3. Turn the PAN control to the Right.
4. Set the TRIM and Channel Fader as for any other recording.
5. Set the other channel faders (1-3) for the final balance. Proceed with the Ping-pong procedure as before.

You will wind up with a mix of the live instruments along with the previously recorded tracks all on track 4.

## Adding Stereo Channels to a Bounce

When bouncing tracks using stereo channels 5-6 and 7-8, you must :

1. Set the ASSIGN to MAIN.
2. Send the left and right inputs to the correct side (to RIGHT in the example of bouncing to track 4 above). To do so, connect the Left signal from the stereo source to jack 5, and the Right signal to jack 7 (not 6), then turn the two BAL controls all the way to the right.

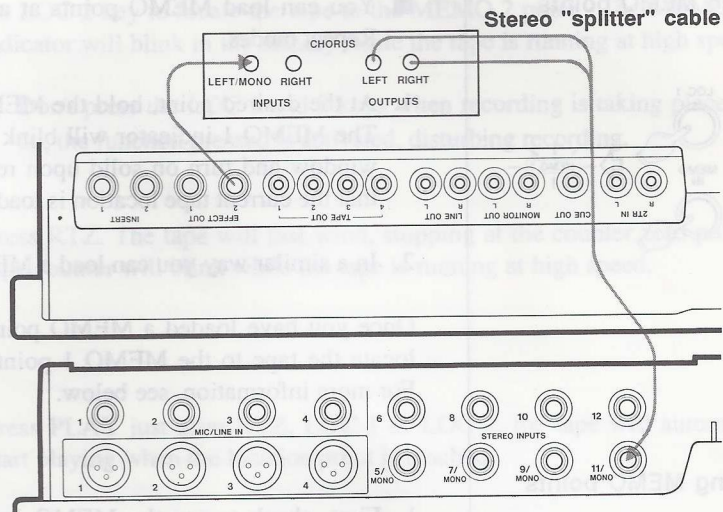
■ Inputs into stereo channels 9-10 and 11-12 cannot be sent to a single track. They go to both the LEFT and RIGHT sides however you set the channels' LEVEL controls.

Ping-pong plus Live Material



## How to Connect Your Effects Devices

There is no absolute "right" or "wrong" way to do this--there are several ways, each with its own consequences.



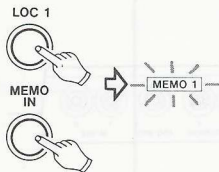
**Mono returns:** A special feature of the STEREO INPUTS allows continuously variable control between left and right if desired: a mono effect connected to a MONO jack will go to both the LEFT and RIGHT sides of the main mix if nothing is plugged into its companion jack (even-numbered). In this mono mode, you can vary the BAL control to send signal anywhere between the left and right sides, similar to using a PAN control. Note, the LEVEL control in channels 9-10 and 11-12 simply adjusts the level feeding the ASSIGN switch and does not work like PAN.

**Patching effects to an input channel:** There's no law that says the output of an effects device must be plugged into a STEREO INPUT, either. They can also be plugged into a MIC/LINE IN jack (Channels 1-4) just like any other source, if you are cautious about one thing: make sure the EFFECT controls of those channels are set to the off position (turned all the way to the left). Otherwise, you will be sending the output of the effect device back to itself, which is a kind of feedback. (If the effect device is a digital delay, feedback has the same effect as a regeneration (number of echoes) control).

**To record reverb onto a track:** Switch the ASSIGN switch to MAIN (Ch.5-6/7-8) or L-R (Ch.9-10/11-12), and adjust the BAL or LEVEL control for the sound you want. Remember that stereo signals must be recorded onto two tracks to keep their "stereo" effect.

**To hear reverb in the headphones but not record the reverb:** Switch the stereo channel ASSIGN switch to the CUE position. By pressing the CUE switch in the MONITOR switch rack you'll hear the reverb, but the recording will be "dry".

## Loading MEMO points



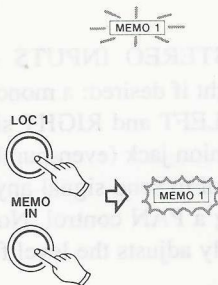
Two autolocation points can be established in the 464's memory system.

■ You can load MEMO points at any time except while in Record and Repeat modes.

1. At the desired point, hold the MEMO IN key and press the LOC 1 key. The MEMO 1 indicator will blink above the tape counter in the display window and turn on solid upon releasing the MEMO IN key, showing that the current tape location is loaded into that register.
2. In a similar way you can load a MEMO 2 point.

Once you have loaded a MEMO point or points, you can press LOC 1 to locate the tape to the MEMO 1 point, and LOC 2 to the MEMO 2 point. For more information, see below.

## Checking MEMO points



1. First, check to see the MEMO indicator whose content you intend to check lights in the display, showing the corresponding register is not empty.
2. Hold the MEMO CHECK key and press the LOC 1 key to check the MEMO 1 point, or the LOC 2 key to check the MEMO 2 point.

The MEMO 1 or 2 indicator will blink while the MEMO 1 or 2 point will show in place of the tape run time.

## Changing MEMO points

You can overwrite new MEMO points. Each time you press LOC 1 or 2 while holding MEMO IN, a new memory point is established, and the previous memory point is erased.

## Erasing

Both MEMO points are erased when you :

- Turn off the 464.
- Take the tape out from the compartment.
- Change TAPE SPEED from NORM to HIGH or inversely.

## Recalculation of MEMOS

The MEMO points don't move even if you reset the counter readout to 00.00. They are automatically recalculated, so they stay the same relative to their original tape positions.



## Locating the tape

### To MEMO points



Press the LOC 1 key to fast wind the tape to the MEMO 1 point, or press the LOC 2 key to locate the tape to the MEMO 2 point. The MEMO 1 or 2 indicator will blink in the display while the tape is running at high speed.

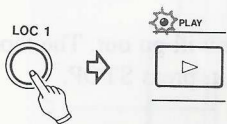
■ Don't press the LOC 1 and 2 keys when recording is taking place. If you do, the function pressed is activated, disturbing recording.

### To 00.00



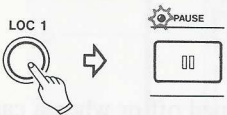
Press RTZ. The tape will fast wind, stopping at the counter zero point. The tape counter will blink while the tape is running at high speed.

### Auto Play



Press PLAY just after RTZ, LOC 1 or LOC 2, the tape will automatically start playing when the location point is reached.

### Auto Pause



Press PAUSE just after RTZ, LOC 1 or LOC 2, the transport will enter automatically Pause mode after the search operation.

## Making an Automatically Repeating Loop

It is convenient when one passage must be repeated over and over to set up an automatic loop.

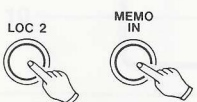
■ REPEAT is blocked out during Record.

### Start point



Locate the tape to the desired start point, then hold MEMO IN down and press LOC 1.

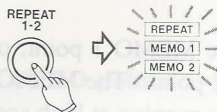
### End point



Locate the tape to the end of the section you want to repeat, then hold MEMO IN down and press MEMO 2.

## Using Memory Location Points

### To start REPEAT play



Press REPEAT 1-2. The tape will automatically rewind to the MEMO 1 point and start playing. When it plays up to the MEMO 2 point, it will again automatically rewind.

- **To get back to the start point of loop without waiting to reach the end point**, press LOC 1. The tape will fast wind to the start point, starting playing automatically. Pressing LOC 2 instead of LOC 1 will first let the tape fast wind to the end point, and then provide the same effect as having pressed LOC 1.
- **To interrupt REPEAT sequence**, press any transport keys (except PLAY). The function pressed will be activated. To resume the REPEAT sequence, press LOC 1 (or 2). You can also press PLAY if you are within the loop.

### To disable the REPEAT function



Press REPEAT 1-2 again. The REPEAT indicator will go out. The tape will continuously play in normal play mode. To stop it, press STOP.

The MEMO 1 and 2 indicators will remain lit in the display, showing the memories are still valid.

### Erasing the MEMO points

Both MEMO points are erased when power is turned off or when a cassette tape is taken out from the compartment.

- In the instructions above, we used MEMO 1 to load the start point of loop, and MEMO 2 to load the end point. But you can reverse ; MEMO 2 does NOT have to be a number higher than MEMO 1. The 464 understands the lower MEMO point as the start point of loop, and the higher point as the end.



