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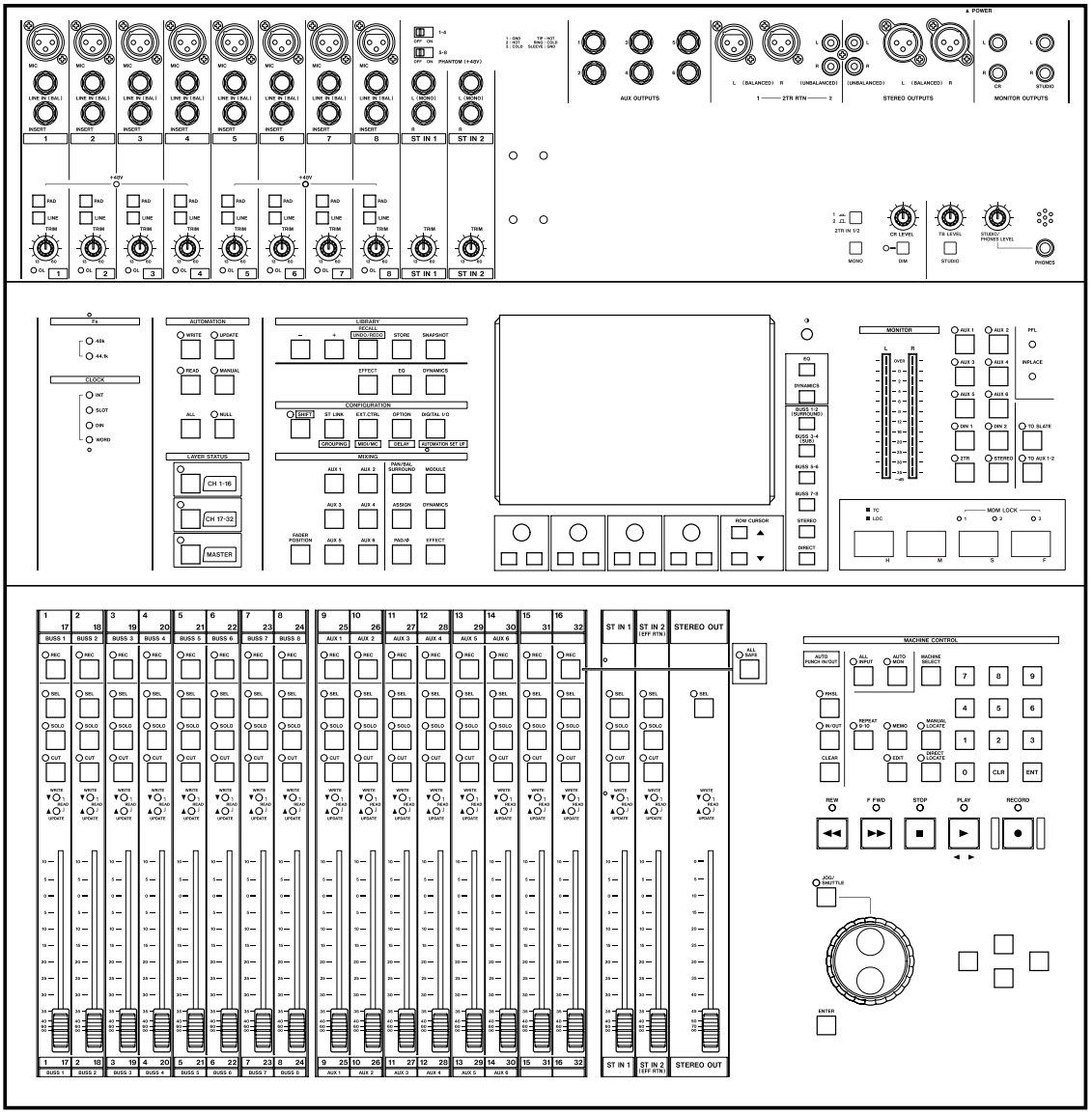
TASCAM

TEAC Professional Division

TM-D4000

Digital Mixing Console

OWNER'S MANUAL



Important Safety Precautions

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.

IMPORTANT (for U.K. Customers)

DO NOT cut off the mains plug from this equipment.
If the plug fitted is not suitable for the power points in your home or the cable is too short to reach a power point, then obtain an appropriate safety approved extension lead or consult your dealer.

If nonetheless the mains plug is cut off, remove the fuse and dispose of the plug immediately, to avoid a possible shock hazard by inadvertent connection to the mains supply.

If this product is not provided with a mains plug, or one has to be fitted, then follow the instructions given below:

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

GREEN-AND-YELLOW	**:** EARTH
BLUE	**:** NEUTRAL
BROWN	**:** LIVE

WARNING: This apparatus must be earthed.

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 GREEN-and-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-and-YELLOW.

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.

When replacing the fuse only a correctly rated approved type should be used and be sure to re-fit the fuse cover.

IF IN DOUBT — CONSULT A COMPETENT ELECTRICIAN.

For U.S.A

TO THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residental area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION
Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user’s authority to operate this equipment.

For the consumers in Europe

WARNING
This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Pour les utilisateurs en Europe

AVERTISSEMENT
Il s’agit d’un produit de Classe A. Dans un environnement domestique, cet appareil peut provoquer des interférences radio, dans ce cas l’utilisateur peut être amené à prendre des mesures appropriées.

Für Kunden in Europa

Warnung
Dies is eine Einrichtung, welche die Funk-Entstörung nach Klasse A besitzt. Diese Einrichtung kann im Wohnbereich Funkstörungen versursachen ; in diesem Fall kann vom Betrieber verlang werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.

CAUTION:

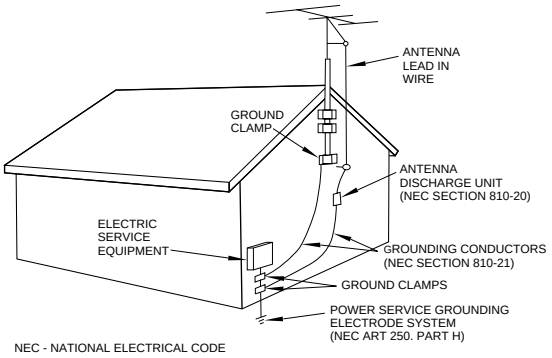
- **Read all of these Instructions.**
- **Save these Instructions for later use.**
- **Follow all Warnings and Instructions marked on the audio equipment.**

1) Read Instructions — All the safety and operating instructions should be read before the product is operated.
2) Retain Instructions — The safety and operating instructions should be retained for future reference.
3) Heed Warnings — All warnings on the product and in the operating instructions should be adhered to.
4) Follow Instructions — All operating and use instructions should be followed.
5) Cleaning — Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
6) Attachments — Do not use attachments not recommended by the product manufacturer as they may cause hazards.
7) Water and Moisture — Do not use this product near water — for example, near a bath tub, wash bowl, kitchen sink, or laundry tub; in a wet basement; or near a swimming pool; and the like.
8) Accessories — Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
9) A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.

10) Ventilation — Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
11) Power Sources — This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.
12) Grounding or Polarization — This product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
13) Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.
14) Outdoor Antenna Grounding — If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

"Note to CATV system installer:
This reminder is provided to call the CATV system installer's attention to Section 820-40 of the NEC which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Example of Antenna Grounding as per National Electrical Code, ANSI/NFPA 70



15) Lightning — For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
16) Power Lines — An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.
17) Overloading — Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in risk of fire or electric shock.
18) Object and Liquid Entry — Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
19) Servicing — Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
20) Damage Requiring Service — Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
a) when the power-supply cord or plug is damaged.
b) if liquid has been spilled, or objects have fallen into the product.
c) if the product has been exposed to rain or water.
d) if the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
e) if the product has been dropped or damaged in any way.
f) when the product exhibits a distinct change in performance – this indicates a need for service.
21) Replacement Parts — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
22) Safety Check — Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating condition.
23) Wall or Ceiling Mounting — The product should be mounted to a wall or ceiling only as recommended by the manufacturer.
24) Heat — The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

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The TM-D4000 digital mixing console is designed to provide you with superlative audio quality in today's digital audio recording environment, as well as ease of use and e xibility to meet changing needs.

This *Reference Manual* is not intended to be read from cover to cover, but we do suggest that you make yourself familiar with the contents of this section as well as the structure of this manual, so that you can find answers to questions when you need them.

If you learn a little about the key features and principles of operation now, before you start to use the TM-D4000 it will save you time and trouble later on.

1.1 Features

The TM-D4000 includes many advanced features, including:

- modular construction, allowing input and output channels to be added in different congurations up to 32 inputs and outputs
- the sixteen long-throw motorized "channel" faders are "layered", allowing control of up to 32 mono inputs (which may be "ganged" in stereo pairs), eight buss sends and six aux sends in a compact package
- in addition to the sixteen faders mentioned above, three dedicated motorized long-throw faders are used for two pairs of stereo inputs and the stereo out buss
- the TASCAM TDIF-1 digital audio format and other popular digital audio formats, as well as high-quality A/D and D/A conversion, are supported through modular expansion,
- all A/D and D/A convertors, including the nal stereo mix, work at up to 24-bit resolution
- digital I/O is also available at up to 24-bit resolution
- eight output busses and six auxiliary sends
- all popular surround formats, as well as stereo, are supported for nal mixdo wn
- expansion with other TM-D4000 consoles using dedicated cascade cables for summing of busses and Aux sends
- integral effects processor, allowing self-contained operation when necessary
- both 44.1 kHz and 48 kHz sampling frequencies are supported, with e xible clock conguration
- each input channel is equipped with 4-band fully-parametric equalization and a dynamics processor
- eight integral high-quality microphone ampliers, with switchable phantom powering, as well as two analog stereo inputs with dedicated faders
- eight fader groups and eight cut groups for e xibility and ease in the mixdown process
- the capability of acting as a remote controller for a wide variety of devices
- synchronization and MIDI timecode generation facilities, allowing location of connected recorders, etc. and integration with the DTRS tape system
- full C-R and studio monitoring facilities are provided, along with an integral talkback microphone and master bargraph meters
- graphical user interface featuring a backlit LCD display with a flexible POD based interface
- library facilities for snapshot mix settings, frequently-used EQ settings, effect settings, dynamics processor settings, etc.
- MIDI control allows dynamic control of parameters through MIDI messages, so mix events can be recorded on MIDI for replay, as well as snapshot recall being linked to Program Change messages
- personal computers connected to the TM-D4000 can run automation software, allowing full real-time control of almost all mix parameters
- an optional MU-4000 meter bridge unit provides channel and master metering facilities through LED bargraph displays which are switchable in "layers"

1.2 About this manual

Please note the following typographical and other conventions used in this manual:

- Physical "push" controls of the TM-D4000 are referred to as "keys".
- "Push" controls which are shown and used on the screen are referred to as "buttons".
- The names of keys and other connectors and controls of the TM-D4000 are given in the following typeface: **ROW CURSOR**.
- The names of on-screen buttons and other on-screen features, titles and prompts, etc. are given in the following typeface:SNAPSHOT LIB .
- The names of any physical keys, connectors and controls of other devices are given in the following typeface: **REMOTE IN**.
- "Warnings" give advice regarding a possible hazard to equipment or personnel.

- “Notes” provide additional information which requires special attention.

1.2.1 How this manual is arranged

We feel that the first five sections of this manual are "required reading". If you take the trouble to read through these sections, you will have a good basic understanding of the way in which you can get the best out of the TM-D4000. Even if you are familiar with the operation of mixers and digital mixers, and even if you never usually read instruction manuals, we suggest that you read these sections. They will provide useful background information for you as you use the TM-D4000.

The other sections are more in the nature of background reference, and contain information that you may not need for everyday working.

Lastly, a tutorial section is provided that allows you (or a new user of the TM-D4000) to become familiar with the working of the TM-D4000.

1, “Introduction” : This section. It provides an overview of the TM-D4000, its operational features, and the manual.

2, “Principles of operation” : Contains basic information on the layout and the special features of the TM-D4000 (fader layers, user interface features, etc.).

3, “System setup” : Before using the TM-D4000, there are certain issues concerned with word (sync) clock timing, etc. This section should be read before you start integrating the TM-D4000 into your setup.

4, “Module operations” : This may be regarded as the "heart" of this manual—it contains details of the everyday operations you perform with any mixing console; for example, equalization, Aux sends, buss routing, etc.

5, “Monitoring” : Explains the principles of monitoring durinng multitracking annd mixdown, and solo operations, etc. using the TM-D4000.

6, “Surround modes” : The TM-D4000 is capable of mixing a a number of different surround formats. This section explains how to use this mixer for surround purposes.

7, “Internal effect processor” : This section explains how to use and set the internal effect processor of the TM-D4000.

8, “Library functions” : In addition to effect processor settings, complete mixer snapshots, equalization settings, and dynamics processor settings can be stored and recalled for convenience. These "library" functions are described in this section.

9, “Machine Control” : The TM-D4000 can act as a remote control unit for a wide variety of external devices, and provides MIDI timecode synchronization facilities. This section provides a guide to these facilities.

10, “MIDI” : This section gives a description of the MIDI-related features of the TM-D4000.

11, “Cascade” : This section describes the way in which a number of TM-D4000 units can be linked together in a “cascade” to form a larger mixing unit.

12, “Front panel” : Provides a brief description of the front panel features of the TM-D4000.

13, “Rear panel & connections” : Provides a brief description of the rear panel connectors, etc. and the connections to be made to and from the TM-D4000 and other units.

14, “Specifications, etc.” : Specifications, and a list of error messages, as well as all the configuration screens available, and a block diagram of the TM-D4000.

“Tutorial–Simple recording session” :

This provides a simple recording session using an analog source (CD player) recording to a DTRS unit, and mixing down to DAT. We suggest that you work through this (about 1 hour) to familiarize yourself with the way in which the TM-D4000 works. This tutorial may be removed from the main manual binder and stored seperately, if desired.

There is also an index, which should allow you to find the answers to any questions relatively easily.

In addition to this manual, the documentation for the automation software is provided seperately, as is the documentation for the expansion cards (see below) and the optional MU-4000 meter bridge unit.

1.3 Expansion cards

You must decide on the system that you will be using with your TM-D4000 and configure it appropriately.

There are three slots available for expansion cards. Without any expansion cards fitted in these slots, the TM-D4000 is only capable of accepting analog sig-

nals through the eight mono analog inputs, the two stereo analog inputs and the two stereo digital inputs, and outputting them to the stereo buss.

These interface cards are easy to install, and it is therefore possible to keep a stock of different interface cards, allowing the TM-D4000 to be used in different ways as needs dictate on different occasions.

Without any interface cards tted, the TM-D4000 provides eight monaural analog inputs and two pairs of stereo analog inputs. These may be mixed to a stereo pair of outputs, in either digital or analog format.

IF-TD4000 : This interface card provides eight channels of digital input/output in TDIF-1 format, allowing devices such as the DTRS series to be connected. In addition to the digital audio, this interface card also provides a **REMOTE OUT** connection, allowing synchronization and control of the remote DTRS recorder.

Note that when connecting a chain of DTRS units using more than one IF-TD4000 card, etc. only one of the DTRS units (the master unit) should be connected directly to the TM-D4000 with the **REMOTE** connection. The other units should be "daisy-chained" to the rst master unit.

IF-AE4000 : This interface card provides eight channels of digital audio input/output in 1992-3AES/EBU professional format. The signals are connected through a 25-pin 'D'-sub connector, and so a suitable cable must be used in order to connect the AES/EBU devices.

IF-LP4000 : This interface card provides eight channels of digital audio input/output in adat™ format. The links to external devices are made through optical "lightpipe" connections, allowing the TM-D4000 to be connected to any device supporting such a compatible interface. A 9-pin 'D'-sub **SYNC OUT** connector is also provided, allowing full remote control of and word clock synchronization to the adat device.

Note that when connecting a chain of adat units using more than one IF-LP4000 card, etc. only one of the DTRS units (the master unit) should be connected directly to the TM-D4000 with the **SYNC OUT** connection. The other units should be "daisy-chained" to the master unit.

Also note than when an adat device is connected to the IF-LP4000, both the IN and OUT connections must be made, and they must be made to the same unit to ensure clock stability across the system.

IF-AD4000 : This interface card provides eight channels of balanced analog input/output at professional (+4 dBu) levels. All conversion is carried out at 24 bits of resolution. The signals are connected through a 25-pin connector, and a suitable cable will be necessary to connect the external analog devices.

1.3.1 Fitting the interface cards

1 **Turn off the TM-D4000 and disconnect it from the power supply. Disconnect all other equipment connected to it.**

WARNING

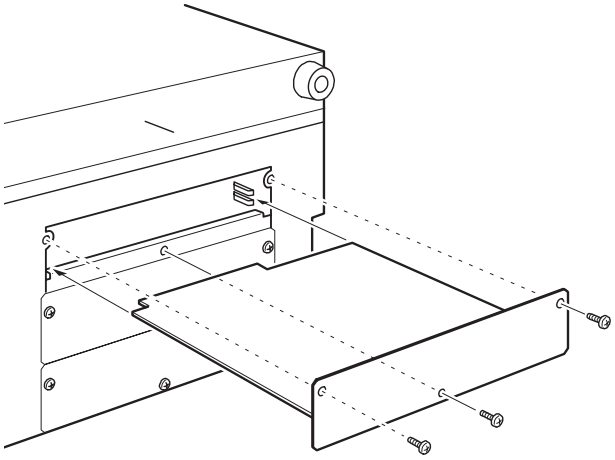
The above step is most important. If you do not do this, there is a risk that you may cause damage to the TM-D4000 as well as other equipment.

2 **Use the screwdriver to remove the blanking panel from the slot into which you will t the interface card. Keep the three retaining screws in a safe place.**

We suggest that you start from the top slot (slot 1) and work downwards. Take care, if you are removing a previously-tted inter - face card, that you are removing the retaining screws, and not the smaller screws which x the card to the r ear plate . Also, if you are removing a previously-tted card, use the binding posts on the rear plate to help remove the card.

3 **Remove the interface card from the anti-static protective bag.**

4 **Hold the card by the edges, and insert it, component side upwards, into the slot.**



5 **Locate the card into the connector inside the TM-D4000. Push the card firmly, without forcing, so that the connector grips the end of the card. A new TM-D4000 and/or new card may be a little stiff. Make sure that the card is pushed as far as it will go (so that the card rear connector plate touches the rear panel of the TM-D4000).**

6 **Use the three blanking plate screws to attach the rear panel of the interface card to the rear panel of the TM-D4000.**

Repeat this process for all the interface cards that you are fitting.

When removing a card, unscrew the three retaining screws and use the “pull posts” on the rear panel of the card to remove it from the TM-D4000.

There are no rules governing which interface cards may be fitted in any of the three slots—any interface card may be fitted in any expansion slot. However, the following points should be noted.

1.3.2 Input channel numbering

Regardless of the type of interface card fitted, and the expansion slots in which any cards are fitted, the numbering of the input channels is always as follows:

Channel number	Slot
1 – 8	Integral analog inputs
9 – 16	Slot 1 inputs
17 – 24	Slot 2 inputs
25 – 32	Slot 3 inputs

These assignments are fixed, and cannot be changed, except that channels 5 through 8 and 13 through 16 can be assigned to the digital inputs (SPDIF or AES/EBU).

It is important to note that there are no dedicated tape return channels. Furthermore, because of this, every channel, no matter what its current signal source, is provided with the same full facilities of equalization, dynamic processing, etc., and all channels may be routed to the output busses in an identical manner (direct outs are only possible for input channels 1 through 16, though).

1.3.3 Output busses

All eight output busses are routed simultaneously in parallel to the appropriately-numbered outputs of all three slots (or as many as are filled with expansion cards). If all three slots are filled, output buss 1 is therefore output to output channel 1 of the cards in slot 1, slot 2 and slot 3.

It is therefore possible to record up to 24 tracks simultaneously, but when the output busses only are used, only eight different signals are output. If, for instance, a 24-track recorder is connected to the TM-D4000 using three IF-AE4000 cards, the signal of output buss 3 will be recorded on tracks 3, 11 and 19, for example.

However, you can use the “direct out” function of input channels 1 through 16, which will allow simultaneous recording of these sixteen inputs to output busses 17 through 32 (slots 2 and 3), overriding any signals which have been taken from the output busses.

At the same time, any inputs from slots 2 and 3 (channels 17 through 32) can be routed through the output busses, which will be output through slot 1 (outputs 1 through 8).

Before you start recording, make sure that you have the correct interface cards for your setup, so that you can interface the TM-D4000 to the other equipment in your setup.

1.3.4 Direct out

As explained later in this manual, the signals from input channels 1 through 8 (the integral analog inputs) and channels 9 through 16 (the first expansion slot) can be assigned to be sent as direct out, rather than to an output buss.

In this case, to determine the number of the output channel, add 16 to the input channel. Input channel 1 is therefore routed to output channel 17 (the first channel in the second interface slot), input channel 9 to output channel 25 (the first channel in the third interface slot) etc. If no interface cards are fitted in

the slots, the input signal selected for direct output will not be output from the TM-D4000.

1.4 Word clock issues

The “word clock” in a digital audio system is the timing information that enables the digital audio samples in a system to be synchronized between the different devices. It is completely unconnected with timecode clocks, etc.

There must be one, and only one, word clock master device in a digital audio system. The TM-D4000 is capable of acting as a word clock master or as a slave.

WARNING

There should be one, and only one, word clock in a setup. Multiple word clocks in a setup may result in noise. which can damage monitoring equipment (speakers and amplifiers).

Check with the other equipment that you are using to see whether it can be a master or slave, and work out which device will be your word clock master. If the TM-D4000 is to be a word clock slave in your system, it can accept word clocks from the following sources:

- Any of the slots which are occupied by a digital interface card (either TDIF-1, adat, or AES/EBU). In the latter case, any of the four stereo signal pairs that make up the IF-AE4000 are individually selectable as word clock sources).
- The digital inputs **D-IN1** and **D-IN2**.
- If more than one TM-D4000 is being cascaded, the clock source on a cascaded TM-D4000 will always be the cascade source. The “head” of the cascade chain can select its clock from any available source.
- A word clock signal, received at the dedicated word clock input on the rear panel.

The clock can be at 44.1 kHz or 48 kHz, with some variation possible for varispeed, etc. at ±6%. See 3, “System setup” for details of word clock selection.

1.5 Effects and monitoring

The TM-D4000 has six auxiliary sends (Aux sends). These may be used for cue purposes, for effect sends, or a mixture of these purposes.

In addition, there is a high-quality stereo digital effect processor built into the TM-D4000, and this may be used in addition to external effects. The internal processor can be fed from either the first or last pair of Aux sends, and the stereo output from the processor can be returned to the second stereo pair of channels.

Typically, the six **AUX OUTPUT** 1/4-inch jacks are used for feeding external effect units, etc. on mixdown, but some of them may be used as studio cue feeds, allowing different sub-mixes to be built up for different monitoring mixes. Since the built-in talkback microphone can be sent to the Aux 1 and 2 busses (as well as being slated), it is suggested that Aux 1 and 2 are used for cueing the in-studio talent.

Though there are no dedicated effect returns, any of the analog inputs can be used for analog effect returns, and the stereo inputs may also be used for this purpose.

Additionally, the two digital stereo inputs can be used as input sources for two of the following channel pairs: 5–6, 7–8, 13–14 or 15–16.

There are two sets of outputs suitable for feeding the control room and studio monitoring systems (as well as a headphone jack). Dimming, talkback, etc. facilities are provided, as well as the ability to monitor any of the Aux sends, the digital inputs, or either of two 2-track recorders (as well as the stereo mix, naturally).

2.1 User interface

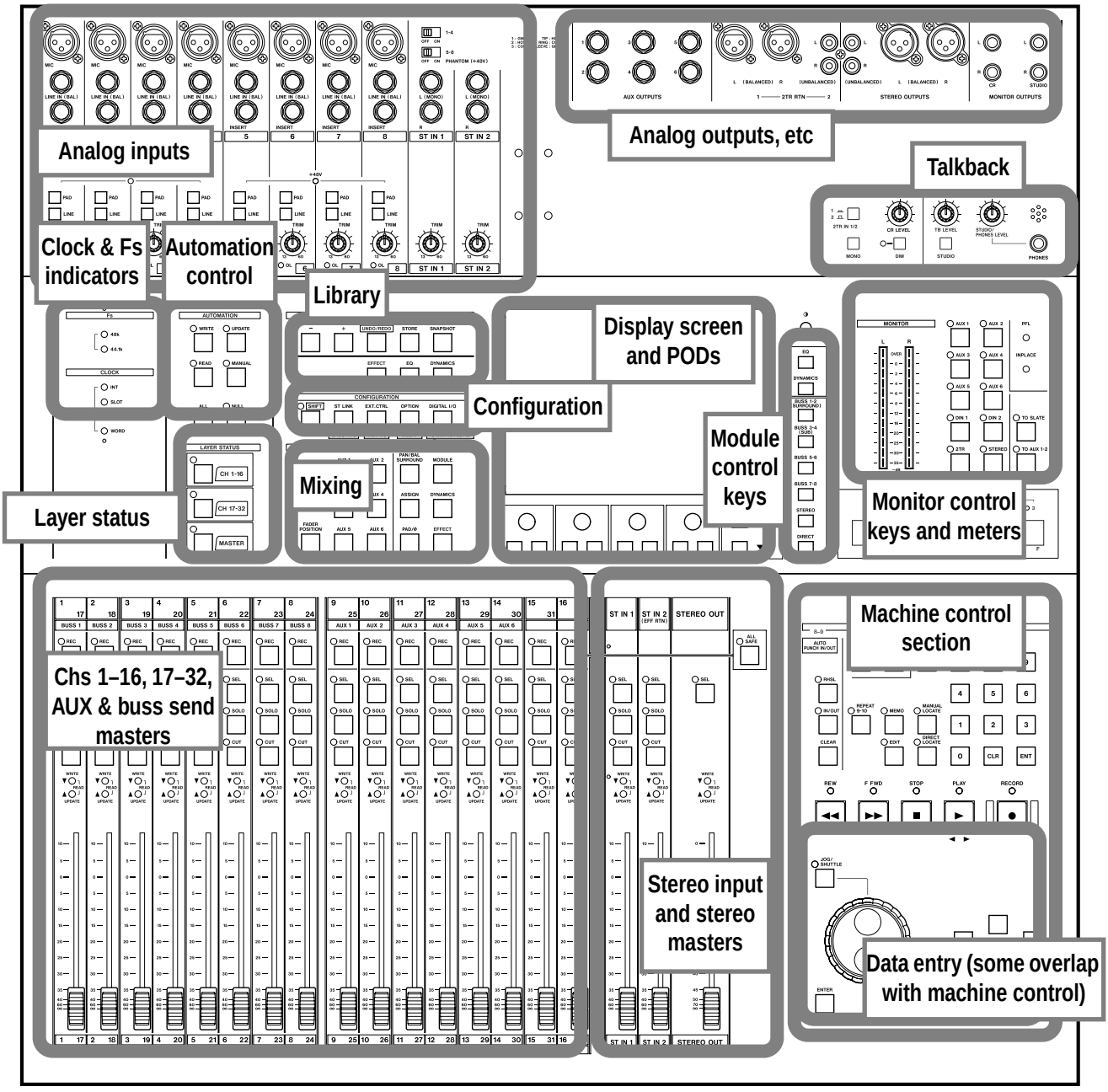
The TM-D4000 is a 36-channel console with eight output busses, 4-band fully parametric equalization on each channel and six aux sends.

However, when you look at the console and compare it with an analog console of the same specifications, it may appear that some controls are missing. For example, there would be 408 EQ rotary controls alone on an analog console (12 on each of 32 mono channels and 12 on each of 2 stereo channels).

In fact, all the appropriate controls are present; they are software controls, and this section explains how to access them, as well as providing a “road map” so that you can find your way easily round the different parts of the TM-D4000.

2.2 Road map

The TM-D4000 can be divided into logical sections, as shown below. It is worthwhile remembering where each section belongs, so that you can find your way around the console quickly and easily when you start to use it.



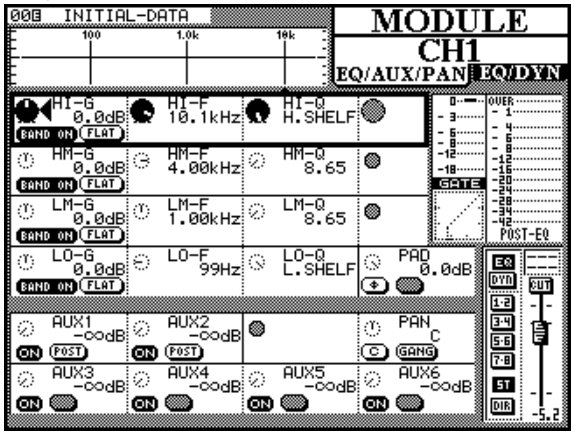
The majority of the settings are made using the display screen, using the PODs underneath the screen.

2.3 Using the PODs

A POD consists of a continuous rotary encoder or "knob", with two keys (or "switches") under it. There are four PODs located directly under the display screen.

The knob is used to set continuously variable parameters shown on the screen (for example, the amount of signal sent to an Aux buss), while the switches are used for "on/off"-type screen parameters (e.g. pre-or post-fader send).

A typical screen showing POD use is shown below (the method of actually selecting screens is given below):



The controls on the screen are shown in rows, each row corresponding to the four PODs.

The heavy blinking box surrounding a row shows the currently-active row. Turning a POD knob will have the effect of changing the corresponding parameter in the active row (turning the left POD knob will adjust the left parameter in the active row, etc.).

In the example above, the right on-screen control in the active row is "grayed out". This means that the corresponding POD has no function when this row is active.

Note that PODs which are enabled, but not in the currently active row, are shown as small dashed circles. PODs which are disabled, and not in the currently active row, are shown as small gray circles.

Where both switches of a POD are unused, they are not displayed on screen. When only one switch of a POD is used, the other is "grayed out".

To change the active row, use the **ROW CURSOR** keys to the right of the PODs to move the heavy blinking box indicating the active row.

In addition to the POD knobs, the POD switches can also be used in a number of cases in this screen to set various parameters.

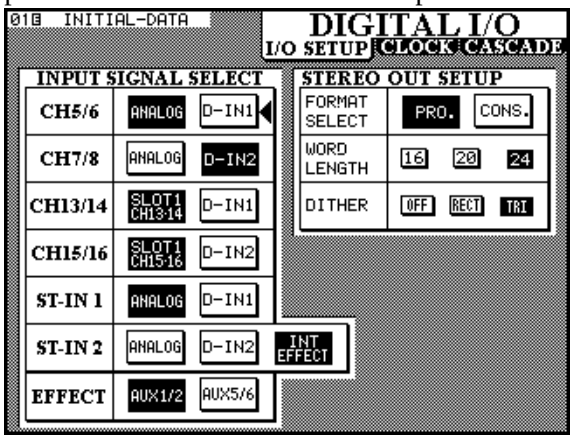
In this way, comparatively few physical controls can be made to adjust many parameters. Since these controls are centralized, this allows for very efficient working with the TM-D4000.

2.3.1 Selecting screens

Display screens are selected using the group of keys to the left of the display screen.

Sometimes a key will have two labels, one above and one below. The function described by the lower label is accessed by pressing the **SHIFT** key so that the **SHIFT** indicator lights, and then pressing the appropriate key.

The screen shown below is a DIGITAL I/O screen, as shown by the title in the top right corner of the screen. Accordingly, the (unshifted) key whose upper label is **DIGITAL I/O** should be pressed.



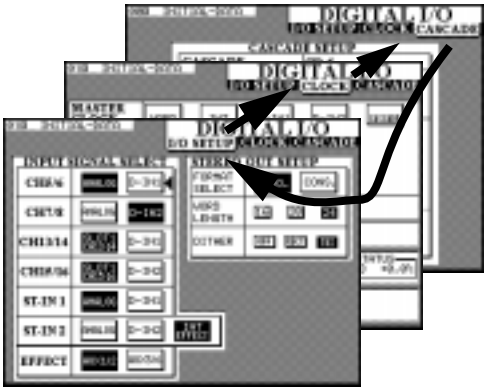
Note that this screen contains three "tabs" under the title. This is because there are more parameters which fall under the heading of "digital I/O" than can fit on one screen.

Currently, the I/O SETUP tab is at the top, and it is these parameters which are available for editing.

To change to the next tab, CLOCK, press the **DIGITAL I/O** key once more (with the **SHIFT** indicator lit).

Another press of the **DIGITAL I/O** key will bring the CASCADE tab to the front, and pressing it one

more time will bring I/O SETUP to the front once more.



2.3.2 Navigation in screens

In the screens above, there are no POD-selectable parameters. In these cases, it is necessary to use another method of working.

This is provided by the cursor keys and the **ENTER** key beside the **JOG/SHUTTLE** dial.

