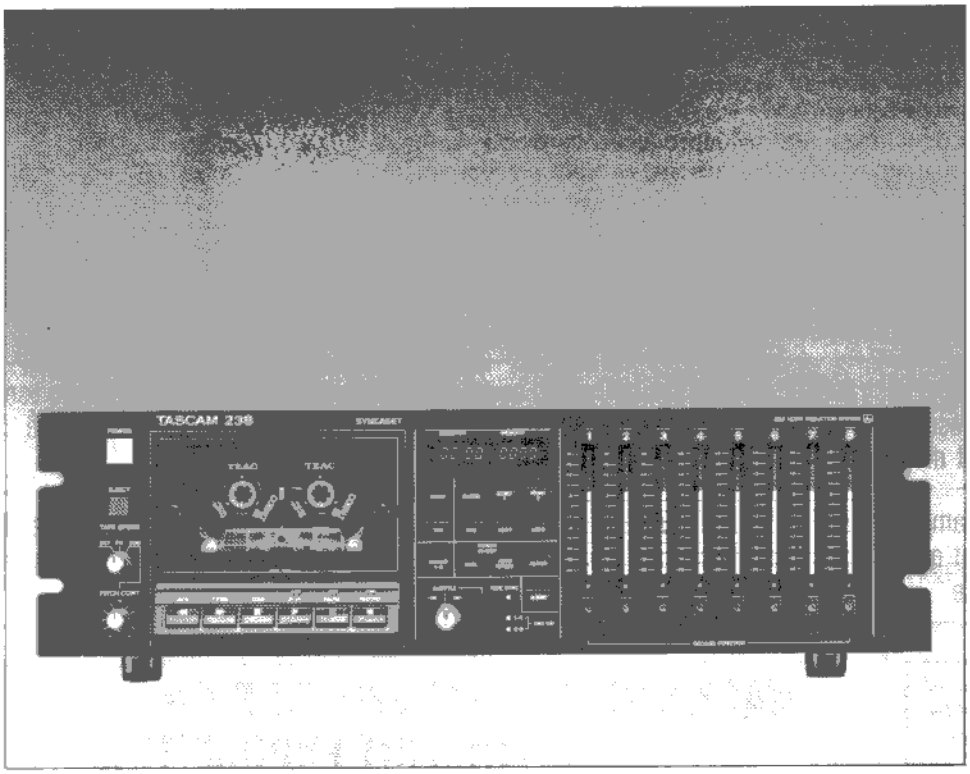
TASCAM

TEAC Professional Division

238

SYNCASET



OWNER'S MANUAL

5700104500

Recording is an art as well as a science. A successful recording is often judged primarily on the quality of sound as art, and we obviously cannot guarantee that. A company that makes paint and brushes for artists cannot say that the paintings made with their products will be critically well-received. The art is the province of the artist. TASCAM can make no guarantee that the 238 *by itself* will assure the quality of the recordings you make. Your skill as a technician and your abilities as an artist will be significant factors in the results you achieve.

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

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

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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.

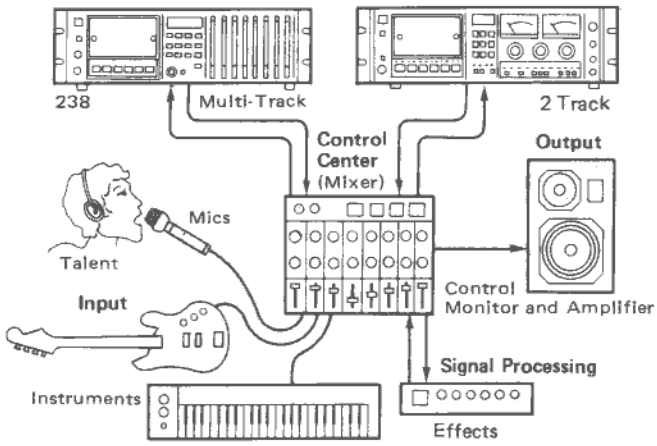
Introduction

The TASCAM 238 Syncaset is a rack-mountable 8 channel/8 track multitrack recorder for professional studio applications. Its transport features microprocessor operation and automatic functions for high reliability, stability, and ease of use in an ever-more complex studio environment. Many features previously available only on 24-track machines have been included in the 238 so you can concentrate on your creative work instead of technical details. It records on readily available standard (Philips) Compact Cassette tape, high bias Type II using built-in DBX noise reduction. The 238's discrete 8-channel format head was developed by TEAC especially for TASCAM multitrack cassette recorders and achieves audio quality specifications equal to TASCAM's original 4-channel Syncaset recorders. Special tape sync circuitry makes it possible to record MIDI/FSK sync tones or SMPTE time code for synchronization of MIDI sequencers. External speed and transport controls are available through a serial port on the rear panel for synchronizing to other recorders or for computer control of functions. An optional remote control and footswitch are available.

The Multitrack System

The 238 is designed to work as the multitrack tape recorder in a system consisting of 5 other components: a mixer, input devices, output devices, signal processing, and a mixdown recorder.

The Six Elements of the System



As you can see, all the connections from the 238 to the rest of the system pass through a mixer. Unlike TASCAM's Portastudios or Ministudios, the 238 is designed to be used with a separate mixer of your choice. Understanding how the other components of your system operate is crucial to successful connection and operation of the 238.

THE 3 PROCESSES OF RECORDING

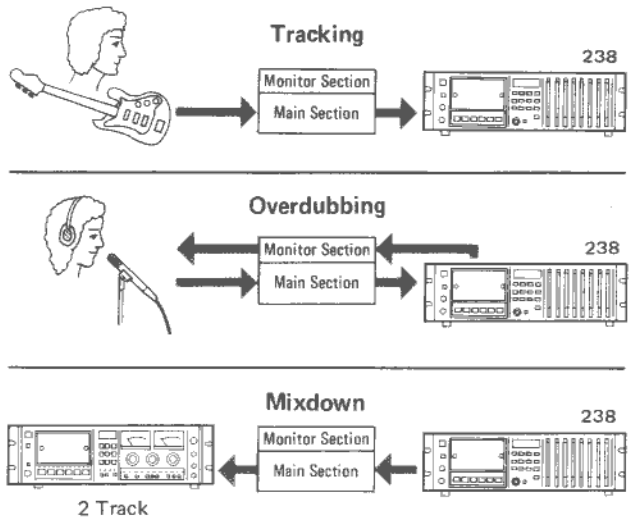
There are basically three processes, or stages, to multitrack recording:

Tracking is the one-way flow from input devices (microphones, instruments, etc.) through a mixer to the 238 for recording the "basic tracks".

Overdubbing involves the heart of multitrack recording: the ability to record on some tracks while simultaneously listening to others. As in tracking, the 238 receives new signals from the mixer for recording; but during overdubs previously recorded "basic tracks" must be *monitored* through a different path in the mixer.

Mixdown is the reverse of tracking: a one-way flow from the 238 through the mixer to the final mixdown media (such as 2-track cassette, DAT, or reel-to-reel recorders).

The Three Steps To Multitrack Recording



HOW THE 238 CONNECTS WITH MIXING CONSOLES

Since it has no level control of its own, the 238 Syncaset must be connected to an external mixer to perform tracking, overdubbing, and mixdown procedures. A mixer designed for recording behaves as if there were more than one mixer in the box, and consists of *main* and monitor sections. Keep in mind also that every control on a console is either a WHERE FROM (input select), HOW MUCH (level control), or WHERE TO (assignment) control.

The **Main mix section** controls HOW MUCH of input devices (microphones, instruments, etc.) will go to the 238 during tracking and overdubbing. The main mix should have multiple group outputs allowing you to mix many inputs to different tracks simultaneously without repatching. This calls for WHERE TO controls: group or program assignment switches and panpots. In most applications, a 4-group output mixer such as the TASCAM M-200 or M-300 will do very well since you will rarely track or overdub more than 4 tracks at any given time. Each group should have -10 dBV unbalanced line level outputs to connect to the input of the 238. During mixdown, the main section of the console is used to mix the eight tracks of the 238 down to a 2-track recorder, so each channel of the mixer should have a WHERE FROM switch that allows you to "reverse the flow" to get signal FROM the 238 instead of FROM microphones or other inputs.

The main section provides mixes primarily to machines. But what about the human beings who are performing and operating the system? They need a separate mix.

A **Monitor (or "cue") section** is a separate set of controls and outputs that feeds a headphone or monitor amp and speakers, allowing performers and engineers to hear what's already been recorded during overdubbing without using up channels of the main mix. This may be a simple 8 input auxiliary section with a mono output for headphones, or a dedicated monitor section with its own "where from" (group/tape or source/return) switches and a stereo output. Some consoles (such as the TASCAM M-300 series) have multiple auxiliary outputs so that each performer can hear a different mix, and the engineer can have a separate one as well.

The 238 has its own built-in source/tape switching that offers great flexibility even if your mixer has a "no frills" monitor section; but it is important that the mixing console have a discrete monitor output. If you have to use the main section to hear the previously-recorded tracks, you run the risk of "bouncing" or re-recording old tracks each time you add new material by overdubbing.

WHAT THIS MANUAL WILL COVER

This manual will demonstrate the basic capabilities of the 238 which include:

- Basic multitrack recording
- INSERT capability with automatic monitor switching from tape to source
- LOCATE functions which allow you to quickly wind tape to any one of 3 specific locations on the tape automatically
- REPEAT, which will play a desired section of the tape over and over automatically
- REHEARSAL and AUTO IN/OUT functions which allow you to set, audibly check, and execute a punch in/out operation automatically
- TAPE SYNC features on Track 8 designed to synchonize the 238 with external devices

This manual has been designed to help you as you learn how to use these features. Please read it throughly and keep it handy as you learn the machine. Taking the time to use this manual now will save you time later on.

About Tape Output Switching

The heart of multitrack recording is the ability to record on some tracks while listening to others. The tape outputs of the 238 are your connection for listening to both the original tracks that have been recorded AND the source you're recording (or getting ready to record). Depending on the position of the RECORD FUNCTION, INSERT, and transport controls, the 238 will allow you to:

- Hear only what's been recorded on tape
- Hear (and meter) the source you're about to record so you can check levels, tune instruments, practice your part, etc.
- Switch the output from tape to source and back again when doing a punch-in/out (insert) to edit previously recorded material
- Using the REHEARSE feature, it will memorize preroll start, punch-in, and punch-out points and automatically switch the monitor from tape to source at those points without actually recording onto the track
- Using the AUTO IN/OUT feature, actually perform the record-in and out operations for you.

HERE ARE THE BUTTONS AFFECTING WHAT YOU HEAR FROM THE OUTPUT OF THE 238:

RECORD FUNCTION

There are eight RECORD FUNCTION buttons and LEDs, one for each tape track. In addition to "arming" a track to record, they control what signal will appear at that track's output jack. As long as a track's FUNCTION button is off, TAPE will appear at the track's output jack when tape moves across the heads, regardless of the position of the INSERT switch.

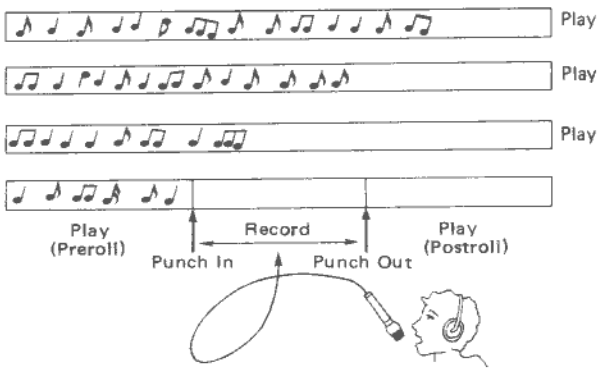
When a track's RECORD FUNCTION is turned ON (and the INSERT switch is off), the signal at its output jack and feeding the meter switches to INPUT. This means that the signal feeding the track's input jack will be reflected right back out its output. You'll hear source regardless of whether the transport is in PLAY ("record ready" mode – the track light will be blinking) or RECORD (track light solid). By listening to the track output, and watching its meter, you can be sure that the connections between the mixer and 238 are OK, and that the proper mix is feeding that track. The only way to hear playback of a track (when INSERT is off) is to turn that track's RECORD FUNCTION switch OFF.

INSERT switch

Hearing source via the tape outputs is convenient when you're originally recording a track, but what about making an insert (or "punch in") into the middle of a track? In this case, you may need to hear the tape up until the actual "punch-in" point (called a *preroll*), then hear the new material being inserted, then switch back to tape after the "punch-out" to see if the insert blended with the following material (called a *postroll*). The INSERT button performs this function. On other recorders this function is called "input/sync" or "preroll sync" switching.

If INSERT is ON, pressing a track's RECORD FUNCTION button will not automatically switch that track's output to source. Instead, you will still get tape from

Insert (Punch-In) Recording



that output until the master RECORD button (or RC-30P footswitch) is pressed. While recording, you'll hear source. When you punch out (by hitting PLAY, STOP or your footswitch) you'll hear tape again.

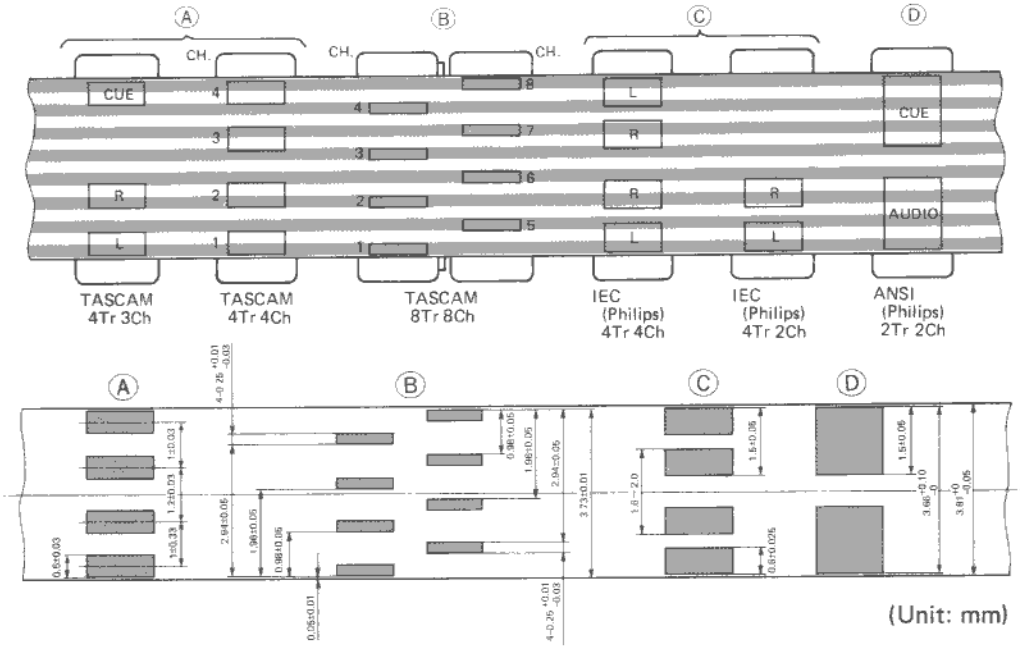
One extra feature: when the 238 is in STOP mode, any track in record ready mode switches to source, so you can stop the deck to check levels, etc. without having to switch out of INSERT mode.