## Recording with Tape Sync - Using the TASCAM MTS-30

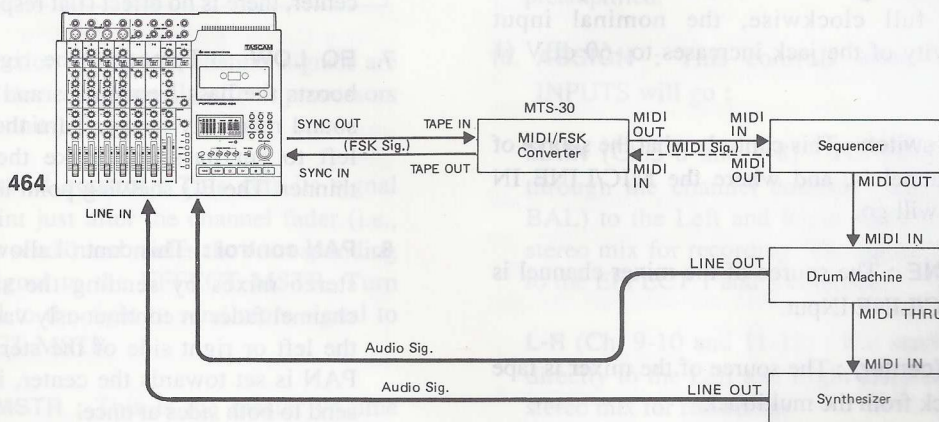
The 464 has a SYNC feature that allows you to have your electronic instruments play in sync with the tape. MIDI clocks are themselves a computer type digital language and cannot be recorded on analog tape; it is necessary to convert them to recordable FSK (Frequency Shift Keying) signals using an appropriate converter, such as the MTS-30.

The MTS-30 is not a mere MIDI-FSK converter but translates MIDI clocks into an FSK sync signal containing score "bar" information or "Song Position Pointer", allowing the associated MIDI equipment to stay in sync and follow the tape no matter where you move the tape within a given song. The maximum stability or resolution of the synchronization is ensured by a TASCAM-exclusive error correction circuit in the MTS-30.

### Connections

The 464 has dedicated jacks for SYNC tones and can directly record and read them without passing through the 464 mixer. A direct connection between the sync tone generator and the 464 recorder ensures that FSK won't accidentally leak into the audio, and unwanted audio won't leak into the FSK tone.

1. Connect the TAPE OUT of the MTS-30 to the SYNC IN of the 464, and the SYNC OUT of the 464 to the TAPE IN of the MTS-30.
2. Hold the DIRECT switch down and press TRK 4 RECORD FUNCTION switch. This patches the SYNC IN jack to Track 4 and allows no channel signal to reach there.
3. Locate the SYNC switch on the back panel and set it to the ON position. This defeats the dbx encode/decode for track 4 only.

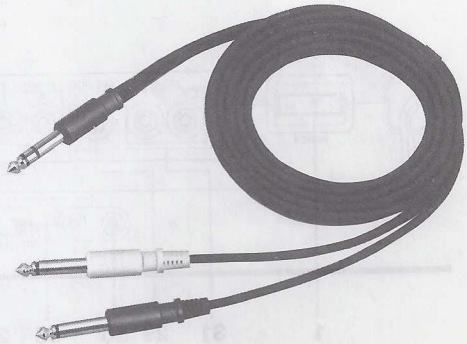


## Optional Accessories

RC-30P Remote Footswitch



PW-2Y/PW-4Y Insertion Cable



MTS-30 MIDI-Tape Synchronizer



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



Head Demagnetizer

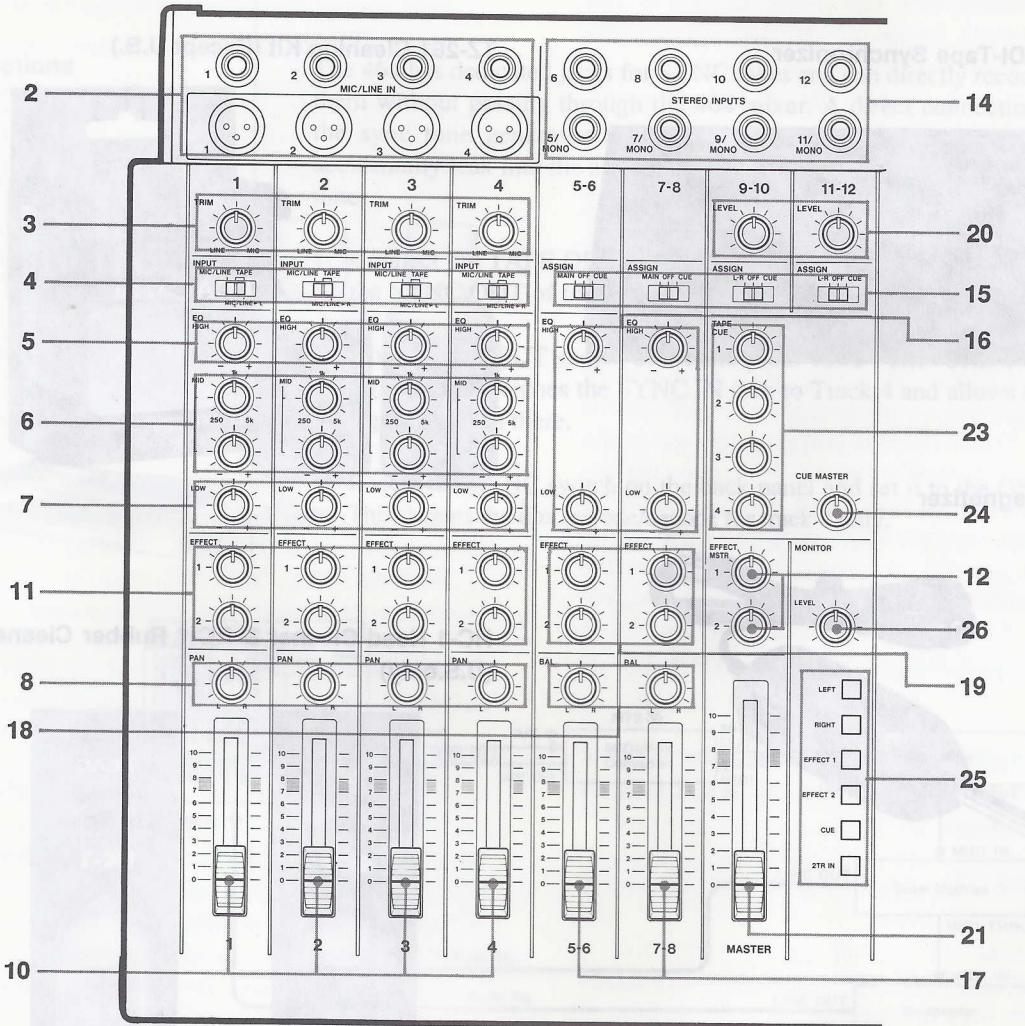
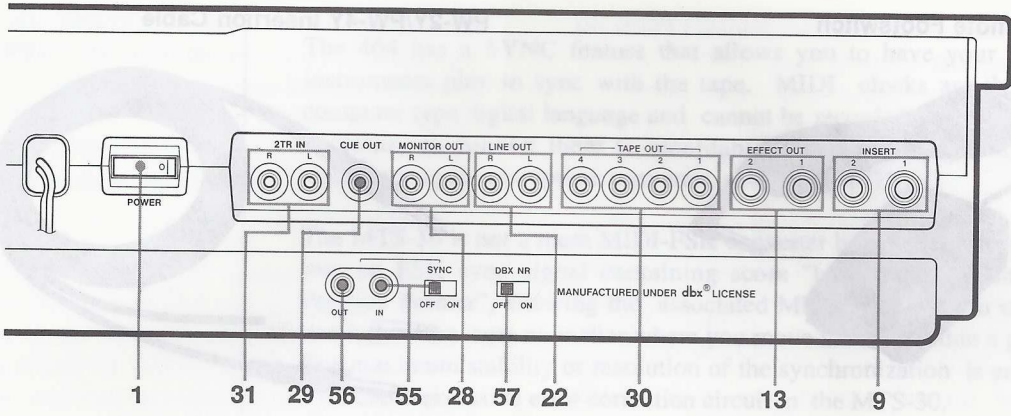


HC-1 Head Cleaner & RC-1 Rubber Cleaner (U.S. only)





# Features and Controls





1. **POWER switch (on the rear panel)** : Turns the 464 on and off.