Use the cursor keys to move the cursor (◀) from field to field, and the **ENTER** key to select a value from one of a number of options.

2.3.3 Using the JOG dial

Sometimes there are numerical values to be set. These can be entered using the **JOG** dial (when the **JOG/SHUTTLE** indicator is off and the Dial Edit option is checked—see 3.3.7, “Dial edit”).

The **JOG** dial can also be used to change the values of a highlighted item which can also be edited by a POD (in the screen above, there are no such values, but the MODULE screen in 2.3, “Using the PODs” contains many such values). Note that the **JOG** dial can be used to control the values of a parameter that is not in the currently active POD row.

In some screens, the **JOG** dial may be used instead of the cursor keys to move the cursor around the screen. The instances where this can be performed are usually obvious and therefore will not be described in detail.

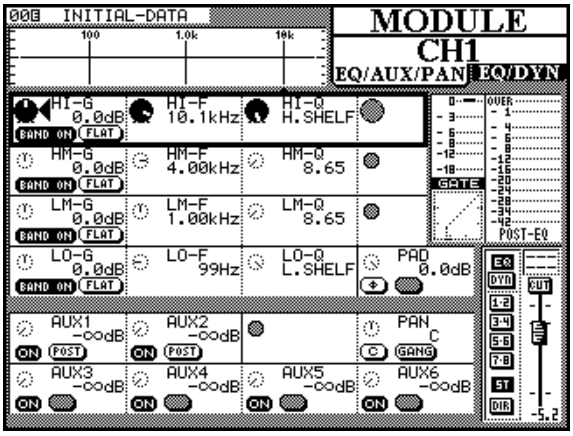
In certain special screens, the outer **SHUTTLE** wheel is used to change the function of a screen (for instance in library screens, it changes the function of the **JOG** dial from a device selector to a character selector.

The numeric keypad may also be used for the direct entry of numeric values in certain cases.

2.3.4 One channel or one parameter?

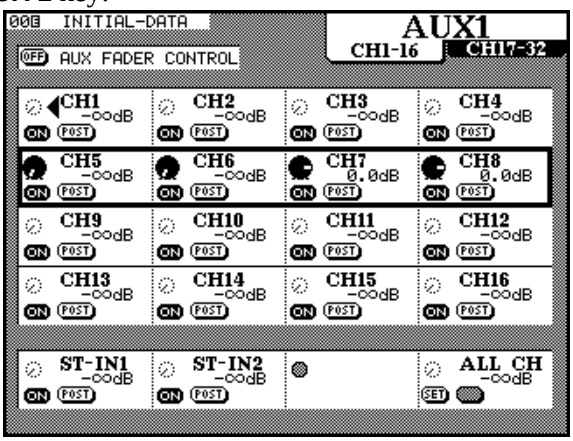
The TM-D4000 provides two options for the setting of module-based (as opposed to system-based) parameters.

If one module (or stereo linked pair of modules) is to have many parameters changed, at one time, the channel is selected (see 2.3.5, “Selecting channels” below) and the MODULE screen is used, as shown below:



In fact, the MODULE “screen” is two screens (EQ/AUX/PAN and EQ/DYN (dynamics processor)). Pressing the **MODULE** key will change between these two screens (see 2.3.1, “Selecting screens” for more information on multiple screens).

Sometimes, though, it makes more sense to view and adjust a single parameter on many modules simultaneously. For instance, here is the screen to adjust the levels for Aux send 1, accessed by pressing the **AUX 1** key:



Note that again, this “screen” is actually two screens, the first for the channels 1 through 16, and the second for channels 17 through 32. Repeated presses of the AUX 1 key will cycle between these two screens.

NOTE

Equalization is only available in the MODULE screen. There is no global equalization screen.

2.3.5 Selecting channels

In the case of the MODULE screens, which allow you to adjust the parameters of an individual channel (or pair of linked channels), it is necessary to select the channel whose parameters are to be edited. This is usually done with the individual channels' **SEL** keys.

Pressing the **SEL** key of a channel (or either channel of a stereo linked pair of channels) will change the MODULE screen (when a MODULE screen is already displayed) to allow viewing and setting of that channel's parameters.

If the MODULE screen is not already displayed, pressing and holding the **SEL** key of a channel for about two seconds will bring up the MODULE editing screen for that channel, if the appropriate option is set (see 3.3.5, "Select MODULE return").

In addition, the **SEL** keys may also be used to jump around a screen quickly when a lot of channels are displayed simultaneously, rather than using the cursor keys to select a channel.

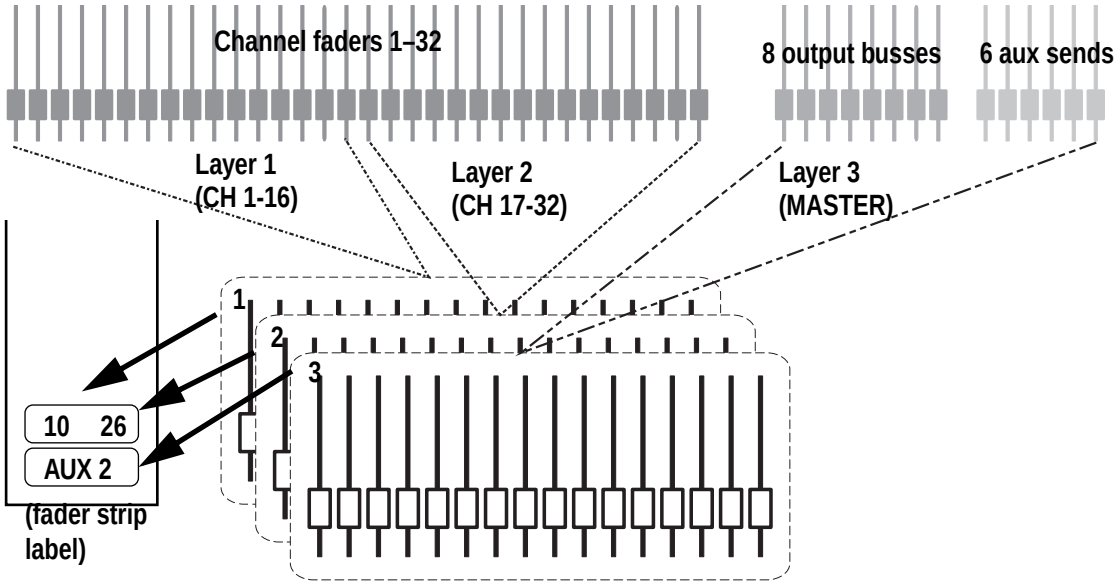
The channel faders may also be used to select channels for editing, together with other optional preferences concerned with the interface, as described in 3.3.4, "Fader select".

2.4 Fader layers

The TM-D4000 can handle up to 32 mono inputs, together with two stereo inputs, and also has eight busses and six aux sends. However, only 19 faders are visible.

The way that faders are used is in "layers"—each layer consisting of 16 faders.

The three right faders always control the two stereo inputs and the stereo master buss, regardless of the settings of the other faders, except in the Aux send mode, where the mono and stereo input faders in the **1-16** and **17-32** layers act as Aux sends. In the **MASTER** layer, even if the Aux send option is selected, all faders retain their settings.



The three layers are selected using the **LAYER STATUS** keys (the appropriate indicator will light). These three keys are interlocking, i.e. only one can be active at a time, and have the following meanings:

LAYER STATUS	Meaning
CH 1-16	Faders 1–8 control the inputs from the integral analog inputs, and faders 9–16 control the channel inputs from slot 1
CH 17–32	Faders 1–8 control the channel inputs from slot 2, and faders 9–16 control the channel inputs from slot 3
MASTER	Faders 1–8 control the levels of the signals fed to the eight output busses. Faders 9–14 control the levels of the six aux sends. Faders 15 and 16 are unused in this fader layer.

Every time the fader layer is changed, the faders will move to the positions corresponding to the new layer.

NOTE

In addition to the faders, the **REC**, **SEL**, **SOLO** *and* **CUT** *keys, as well as the channel automation indicators above each fader all change function to control the appropriate input channel, buss or aux send. However, in this manual we sometimes use the term "fader" as a shorthand expression for all these items.*

Note that there are some modes where the fader controls do not act as channel, Aux or buss faders. These are principally the Aux Fader Control mode (see 4, "Module operations") and MIDI Fader (10.5, "MIDI Faders") modes (some Machine Control settings may also use the faders). If the current fader layer is not controlling module (or Aux or buss) levels, the currently-selected indicator will ash.

NOTE

In the Aux Fader Control mode, the MASTER layer functions do not change. Accordingly, the **STEREO IN** *faders act as channel faders in the MASTER layer when the Aux Fader Control mode is selected, not as Aux sends for the stereo channels.*

2.4.1 Turning fader motors on and off

The fader motorization can be turned on and off as n described in 3.3.8, "Automation fader inhibit"..

This setting only takes effect in automation replay (Read) mode. In all other cases such as fader layer changes, snapshot recall, etc., the faders are always motorized.

2.4.2 Physical and logical faders

When automation operations are taking place, we can speak of "physical" and "logical" faders.

The "physical" faders, as the name implies, are the actual controls (the fader knobs). The "logical" faders, on the other hand are not visible, and are the positions that the physical faders would occupy for the current level.

NOTE

The positions of the physical and logical faders will always be the same when fader motorization is turned on.

This section describes the operations that should be carried out to affect the operation of the TM-D4000 as a whole.

These include:

- Digital I/O setup
- Word clock setup
- System options

It is important to understand the basic principles explained here. If you do not, it will be more difficult to achieve satisfactory results with your TM-D4000.

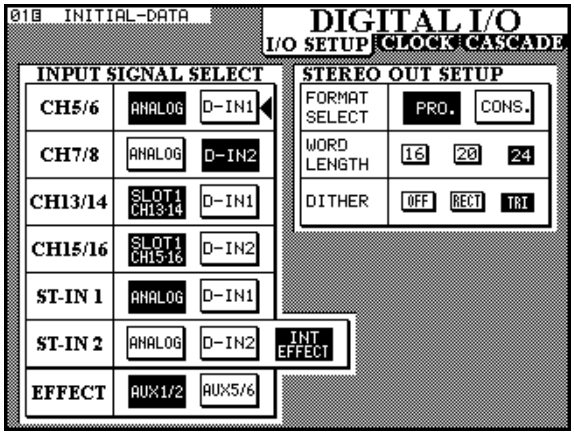
NOTE

The Cascade setup (accessed through the DIGITAL I/O key) is described in 11, "Cascade", the Solo setup in 5, "Monitoring", and the Surround setup in 6, "Surround modes".

3.1 I/O setup

1 **With the SHIFT indicator off, press the DIGITAL I/O key [5] until the screen below appears.**

This screen allows the selection and assignment of the digital inputs to channels. Note that the same digital input may appear as an input option for more than one pair of channels. If a digital input is selected as the source of more than one pair of channels, it will appear at all these channels simultaneously.



The options available are:

Input channels	Available sources		
5 & 6	Analog (integral analog channels 5 and 6)	D-IN1 (XLR-type)	—
7 & 8	Analog (integral analog channels 7 and 8)	D-IN2 (RCA)	—
13 & 14	Slot 1 CH13-14 (channels 7 and 8 of the card in slot 1)	D-IN1 (XLR-type9	—
15 & 16	Slot 1 CH15–16) channels 7 and 8 of the card in slot 1)	D-IN2 (RCA)	—
ST-IN 1	ANALOG (integral stereo inputs)	D-IN1 (XLR-type)	—
ST-IN 2	ANALOG (integral stereo analog inputs	D-IN2 (RCA)	INT EFFECT (internal effect processor)
EFFECT[a]	AUX1/2 (Aux busses 1 and 2)	AUX5/6 (Aux busses 5 and 6)	—

a. The source of the internal effect processor input

3.1.1 STEREO OUT settings

In addition to these input sources, changes to parameters affecting the digital output of the **STEREO OUT** can be made.

Firstly, the **STEREO OUT** can be selected as being in either professional (PRO.) or consumer (CONS.) format.

Changing the setting made here will also affect the format of the output from any IF-AE4000 interface cards fitted in the expansion slots.

NOTE

The Consumer format, when output from the unbalanced RCA STEREO OUT jack, corresponds to the IEC61958 (SPDIF) format.

If the Professional format is selected, the resulting data output from the RCA STEREO OUT jack will probably be unusable by most domestic equipment.

3.1.2 Consumer options

If the chosen output is Consumer, hold down the **SHIFT** key and press the right switch of POD 4 to change the SCMS (copy-protect) settings between FREE (SCMS disabled), ONCE (standard SCMS one-generation) and NO COPY ((copy-prohibit). An appropriate message will appear on screen, and these settings are stored in memory.

In addition, the category of consumer audio can be set using the **SHIFT** key along with the left switch of POD 4 to cycle through the following values:

General	General
CD	CD
LD	Laser (usually disc)
MD	MD
CODEC	PCM Codec
MIXER	Mixer[a]
SRC	SRC (Sample Rate Converter)
SAMPLER	Sampler
DAT	DAT
DVTR	DVTR
DCC	DCC
TV-J	Japanese broadcast digital
TV-EUR	European broadcast digital
TV-USA	American broadcast digital
TV	Broadcast digital
Synth	Synthesizer
Microphone	Microphone
Pro A/D	Copy-free A/D converter
A/D	A/D converter
RAM	Solid state reproducer

a. TM-D4000 default setting

This allows the TM-D4000 to pose as an alternative audio source, for instance if an MD deck can only accept signals from a CD or another MD deck, or in a broadcast situation, a certain category may be necessary for use with other equipment.

If an attempt is made to set the category with the Professional format setting, an error message, "No Category for AES/EBU" will appear on screen.

3.1.3 Word length and dithering

The word length can be selected as being either 16, 20 or 24 bits in length.

If the selected word length is less than 24 bits, you may choose to dither the resulting output. Dithering helps to reduce quantization noise, but results in a slightly lower signal-to-noise ratio. Choose either OFF, rectangular (RECT) or triangular (TRI) dithering. The shape names refer to the probability distribution of the noise which is used in the dithering process.

Typically, triangular dithering gives better quantization noise reduction than rectangular, but the signal-to-noise ratio is not as good.

NOTE

The word length from the output busses is always set to 24 bits.

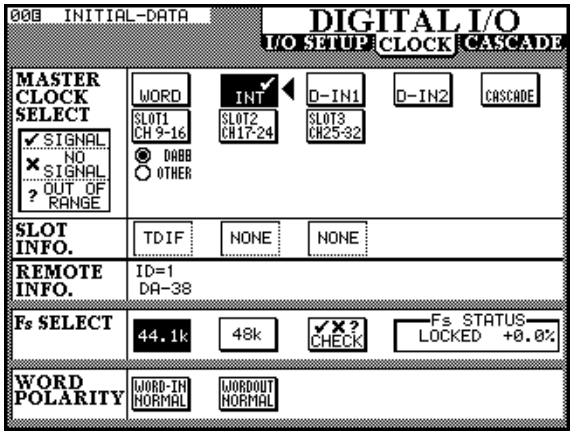
3.2 CLOCK setup

WARNING

There should be one, and only one, word clock source in a digital audio setup. Multiple word clocks in a setup may result in noise which can damage monitoring equipment (speakers and amplifiers).

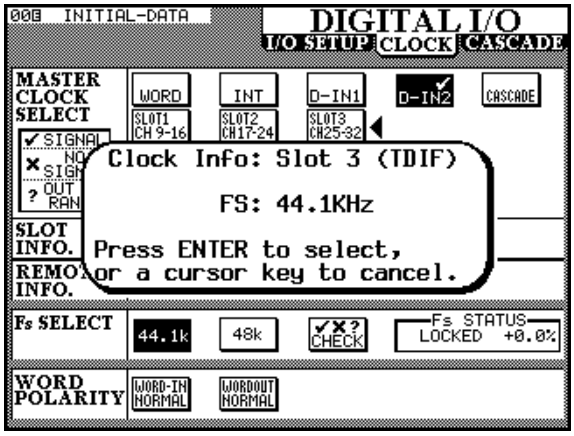
The word clock source is selected in the following way:

1 **With the SHIFT indicator unlit, press the DIGITAL I/O key until the screen below is shown (note that the exact screen may differ from that shown here, depending on the number and the type of the interface cards fitted in the expansion slots):**



2 **Move the cursor to the box which contains the description of the desired clock source.**

3 **Select the clock source by pressing ENTER.**



The popup panel provides information about the potential clock source. Press ENTER to select this source, or any one of the cursor keys to dismiss the popup panel, and select another source.

In the case of an IF-AE4000 (AES/EBU interface card), there are four different sources (the four AES/EBU inputs) which may be selected as the word clock source for the TM-D4000.

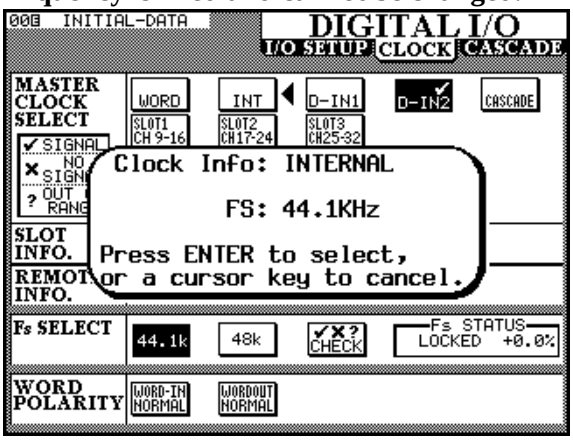
If the TM-D4000 has been cascaded from another unit, the clock source is set as `CASCADE` **and cannot be changed. The "head" of the cascade chain can select the clock from any source.**

In the case of an IF-TD4000 (TDIF-1 interface card), the device attached to the card source is shown as either a `DA88` **(DA-88 DTRS recorder) or** `OTHER` **(another type of recorder connected through the TDIF-1 interface). If the indicator shows DA88, then I/O data is truncated to 16 bits, otherwise I/O is carried out at 24 bits.**

In the case of an IF-LP4000 (ADAT "light-pipe" interface card), there are three options: `INT`, `SYNC` **or** `DIGI`**. If more than one IF-LP4000 is fitted, changing the setting for one card will change the settings for all the rest. The** `INT` **setting allows the ADAT to act as the clock master (this is not a recommended setting). If** `SYNC` **is selected, the ADAT receives its clock through the SYNC cable, and if** `DIGI` **is selected, the optical connection is used as the clock source to the ADAT. We strongly suggest that** `SYNC` **is used, rather than** `DIGI`**, if the ADAT is to be a word clock slave, especially if more than one ADAT is connected. See also 9.4.4, "ADAT devices".**

If more than one IF-LP4000 card is fitted, there are three choices for each card, regardless of the actual connection of the ADAT units to the TM-D4000. The last on-screen button pressed (on any of the IF-LP4000 options) then determines the status of the first ADAT in the chain.[1]

4 **If the clock source has been selected as** `INT`**, the clock rate (sampling frequency) can be selected. In all other cases, the sampling frequency is fixed and cannot be changed.**



3.2.1 Selecting clock frequencies

Word clock sources, except for `WORD` and `ADAT` sources, include information regarding their sampling frequencies. If either `WORD` or `ADAT` is selected as a clock source, the procedure below should be followed:

1 **Decide what sampling frequency the project will use.**

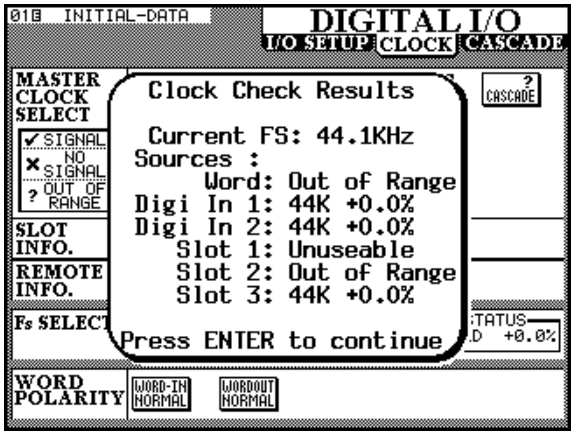
2 **Select** `INT` **as the clock source (this is a temporary measure), and select the frequency.**

3 **Select the final clock source (**`WORD` **or** `ADAT`**). The TM-D4000 sampling frequency will now match the incoming word clock.**

1. Note that the other ADAT units, "daisy-chained" to the first ADAT unit in the chain with SYNC connections, will be automatically set to take their clock from the SYNC connector, and their IDs will also be set automatically, regardless of setting made here.

3.2.2 Clock check

The status of all possible clock sources currently connected to the TM-D4000 can be checked by moving the cursor to the CHECK box and pressing **ENTER**. The console will mute, and a list of available clock sources will be shown.



Press **ENTER** to continue operations.

3.2.3 Clock settings (other)

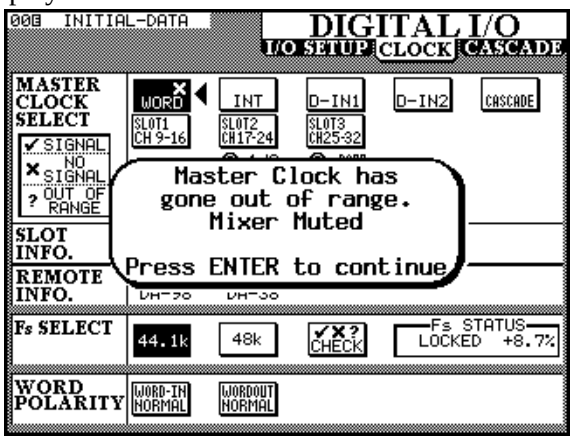
The Fs STATUS box shows the status of the currently selected clock source.

The WORD POLARITY settings allow either incoming or outgoing word clock information to be inverted (REVERSE) relative to normal. This is because some units either transmit or expect to receive such signals in this inverted format.

3.2.4 Clock tolerance

When setting the clock, the sampling frequency received can be ±6% of the stated nominal value. When in use, the frequency can be ±7% of the stated value. This allows a digital device which has a varispeed feature to be used as the word clock source for the TM-D4000.

If the selected clock source goes out of range, the TM-D4000 will mute, the currently-selected clock indicator will flash, and a message will appear on the display:



The TM-D4000 will report the out-of-range clock frequency at a range of ±9.9% relative to the stated frequency, but will mute at 7.0% or over.

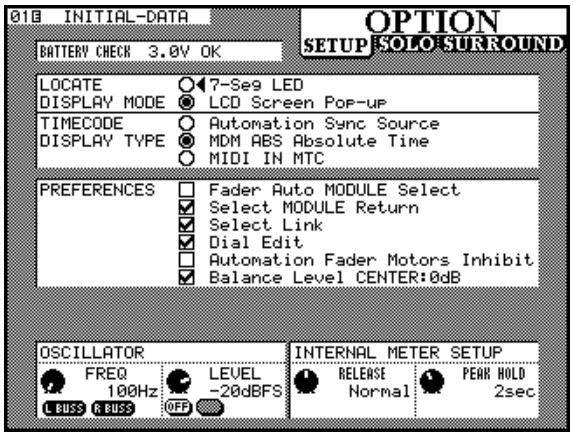
Press the **ENTER** key to dismiss the popup message, change to the CLOCK screen, and correct the error condition (by selecting another clock source, or by re-selecting the clock if it has come back into range).

3.3 Option setup

In unshifted mode, this key is used to show the OPTION screens. There are three of these screens: SETUP, SOLO and SURROUND, and they are accessed by repeated presses of the **OPTION** key.

The solo operations are explained in 4, “Module operations”, and the surround operations in 6, “Surround modes”.

The SETUP screen provides the following options (as well as displaying the current battery voltage, used to power the memory holding library entries, etc.) as shown and described below:



These settings are generally made using the cursor keys to move the cursor to the parameter to be

changed, and the ENTER key is then used to make the setting.

3.3.1 Location display mode

When using the TM-D4000's location facilities to control an external device, the value of the location points (LOCATE DISPLAY MODE) can be displayed either on the main time counter (7-Seg LED) or as a "pop-up" panel on the main display screen (LCD Screen Pop-up). These options are mutually exclusive, i.e. you can only choose one.

3.3.2 Timecode source

The timecode displayed on the time counter can be taken from the timecode source used for automation timing (Automation Sync Source), directly from a DTRS recorder through the **REMOTE IN** terminal (MDR ABS Absolute Time) or received at the MIDI IN terminal as MIDI timecode (MIDI IN MTC [MIDI Time Code]). This timecode source is also used when controlling external devices (see 9, "Machine Control"). Again, only one of these options can be selected.

3.3.3 Preferences

The PREFERENCES are as follows: Fader Auto MODULE Select, Select MODULE Return, Select Link and Dial Edit, Automation Fader Motors Inhibit and Balance Level CENTER 0dB. Any number of these preferences can be selected, as indicated by a check mark in the checkboxes (✔).

3.3.4 Fader select

When checked, and the MODULE screen is currently displayed this option allows a module to be selected whenever its fader is moved, in addition to the usual method of pressing the **SEL** key.

3.3.5 Select MODULE return

When checked, this option allows the MODULE screen of the appropriate module to appear (even if a MODULE screen is not currently displayed) if the **SEL** key of the module is pressed and held for about two seconds.

3.3.6 Select link

When checked, this option allows the stereo linking of two adjacent modules (provided the left module is odd-numbered) by pressing and holding the **SEL** key of one module and pressing the **SEL** key of the other. See 4.2.2, "Using the SEL keys to link channels".

3.3.7 Dial edit

When checked, this option allows the **JOG** dial to be used as a data entry dial for the on-screen control pointed to by the triangular cursor, which is usually controlled by a POD knob. In effect, this provides another POD. In addition to this option being checked, the **JOG/SHUTTLE** indicator must be off when using the **JOG** dial in this way, to prevent the JOG dial being used as a transport control.

3.3.8 Automation fader inhibit

The Automation Fader Motors Inhibit setting allows the motorization of the faders to be turned off or on for automation replay (Read) purposes. See 2.4.1, "Turning fader motors on and off".

3.3.9 Balance level

When two channels are linked together as a stereo pair, the pan controls change to a balance control, as mentioned earlier. In the center position, the level may either be set to 0dB (checked) or a 3 dB cut (unchecked).

3.3.10 Oscillator

The integral line-up oscillator can be turned using the left switch of POD 2 and the frequency adjusted with the POD 1 control. It can be assigned to either the left or right main output buss, (L Buss, R buss), Both of these, or neither using the switches of POD 1. The left busses are the odd-numbered output busses (1, 3, 5, 7) and the left channel of the stereo output buss. The right busses are the even-numbered output busses (2, 4, 6, 8) and the right channel of the stereo output buss.

The POD 1 rotary control is used to change the level of the oscillator, relative to full-scale.

3.3.11 Meter ballistics

The release rate ("fall time") and peak hold time of the meters and can be adjusted using the knobs of PODs 3 and 4.

The release rate can be set to Fast, Normal or Slow.

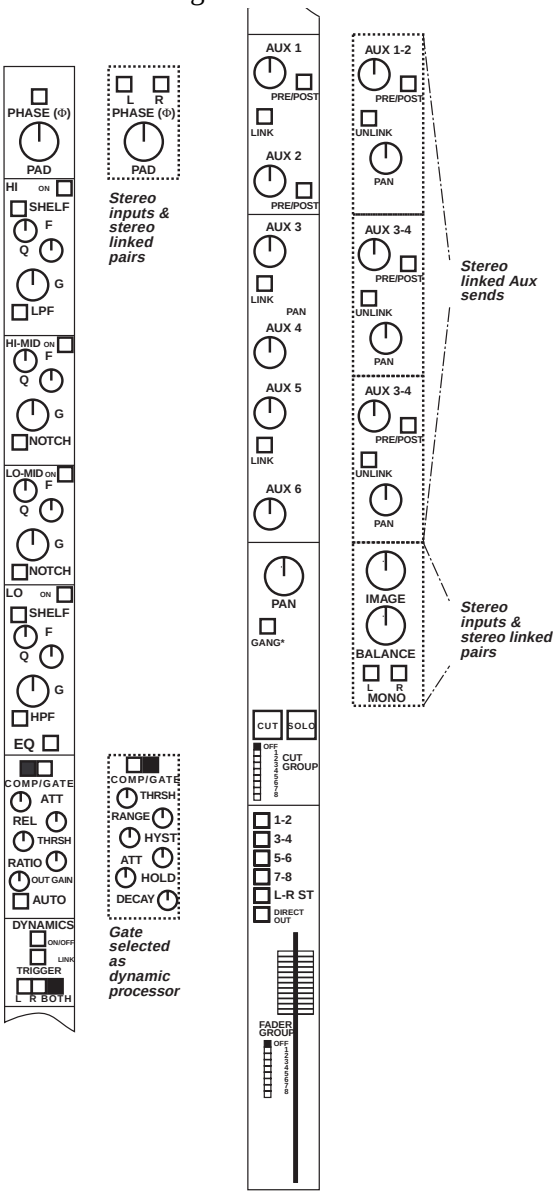
The hold time can be set to 0sec, 1sec, 2sec, 4sec, 8sec or . The final (infinity) setting will hold the peak value until a new setting is made (or the TM-D4000 is turned off!).

4 - Module operations

The input modules of the TM-D4000 are of two types: mono input and stereo inputs. There is no difference between a “tape return” channel, an “effects return” and an input channel—all modules are equipped with the same features.

The digital parts of the mono input modules are identical, regardless of what interface card is fitted. The only difference between mono modules is that modules 1 through 8 use the integral mic amplifiers and A/D convertors. These analog features (MIC/LINE switch, phantom powering, analog pad and gain, etc.) work in an identical way to similar features on a conventional analog console. If you are unsure about the operation of these items, consult 13, “Rear panel & connections”.

If the digital functions of the modules were “converted” to analog controls, a module would look similar to the following:



*the GANG control is only available on odd-numbered modules

Dashed lines indicate options (e.g. the dynamics processor selected for each module can be a compressor/limiter or a gate, but not both). Aux sends can be optionally linked, providing a PAN control. When channels are linked together in a stereo pair (see 4.2, “Stereo linking”), the PAN controls are replaced by an IMAGE control and a BALANCE control.

4.1 Module features and control

NOTE

This section contains the instructions for the everyday module operations, as described below. You should at least make yourself familiar with the contents of this section, so that you know which parts to use for reference if you need information.

Very briefly, the typical signal path is:

- phase (4.8, “Pad and phase(Φ)”
- digital trim (4.8, “Pad and phase(Φ)”)
- 4-band EQ (4.3, “Equalization”)
- dynamics processor (comp/limiter or gate) (4.6, “Dynamics processor settings”)
- fader (self-explanatory—for details of fader grouping, see 4.9, “Fader and cut groups”)
- Aux sends (4.5, “Aux sends”
- cut and solo (cut groups are described in 4.9, “Fader and cut groups”, solo modes are described in 5, “Monitoring”)
- panpot (4.7, “Pan and balance”)
- channel-to-buss assignment (4.4, “Channel-to-buss assignments”)

4.1.1 Stereo out module

This module includes 4-band EQ facilities and a dynamics processor (identical to those provided on the other modules).

4.1.2 Control of module parameters

In many instances, there may be more than one way of controlling module parameters: e.g. from the MODULE screen, allowing the control of many parameters for a single module (or linked pair) and from a dedicated “global” screen, allowing the adjustment of a single parameter for many modules.

These are described in 2.3.4, “One channel or one parameter?”. In this section, the appropriate way(s) of working are described for each parameter.

4.2 Stereo linking

In unshifted mode, the **GROUPING/ST LINK** key allows the linking of channels as stereo pairs.

Only adjacent channels can be linked into stereo pairs, and the lower channel must be odd-numbered. In other words, while it is possible to link channels 1 and 2, it is not possible to link channels 1 and 3, nor is it possible to link channels 2 and 3.

Stereo linked channels allow the simultaneous setting and linking of the following module parameters:

- Input source
- Digital pad setting
- EQ settings
- Aux 1–6 send levels, on/off status and pre/post status
- Dynamics processor settings
- Logical fader level
- **CUT** switch status
- **SOLO** switch status
- Buss assignment
- Fader group and cut group assignments
- Automation mode settings.

In addition to the stereo linking of channels, the TM-D4000 also allows the stereo linking of output busses 1 through 8, and Aux send busses 1 through 6. Again, only adjacent busses may be linked, and the lower buss of each buss pair must be odd-numbered.

When a pair of output busses is linked, the buss send levels and delay settings are linked.

When a pair of Aux sends is linked, the send levels are linked.

In cases where pan controls were previously available (channels), the pan controls are changed to balance controls and an image width control is added.

When channels are linked, the pan "gang" feature is no longer available.