Understanding how the outputs of your 238 SYNCASET work with the RECORD FUNCTION and INSERT buttons will help you understand the operation of REHEARSE and AUTO IN/OUT later on.

Precautions and Recommendations

TRACK FORMAT AND COMPATIBILITY

The 238 Syncaset uses a basic speed of 9.5 cm/sec. (3-3/4 i.p.s. – inches per second) which is two times (2X) the normal speed of a standard audio cassette. It also employs a discrete 8-channel format head developed especially by TEAC for TASCAM multitrack cassette recorders. Here is a comparison of various cassette formats:



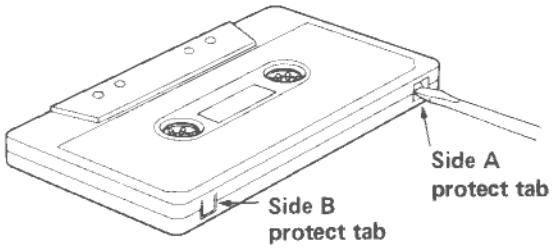
For a description of the 238 Syncaset's track numbering scheme, see Page 17.

Tapes recorded on stereo cassette recorders will not play back properly on the 238 Syncaset because of the differences in the track format and tape speed. For the same reasons, tapes recorded on the 238 Syncaset will not play back properly on stereo cassette recorders. Material recorded on the 238 Syncaset must be mixed down to stereo for general distribution.

The 238 Syncaset, like all multi-track cassette recorders, **records and plays the tape in one direction only**. The 238 Syncaset needs the entire width of the tape to record its eight 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. You might want to get into the habit of consistently using the same side on all your tapes.

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 238 Syncaset uses the entire width of the tape, as mentioned above. If, for example, your remove only one of the tabs, you could accidentally insert the cassette into the 238 backwards and erase all eight tracks of your master.



TAPE TYPE

The 238 Syncaset is internally adjusted for HIGH BIAS "Type II" tape. This means that for best results, you should only use tapes of this type. Examples would include TDK SA, Maxell XL II or equivalent formulations. We strongly suggest that you select one good quality brand and use it exclusively. The time you spend creating your eight tracks is much more valuable than the money you save by buying inferior tape. The cassette shell essentially becomes a part of the 238'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 of the eight tracks. High quality tapes are less likely to cause problems in the long run. Keep in mind that eight track recordings are much more sensitive to damage on the tape than four- or stereo tracks.

TAPE LENGTH

Use the shortest possible tape for a given work. It is not unusual to play the tape 100 times before you are ready to mix down, so select a cassette length that is as close as possible to the length of the program you plan to record. The shorter tapes use thicker and more durable tape stock. The shorter the better!

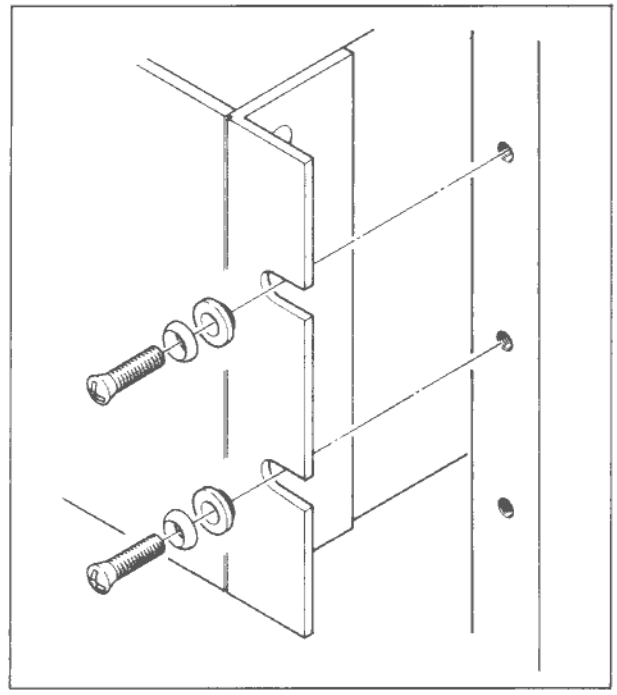
Therefore, the use of "C-120" cassettes is definitely **not** recommended. The tape used in C-120 cassettes is extremely thin and can cause winding problems, crimping, wrinkling, and other damage to the oxide coating of the tape which will destroy your work.

For best results, we recommend that you use C-60 or shorter tapes. Remember that the 2X normal speed of the 238 Syncaset and the "one-side-only" 8-track single-direction format means that a C-90 cassette will play for only 22-1/2 minutes, a C-60 plays for 15 minutes, a C-45 for 11-1/4 minutes and a C-30 for 7-1/2 minutes.

Directions under "Maintenance of the 238 Exterior" on page 27 should be observed to prevent the finish of the unit from being damaged.

Rack Mounting the 238 Syncaset

1. Remove the four feet from the 238 Syncaset by loosening the screws that mount them to the bottom chassis.
2. Refer to the illustration below and securely attach the 238 Syncaset's rack mount brackets to the rack.



Note for U.K. Customers

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 mach 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 in 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.

Voltage Conversion

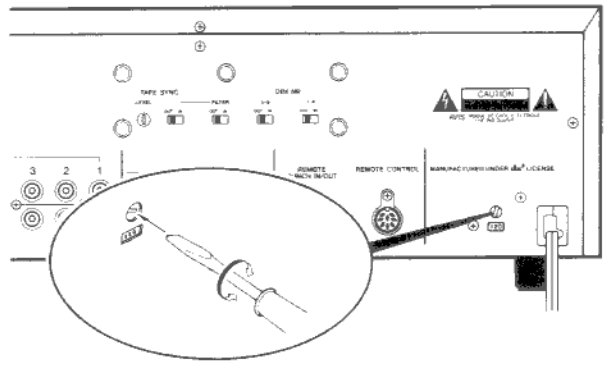
This unit is adjusted to operate on the electric voltage specified on the unit or packing carton.

NOTE: This voltage conversion is not possible on models sold in the U.S.A., Canada, U.K., Australia, or Europe.

For general export units, if it is necessary to change the voltage setting of the 238 to match your area, use the following procedures. ALWAYS DISCONNECT THE POWER LINE BEFORE MAKING THESE CHANGES.

1. Locate the voltage selector on the rear panel of the 238.

2. Using a regular (slot blade) screwdriver, turn the selector until the numerals corresponding to the voltage requirements for your area appear.



Specifications

MECHANICAL CHARACTERISTICS	
Tape	Compact Cassette (C-30/60/90), Hi-bias, type II tape
Track Format	8-track, 8-channel, single directional record/play
Head Configuration	1 record/reproduce, tracks 1—4 and 5—8 staggered (sendust) 1 erase (ferrite)
Motor	1 FG servo DD capstan motor, 1 DC reel motor, 1 DC ancillary motor
Tape Speed	9.5 cm/sec (3-1/2 ips) ±0.5 %
Pitch Control	±12 %
Wow and Flutter	0.04 % WRMS (NAB weighted) ±0.08 % W.PEAK (DIN/CCIR/IEC/ANSI weighted)
Fast Winding Time	70 sec. (approx.) with C-60
Recording/Play Time	15 min. with C-60, pitch control off
Dimensions (W x H x D)	480 x 149 x 345 mm (19" x 5-7/8" x 13-9/16"), rack mount brackets, feet and other protruding parts included
Weight (net)	9.5 kg (20.94 lbs)

ELECTRICAL CHARACTERISTICS	
Line Input (x 8), Unbalanced	
Input Impedance	30 kohms
Nominal Input Level	−10 dBV (0.3 V)
Line Output (x 8), Unbalanced	
Output Impedance	100 ohms
Nominal Output Level	−10 dBV (0.3 V)
Record Channel	8 (dbx switchable per two groups of channels 1-4/5-8)
Playback Channel	8 (dbx switchable per two groups of channels 1-4/5-8)
Bias/Erase Frequency	85 kHz ±5 kHz
Equalization	3,180 μs + 35 μs
Power Requirements	
USA/CANADA	120 V AC 60 Hz
U.K./AUSTRALIA	240 V AC 50 Hz
GENERAL EXPORT	120/220/240 V AC 50/60 Hz
EUROPE	220 V AC 50 Hz
Power Consumption	47 Watts

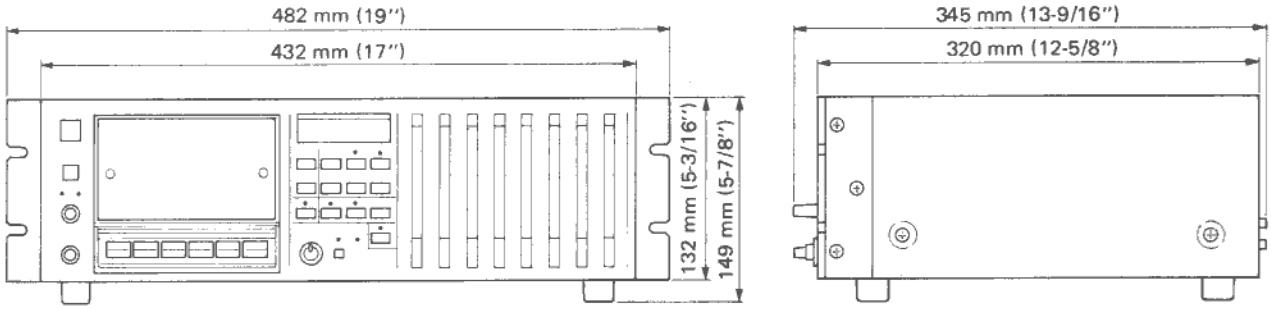
PERFORMANCE CHARACTERISTICS

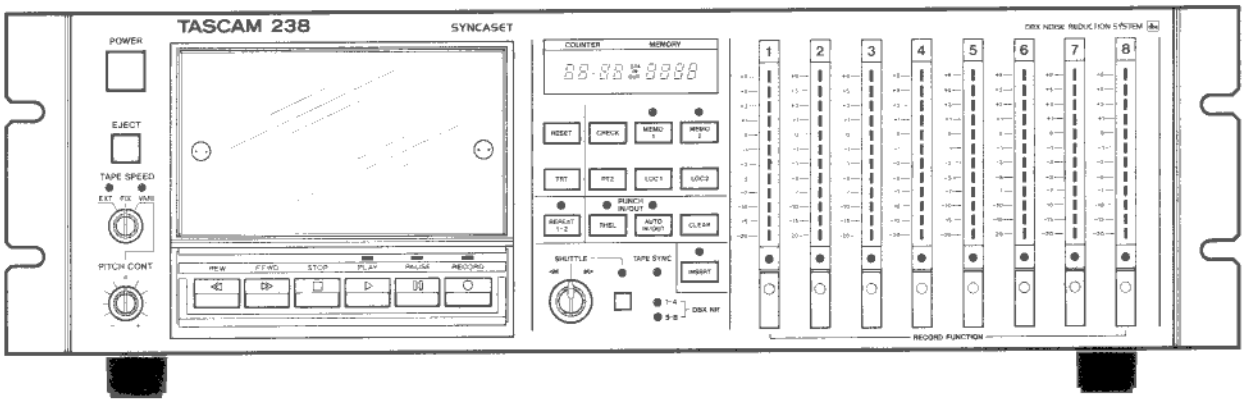
Frequency Response (Overall)	30 Hz to 16 kHz ±3 dB
Signal-To-Noise Ratio (Overall)	93 dB (dbx* IN, IHF "A" weighted, 1 kHz)
(Ref. to 3 % THD)	90 dB (dbx IN, unweighted, 20 to 20,000 Hz)
	58 dB (dbx OUT, IHF "A" weighted, 400 Hz)
	54 dB (dbx OUT, unweighted, 20 to 20,000 Hz)
Distortion (THD)	Less than 0.8 % (400 Hz, 0 VU)
Crosstalk (Adjacent Channels)	70 dB (1 kHz, 0 VU, dbx IN)
Erasure	70 dB (1 kHz, +10 VU)

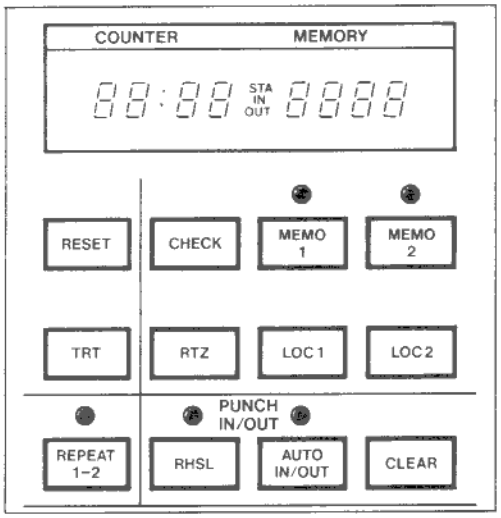
In these specifications, 0 dBV is referenced to 1.0 Volt. Actual voltage levels are also given in parenthesis. To calculate the 0 dB = 0.775 Volt reference level (i.e., 0 dBm in a 600-ohm circuit), add 2.2 dB to the listed dB value; i.e., −10 dB re: 1 V = −7.8 re: 0.775 V.