#### Input Section (Channels 1 through 4)

2. **MIC/LINE IN** : The 3-contact XLR type connector accepts balanced microphone signals ranging from -60 dBV (1 mV) to -20 dBV (0.1 V), depending on the setting of the TRIM control. Its companion 1/4" jack is primarily intended for unbalanced, line-level signals (synthesizers, etc). But it also accepts lower-level signals (down to -50 dBV) when you amplify them using the TRIM control.

#### NOTE

DO NOT use both the XLR-type and 1/4" connections in the same channel at one time. Disconnect one when the other is used.

3. **TRIM control** : This sets how much preamplification level there is on the MIC/LINE INputs. When TRIM is turned all the way to the left, the preamplifier gain is low, allowing the jack to accept line level sources such as electronic instruments or other -10 dBV output audio equipment. As you turn TRIM up, the preamplifier gain increases, and when you turn TRIM full clockwise, the nominal input sensitivity of the jack increases to -60 dBV (1 mV).
4. **INPUT switch** : This controls what the source of the channel is, and where the MIC/LINE IN source will go.

**MIC/LINE** : The source of the mixer channel is the MIC/LINE INput.

**TAPE (center)** : The source of the mixer is tape playback from the multitrack.

**TAPE and MIC/LINE > L (or R)** : The source of the mixer channel is still tape playback from the

multitrack, but the MIC/LINE IN source connects directly to the MASTER fader, bypassing the mixer controls.

The left position (MIC/LINE) is used when recording microphones/instruments (in Tracking or Overdubbing).

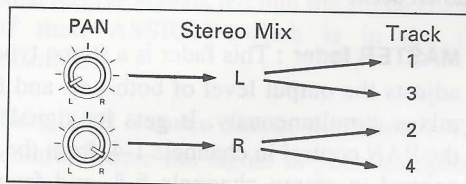
The right position (TAPE and MIC/LINE > L/R) is used during Mixdown, when you need more inputs for external MIDI virtual tracks. In this position, the MIC/LINE IN jack is acting as a "Sub" or "Buss" input to the stereo mix. The only control that affects it before the MASTER is the TRIM control.

5. **EQ HIGH** : This controls the tonality of the high or "treble" frequencies. Turn it to the right to boost the high frequency content of the signal and emphasize its brilliance or brightness. Turning it to the left cuts the high frequency content, if the signal sounds too harsh or shrill. The EQ shelving point is 10 kHz.
6. **EQ MID Frequency and Amount** : The upper knob changes the center frequency of the MID equalizer from 250 Hz to 5 kHz. The lower knob controls how much cut or boost is applied to the band chosen by the upper knob. Turning the lower knob to the right amplifies the band, to a maximum of 14 dB. Turning it to the left cuts the band, to a maximum of -14 dB. At center, there is no effect (flat response).
7. **EQ LOW** : Turned to the right, the control boosts the bass frequencies and the signal will sound relatively heavy. Turn the control to the left to cut bass and make the signal sound thinner. The EQ shelving point is 100 Hz.
8. **PAN control** : This control allows you to create stereo mixes by sending the signal from the channel fader in continuously variable degree to the left or right side of the stereo mix. If the PAN is set towards the center, it is possible to send to both sides at once.

The 464 mixer has only two main mix outputs while the incorporated recorder has four tracks.



You can record all 4 tracks at one time (using **DIRECT**), but when recording a mix of multiple sources you must record only 2 tracks at a time : one from Left, one from Right. The diagram below depicts how a channel signal goes through the mixer controls to the tracks.



**9. INSERT jack (on the rear panel) :** Lets you insert an external signal processor (typically a compressor or equalizer) in the input channel signal path between the EQ section and the channel fader. If nothing is plugged into this jack, it has no effect ; signal will go down the channel normally. Use the TASCAM PW-2Y/4Y insertion cable.

**10. Channel Fader :** This linear control varies the level feeding the MASTER fader and the EFFECT send controls.

The nominal setting position is between 7-8 (shaded area).

#### Effect Send Section

Through this section of the 464, channel signals are sent to external devices, primarily effects processors (such as reverb units).

**11. EFFECT send control :** This gets its signal from a point just after the channel fader (i.e., "post fader send") and routes the corresponding channel signal to the EFFECT MSTR. Turn the control to the right to send more signal to the EFFECT MSTR.

**12. EFFECT MSTR :** This is the master volume controls for the Effect Send mix. It gets signal from the four EFFECT controls in the channels. It sends signal to the EFFECT OUT jacks on the back panel.

**13. EFFECT OUT jacks :** These are the output jack for EFFECT send mixes 1 and 2 of the 464. Signal comes here directly from the EFFECT MSTR level controls. They are typically connected to the inputs of external devices such as reverbs, digital delays, etc. (After the signals are processed, they are usually returned to the 464 via STEREO INPUTS on channels 5-6 through 11-12.) The Effect Send system may also be used to feed a separate monitor, but it will be affected by changes to the channel fader.

#### Stereo Inputs Section

This section of the 464 includes four stereo signal paths which are equivalent to eight additional inputs. You can use these inputs as "Effect Returns".

**14. STEREO INPUTS :** You can connect the outputs of your effects devices to these 1/4" jacks, but they can be used for any line level input if desired (especially jacks for channels 5-6 and 7-8 because these channels have their own EQ and Fader and can also be assigned to the Effect Send mix).

The nominal input level is -10 dBV (0.3 V) ; the STEREO INPUTS have no trim control so it cannot accept microphone signals unless they are preamplified.

**15. ASSIGN :** This controls where STEREO INPUTS will go :

**MAIN (Ch.5-6 and 7-8) :** For sending signal through the channel controls (EQ, fader and BAL) to the Left and Right sides of the main stereo mix for recording. The signal is also sent to the EFFECT 1 and 2 controls.

**L-R (Ch. 9-10 and 11-12) :** For sending signal directly to the Left and Right sides of the main stereo mix for recording.

■ The ASSIGN switch in channels 9-10 and 11-12 gets its signal from the input LEVEL control, while the switch for channels 5-6 and 7-



8 gets its signal directly from the input jacks on the respective channels.

**OFF** : Stops signal here.

**CUE** : Setting the switch to this position lets you send signal directly to the CUE MASTER control. Useful for hearing MIDI-sequenced "virtual tracks".

**16. EQ (Ch.5-6 and 7-8)** : These HIGH and LOW controls provide the same functions as the counterparts in channels 1-4.

**17. Channel Fader (Ch.5-6 and 7-8)** : This varies the level feeding the BAL control and the EFFECT send 1 and 2 controls.

**18. BAL, balance (Ch.5-6 and 7-8)** : This works similarly to the PAN control on channels 1-4. It controls the relative level of the left and right signals. The left signal goes to the left side of the stereo mix, and the right signal goes to the right side at all times, as long as there are two inputs (left and right) plugged in. If only the MONO input is plugged in, the stereo feature is defeated, and the BAL control works just like PAN, sending the one input anywhere to the left or right of the stereo mix.

**19. EFFECT send control (Ch.5-6 and 7-8)** : When using the stereo channels as additional inputs (not as effects returns), this control adjusts how much signal will be sent to the EFFECT MSTR control. It gets its signal from a point after the channel fader (i.e., "post fader send").

**20. LEVEL control (Ch.9-10 and 11-12)** : This rotary control varies the level fed into the corresponding stereo channel and going to the L-R or the CUE mix as selected by the ASSIGN switch.

LEVEL does not work like BAL in channels 5-8. If you turn it to the right, you're increasing the level of both Left and Right inputs at the same time.

## Stereo Output

The main output of the 464 gets its signal from the individual channels already listed, and sends them to the internal multitrack recorder, or to an external mixdown deck.

**21. MASTER fader** : This fader is a stereo type and adjusts the output level of both Left and Right mixes simultaneously. It gets its signal from the PAN control in channels 1-4, from the BAL control in stereo channels 5-8, and from the ASSIGN switch in stereo channels 9-12. It sends signal to the LEFT and RIGHT position of the track RECORD FUNCTION switches, to the LINE OUT L-R jacks on the back panel, and to the MONITOR LEFT and RIGHT switches.

This fader controls the overall level both for multitrack recording (when not using DIRECT) and for mixdown.

**22. LINE OUT L-R jacks** : These jacks are the line-level outputs from the MASTER fader. The L and R jacks are typically connected to your two-track mixdown recorder at MIXDOWN. Another use of the LINE OUT jacks is when you want to send the mixer outputs of the 464 to the sub inputs of a larger mixer.

## Tape Cue and Monitor Section

The MONITOR section allows you to control what you hear in the headphones/monitor speakers, without affecting what's printing to tape. The TAPE CUE section is crucial to successful multitrack recording.