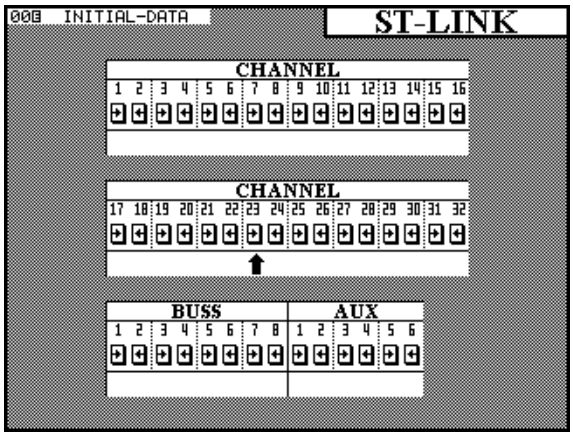
NOTE

When a pair of channels or busses is linked, if the physical faders are not in identical positions before the link process, the "child" fader of the pair will rise to meet the other "parent" fader. This may cause a sudden rise in monitoring, etc. levels.

4.2.1 Using the ST LINK key to link channels

To make a stereo link between two adjacent channels or busses, make sure the **SHIFT** indicator is off, and press the **ST LINK** key to show the screen below.

Use the cursor keys or the **JOG** dial to move the cursor (upward-pointing arrow—↑) to the pair of channels or busses whose link status is to be changed.



Press the **ENTER** key to change between separate channel status (◄►) and stereo linked status (ST LINK) of the channels or busses.

4.2.2 Using the SEL keys to link channels

See 3.3.6, "Select link" for details of the Select Link parameter. When this is set on, the **SEL** keys of channels may be used to create and remove stereo links, rather than the screen described above.

Note that the **SEL** keys have a different function when the GROUPING screen, described in 4.9, "Fader and cut groups", is showing, and therefore stereo linking and unlinking cannot be carried out at that time.

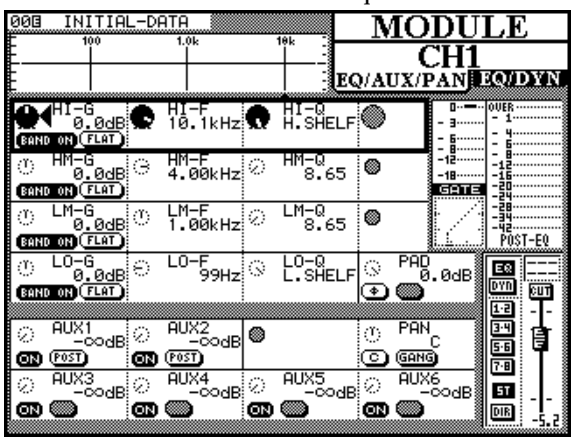
Pressing and holding the **SEL** key of one of a valid pair of channels and busses and then pressing the **SEL** key of the other member of the pair will bring up a pop-up panel asking for confirmation to form the stereo link between the two channels or busses. Press **ENTER** to confirm, or a cursor key to cancel.

If the two channels or busses already form a stereo link, this procedure will bring up a pop-up panel asking for confirmation to break the link. Press **ENTER** to confirm, or a cursor key to cancel.

The status of stereo links between channels and busses can be verified at any time, using the screen described above.

4.3 Equalization

The first three PODs in the first four POD rows of the MODULE screen control the equalization.



As the equalization settings are changed, the graphical representation of the EQ response also changes.

The four EQ bands are named HI (high), HM (high-mid), LM (low-mid) and LO (low). The HI and LO bands differ from the other two, as explained below.

The gain of the bands is between +15dB and −15 dB in 62 steps.

However, the high and low bands can be set to act as lowpass and highpass filters, respectively, by turning the gain to below the minimum −15dB setting.

If the gain is turned below −15dB on the HM and LM bands, they change to notch-type filters.

Each of the four EQ bands covers the same frequency range: 32Hz to 19kHz, selectable over a 112-step range using POD 2.

The Q of each band (the frequency range over which it operates) can be set from 8.65 to 0.27 in 25 steps. The high and low bands can be set to provide shelving EQ, as opposed to peaking-type EQ.

Each band can be turned on and off using the left switch of POD 1.

The gain of each band can be flattened using the right switch of POD 1.

In order to bypass the equalization circuit for the module completely, the **EQ** key to the right of the display screen should be pressed. When the EQ is bypassed, the response curve at the top of the display is “grayed out” to show that EQ settings have no audible effect, but making adjustments using the PODs will change the shape of the curve. When the EQ is brought back, these changes will take effect.

When two channels have been linked into a stereo pair, or when one of the two stereo inputs is selected, the changes made to the equalization affect both channels equally.

EQ settings, once made, may be stored in the EQ library for further recall. The way in which this is done is explained in the section of this manual dealing with the TM-D4000 libraries (8, “Library functions”).

4.4 Channel-to-buss assignments

There are two ways of assigning channels to the eight output busses, the stereo busses, or for direct output: using the dedicated **ASSIGN** key or from the MODULE screen.

4.4.1 Using the MODULE screen for buss assignment

The status of the keys to the right of the display screen are shown: **EQ**, **DYNAMICS**, the buss and stereo assignment keys, and the direct out status (for input channels 1 through 16).

The function of the **EQ** and **DYNAMICS** keys are explained in the appropriate places (4.3, “Equalization” and 4.6, “Dynamics processor settings”).

The channel can be assigned to any combination of the eight output busses and the stereo output buss. Busses are selected in pairs (1–2, 3–4, 5–6, 7–8).

As with most analog consoles when a buss pair is selected, the odd-numbered buss of the pair corresponds to a hard left pan, and the even-numbered buss corresponds to a hard right pan. Anything in between will balance the channel signal proportionately between the two busses.

Input channels 1 through 16 (the integral analog inputs and the inputs of slot 1) can also be assigned as direct outs (DIR on this screen).

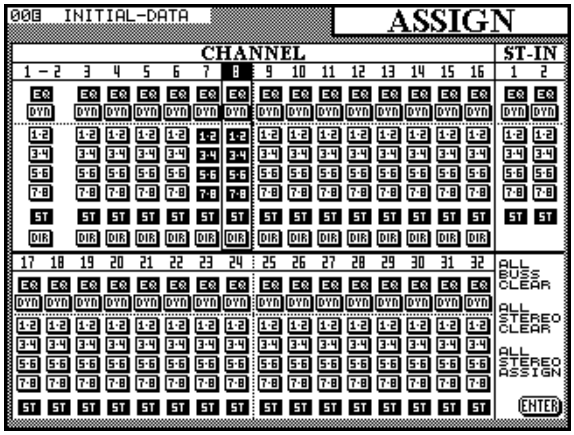
They are sent from the outputs which correspond to the input channel number, plus 16. In other words, input channel 1, when selected for direct out, is output from channel 17 (the first output channel of slot 2), channel 9 is output from channel 25 (the first output channel of slot 3), etc. If slots 2 and 3 are not fitted with interface cards, the **DIRECT** key will have no effect.

NOTE

The direct out setting is available for channels 1 through 16 only.

4.4.2 Using the ASSIGN key for buss assignment

Press the **ASSIGN** key **[10]** to bring up the channel assignment screen.



The cursor keys are used to move the cursor to a particular channel and highlight the channel's number at the top of the column.

Alternatively, the channel's **SEL** key may be used to select a channel.

When a channel has been highlighted on this screen, pressing any of the following keys to the right of the display screen will change the assignment status of the selected channel: **BUSS 1-2**, **BUSS 3-4**, **BUSS 5-6**, **BUSS 7-8** and **STEREO**.

As with most analog consoles when a buss pair is selected, the odd-numbered buss of the pair corresponds to a hard left pan, and the even-numbered buss corresponds to a hard right pan. Anything in between will balance the channel signal proportionately between the two busses.

In addition, the **EQ** and **DYN** keys can be used to bypass the equalization and the dynamics processor for each channel, respectively.

There are three "global" on-screen buttons. The first of these (`ALL BUSS CLEAR`) is used to clear all buss (but not stereo) assignments. This may be used, either together with or independently from the last (`ALL STEREO ASSIGN`) when starting the mixdown in a multitrack recording session.

The second on-screen button, `ALL STEREO CLEAR`, clears all channel-to-stereo assignments.

The direct out of channels 1 through 16 can also be set in this screen (there are no on-screen representations of the direct out setting for channels 17 through 32, as this is not possible).

NOTE

When channels 1 through 16 are set to direct out, the signal appears in the output channel corresponding to the number of the input channel plus 16, as described above.

4.5 Aux sends

The `MODULE` screen can also be used to set the Aux send levels for a channel or pair of stereo linked channels. In addition, there are six dedicated **AUX** keys which allow the viewing and setting of the six Aux send levels of many channels from one screen.

4.5.1 Using the MODULE screen to set send levels

The level of the signals sent from the channel to the six Aux sends are set and displayed on the bottom two rows of the `MODULE EQ/AUX/PAN` screen.

In an identical fashion to the dedicated Aux screens, the levels of the Aux sends can be set from `- dB` to `10.0dB`.

The left switches of the Aux PODs are used to turn the module's Aux sends on and off.

Aux sends 1 and 2 can be selected as pre- or post-fader, using the right switches of PODs 1 and 2 respectively.

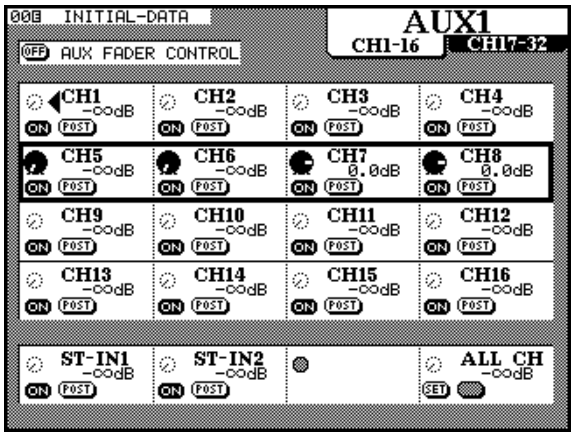
When two modules have been linked into a stereo pair, or one of the two stereo inputs is selected, the Aux send levels apply to both channels in the pair.

When two Aux busses have been linked together into a stereo pair, the level control of the first (odd-numbered) Aux buss is replaced by a pan control. The left switch of the corresponding POD becomes a centering switch.

4.5.2 Using AUX keys to set send levels

When one of the **AUX** keys is pressed and the Aux buss selected has not been made into a stereo linked pair with the adjacent Aux buss, two screens are available, each controlling 16 input channels. The

first screen controls channels 1–16 and the second controls channels 17–32.



Use the POD **ROW CURSOR** controls to move the "box" up and down, highlighting the channels which are to be edited.

The POD rotary controls adjust the level of the signal sent to the Aux buss.

This level can be adjusted from +10.0dB (relative to nominal) to −∞dB (minus infinity–full cut) in 128 steps.

The left POD switches control whether the Aux send signal from the selected channel is on or off.

For Aux busses 1 and 2, the right POD switch functions as a pre/post selector, allowing the pickoff point for the Aux send to be pre-fader or post-fader.

The pre-fader point is also before the cut and solo switches, as well as before the pan.

The bottom POD row of the screen provides controls for the two stereo inputs, as well as a global control control. Turn the fourth POD's knob to select between −∞dB (full cut), 0dB (nominal), AUX OFF, AUX ON and (for Aux sends 1 and 2 only) PRE and POST. Use the left POD switch to SET the value selected using the knob for all channels.

AUX Fader control : There is also one important on-screen button at the top of the screen: the AUX FADER CONTROL button.

When this option is selected using the cursor and **ENTER** keys, the faders will move to match the Aux send levels of the currently-selected Aux buss, and the currently-selected **LAYER STATUS** indicator (**[3]**) will flash to show that the faders are no longer controlling channel and module levels.

The PODs are also active, and moving a POD knob will also move the appropriate fader to reflect the new level.

NOTE

This is the only time that the **ST IN** *faders change function.*

If two channels have been linked as a stereo pair (see 4.2, "Stereo linking"), only the left POD of the pair is active.

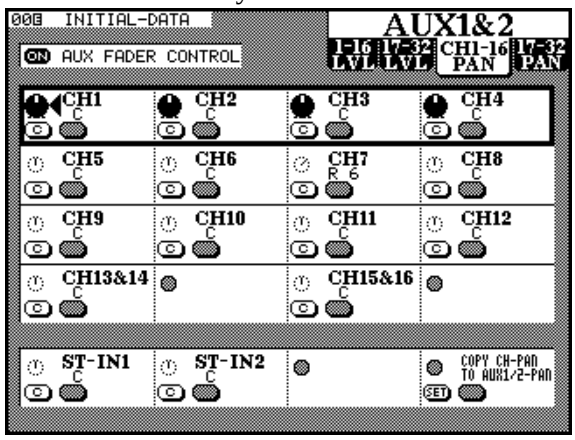
Stereo linking and AUX sends : If two Aux sends have been linked together as a stereo pair, there are now four screens available when an **AUX** key is pressed.

As well as the level screens for the two sets of 16 channels (identical to the one described above), there are also two pan screens; one for each set of 16 channels.

In these screens, the POD rotary controls are used to adjust the relative level of the signal sent to the two linked Aux busses.

The left switch of the PODs is used to center the pan control for the channel.

In the case of a stereo linked pair of channels, the left POD only is active. The pan control changes to a balance control. This can be centered using the left POD switch in the same way as a mono channel.



The left switch of POD 4 in the last row is used to copy the channel pan settings of all channels to the pan settings for the selected Aux send pair. In this way, the main "buss" image of the channels is preserved in the Aux sends.

4.6 Dynamics processor settings

These settings are accessed by pressing the **MODULE** key for the selected channel until the EQ/DYN screen is shown, or alternatively by pressing the

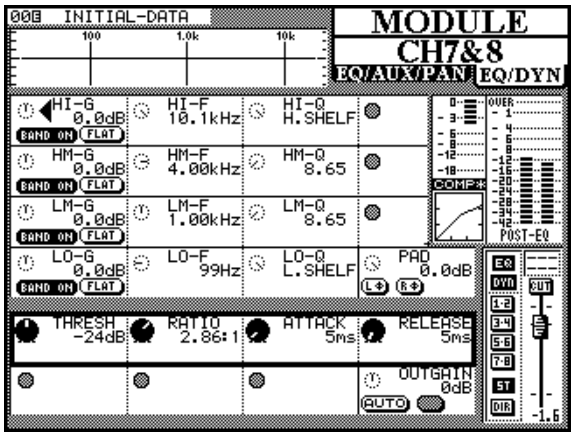
DYNAMICS key to recall the DYNAMICS screen for the selected module.

4.6.1 Assigning a processor to a module

This is described in full in 8.2.2, “Recalling a library entry”. Briefly, the module is selected, the dynamics processor library screen is entered, and the desired processor settings are recalled from the library.

4.6.2 Using the MODULE key to make dynamics processor settings

The equalization controls on this screen are identical to those on the other MODULE screen.



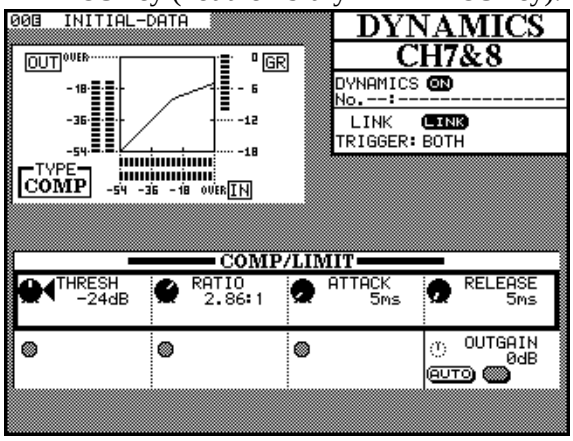
However, the two lowest POD rows are used to control the dynamics processor. The exact assignment of the PODs to controls depends on whether a gate or a compressor (shown on the small on-screen level diagram as GATE or COMP) has been recalled from the library into this channel, as described below.

To enable and disable the selected channel’s dynamics processor, use the **DYNAMICS** key to the right of the display screen. The on-screen DYN indicator in the “button strip” at the lower left of the screen changes to reflect the on/off status.

Stereo linked channels and stereo inputs may share the same dynamics processor settings. However, see the explanation of the **DYNAMICS** key immediately following this, for further information regarding stereo linking of dynamics processors.

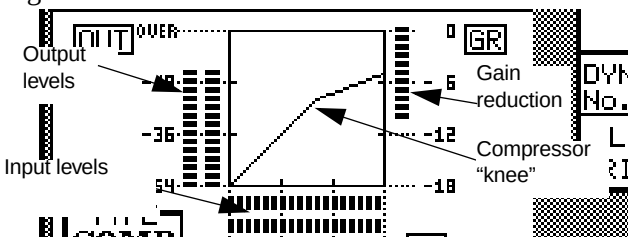
4.6.3 Using the DYNAMICS key to make dynamics processor settings

With the desired channel selected, press the mixer **DYNAMICS** key (not the library **DYNAMICS** key).



The information at the upper left of the screen includes:

- The dynamics processor’s gain reduction meter
- A graphical representation of the dynamics processor’s gain structure. An example of the way a pair of stereo linked processors are shown on screen is given here:



4.6.4 Compressor/limiter settings

Both the MODULE and DYNAMICS screens allow the same parameters to be set.

- **Threshold** (THRESH), controlled by the POD 1 knob, and variable from −48dB to 0dB in 49 1 dB steps.
- **Compression ratio** (RATIO), controlled by the POD 2 knob, and variable from 1:1 to :1 (infinite compression) in 21 steps.
- **Attack time** (ATTACK), controlled by the POD 3 knob, and variable from 0ms to 125ms in 1ms steps.
- **Release time** (RELEASE), controlled by the POD 4 knob, and variable from 5ms to 5.0s in 100 steps.
- **Output gain** (OUTGAIN), controlled by the POD 4 knob on the last row. Variable from −24dB to +24dB in 1 dB steps.

- **Auto make-up** (AUTO), controlled by the left switch of POD 4 below the output gain. This is used, together with the output gain setting for automatic optimum level control if the compression settings have resulted in gain reduction.

4.6.5 Gate settings

Both the MODULE and DYNAMICS screens allow the same parameters to be set.

- **Threshold** (THRESH), controlled by the POD 1 knob, allows the setting of the threshold at which the gate will open. Variable from -80dB to 0dB in 1 dB steps.
- **Range** (RANGE), controlled by the POD 2 knob, sets the gate range, from 0dB to 60dB in 1dB steps.
- **Hysteresis** (HYST), controlled by the POD 3 knob, from 0dB to 24dB in 1dB steps.
- **Gate attack time** (ATTACK), controlled by the POD 1 knob on the last row. Variable from 0ms to 125ms in 1 ms steps.
- **Gate hold time** (HOLD), controlled by the POD 2 knob on the last row. Variable from 0ms to 990ms in 100 steps.
- **Gate decay time** (DECAY), controlled by the POD 3 knob on the last row. Variable from 50ms to 5.0s in 100 steps.

4.6.6 Linked channels

LINK allows the linking of two processors assigned to two adjacent channels (the "left" channel of the pair must be odd-numbered).

This link is automatically made, and cannot be turned off, when two modules have been stereo linked (or for the stereo inputs or the stereo out).

Trigger source (TRIGGER) is only valid when two processors are linked. This option (selected using the **ENTER** key or **JOG** dial) allows the triggering for both processors to be initiated by L-ch (left channel), R-ch (right channel) or BOTH (both channels act as triggers—in other words, the first channel to be triggered will automatically activate the second channel's processor).

NOTE

The two ST IN channels and the stereo out buss do not allow trigger selection, and are fixed at the BOTH *setting.*

4.7 Pan and balance

As well as using the MODULE screen to adjust the pan of a module (or the balance of a stereo pair of modules), there is a dedicated PAN/BAL screen, allowing the viewing and setting of many modules simultaneously.

4.7.1 Using the MODULE key to set pan and balance

Pan and balance controls are only available in the EQ/AUX/PAN MODULE screen, not the EQ/DYN module screen.

Mono modules : The fourth POD rotary control on the fifth row is a pan control, when the module is a mono module.

The pan settings are L45 (hard left), through C (center) to R45 (hard right).

The left switch of this POD is a centering switch.

For odd-numbered channels only, the right switch of this POD is a gang switch, allowing this pan control to be ganged with the pan control of the next channel.

Stereo modules : When two channels have been linked into a stereo pair, or when one of the stereo inputs is selected, the pan control changes to a balance control.

The left switch of the POD is a centering switch.

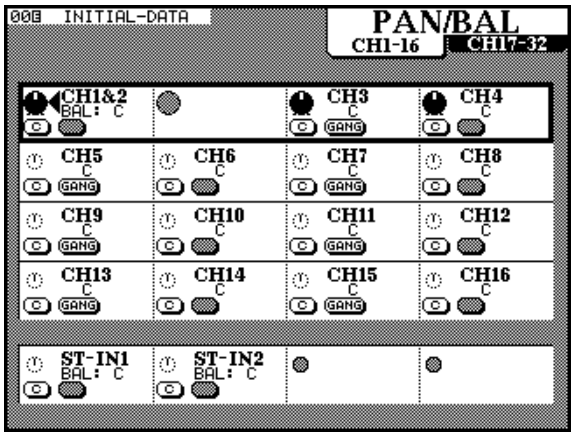
The third POD becomes an "image" control, which determines the width of the stereo image produced by the two channels. Turning the knob to the "center" allows "pinpointing" of the image (L+Rmono), full width (STEREO, fully counterclockwise) or full width, with the positions of the two linked channels reversed with respect to normal (REVERSE, fully clockwise). Intermediate positions are represented as percentage figures preceded by ST (stereo) or REV (reverse), with ST 98% following immediately after STEREO, and REV 98% immediately after REVERSE.

The switches of the third POD allow either the left or the right channel of the pair to be selected as a mono source (the image control is then disabled).

If a surround mode, rather than the stereo mode, has been selected, surround positioning control is not possible from the MODULE screen. Use the dedicated **PAN/BAL** key instead. See 6, "Surround modes" for details.

4.7.2 Using the PAN/BAL key

Pressing the **PAN/BAL** key brings up a display screen allowing the viewing and setting of a number of the pan and balance parameters for a number of different modules:



There are two screens, the first for the input modules 1 through 16, and the second for input modules 17 through 32. The stereo inputs are visible and their parameters may be adjusted in both screens.

Press the **PAN/BAL** key repeatedly to cycle between these screens.

In the screen shown above, channels 1 and 2 are linked into a stereo pair.

The left switch of each POD acts as a centering switch, and the right switch of odd-numbered mono modules allows “ganging” of two mono inputs.

The POD for the even-numbered switch of a stereo linked pair is disabled—the odd-numbered pod must be used here.

Note that the image control is not available from this screen—this parameter can be set from the MODULE screen only.

4.8 Pad and phase(Φ)

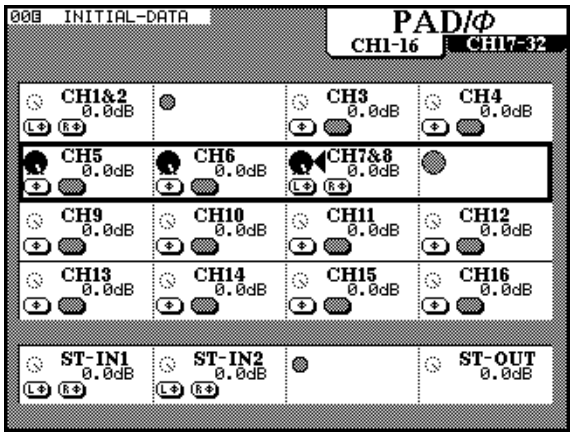
The digital pad and phase of the input signal may be adjusted from the MODULE screen, as well as through a dedicated screen, allowing the viewing and adjustment of the parameters for many modules.

4.8.1 Using the MODULE screen

In the EQ/AUX screen, the knob of the fourth POD of the fourth row is used to adjust the digital pad. The pad values are from 0 dB to –36 dB in 0.5 dB steps.

4.8.2 Using the PAD/phase key

There are two screens available for control of the input modules’ digital pads and phase settings. The first screen controls channels 1 through 16, and the second controls channels 17 through 32. Both control the two stereo inputs and the stereo output.



These settings are made using the POD knobs to control the digital pads, and the POD left switches to control the input channel phase.

The possible pad parameter values are the same as for the MODULE screen.

The two stereo inputs, and any channels that have been linked into a stereo pair, can have the phase set independently for each channel of the pair, allowing compensation for mis-wired microphone pairs, etc.

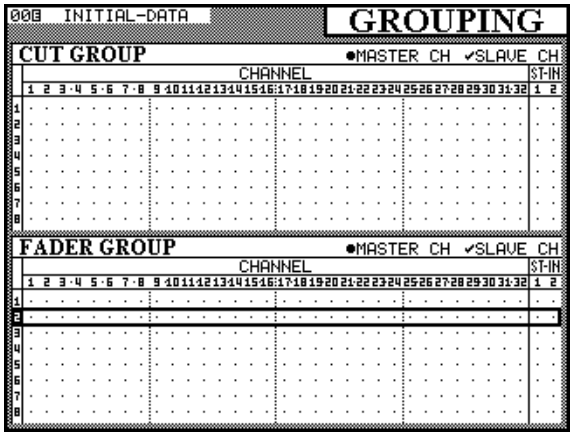
The phase of the stereo outputs cannot be changed, though a pad is available for the stereo output.

NOTE

This digital pad is not related to the analog pad which forms part of the analog input circuitry of channels 1 through 8.

4.9 Fader and cut groups

In shifted mode, this key brings up the GROUPING screen, allowing input channels to be assigned to fader and cut groups.



In this screen, each column represents an input channel (from 1 through 32). The two stereo input channels are also shown here.

There are eight fader groups and eight cut groups, shown as rows on the display. Each channel may be a member of one of each type of group (i.e. a channel can be a member of one fader group and one cut group, but not of two fader groups or two cut groups).

Fader groups and cut groups are independent of each other. The number of the fader group to which a channel is assigned bears no relation to the number of the cut group.

In each group (fader and cut), there is one master channel, and all other channels in that group are slave channels.

In the case of a fader group, moving the fader group's master channel fader will move the slave channels' faders, relative to the master channel's fader. Moving the fader of a slave channel will affect only that channel.

NOTE

These fader groups are not the same as the output buss assignments (which are sometimes referred to as "groups" on some mixing consoles).

In the case of a cut group, pressing the **CUT** key of the cut group master channel will have the same effect as pressing the **CUT** key of all the cut group channels simultaneously.

NOTE

If channels have been stereo linked (see below), the stereo pair of channels can be used as a master channel. Moving either fader of a master pair or pressing the **CUT** *key of either pair will affect the status of all slave channels in that group.*

4.9.1 Making group settings

Use the **UP** and **DOWN** cursor keys to navigate around the groups. As each group is selected, as shown by an on-screen box surrounding the group row, the **SEL** indicators of the channels of the active fader layer which belong to that group will light.

Alternatively the **ROW CURSOR** keys and the **JOG** dial can be used for navigation around the screen.

Press the **SEL** key of a channel to assign it to a group or de-assign it from that group.

An on-screen group/channel intersection with a small dot (•) means that the channel is not currently assigned to any group. A large dot (●) indicates that the channel is the master channel for that group (cut or fader). A check mark (✔) shows that the channel is a slave channel within that group.

When a group is selected on this screen, the **SEL** indicator of the master channel lights, and the **SEL** indicators of the slave channels ash (if the y are visible in the current fader layer).

4.9.2 Clearing group settings

The rst channel selected as the member of a group becomes the master channel. Removing that channel from the group clears it from the group and also clears all slave channel assignments from that group.

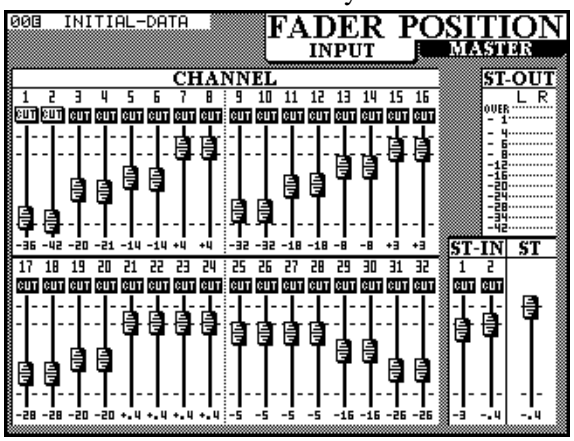
4.10 Checking fader and cut status

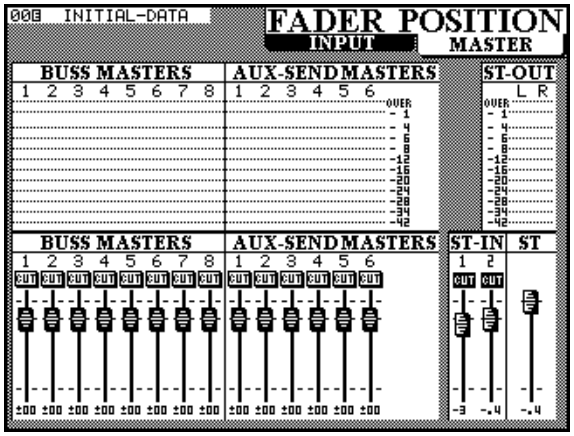
This allows the checking of the fader positions on the display screen. This may be useful under the following circumstances:

- when faders are grouped (see above, 4.9, "Fader and cut groups" and it is necessary to check the fader and cut positions of modules of layers other than the layer containing the fader or cut master.
- when a snapshot is recalled (see 8.1, "Snapshot memories") and it is necessary to check the status

of modules in layers other than the currently active layer.
- to view Aux send and buss levels (see below).

Press the **FADER POSITION** key:





Note that there are two screens available. Press the **FADER POSITION** key to cycle between them.

Both screens also contain an on-screen representation of the stereo meters. This allows metering of the stereo output, even if the main hardware meters are being used for another purpose.

4.10.1 Resetting faders to 0 dB

An easy way of setting any fader (including the **ST OUT** fader) to the 0 dB position is provided:

1. **Press and hold the CLR key in the numeric keypad.**
2. **Press the SEL key of the module to be set to 0 dB.**

   The level will be set to 0 dB, and the fader will move appropriately.

4.10.2 Buss and Aux send metering

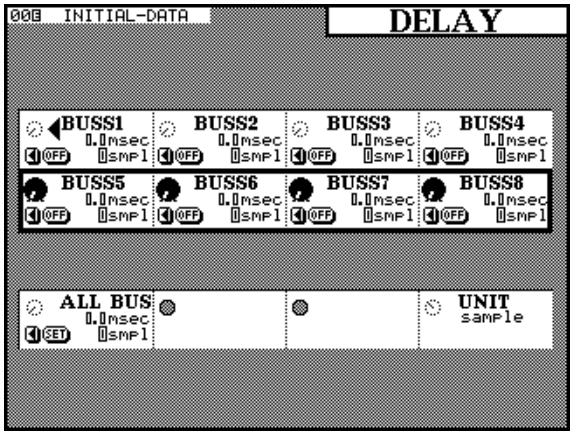
In addition to the fader positions visible in the MASTER screen, this screen also contains eight meters for the buss masters and six for the Aux send masters.

These meters are calibrated in the same way as the main hardware meters, i.e. the top segment represents an “over” condition. However, the denition of “over” sometimes differs between manufacturers. You are therefore advised to check the meter levels here against the meter levels displayed on your other equipment.

4.11 Buss delay

Use the shifted **DELAY** key to show the DELAY screen, which allows the setting of a delay time to the output busses.

The delay settings may be made individually for each buss, or applied globally to all busses, as described below.



Use the PODs to control the settings for the eight individual busses using the top two on-screen POD rows.

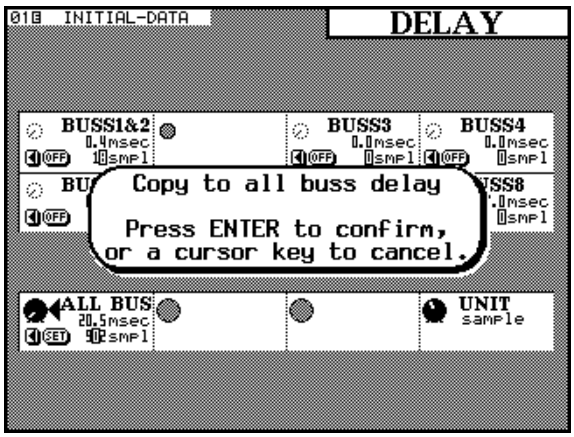
The POD rotary controls are used to set the time of the delay. The minimum delay time is 0 samples (0 milliseconds, obviously), and the maximum delay time is 16,382 samples (320 ms @ 44.1 kHz, or 340 ms @ 48 kHz). The resolution is to individual samples, or to 0.1 ms.