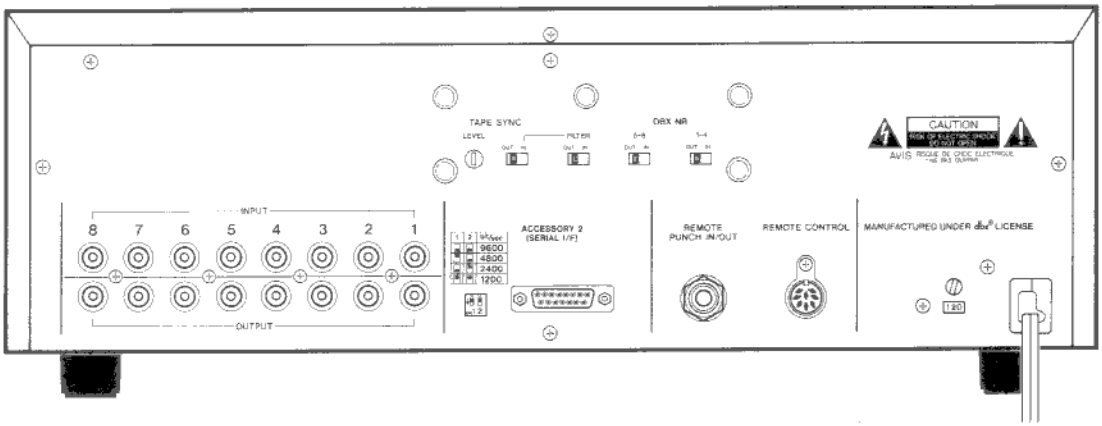
Changes in specifications and features may be made without notice or obligation.

* dbx is a registered trademark of dbx Incorporated.




TASCAM 238
SYNCASET
POWER
EJECT
TAPE SPEED
PITCH CONT
REW
FF/WD
STOP
PLAY
PAUSE
RECORD
COUNTER
MEMORY
RESET
CHECK
MEMO 1
MEMO 2
TRT
RTZ
LOC 1
LOC 2
PUNCH IN/OUT
REPEAT 1-2
RHSL
AUTO IN/OUT
CLEAR
SHUTTLE
TAPE SYNC
INSERT
dbx NR
1-4
5-8
1
2
3
4
5
6
7
8
RECORD FUNCTION

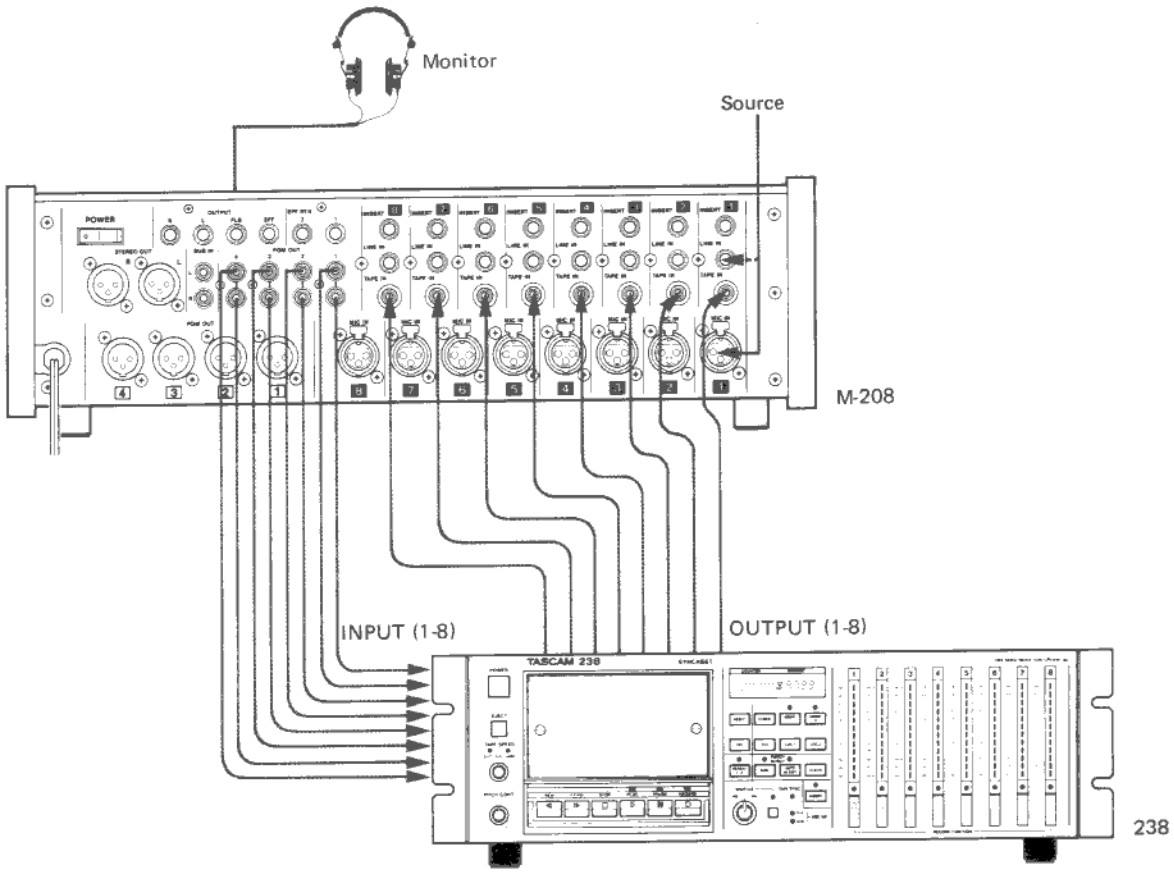

COUNTER
MEMORY
STA
IN
OUT
RESET
CHECK
MEMO 1
MEMO 2
TRT
RTZ
LOC 1
LOC 2
PUNCH IN/OUT
REPEAT 1-2
RHSL
AUTO IN/OUT
CLEAR


TAPE SYNC
LEVEL
FILTER
dbx NR
CAUTION
INPUT
8 7 6 5 4 3 2 1
OUTPUT
ACCESSORY 2 (SERIAL I/F)
9600
4800
2400
1200
REMOTE PUNCH IN/OUT
REMOTE CONTROL
MANUFACTURED UNDER dbx® LICENSE
120

CONNECTING THE 238

When connecting the 238 Syncaset to your system, use shielded cables that are as short as your situation will allow. We strongly recommend low-capacitance cables with quality connectors, such as the TASCAM Pro Series. Cheaper cable has less shielding and may introduce radio frequency interference, hum and noise into your system.

CAUTION: Before attempting any cable connection, check to make sure that all the units involved in your system are turned off.



1. **Connect the PGM Group outputs** (or other suitable buss outs) from your mixer to the RCA input jacks on the rear panel of the 238 Syncaset. Then, connect the RCA output jacks on the back of the 238 Syncaset to the "Tape Return" or "Tape In" jacks (or other suitable tape inputs) on the mixer.

2. **Connect the instrument or microphone** (the "source") that you want to record to the mixer's LINE IN or MIC IN as required. For our example, we will use Channel 1 on the mixer. Assign Channel 1 to PGM Out 1. When you record, the signal should go to Track 1 on the 238 Syncaset. If not, check your connections.

If your mixer has phono jack (RCA) outputs conforming to the −10 dBV standard, the meter readings of your mixer and the 238 should match, i.e., 0 VU on the mixer will read 0 dB on the 238 track it's connected to. If the readings don't match, always go by the readings on the recorder.

SETTING THE RECORD LEVEL

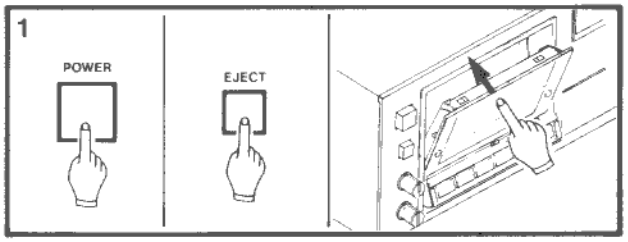
The 238 Syncaset does not utilize its own controls for setting the volume or "level" of the signal to be recorded. Therefore, the recording level is adjusted on the mixer. The basic procedure for setting the record level is as follows:

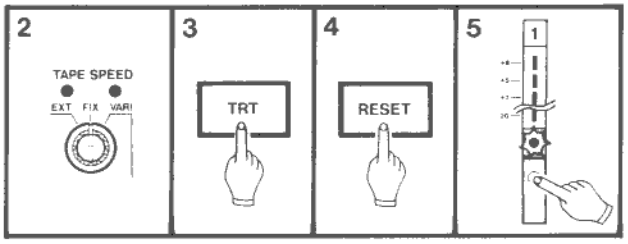
1. Consult your mixer manual for information on setting its INPUT Trims, faders, EQ's and any other control that has an effect on the output level of the mixer. Set these controls to their nominal levels on the mixer.

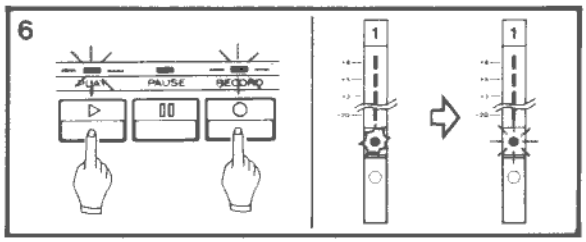
2. Press the RECORD FUNCTION button for a track being fed by the mixer output.

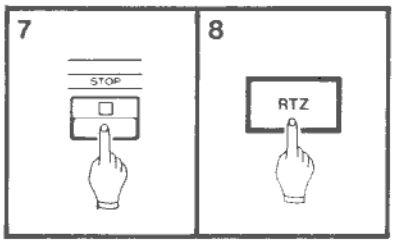
3. Play the instrument (or speak into the microphone). While you are doing this, watch the meter on the mixer and the Track 1 LED meter on the 238 Syncaset. At the loudest point, both meters should peak at the reference level of "0". If not adjust the level of the source.

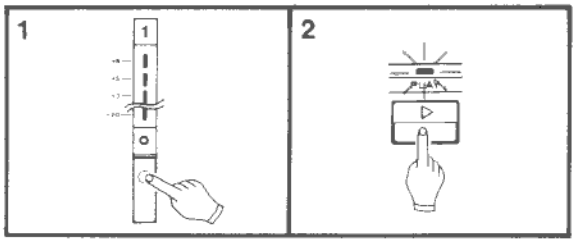
In the following illustrations, ☼ shows a blinking LED, and ☀ a steadily lit LED.











SETTING THE MONITOR LEVEL

The monitoring of both the recorded material as well as the source during the recording process is accomplished through the mixer's monitor section. You may use either headphones or a pair of speakers in order to listen to the material. Refer to the mixer's manual for the correct procedure in setting up the monitoring system.

RECORDING THE FIRST TRACK

After you have made the necessary level adjustments on your mixer, you can go ahead with your recording. As an example, we will assume that you wish to use track 1 as the rhythm track. We assume that the 238 Syncaset is still on, if not, press the POWER switch.

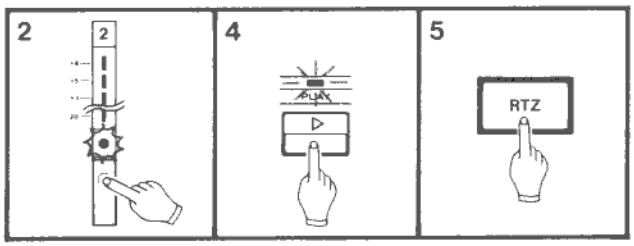
1. Load a cassette.
2. Set the TAPE SPEED selector switch to FIX.
3. If the COUNTER display is in "TRT" (Tape Run Time) mode – indicated by a colon ":" between the two pairs of digits – switch it back to its normal counter mode by pressing the TRT button. Pressing the TRT button repeatedly "toggles" (switches back and forth) between TRT mode and COUNTER mode.
4. Reset the display to "0000" by pressing the RESET button.
5. Press the RECORD FUNCTION button for track 1. A red LED above the button will flash.
6. Press and hold the RECORD (●) button down. While still pressing RECORD, press the PLAY (▶) button. The tape will begin moving in its forward direction and recording is now in progress on track 1. The PLAY LED will light in green, the RECORD LED will light in red and the track 1 LED will light steadily.
7. When you have finished with recording, press STOP (■) to terminate the recording. Both LEDs above the PLAY and RECORD buttons will go out and the RECORD FUNCTION LED will begin flashing again.
8. Press the "RTZ" (Return to Zero) button. The tape will rewind, automatically stopping at counter position 0000.

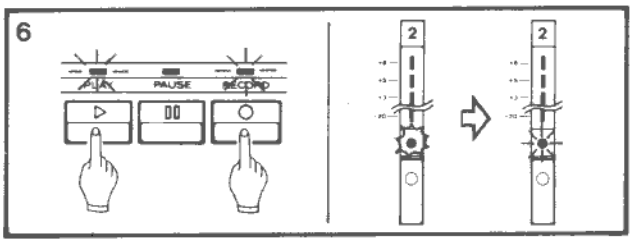
First Playback

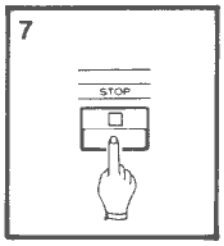
1. Press the track 1 RECORD FUNCTION button. The blinking LED will go out showing that Track 1 is now in "safe" mode.
2. Press PLAY (▶). The track you just recorded can be listened to ("monitored") through the mixer.

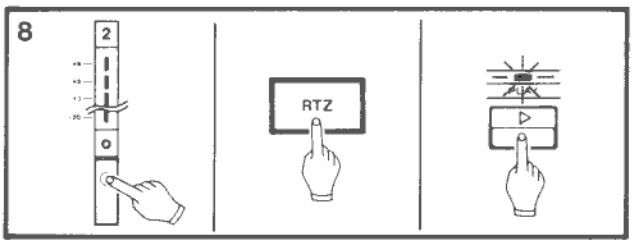
If you are not satisfied with your first take and want to re-record it (thereby erasing the first take), all you have to do is:

a) Make any changes that occured to you while you listened to the first playback.









b) Press RTZ to rewind the tape to 0000.

c) Press the Track 1 RECORD FUNCTION button.

d) Press RECORD (●) and PLAY (▶) together and try again.

Once you have a basic track you're satisfied with, you are ready to move on to overdubbing.

OVERDUBBING

There are two tasks in overdubbing. First, the new signals must be adjusted for proper level going to the 238, as in tracking. Second, you must make a proper monitor mix of the existing track(s). Here is a basic overdubbing procedure:

1. **Select an open track for the overdub:** Since we assume, in our example, that you have recorded your first take on track 1, you can choose any other track for the overdub. Factors affecting which track you choose include how many total parts you will record, and whether you plan to bounce ("ping-pong") tracks later. In this example, we'll assume that you choose track 2.