**23. TAPE CUE controls 1-4** : These act as a separate 4x1 submixer. Each control gets signal directly from the corresponding tape track. You turn each control to set the level of each track in the CUE mix. The overall level of the CUE mix depends on the CUE MASTER control.

These controls are totally separate from the Channel controls and the stereo MASTER fader.



The output of the TAPE CUE submixer appears at the CUE OUT jack, and at the MONITOR CUE switch.

**24. CUE MASTER control :** This gets its signal from tape via the TAPE CUE controls. It can also receive signals fed into the stereo channels if their ASSIGN switch is in the CUE position.

**25. MONITOR source select switches :** These control where the signal in your headphones/monitor speakers is coming from. They can be used in combination.

**LEFT :** Press this to hear the Left output of the mixer, so you can hear the sources going to tape during recording. To hear the Left output at the center in the headphones/monitor speakers, the RIGHT switch must be OFF.

**RIGHT :** Press this to hear the Right output of the mixer. To hear the Right output at the center in the headphones/monitor speakers, the LEFT switch must be OFF.

If only either side of the stereo mix is active and both the LEFT and RIGHT switches are on, that left or right buss feeds the corresponding side of the monitor mix and cannot be heard at the center.

**EFFECT 1 :** Press this to hear the mix being sent to the EFFECT OUT 1 jack. You can hear it at the center in the headphones/monitor speakers if the EFFECT 2 switch is OFF. If both the EFFECT 1 and 2 switches are ON, you'll hear the Effect 1 mix on the left side and the Effect 2 mix on the right side.

**EFFECT 2 :** Similar to EFFECT 1. Pressed, this lets you hear the mix being sent to the EFFECT OUT 2 jack. You can hear it at the center of the headphones/monitor speakers if the EFFECT 1 switch is OFF.

**CUE :** Press this to hear the TAPE CUE section, so you can hear *what's being played back* from the multitrack tape while overdubbing.

The stereo channels (5-6/7-8/9-10/11-12) are also be heard without recording by pressing this CUE switch if their ASSIGN switch is in the CUE position.

The CUE mix is always in the center (mono).

#### NOTE

Don't use CUE when bouncing tracks -you won't get an accurate picture of the mix in your phones. Use LEFT and RIGHT MONITOR switches instead (LEFT when bouncing to track 2 or 4, RIGHT when bouncing to track 1 or 3).

**2TR IN :** Press this to hear the output of your 2-track mixdown recorder plugged into the 2TR IN L and R jacks.

**26. LEVEL control :** This sets the level feeding both the MONITOR OUT and PHONES jacks.

**27. PHONES jack :** Connect any stereo headphone (with a 1/4" stereo TRS 3-conductor plug) to this jack. Signal comes here from the MONITOR select switches.

#### CAUTION

Don't connect a 2-conductor mono plug to this jack, which will short out one of the headphone amplifiers, causing it to burn out.

**28. MONITOR OUT L and R jacks :** These provide a line level version of the same signal that feeds the PHONES jack and may be connected to your control room speaker amplifier.

**29. CUE OUT jack :** This jack carries tape playback signal and may be connected to the input of a studio speaker amplifier. This gets signal directly from the CUE MASTER control. As opposed to MONITOR OUT, CUE OUT is always MONO. During overdubbing, many performers play better when they're listening in mono.

Here also comes signal from the CUE position of the ASSIGN switch in stereo channels 5-6



through 11-12. This signal may be sent to an additional effect device.

**30. TAPE OUT jacks :** These get signal directly from the tape (jack 1 from track 1, jack 2 from track 2...). Use them if you want to mix the tape down with an external mixing console, or if you want to make a backup copy of your master 4-track onto another tape deck.

**31. 2TR IN L and R jacks :** These jacks connect directly to the MONITOR select 2TR IN switch. They are typically connected to the -10 dBV unbalanced outputs of a two track mastering recorder, so playback can be heard in the headphones/control monitor speakers without disturbing any settings or risking feedback by brinking the two track returns into a channel.

#### Recorder section

**32. Cassette compartment door :** To insert or remove a cassette, push on the door's lower right hand corner (marked PUSH OPEN). Once a cassette is inserted, be sure to close the door. This will prevent objects, dust or liquids from falling into the tape path.

**33. REW key :** Winds tape at high speed in reverse.

**34. F.FWD key :** Winds tape at high speed in the forward direction.

**35. STOP key :** Stops any tape motion and disables all transport modes.

**36. PLAY key :** Provides various functions :

- a) Starts playback if this key alone is pressed.
- b) Starts recording ("punch in") if pressed together with RECORD when any tracks are in Record Ready mode with the REC indicator for them are blinking in the display.
- c) Stops recording ("punch out") if pressed when any tracks are in Record mode without stopping the tape motion.

d) Activates a Cleaning Mode if you press POWER while holding PLAY down. For more information on the Cleaning mode, see p.49.

**37. PAUSE key :** Temporarily stops play or recording. To resume the function interrupted, press PLAY (not PAUSE).

When pressed after RTZ, it programs the tape to park in Pause at the counter zero point.

**38. RECORD key :** Hold this key and press PLAY, or press the sole RECORD when tape is playing, to start recording on the track or tracks as selected by the RECORD FUNCTION switches.

**39. TAPE SPEED select switch :** Controls the speed of the transport in both record and playback.

**HIGH** (3 3/4 i.p.s., 9.5 cm/sec.) is the position you should use for master recording, since it offers slightly better frequency response and signal-to-noise ratio than standard speed. In high speed, a C-60 offers 15 minutes of 4-track recording.

**NORM** is standard cassette speed of 1-7/8 i.p.s. (4.8 cm/sec.). It offers compatibility with other cassettes, acceptable sound quality for less critical work, and 30 minutes of recording on a C-60.

#### NOTE

Be careful not to touch the TAPE SPEED switch inadvertently (especially when the tape is running). Changing the tape speed has the following consequences :

- a) Operation modes (such as REHEARSAL, AUTO IN/OUT, REPEAT) are disabled ;
- b) Memory points (MEMO 1 and 2) are erased ; and
- c) The tape counter is reset to 00.00.



**40. PITCH CONTROL dial :** Provides a plus or minus 12% variation (approx.) to the tape speed in both record and play modes. Turn the dial to the left to lower the speed, or to the right to increase the speed. Set the dial to the center "0" position for the tape to run at the standard speed.

This can sometimes be used to save parts that are a little out-of-tune, or to create sound effects such as flanging. Note that if you record with the dial at its maximum or minimum settings, you will NOT have the ability to make further adjustment in that direction upon playback.

**CAUTION**

The PITCH CONTROL dial affects the record speed also. Check to make sure that the dial is at its center "0" position unless you are using the function intentionally.

**41. REMOTE PUNCH IN/OUT jack :** For connection to the optional RC-30P remote footswitch.

**42. RECORD FUNCTION switches, TRK 1-4 :** These switches put the respective tracks into Record Ready. The REC indicator for them will flash in the display. Recording starts when you hold RECORD and press PLAY. The REC indicator that was flashing will turn on solid.

Pressing the RECORD FUNCTION switches again turn off the REC indicators and the tracks are put into Safe mode.

The RECORD FUNCTION switches also select what source will be recorded. For example, Track 1 can record either the single source plugged into Channel 1 of the mixer (DIRECT), or the entire LEFT mix (which may have as many as eight sources : four mono, four stereo). The other RECORD FUNCTION switches work in the same way: either DIRECT from the same-numbered mixer channel, or from the MASTER stereo mix : Tracks 1 & 3 from LEFT, Tracks 2 & 4 from RIGHT.

The DIRECT position of Track 4 also has a SYNC function. If the SYNC switch is in its ON position, Track 4 will be recorded with signal from the SYNC IN jack on the rear panel, instead of the direct output from Channel 4 of the mixer.

**43. DIRECT :** This switch is used together with the RECORD FUNCTION switches to send the post-fader signal of channels 1-4 directly to the same-numbered tracks (ch.1 to track 1, ch.2 to track 2, and so on), without passing through the stereo MASTER fader.

The switch is activated when you hold it down and press any of the RECORD FUNCTION switches.

**44. Meters :** The left four meters show the level coming either from the stereo MASTER fader or directly from the channel faders 1-4 (DIRECT), and going to each of the four tracks. Use these meters to set the recording level, before entering a Record mode, or even if tape is not yet in the transport. When a track or tracks are in Safe mode, the respective meters show the playback level.