The right switch of each POD can be used to turn the delay on or off for the selected buss, allowing instant A-B comparisons of the effect of the delay.

The left switch of each POD can be used to move the signicant digit (in verted) of the numerical value being edited.

4.11.1Global delay setting

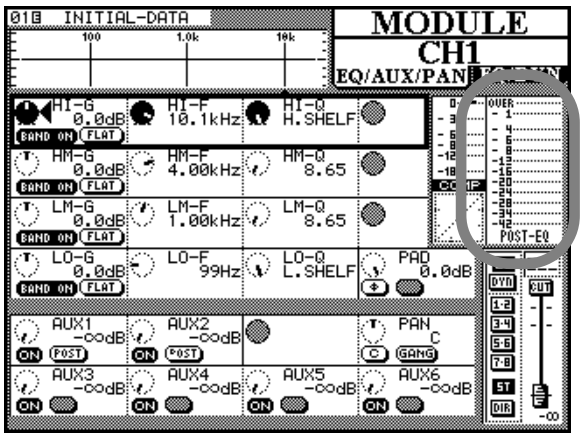
Use POD 1 of the last row to set the value and copy it to all busses (right switch of POD 1) for the “global” buss delay:



Confirm the setting with the **ENTER** key or cancel with a cursor key.

4.12MODULE screen (miscellaneous)

In the MODULE screen, a meter is shown to the right of the screen:



4.12.1Meter pickoff point

Immediately below the meter is a description showing the “pickoff” point for the meter (POST-EQ in the illustration above).

Move the cursor to this description and press the **ENTER** key to cycle through the following pickoff points: POST-EQ (after the equalization), POST-DYN (following the dynamics processor) or POST-FADER (after the channel fader).

This also applies to the **STEREO OUT**. In this case, only the on-screen meters are affected. If this buss is selected for monitoring using the hardware meters, the meter readings will not be changed by this operation.

4.12.2Other information

The MODULE screen also shows the current fader and cut group assignment for the module (see 4.9, “Fader and cut groups”), the group assignments (and direct output assignment if appropriate).

A representation of the current fader position is also given, together with the fader level, relative to the nominal level. The cut status is also shown, immediately above the fader representation.

4.13Soloing

Modules may be soloed by pressing the **SOLO** key of a module.

The exact action taken depends on the solo mode currently selected, as well as the Inplace Defeat setting for the module and other modules.

See 5.4, “SOLO” for details of solo settings and operations.

The monitoring facilities on the TM-D4000 allow the connection of both a control room (**CR**) and studio (**STUDIO**) set of monitor systems as well as the connection of a 2-track analog recorder through dedicated connections (digital 2-track recorders may be connected through the **D IN1** and **D IN2** inputs).

An integral talkback microphone is also provided, as is a line-up oscillator. The talkback may be routed to the slate or to the Aux 1-2 busses

5.1 CR and STUDIO

The **STUDIO** buss echoes the selection for the **CR** buss.

These connections are made through the appropriately-labelled analog connectors on the top of the front panel.

Note that these are professional-level (+4 dBu) balanced outputs, and should be connected to an appropriately-equipped monitoring system.

A standard pair of stereo headphones may be connected to the **PHONES** jack at the right of the console.

5.1.1 Monitor sources

The **MONITOR SELECT** keys (**AUX1**, **AUX2**, **AUX3**, **AUX4**, **AUX5**, **AUX6**, **D-IN1**, **D-IN2**, **2TR** and **STEREO**) are used to select the signals which are routed through the monitoring system. These correspond to the six Aux buss sends, the two digital inputs, one of the two analog 2-track mastering recorders (selected with the **2TR RTN 1/2** switch) and the **STEREO OUT**.

Except when two Aux sends have been linked, only one of these monitoring sources can be selected at any one time.

The meters show the level of the selected monitor source(s).

5.1.2 Adjusting volume

Use the **STUDIO/PHONES LEVEL** and **CR LEVEL** controls to adjust the the **STUDIO** and the **PHONES** levels together, or the **CR** level.

The **MONO** key (latching) puts the **CR**, **STUDIO** and **PHONES** output signals into monaural mode.

Use the **DIM** key to cut the **CR** level by 30dB when necessary (the talkback key also dims the **CR** level). The indicator lights when dimming is active.

5.1.3 Talkback

Push the latching **STUDIO** key under the **TB LEVEL** control to activate the talkback to the **STUDIO** outputs. The other **STUDIO** signals will be muted and the control room outputs will be dimmed while talkback is carried out.

Adjust the level with the **TB LEVEL** control.

The **TO SLATE** and **TO AUX 1-2** keys in the monitoring section allow the routing of the signal from the integral talkback microphone to the slate (the stereo output buss and the eight output busses) and the Aux 1/2 busses.

These are “smart” latching keys; in other words, if pressed and released within half a second, they are latching, and if pressed and held for more than half a second, they are non-latching. They also dim the **CR** output level.

NOTE

Since this facility is available on the Aux 1-2 busses, which are also the only Aux busses that can be made pre- or post-fader, you may want to use these busses as the in-studio headphone feeds if you require the artists to listen to a different mix than that heard in the control room. Of course, the **STUDIO** *outputs can also be used for this purpose, but they will always mirror the control room feed.*

5.1.4 Near-eld monitor s

Although the TM-D4000 is not tted with tw o sets of CR outputs, it is possible to use the **STUDIO** buss as a “near-eld” feed (especially if the Aux 1-2 busses are used for in-studio talent cueing), and adjusting the relative levels of the **CR** and **STUDIO** busses.

Alternatively, a system to switch between the two different monitoring systems can be set up, fed from the **CR** buss.

5.2 Meters

These meters show the level of the current signal being monitored, as selected with the monitor select keys. Note that the **2TR IN** analog signals cannot be metered using these meters, however.

NOTE

When working with analog equipment, the nominal analog signal level (either +4 dBu or

–10 dBV) corresponds to a reading of –16 dB (relative to full-scale), which is represented here as –16 dBFS). This factory value may be changed by authorized TASCAM service personnel only to either –20 dBFS or –9 dBFS. Contact your TASCAM dealer for details.

The top of the scale represents overload (over full-scale). Unlike an analog meter reading of 0 or a "plus" value, which are relative to a nominal signal level, digital overload results in harsh distortion and clipping. Take care that the top **OL** meter segment does not light, even in the loudest parts of the program.

NOTE

The way in which digital equipment meters are calibrated varies between different manufacturers. While a reading of OL or OVER will be the same on all TASCAM equipment, there is no guarantee that identical readings will be produced on equipment from other manufacturers. Be aware of the possible discrepancies between meter readings on different pieces of equipment in your setup.

5.3 2-track monitoring

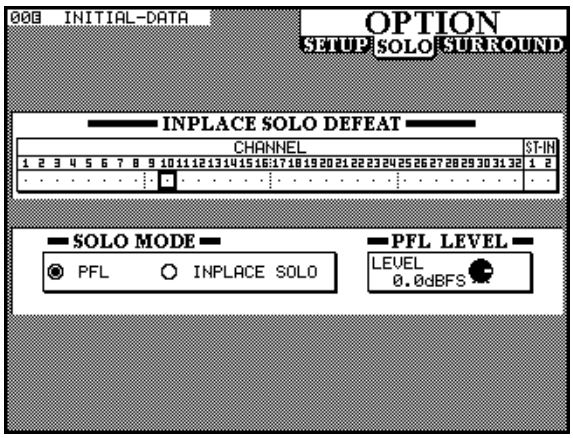
A balanced +4 dBu level analog recorder may be connected to the XLR-type **2TR RTN 1** jacks, and/or an unbalanced –10 dBV analog recorder may be connected to the RCA **2TR RTN 2** jacks.

Select which pair of inputs will be used when the **2TR** monitoring selection key is pressed by using the **2TR RTN 1/2** key (depressed for **1**, out for **2**).

Note that these analog signal levels are not shown on the meters.

5.4 SOLO

The TM-D4000 provides two modes of soloing, as explained here. Soloing occurs when the **SOLO** key of at least one module is pressed. What happens when this happens is dependent on the settings made in the SOLO screen.



5.4.1 Inplace solo defeat

The rst option is a defeat option to pre vent channels selected in this way from being muted when other channels are soloed. It can be used with a pair of effect returns, for instance, so that these effect returns will always be added in the inplace mix, together with those other channels selected for inplace soloing.

Inplace soloing will output the soloed channel(s) from the stereo outputs, and cut all other channels.

Use the cursor keys to highlight a channel, and the **ENTER** key to change the status of the INPLACE SOLO DEFEAT .

5.4.2 Solo mode

The SOLO MODE can be selected as either PFL (pre-fade listen) or INPLACE SOLO . The setting here is also reected in the status of the two solo mode indicators at the right of the console, below the talkback microphone.

The **PFL** indicator will ash whene ver a channel is soloed in PFL mode. The **INPLACE** indicator is always lit when inplace solo mode is selected.

PFL is taken, as the name implies, before the signal is sent through the panpot and fader. When a channel is soloed in PFL mode, the output from the eight output busses and from the **STEREO OUT** is unaffected. The solo monitor signal is in mono.

By contrast, as mentioned above, soloing a channel in Inplace Solo mode will cut the signal from the stereo outputs. The level of the solo signals and their position in the solo mix is determined by the channel faders and panpots.

5.4.3 PFL level

The level of the PFL signals is determined by the PFL LEVEL, controlled by the fourth POD rotary control. The maximum signal level is 10 dB, relative to full-scale.

5.4.4 To clear all soloed channels

Press and hold down the **CLR** key of the numeric keypad **[41]** and press any **SOLO** key to clear the solo status of all currently soloed channels.

Because the TM-D4000 is capable of mixing to several different surround modes, some of the operations and display screens are slightly different from the "normal", stereo mode, as explained here.

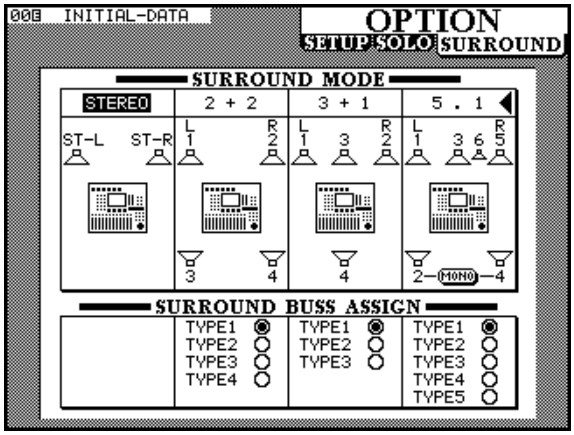
Some of these operations are also explained in other parts of the manual, but are gathered here for easy reference.

In all cases where a surround mode is selected, the output busses are used to control the levels of the signals sent to the different channels of the surround matrix.

6.1 Selecting a surround mode

This selection is made through the OPTION SURROUND screen:

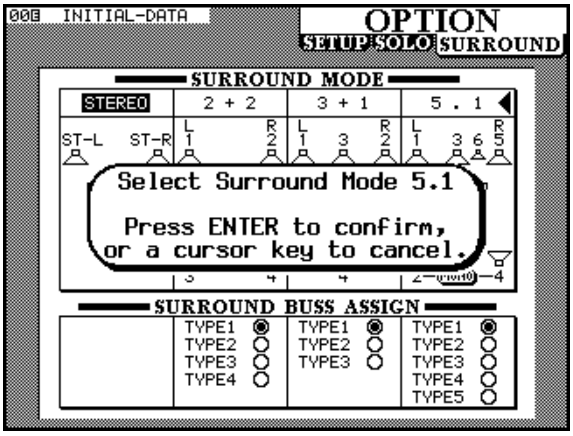
1 **Make sure the SHIFT indicator is off, and press the OPTION key [5] until the following screen is shown:**



2 **Use the cursor keys and the ENTER key to highlight and select the stereo mode or a surround mode from the following:**

STEREO	One left and one right speaker, output through the stereo output buss
2 + 2	One front left speaker and one front right speaker, with a pair of rear speakers (left and right)
3 + 1	A pair of front left and right speakers, together with a front center speaker and a center rear speaker
5 . 1	A pair of front left and front right speakers, with a front center speaker. A pair of rear left and rear right speakers is also provided, as is a sub channel (typically placed front center)

A popup screen will appear, allowing you to confirm the new setting, or cancel it:



A plan view of the speaker layout is shown on the display screen.

Note that in the 5.1 screen, the two rear speakers can be selected as a single mono output.

6.1.1 Selecting a buss pattern

As mentioned earlier, the output busses are used to control the levels of signals sent to the surround matrix channels.

In this context, they can be regarded as "super-stereo master" controls.

The assignment of the busses to the channels is shown by a number beside the representation of the on-screen speakers.

The surround buss assignments below each surround mode type allow the assignment of different buss patterns to the surround channels. Where a channel does not exist as part of a surround mode pattern, it is represented by a dash (–).

Surround mode	Buss Assign Type	Output buss used for:						
		Front Left	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Sub
2+2	1	1	—	2	3	—	4	—
	2	1	—	3	2	—	4	—
	3	1	—	4	2	—	3	—
	4	1	—	2	4	—	3	—

Surround mode	Buss Assign Type	Output buss used for:						
		Front Left	Front Center	Front Right	Rear Left	Rear Center	Rear Right	Sub
3+1	1	1	3	2	—	4	—	—
	2	1	2	3	—	4	—	—
	3	1	4	2	—	3	—	—
5.1	1	1	3	5	2	—	4	6
	2	1	3	2	5	—	6	4
	3	1	2	3	4	—	5	6
	4	1	5	2	3	—	4	6
	5	1	2	3	5	—	4	6

This facility allows the selection of a fader pattern that suits an individual way of working.

6.2 Monitoring issues

The main issue that affects surround mixing is that of monitoring.

Because the TM-D4000 uses the buss outputs as the sources for the surround mix, and these busses are output in parallel to all the interface cards fitted in the expansion slots, it is possible to use an IF-DA4000 analog interface card in one slot, and an appropriate digital format (TDIF-1, AES3-1992 or ADAT) card in another slot. The multitrack output to the digital mastering recorder is therefore also output to the analog buss outputs, which are connected to the monitoring amplifiers.

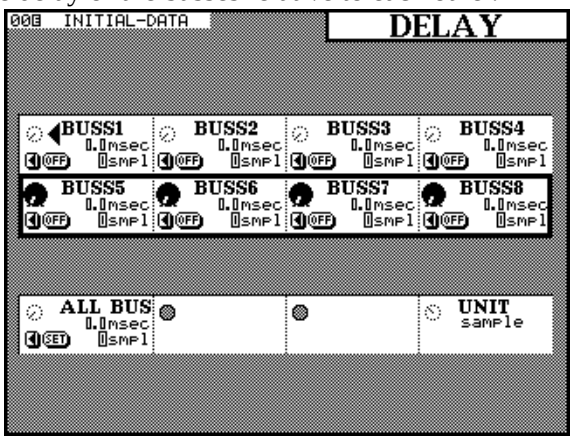
However, this approach uses two of the three interface slots available, and on a non-cascaded setup, this will probably not provide enough inputs for the mixing of digital material.

One solution is to use the TASCAM IF-DA8 (provided the mix is to be made to a TDIF-1-compatible unit). The “pass-through” of the digital audio, together with the conversion of these signals, make this an attractive option.

It is also possible to use the on-board D/A convertors of the multitrack unit, with suitable source/tape monitor switching, to drive the monitoring system. This option requires no additional convertors, and may prove to be the most convenient option under some circumstances.

6.3 Buss delay

The DELAY screen (accessed through the **SHIFT**ed **OPTION** key **[5]**) can be used in surround mode to set the delay of the busses relative to each other.



Use the POD controls to set the delay, which can be used to compensate for delay caused by speaker placement, etc. The right switch of the top two POD rows can be used to turn the delay on and off. the left switch of these PODs is used to change the digit that is adjusted using the POD knobs.

POD 1 in the last row is used to change and set the delay value for all busses simultaneously. Change the value with the pod knob and press the right switch to set the value.

POD 4 of the last row changes the delay time units between samples and milliseconds.

6.4 Modules in the surround mix

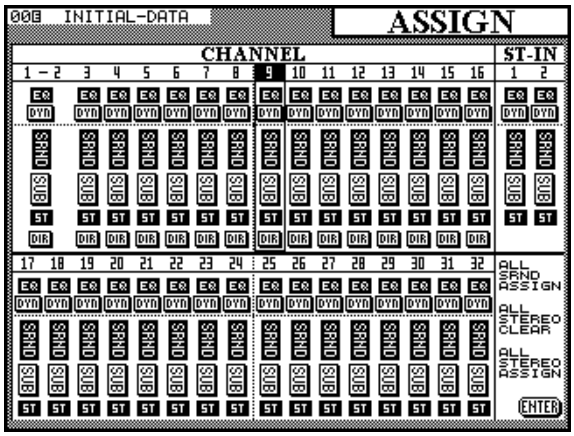
Since the busses are being used for the surround matrix channels, modules cannot be assigned to them in the usual way, and the buss keys for busses 5&6 and 7&8 are disabled.

However, modules can always be assigned to the stereo output buss.

6.4.1 Assigning modules

When a surround mode has been selected, the ASSIGN screen changes so that the buss assign-

ments are not shown, but it is possible to assign the modules to the surround channels:



The four buss pairs are replaced by two buttons: SRND and (optionally) SUB.

NOTE

The SUB button only has any meaning when the 5.1 surround option is chosen.

When the SRND button is "pushed" (on), the channel is routed to the busses for surround output.

When the SUB button is "pushed" (on), the channel is routed to the sub channel.

In addition to these two routings, modules can also be assigned to the stereo master buss. This allows the monitoring and soloing of channels through the STEREO OUT, which of course is output to the CR monitor outputs. The position of a module's signal in the stereo outputs is represented by the balance between the front pair of speakers in the surround matrix.

Channels 1 through 16 can also be assigned to the direct outputs (i.e. they will be output from the outputs of the interface cards fitted in slots 2 and 3).

As well as the on-screen buttons controlling the assignment of individual modules to the surround and sub busses, there are three "master" buttons: ALL SRND ASSIGN, ALL STEREO CLEAR, and ALL STEREO ASSIGN. The last two work in exactly the same way as the buttons with the same name in the normal stereo screen **[8]**, allowing the assignment and "unassignment" of all modules to the STEREO OUT.

The first button assigns all modules to the surround buss. Note that there is no dedicated button to do the same for the sub buss.

These on-screen buttons are used in the usual way; using the cursor and **ENTER** keys.

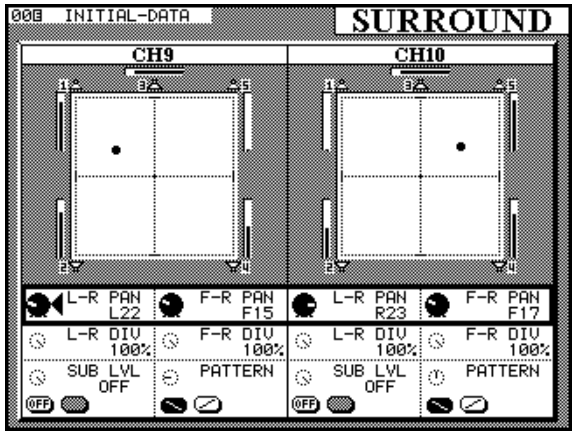
6.4.2 "Pan" controls

The concept of panning does not apply to surround mixes as it does to stereo mixes.

Accordingly, when a surround mode is selected, the MODULE screen does not show the pan controls.

Instead of this, the PAN screen (now the SURROUND screen) is used.

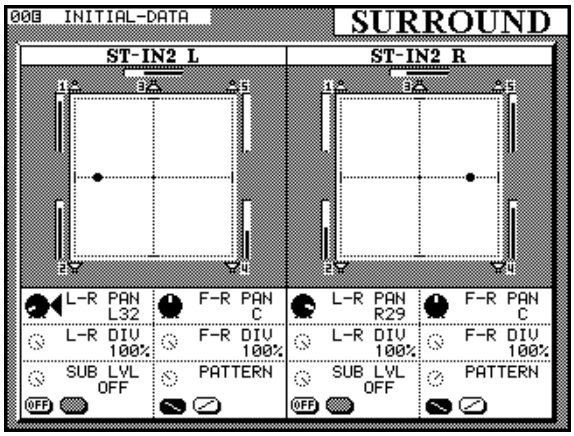
The screen is accessed by pressing the **PAN/BAL – SURROUND** key **[8]**. Instead of a general screen showing all modules, the surround screen for the currently-selected module and one other module is shown.



In the case of an odd-numbered module being selected, the other displayed module will be the even-numbered module immediately following the selected module. In the case of an even-numbered module, the other displayed module will be the odd-numbered module immediately before the selected module.

If a pair of modules has been linked as a stereo pair (or if one of the stereo inputs has been selected), the stereo linking does not apply to the surround settings—each module's (or channel's) position in the surround image is set independently. However, the fact that these modules have been linked is shown by a & following the module number at the top of the

screen. The screen below shows a stereo input in surround mode:



Note that the “image” control is unavailable for these stereo inputs in surround mode, but either of the two stereo inputs may be selected as a mono input (using the on-screen buttons in the MODULE screen).

To change the module to be edited, use the **SEL** key of the channel to be edited.

Each channel is shown as a “dot” cursor on a plan of the current surround mode.

The crossing point of the cursor (i.e. the position of the module signal in the surround mix) can be changed with the knobs of POD 1 and POD 3 (these adjust the left/right position for the odd and even modules) and the knobs of PODs 2 and 4 are used to adjust the position from front to rear. These adjustments are made when the row cursor is highlighting the top row on the screen.

For both the left/right and front/rear position settings, there are 91 steps, so the left/right setting goes from L45 through C (center) to R45, and the front/rear setting goes from F45 through C (center) to R45.

There is another parameter, which determines the amount of the total “sound-stage”, taken from the center position, within which the module signal can be positioned. This is set using the second row of on-screen PODs.

The values here are set in 4 steps: 25% (the most tightly focussed, almost a point source near the center), through 50% and 75% to 100% (the whole of the sound-stage is available).

Using these parameters, it is therefore possible to set the position of a signal precisely or loosely in either dimension.

As the space available for positioning the sound source is changed, the dotted box on the screen enclosing the available area changes size and shape.

Note also the “bar-graphs” (not meters) by each on-screen speaker, which give an indication of the relative level of the signal to each of the output channels in the surround matrix.

In addition to these positioning controls, in the 5.1 surround mode the sub- level (SUB LVL) may be set with the knobs of PODs 1 and 3 using the bottom on-screen row of PODs.

The left switch of these PODs is used as an ON/OFF switch to route the module signal to the sub buss.

Pods 2 and 4 of this row are used to move the signal source diagonally within the surround area (equivalent to turning the L-R and F-R pan controls simultaneously). The diagonal angle is set with the switches of these two pods.

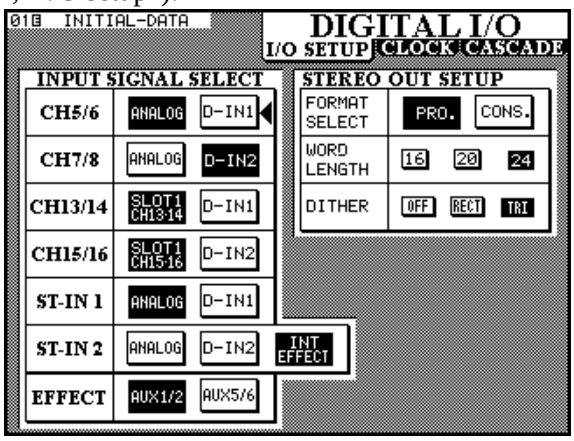
The internal effect processor of the TM-D4000 allows a variety of high-quality effects to be added to the mix, while keeping the signal in the digital domain.

The processor can be used either while recording, or on mixdown, as explained here.

7.1 Routing the processor

The processor signal path is not limited to a single setting. The send to the processor may be routed to suit the current purposes of the project.

These settings are made using the I/O SETUP screen, accessed through the **DIGITAL I/O** key (see 3.1, "I/O setup").



7.1.1 Effect processor feed

The EFFECT selection at the bottom of this screen allows the internal effector to be fed by either the Aux 1 and 2 send pair, or by the Aux 5 and 6 send pair.

Remember that Aux 1 and 2 can be set to be pre- or post-fader, unlike any other Aux send pair. For this reason you may be using them as a foldback mix in a recording session, and you may want to use Aux sends 5 and 6 to drive the internal processor.

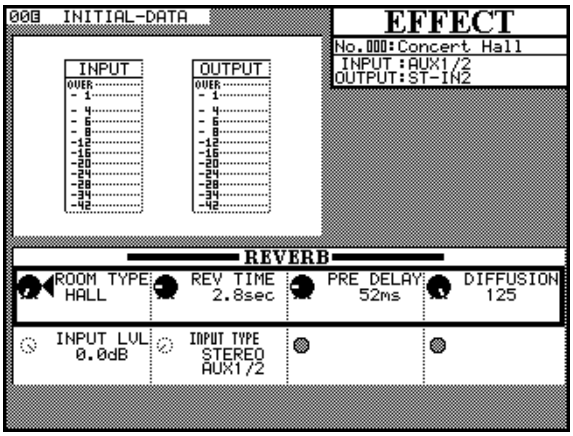
Remember that the feed to the processor can be monitored using the appropriate **MONITOR SELECT** keys **[22]**.

NOTE

Regardless of the Aux busses which are selected as the inputs to the internal effector, the Aux buss signals are also output at the appropriate **AUX OUTPUT** *jacks* **[56]** *in parallel with the feeds to the internal processor.*

7.1.2 Processor input mode

The feed to the processor can be mono (from either or both of the Aux sends) or stereo. This is set from the EFFECT screen, accessed through the **EFFECT** key in the Mixing section **[13]** (not the **EFFECT** key in the Library section).



The knob of POD 2 in the second row is used as an rotary switch to change the input to the internal processor between the following four modes: STEREO (both Aux sends are input to the processor separately), L Mono (the odd-numbered Aux send only is input in mono, R Mono (the even-numbered Aux send only is input in mono, L+R Mono (the two Aux sends are summed and presented as a mono signal to the processor).

7.1.3 Effect processor input level

The Aux sends control the level of the signals sent to the effect processor, which also has its own digital input level control (POD 1 in the screen above).

This ranges from −∞ (full cut of the input signal) to +0dB (relative to nominal), in 128 steps using the POD 1 knob. This level is applied after the appropriate level selected using the Aux send master.

7.1.4 Effect processor return

The I/O SETUP screen shown above is also used to use the effect processor return.

There is only one module that can take the effect output as a return; the ST IN 2 output.

Select INT EFFECT on the ST-IN 2 selection on this screen. If this setting is not made, you will not be able to hear the effects produced by the processor.

The ST IN 2 module can be routed to busses, etc., and can also be sent to Aux sends 1 and 2 (if these are being used as the foldback sends).

NOTE

Turn off the Aux sends from this module to the Aux busses that feed the processor. If you send from the effect return module back into the effect processor, feedback will result. This applies, of course, to all effect returns, but it is particularly easy to overlook on an internal effect processor.

7.2 Effect types

The effect processor provides a number of different major effect types (some of which have sub-types), as listed here:

- Reverb (Hall, Room, Live and Studio sub-types)
- Gated Reverb
- Delay (Stereo, Ping-pong and Multi-tap)
- Chorus
- Flanger
- Phaser
- Pitch shifter
- Exciter
- Dynamics (Compressor/Limiter/Expander)
- De-esser

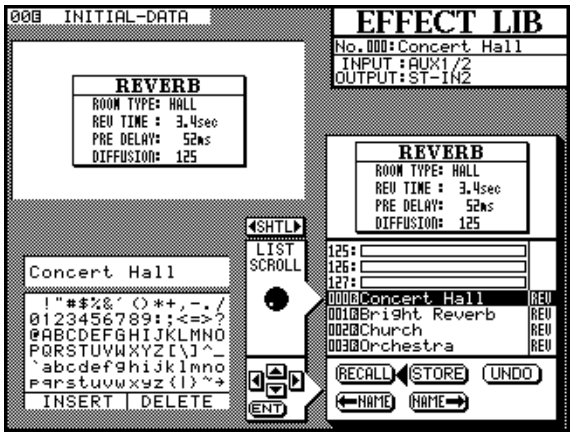
The Compressor/Expander/Limiter available as an effect here is different from the dynamics processors available for each module. Settings made and stored for the effect processor in this setting cannot be recalled for channel dynamic effects, and *vice versa*.

Likewise, the gated reverb effect uses a gate which is independent of any channel dynamics processor gate settings.

7.2.1 Selecting a basic effect type

The way in which an effect is selected is from the library. The library contains a number of different preset effects, which may be used “as is” or used as starting points for experimentation and creation of new effect settings, which may be stored in the library.

1 **Press the EFFECT key in the Library section [4].**



Notice that the current settings for the effect send and return, as well as the currently-selected effect, are shown at the top right of this screen.

2 **Make sure that the central lower part of the screen is pointing towards the right (as shown above). If it is not, turn the SHUTTLE wheel clockwise, so that it reads** LIST SCROLL **(not** CHAR SELECT**).**

3 **Turn the JOG dial to scroll through the list of available effects. As the effects are highlighted, the effect type is shown in large characters on the screen.**

Effects which are preset library effects are shown with an inverse R **(**R**ead-only).**

4 **When the effect to be recalled has been highlighted, move the cursor to the on-screen** RECALL **button, and press ENTER.**

7.2.2 Editing a recalled effect

The **EFFECT** key in the Mixer section (not the **EFFECT** key in the Library section) is used to bring up the EFFECT screen,

Up to four POD knobs in the top row may be used to set parameters for the effect, as follows.

Effect type	POD1	POD2	POD3	POD4
Reverb	Room type	Reverb time	Pre-delay	Diffusion
Values	Hall, Room, Live, Studio	0.1 – 37 (s)	0 – 250 (ms)	0 – 127
Gated reverb	Gate mode	Gate threshold	Gate time	Density
Values	Noise gate, Gate reverb, reverse	–60 – 0 (dB)	10 – 400 (ms)	0 – 127

Effect type	POD1	POD2	POD3	POD4
Delay	Delay type	Delay time	Feedback level	Feedback delay time
Values	Stereo, Ping-pong, Multi-tap	0 –1000 (ms)	0 – 100 (%)	0 – 1000 (ms)
Chorus	Rate	Depth	Pre-delay	Feedback level
Values	0.1– 12.0 (Hz)	0 – 127	0 – 100 (ms)	0 – 100 (%)
Flanger	Rate	Depth	Resonance	Delay time
Values	0.1 – 12.0 (Hz)	0 – 127	0 – 127	0 – 1000 (ms)
Phaser	Step	Rate	Depth	Resonance
Values	4, 8, 12, 16	0.1 – 12.0 (Hz)	0 – 127	0 – 127
Pitch Shifter	Pitch	Fine pitch	Pre-delay	Feedback level
Values	–12 – +12 (semitone)	–50 – +50 (cent)	0 – 500 (ms)	0 – 100 (%)
Exciter	Sensitivity	Frequency	—	—
Values	0 – 127	1.0 – 10.0 (kHz)	—	—
De-esser	Sensitivity	Frequency	—	—
Values	0 – 127	1.0 – 10.0 (kHz)	—	—
Compressor/limiter	Threshold	Attack Time	Release time	Ratio
Values	–60 – 0 (dB)	0 – 125 (ms)	5 – 5000 (ms)	1:64 – 64:1

7.2.3 Storing an edited effect

1 **Press the EFFECT key in the Library section (not the EFFECT key in the Mixer section).**

2 **Make sure that the central lower part of the screen is pointing towards the right. If it is not, turn the SHUTTLE wheel clockwise, so that it reads** `LIST SCROLL` **(not** `CHAR SELECT`**).**

3 **Use the JOG dial to select an unused effect memory location, or a memory location which can be overwritten with the new edited values.**

4 **Move the cursor to the on-screen** `STORE` **button, and press ENTER.**

If the memory location in which you are storing the new effect already contains an effect, a popup window will ask you for confirmation that you want to overwrite the existing data.

You cannot overwrite any of the preset read-only memories.

5 **Naming of effects is done using the library screen, as described in the section on library functions.**

7.3 Preset effects

The following effects are provided as standard. They are read-only memories, and cannot be overwritten (though they can be recalled, the parameters edited, and stored in user memory locations).