2. **Place the track in record ready mode:** Press the RECORD FUNCTION button of track 2. Its LED will start blinking. Make sure that previously recorded tracks (such as track 1 in our example) are in safe mode so you don't accidentally erase them.

3. **Adjust the recording level** of the new source using your mixer controls, watching the meter level on track 2.

4. **Play the tape and adjust monitor levels** for a proper balance of the incoming new signal with the signal being played back from track 1 in your headphones or monitor.

5. **Rehearse your overdub** until you feel confident that your levels are correct. Rewind to 0000 by pressing RTZ.

6. **Record the first overdub** by pressing RECORD (●) and PLAY (▶).

7. **Stop the recording** by pressing STOP.

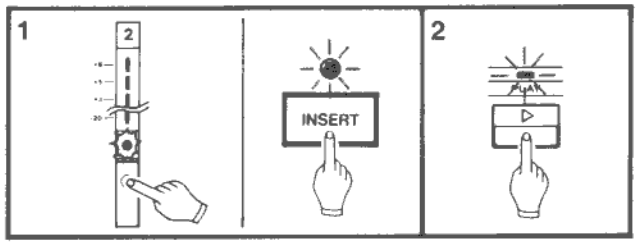
8. **To listen to playback of the overdub,** press the RECORD FUNCTION button of track 2 (to place this track in safe mode), then rewind to the beginning of the take and hit PLAY.

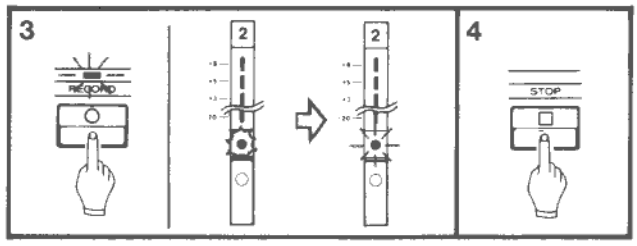
PUNCH-IN OR INSERT RECORDING

It is possible to record over a section of a track containing an error without having to re-record the entire part. This procedure is called "punching in" or "insert" recording. The 238 can manually punch in with the RECORD (●) button, the RECORD FUNCTION switches, or the optional RC-30P footswitch. You can also program the punch-in and punch-out with the REHEARSAL and AUTO IN/ OUT functions.

Manual Punch-In

METHOD A: Punching with the RECORD (●) button or footswitch





1. Make the following preliminary settings:

a) Press the RECORD FUNCTION switch of the track you intend to INSERT on. Its LED will start blinking.

b) Press the INSERT switch. Its LED lights steadily.

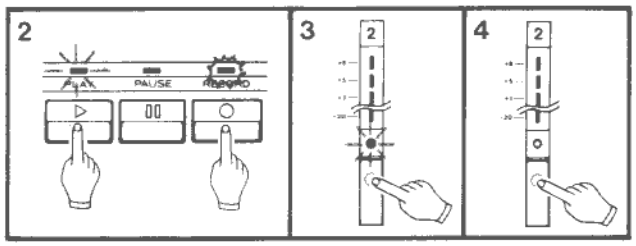
c) Adjust the recording and monitoring levels for the desired balance.

2. Press PLAY (▶). You can use the INSERT switch to toggle the 238's meter and output between source and tape. While the tape is in PLAY and INSERT is on, you'll hear tape; while tape is stopped or INSERT is off, you'll hear source.

3. When the tape reaches the desired punch-in point, press RECORD (●) or the footswitch to start recording. The monitor switches from tape to input on that track. The RECORD LED and RECORD FUNCTION LED both stay on.

4. Punch out by pressing STOP (■), PLAY (▶) or the footswitch.

METHOD B: Punching with the RECORD FUNCTION button
This method is sometimes called "rolling in record" and requires that you have a free hand.



1. After the recording and monitoring levels are set, make sure that all tracks are SAFE (no LEDs blinking).

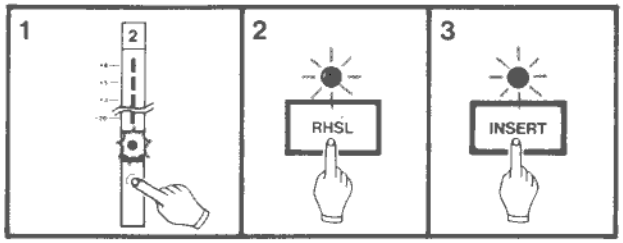
2. Press RECORD (●) and PLAY (▶) together to start playing the tape. The RECORD LED will blink, showing that the 238 is in record-ready mode.

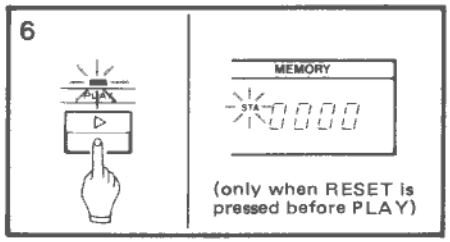
3. Press the RECORD FUNCTION button of the punch-in track when the tape reaches the punch-in point. The LEDs above the Track and RECORD button will light up steadily, showing that recording is taking place.

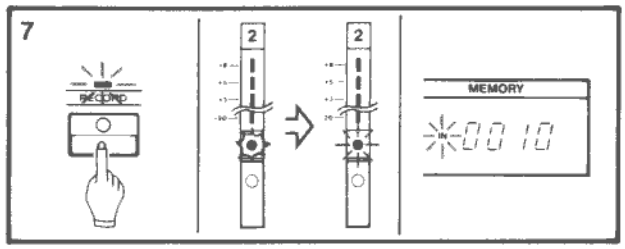
4. To punch out, press RECORD FUNCTION again (you could also press STOP or PLAY).

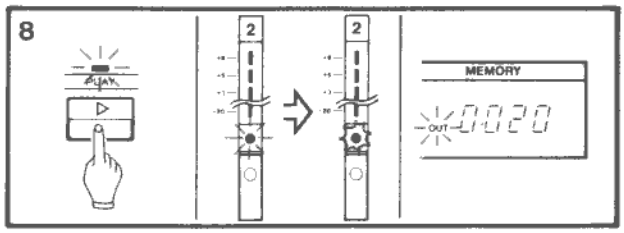
REHEARSAL AND AUTO IN/OUT PROCEDURES

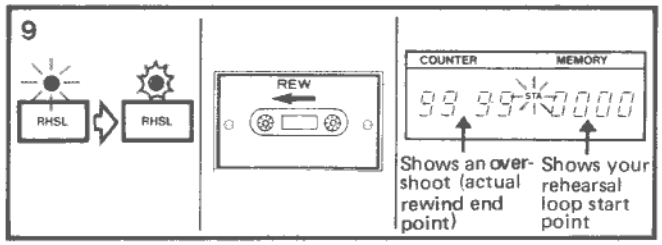
The 238 Syncaset can automatically punch in and out for you, relying on its built-in counter for reference. During Rehearsal and Auto In/Out modes, the auto-location functions (the MEMO 1, MEMO 2, REPEAT, LOC 1, LOC 2 and CHECK) keys, LEDs, and displays are temporarily disabled. Leaving the Rehearsal and Auto In/Out mode will make these functions active again with their original memories.

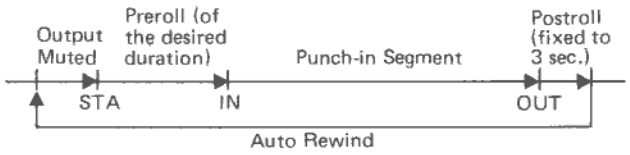












Rehearsing Inserts (RHSL)

Before you actually record an insert, the 238 allows you to "preview" the punch-in and out points with its special REHEARSE function. During a rehearsal, the tracks in record ready mode will switch meter and output from tape to source and back again, but won't actually record. What you hear in your monitor mix will be the same as during recording; so if a punch accidentally overruns existing material you can change the points until you've got exactly what you want. During a rehearsal, the MEMORY display will show you what's going to happen next, and when.

Entering the automatic preroll and punch in/out points

1. **Press the RECORD FUNCTION switch** of the track you want to punch-in on. Its LED will start blinking. Check to make sure that all other tracks are in safe mode.

2. **Press the RHSL switch.** Its LED will light in red. As long as this light is on, you can't actually record, even though the RECORD and RECORD FUNCTION lights may go on solid.

3. **Press the INSERT switch.** Its LED will light.

4. **Adjust the record and monitoring levels** as you would for a manual punch in.

5. **Make sure the COUNTER display** is in Tape Counter mode.

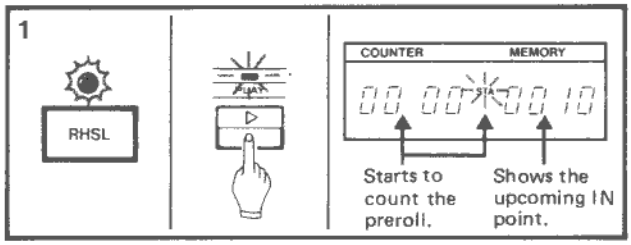
6. **Press PLAY (▶).** Whatever number is on the left side counter will become the preroll STArt point, as indicated by the appearance of "STA XXXX" in the right side MEMORY display window.

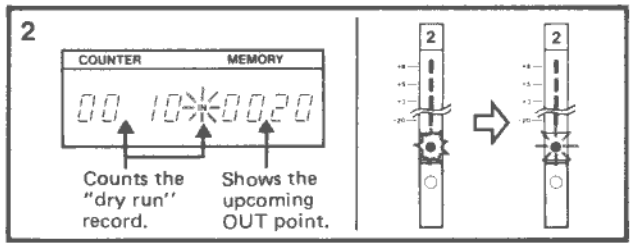
7. At the punch-in point, **press RECORD (●)** or the footwitch. "IN XXXX" will appear in the MEMORY display to show that your punch-in point has been put into memory. Both the track and master record lights will light steadily, but recording is not actually taking place, because the RHSL switch is engaged.

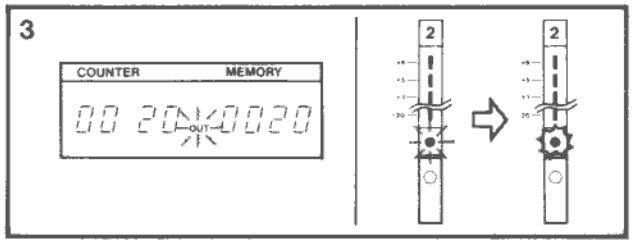
8. **Press PLAY (▶)** or the footswitch when the tape reaches the punch-out point. "OUT XXXX" appears in the MEMORY display showing that the punch-out point has been put into memory. The RECORD FUNCTION LED of the selected track will start blinking.

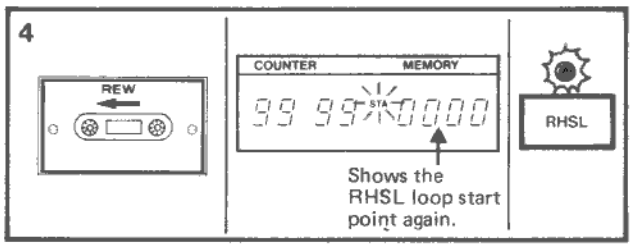
9. After a 3-second postroll, the RHSL LED will begin blinking, the MEMORY display will show "STA XXXX", while the tape will automatically rewind, stopping at the STArt point. The 238 is now in Rehearsal Ready mode.

NOTE: Tape will not stop exactly at "STA XXXX" because of inertia. This, however, does not move the preroll and punch-in/out points you have set. When you initiate the rehearsal loop as per instructions in the next paragraph, you'll notice that the 238 outputs are muted for a time proportional to the overshoot and the tape can be monitored exactly from the MEMORY STArt point.









If you press STOP (■), F.FWD (▶▶) or REW (◀◀) before the OUT point is set, the *Rehearsal Set* function will abort and the function pressed (either STOP, F.FWD or REW) will be activated. If STOP or REW is pressed after the postroll starts, the tape will rewind back to the STA point (pressing F.FWD has no effect). The IN and OUT points will still in memory and the 238 will be in "Rehearsal Ready" mode (the RHSL LED will blink).

Rehearsing the punch-in ("dry run")

During Rehearse mode, the MEMORY display will show you the counter position of the upcoming IN and OUT points.

1. Make sure that the 238 is in "Rehearsal Ready" mode with the RHSL LED blinking. Press PLAY (▶) or RC-30P footswitch. The 238 will begin playing from the MEMORY STArt point. The MEMORY display will show the upcoming punch-*in point.*

2. When the tape reaches the displayed IN point (i.e., when the COUNTER readout matches the MEMORY readout), "STA" will change to "IN" and the upcoming punch-*out point* will be displayed, while the track's output will switch from tape to source as it did before. The RECORD FUNCTION LED of the punch-in track stops blinking and stays on, although recording is not yet taking place. Your live instrument can be heard from the output of the track.

3. When the tape reaches your preset punch-OUT point, "IN" will change to "OUT" (unlike in step 2 above nothing will occur to the MEMORY *number* displayed on the right) and the track's output will switch back from source to tape. The RECORD FUNCTION LED of the punch-in track will start blinking, indicating that the "dry run" record is over.

4. After a 3-second postroll, the tape will automatically rewind to the "MEMORY STArt" point, ready for as many rehearsals as you wish.

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!

To Quit REHEARSAL Mode

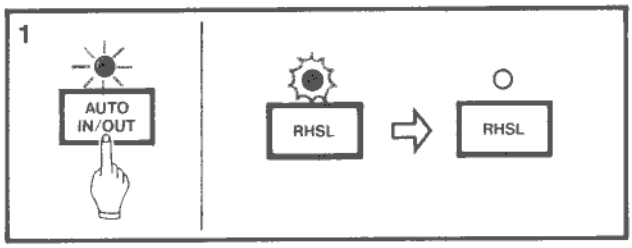
There are a number of ways to end rehearsal modes:

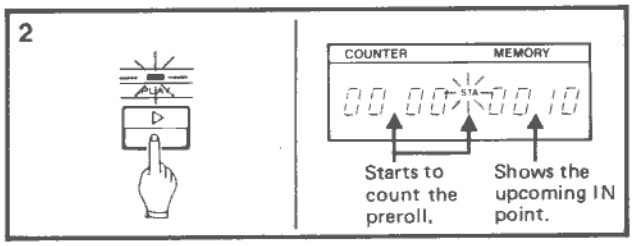
* Pressing the RHSL button while the 238 is in Rehearsal Ready Mode (RHSL LED blinking) will take it out of that mode. Pressing it a second time will put the machine back into Rehearsal ready mode with the same memory points.