**REC indicators :** The L indicator flashes ("Ready") or turns on solid ("Record") when track 1 or 3 is fed with the Left side of the stereo MASTER mix. The R indicator works in the same way for tracks 2 and 4. In DIRECT recording, the L/R indicators give place to numbers 1-4.

The right two MONITOR meters will switch to show the level in the monitor mix selected by the MONITOR switches.



#### 45. Tape counter and RESET button :

This 4-digit counter displays the elapsed time from a zero reference point. Each time you press the RESET button just below, a new zero reference point is established. Pressing RTZ gets you back to that location.

■ See also "The Tape Counter is Not a Clock" in the section on "Precautions and Recommendations".

#### 46. Other Indicators in the Display Window :

**dbx** : Lights when the DBX NR switch on the rear panel is set to its ON position and the NR system is active.

**RHSL** : Flashes indicating that a punch-in/out sequence is being programmed, and turns on solid when programming is complete.

**AUTO** : Flashes when a punch-in recording actually starts on tape as programmed in REHEARSAL mode, and turns on solid when the 464 punches out of record.

**START**: Lights when the preroll start point of punch-in sequence is established.

**REPEAT** : Lights when a repeat play is taking place.

**MEMO 1** : Flashes when you press LOC 1 while holding MEMO IN down, and turns on solid the instant you release LOC 1, indicating the current tape location is loaded into the MEMO 1 register.

**MEMO 2** : Similar to MEMO 1 : flashes then turns on solid as you operate LOC 2 and MEMO IN.

**IN and OUT** : IN lights when a punch-in point is established in REHEARSAL setting mode (RHSL flashing). OUT lights when a punch-out point is established (IN turning off). Similarly, during REHEARSAL (RHSL on solid) and AUTO IN/OUT both indicators turn

on and off as the tape passes by preset IN and OUT points.

#### 47. RTZ (Return To Zero) :

When this key is pressed in any transport mode, the tape will fast wind to the counter 00.00 point.

When located to the counter zero point, the tape will:

STOP – if no key was pressed after RTZ ;

PLAY – if PLAY was pressed after RTZ ; or

PAUSE – if PAUSE was pressed after RTZ.

#### 48. LOC 1 and 2 keys :

These keys let the tape locate to the MEMO 1 and 2 points, respectively (p.35).

When located to the MEMO points, the tape will :

STOP – if no key was pressed after RTZ;

PLAY – if PLAY was pressed after LOC ; or

PAUSE – if PAUSE was pressed after LOC.

#### NOTE

The LOC keys are effective in Record mode too. Don't press either when record is taking place.

#### 49. REPEAT 1-2 :

This provides a "playback loop" or "block repeat" between MEMO 1 and MEMO 2 points (p.35).

#### 50. MEMO IN :

Used to load the current tape location into the MEMO 1 and 2 registers (p.34).

Resetting the tape counter to 00.00 does not move the MEMO points.



- 51. **MEMO CHECK** : Lets you see the time location you have loaded into MEMO 1/2 (p.34).
- 52. **REHEARSAL switch** : Helps you rehearse a punch-in without erasing anything until you are ready to actually record (p.26).
- 53. **AUTO IN/OUT switch** : Automates the occurrence of the punch-in/out sequence (Preroll, Punch-in, Punch-out and Postroll) as you programed in REHEARSAL mode (p.27).
- 54. **CLEAR key** : Turns off the RHSL and AUTO IN/OUT functions (pp.26-27). This key has no effect during any other modes.

**SYNC and DBX Features (on the rear panel)**

- 55. **SYNC IN jack and SYNC ON/OFF switch** : This typically accepts FSK-converted MIDI sync signals from devices such as the TASCAM MTS-30.

When the adjacent SYNC switch is set to its ON position, Track 4 is electronically disconnected from the dbx noise reduction system ; and when the TRK 4 RECORD FUNCTION switch is pressed while holding the DIRECT switch, Track 4 receives signal directly from the SYNC IN jack

When the 464 is in Play mode, track 4's play signal is sent directly to the SYNC OUT jack. Note that Track 4 play signal goes also to the TAPE side of the channel 4's INPUT switch. Be sure to set the switch to the left MIC/LINE position to stop sync tones going down the channel.

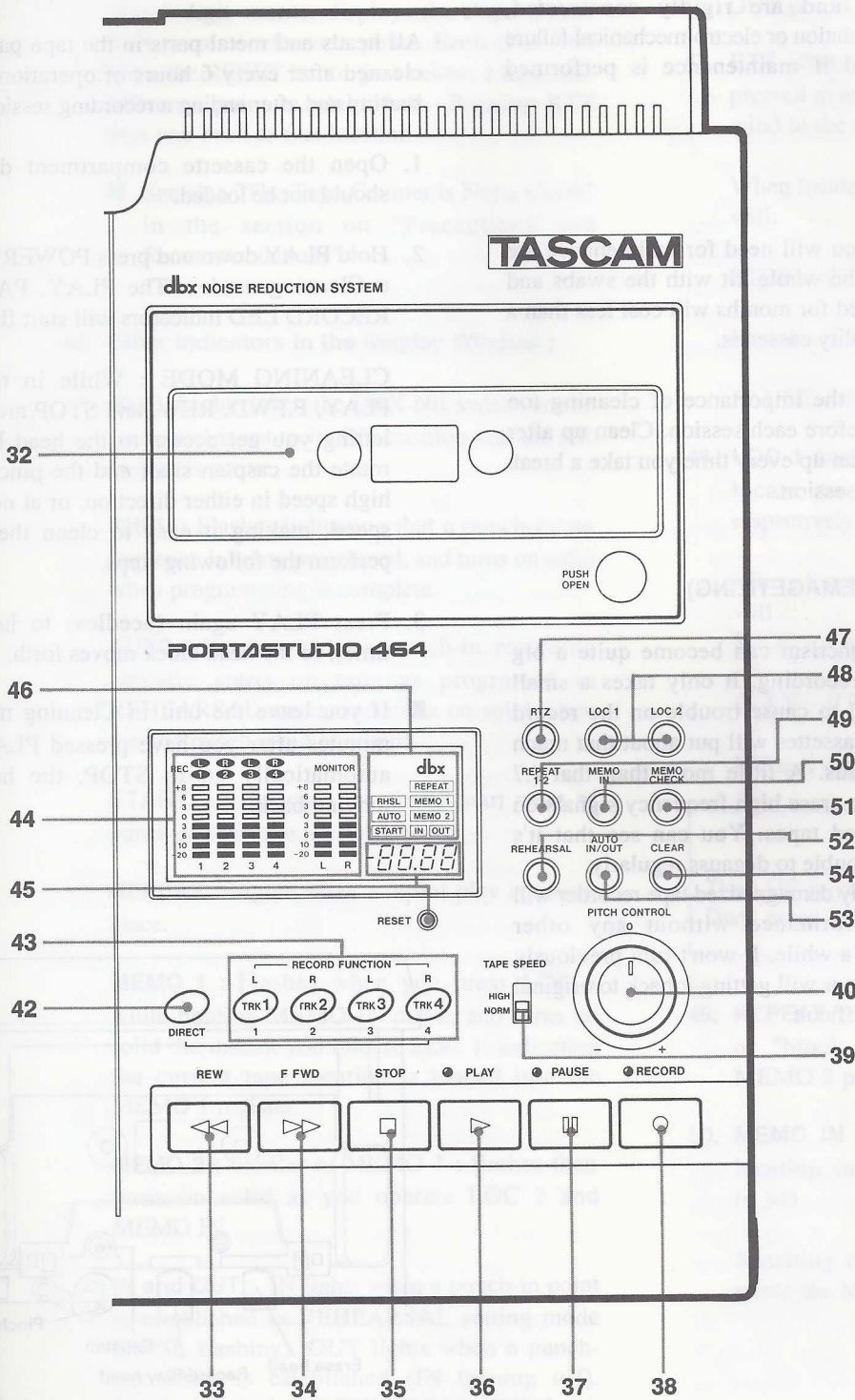
If you wish to use Track 4 for standard recording instead of SYNC tones, set the SYNC switch to OFF.

- 56. **SYNC OUT jack** : FSK tones recorded on track 4 are sent out from this jack to the MTS-30 or other synchronizers.

This jack always gets its signal directly from track 4.

- 57. **DBX NR ON/OFF switch** : When this switch is set to its ON position, the built-in dbx noise reduction system for all 4 tracks is turned on. This is the normal position for all recording and playback. When the adjacent SYNC switch is set to its ON position, only track 4 is disconnected from the dbx system

The dbx NR system provides a net noise reduction (broadband, not just hiss) of about 30 dB, and also permits a net gain in tape headroom of about 10 dB, allowing recordings over a 90 dB dynamic range.