Effect	Type	Number	Title	Comment
Reverb	Hall	00	Concert Hall	Hall-type reverb setting
		01	Bright Reverb	Reverb with a brighter sound than the previous setting
		02	Church	Simulates a building with a a high ceiling
		03	Orchestra	A “thick” reverb to provide an orchestral reverb sound
		04	Woody Hall	Simulates a hall of wooden construction
		05	Thin Hall	Simulates the reverb in a narrow, corridor-like structure
	Room	06	Ambience	Gives a three-dimensional, “off-mic” feeling
		07	Garage	Garage-type reverberation pattern
		08	Big Drums	Designed to enhance drum and percussion sounds
		09	Concrete Room	Reverberation pattern of a concrete-walled room
		10	Live House	Mimics the feel of a live venue
		11	Plate Reverb	Classic warm plate reverb sound
	Live	12	Stadium	Similar to the sound close to the stage in a large stadium
		13	Arena	Similar to an arena, with the amount of pre-delay determining the “seating position”
		14	Spacey	Gives the impression of a wide space
		15	Endless	Continuing “magical” reverb with a very long decay time
	Studio	16	Vocal Plate	A “plate” type reverb suitable for vocals
		17	Instrument Booth	A natural-sounding reverb for rhythm instruments
		18	Strings Reverb	This smooth setting is suitable for strings
		19	Session	A tight reverb, suitable for the small-scale band sound

Effect	Type	Number	Title	Comment
Gated reverb		20	Noise Gate	A “heavy” gated reverb
		21	Short Gate	Gated reverb with a short hold time
		22	Wild Gate	A slightly unusual-sounding gate
		23	Long Gate	A gated reverb with a longer hold
		24	Slow Attack	Gated reverb with a slower attack
		25	Ambience Gate	Suitable for an “ambient” feel
Delay	Stereo	26	Stereo Echo	Basic setting with the repeat rate set at 120 bpm
		27	Enhance Comb	Uses a comb filter for enhancement
	Ping-Pong	28	Cross Feedback	Echo feedback alternates between the left and right channels, (in mono, this is the same as the Stereo Echo setting)
		29	Delay L<-->R	One delay moving between left and right
	Multi-tap	30	80bpm	Rhythmic sound for pieces with a tempo of 80 bpm. The ratio of delay time to feedback time (4:3) is particularly effective.
		31	120bpm	As above, but for pieces with a tempo of 120 bpm
		32	150bpm	As above, but for pieces with a tempo of 150 bpm
Chorus		33	Ensemble	A thick chorus sound, with a continuous feel
		34	Chorus Flange	Feedback is added to the chorus algorithm, producing resonance
Flanger		35	Sweet Flanger	Soft flange effect
		36	Tremolo Flange	Tremolo sound produced using flanger
Phaser		37	Mellow Phaser	Sweet, “polished” phaser sound
		38	Wah Phaser	Phaser using resonance to mimic a wah-wah pedal
Pitch Shifter		39	Octaver	Pitch shift by one octave, suitable for chords
		40	5th Harmony	Pitch shift by an interval of a fifth. Suitable for monophonic signals
		41	Doubler	Chorus sound produced by detuning. Fine control alters the amount of effect.
		42	Glow up!	Repeating ever-increasing pitch shift, depending on feedback
Exciter		43	Edge	Helps to emphasize higher-frequency sounds

Effect	Type	Number	Title	Comment
Dynamics	Limiter	44	Limiter	A limiter limiting signals to the 0 dB level
	Comp	45	Percussive	A compressor for percussive signals
		46	Sustain	A compressor providing a sustained signal
		47	Fat Comp	A “fat”-sounding compressor setting
	Expander	48	Light Exp	A light expansion setting
		49	Violin Gate	Another type of expansion
De-esser		50	Vocal De-esser	Hiss eliminator

This section introduces the principles of operating the library functions for the following settings which can be edited, stored and recalled:

- snapshots
- dynamics processor settings
- equalization settings
- effect processor settings

The way in which these library functions are carried out are similar for all of these, except for the snapshot functions, which are slightly different, and are explained separately.

Each library has a number of preset memory locations, and a number of user memories:

Snapshots (all digital settings)	1 pre-set "neutral" setting; 60 user settings
Effector (internal effect processor)	51 pre-set settings, 77 user settings
EQ (channel equalization settings)	20 preset settings, 80 user settings
Dynamics (channel compression and gating)	20 pre-set settings, 80 user settings

The preset memory locations in each library are "read-only" and cannot be overwritten by user settings. However, they may be recalled, and used as starting points for user settings, with the edited parameters being stored in a user location.

Each library is independent of the other libraries; entries allocated for one library cannot be used by another library.

Library settings can be stored "offline" using MIDI System Exclusive data dumps to MIDI data filing devices or suitably-equipped personal computers.

8.1 Snapshot memories

Snapshot memories may be stored and recalled from almost any display screen. There are two dedicated keys for the store and recall of snapshots (**STORE** and **RECALL**) in addition to the **+** and **–** keys which are used to step through the snapshot memories.

All digital audio parameters are stored as part of a snapshot library entry. However, I/O setup parameters, including clock source, analog audio settings (analog trim, phantom power, mic/line switching, etc.) are not stored as part of a snapshot library entry.

The **SNAPSHOT** key is used to display the snapshot library screen, allowing renaming, etc. of snapshot library entries, as explained below.

8.1.1 Snapshot 00

This snapshot is a special case. It resets all settings to a "neutral" snapshot.

All faders are set to nominal levels, and pan controls are set to center, etc.

Specifically:

Item	Value
EQ switch	ON
EQ gain (all bands)	0dB
EQ frequency (LO/LM/LH/HI)	99 Hz/1 kHz/4 kHz/10.1 kHz
EQ Q (LO/LM/LH/HI)	L.SHELF/8.65/8.65/H.SHELF
Fader level	0dB
Cut	OFF
Aux send levels (all)	–∞
Aux pre/post (Aux 1,2 only)	POST
Aux ON/OFF	ON
Pan/BAL	CENTER
Image width	STEREO100%
MONO switch	STEREO
Surround L-R	CENTER
Surround F-R	F45
Surround L-R Div	100%
Surround F-R Div	100%
SUB level	0dB
Aux master levels	0dB
Aux master link	OFF
Aux master cut	OFF
Buss level	0dB
Buss links	OFF
Buss cuts	OFF
Dynamics on/off	OFF
Dynamics type	COMP
Dynamics parameters THRESH/RATIO/ATTACK/ RELEASE/OUTGAIN/AUTO-MAKEUP	0dB/ –∞:1 /5ms/5ms/0dB/OFF
Dynamics links	OFF (except for ST IN 1 and 2)
Dynamics trigger (not shown as link is off)	BOTH
Effect in	0dB
Effect type	REVERB
Effect (as Library 1) ROOM TYPE/REV TIME/PRE DELAY/DIFFUSION	HALL/3.4sec/52ms/125
Link	OFF
Pad level	0dB
Phase switch	Normal
Pan gang	OFF
Sample delay	0sample
Delay switch	OFF
Buss assignments	No Assign

Item	Value
Stereo/direct assignments	(St:ON)/(Dout:OFF)
Surround assignments	(Srnd:ON)/(Sub:OFF)
Cut group	No Assign
Fader group	No Assign
Snapshot name	INITIAL-DATA

This snapshot is read-only; it cannot be overwritten with user snapshot data.

8.1.2 Recalling a snapshot

The current snapshot entry is displayed at the top left of the display screen.

An inverse E to the right of the snapshot number indicates that the current settings differ from those stored in the snapshot library memory.

1 **Press the + or – key to change the snapshot entry displayed at the top left of the screen.**

The library entry number is displayed in inverse video, showing that the library entry is selected for recall, but as not yet actually been recalled.

2 **Press the RECALL key to recall the library entry.**

NOTE

When a library entry is recalled, there may be sudden jumps in level. You are advised to turn down the level of the monitoring systems before recalling a snapshot library entry.

Snapshots can also be recalled from the snapshot library screen, using the on-screen RECALL button, as mentioned in the section below (8.1.5, “Naming a snapshot”).

The on-screen UNDO key can be used to reverse the effects of the last snapshot recall. If no snapshot has been recalled before the UNDO key is pressed, an appropriate error message is displayed.

Pressing and holding the **SHIFT** key and pressing the **RECALL** key will have the same effect as using the UNDO button.

8.1.3 Storing a snapshot

As mentioned above, an inverse E following the snapshot number at the top right of the screen indicates that the current settings differ from the values stored in the library entry.

To store these current settings into a library entry:

1 **Press the + or – key to change the snapshot entry displayed at the top left of the screen.**

2 **Press the STORE key to store the settings to the library entry.**

If the library entry already contains data, an appropriate message appears asking if the existing data is to be overwritten.

The current settings may, of course, be stored in the currently-selected library entry, overwriting the settings already stored there.

If the “neutral” setting (00) is selected, a message appears on the display screen reminding you that this memory area is read-only and cannot be overwritten with other data.

Snapshots can also be stored from the snapshot library screen, using the on-screen STORE button, as mentioned in the section below (8.1.5, “Naming a snapshot”).

8.1.4 Copying a snapshot

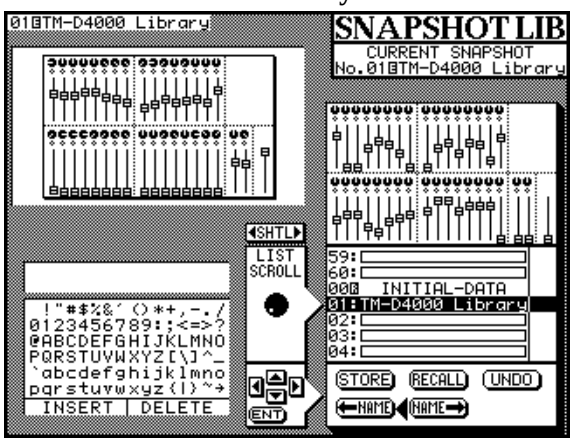
Although there is no dedicated function which allows the copying of the snapshot data stored in one library entry to another library entry, it is easy to use the recall and store facilities to recall a snapshot, select another library entry, and store the recalled snapshot into the newly-selected library entry.

8.1.5 Naming a snapshot

To help you remember the function of a snapshot, snapshot library entries can be named with up to 16 alphanumeric characters (and punctuation).

The names of existing snapshot library entries can be used as starting points for entering new names, reducing the time and effort needed to enter names.

1 **Press the SNAPSHOT key:**



2 **The SHUTTLE wheel is used to change the function of the center lower portion of the screen. In the screen shown above, this portion of the screen is used to manage the list of library entries.**

3 **The JOG dial is used to scroll through the list of entries. note that as the entries in the list are highlighted, a graphical representation of the faders is shown above the list.**

The fader map to the left of the screen represents the current fader position, allowing comparison of a library entry with the current fader positions.

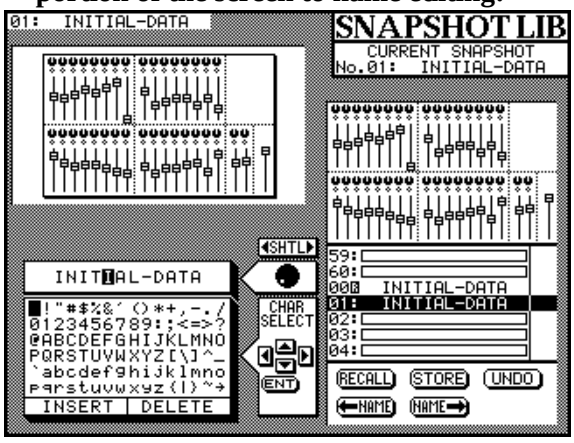
4 **When the name of an entry which is to be used as the basis for a new library entry name is highlighted, the cursor keys are used to move the cursor to the on-screen NAME button.**

5 **Press the ENTER key to transfer the name of the currently-selected list entry to the name editing area on the right of the screen.**

NOTE

This procedure does not transfer the snapshot itself; only the name of the snapshot library entry. To recall the snapshot of the currently-selected list entry, use the on-screen RECALL button, or the hardware **RECALL** *key.*

6 **Turn the SHUTTLE wheel counterclockwise to change the function of the center lower portion of the screen to name editing:**



7 **Use the JOG dial to move the cursor inside the name of the snapshot entry to be edited.**

8 **Use the cursor keys to move the cursor through the list of available characters, and the ENTER key to insert the highlighted character at the cursor position in the name.**

There are two special buttons below the list of characters: the INSERT button inserts a character at the cursor position, and the DELETE button deletes the character at the cursor position.

The number keypad can also be used for direct entry of numeric characters in the name.

9 **When the name has been edited, turn the SHUTTLE wheel clockwise so that the center portion of the screen controls the list scrolling functions.**

10 **Use the JOG dial to select the library entry into which the edited name will be stored.**

11 **Move the cursor to the on-screen NAME button, and press ENTER. The edited name will now overwrite the current name (if any) of the highlighted library entry.**

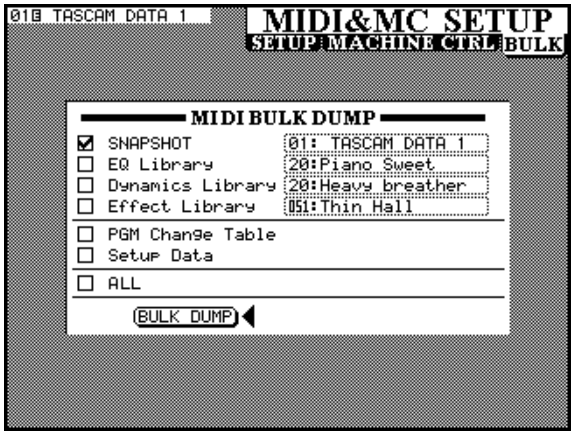
NOTE

This does not overwrite the snapshot data in the library entry, only the name of the library entry. Use the on-screen STORE button or the hardware **STORE** *key to store snapshot data.*

8.1.6 MIDI dumping and loading of snapshot library entries

Snapshot data (except for snapshot 00) can be transmitted to MIDI devices such as sequencers, data filers, etc. allowing mixer settings to be stored alongside MIDI sequences, or simply as a convenient offline storage method.

1 **Press the MIDI/MC key [5] until the BULK screen appears:**

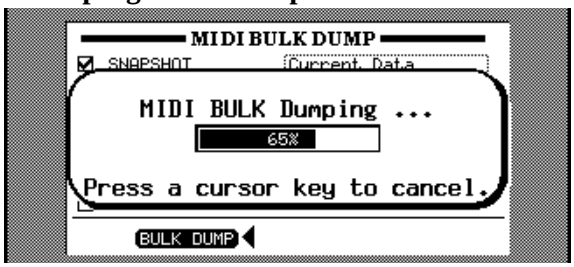


2 **Move the cursor to the SNAPSHOT checkbox, and press ENTER. Note that the other libraries can also have their data dumped and loaded together with the snapshot library entries (i.e. more than one checkbox can be checked at the same time).**

3 **Move the cursor to the box at the right of the checkbox. Use the JOG dial to scroll through the list of options: ALL snapshot library entries, the current settings (Current Data), or an individual snapshot library entry, from 01 to 60 (Library01 – Library60).**

4 **Make any preparations on the receiving device so that the bulk dump data can be received successfully.**

5 **Move the cursor to the BULK DUMP button, and press ENTER to start the bulk dump. As the data is being transmitted, the following popup "bargraph" appears, to indicate the progress of the operation:**



Note that pressing a cursor key will stop the operation. After the MIDI data has been transmitted, the popup message changes to the following:

Restoring snapshot data from a MIDI bulk data transfer is carried out in the following way:

1 **Make sure that MIDI is selected as the Communication Speed in the Automation Setup screen.**

2 **Make sure that the MIDI channel is set to be the same as the MIDI channel when the dump was made from the TM-D4000 (if this is not known, the OMNI ON function can be turned on).**

3 **Start the transfer of the System Exclusive data from the MIDI device.**

NOTE

If the transfer is interrupted, the TM-D4000 may be left in a "random" state. Either make the data transfer again, allowing it to complete, or turn the TM-D4000 off, wait a few seconds, and turn it on again.

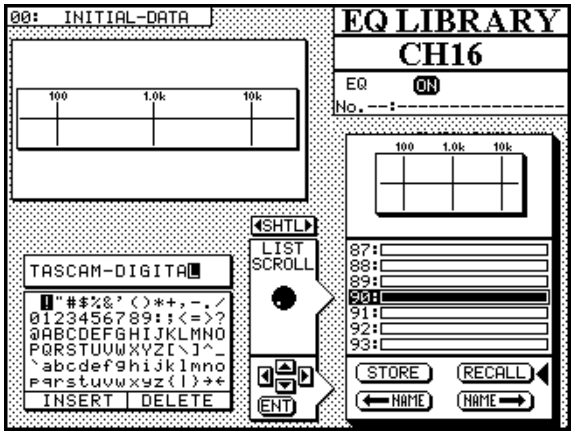
It is strongly advised that the TM-D4000 controls are not moved during a dump process, either in or out), as this may affect the successful trasnmission of data. Also note that after a dump transmission, if the faders have accidentally been moved during the transmission, they will return to their original (pre-dump) position as soon as the dump is ended.

The format of the MIDI System Exclusive bulk dump data is given in the section on MIDI.

8.2 Other libraries

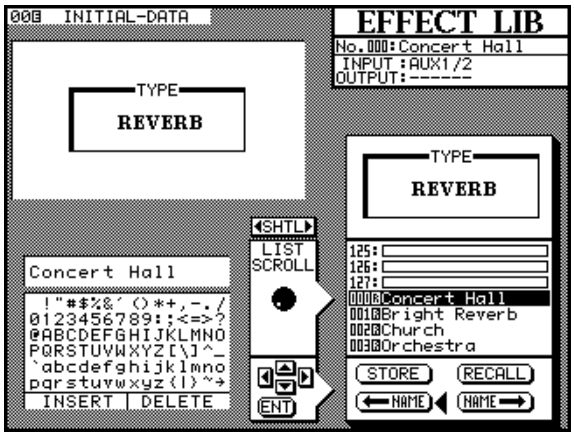
The other libraries: EQ, dynamics processor and effect processor, are very similar to each other in the methods used for storing and recall of library entries.

There are no dedicated hardware **STORE** and **RECALL** keys, and no dedicated keys for incrementing and decrementing the current library entry number. Instead, the three library keys: **EFFECT**, **EQ** and **DYNAMICS** are used to bring up the appropriate library management screens.



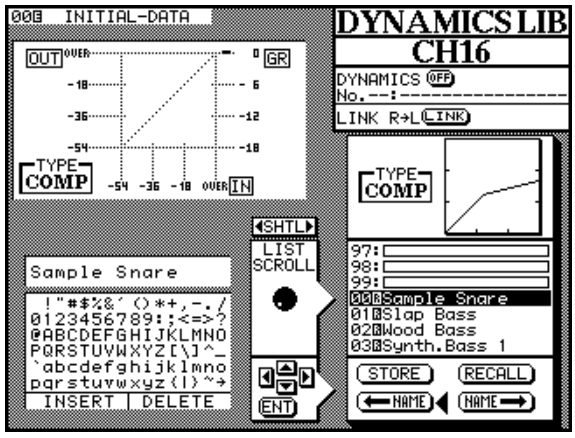
The EQ library management screen shows the equalization curve above the list of the currently-highlighted library entry. The equalization curve for the currently-selected module is displayed at the upper left of the screen.

The equalization for the module can be turned on and off in this screen, using the **EQ** key to the right of the display screen above the buss assignment keys **[18]**, and the current on/off status is shown at the top right of the screen.



The effect processor library management screen shows the effect details above the list (reverb, delay, flanger, etc.) of the currently-highlighted library entry. To the right of the effect names is the abbreviated name of the effect type (see 8.2.1, “Effect type abbreviations” below).

The effect details of the currently-selected effect processor settings are displayed at the upper left of the screen. At the top right of the screen, the current source and destination of the effect processor are shown (the settings for these are described in 7.1.2, “Processor input mode” and 7.1.4, “Effect processor return”.



The dynamics processor library management screen shows the dynamic gain response above the list of the currently-highlighted library entry. The dynamic gain response of the dynamics processor for the currently-selected module is displayed at the upper left of the screen. At the top right of the screen, a button allows the enabling or bypassing of the processor using the **DYNAMICS** key to the right of the display screen **[19]**.

By moving the cursor to the on-screen LINK button, and pressing **ENTER**, the processor can be linked or unlinked to or from the adjacent processor (see the explanation of the **DYNAMICS** key **[11]** for an explanation of processor linking).

The main difference between these screens is therefore that the EQ and dynamics library entries apply to a selected module (or a pair of stereo linked modules), while the effect library entry is applied to the whole setup.

This makes the library functions especially useful for copying equalization and dynamics processor settings, between modules. If, for example, the same compressor settings are to be applied to a group of modules, the settings are first made on one module, stored to a library entry as described below. The other modules to which the settings are to be applied are then selected in turn, and the compressor settings recalled from the library to each module. Equalization settings can be applied to a number of modules in the same way.

8.2.1 Effect type abbreviations

These abbreviations are given at the right of the effect name in the scrolling list:

REV	Reverb
G.R.	Gated reverb
DLY	Delay

CHO	Chorus
FLG	Flanger
PHA	Phaser
PIT	Pitch shifter
EXC	Exciter
DYN	Dynamics processor
DES	De-esser

8.2.2 Recalling a library entry

1. **If the library entry to be recalled is an EQ or dynamics processor library entry, select the appropriate module to which the library entry settings will be applied.**
2. **Press the appropriate library key: EFFECT, EQ or DYNAMICS.**
3. **Making sure that the lower center part of the screen points to the right (use the SHUTTLE wheel to change it if necessary), use the JOG dial to scroll through the list of library entries.**

   As the list is scrolled, the appropriate display (response curve, effect type or gain) is shown above the list.
4. **Move the cursor to the on-screen RECALL button and press ENTER.**

8.2.3 Storing a library entry

1. **If the library entry to be stored is an EQ or dynamics processor library entry, select the module which contains the settings which are to be stored.**
2. **Press the appropriate library key: EFFECT, EQ or DYNAMICS.**
3. **Making sure that the lower center part of the screen points to the right (use the SHUTTLE wheel to change it if necessary), use the JOG dial to scroll through the list of library entries.**
4. **move the cursor to the on-screen STORE button and press ENTER.**

   If the library entry currently contains data, a message appears on screen asking whether the existing data should be overwritten.

   If an attempt is made to store settings to a preset library entry (marked by an inverse R following the library entry number) an appropriate error message is displayed on a popup window.

8.2.4 Copying a library entry

Although there is no dedicated copy function provided for library entries, it is easy to recall settings from a library entry and store them, unchanged, into another library entry.

8.2.5 Naming a library entry

The principles of naming and renaming library entries are identical to those used for snapshot libraries (8.1.5, “Naming a snapshot”). see this section for detailed instructions of how to use the naming and renaming functions.

Names are retrieved from the existing list of names and copied to the name editing area. The cursor is used to move around the list of available characters to edit the name, which is then copied over to the library list.

8.2.6 Storing and recalling library entries using MIDI

The MIDI System Exclusive data dump facilities can be used to store and recall these library entries as well as snapshot library entries.

Note that only user memories may be transferred in this way—it is not possible to dump or restore the preset memory settings.

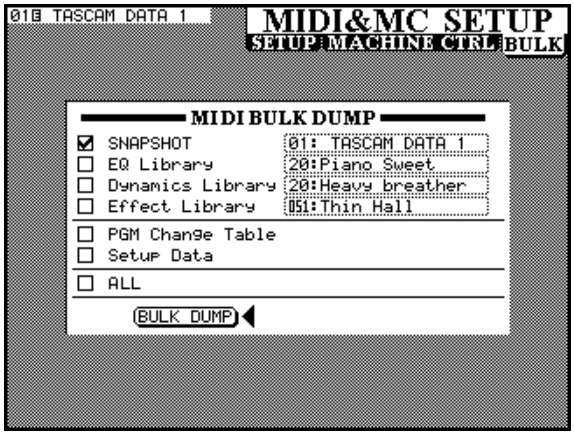
Data settings that may be dumped and restored, therefore, are:

EQ	individual settings from 20 through 99, and All settings
Dynamics processor	individual settings from 20 through 99, and All settings
Effect processor	individual settings from 51 through 127, the Current setting, and All settings

1. **Make sure that the Communication Speed in the Automation Setup screen is set to MIDI. Make sure that the MIDI channels of the units are correctly set up.**

   On a data restore operation the TM-D4000’s MIDI channel must match that of the dumped data, or OMNI must be set on.

2 **Press the MIDI/MC key [5] until the BULK screen appears**



3 **Move the cursor to either the EQ Library, the Dynamics Library or the Effect Library checkbox, depending on which library is to be dumped or restored, and press ENTER to select it. Note that entries from more than one library (including the snapshot library) can be saved or restored in the same operation.**

4 **Move the cursor to the appropriate box at the right of the screen, and use the JOG dial to select the library entries, as specified above.**

5 **If data is being dumped from the TM-D4000 to the remote device, start the "receive mode" on the remote device, move the cursor to the BULK DUMP button, and press ENTER.**

6 **If data is being restored from the remote device to the TM-D4000, simply start the bulk dump from the remote device.**

The data formats for the System Exclusive messages are given in the section on MIDI.

8.3 Preset library entries

The following library entries are provided as preset patterns. They may either be recalled and used "as-is", or recalled, their parameters edited, and stored in a user library entry for further use. Note that they cannot be re-stored in their original, read-only, library entry (as shown by the inverse R following their names.

Preset effect library entries are listed in 7.3, "Preset effects".

Remember that there is only one preset snapshot, the 00 "neutral" snapshot, as described earlier in 8.1.1, "Snapshot 00".

8.3.1 EQ presets

The titles of these EQ preset settings are intended to give an idea of the kind of signal for which they have been designed. However, this is only a guide, and you should experiment with these settings, and variations of these settings, in different contexts in order to discover the best sounds for your purposes.

Number	Title	Comment
00	Snare Drum	Suitable for a snare drum
01	Bass Drum	Suitable for kick (bass) drum
02	Sample Snare Dr.	EQ for a sampled snare sound
03	Sample Bass Dr.	Fo a smapled kick (bass) drum sound
04	Wood Bass	Upright plucked double bass
05	Synth. Bass 1	For synth bass sounds
06	Synth. Bass 2	
07	Acoustic Guitar	Suitable for acoustic guitars
08	Ele. Guitar 1	For electric guitars
09	Ele. Guitar 2	
10	Ele. Guitar 3	
11	Violins & Violas	For the upper instruments in a string enemble

Number	Title	Comment
12	Cello & C.Bass	For the lower instruments in a string enseble
13	Brass	For brass sections
14	Piano	Acoustic piano setting—starting point for experimentation
15	Pad fits to VOX	For “pad” sounds to match vocals
16	Vocal 1	Vocal EQ starting points
17	Vocal 2	
18	Hum Cancel	Elimination of AC (mains) noise
19	Radio Voice	“Squawk-box” vocal setting

8.3.2 Dynamics processor presets

The titles of these dynamics processor preset settings are intended to give an idea of the kind of signal for which they have been designed. However, this is only a guide, and you should experiment with these settings, and variations of these settings, in different contexts in order to discover the best sounds for your purposes.

Number	Title	Comment
00	Sample Snare	Sampled snare drum setting
01	Slap Bass	Suitable for slap bass sounds
02	Wood Bass	Suitable for upright plucked double bass
03	Synth. Bass 1	For synth bass sounds
04	Synth. Bass 2	
05	Acoustic Guitar	Acoustic guitar compression
06	Ele. Guitar 1	For electric guitars
07	Ele. Guitar 2	
08	Ele. Guitar 3	
09	Brass	For brass sections
10	Vocal 1	For vocals
11	Vocal 2	
12	Total Comp 1	Overall “blanket” compression settings
13	Total Comp 2	
14	Total Comp 3	
15	Post Pro.1	Useful in post-production work
16	Post Pro.2	
17	Noise Gate 1	Noise gate settings
18	Noise Gate 2	
19	Narration	Useful setting when recording narrations

The TM-D4000 is capable of acting as a remote control unit for a wide variety of external devices.

The exact functionality of the machine control depends, of course, on the device to be controlled.

The device control is carried out through any of the following: dedicated control connections (through the IF-TD4000 and IF-LP4000 interface cards), the RS-422 9-pin connector (P2 protocol devices) and MIDI connections (for MMC).

Different devices can be selected for simultaneous control by the TM-D4000, with different devices being controlled in different ways. For instance, it is possible to select one device to have its transport functions controlled by the TM-D4000, while the TM-D4000 controls the track arming functions of another device.

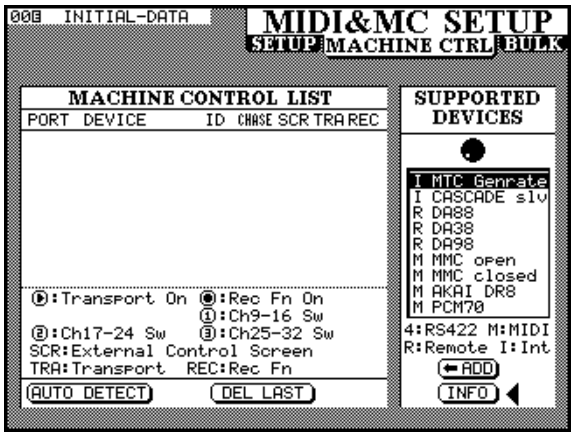
NOTE

In this section, the term "controller" is used to refer to a part of the TM-D4000 software controlling an external device, rather than a hardware feature of the device or the TM-D4000.

9.1 Selecting devices for control

The **EXT CTRL – MIDI/MC** key **[5]** is used to set up the control of external devices.

1 **With the SHIFT indicator on, press the EXT CTRL key until the following screen appears:**



2 **With the cursor pointing to either the ADD or INFO buttons, use the JOG dial to scroll through the list of devices that may be controlled by the TM-D4000.**

3 **When a device to be controlled by the TM-D4000 is selected in the list, move the cursor to the ADD button, and press ENTER. The device will be added to the list.**

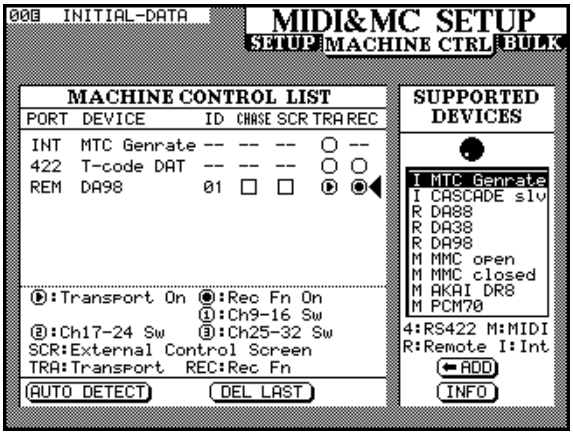
To obtain more information regarding a particular item in the list of devices which may be controlled by the TM-D4000, highlight the item, move the cursor to the INFO button, and press ENTER. A popup screen will provide information regarding the list item.

Other devices may be added to the list in the future. If the list does not contain the name of a device that you wish to control, please contact your TASCAM dealer regarding the availability of a software upgrade which contains the control capability for your device.

At the bottom of the list is a key to the method used for controlling each item in the list:

Display	Meaning
I	Internal devices
R	REMOTE (DTRS through IF-TD4000)
M	MIDI Machine Control
4	RS-422 P2
S	ADAT sync (IF-LP4000)

When a few devices have been added to the list, the screen will contain some entries in the list, like the following:



9.1.1 Deleting devices from the list

If a device is added in error to the list, move the cursor to the on-screen DEL LAST button, and press **ENTER**.

This process can be repeated to clear the list.

9.1.2 Auto-detection of devices

In addition to the manual addition of controlled devices, the AUTO DETECT button can also be

used to search through the MIDI, RS-422, IF-LP4000 and IF-TD4000 **REMOTE** control ports and report on devices that it nds, adding the controllers to the Machine Control list.

NOTE

Because not every device that may be controlled by the TM-D4000 is capable of reporting its presence accurately, some devices will not appear on the list, and must be added to the list manually.

When attempting to identify a MIDI device, the TM-D4000 rst sends out an MMC Read Signature command. It adds a generic “closed loop” device for every device ID that responds to this command.

It also sends out a MIDI Device Inquiry Message. If a remote device replies to this message, and an appropriate controller is available, this controller replaces the generic MMC closed-loop controller.

After power has been applied, it may take between one and two minutes for the remote devices to be recognized. Even if they have been added to the memorized Machine Control list previously, it may not be possible to control them immediately after the system is powered up.

During this "warmp-up" period, connected devices will not appear during the AutoDetect procedure. If connected devices do not appear when the Auto Detect is rst attempted, it is recommended that you retry the procedure until they are detected (the CLOCK screen shows any ADAT and DTRS chains as they are connected, but RS-422 devices are not shown).

If two control chains of the same type (i.e. two DTRS chains or two ADAT chains) are connected to the TM-D4000, only the chain connected to one of the interface cards will be detected. The other such chain will be ignored. However, there is no problem with regard to having one DTRS and and one ADAT control chain connected simultaneously. Only one such chain can be controlled at a time, of course.