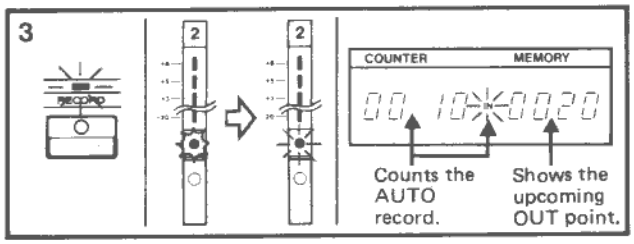
* Pressing STOP (■) or REW (◀◀) once you start the Rehearsal loop will rewind the tape back to the STArt point. You can start a Rehearse again as the STA, IN and OUT points remain in memory and the RHSL LED will continue to blink.

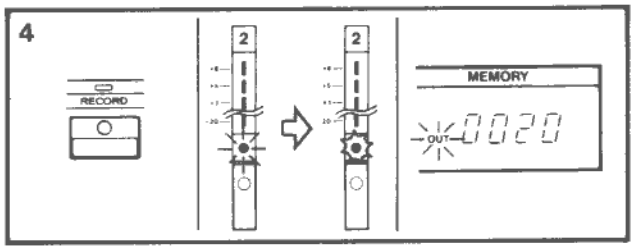
* Another way to exit a rehearsal is to press CLEAR. The RHSL memory points will be cleared and the RHSL LED will go out.

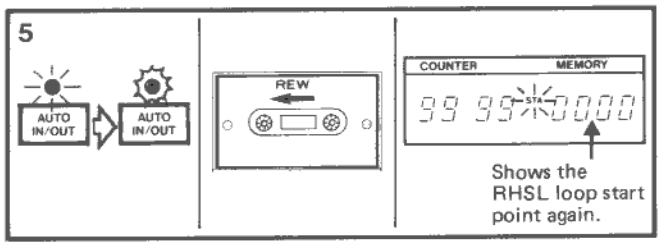
* Ejecting the tape or turning the power off will clear the RHSL memory points (also MEMO 1 and MEMO 2). To enter new points, press RHSL again and go through the steps as before.











Actual, Auto Punch-in

Once you're sure your performance and the in/out points selected are correct, you're ready to actually record the insert. The INSERT LED should still be on and the RHSL LED should be blinking. All tracks should be in SAFE mode except the ones you intend to record.
If you make a mistake during the following procedure, press STOP or REW. The tape will then rewind back to the STA point and you can try again from the beginning.

1. **Press the AUTO IN/OUT switch.** A red LED will light above the AUTO IN/OUT switch, while the RHSL LED that was blinking turns off, indicating the 238 Syncaset is switched from Rehearsal mode to actual, automated "Punch-in ready" mode.

2. **Press PLAY (▶)** or the footswitch to begin the preroll from the START point. The upcoming IN point will be displayed in the MEMORY window.

3. When the tape reaches the MEMORY IN point, the punch-in track will automatically enter Actual record mode, and the RECORD button and track RECORD FUNCTION LEDs will turn on solid. New material is being recorded, erasing the original part. The MEMORY display will show the upcoming OUT point.

4. When the tape reaches the MEMORY OUT point, the 238 punches out of Record. The RECORD LED will turn off and the track's FUNCTION LED should again be blinking.

5. After a 3-second postroll, the AUTO IN/OUT LED will begin blinking and the tape will automatically rewind to the MEMORY START point.

   To review the result, press PLAY (▶) or the foot switch. The tape will play the entire segment and rewind to the start point.

   To try agian using the same memory points, press the AUTO IN/OUT switch again (its blinking LED will turn on solid), then press PLAY.

   To terminate the auto in/out procedure, press the CLEAR switch. The AUTO IN/OUT LED which was blinking will turn off. By hitting CLEAR, you erase all of the memory points, START, IN and OUT.

About Punching In

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. For this reason, some session players leave a beat or two of silence between passages they might want to edit later. Making inserts well requires some practice. Many engineers count bars and beats to keep track of the punch in and out points and hit them on cue. 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.

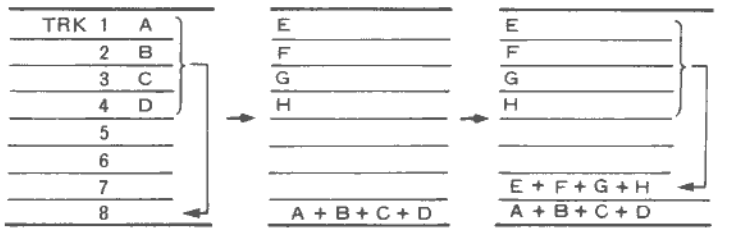
External computer punching: If you need insert points that are consistently repeatable within 1/30th of a second, you may want to control the 238 by an external computer device. With this method, track 8 is recorded with SMPTE time code and punch in/out points are entered into the computer unit which acts as a remote control for the 238 via the serial connector on the back panel. The procedure is similar to the 238's built-in AUTO IN/OUT function but more accurate because the computer is reading a reference actually recorded on tape instead of tach pulses generated by the movement of the cassette reels. See also the "Serial Port" section at Page 25.

Level matching: No mater how carefully you set your punch points, if the inserted material is louder, softer, or a different tone from the original track, it will be noticable. Set the EQ and volume settings on your mixer the same as they were during the original recording. If you make inserts immediately after recording, don't change the instrument or mixer settings at all. Keep in mind that at a certain point it's better to record the whole track over rather than making multiple punch-ins.

BOUNCING TRACKS (PING-PONG)

The recording capability of the 238 Syncaset is not limited to the eight tracks. As you progress with your recording, you may reach a point where you need more than eight tracks of material. This is where **bouncing** – also called collapsing or Ping-ponging tracks – is invaluable. Essentially, bouncing tracks consists of a "mini-mixdown": taking tracks that have already been recorded, making a mix of these tracks and re-recording them back onto an empty track (or tracks) of the 238.

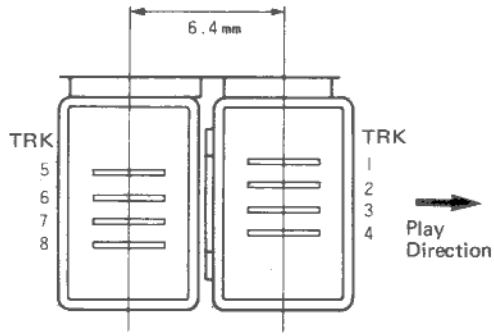
NOTE: With all multitrack recorders, it is advisable to avoid bouncing from surrounding tracks (for example, recording tracks 1 and 3 onto track 2). Doing so is like surrounding a microphone with a speaker on each side and may cause feedback oscillations under certain conditions. The 238 uses a special head format as shown below to avoid "crosstalk" – the undesirable leakage of sound from one track onto the tracks next to it. For best results, we recommend bouncing from the right half of the head (tracks 1-4) onto the left half tracks 5-8). Plan the sequence of recording your tracks if you intend to do any bouncing.



Bouncing tracks 1 – 4 onto track 8

Tracks 1 – 4 available for recording new parts

Bouncing new tracks 1 – 4 onto track 7



(Viewed from the recorder's front)

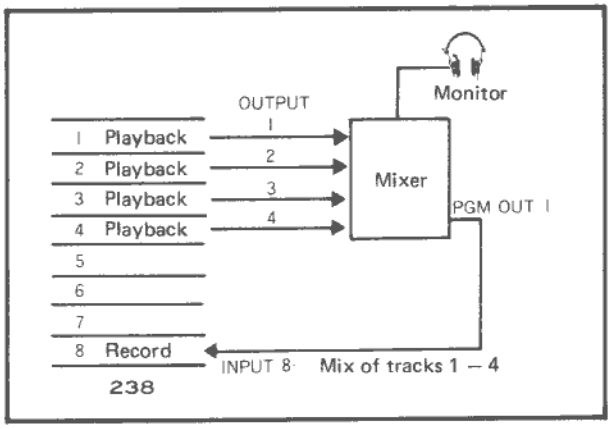
Other Tips About Bouncing

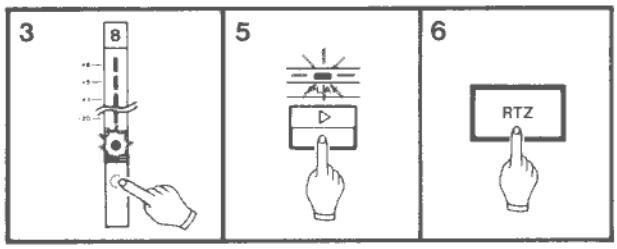
1. Before you record over the parts that have been bounced together, make certain that you're happy with the overall sound of the bounced parts, because you won't be able to change their mix or punch-in to fix errors.

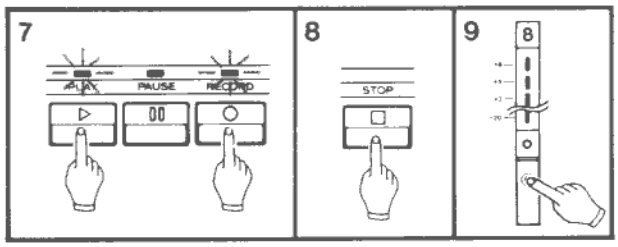
2. It is possible to bounce tracks more than once, i.e., to take a bounced track and combine it yet again with other material onto another empty track. There are limits, however, just as there are anytime you make a copy of a copy of a copy. Eventually the sound will get "blurry"—treble will be decreased and dropouts will become more noticable. Whether the added versatility of bouncing is worth the slight loss of sound quality is up to you and the demands of your project.

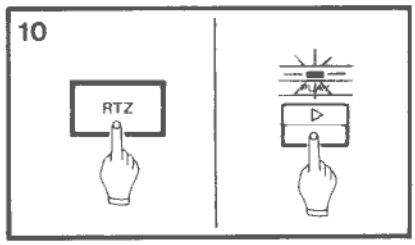
3. It is also possible to add new, previously unrecorded ports to the bounced material, for example to take Tracks 1-4 and mix them with additional "live" sources onto Track 5.

4. Certain material lends itself to bouncing – vocal backgrounds, layered keyboards etc. Main parts of the program such as lead vocals and instrumental solos are best left on their own tracks so you can control them separately in the final mix.









Bouncing: Example

Let's take the contents of tracks 1-4 and bounce them to track 8.

1. Set your mixer so that the main input channels 1-4 are receiving the 238's tape outputs (this is the WHERE FROM switch on each module: it may be labeled TAPE, RTN, RMX. or something else).

2. Assign channels 1-4 to the group output on the mixer connected to track 8 of the 238.

3. Press the RECORD FUNCTION switch of Track 8 (Record Ready mode). Its LED will start blinking.

4. Make sure that the monitor section of your console is receiving the output from track 8 and nothing else. All other signals feeding the monitor should be turned off. This gives you an accurate monitor of the mix you're actually bouncing.

5. Start playing the tape. Slowly raise up the channel faders 1-4, and the master fader of the program group the channels are assigned to. Get the balance you want from the channel faders. then adjust the master fader for overall level until you get proper meter readings on the 238.

6. Press the RTZ button to rewind the tape to counter 0000.

7. Press PLAY (▶) and RECORD (●) to begin recording.

8. Stop recording by pressing STOP (■) or PLAY (▶).

9. Press the track 8 RECORD FUNCTION switch to prevent accidental erasure of the track.

10 Press RTZ, then PLAY to hear the result. Make sure you've got a mix that you want to keep. If so, you're free to record over the old tracks; if not, make whatever adjustments that are necessary on your mixer and try it again.

MIXDOWN (REMIX)

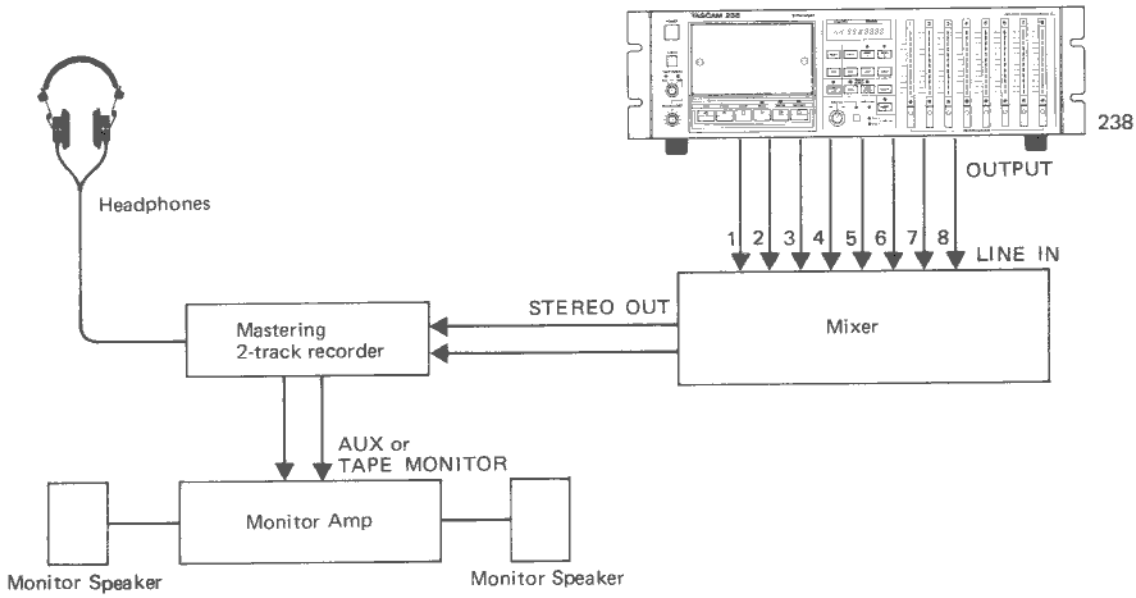
Once all the tracking and overdubbing is complete, it will be time to mixdown to stereo. At this point, the 238's tracks should all be in safe mode, and the main input channels of the mixer should be switched to receive signal from the 238. The stereo outputs of the mixer should be connected to your 2-track recorder, and your monitor "where from" switch should be switched to receive signal either from the 2-track outputs or the stereo output of the mixer.