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## Care And Maintenance

Even though the heads used in your 464 have high wear resistance and are rigidly constructed, performance degradation or electro-mechanical failure can be prevented if maintenance is performed regularly.

### 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.

### DEGAUSSING (DEMAGETIZING)

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.

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.

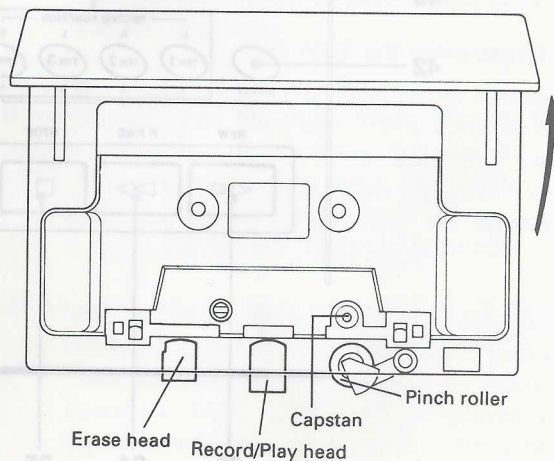
### Cleaning the Heads and Tape Guides

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.

1. Open the cassette compartment door. Tape should not be loaded.
2. Hold PLAY down and press POWER to activate a Cleaning mode. The PLAY, PAUSE, and RECORD LED indicators will start flashing.

**CLEANING MODE :** While in this mode, PLAY, F.FWD, REW, and STOP are effective, letting you get access to the head block, and rotate the capstan shaft and the pinch roller at high speed in either direction, or at normal play speed, making it easy to clean them as you perform the following steps.

3. Press PLAY again (needless to hold it this time), so the head block moves forth.
- If you leave the unit in Cleaning mode for 5 minutes after you have pressed PLAY, it will automatically go to STOP, the head block moving back.



- 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

- Press a cotton swab that has been moistened with rubber cleaner to the pinch roller on the right hand side of the capstan shaft (or, on the left hand side if REW is pressed). This will prevent the swab from becoming tangled in the mechanism.

- Clean it until there is no visible residue coming off onto the swab.

- Using a clean cotton swab, wipe off all the 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

- Clean the capstan shaft by lightly pressing a cotton swab moistened with head cleaning fluid onto the shaft. Clean thoroughly and wipe off excess fluid.

#### Degaussing the Tape Path

- Slowly move in to the tape path. Move the degausser slowly back and forth, 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.
- To complete the cleaning and demagnetizing procedure, press RESET.

#### 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.

#### SYNC and DBX Features (on the test panel)

55. SYNC IN Jack and SYNC ON/OFF switch : This typically accepts FSK-connected MIDI sync signals from devices such as the TASCAM MT-30.

When the adjacent SYNC switch is set to its ON position, Track 4 is electronically disconnected from the dbx noise reduction system ; and when the TRK 4 RECORD FUNCTION switch is pressed while holding the DIRECT switch, Track 4 receives signal directly from the SYNC IN Jack.

When the 404 is in Play mode, track 4's play signal is sent directly to the SYNC OUT Jack. Note that Track 4 play signal goes also to the TAP side of the channel 4's INPUT switch. Be sure to set the switch to the left MIC/LINE position to stop sync tones going down the channel.

If you wish to use Track 4 for standard recording instead of SYNC tones, set the SYNC switch to OFF.



## Some Commonly Asked Questions about the Portastudio

- Q. I plugged into track two, but it didn't record there. Why?
- A. First of all, it's impossible to plug into a track. You plug instruments into a channel of the mixer. The word track, in recording, refers to the actual path that your signal makes on the magnetic tape. An instrument plugged into channel two can be recorded on any of the four tracks, depending on the setting of the RECORD FUNCTION and PAN controls. When the RECORD FUNCTION is set to DIRECT, that is the only time when a channel source has to go to the same numbered track.
- Q. The first track I recorded winds up bleeding onto all the other tracks. How can I avoid that, and keep each part on a separate track?
- A. The most common cause of this is the bad habit of switching the INPUT of the first track to the TAPE position for playback, instead of monitoring on the CUE. Don't switch to TAPE on a channel unless you intend to mix down or bounce.
- Q. The instrument I'm recording is really loud in the room, and even when the TAPE CUES are up all the way, they're not loud enough over the live instrument. How can I hear less of the live instrument in the headphones?
- A.
- Make sure the first tracks were recorded at the proper level, and that the new track isn't clipping on the meter.
  - Obtain closed-cup headphones to block acoustic sound.
  - If you're recording using DIRECT, you can lower the MASTER fader to decrease the level of the live instrument in the phones without affecting the recording level.
  - Turn off the LEFT and RIGHT MONITOR switches completely, if you can hear enough of the live instrument acoustically.
- Q. Why can't I get the stereo line inputs to record onto a track?
- A.
- The stereo line inputs cannot DIRECTLY be sent to a single track. The Left input goes to LEFT and the Right goes to RIGHT, so they must be recorded onto two tracks.
  - To record a stereo source onto one track, you must plug the left and right signals into jacks 5 and 7 (or 6 and 8) and turn both BAL controls all the way to the left or to the right, so they may be sent either to LEFT or RIGHT; or, repatch the instrument into two mono channels and mix the sides together.
- Q. I have an external mixer. How can I connect it to the 464, and how should the levels be set?
- A.
- The unbalanced outputs of any mixer that can be adjusted to have a -10 dBV (.316 volt) output may be connected to any of the input jacks of the Portastudio.
  - If connected to inputs 1-4, lower the TRIM levels.
  - It is better to connect the external stereo mixer to the stereo input channels since it can be assigned to CUE there. This is important so you can hear MIDI virtual tracks in the headphones while leaving the Portastudio's mixer free to record vocals etc. onto tape. At mixdown (or if you want to record the external mixer sources onto a track), set the ASSIGN switch back to the MAIN/L-R position.
  - The external mixer should be set for its own best signal-to-noise ratio. If the signal is too loud on the 464's meters when the Channel and MASTER faders are set to 5 or less, you will have to lower the Master output level of the external mixer.
  - You can also connect the 464 to a larger mixer by connecting the TAPE OUT jacks to unbalanced, -10 dBV inputs of the mixer. Since the TAPE OUT jacks get playback signal directly from the tape, there should be no problem in level setting on the part of the external mixer.

# Specifications

## Mechanical Characteristics

<b>Tape:</b>	Compact Cassette (C-30 to 90), High-Bias (Type II, CrO <sub>2</sub> )
<b>Track Format:</b>	4-track/4-channel, single directional record/play
<b>Head Configuration:</b>	4-channel record/play (Permalloy) x1 4-channel erase (ferrite) x1
<b>Motor:</b>	DC servo capstan motor x1 DC reel motor x1 DC ancillary motor x1
<b>Tape Speed:</b>	HIGH: 9.5 cm/sec.(3-3/4 ips) NORM: 4.8 cm/sec.(1-7/8 ips)
<b>Tape Speed Accuracy:</b>	Within +/-2% (at both HIGH and NORM)
<b>Pitch Control:</b>	+/-12 % (approx.)
<b>Wow and Flutter:</b>	0.05% or less WRMS at HIGH 0.06% or less WRMS at NORM
<b>Fast Winding Time:</b>	80 sec. (approx.) with C-60
<b>Dimension (WxHxD):</b>	441 x 115 x 356 mm (17-3/8" x 4-1/2" x 14")
<b>Weight:</b>	5 kg (11 lbs)

## Electrical Characteristics

### Mixer Section

#### MIC/LINE IN

##### (XLR type connector x4)

<b>Input Impedance:</b>	2.8k ohms
<b>Nominal Input Level:</b>	-60 dBV (1mV) (Mic In) to -20 dBV (0.1 V)
<b>Maximum Input Level:</b>	+5 dBV (1.8 V) at Trim Min.

##### (1/4" phone jack x4)

<b>Input Impedance:</b>	50k ohms
<b>Nominal Input Level:</b>	-50 dBV (3mV) (Mic In) to -10 dBV (0.3 V) (Line In)
<b>Maximum Input Level:</b>	+5 dBV (1.8 V) at Trim Min.