Note when using DTRS and/or ADAT control chains, that only one control connection of each type (DTRS or ADAT) should be made between the TM-D4000 and the controlled devices.

9.1.3 Selecting the control type for the devices

The Machine Control list is composed of a number of columns. These are explained below:

PORT : This is an expanded version of the control port abbreviation shown in the list at the right of the screen. This list item cannot be changed or edited.

DEVICE : This is the name of the device being controlled. This list item cannot be changed or edited.

ID : This applies to MIDI faders and controllers, and MMC units. In the case of DTRS and ADAT units, it refers to the unit ID, and cannot be edited. In the case of MMC units, it refers to the MMC ID (2 hexadecimal digits) of the unit. This list item cannot be changed or edited. In the case of MIDI faders and controllers, see the appropriate section later in this section. Use the **JOG** dial to change the value and conrm with **ENTER**.

CHASE : This applies to DTRS units, and allows the CHASE mode of the selected unit to be turned on or off. Any unit which can have its chase mode controlled by the TM-D4000 has this item represented by a square box. Units whose CHASE mode cannot be remotely controlled have this item represented by two dashes (--).Use the cursor keys to navigate to the list item, and the **ENTER** key to toggle between on (a check mark is shown in the box) and off (the box is empty).

SCR : External control screen. Some devices may have special screens available, allowing further control from the TM-D4000. Such devices are represented by a square box as this list item. Devices which do not have a special control screen have this list item represented as two dashes (--). Use the cursor keys to navigate to these boxes, and the **ENTER** key to toggle between on (a check mark ✔ is shown in the box) and off (the box is empty). Note that more than one device can have this box checked, allowing the control of many such devices without remapping.

These screens are accessed with the **EXT CTRL** key (unshifted). Since more than one device may be selected for external control, repeated presses of this key will bring up the screens for all such selected devices, in order.

TRA and REC : These two parameters are set together, to allow the transport controls and of the TM-D4000 **[43]** to control the transport of the selected device (TRA), and the **REC** keys **[25]** to be used for track arming (REC).

NOTE

The exact way in which the transport controls work with the external device depends on the capabilities of the device. For instance, the notion of "record" is not very meaningful when applied to the internal timecode generator.

There are also many specific features for different devices. If you require further information on the control features of a specific device that are not detailed here, please contact your TASCAM dealer, who should be able to supply you with further information.

Moving the cursor to the right of the REC column, and pressing the **ENTER** key repeatedly will cycle through the following conditions:

TRA on REC off
TRA on REC on
TRA off REC on
TRA off REC off

Only one device at a time can be selected for transport control, as shown by the circled ▶ symbol. If a device has been selected for transport control, and it is required to control another device, the first device selected for external control must be de-selected from transport control before the "new" device is selected for this purpose.

One feature which is not visible from the transport controls is an "eject" function. DTRS and ADAT units, as well as most VTRs, can have their media ejected by pressing and holding the **STOP** transport key, and pressing the **CLEAR** key of the auto-punch section **[36]** (not the number keypad **CLR** key).

Some machines may unthread the tape if the **STOP** key is pressed while the transport is stopped.

If a device can be armed for recording using the TM-D4000 controls, a circle appears in this position in the list. A solid circle, or circled number, indicate that the **REC** keys above each module **[25]** are used as the track arming/record switches for the remote device. There are 24 module **REC** keys (the last eight of the first layer, and all of the second layer) available for use. As explained at the bottom of the list screen, a circled number indicates which module **REC** keys are used for the device:

Number	Module REC keys	Default for card in expansion slot
①	9 – 16	1
②	17 – 24	2
③	25 – 32	2

If a solid circle is shown, the default **REC** key assignments are made, as shown in the table above. However, this can be changed to a non-default assignment using the **JOG** dial to change the solid circle to the appropriate circled number, and confirming with the **ENTER** key.

NOTE

When the **LAYER STATUS MASTER** *indicator is lit, the module* **REC** *keys have no effect.*

The **ALL SAFE** key **[33]** can be used to turn off the track arming for all tracks for all assigned **REC** keys. While **ALL SAFE** is active, the **REC** keys are disabled, until **ALL SAFE** is turned off again. The recording status that was active before the **ALL SAFE** was turned on is restored when **ALL SAFE** is turned off again.

9.1.4 Machine Control mapping memories

So that commonly-used machine control settings can be stored and recalled easily, the TM-D4000 provides 10 memories of machine control mappings (numbered from 0 through 9).

These memories include: the CHASE setting, the SCR setting and the TRA setting.

An an example of the practical use of this, take the example of three DTRS units connected to a VTR, chasing to timecode supplied by the VTR. Usually, the transport keys will control the VTR, and the **REC** keys will control the three DTRS units. The DTRS units will be locked and chasing the VTR. Sometimes, though, it will be necessary to control the DTRS units directly (through the first DTRS). Recording functions are still assigned to the DTRS units.

These two setups can be stored to two different memories, and recalled instantly as necessary.

To store the current machine control mapping into a memory:

1 **Press and hold down the MACHINE SELECT key [39].**

2 **While holding down this key, also press and hold down the CLR key of the numeric keypad [41].**

3 **While holding down these two keys, press the key of the number keypad corresponding to the memory where the setting is to be stored (0 through 9).**

A pop-up window will appear, showing that the Machine Control Mapping setting has been saved.

NOTE

The machine control screen does not have to be displayed for this operation.

To recall a machine control mapping memory:

1 **Press and hold down the MACHINE SELECT key [39].**

2 **While holding down this key, press the key of the number keypad corresponding to the memory to be recalled (0 through 9).**

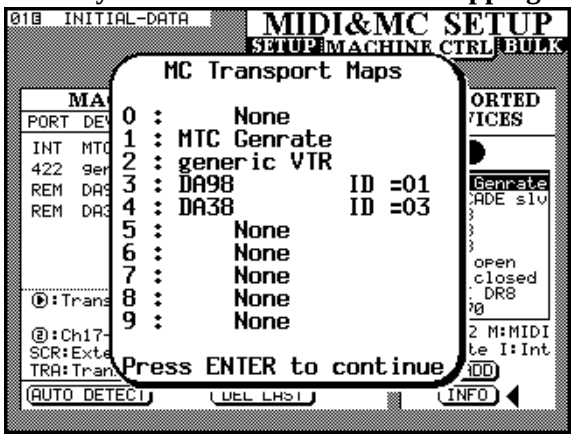
A pop-up window will appear showing that the Machine Control Mapping setting has been recalled.

9.1.5 Showing current Machine Control mappings

1 **Press and hold down the SHIFT key [5].**

2 **While holding this key down, press the MACHINE SELECT key [39].**

The display will show a list of all the currently-stored Machine Control Mappings.



3 **To dismiss this popup list, press the ENTER key.**

9.1.6 Automatically creating a list of machine control mapping memories

When up to sixteen controllers have been added to the machine control list from the list of supported devices, you can create a list of machine mapping memories, each of which provides a transport controller for the different remote devices connected to the TM-D4000, using the following procedure:

1 **Set up the CHASE, SCR and REC fields as needed.**

2 **Press and hold down the SHIFT key [5].**

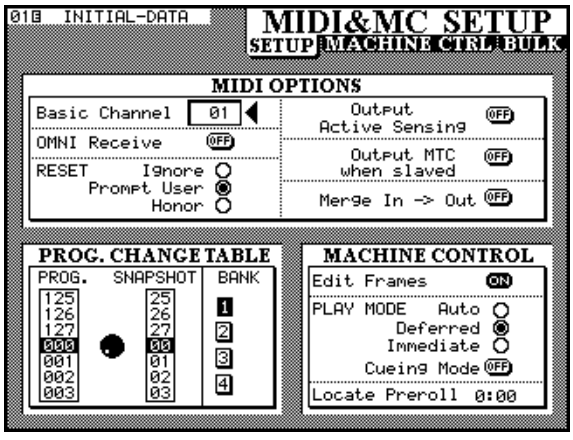
3 **While holding down this key, press and hold down the CLR key [41].**

4 **While holding down these two keys, press the MACHINE SELECT key [39]. The machine control mapping list will be automatically created from the list of machine entries and shown on screen.**

Memory 0 is the current setup, and the other memories are then stored in order following this,

9.2 General parameters

When the **SHIFT** indicator is lit, press the **MIDI/MC** key until the following screen appears:



Use the cursor keys to navigate to the options in the MACHINE CONTROL section, and the **ENTER** key to set parameters.

9.2.1 Edit Frames

When this is set on, location memories, etc. are edited to frame accuracy. When it is set to off, location is made to second accuracy.

9.2.2 Play Mode

This function determines the way in which the **PLAY** key works. There are three settings:, Auto , Deferred and Immediate .

AUTO : The **PLAY** indicator will ash as the unit is locating to a location point. When the location point is reached, playback will start automatically. However, if the **PLAY** key is pressed before the location point is reached, the unit will stop locating and start playing.

DEFERRED : The unit will stop after location is completed. However, if the **PLAY** key is pressed while the unit is locating, the **PLAY** indicator will ash, and playback will start when the location point is reached.

NOTE

Because an open MMC connection cannot determine when the locate point has been reached, deferred play is not possible for a machine controlled in this way. This also applies to ADAT units connected through the IF-LP4000 interface.

IMMEDIATE : The unit will stop after location is completed. If the **PLAY** key is pressed while the unit is locating, the machine will go straight into play mode, without locating.

9.2.3 Cueing Mode

"Cueing mode" here means that if the controlled device is in play mode, and either of the fast transport keys (forward or rewind) is pressed, the fast transport mode is not latched and the unit will be in cue mode (i.e. when the fast transport key is released, the unit will go back into play mode). To latch the unit in the fast transport mode, press the **STOP** key before entering fast transport mode.

A VTR controlled over the RS-422 connection which is put into fast wind with the cueing mode set on will fast wind with the picture visible.

If cueing mode is not selected, when a fast transport key is pressed, irrespective of the current transport mode, the unit will enter the fast transport mode, even when the fast transport key is released.

9.2.4 Locate Preroll

Move the cursor to the numeric eld, which sho ws the pre-roll time when a location point is reached (displayed in minutes and seconds). For example, if this eld sho ws 0:10 , if a location operation is carried out to a location memory of 00:20:32, the actual point located to will be 00:20:22.

Note that this is used only in the case of Direct location 9.3.4, "Location to a location memory", and not in the case of manual location operations (9.3.6, "Manual location"), which will locate to the value entered, irrespective of the pre-roll time set here.

Use the **JOG** dial to set the pre-roll value and conrm the setting of this value with the **ENTER** key.

9.3 Location memories

The TM-D4000 allows the storage and recall of up to ten location memories, allowing easy location of the controlled devices to cue points.

9.3.1 Selecting the location point display

As explained in 3.3.1, "Location display mode", the LOCATE DISPLAY MODE setting in the OPTION SETUP screen is used to determine whether the LED time counter will show the location memories as they are entered, edited and recalled, or whether they will be shown as "popup" panels on the LCD display screen.

When this section mentions "the display" showing location memory values, this refers to the display that has been selected in this option.

NOTE

Depending on the settings for frame display (9.2.1, "Edit Frames"), the frames value may or may not be shown on the display when location memories are being edited, etc.

In the following explanations, the **ENTER** key by the cursor keys **[45]** may be used in place of the **ENT** key by the number keys **[42]**.

9.3.2 Storing a location memory "on the fly"

This procedure allows you to set a location memory, regardless of whether timecode is currently being received or not. If timecode is not currently being received, the value of the location memory will be the last received value as shown on the time counter.

The value on the time counter, regardless of source, will be stored as the location memory. This may be timecode, MTC or an ABS time from a DTRS unit. However, only a controller which is specifically for DTRS use can locate a DTRS unit correctly, if there is an offset or other difference between timecode and the ABS time. If an ABS time is captured, other controllers will assume that this was a timecode value, and will locate the unit to this timecode position.

1. **Press the MEMO key [41]. The indicator will start to flash.**
2. **Press any of the numeric keys, corresponding to the ten location memories available.**
3. **The MEMO indicator will stop flashing and the currently-displayed timecode value will be stored in the location memory.**

9.3.3 Manually entering and editing a location memory

This procedure can be used for editing existing location memories or for adding new ones.

1. **Press the EDIT key. The indicator will start to flash.**
2. **Press one of the number keys to select the location memory which will store the value.**
3. **Enter the timecode value using the numeric keypad. The display will show the value, "filling up" from the right digit towards the left.**
4. **As an alternative to step 3 above, if the EDIT key is pressed again after the location memory number has been pressed, the indicator will start to flash again, allowing the checking and editing of another location memory.**
5. **Press the ENT key [42] or the ENTER key when the timecode value for the location memory has been entered.**
6. **Press EDIT again once to edit another location memory, or press EDIT twice to exit the location memory editing mode.**

   If the CLR key is pressed before the ENT key, a location memory entry which has been made in error will be cleared. Pressing ENT or ENTER will store the cleared memory.

NOTE

All blank location memories are assumed to be timecode memories. Editing one, and attempting to locate using ABS with a DTRS controller will almost certainly result in an unwanted result. It is suggested that an ABS time is captured first and then edited.

It is possible to switch between the capture, edit and location procedures at any time.

9.3.4 Location to a location memory

When the location memories have been entered, they are recalled in the following way:

1. **Press the DIRECT LOCATE key. The indicator will light.**
2. **Press any one of the numeric keys, corresponding to the ten location memories.**
3. **The controlled device will locate to the memory stored in the location memory.**

   What happens next depends on the PLAY MODE setting (see 9.2.2, "Play Mode").

NOTE

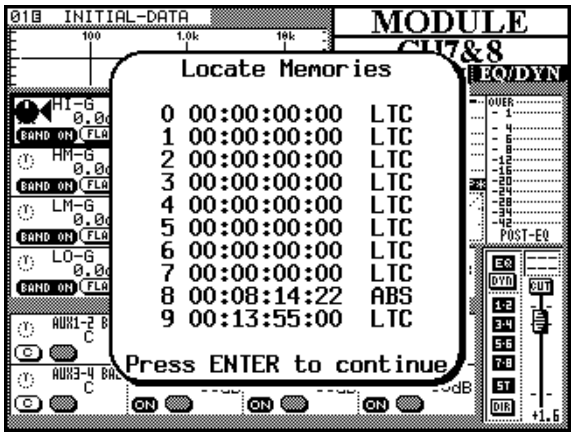
If a pre-roll time has been set (9.2.4, "Locate Preroll"), the controlled device will locate to the location memory point, minus the value set as the preroll time.

9.3.5 Viewing a list of location memories

To view a popup list of all the location memories which have been stored:

1. **Press and hold down the SHIFT key.**

2 **Press the EDIT key.**



The location memory source (timecode or MTC, or ABS) is shown, along with the value of the location memory.

9.3.6 Manual location

It is also possible to enter a location point manually, (from a cue list, for instance) and locate straight to it.

1 **Press the MANUAL LOCATE key so that the indicator lights.**

2 **Use the number keys to enter a number in hh:mm:ss (and optionally frames) format.**

3 **When the ENT or ENTER key is pressed, the controlled device will start to locate to the location point just entered.**

This location point can be stored by pressing the **MEMO** key so that the indicator flashes, followed by the **MANUAL LOCATE** key.

To locate to this point again after storing the location point, press the **MANUAL LOCATE** key, followed by the **ENT** or **ENTER** key.

Note that the pre-roll time (9.2.4, “Locate Preroll”) does not apply here.

9.3.7 Repeat play

Location memories 8 and 9 (accessed with the **8** and **9** keys) are used as the start and end points of a repeat loop that can be played by pressing the **REPEAT 8-9** key **[40]**.

While the controlled device is in repeat mode, the **REPEAT** indicator is lit. The indicator flashes when the location of the controlled device is outside the repeat points.

If point 8 follows point 9, or if the distance between the two points is very short, the behavior of the repeat playback depends on the device which is being controlled.

9.3.8 Auto punch operations

For DTRS units, the three “punch” keys: **RHSL** , **IN/OUT** and **CLEAR [36]** are used in the same way as the corresponding keys on the DTRS unit.

Consult the documentation for the DTRS unit for details of how to perform punch operations.

When punch operations are taking place, the punch-in and punch-out points may be viewed and edited in location memories 4 and 5 respectively. When the **CLEAR** key is pressed to finish punch operations, the original location memories (if any) are restored.

9.3.9 ALL INPUT and AUTO MON

The **ALL INPUT** and **AUTO MON** keys send the appropriate commands to all devices in the list that have the REC function enabled. When the function is active, the key’s indicator will light.

If the controller does not support the function, the indicator will not light.

If a number of controllers have had the REC function selected, some of which do accept this command, and some which do not, the indicator will not light in the majority of cases.

DTRS and ADAT devices can accept this command, as can MMC devices. Some devices controlled using the P2 protocol can accept these commands, but some cannot, depending on the manufacturer’s implementation of the protocol.

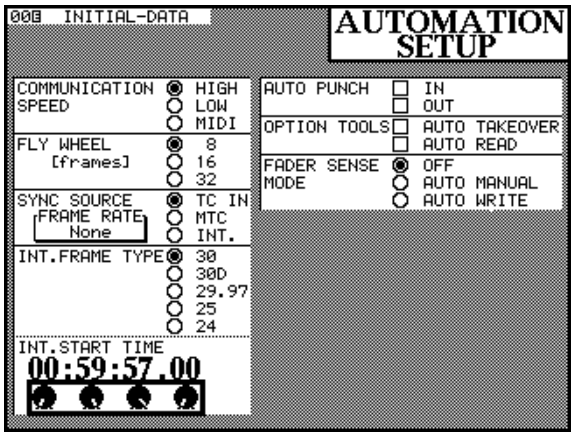
9.4 Notes on individual devices

These following notes apply to the external control screens, etc. for some of the specific devices that may be controlled by the TM-D4000.

9.4.1 MIDI timecode generator

The timecode generator incorporated into the TM-D4000, which outputs MIDI Timecode (MTC) from

the **MIDI OUT** port, is controlled using the Automation Setup screen.



1. **Move the cursor to the SYNC SOURCE panel, and select the timecode type (30fps, 25fps, etc.),**
2. **Select the INT (internal generator) option.**
3. **While this screen is displayed, and the cursor is pointing to this bottom section of the screen, the PODs can be used to set the start time of the internal generator.**

   Alternatively, the numeric keypad can be used for direct entry of the time value, if the memory location functions are not being used (and taking over the use of the numeric keypad).

9.4.2 DTRS devices

Depending on the functionality of the DTRS unit (DA-88, DA-38 or DA-98), different options, such as track delay, dither setting, etc. are available, allowing these menu operations to be carried out easily from the TM-D4000. Consult the documentation of your DTRS unit for full details of these operations.

It is essential that only one unit is connected directly using the **REMOTE OUT** connection from the TM-D4000 and this should be is ID 1 (0 in the case of DA-88). It is suggested that the other units in the chain are numbered in order following this (but this is not essential). Remember that all chains of DTRS units should be terminated.

If the DTRS units are to be word clock slaves of the TM-D4000, the dedicated word clock input of the DTRS unit connected directly to the TM-D4000 should be connected to the word clock sync output (**[76]**) of the TM-D4000, and the clock source set to **WORD**. Subsequent units in the chain will receive their word clock information directly through the REMOTE connections, and do not require dedicated word clock connections.

9.4.3 8mm DTRS

This setting allows the control of a DTRS unit through the RS-422 connection, using the P2 protocol. This may be useful in certain setups where the P2 protocol is being used extensively.

9.4.4 ADAT devices

The **SYNC OUT** connector on the IF-LP4000 is used for controlling ADAT recorders (as selected from the list of available units). No matter how many ADATs are connected, only one SYNC connection should be made from the TM-D4000 to the ADAT chain.

In addition to control information, this also provides a word clock to the ADAT recorder. This is particularly useful when using the TM-D4000 with ADAT models which do not have a dedicated word clock input.

It may take a little experimentation before the best way of providing a word clock to the system is discovered. ADAT models LX20 and XT20 have a “LOCK” indicator which can help determine the most stable configuration.

However, we suggest that ADAT recorders are not used as clock masters.

In addition, the SYNC word source should be used when more than one ADAT recorder is connected (the “lightpipe” clock can cause noise in some chains of ADATs).

Some models of ADAT recorder (e.g. the LX20 and XT20 models) will echo the status of their **REC FUNCTION** keys on the TM-D4000’s **REC** indicators. However, other models will not echo the status of their **REC FUNCTION** keys on the TM-D4000. In addition, other ADAT settings, such as "all input", auto monitor, input source, etc. cannot be read by the TM-D4000.

Also note that it is not possible to add ADAT units while the TM-D4000 is powered on (it is never a good idea to connect and disconnect equipment which is powered on in any case). When adding or removing ADAT units from a chain, we suggest that the ADATs are turned on first, in order to establish their IDs, before turning on the TM-D4000 (and then the monitoring system).

9.4.5 MIDI Controllers and MIDI Faders

These are covered in the section on MIDI, but basically, these two settings (MIDI Controllers and MIDI

Faders) allow the PODs and **MASTER** layer faders respectively to send MIDI Control Change messages to MIDI devices connected to the TM-D4000.

9.4.6 JLC BB3

The J. L. Cooper BB3 transport controller can be connected to the MIDI IN of the TM-D4000 and used to duplicate the transport keys of the console (i.e. pressing the keys of the BB3 will control the external unit currently selected for transport control in the Machine Control List). As well as MMC commands, the BB3 also transmits MIDI Note On and Note Off information for notes 21 through 25 on channel 16 (fixed).

To avoid confusion, therefore, the TM-D4000 will not map these notes on channel 16 to the transport keys, unless the BB3 is added to the list of external devices from the Supported Devices list.

9.4.7 MMC devices

There are two MMC control methods: the first being a closed-loop (`MMC closed`) where the controlled device is sending information back from itself using the MIDI connections, providing an information feedback cycle. Connections should be made from the **MIDI OUT** of the TM-D4000 to the **MIDI IN** of the controlled unit, and from the **MIDI OUT** of the controlled unit to the **MIDI IN** of the TM-D4000, allowing two-way communication.

The second is an open system (`MMC open`), which is closer to a “command and forget” system. No feedback is provided from the controlled device, and the connection is a one-way connection; from the **MIDI OUT** of the TM-D4000 to the **MIDI IN** of the controlled unit.

9.4.8 Cascade slave

This allows control of a slave cascade unit’s transport keys from a master cascade unit. For details of this facility, see 11, “Cascade”.

Any unit which is connected for transport control to a cascade slave will then behave as if the slave’s own transport keys have been pressed to control it.

The TM-D4000 is capable of acting as a MIDI controller as well as responding to Program Change commands. Each Program Change command corresponds to a snapshot which is recalled.

MIDI Timecode (MTC) can be used as the timecode base, and displayed on the time counter.

Library data may be stored to a MIDI bulk ling device using MIDI System Exclusive, and recalled. This includes EQ data, effect and dynamics processor data, as well as snapshot library entries. These procedures are described in 8.1.6, “MIDI dumping and loading of snapshot library entries” and 8.2.5, “Naming a library entry”. See these sections for details of this facility.

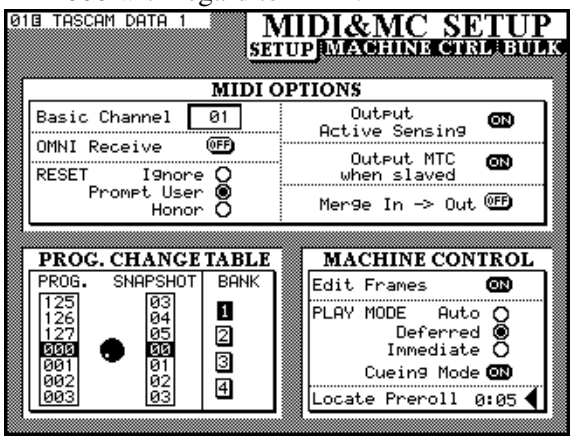
Other parameters may also be stored and recalled by means of MIDI System Exclusive dump commands, and these are explained below.

The TM-D4000 controls can be used to send MIDI Control Change commands through the MIDI OUT, as described here, using one of two methods: the MIDI Controller and the MIDI Fader “external devices”, selected from the Machine Control List.

All MIDI connections to and from the TM-D4000 are made in the standard way, using standard MIDI connectors: the **MIDI IN** accepts MIDI data, the **MIDI THRU** echoes these commands, and the **MIDI OUT** outputs those MIDI commands that originate from the TM-D4000 (there is a soft “through” described below).

10.1 MIDI settings

The following settings affect the operation of the TM-D4000 with regard to MIDI:



Basic Channel : This sets the channel on which the TM-D4000 receives Program Change messages, etc. Use the **JOG** dial or the number keypad, followed by the **ENTER** key, to enter the MIDI channel from 1 to 16.

OMNI Receive : The setting made above can be overridden, so that the TM-D4000 will respond to MIDI messages received on any channel (see the note below regarding the JLC BB3).

In addition to this setting, the Omni Off (B*n* 7C) and Omni On (B*n* 7D) where *n* is the basic MIDI channel) messages are also recognized and interpreted by the TM-D4000.

RESET : If a MIDI Reset messages is received by the TM-D4000, there are three options: the TM-D4000 will Ignore this message (it will be discarded, and not used), the Prompt User setting will produce a popup message when a Reset message is received, allowing the choice of whether the console should be reset or not, and Honor will always reset the console when a Reset message is received.

Output Active Sensing : enables or disables the reception of System Real Time Active Sensing messages (FEh) by the TM-D4000. If Active Sensing is enabled, and the data stream is interrupted, a popup panel appears on the display to inform you of the fact.

Output MTC when slaved : When this is turned on, the TM-D4000 will output MIDI Timecode from the **MIDI OUT**, echoing the current timecode source (as selected in the OPTION screen). If the internal generator is running (as selected by the Machine Control screens), MTC is always output, regardless of the setting made here.

Merge In → Out : This allows the **MIDI OUT** to echo the data received at the **MIDI IN**, merged with the data originated by the TM-D4000. Regardless of this setting, the **MIDI THRU** will only re-transmit the data received at the **MIDI IN**.

Received MTC (including full frame MTC messages) is not merged into the **MIDI OUT**.

NOTE

When a valid dump header is received, merging of MIDI data is turned off until the next power-up. The TM-D4000 supports the MIDI FILE DUMP, as specied in the MIDI 1.0 specications , and because of the handshak-

ing between the units, data merging is turned off here.

10.2 MIDI data dumps

As well as the library entries, as described in the Library section, it is also possible to save and restore the following parameters:

- Program Change Tables (see 10.3, "Program Change commands" below)
- Setup Data (the preferences settings, etc.)
- All data (including library settings, etc.)

The automation communication speed should be set to MIDI (use the **AUTOMATION SET UP** key—shifted **DIGITAL I/O** to edit the automation setup screen) for MIDI bulk transmission and reception. If it is not set when the MIDI bulk dump screen is started, a popup message appears to remind you.

The method for saving and restoring this data is the same as for library entries.

1. **Use the cursor and ENTER keys to select the checkboxes corresponding to the data set to be backed up or restored.**
2. **To dump the data, make any preparations on the receiving device so that the bulk dump data can be received successfully.**
3. **Move the cursor to the** BULK DUMP **button, and press ENTER to start the bulk dump.**

10.2.1 Receiving bulk data

1. **Start the bulk transmission on the MIDI data ling de vice.**
2. **The bulk data is automatically received by the TM-D4000.**

10.2.2 Transferring data between two TM-D4000 units

1. **Connect the two units so that the MIDI OUT of each unit one is connected to the MIDI IN of the other.**
2. **The automation communication speed of the receiving unit should be set to** MIDI **(use the AUTOMATION SET UP key—shifted DIGITAL I/O to edit the automation setup screen).**
3. **Start the bulk transmission on the first TM-D4000.**
4. **The bulk data is automatically received by the second TM-D4000.**

NOTE

It is strongly advised that the TM-D4000 controls are not moved during a dump process, either in or out), as this may affect the successful trasnmission of data. Also note that after a dump transmission, if the faders have accidentally been moved during the transmission, they will return to their original (pre-dump) position as soon as the dump is ended.

10.3 Program Change commands

The TM-D4000 can hold four different tables of Program Changes, only one of which may be active at a time.

These tables are "mappings" of Program Change numbers to snapshot numbers, meaning that a particular Program Change number is used to change to a particular snapshot memory setting. Because the Program Change number does not necessarily correspond to the snapshot number, it is possible for the TM-D4000 to share a MIDI channel with another MIDI device which is also to change programs together with the TM-D4000 (e.g. a MIDI-controlled external effect unit).

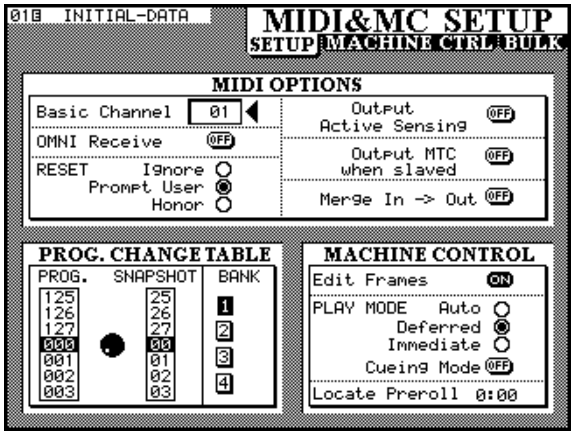
These Program Change messages can be sent at the beginning of a sequence, or part of the way through, to synchronize the settings with the input material. Alternatively, a MIDI controller can be used to transmit the Program Change messages "off-line".

WARNING

A change of snapshot may cause sudden changes in level which, if you are not prepared for them, may result in damage to monitoring equipment. Be aware of these possible level changes when making snapshot changes.

10.3.1Setting the Program Change tables

1 **Use the** MIDI/MC SETUP **screen. The** PROG. CHANGE TABLE **section is at the bottom left:**



2 **Move the cursor to select one of the four banks, and press ENTER.**

3 **Use the JOG dial to scroll through the 128 Program Change numbers (**000 **through** 127**).**

4 **When the Program Change number to be edited is highlighted, use the numeric keypad to enter the value of the snapshot to be associated with the highlighted Program Change number (snapshot numbers less than 10 should be prefixed by a zero).**

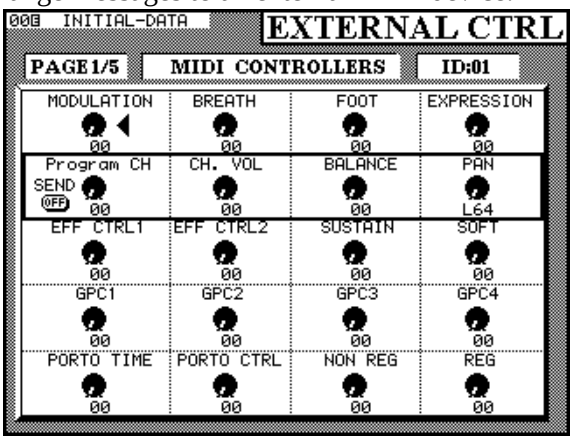
5 **Use the JOG dial and numeric keypad until you havce entered all the Program Change number/snapshot assignments you want to use into the current bank.**

6 **Use the cursor keys to select another bank, if necessary.**

10.4MIDI controllers

One of the remote "devices" which may be set up in the MIDI/MC MACHINE CTRL screen (see 9.1, "Selecting devices for control") is the MIDI Controllers "device".

This allows the PODs of the TM-D4000 to be used as a bank of continuous controllers, sending Control Change messages to an external MIDI device.



The "ID" set in the MACHINE CTRL screen corresponds to the MIDI channel of the device to be controlled.

The names of the controllers correspond to the standard MIDI controller names. Some of these controls are off/off controls, although the POD continuous controls are used to make these settings.

The Program Change POD (left POD, second row) is not, of course, a Control Change message. Instead, turning the knob changes the value of the Program Change number. If the left switch of this POD is used to turn the button ON, the Program Change message is sent as the knob is turned. If the the button is turned OFF, the Program Change message corresponding to the current position of the knob will only sent when the button is turned ON.