PRECAUTION:
To prevent the accidental erasure of your master multitrack tape, be sure to break both record protect tabs on the cassette.

NOTES:

1. If you recorded the 8-track tape with DBX noise reduction, you should play it back with DBX on. DBX is an encode/decode process. It is not possible to get a "DBX mixdown" by defeating the noise reduction on playback, mixing encoded tracks to stereo, and then playing back the 2-track master through a DBX decoder.

2. Once outputs of the 238 have been decoded by the DBX unit within the 238 they behave like any other audio source, and can be mixed down to any medium: digital, cassettes with Dolby B, C or DBX noise reduction, or the audio tracks of a VCR.



RECORDING WITH TAPE SYNC

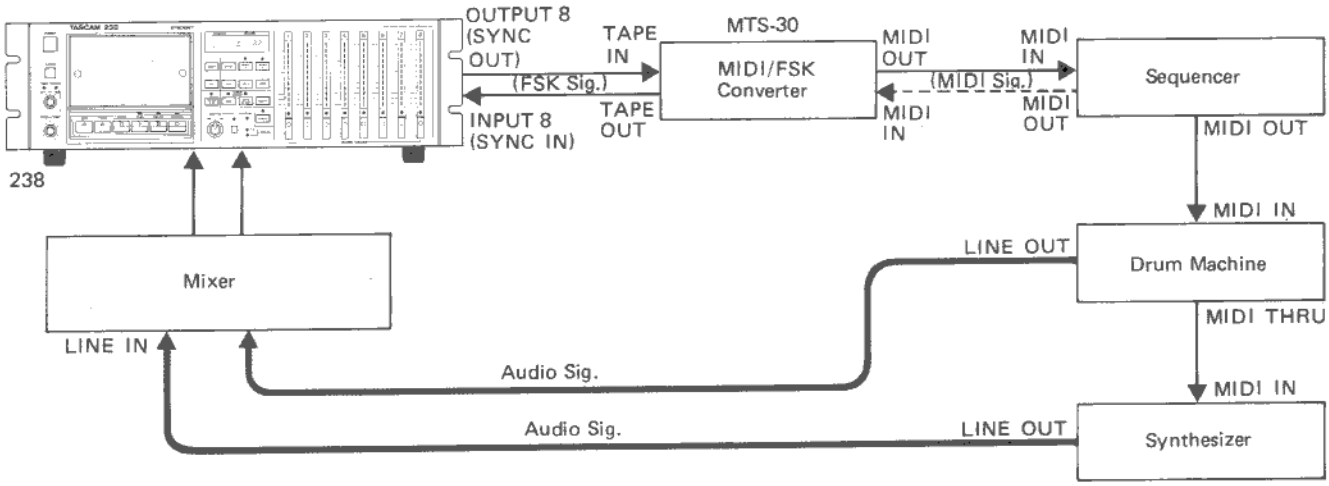
Your 238 SYNCASET has special features designed to make it an ideal recorder for use with electronic musical instruments. Track 8 is specifically designed to be used with the recordable synchronizing codes used by MIDI (Musical Instrument Digital Interface) and some other instrument systems. Since MIDI itself is a computer type digital language and cannot be recorded on analog tape, it is necessary to convert MIDI timing clocks to recordable FSK (Frequency Shift Keying) signals using a MIDI/FSK converter such as the TASCAM MTS-30. Sometimes this type of converter is built into sequencers, drum machines and computer interfaces.

You should record the sync signal by itself onto track 8 before you record any other tracks. This will ensure that any time lag that may result from the recording of the tone onto the tape – even though it is usually very slight – will be eliminated.

- Connect the FSK output (labeled "Sync Out" or "Tape Out") of your sequencer, MIDI converter, or computer interface directly to the INPUT of track 8. Do not patch through your mixer. A direct connection between the sync tone generator and the 238 ensures that FSK won't accidentally leak into the audio, and unwanted audio won't leak into the FSK.

- Turn the TAPE SYNC switch on the back of the 238 to IN. This defeats the dbx encode/decode for track 8 only, and routes the input of track 8 through the LEVEL control.

- Turn the FILTER switch on the back of the 238 to IN. This routes the output of track 8 through a midrange bandpass filter, making it virtually immune to crosstalk interference from other tracks that could cause sequencer miscuing. The adjustments of the FILTER are set at the factory for optimum results.



- Consult the owner's manual of the device that is generating the sync tone to find out how to start the tone. Most units utilize a "pilot tone" that is output before the unit is started to help you set the level on the tape deck.

- Turn the RECORD FUNCTION switch of Track 8 to ON (red LED blinking).

- Using a small screwdriver adjust the LEVEL control on the back of the 238 until the meter of Track 8 reads 0 dB (first red LED on).

- Press RECORD (●) and PLAY (▶). After a few moments, hit START on your sequencer unit. Let the sequence play to its completion without stopping the 238.

Playback of Sync Tones

- Connect the Track 8 output **directly** to the Sync in ("Tape in") of the sequencer or MIDI converter. Again, do not patch through the mixer.

- Consult the owner's manual of your sequencer unit for specifics of how to switch it to follow external tape or MIDI clocks, depending on whether you're using a MIDI/FSK adapter.

- Rewind and play the tape. The sequencer or drum machine will start **at the correct place on the tape every time and play at the same tempo** that was recorded. Or, your converter will translate the sync code playing back from track 8 into MIDI clock information which, in turn, will drive the MIDI program in the sequencer or drum machine. In addition, the synthesizers and other sound sources or processors connected to the sequencer will now operate in sync with the tape. In this way you can continue to record other "non-MIDI sound sources" – vocals, acoustic instruments, etc. – on the remaining tracks while listening to the MIDI instruments playing along with the sync track 8.

By following this procedure, the sequencer in effect uses track 8 as a "guide" track to play as many instruments as are being controlled via MIDI from the sequencer, creating "virtual" tracks. You may decide to actually record the audio output of some of those tracks so you can use the instrument in a different way on another track, or you can leave the "virtual" tracks unrecorded until mixdown time. Combining virtual tracks with the normal tracking procedures used in recording makes it possible to record a tremendous number of different instrument sounds on a small number of tape tracks. Your only real limitation is the number of sound sources and the capacity of your sequencer.

About Tape Sync

1. It is **not** necessary to record and playback sync tones with the 238's TAPE SYNC switch on. Many sequencers/converters work quite well with a straight tape track. However, some units can miscue (drop beats, etc.) if they "hear" even the smallest crosstalk. Some are also very sensitive to changes in level. The TAPE SYNC switch is there as extra protection for such units.

2. A tone recorded with TAPE SYNC on must be played back with TAPE SYNC on. Otherwise the dbx decoder will change the level causing errors.

3. The possibility of sequencer miscuing is greatest while recording a percussive sound at high levels onto Track 7, due to sync mode crosstalk. Note that this miscuing happens only while overdubbing onto Track 7, not during Playback. To solve this problem, lower the recording level of Track 7, and make sure that the sync tone on Track 8 is recorded at 0 dB.

4. If you record the sync tone at the same time as instrument tracks, processing delays in some sequencers may cause phasing or timing lags during Playback. It's good practice to record the sync tone *before* recording instruments to tape.

FRONT PANEL

1. POWER Switch
When pressed, the POWER switch turns the 238 Syncaset on and illuminates the multifunction display. Pressing the POWER switch again turns the 238 off, and clears the MEMO 1, MEMO 2, STA, IN, and OUT memories.

NOTE: Be careful not to turn the 238 on and off too quickly or repeatedly as this will not give the internal micro-computer enough time to reset and initialize. Once you turn the 238 off, wait at least two seconds before turning it on again.

2. EJECT Switch
When pressed, the EJECT button opens the cassette holder and clears the MEMO 1, MEMO 2, STA, IN and OUT memories. The cassette holder cannot be opened during the RECORD, PLAY, FAST FORWARD, REWIND or PAUSE modes. These modes must first be exited by pressing STOP (■).

3. TAPE SPEED Select Switch (EXT/FIX/VARI)
This three-position switch controls the status of the PITCH CONTrol function. In the VARI position, the PITCH CONTrol knob will function and an LED will indicate that it is on. In the FIX position the PITCH CONTrol will be locked off, it will not function. In the EXT position, the transport speed of the recorder will be controlled by a device plugged into the SERIAL connector on the back panel. SMPTE Controllers and Synchronizers will normally be used with this function. The yellow LED for EXT will light steadily, indicating that the capatan motor is under control of a DC 5V reference signal coming from the exterior. Interruption of this external signal will cause the LED to blink.

4. PITCH CONTrol
This knob allows you to adjust the speed of the 238 by plus or minus 12 % in either PLAY or RECORD. You can use this speed control to accommodate minor changes necessary in the length or relative pitch of your program material. If you're making a 30 second radio commercial and it runs a little long, you can speed it up enough to drop out the extra seconds. When tape runs faster than the speed at which it was recorded, the material on it will raise in pitch. This can sometimes be used in a creative way to save parts that are a little out-of-tune, or to create sound effects such as flanging. If you record with the PITCH CONTrol at its maximum or minimum settings, you will NOT have the ability to make further adjustment in that direction upon playback.
Also, it is recommended that you run the 238 for several seconds in the play mode for the speed to stabilize, especially when the change in speed is large. Before beginning to record again, check the pitch carefully with a short playback, and you will have less trouble with drift.

CAUTION: The PITCH CONT affects the record speed also. Check to make sure that the TAPE SPEED select switch is set to FIX unless you are using the PITCH CONT intentionally.

5. REW (⏪) Button
Winds the tape at high speed in reverse. If this button is pressed in RHSL or AUTO IN/OUT mode, the tape will rewind to the MEMORY STArt point. For further details, see pp. 15 and 16.

6. F.FWD (⏩) Button
Winds the tape at high speed in the forward direction.

7. STOP (■) Button
Stops any tape motion, and cancels all transport modes.
If STOP is pressed in RHSL or AUTO IN/OUT mode, the tape will rewind to the MEMORY STArt point. For further details, see pp. 15 and 16.

8. PLAY (▶) Button
a) Pressing this button alone starts tape playback (the green LED above the button will turn on).

b) If pressed during Record/Pause, the PLAY button resumes recording (green LED stays ON).

c) Pressing the button during recording stops the recording without stopping the tape motion ("PUNCH OUT" function occurs and green LED stays ON)

NOTE: Pressing PLAY while a "dry-run" record is taking place (i.e., while the tape is running between the IN and OUT points in RHSL mode) has the same effect as pressing STOP or REW; the Rehearsal will abort and the tape will rewind back to the STA point.

9. PAUSE (⏸) Button
Pressing this button in record or play mode retracts the pinch roller from the capstan and temporarily stops the tape. However, the previously selected mode is retained, and pressing PLAY (▶) button will resume record or play accordingly. A red LED will light above the PAUSE button when the 238 is in PAUSE mode.

10. RECORD (●) Button
Pressing this button alone has no effect. Pressing it together with PLAY (▶) carries two functions:

1) If any RECORD FUNCTION switches are engaged, the LEDs above them as well as the RECORD LED will stay on, and recording will begin on the corresponding tracks.

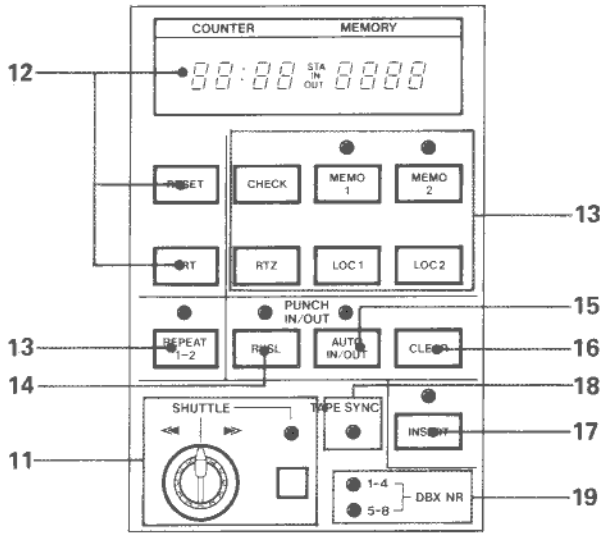
2) If none of the RECORD FUNCTION switches is engaged, the RECORD LED will blink to indicate a record ready.

The RECORD LED conveys the following messages:

A) LED out: safe mode – no recording is taking place.

B) LED blinking: record ready mode – tape is rolling at play speed (green PLAY LED on), but not actual recording is in progress. Recording will start as soon as any RECORD FUNCTION switch or switches are pressed on.

C) LED steadily on: record or record/pause – recording is taking place unless PAUSE (⏸) button is engaged and the red LED above the button lights up. When the transport is in Pause mode, pressign PLAY (▶) will start or resume recording.



11. SHUTTLE Button and Control Knob

SHUTTLE can be activated from any transport mode except RECORD (tape running) or RECORD/PAUSE.

When the SHUTTLE button is pressed, the red LED above the button will light, and the adjacent knob can be used to roll tape forward or in reverse as you monitor its playback, at continuously variable speeds determined by the amount of knob rotation.

The further the knob is rotated clockwise, the faster the tape will roll in the forward direction (toward the right). Conversely, as the knob is rotated counterclockwise, the tape will roll backward (toward the left).

Returning the knob to its original, centered position will stop the tape.

Pressing STOP or any other transport control buttons will disable the SHUTTLE function.

CAUTIONS:
When using the SHUTTLE, be sure to observe the following:

1. To prevent your monitor system from being damaged from high level cueing "squeal", be sure to lower the volume of your monitors before you use the SHUTTLE.

2. Extensive use of the SHUTTLE causes premature wearing of the heads. Use the SHUTTLE sparingly!

3. Use the SHUTTLE only for cueing out exact edit points and never use instead of Fast Forward or Rewind. If you let the tape fast wind in SHUTTLE without monitoring it, you may not know whether or not the tape reaches its end. Here remember that the auto STOP feature is not active in SHUTTLE mode and that the tape will stretch. If this happens by accident, and if you leave the 238 in this status without noticing it for 4 minutes, only then the SHUTTLE will automatically be disabled and PAUSE entered. When SHUTTLE is disabled in this manner, its LED will blink instead of turning off. Pressing STOP (or any other transport button) will turn SHUTTLE off.