#### STEREO INPUTS (1/4" phone jack x4)

##### Ch.5-8

<b>Input Impedance:</b>	20k ohms
<b>Nominal Input Level:</b>	-10 dBV (0.3 V)
<b>Minimum Input Level:</b>	-18 dBV (0.13 V)
<b>Maximum Input Level:</b>	+5 dBV (1.8 V)

##### Ch.9-12

<b>Input Impedance:</b>	10k ohms
<b>Nominal Input Level:</b>	-10 dBV (0.3 V)
<b>Minimum Input Level:</b>	-18 dBV (0.13 V)
<b>Maximum Input Level:</b>	+5 dBV (1.8 V)

#### INSERT (TRS 1/4" jack x2)

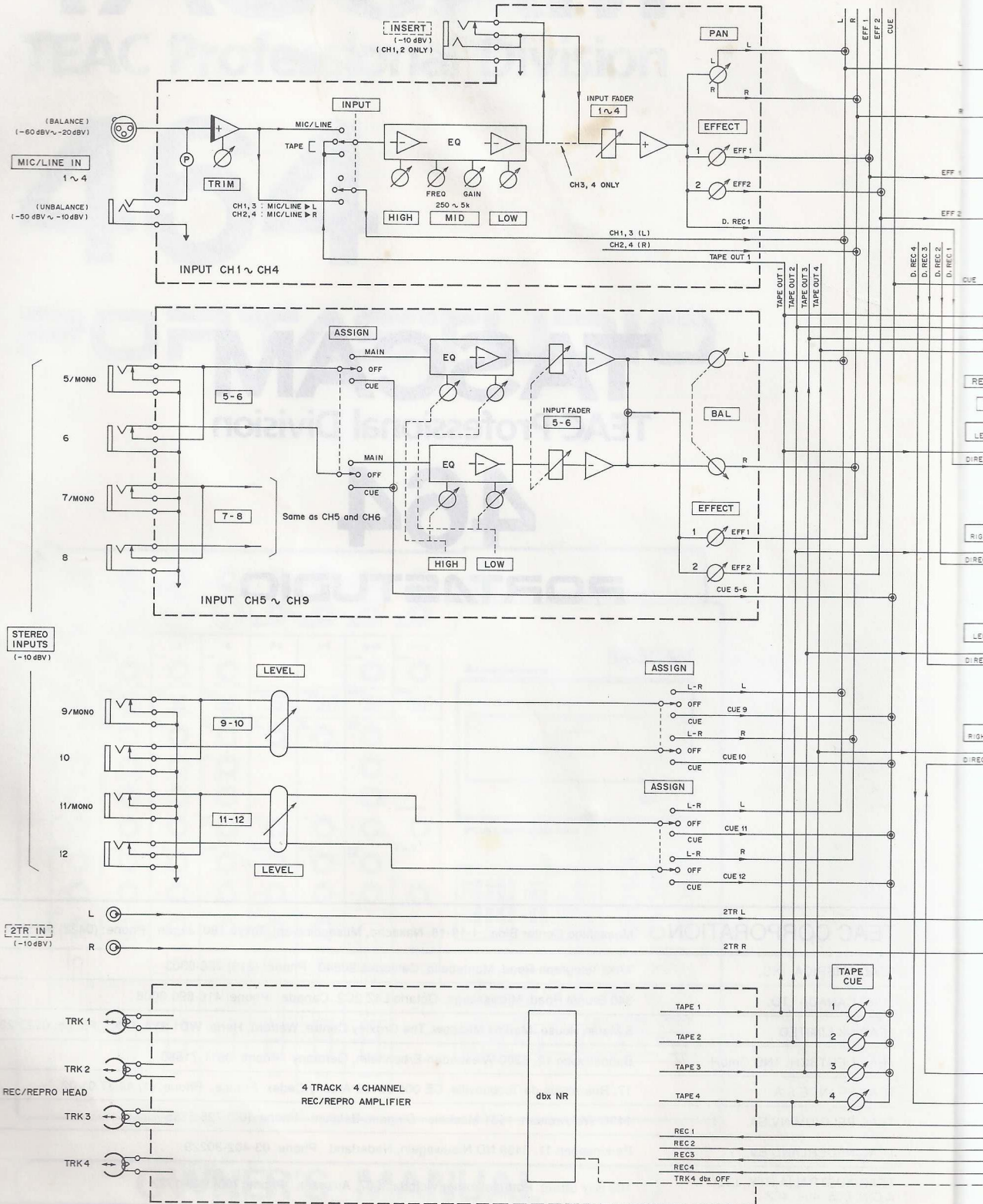
<b>Input Impedance:</b>	10k ohms
<b>Nominal Input Level:</b>	-10 dBV (0.3 V)
<b>Maximum Input Level:</b>	+5 dBV (1.8 V)

<b>Output Impedance:</b>	100 ohms
<b>Nominal Output Level:</b>	-10 dBV (0.3 V)
<b>Minimum Load Impedance :</b>	2k ohms