The official MIDI specification defines the names of these controllers as follows:

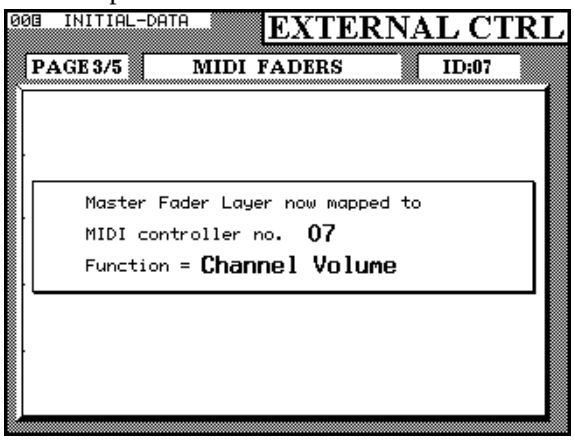
Controller name	Number (decimal)	Number (hex)
MODULATION	1	01
BREATH	2	02
FOOT	4	04
EXPRESSION	11	0B
CH. VOL	7	07
BALANCE	8	08
PAN	10	0A
EFF CTRL 1	12	0C
EFF CTRL 2	13	0D
SUSTAIN	64	40
SOFT	67	43
GPC1	16	10

Controller name	Number (decimal)	Number (hex)
GPC2	17	11
GPC3	18	12
GPC4	19	13
PORTO TIME	5	05
PORTO CTRL	84	54
NON REG (MSB)	99	63
REG (MSB)	101	65

10.5 MIDI Faders

Another “device” which may be selected for external control from the Machine Ctrl screen is the MIDI Faders “device”.

Here, the “Device ID” is a two-digit hexadecimal number, corresponding to a Controller, as defined by the MIDI Specification.



When the external control screen for the MIDI Faders “device” is displayed, as in the example above, each of the channel faders in the Master fader layer is then used to set the Controller value.

Note that the TM-D4000 is constantly monitoring the controller status of the controllers on all 16 channels, so that when the Master faders are selected as the controls for a particular MIDI Controller, they will move to match the current values in the MIDI setup.

The fader numbers (1 through 16) correspond to the 16 MIDI channels. In the example above, since the “ID” of the “device” has been set to 07, i.e. Channel Volume, the sixteen channel faders in the master layer are used as volume controls. Of course, any continuous controller may be selected as the “device ID”, allowing the TM-D4000 to be used as a convenient general-purpose controller for a MIDI setup.

The TM-D4000 recognizes and interprets the Reset All Controllers message (B*n* 79, where *n* is the basic MIDI channel).

The parameters of the internal Control Change map are reset to:

Channel volume	100
Balance	64
Pan	64
Expression	127
All others	0

This message only has any real meaning when the MIDI Faders are being used.

10.6 Sequenced mixing

It is not possible to use a MIDI sequencer to automate the TM-D4000, other than by sending Program Change messages to change snapshots. Use the TASCAM Automation Software for realtime control of the TM-D4000.

10.7 MIDI System Exclusive data formats

Some of the System Exclusive formats data formats used by the TM-D4000 are as follows. However, there are many other System Exclusive messages sent and received by the TM-D4000. If you wish to know the details of these messages, please contact your TASCAM Service Center. The more common messages are listed below:

10.7.1 Device Inquiry

When the following inquiry is received,

Value (hexadeximal)	Meaning
F0h	Status byte
7E	
device ID	01h–7Fh (7Fh = broadcast)
06	
01	
F7h	EOX

the TM-D4000 responds with:

Value (hexadeximal)	Meaning
F0h	Status byte
7E	Inquiry
device ID	00h–7Eh (7F = broadcast)
06	
02	
4E	
07	

Value (hexadeximal)	Meaning
01	
00	
02	
p1	panel firmware version (1st byte)
p2	panel firmware version (2nd byte)
m1	main firmware version (1st byte)
m2	main firmware version (2nd byte)
F7h	EOX

10.7.2Master Volume

The TM-D4000 responds to the following Master Volume System Exclusive command.

Value (hexadeximal)	Meaning
F0h	Status byte
7E	
device ID	00h–7Eh (7F = broadcast)
04	
01	
xx	Volume, between 00 and 127)
F7	

10.7.3Other System Exclusive messages

As well as the System Exclusive messages described above, the TM-D4000 uses the following:

- Device Inquiry messages are sent by the TM-D4000 when the auto detect operation (described in 9.1.2, “Auto-detection of devices”) is taking place, to discover what devices are connected using MIDI. Any devices which are capable of control by the TM-D4000 are added to the list.
- When MTC is selected as the timecode source, the TM-D4000 will receive and display MTC Full Frame messages.
- MTC Full Frame messages may be transmitted by the TM-D4000.
- When the TM-D4000 is emulating a CS-10 controller, it will respond to System Exclusive messages for this J. L. Cooper product. Consult the CS-10 documentation for details of these messages.
- When the TM-D4000 is acting as a controller for some of the devices in the controlled devices list, the messages sent out may be System Exclusive messages which are not mentioned explicitly above.
- Again, when acting as a controller for some of the devices in the list, the TM-D4000 may output MIDI messages such as aftertouch, Program Change, etc. which are not listed here, and are used specifically for the control of those devices.

10.8Updating the system software

The system software of the TM-D4000 can be upgraded without the need for special equipment or personnel.

As upgrades are released (your TASCAM distributor will inform you of their availability), you can add new features to the TM-D4000, including the ability to control other devices using the Machine Control screens of the TM-D4000.

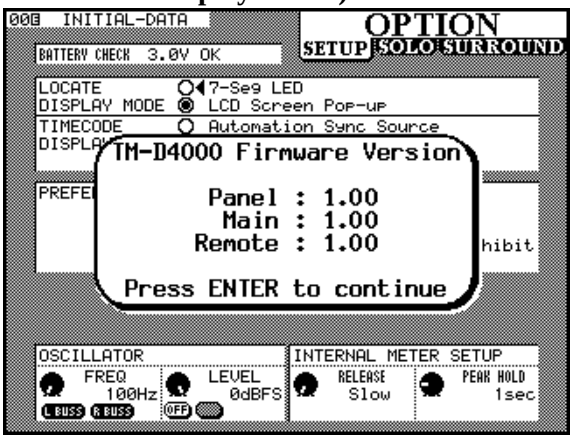
Only transfer files for system update which have been prepared by TASCAM using the method described here.

10.8.1Viewing the current version number

To view the version number of the software currently installed on the TM-D4000:

1 **Press the OPTION key until the SETUP screen is shown.**

2 **Press the DIRECT key (to the right of and below the display screen):**



10.8.2Equipment needed

To upgrade your TM-D4000, you will need the following:

- A MIDI cable.
- A program on your computer that allows you to play MIDI files, together with a MIDI interface.

10.8.3Connections

There is only one connection you need to make.

1) Connect the MIDI OUT of your MIDI interface or sequencer to the MIDI IN of the TM-D4000.

10.8.4Preparing to upgrade

Upgrading the system software will not lose any data, so there is no need to take any special precautions when upgrading.

1) If you have been running the TM-D4000 automation software and you intend to use the computer which runs the automation software to perform the upgrade, quit the automation software.

Macintosh and MacOS users should enable the MIDI interface system Extension if it has been disabled, and restart the computer if necessary.

2) Open the le containing the upgrade le with your MIDI sequencer.

If you are using a dedicated MIDI sequencer, you should transfer the le to the sequencer from your computer using an appropriately-formatted oppy disk.

10.8.5Upgrading

1) Start playing the MIDI le (as if it was a sequence le).

The MIDI data will start to be transferred to the TM-D4000.

2) The display of the TM-D4000 will change to show the number of received data blocks.

3) When the data has been transferred, the TM-D4000 will update its ROM memory and reset itself.

WARNING

Do not turn off the power or interrupt the TM-D4000's updating process while the following message is displayed on the TM-D4000 display screen:

Updating ROMs, please wait

This message will appear as a blinking message for between 20 and 40 seconds after "playback" has nished.

10.8.6Notes on the upgrade process

The update process will take some time. The main portion of the system software will take about 15 minutes to transfer, the panel software will take about 13 minutes, and the remote modules portion of the system software will take about v e minutes.

If the transfer is interrupted part of the way through (for instance, the power is cut to the TM-D4000), when the TM-D4000 is next turned on, a message will appear on the display screen, asking you to make the transfer again.

As noted, you should not interrupt the update process after the transfer of data has ended, and the TM-D4000 is updating its ROM memory.

10.8.7 A note on using sequencer programs

If the computer mouse is moved while the upgrade is under way, there may be problems with the update process. Some computer software is particularly susceptible to input from the keyboard or mouse while "heavy-duty" background processes, such as bulk transfer of MIDI data, are going on

These difculties may include the corruption of the system software, making it impossible to re-start the TM-D4000 and necessitating a change to the ash ROMs by service personnel.

For this reason, once you have started the "playback" of the upgrade software to the TM-D4000, we strongly recommend that you should not touch the computer or any peripherals until the uploading process is complete, as shown on the TM-D4000 display.

The TM-D4000 can be linked in a cascade with to up to three other similar units, providing up to 128 mono channels of input, together with eight stereo inputs.

The stereo outputs of all cascaded console are summed. The eight output busses and the first four Aux sends may also be summed, turning the chain of TM-D4000 units into a modular, flexible recording console. Note that Aux sends 5 and 6 are excluded from the cascade, and hence can be used locally, with the built-in effect processor of each cascaded unit—this provides more flexibility in effect processing.

In the cascade, one unit is designated as the master unit. All aux sends and busses that are being summed are passed through to this master unit and are output from the appropriate connectors on the master.

In addition, a summed output buss is always echoed locally at the outputs of all consoles contributing to the summed buss (this allows more than three MDM units to be controlled by a cascade of TM-D4000s).

Individual busses and aux sends may be excluded from the cascade summing, so that they are local to the unit.

In addition to the signal summing described above, the cascade function also links the following functions of the cascaded units:

- soloing, for both IPS and PFL (5.4, “SOLO”)
- snapshot store and recall (8.1, “Snapshot memories”)
- option settings (3.3, “Option setup”)
- automation setup (automation documentation)
- automation mode (automation documentation)

11.1 Cascade connections

As always, connections should be made with the power to the units turned off.

WARNING

Only use the special TASCAM-supplied cables (PW-4000CS) to make cascade connections. Although computer cables may appear similar, and may even be wired identically, the cables themselves have different electrical characteristics, and damage may be caused to the units if the wrong cables are used.

If the use of cables other than these TASCAM cables causes or results in damage, the warranty is voided.

Slave units are numbered from 1 through 3. This numbering is carried out as carried out below.

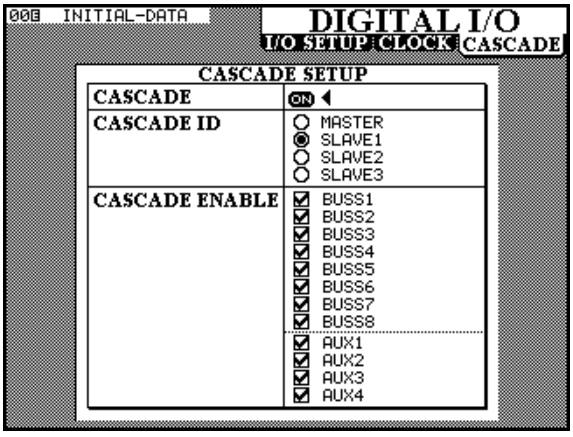
A cascade of TM-D4000 units is a “daisy-chain”; the master unit should be at one end of the chain, with its **CASCADE OUT** connector **[78]** connected to the **CASCADE IN** of slave 1, whose **CASCADE OUT** connects to the **CASCADE IN** of slave 2, etc.

No termination is necessary, but all units in a cascade connection must be turned on and selected as being part of the cascade, even if they are not being used as part of the chain. It is not possible to have a “dead” unit in a chain or to have a unit in the physical cascade chain which does not have the cascade function selected.

1 **If your units have not yet been configured for use in a cascade, turn on and configure the units that will be slaves first, and then turn on and configure the unit that will act as the cascade master.**

2 **On the first slave unit (connected to the master unit) use the** DIGITAL I/O CASCADE **screen to select the** SLAVE 1 **ID for this unit.**

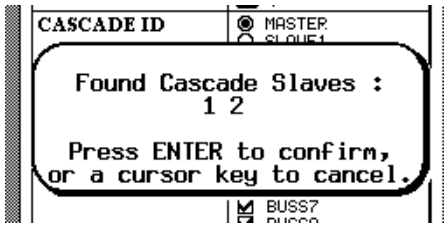
3 **Move the cursor to the** CASCADE ON/OFF **button at the top of the screen, and turn the cascade on for this unit:**



4 **Repeat this procedure for all the other slaves in the chain, assigning the appropriate ID to each slave.**

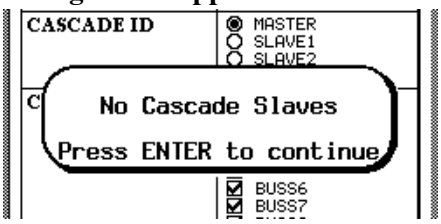
5 **Finally, set the master unit’s ID to MASTER, and turn the cascade ON.**

The master unit will check the connections, and check for the presence of other units in the cascade which have had their IDs set correctly. The screen below will be shown if two correctly-congur ed and connectred slaves are discovered in the cascade.



6 **Press ENTER to continue with the cascade operations, or, if the number of slaves has been wrongly reported, press a cursor key to cancel, check connections and settings, and re-try.**

If no slaves are discovered by the master, the following screen appears:



7 **When ENTER is pressed (in 6 above), the slave units' CLOCK indicators will go out, as the slaves lock their clocks to that of the master unit.**

After the clocks have been set, other internal settings are communicated between the master and slave units. Do not try to add or remove units from the cascade. The following message appears if a cascade connection is broken or a unit is removed (via software) from a cascade while this negotiation is taking place:

When turning on a previously-congured cascade of units, make sure that the master unit is always turned on **last**.

It is not possible to turn the cascade function off on any unit or to turn the power off on a cascaded unit while the cascade is in use. If the power to a slave unit is turned off accidentally, turn the slave off again, and restart from step 5 (turning the master unit's cascade off and on again to re-recognize the existence of the slaves).

The top on-screen button in the DIGITAL I/O CASCADE screen, shown below, is used to turn the cascade on or off. If this is set to OFF, the unit is described as being out of the cascade, even if it is physically connected as part of the chain.

NOTE

Do not attempt to turn the cascade on or off while the initial "negotiation process" is taking place, as described above. If an attempt is made to do this, the cascade setup must be re-started from the beginning. If the cascade function of a slave unit is turned off while the cascade is in operation, the cascade setup process must be re-started from step 5 above.

Every time the units in a cascade are powered off, their cascade status and IDs are memorized. However, so that the master can negotiate the cascade status, it is important that the slave units are turned on rst, allo wing the master to recognize the slave units when the power is turned on. The cascade slaves should be recognized, and **ENTER** pressed to continue using the cascade.

11.1.1Selecting busses for cascade

In the CASCADE screen of a slave unit, it is possible to select the following for cascade through the chain, or to make them local to the unit:

- output busses 1 through 8
- Aux sends 1 through 4

As explained above, Aux sends 5 and 6 may be used with the individual effect processor of each unit, providing greater e xibility in effect processing in a larger system.

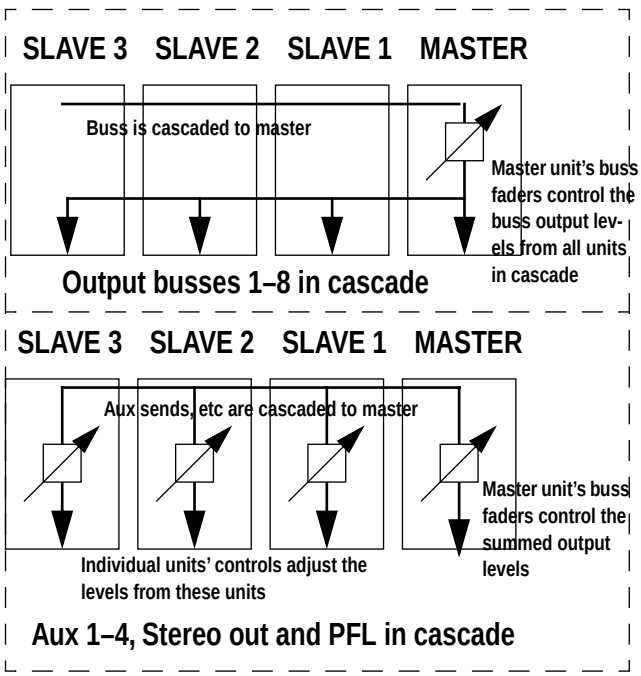
When a buss or Aux send has a check mark beside it (✔), the buss or send is passed through from the unit to the master unit. In addition, the summed eight output busses are output in parallel from all slave units that add their buss to the cascaded summed buss, as well as the master unit.

NOTE

The buss master controls on a slave unit have no effect on the levels of cascaded busses.

However, the individual slave controls may be used to control the level of the **STEREO OUT***, the first four Aux sends and the PFL busses from the slave units, but this will have no effect on the overall summed level of the Aux send or stereo buss, etc.*

See the diagram below for details of the buss summing and fader controls available for these cascaded busses.



11.1.2Word sync in a cascade

The slave units all take their clock automatically through the cascade connection from the master unit.

Only one sampling frequency (that of the master) is available in a cascade—it is not possible to mix 44.1 kHz and 48 kHz operations in one cascade.

The master unit itself can take its clock from any source (except cascade, of course), including its own internal clock. Note that if there are digital recorders attached to more than one unit in the cascade, these should probably be set to take their clock from the master TM-D4000 unit in the cascade.

11.2Using the cascade

The following explains the functions available in a cascade of TM-D4000 units:

11.2.1Level settings

The controls on slave units which normally control the output buss levels have no effect on the overall level of the cascaded busses output from the master unit.

Even though an output buss is output in parallel from the master and a slave unit simultaneously, the slave buss fader will have no effect on the level of the buss output from the slave.

Likewise, although the level of the individual Aux sends, PFL and **STEREO OUT** which are output from a slave unit can be set from the slave unit itself, the settings made on the slave unit will have no effect on the level output from the master. It is necessary to use the master buss fader to adjust these levels.

In this way, the cascade function differs from a post-fader "sub out" that is sometimes found on analog consoles.

11.2.2Option settings

When the cascade is first set up, the master unit's option settings (3.3, "Option setup") are copied to all slave units.

These settings may be changed later on any of the units in the cascade, and the changes will be reflected throughout the cascade.

11.2.3Automation settings

Settings made in the `AUTOMATION SETUP` screen will be copied from the master unit to slave units when the cascade is first set up.

These settings may be changed later on any of the units in the cascade, and the changes will be reflected throughout the cascade.

11.2.4Monitoring

Only the master unit's **MONITOR SELECT** keys **[22]** have any effect.

Pressing the **MONITOR SELECT** keys on any of the slave units will have no effect, as the **C-R** output from a slave is not the summed buss.

11.2.5Soloing (PFL)

When the PFL solo mode is selected, pressing the **SOLO** key on any of the cascaded units will replace

the monitor signal on the master unit with the PFL signal.

The **PFL** indicators on all units will flash, showing that a PFL signal is currently being monitored. The indicators will go out (and monitoring will revert to the monitor source selected on the master unit) when all PFL solos are cleared on all cascaded units.

11.2.6Soloing (IPS)

When the IPS solo mode is selected, soloing a channel on any console will mute all other channels on all other cascaded units, unless they have been solo defeated (see 5.4.1, “Inplace solo defeat”).

The solo defeat function is set for each unit in the cascade independently.

11.2.7SOLO all clear

When a number of channels are soloed, including channels on a number of different units in the cascaded, the soloing can be cleared from any unit in the chain, following the procedure described in 5.4.4, “To clear all soloed channels” (press and hold down the **CLR** key of the numeric keypad and press any channel’s **SOLO** key).

11.2.8Snapshot library functions

When a snapshot is recalled from any unit in the cascade (see 8.1.2, “Recalling a snapshot”), all units in the cascade will attempt to recall snapshots with the same number.

If no data has been previously stored to the snapshot memory, a unit attempting to recall the snapshot will display the appropriate message.

When a snapshot is stored, using any unit in the cascade (see 8.1.3, “Storing a snapshot”), the current settings will be stored on all units in the cascade. The existing snapshot memories in that memory location are automatically overwritten in all units other than the one from which the store operation was requested.

If store operation is to be confirmed on the unit from which the store operation was requested (i.e. the snapshot data will overwrite an existing library entry), no data will be overwritten in the other units until the **ENTER** key is pressed to confirm the overwrite operation.

When a snapshot is named from a unit in the cascade, that name will be copied over the cascade, so that all units in the cascade will use the same name for that snapshot number.

Snapshot undo and redo functions (see 8.1.2, “Recalling a snapshot” also work for all units in the cascade, if performed from any unit in the cascade chain.

11.2.9Talkback in the cascade

Pressing the **TO SLATE** key of any unit in the cascade will activate the talkback microphone of that unit, routing the microphone to slate, and will also dim the **CR** outputs of the master unit.

However, pressing either the **STUDIO** or the **TO AUX 1-2** key of a slave unit only outputs the signal of the slave’s talkback microphone from the slave’s outputs (which will almost certainly not be connected to the monitoring systems).

Accordingly, the master unit is effectively the only unit in the cascade where the **STUDIO** and the **TO AUX 1-2** keys can be used.

This section explains the different parts of the front panel of the TM-D4000.

Within this section there are also detailed explanations of some system conguration, etc. procedures, which are linked to particular controls. In particular, explanations are given for the conguration k eys, which are located to the left of the display screen.

12.1 System controls, etc.

These keys and indicators provide access to functions that control the whole of the TM-D4000 system. They include controls for automation, fader-to-channel layers, library functions, conguration and general mixer controls.

[1] Clock and Fs indicators

This section consists of indicators giving the current word clock status of the TM-D4000.

These **Fs** indicators show the sampling frequency currently being used by the TM-D4000, either **48k** or **44.1k**.

If the sampling frequency from the selected clock source is out of range, or is not available, the appropriate **CLOCK** indicator will ash.

The sampling frequency may either be internally generated, or derived from an external source. See 3.2, “CLOCK setup” for details.

These **CLOCK** indicators show the source of the word clock currently being used by the TM-D4000: either **INT** (internal), **SLOT** (taken from one of the interface cards tted in the e xpansion slots, **D-IN** (from one of the stereo digital input ports) or **WORD** (from the dedicated word clock connection).

[2] Automation control

This section consists of indicators and controls, mainly associated with automation procedures (automation requires an external computer system connected to the TM-D4000, and is explained in the Automation Manual).

The automation mode keys are the **WRITE** key, **UPDATE** key, **READ** key and **MANUAL** key. Each one has an associated indicator.

As well as the above keys, there is also an **ALL** key (used to select all modules for a particular mode).

[3] LAYER STATUS keys and indicators

These three keys allow the selection of the fader layer (for further details, see 2.4, “Fader layers”).

NOTE

The **ST IN 1**, **ST IN 2** *and* **STEREO OUT** *faders always control the stereo inputs and the master stereo output buss, regardless of the current* **LAYER STATUS** *setting, unless the option in the* AUX *screen to use faders as channel Aux sends in the* **1-16** *and* **17-32** *layers is selected (see* **[7]***). In this case, both* **ST IN** *faders will control the appropriate Aux send from the stereo inputs. The* **STEREO OUT** *fader will always retain its function.*

[4] Library

These keys control the storage and recall of the built-in libraries.

The TM-D4000 stores the following internally:

Snapshots (all digital settings)	1 pre-set “nominal” setting; 60 user settings
Effector (internal effect processor)	51 pre-set settings, 77 user settings
EQ (channel equalization settings)	20 preset settings, 80 user settings
Dynamics (channel compression and gating)	20 pre-set settings, 80 user settings

All library entries may be dumped and restored using MIDI System Exclusive protocols.

Full details of the operation of library functions are given in 8, “Library functions”. A brief description of the library-related keys is given here, however.

The auto-repeating **+** and **–** keys are used to increment and decrement the snapshot library entry number shown in the top left of the display. The number of a snapshot library entry which has not yet been recalled will always be shown in inverse video.

The **STORE** key stores the current console settings into the snapshot library entry which is shown on the top left of the display.

The **RECALL** key recalls the snapshot library entry shown on the top left of the display, and set the console parameters to match the values stored in the snapshot library entry.

The **SNAPSHOT** key brings up the SNAPSHOT library screen, allowing management and naming, etc. of snapshot library entries.

The **EFFECT** key brings up the EFFECTOR library screen, allowing management and naming, etc. of effect processor library entries.

The **EQ** key brings up the EQ library screen, allowing management and naming, etc. of equalization setting library entries.

The **DYNAMICS** key brings up the DYNAMICS library screen, allowing management and naming, etc. of dynamics processor library entries.

[5] Conguration ke ys

These keys are used to make conguration changes and settings to the TM-D4000 system. These keys are all "shiftable", i.e. they have two functions, as determined by the **SHIFT** key. This is explained in 2.3.1, "Selecting screens".

The **GROUPING – ST LINK** key is used to assign fader and cut groups, and make stereo links, as described in 4.9, "Fader and cut groups" and 4.2, "Stereo linking".

The **EXT.CTRL – MIDIMC** key is used to view and set parameters related to MIDI functions of the TM-D4000 and external machine control.

In unshifted mode, it is used to perform control functions specic to the e xternal device selected for such control.

These functions are discussed in the appropriate sections (9, "Machine Control" and 10, "MIDI").

The **OPTION – DELAY** key is used to set system options (see 3, "System setup") and (shifted) to set buss delays.

The **DIGITAL I/O–AUTOMATION SET UP** key allows the setting up of the word clock, digital inputs and outputs, and cascade settings. See 3.2, "CLOCK setup", 3.1, "I/O setup" and 11, "Cascade" for details. Automation setup, as explained in the Automation manual (as well as the MTC generator operation—see 9.4.1, "MIDI timecode generator") is also performed using this key).

12.2 Mixing keys

NOTE

This block of keys is the "heart" of the TM-D4000. These keys provide the methods to perform the usual operations carried out on analog consoles (EQ, aux sends, assignments, etc.) as well as the specialized functions which are only possible with the TM-D4000 (internal effector, dynamic processing, etc.). Make sure that you familiarize yourself with the operation and functions of these keys—you will probably nd y ourself using this section more than any other part of the TM-D4000. See 4, "Module operations" for details.

These keys are all used to bring up screens which control the mixer functions of the TM-D4000 through the display screen and the PODs. For the most part, these are dedicated, single-function keys, but in some cases, repeated presses of a key will bring up different, but related screens.

[6] FADER POSITION key

This key may be used when to view the position of the faders (see 4.10, "Checking fader and cut status").

[7] AUX 1 through AUX 6 keys

These keys all provide similar functions for the six Aux buss sends. The only difference between the Aux busses is that busses 1 and 2 can be selected to be pre-or post-fader, while the other busses are all post-fader only. See 4.5, "Aux sends".

[8] PAN/BAL–SURROUND key

This key provides a way in which many channels can have their pan (and balance, in the case of stereo linked pairs) viewed and adjusted (see 4.7, "Pan and balance").

If a surround mode has been selected (see 6, "Surround modes"), pressing this key brings up a screen allowing the viewing and adjustment of the channel's position in the surround image.

[9] MODULE key

This key allows the setting of many parameters affecting one input channel or a stereo pair of input channels. The stereo inputs and the **STEREO OUT** module may also be selected for viewing and editing using the screens here. See 4, "Module operations" for details.

NOTE

Equalization is a module-only setting—there is no global "EQ" key.

[10] ASSIGN key

Allows the modules to be assigned to the eight output busses as well as to the stereo output buss and to the direct outputs. See 4.4, “Channel-to-buss assignments” for details.

[11] DYNAMICS key

This key allows the setting of the dynamics processor currently assigned to the selected channel(s).

See 4.6, “Dynamics processor settings” for details.

[12] PAD/Φ

Sets the digital (not analog) pad and phase parameters for modules. See 4.8, “Pad and phase(Φ)” for details.

[13] EFFECT key

This key brings up a screen which allows the editing of the current effector settings.

The parameters which may be set here vary, depending on the effector currently selected, and are described in detail in 7, “Internal effect processor”.

12.3 Display and POD s

This section is described in more detail in 2, “Principles of operation”. See this section for further details of POD operations, etc.

[14] Display screen

This backlit LCD screen has a resolution of 320 x 240 pixels.

Adjust the contrast (viewing angle) with the contrast control **[17]**.

[15] PODs

Each POD consists of a continuous rotary encoder (knob) and two switches.

All or part of a POD may be active or inactive, depending on the context

[16] ROW CURSOR keys

Use these auto-repeating keys to move the “highlight box” up and down the displays in order to change the functions of the PODs.

[17] Contrast control (◑)

Adjust the viewing angle (contrast) of the display screen with this control.

12.4 Module control keys

These dedicated function keys are typically used with the MODULE and ASSIGN screens in order to set buss assignments, etc.

[18] EQ key

This key bypasses the equalization processing for the selected module or pair of modules.

This key can be used with any of the channel inputs, including the stereo inputs, and the stereo master.

[19] DYNAMICS key

This key is used to bypass the dynamics processor for the selected module or pair of modules.

This key can be used with any of the channel inputs, including the stereo inputs, and the stereo master.

[20] BUSS ASSIGN keys

These keys (**BUSS 1-2 (SURROUND)**, **BUSS 3-4 (SUB)**, **BUSS 5-6** , **BUSS 7-8**, **STEREO** and **DIRECT OUT**) change the assignment status of the selected channels or pairs of channels to the appropriate output busses. See 4.4, “Channel-to-buss assignments” for details.

In surround mode, the first key (**SURROUND**) assigns the channel to the surround busses, and the second key (**SUB**) assigns the channel to the sub (if the surround type supports a separate sub channel). See 6, “Surround modes”.

These keys can be used with any of the channel inputs, including the stereo inputs.

12.5 Monitor control keys and meters

This section is connected with the monitoring functions of the TM-D4000: the control-room monitoring, studio and phones monitoring, and talkback.

The following controls, etc. are all located on the angled front panel of the TM-D4000.

[21] Meters

These meters show the level of the current signal being monitored, as selected with the monitor select keys.

NOTE

When working with analog equipment, the nominal analog signal level (either +4 dBu or

–10 dBV) corresponds to a reading of –16 dB (relative to full-scale), which is represented here as –16 dBFS). This factory value may be changed by authorized TASCAM service personnel only to either –20 dBFS or –9 dBFS. Contact your TASCAM dealer for details.

The top of the scale represents overload (over full-scale). Unlike an analog meter reading of 0 or a "plus" value, which are relative to a nominal signal level, digital overload results in harsh distortion and clipping. Take care that the top **OL** meter segment does not light, even in the loudest parts of the program.

NOTE

The way in which digital equipment meters are calibrated varies between different manufacturers. While a reading of OL or OVER will be the same on all TASCAM equipment, there is no guarantee that identical readings will be produced on equipment from other manufacturers. Be aware of the possible discrepancies between meter readings on different pieces of equipment in your setup.

[22] Monitor select keys and indicators

These keys (**AUX1**, **AUX2**, **AUX3**, **AUX4**, **AUX5**, **AUX6**, **D-IN1**, **D-IN2**, **2TR** and **STEREO**) are used to select the signals which are routed through the monitoring system. These correspond to the six AUX buss sends, the two digital inputs, one of the two analog 2-track mastering recorders (selected with the **2TR RTN 1/2** switch **[62]**) and the STEREO OUT.

The meters show the level of the selected monitor source(s), except for the analog **2TR** selection.

[23] PFL and IN PLACE indicators

The appropriate one of this pair of indicators shows the status of thr currently-selected solo mode (from the `OPTION SOLO` screen (see 5.4, "SOLO"). **PFL** flashes when pre-fade listen mode is selected and a channel is being soloed. **IN PLACE** lights whenever in-place soloing is selected.

[24] TO SLATE and TO AUX 1-2 keys and indicators

These keys allow the routing of the signal from the integral talkback microphone to the slate (the stereo output buss and the eight output busses) and the Aux 1/2 busses. See 5.1.3, "Talkback".

12.6 Chs 1–16, 17–32, Aux & buss send masters

Each mono input module has identical facilities and controls, regardless of whether it is being used as an input channel or a tape return.

Note that the majority of the operations which affect a channel are performed using the PODs and the display screens as described in 4, "Module operations".

[25] REC key and indicator (modules 1–16)

If an external machine is connected and has been selected for remote track arming control through the TM-D4000 (see the section on external machine control for details of how to achieve this), these keys and indicators are used to set and display the track arming and recording status of the external machine.

The **ALL SAFE** key **[33]** can be used to turn off the recording status of all tracks.

Note that the status of the keys and indicators changes according to the active fader layer, and is set up on the `MIDI & MC SETUP MACHINE CTRL` screen.

[26] SEL key and indicator

This key and indicator are used to select the module for editing, etc. using the display screens. They are also used in grouping, etc. to select the channels which are part of a group (4.9, "Fader and cut groups") and for the stereo linking of modules (4.2, "Stereo linking").

When a module, or pair of modules linked as a stereo pair is selected, the appropriate **SEL** indicator(s) will light.