12. COUNTER Display with the RESET and TRT Switches
(As for the MEMORY display, refer to #13 and 14.)

The 4-digit COUNTER display has a double function:

1) When the SYNCASET is first turned on, the COUNTER switches to its normal tape counter mode and displays "0000" (not 00:00).

2) Pressing the "TRT" (Tape Run Time) button switches the display from COUNTER mode to Tape Run Time mode, as indicated by a colon ":" in the window.

3) The maximum readout time is 59 minutes, 59 seconds (displayed as 59:59).

4) Unlike the normal Tape Counter mode which counts tape motion in both forward (RECORD, PLAY and FAST FORWARD modes) and reverse (REWIND mode) directions, TRT mode counts only in RECORD and PLAY.

NOTE: The TRT display is calculated from the capstan motor and will not necessarily be accurate with elapsed time as read from your wrist watch or wall clock.

5) Both the Tape Counter and TRT modes are active at the same time. Therefore, switching the display from one mode to another does not disable or reset the previously displayed readout. You can switch COUNTER display modes as often as needed and the readouts will not be cancelled or reset to 0000.

The RESET switch has effect only on the currently displayed readout. When the SYNCASET is turned off, both the displayed and hidden readouts are reset.

The current tape location readouts (displayed or hidden) can be put into memory system of the SYNCASET. See the next item, #13.

13. Auto Locator Section
Grouped to this section are the following:

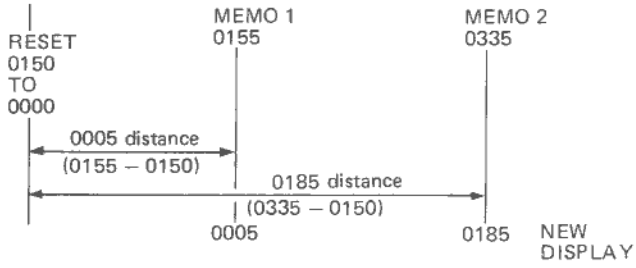
1) MEMO 1 and 2
2) CHECK
3) LOC 1 and 2
4) RTZ
5) REPEAT

MEMO 1 and MEMO 2

These buttons are used to establish 2 autolocation points in the 238's memory system. They can be used while the tape is stopped or rolling. Pressing either button at any point on the tape loads the current tape counter number into that memory register and into the MEMORY display. Each time the button is pressed, a new MEMO point is established, erasing all previous memories in that register. An LED above each button shows which MEMO is currently being displayed. Neither MEMO location is available for use if the 238 is in RHSL or AUTO IN/OUT

mode. Both MEMO points are erased when power is turned off or when a cassette tape is ejected.

The MEMO points will not move even if the Zero position is changed by the RESET button. For example, if MEMO 1 is pressed at counter 0155 and RESET is afterwards pressed at 0150, then the 238's memory system will calculate where the 0155 point is with respect to the New Zero position and display the MEMO 1 point as 0005.



The MEMO points are based on the counter readouts and the counter is based on revolutions of the cassete hub. The MEMO points are subject to variations in tape pack. Slight drifting of a cue point after a number of fast wind operations is normal.

CHECK

The CHECK button toggles the MEMORY display between the contents of MEMO 1 and MEMO 2. An LED above the MEMO button will light to show which one is being displayed.

LOC 1 and LOC 2

Pressing either of these buttons causes the tape to roll (in either F.FWD or REW) to the corresponding MEMO point. While fast winding, the MEMO number will flash in the display. The tape will stop when it reaches the MEMO point. If PLAY is pressed while the tape is locating, the 238 will automatically enter Play mode after reaching the memorized point. The LOC 1 and 2 buttons may be pressed at any time except during RHSL or AUTO IN/OUT modes.

When the tape overshoots the memorized point, it will roll back at Slow Play speed, stopping at, or if PLAY has been pressed, starting playback from the memorized point. Don't hit PLAY during that Slow Play interim. If so, the tape may be blocked. If this happens by accident, defeat it by pressing STOP.

RTZ (Return to Zero)

Pressing the RTZ button will cause the 238 to fast wind (FAST FORWARD or REWIND) the tape to the COUNTER 0000 point on the tape. The RTZ function can not be activated from RHSL and AUTO IN/OUT modes.

REPEAT

The REPEAT function provides a "Playback Loop" or "Block Repeat" between the two programmed MEMO points. Note that MEMO 2 does NOT have to be a number greater than MEMO 1. When REPEAT is enabled and the current counter number is between the two MEMO points, the tape will play to the higher MEMO location, rewind to the lower MEMO location and start over. This cycle will repeat until STOP, or any other transport button is pressed.
If LOC or RTZ is pressed when REPEAT is on, REPEAT is cancelled and LOC or RTZ is entered, instead.

14. RHSL (Rehearsal) Button and LED
RHSL is the first stage of an automatic punch-in recording. During Rehearsal Set mode (RHSL LED on solid), the 238 memorizes the preroll, punch-in, and punch-out counter locations that are used for rehearsals and for AUTO IN/OUT.

In Rehearsal mode, the RHSL function (in combination with the INSERT feature) switches the output of tracks in record ready mode from tape to source and back again at the preset points **but no signal will be recorded to tape.** This allows you to hear what a punch-in will sound like before you actually record it, without having to manually press any keys or footswitch.

When the RHSL LED is blinking, the 238 is in RHSL Ready mode, and pressing PLAY (▶) will start a rehearsal loop.

The MEMORY display will read out the following messages as you go through the Rehearsal Set operations (RHSL LED on solid).

1) "STA xxxx" appears as you press PLAY (▶) and the 238 will start the pre-roll.

2) "IN xxxx" appears as you press RECORD (●). This loads the 238's memory with the Punch-in point.

3) "OUT xxxx" appears as you press PLAY again. This loads the 238's memory with the Punch-out point.

4) After a 3-second postroll, the RHSL LED will start blinking, the tape will automatically rewind to the STArt point. While rewinding, the STA number will flash in the display. Pressing PLAY will start the rehearsal loop. (You can press AUTO then PLAY to start the actual recording without rehearsing if you like. But, pressing AUTO before setting all the three points, STA, IN and OUT, will cause nothing to occur.)

As you go through the Rehearsal loop, the MEMORY display will let you know the upcoming IN and OUT locations as follows:

1) The display number changes to show the IN point as you press PLAY to start the preroll.

2) The display number changes to show the OUT point as you reach the IN point. At the same time, the indication "STA" changes to "IN".

3) The indication "IN" changes to "OUT" as you reach the OUT point. The display number does not change and continues to show the OUT point until you reach the loop end.

15. AUTO IN/OUT Button
After you have set the tape's pre-roll STArt point, the Punch-IN and Punch-OUT points in RHSL mode, entering the 238's AUTO IN/OUT mode puts it into a ready state to commit the record Punch to tape.

- Pressing this button puts the 238 Syncaset into its automatic Punch-in/Punch-Out mode.
- Pressing PLAY (▶) or the RC-30P footswitch initiates the actual recording by activating the automatic Punch-In/Punch-Out sequence (Pre-roll, Punch-In, Punch-Out and Post-roll).

16. CLEAR Button
This button is used to turn off the RHSL and AUTO IN/OUT functions. If CLEAR is pressed while the 238 is in RHSL or AUTO IN/OUT, the 238 will turn off the current mode and return to normal operation. Pressing CLEAR during any other modes has no effect.

17. INSERT Button
INSERT determines what signal (source or tape) appears at the output of tracks placed into record ready mode by the RECORD FUNCTION buttons. It allows automatic monitor switching from tape to source during punch-in, and back to tape at punch-out.

- When insert is ON, the output of any tracks whose LEDs are blinking (in record ready mode) will be *tape*.
- When insert is ON and RECORD mode is entered (LEDs solid), the output of the tracks being recorded will be *source* (input).
- When insert is OFF, the output of any tracks whose RECORD FUNCTION buttons are on will be *source* (input) regardless of whether you're actually recording or not.

The INSERT button only affects tracks whose RECORD FUNCTION LEDs are on. When INSERT is off, you can use the RECORD FUNCTION buttons to manually toggle between tape and source and rehearse a punch-in.

Switch Setting		Transport Mode			
INSERT	RECORD FUNCTION	STOP	PLAY	RE-CORD	RECORD/ PAUSE
OFF	Off	—	Tpae	Tape	—
	On	Input	Input	Input	Input
ON	Off	—	Tape	Tape	—
	On	—	Tape	Input	Input

18. TAPE SYNC LED
This will light in red for as long as the rear panel TAPE SYNC button is set to its IN position.

19. DBX NR LEDs
These two green LEDs will light when the corresponding tracks' dbx switches on the rear panel are set to IN.

20. RECORD FUNCTION Buttons and LEDs
Pressing any of these eight buttons puts the corresponding track into Record-Ready mode, or directly into Record mode if RECORD (●) and PLAY (▶) have already been pressed.

Functions of the RECORD FUNCTION LED:

A) LED off — Safe: recording cannot occur on that track.

B) LED blinking — Record-Ready: recording on that track will occur when RECORD and PLAY are pressed.

C) LED on solid — Recording on that track is in progress (RHSL or actual) or, if RECORD and PLAY were PAUSEd, recording will resume when PLAY is pressed.

21. Peak Level Meters
These meters register either the input level or the reproduce (Playback) level for the corresponding track. Refer to the logic table in #17.

REAR PANEL

22. TAPE SYNC Switch
Setting the TAPE SYNC switch to its in position turns on the corresponding LED on the front panel, turns off the dbx NR on track 8, and routes Track 8 through the LEVEL and FILTER controls. Track 8 is designated as the track used to record and playback the sync signal (FSK or SMPTE Time Code).

23. LEVEL Control
The LEVEL control adjusts the input level of the sync tone on track 8. The adjustable range is from 0 dB (0 volt) fully left to +6 dB (0.6 volt) fully right with respect to the center -10 dBV (0.316 V) position. Adjust the LEVEL control before recording so that the sync signal reads 0 dB (or as close as possible) on the front panel meter for track 8. The input to track 8 goes through the LEVEL control only if the TAPE SYNC switch is set to its IN position.

24. FILTER Switch
The FILTER function is used, if necessary, when playing back FSK tape sync signal from track 8. When TAPE SYNC is on and FILTER is set to IN, the FSK output of track 8 is filtered through a band-pass filter to cut the frequencies below 300 Hz, and above 7 kHz. This filtering of the sync signal isolates it from any signal on track 7 that might interfere with it. Thus, the sync tone is much more reliable. *When using SMPTE Time Code, the FILTER should be set to OUT. Otherwise, fast winding the tape will make the code unreadable.*

25. DBX NR Switches 1-4 & 5-8
When these switches are set to their IN positions, the corresponding LEDs on the front panel will light in green indicating that the built-in dbx Noise Reduction System for each group of channels (1-4 and 5-8) is turned on. This system provides a dynamic rang of more than 90 dB with noise reduction of about 30 dB and an increase in tape saturation level (headroom) of about 10 dB.

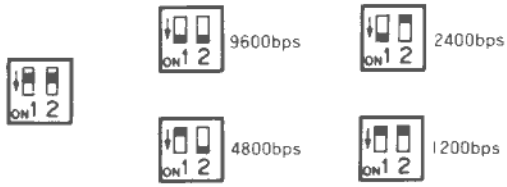
26. INPUT Jacks 1-8
Each of these RCA jacks accepts line level signals coming from a mixer or a device with a nominal level of –10 dBV (0.3 V). These jacks require an unbalanced signal.

Also, for proper operation, the input level must be externally adjusted as the 238 is not designed with level controls.

27. OUTPUT Jacks, 1 through 8 (Unbalanced)
They either carry input signals or track signals following the switching logic shown in a table in paragraph #17.
The SYNCASET has no output level controls and the output level is the same as the input level; that is, -10 dBV (0.3 V). The output impedance is 100 Ohms.

28. ACCESSORY 2, SERIAL I/F Connector (15-pin, D-SUB)
This is a serial I/O port conforming to the RS-232C standard for linking the SYNCASET to an external computer.

The dip switch adjacent to the D-SUB connector is used to select the bit rate as per the illustation shown below.



See also the "Serial Port" section below.

29. REMOTE PUNCH-IN/OUT Jack
This is for connection of the optional RC-30P foot switch. Whether you're a busy engineer, producer, or a musician with both hands on an instrument, there are times when you can't drop what you're doing to press RECORD (●) button. The RC-30P is the solution. It lets you punch-in and out of Record with a tap of your foot.

30. REMOTE CONTROL Connector
This multi-pin connector is for connection of the optional RC-88 remote control unit. With the RC-88, you can control all tape motion from a maximum of about 15 ft. (5 m).

31. AC Power Cord

Advanced Functions
Use of the Serial Connector

The SERIAL connector, an RS-232C serial I/O port, allows the 238 to be interfaced with a computer for system control, synchronization, and other advanced functions.

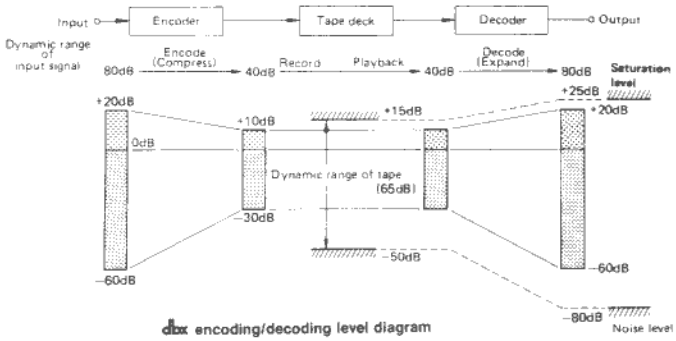
The method of communications performed in compliance with the RS-232C standard differs depending on the mechanical/electrical characteristics and system programs of the associated devices, and a small error in communications thwarts the interfaced system and even can cause the computer to run away. For detailed technical information about the computer interface, consult TASCAM.

How the dbx Works

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

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

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



dbx encoding/decoding level diagram

SUBSONICS AND INTERFERENCE

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

Care and Maintenance

Even though the heads used in your 238 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.

Here's why:

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

2. Tape and tape oxide act very much the same way as fine sandpaper. The combination will slowly grind down the tape path. If you do not clean off this abrasive material on a regular basis, the wear will be much more rapid and will become irregular. Even wear on heads can be compensated for with electronic adjustments for a while, but uneven wear can produce notches on heads and guides that will cause the tape to "skew" and skip around, making adjustment impossible. This ragged pathway also chews up the tape, producing more abrasive material, which in turn causes more uneven wear. This begins a vicious circle that cannot be stopped once it gets a good start. The only solution to this will be to replace not only the heads, but the tape guides as well. Being conscientious about cleaning the tape path on your 238 will more than double the life of the heads and tape guides.