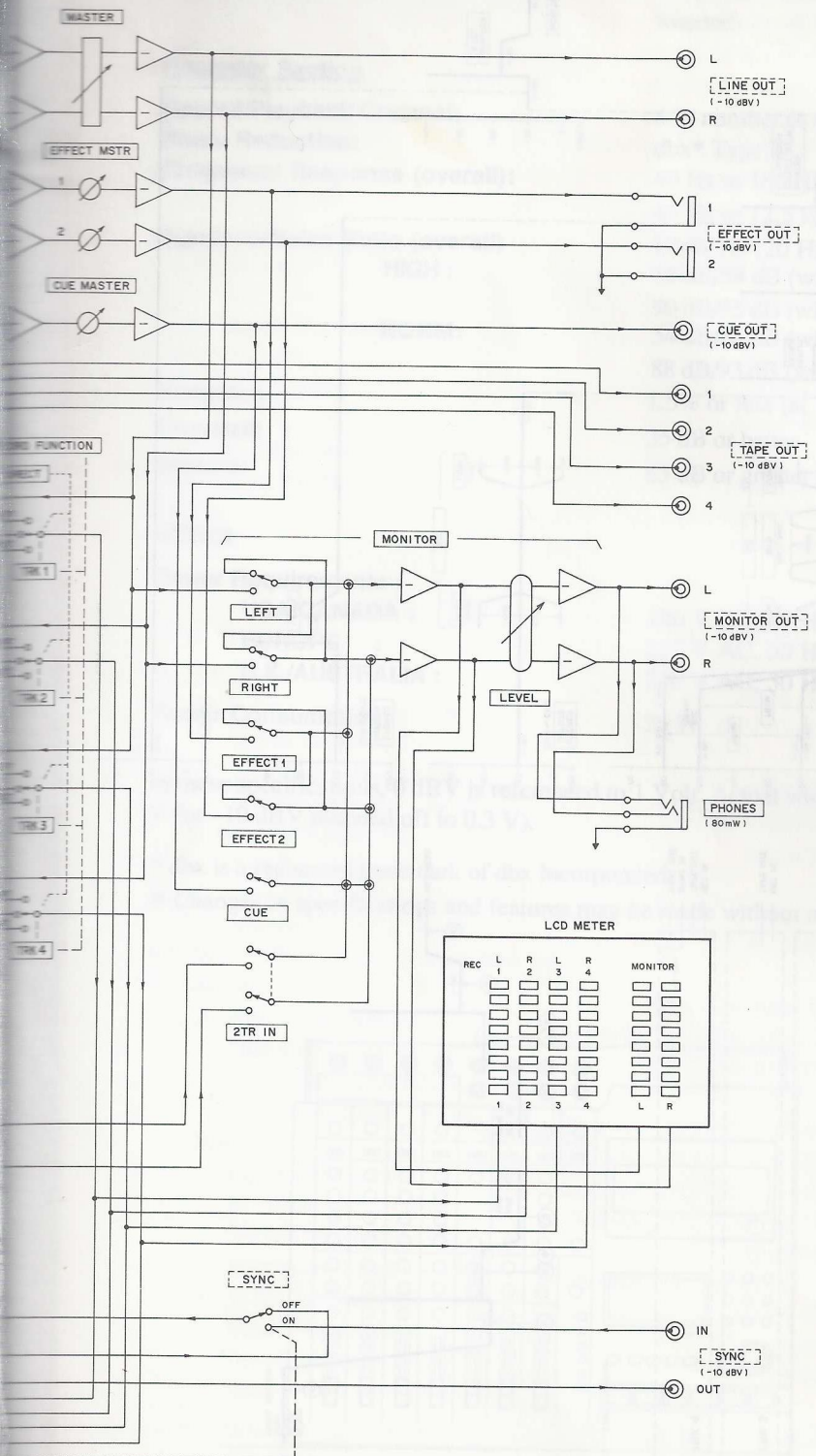


<b>2TR IN (RCA jack x2)</b>	
Input Impedance:	47k ohms
Nominal Input Level:	-10 dBV (0.3 V)
<b>LINE OUT (RCA jack x2)</b>	
Output Impedance:	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
Minimum Load Impedance :	2.0k ohms
<b>EFFECT OUT (1/4" phone jack x2)</b>	
Output Impedance :	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
Minimum Load Impedance :	2.0k ohms
<b>TAPE OUT (1/4" phone jack x4)</b>	
Output Impedance :	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
Minimum Load Impedance :	2.0k ohms
<b>CUE OUT (RCA jack x1)</b>	
Output Impedance :	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
Minimum Load Impedance :	2.0k ohms
<b>SYNC IN (RCA jack x1)</b>	
Input Impedance:	40k ohms
Nominal Input Level:	-10 dBV (0.3 V)
<b>SYNC OUT (RCA jack x1)</b>	
Output Impedance:	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
<b>MONITOR OUT (RCA jack x2)</b>	
Output Impedance :	100 ohms
Nominal Output Level:	-10 dBV (0.3 V)
Minimum Load Impedance :	2k ohms
<b>PHONES (1/4" stereo phone jack x1)</b>	
Nominal Load Impedance:	8 ohms
Maximum Output Level:	100 mW
<b>Equalizer</b>	
HIGH (Shelving):	10 kHz, +/-12 dB
MID (Sweep):	250 Hz to 5 kHz, +/-14 dB
LOW (Shelving):	100 Hz, +/-12 dB
<b>Frequency Response:</b>	
MIC IN to LINE OUT:	20 Hz to 20 kHz, +/-3 dB
LINE IN to LINE OUT:	20 Hz to 20 kHz, +/-2 dB
LINE IN to EFFECT OUT :	20 Hz to 20 kHz, +/-2 dB
LINE IN to PHONES:	40 Hz to 20 kHz, +/-3 dB
<b>Signal-to-Noise Ratio (20 Hz-20 kHz, BPF inserted)</b>	
1 MIC IN to LINE OUT:	65 dB (at nominal -60 dBV)
4 MIC INs to LINE OUT:	60 dB (at nominal -60 dBV)
1 LINE IN to LINE OUT:	76 dB
8 LINE INs to LINE OUT:	70 dB
<b>Distortion</b>	
1 MIC IN to LINE OUT:	0.05% (at 1 kHz, 15 dB above nominal input level, 30 kHz low-pass filter inserted)
1 LINE IN to LINE OUT:	0.05% (at 1 kHz, nominal input level, 30 kHz low-pass filter inserted)

# Block Diagram







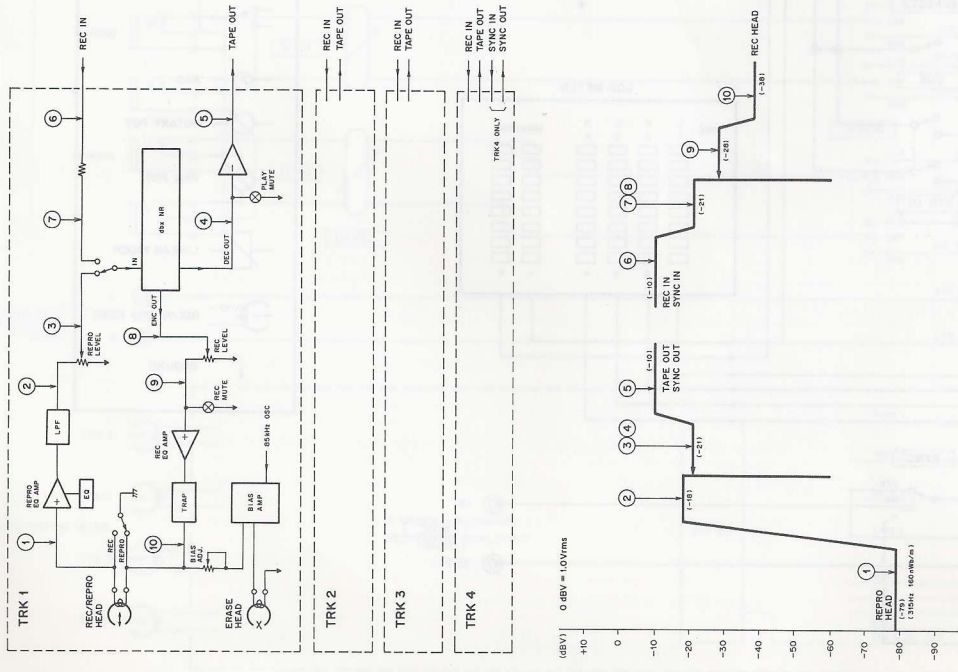
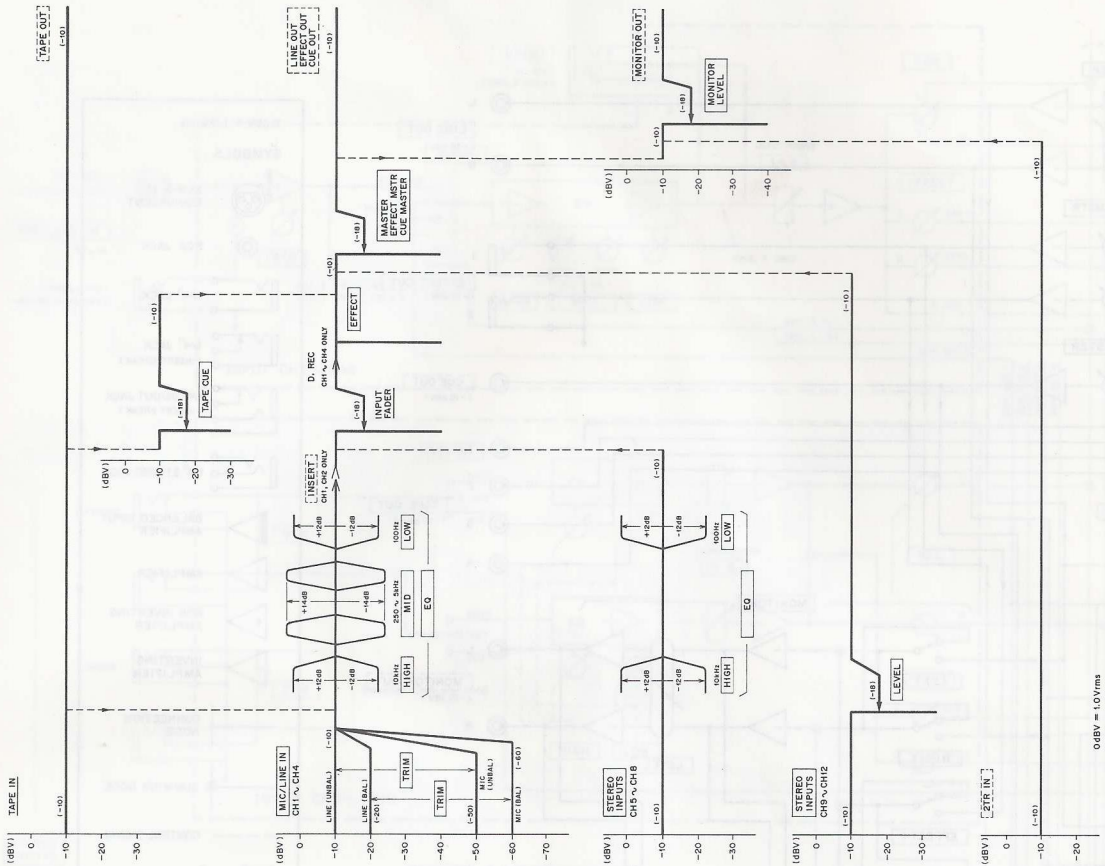
0 dBV = 1.0 Vrms

**SYMBOLS**

- XLR-3-31 EQUIVALENT
- RCA JACK
- 1/4" JACK
- 1/4" JACK (INSERT BREAK)
- 1/4" IN/OUT JACK (INSERT BREAK)
- 1/4" STEREO JACK
- BALANCED INPUT AMPLIFIER
- AMPLIFIER
- NON INVERTING AMPLIFIER
- INVERTING AMPLIFIER
- CONNECTION NODE
- SUMMING NODE
- CONTROL SIGNAL
- SWITCH
- PAD
- ROTARY POT
- PAN POT
- LINEAR FADER
- REC/REPRO HEAD
- GROUND

.316

# Level Diagram





# TASCAM

TEAC Professional Division

# 464

## PORTASTUDIO

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