Cleaning the Heads and Tape Guides

All heads and metal parts in the tape path must be cleaned after every 6 hours of operation, or before starting and after ending a recording session.

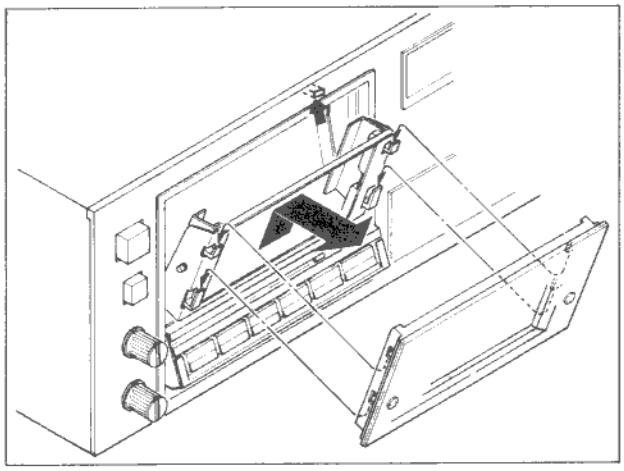
1. Open the cassette door.

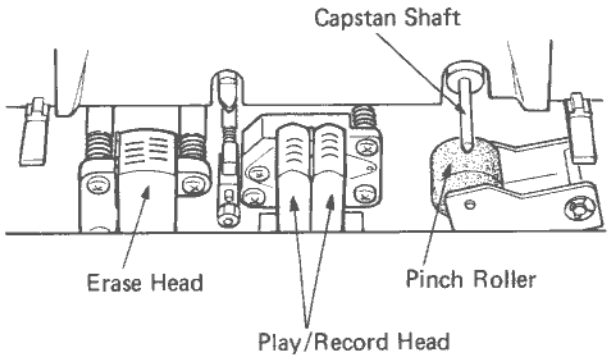
2. Grasp the two sides and pull gently upwards to remove the cover.

3. Using a good head cleaning fluid and a cotton swab, clean the heads and tape guides until the swab comes off clean. Wipe off any excess cleaning fluid with a dry swab.

Cleaning the Pinch Roller

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





1. Push up the transport protection lever as illustrated. Press the PLAY button to engage the pinch roller and capstan shaft, while holding the protection lever up.

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

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

Cleaning the Capstan Shaft

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

DEGAUSSING (DEMAGNETIZING)

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

DEGAUSSING IS ALWAYS DONE WITH THE RECORDER TURNED OFF. If you try it with the electronics on, the current pulses produced by the degausser will look just like audio signals to the heads. These pulses are around 10,000 Gauss, and will seriously damage the electronics and/or meters. Turn off your 238, then turn on the degausser at least 1 m (3 feet) away from the recorder.

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

Slowly move in to the tape path. Move the degausser slowly 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.

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

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

MAINTENANCE OF THE 238 EXTERIOR

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.**

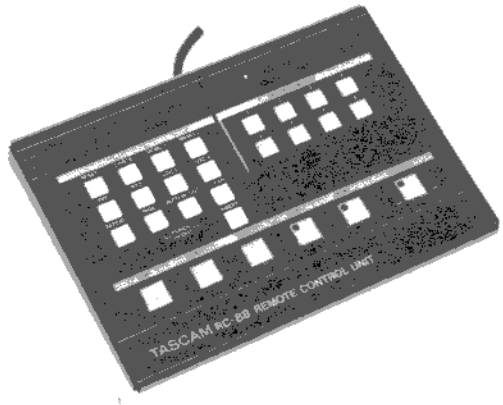
Also, observe the following to prevent damage to the film coating of the top-side panel of the 238:

1) Do not use perfumes, deodrants, insect spray or similar substances near the 238. If they drop on the unit, immediately wipe them off using a coton swab moistened with neutral cleaning fluid or soapy water.
2) Keep heating devices apart from the 238.
3) Do not attatch scotch tape or any other sticky material.
4) Do not leave on the unit photos or magazines or any books with a film-coated, shiny cover.

Be aware also that placing other units or any objects on the 238 can leave marks depending on their weight.

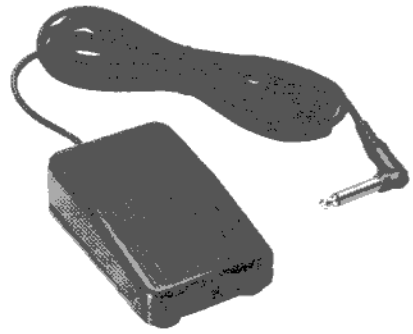
Optional Equipment

RC-88 Remote Control Unit



The RC-88 has duplicates of the rehearsal/auto punch-in and auto-locator controls in addition to the basic transport controls. The cable length is 5 meters (15 ft.).

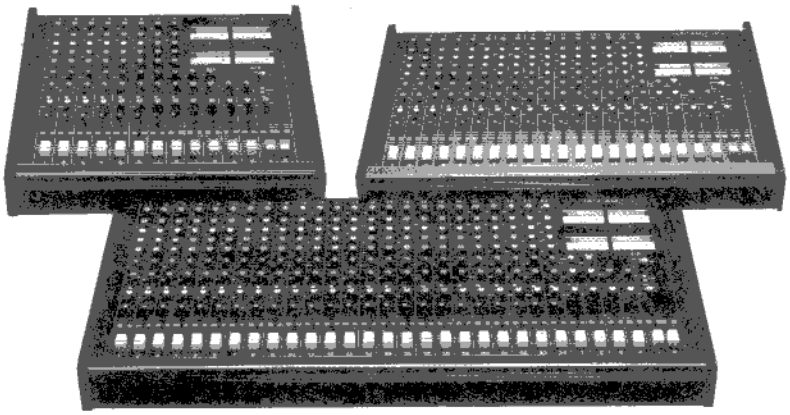
RC-30P Punch-in/out Remote Foot Switch



MTS-30 MIDI Tape Synchronizer

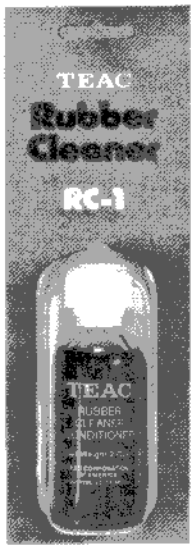
The MTS-30 allows the 238 SYNCASET to sync-up with the MIDI keyboards, drum machines, sequencers. Thanks to its unique "Song Pointer Sync" capability, the associated MIDI equipment will stay in sync and follow the tape no matter where you move the tape within a given song. The MTS-30 responds also to the PITCH CONTrol of the SYNCASET. The maximum stability or resolution of the synchronization is ensured by the use of a newly developed, special error correction circuit.

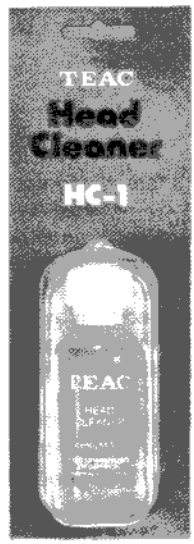
M-200 Series Mixers (M-224, 24 In/4 PGM Out; M-216, 16 In/4 PGM Out; and M-208, 8 In/4 PGM Out)



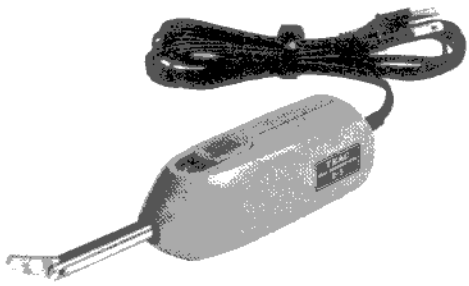
Their maximum flexibility and performance allow them to successfully be used not only as multi-track recording mixers, but as keyboard mixers, DJ mixers, or stage (sound reinforcement) mixers. They fit the bill. Their broad range of features include: 8 Tape Returns (16 on the M-224), 3-band equalizers with a quasi-parametric type for the middle, sub-mix system with 2 effect returns, XLR-RCA dual-standard inputs and outputs.

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



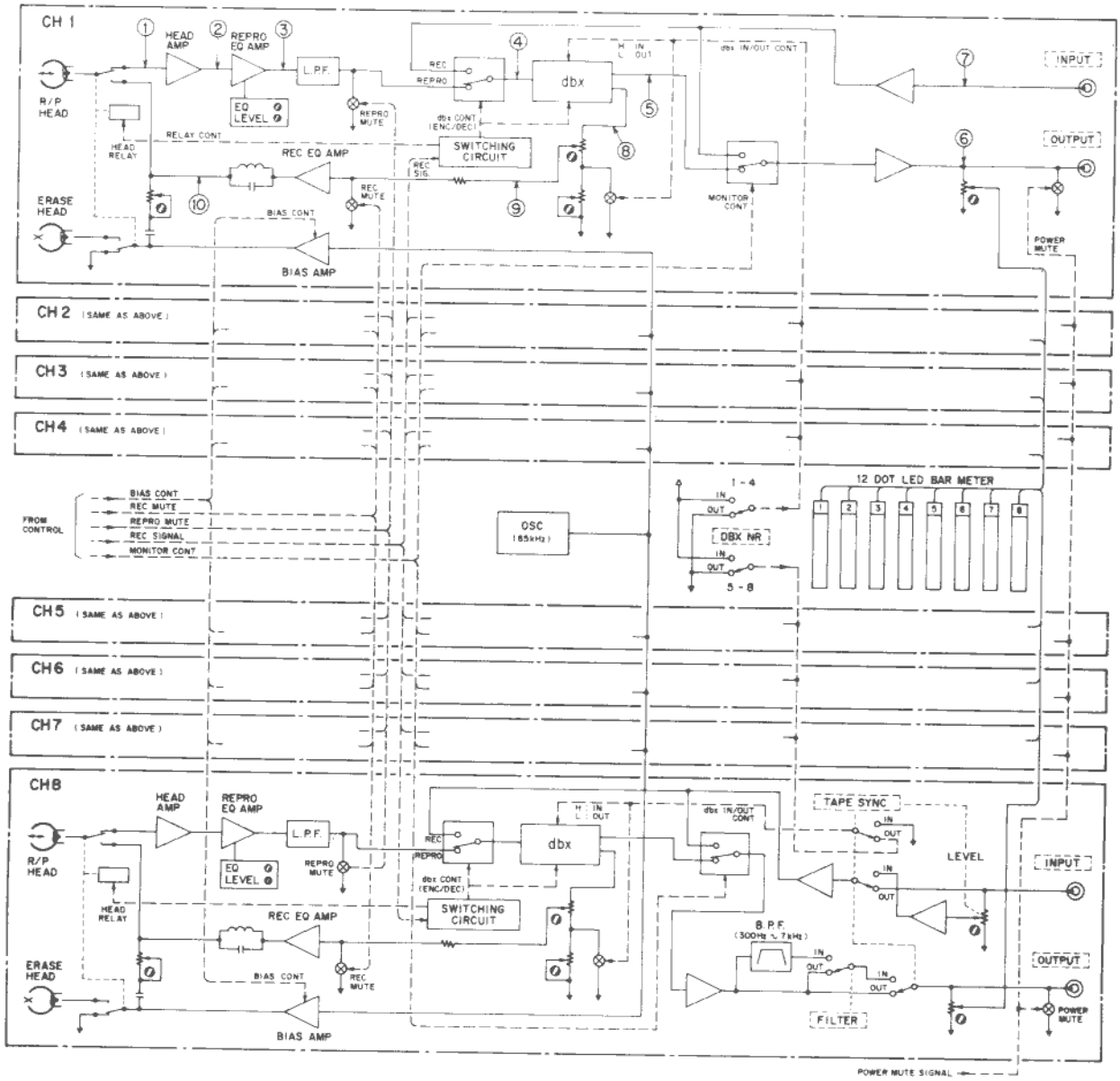


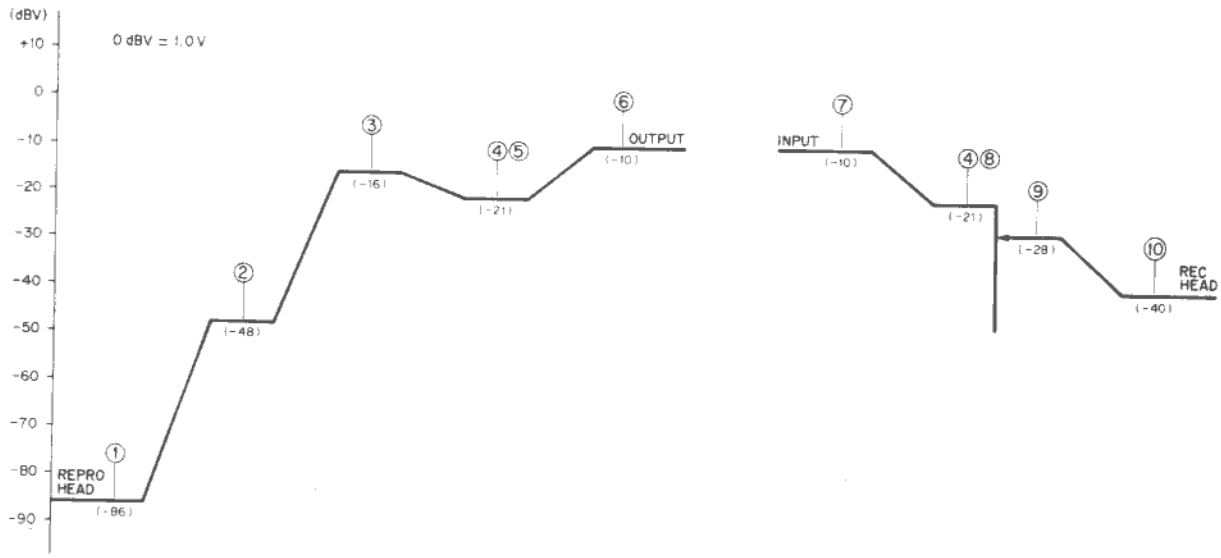
E-3 Head Demagnetizer



TZ-Z61 Cleaning Kit (Except U.S.)

Block and Level Diagrams





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