[27] SOLO key and indicator (mono input modules and ST IN modules)

This key and indicator are used to solo the input module in the appropriate mode, as selected in the `SOLO` options (5.4, "SOLO") and shown on the solo indicators **[23]**.

When the active fader layer is the **MASTER** layer, pressing the **SOLO** keys will have no effect, except on the **ST IN** modules (output busses and Aux sends cannot be soloed).

[28] CUT key and indicator

This key and indicator are used to cut the signal from the input channel to all output busses, the **STEREO**

OUT, the direct out (where appropriate) and all post-fader Aux busses.

When the active fader layer is the **MASTER** layer, pressing the **CUT** keys will cut the output busses and Aux sends.

If Aux busses 1 and 2 have been selected as being pre-fader, and the **CUT** key of a module is pressed, signals will still be sent to Aux busses 1 and 2.

The **CUT** indicators are also used to show inplace solo status (all channels except the soloed channels will be cut).

[29] READ. WRITE, UPDATE indicators

These indicators are used to show the current status of the module when console automation is in progress, using an external computer.

[30] Layered faders

These faders are usually used to control the level of the signal of the module's current channel, Aux send or buss, as selected by the **LAYER STATUS** keys **[3]**, hence the name "layered faders".

When the faders are "full up", +10 dB of boost is provided. In the "full down" position, the signals are completely attenuated.

The AUX screens (4.5.2, "Using AUX keys to set send levels") also contain an option to use the faders to control the level of the signal sent from the channels to the Aux buss.

The faders are motorized, but when playing back automated mixes from an external computer, motorization may be turned off (2.4.1, "Turning fader motors on and off").

12.7 Stereo input and stereo masters

[31] ST IN & 2 faders

These faders are usually used to control the level of the signals received at the **ST RTN** jacks **[55]**, as a stereo pair. Note that if a connection is made to the **L** jack only of one of these pairs, the channel will be a mono channel.

When the faders are "full up", +10 dB of boost is provided. In the "full down" position, the signals are completely attenuated.

The AUX screens also contain an option to use these faders to control the level of the signal sent from the channels to the Aux buss (4.5.2, "Using AUX keys to set send levels"). This is the only occasion in which these faders do not control the levels of the stereo inputs, regardless of the fader layer.

Like the channel faders, these are motorized faders, and subject to the same restrictions and limitations as them.

[32] STEREO OUT fader

This fader is used to control the level of the stereo output buss (both channels).

When the fader is in the "full up" 0 position, the level of the stereo output is not attenuated. For example, if a signal is input to one channel at nominal level, and the channel fader is at the nominal level (0), and routed to the stereo outputs with the STEREO fader at 0, the stereo outputs will be at nominal level.

When the fader is in the "full down" position, the stereo signal is fully attenuated.

[33] ALL SAFE key

This key is used to turn off the track arming and recording status for any external devices whose track arming function is controlled by the TM-D4000. See also the **REC** key description **[25]**.

12.8 Machine control

The machine control section allows for control of the external devices connected to the TM-D4000 and selected for control.

The exact degree of control depends on the device and on the settings made, and is described more fully in the appropriate section on Machine control.

However, a brief guide to the controls is given here, for reference. Where appropriate, you should read the documentation provided with the external unit for an in-depth explanation of some of the topics which are covered briey in this manual.

[34] TC/LOC indicators

Used to show whether the time counter **[35]** is currently displaying the timecode received from the timecode source, or is showing a location position if the appropriate Locate Display

Mode has been set (see 3.3.1, “Location display mode”).

[35] MDM LOCK indicators and time counter

These three indicators (**1**, **2**, **3**) are used to show the running status of DTRS or ADAT units, etc. (Modular Digital Multitrack) connected to the TM-D4000. The numbers refer to the units connected to the interface cards fitted in slots 1, 2 and 3 respectively.

The time counter shows the timecode from the specified source, to frame accuracy, or the current location memory (as shown by the **TC/LOC** indicators **[34]**.

The options relating to this counter (timecode source, etc. are set with the OPTION SETUP screen (see 3.3, “Option setup”).

[36] Punch keys and indicators

Typically used with the DTRS family of recorders, the **RHSL**, **IN/OUT** and **CLEAR** keys duplicate the **REHEARSAL** key, **AUTO IN/OUT** (or **AUTO PUNCH**) and **CLEAR** keys on the remote units. See the documentation for the remote units for details of how to use these keys.

[37] ALL INPUT key

Provides input monitoring for all tracks on the selected unit(s).

[38] AUTO MON

Provides automated switching between input and off-tape monitoring.

[39] MACHINE SELECT

This key is used with the numeric keypad in order to select a machine control memory mapping (see 9.1, “Selecting devices for control”), etc.

[40] REPEAT 8-9 key and indicator

Used with the external units to repeat playback between location memories 8 and 9.

[41] MEMO, MANUAL LOCATE, EDIT, DIRECT LOCATE, CLR keys and indicators and numeric keypad

Used to control the input and recall of timecode memory location points for location control of external units as described in 9.3, “Location memories”.

[42] ENT key

Used to confirm entries made using the numeric keypad **[41]**. It may also be used in place of the **ENTER** key **[45]** under certain circumstances, to confirm settings made on the main display screen.

[43] Transport keys and indicators

The exact function of these transport keys and indicators depends on the device currently selected for external control (see 9, “Machine Control” for details of external device control).

For instance, if the device selected for external control is the internal MTC generator, the **REC** key will have no effect.

Again, depending on the unit, the fast forward and rewind keys may or may not have an additional use as cue and review keys when combined with other transport controls, depending on the setting of the “cueing mode” (see 9.2.3, “Cueing Mode”).

12.9 Data entry section

[44] JOG/SHUTTLE key, indicator, dial and wheel

The key is used to change the function of the **JOG** dial and **SHUTTLE** wheel between transport and data entry functions.

When the indicator is lit, these controls act as transport controls. The exact way in which they function naturally depends on the device being controlled.

When the indicator is not lit, these controls may act as data entry controls. The **JOG** dial is used to change on-screen values, and the **SHUTTLE** wheel is used to change the active area in certain screens (e.g. librarian screens).

[45] ENTER key

Used to confirm entries made using the **JOG** dial, when used as a data entry control.

It may also be used in place of the numeric keypad **ENT** key **[42]** to confirm timecode location settings, etc. and is also used as a “confirm” key to confirm settings in pop-up menus, etc. as well as turning on-screen switches on and off, and selecting from on-screen “radio button” lists.

[46] Cursor keys

These auto-repeating keys are used to navigate the cursor around the display screen, so that the parameter pointed to by the cursor may be edited.

This section describes the rear panel connectors of the TM-D4000.

All rear panel connections on the TM-D4000 are digital or control connections. The analog connections are all provided on the top of the unit, and are described in 12, “Front panel”.

13.1 Analog inputs

These features (all on the horizontal top panel of the TM-D4000) are provided for input channels 1 through 8. Some of these features also apply to the two **ST IN** channels.

[47] MIC input (channels 1–8)

These XLR-type connectors provide inputs suitable for balanced microphones, etc. to be connected to the TM-D4000.

They are wired as follows: 1=ground, 2=hot, 3=cold.

With the **PAD [51]** off, the nominal input level for these connectors is –50 dBu. Using the channel’s **TRIM** control, this can be adjusted between levels of –67 dBu and –20 dBu.

With the **PAD** on, the nominal input level is –20 dBu. The channel’s **TRIM** control can be used to adjust the value between –41 dBu and +6–dBu.

The input impedance level is 2.4 kΩ.

Phantom power is available for these connectors. It is turned on and off for two blocks of input channels (1–4 and 5–8) using the **PHANTOM (+48V)** switches **[54]**.

WARNING

Connection of microphone cables and microphones: to prevent hazard or damage, ensure that only microphone cables and microphones designed to the IEC 268-15A standard are connected.

Connexions des microphones et de leurs câbles: pour éviter tout endommagement, s’assurer de brancher uniquement des microphones et des câbles de microphones conçus selon la norme IEC 268-15A.

[48] LINE IN (BAL) input (channels 1–8)

These 1/4-inch balanced inputs are used to accept analog line-level sources.

These are wired: tip=hot, ring=cold, sleeve=ground.

The nominal input level is +4 dBu, adjustable using the **TRIM** control from between –39 dBu and +8 dBu.

No phantom power is supplied to these connectors.

[49] INSERT connector (channels 1–8)

These 1/4-inch TRS (tip-ring-sleeve) connectors are used to provide an insert loop for the eight integral analog inputs.

These are wired as follows: tip=send, ring=return, sleeve=common ground.

The nominal signal level of both the send and return is –2 dBu. The impedance of the send is 100 Ω and that of the return is 10 kΩ.

The insert send occurs post-**TRIM [52]**. The insert return is located immediately before the **O/L** indicator **[53]**.

[50] LINE switch (channels 1–8)

When this switch is pressed in, the channel’s input is taken from the 1/4-inch balanced **LINE IN (BAL)** inputs **[48]**.

When this switch is in the out position, the channel’s input is taken from the XLR-type balanced **MIC** connector **[47]**.

[51] PAD switch (channels 1–8)

When this switch is pressed in, it provides 20 dB of attenuation to any signals received at the **MIC** connectors (**[47]**).

This is unconnected with the digital PAD control provided as part of the MODULE screens (see 4.8, “Pad and phase(Φ)”).

[52] TRIM control (channels 1–8 and ST RTN 1 and 2)

On the eight input channels and the two stereo inputs, this **TRIM** control is used to adjust the input signal level by a range of 47 dB.

When it is turned fully counterclockwise, full trim is applied. Turning the knob clockwise increases the signal level fed to the channel’s A/D convertor.

[53] O/L indicator (channels 1–8)

This red LED lights when the post-**TRIM**, post-insert return signal exceeds –3 dBFS.

This LED should light only on the very loudest part of program material, since there is only 3 dB of headroom remaining when it lights.

[54] PHANTOM (+48V) 1–4 & 5–8 switches

When turned on, these switches provide +48 V phantom powering to the XLR-type **MIC** connectors **[47]** on the eight integral analog input channels, for powering condenser microphones.

WARNING

Make sure that these switches are not turned on if equipment which does not require phantom power is connected to these jacks, and if the **MIC** *input is selected* **[50]**.

[55] L (MONO) & R inputs (ST IN 1 & 2)

These unbalanced 1/4-inch jacks are used to accept signals coming from external signal processors, etc., and the levels are controlled by the two **ST IN** faders.

The nominal signal level of these inputs is +4 dBu, and the input impedance is 10 kΩ. The level can be adjusted using the **TRIM** control **[52]**.

If only one signal is to be input to these channels, the **L (MONO)** jack should be used for connection.

13.2 Analog outputs, etc.

These connectors are all located on the horizontal top panel of the TM-D4000.

[56] AUX OUTPUTS

These six unbalanced 1/4-inch jacks provide the outputs from the six Aux busses available on the TM-D4000. The level of these busses is controlled by faders 9 through 14, when the **LAYER STATUS MASTER** indicator **[3]** is lit. The nominal level is +4 dBu, and the impedance is 100 Ω.

The individual channel Aux send levels are set either in the MODULE or the AUX screens.

NOTE

Aux sends 1 and 2 can be selected to be pre- or post-fader, and can also have the talkback mic routed directly to them. For these reasons, you may wish to use these as studio headphone feeds when recording, using them to set up a separate monitoring mix, and use them as effect sends on mixdown.

[57] 2TR RTN (BALANCED)

This pair of balanced XLR-type connectors is used for the analog returns from a 2-track mastering recorder.

The nominal signal level of these inputs is +4 dBu, and the input impedance is 20 kΩ.

[58] 2TR RTN (UNBALANCED)

This pair of unbalanced RCA inputs is used for the analog returns from a 2-track mastering recorder.

The nominal level of these inputs is –10 dBV, and the input impedance is 20 kΩ.

[59] STEREO OUTPUTS (UNBALANCED)

This pair of RCA connectors outputs the stereo OUT as an analog signal.

The nominal level of these unbalanced outputs is –10 dBV, and the output impedance is 600 Ω.

[60] STEREO OUTPUTS (BALANCED)

This pair of XLR-type connectors outputs the stereo OUT as an analog signal.

The nominal level of these balanced outputs (1=ground, 2=hot, 3=cold) is +4 dBu, and the output impedance is 75 Ω.

[61] MONITOR OUTPUTS (CR and STUDIO)

These two pairs of 1/4-inch connectors output the signal selected using the monitor select keys **[22]**. The signal output selected by these keys is identical in each set of connectors, but the volume can be adjusted individually for each set (**[63]** and **[65]**), and the talkback mic **[70]** is routed directly to the **STUDIO** outputs.

In addition, the control room output can be dimmed, and can be put into mono (see below).

These are balanced outputs, with tip=hot, ring=cold and sleeve=ground.

The nominal level is +4 dBu, and the output impedance is 100 Ω.

13.3 Talkback

The talkback controls are all located on the top panel of the TM-D4000, at the right side. For more information regarding talkback, see 5.1.3, “Talkback”.

[62] 2TR RTN 1/2 switch

This switch is used to select which of the 2-track mastering recorder inputs (**[57]** and **[58]**) is used when the **2TR** monitor select key **[22]** is active.

When this switch is pressed in, the balanced XLR-type inputs are active, and when out, the unbalanced RCA inputs are active.

[63] CR LEVEL

This is used to control the level of the signal selected using the monitor select keys **[22]** sent through the pair of **CR** output jacks **[61]**.

[64] DIM key and indicator

This switch is used to "dim" (attenuate) the level of the **CR** output by 30 dB. When the CR output is dimmed, the indicator is lit.

[65] STUDIO/PHONES level

This is used to control the level of the signal selected using the monitor select keys **[22]** sent through the pair of **CR** output jacks **[61]** and also through the **PHONE** jack.

[66] MONO key

This latching key puts the **CR** output into mono. It has no effect on the **PHONE** output or the **STUDIO** outputs.

[67] TB LEVEL control

This is used to adjust the level from the talkback microphone **[70]** before it is routed to its destinations.

[68] STUDIO key

This latching key is used to route the signal from the talkback microphone **[70]** to the **STUDIO** outputs. The CR output is dimmed, and the other studio output is cut while the talkback is continuing.

[69] PHONES jack

This stereo 1/4-inch jack is used for connecting a standard pair of headphones (40 Ω). The maximum output power is 50 mW + 50 mW.

The headphones should be wired: tip=left, ring=right, sleeve=ground.

[70] Talkback microphone (unlabeled)

This microphone is used in conjunction with the **STUDIO** key **[68]** and the **SLATE** and **AUX 1-2** keys **[24]** for talkback to the in-studio talent and for tape slating purposes.

13.4 Digital I/O

WARNING

Only use TASCAM-supplied and TASCAM-approved cables when making digital audio and control connections to the TM-D4000. Though the cables and connectors may resemble computer cables, they serve different purposes, and meet a different set of specifications. The use of cables other than TASCAM cables will at best cause the equipment to work erratically, and at worst cause damage to the equipment.

If the use of cables other than TASCAM cables causes or results in damage, the warranty is voided.

[71] DIGITAL OUTPUT (XLR-type)

This XLR-type connector outputs the **STEREO OUT** signal in the format selected for stereo digital output.

The word length and format, along with dithering options, are selected from the DIGITAL I/O screen (see 3.1.1, "STEREO OUT settings").

[72] DIGITAL OUTPUT (RCA)

This RCA coaxial connector outputs the **STEREO OUT** signal in the format selected for stereo digital output.

The word length and format, along with dithering options, are selected from the DIGITAL I/O screen (see 3.1.1, "STEREO OUT settings").

[73] D IN 2 (RCA)

This RCA coaxial connector accepts digital audio signals in IEC60958 format (SPDIF).

This stereo signal may be routed to any combination of the following: input channels 7-8, input channels 15-16 and ST-IN 2, using the I/O SETUP screen accessed through the **DIGITAL I/O** key (see 3.1, "I/O setup").

Regardless of the channel assignment, the signal received here may always be selected for monitoring using the **D-IN 2** key of the monitor select keys **[22]**.

Using the DIGITAL I/O screens, this may also be used as a clock source.

[74] D IN 1(XLR-type)

This XLR-type connector accepts digital audio signals in AES3-1992 format (AES/EBU).

This stereo signal may be routed to any combination of the following: input channels 5-6, input channels 13-14 and **ST-IN 1**, using the I/O SETUP screen accessed through the **DIGITAL I/O** key (see 3.1, "I/O setup").

Regardless of the channel assignment, the signal received here may always be selected for monitoring using the **D-IN 1** key of the monitor select keys **[22]**.

Using the DIGITAL I/O screens, this may also be used as a clock source.

13.5 Other connections

[75] POWER switch

Turns the TM-D4000 on and off.

WARNINGS

Always make sure that the TM-D4000 is turned off when connecting or disconnecting equipment.

Always make sure that the voltage of your power supply corresponds to the voltage requirements of the TM-D4000, as specified on the rear panel by this switch.

[76] WORD SYNC OUT connector

This BNC connector provides a word clock signal generated from the TM-D4000, for use if the TM-D4000 is to be used as the word clock master in the system.

This connector is unbalanced, and outputs the clock at TTL levels. It is auto-terminating.

[77] WORD SYNC IN connector and switch

This BNC connector accepts a word clock from an external source. On the DIGITAL I/O CLOCK screen, as described in 3.2, "CLOCK setup", this is referred to as WORD.

Set the **75ohms** terminator switch to **ON** in almost every case. However, if a "daisy-chain" type of word clock connection, using BNC T connectors is employed (this is not a recommended method of working, by the way), this switch should be set to the **OFF** position.

WARNING

There should be one, and only one, word clock master unit in a system. If more than one word clock master is present in a system, there is a risk of damage being caused to monitor speakers, etc.

The connector is unbalanced, and accepts the clock signals at TTL levels.

[78] CASCADE IN and CASCADE OUT

These 25-pin 'D'-sub connectors are used to provide cascade connections between the TM-D4000 and another TM-D4000.

When making cascade connections, **CASCADE IN** connectors must be connected to **CASCADE OUT** connectors. **CASCADE IN**s should never be connected to other **CASCADE IN**s, and **CASCADE OUT**s should never be connected to **CASCADE OUT**s.

For full details of cascade operations, refer to the section on "Cascade".

[79] TO METER

This 37-pin 'D'-sub connector is used to make the connection between the optional MU-4000 meter bridge unit and the TM-D4000.

[80] RS-422

This 9-pin 'D'-sub connector is used for connecting to the control inputs of remote devices which use the Sony P2 or other "9-pin" control protocols supported by the TM-D4000.

[81] TO HOST

This 9-pin 'D'-sub connector is used for making a serial connection (RS-422) to the computer running the automation software to control the TM-D4000.

[82] MIDI IN, OUT and THRU

These three 5-pin DIN connectors correspond to the MIDI standard (**MIDI IN** receives MIDI data, **MIDI OUT** outputs MIDI data originated by the TM-D4000, and **MIDI THRU** echoes data received at **MIDI IN**).

The MIDI is used for MIDI Timecode, Program Change and Control Change messages, as well as for MIDI System Exclusive bulk data dumps, etc. The details of these are all given in the section on MIDI.

[83] TC IN

This RCA connector provides a way for the TM-D4000 to accept linear timecode as an unbalanced signal.

The input impedance of this connector is 20 kΩ, and the input level is –30 dBV.

This section provides technical details relating to the TM-D4000.

All specifications are given with the factory reference level of –16 dBFS. This can be changed to either –20 dBFS or –9 dBFS by a qualified service person, affecting the maximum output level (0 dBFS)

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

14.1 Analog audio I/O

MIC inputs (channels 1–8)	Balanced XLR-type [a] Input impedance: 2.4 kΩ Nominal input level with pad off: –50 dBu (–67 dBu to –20 dBu) Gain with pad off: +20 dB to +67 dB Nominal input level with pad on: –20 dBu (–41 dBu to +6 dBu) Gain with pad on: –6 dB to +41 dB Headroom: > +16 dB
LINE inputs (channels 1–8)	Balanced 1/4-inch TRS jacks [b] Input impedance: 10 kΩ Gain: –8 dB to +39 dB Nominal input level: +4 dBu (–39 dBu to +8 dBu) Headroom: > +16 dB
OL LED (channels 1–8)	Lights at –3 dBFS
INSERT connections (channels 1–8)	Unbalanced 1/4" TRS jack (T=send, R=return, S=common ground) Output impedance: 100 Ω Nominal output level: –2 dBu Maximum output level: +14 dBu Input impedance: 10 kΩ Nominal input level: –2 dBu (–16 dBFS) Maximum input level: +14 dBu (0 dBFS)
STEREO IN 1 & **2**	Unbalanced 1/4-inch jack Input impedance: 10 kΩ Gain: –∞ to +22 dB Nominal input level: +4 dBu (–18 dBu -) Headroom: > +16 dB
AUX SENDs **1**–**6**	Balanced 1/4-inch TRS jack[b] Output impedance: 100 Ω Nominal output level: +4 dBu (–16 dBFS) Maximum output level: +20 dBu (0 dBFS)
STEREO OUTPUTS (BALANCED)	Balanced XLR-type[a] Output impedance: 75 Ω Nominal output level: +4 dBu (–16 dBFS) Maximum output level: +20 dBu (0dBFS)
STEREO OUTPUTS (UNBALANCED)	Unbalanced RCA pin Output impedance: 600 Ω Nominal output level: –10 dBV (–16 dBFS) Maxumum output level: +6 dBV (0 dBFS)
2TR RTN 1 (balanced)	Balanced XLR-type[a] Input impedance: 20 kΩ Nominal input level: +4 dBu
2TR RTN 2 (unbalanced)	Unbalanced RCA pin Input impedance: 20 kΩ Nominal input level: –10 dBV
MONITOR OUTPUTS (CR)	Unbalanced 1/4-inch jacks Output impedance: 100 Ω Nominal output level: +4 dBu (–16 dBFS) Maximum output level: +20 dBu (0 dBFS)
MONITOR OUTPUTS (STUDIO)	Unbalanced 1/4-inch jacks Output impedance: 100 Ω Nominal output level: +6 dBu (–16 dBFS) Maximum output level: +20 dBu (0 dBFS)
PHONES connector	1/4-inch stereo jack Impedance: 40 Ω Output level: 50 mW + 50 mW

a. All analog XLR-type connectors are wired as follows: 1=ground, 2="hot", 3="cold"

b. All analog 1/4-inch balanced jacks are wired as follows: tip=hot, ring=cold, sleeve=common ground

14.2 Digital audio I/O

D IN 1	XLR-type AES3-1992 data format
D IN 2	RCA pin IEC60958 (SPDIF) data format
DIGITAL OUTPUT (XLR)	XLR-type AES3-1992 data format or IEC60958 (SPDIF) data format [selectable]
DIGITAL OUTPUT (RCA)	RCA pin AES3-1992 data format or IEC60958 (SPDIF) data format [selectable]

For details of the I/O facilities provided by the interface cards, please consult the documentation supplied with the cards.

14.2.1 Sampling frequency

Limits of FS synchronization	Stated frequency ±6%
Internal clock	Accuracy to ±50 ppm

14.3 Other I/O

WORD SYNC IN	BNC connector (unbalanced), TTL level, 75 Ω, switchable
WORD SYNC OUT	BNC connector (unbalanced), TTL level, 75 Ω
RS-422	9-pin 'D'-sub female — conforms to RS-422 specifications
TO HOST	9-pin 'D'-sub female — conforms to RS-422 specifications
MIDI IN, MIDI OUT, MIDI THRU	5-pin DIN, conform to MIDI specifications
TC IN	RCA unbalanced Input impedance > 20 kΩ Input level: > –30 dBV

CASCADE IN/ OUT	25-pin 'D'-sub connector
TO METER	37-pin 'D'-sub connector for connection to optional MU-4000 meter unit

14.4 Analog performance

14.4.1 MIC/LINE channel inputs (measured with STEREO OUTPUTS)

Equivalent Input Noise	MIC: (DIN audio weighting): < –128 dBu, gain +65 dB, input impedance 150 Ω LINE: < –108 dBu, gain + 18 dB, input impedance 150 Ω
Frequency response (MIC/LINE)	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	MIC: < 0.05%, 20 Hz to 20 kHz, gain +65 dB, input –42 dBu LINE: <0.03%, 20 Hz to 20 kHz, gain +18 dB, input –6 dBu
Common mode rejection ratio (MIC)	> 60 dB 20 Hz – 20 kHz, gain at +61 dB

14.4.2 STEREO IN 1 and 2 (measured with STEREO OUTPUTS)

Equivalent Input Noise	(DIN audio weighting): < –110 dBu, gain +22 dB, input impedance 1 kΩ
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz, gain +22 dB
Total harmonic distortion	< 0.05%, 20 Hz to 20 kHz, gain +22 dB, input –7 dBu

14.4.3 2TR RTN1 input

Equivalent Input Noise	(DIN audio weighting): < –100 dBu, input impedance 1 kΩ
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, CR out level +18 dBu

14.4.4 2TR RTN2 input

Equivalent Input Noise	(DIN audio weighting): < –100 dBV, input impedance 1 kΩ
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, CR out level +18 dBu

14.4.5 STEREO outputs (XLR)

Noise level	(DIN audio weighting): < –90 dBu , Channels/ST/RTN all cut
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, output level +18 dBu

14.4.6 STEREO outputs (RCA)

Noise level	(DIN audio weighting): < –95 dBu , Channels/ST/RTN all cut
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, output level +18 dBu

14.4.7 AUX 1–6 outputs

Noise level	(DIN audio weighting): < –90 dBu , Channels/ST/RTN all cut
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, output level +18 dBu

14.4.8 CR outputs

Noise level	(DIN audio weighting): < –100 dBu , CR minimum
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, output level +18 dBu

14.4.9 STUDIO outputs

Noise level	(DIN audio weighting): < –100 dBu , STUDIO minimum
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Total harmonic distortion	< 0.01%, 20 Hz to 20 kHz, output level +18 dBu

14.4.10 PHONES output

Total harmonic distortion	< 1% 20 Hz – 20 kHz
Output level	10 mW + 10 mW

14.4.11 Overall system performance

Noise level (DIN audio weighting)	–60 dBu: 1 MIC to STEREO OUT, trim maximum –47 dBu: 16 MICs to STEREO OUT, trim maximum –80 dBu: 24 MTRs to STEREO OUT
Overall THD	< 0.1% (nominal levels)
Frequency response	within +0.5 dB / –1 dB, 20 Hz to 20 kHz
Crosstalk	–90 dB (1 kHz) STEREO OUT, STUDIO OUT –70 dB (10 kHz) STEREO OUT, STUDIO OUT –67 dB (10 kHz) CR OUT
Total signal processing time	> 1.25 ms (MIC/LINE to XLR STEREO OUT, Fs 48 kHz)
Click	< –35 dB
Muting	> –90 dB @ 1 kHz

14.5 Physical specifications

Power requirements	120V AC, 60 Hz (U.S.A./Canada) 230V AC, 50 Hz (Europe) 240V AC, 50 Hz (Australia)
Power consumption	60W
Dimensions of main unit (w x h x d) mm (in.)	644 x 237 x 703 (25.4 x 9.3 x 27.7)
Weight	26 kg (57.2 lbs)

14.6 Error and warning messages

Not every one of these messages indicates an error. The purpose of some of these messages is to let you know that the status of some of the parameters of the TM-D4000 have changed.

“User” messages, i.e. those which result from an invalid entry or selection, are marked with a ●

“Confirm” messages, where a response may be necessary to confirm an action or setting, are marked by a ✔.

“Fatal” messages, where the TM-D4000 may either be powered down and reset, or where attention by a qualified service engineer is required, are marked by a ✘.

14.6.1 Clock and synchronization

✔ New clock source out of range, Master Clock is unchanged	The selected clock source is outside the limits of tolerance (44.1 kHz or 48 kZ, ±6%)
✔ Flags NG	A digital audio source has been selected as a clock source, but the flags in the data show that it cannot be used for this purpose
✔ PLL Unlocked, so mixer muted.	The clock signal at the designated connector is unstable. To avoid damage to the monitoring equipment, the TM-D4000 mutes itself.
✔ Master Clock has gone out of range, Mixer muted	The clock signal at the designated connector is more than 6% out of the numinal frequency. To avoid damage to the monitoring equipment, the TM-D4000 mutes itself.
● Can’t select Cascade clock from this screen	The Cascade option is automatically set and cannot be changed from the clock screen
● You can’t change the clock source when cascade slave is selected	A cascade slave cannot have its clock source changed.
✔ Please select INIT clock to change FS	Only the internal source can change the sampling frequency. Select the INT source to change the sampling frequency
✔ There is no card in slotx	An attempt has been made to select an empty slot as a clock source
✔ The AD/DA board has no clock source	An IF-AD4000 interface card cannot be used as a clock source
✔ Mixer will mute while chcking	When checking trhe clock source, the TM-D4000 mutes
✔ Clock check results...	The result of a clock check operation

14.6.2 General

✔ Copy to all buss delay	Confirmation that the same delay is to be applied to all busses
● Can’t Unlink Dynamics with INPUT Channels linked	If a pair of channels has been stereo linked, the dynamics processors cannot be unlinked.
● Can’t Unlink Dynamics for ST-INx	The dynamics processors cannot be unlinked for the stereo input channels
● Can’t Unlink Dynamics for STEREO OUT	The dynamics processors cannot be unlinked for the stereo output
● Automation Mode Select	Connfirms that Automation Mode is entered, to remind you that the **SEL** keys now work with the Automation software.
● Select Stereo Mode	Reminder that s achange has been made to a particular surround mode or to the stereo mode from a surround mode
● Select Surround Mode 2 + 2	
● Select Surround Mode 3 + 1	
● Select Surround Mode 5.1	
● No Category for AES/EBU	An attempt was made to change the SCMS setting on professional format output data
● New Category: xxx	Concerned with SCMS settings
● New SCMS: xxx	Concerned with SCMS settings

● TM-D4000 Firmware Version Panel :x.xx Main y.yy Remote z.zz	The main, display and machine control version numbers (major and minor revisions) of the software currently installed in the TM-D4000
✘ <WARNING> Battery Voltage is Too Low to Save T-D4000 Data	Contact TASCAM service for the internal battery to be replaced. If you cannot save snapshots, etc. using the battery, we suggest that you do a MIDI Bulk Dump

14.6.3 Automation setup

● Illegal time code!	The entered timecode is invalid, and cannot be used
● Timecode running!	An attempt was made to change the frame type or start time while the internal generator was running.

14.6.4 Machine control

✔ Confirm AutoDetect?	The on-screen AUTO DETECT button was pressed when the machine control list contained entries
✔ Confirm All Clear?	The on-screen ALL CLEAR button has been pressed to clear the machine control list
● No More Devices to Delete	An attempt is made to delete from an empty list
✔ Locate Memories...	A list of the location memories
● It is already included	An attempt has been made to add a device to the list which is already present
● Too many of this device	The TM-D4000 cannot control any more units of this type
● There are no more devices connected to the remote port	The number of DTRS devices in the list must be no more than the number of units physically connected to the TM-D4000.
● Machine Control List Full	The list can contain a maximum of 16 units
● Too many screens enabled	There is a maximum of six SCR external control screens that can be set up
● The RS422 port is already assigned	There is already a device using the RS-422 port in the list
● There are no devices selected, use MIDI/MC screen to add	There are no SCR screens currently set up in the machine control list
✔ Recalled MC Mapping #x yyyy	The Machine Control Mapping has been recalled
✔ Saved MC Mapping #x yyyy	The Machine Control Mapping has been saved
✔ MC Transport Maps...	A list of the Machine Control transport mappings
✔ The Internal MTC generator is not selected	An attempt was made to control the MTC generator when it was not selected as the active controller
● Please check 9 pin RS422 Port	Communication error
● Please check Remote Out Port	Communication error
✔ Incompatible Remote ROM version	The wrong version of the software has been installed in the TM-D4000.
✔ DTRS id #x sssss	An error has been received from the DTRS unit with ID x

14.6.5 Snapshot library

In these messages, XX represents the snapshot library entry number

● Snapshot00 is Read Only!	An attempt was made to store to the “neutral” snapshot library entry
● Can’t Recall Snapshot XX.	An attempt was made to recall an empty snapshot library entry
✔ OK to Overwrite Snapshot XX?	A request was made to store a snapshot to a non-empty library entry
✔ Stored to Snapshot XX.	Storing to the snapshot library entry is complete
✔ Snapshot XX Recalled.	A snapshot library entry has been successfully recalled
✔ Can’t undo Snapshot-recall	No dynamics library entry has yet been recalled for undoing
✔ Snapshot Undo Completed	The recall operation has been undone
✔ Snapshot Redo Completed	The undo operation has itself been undone

14.6.6 Dynamics library

In these messages, XX represents the library entry, and YY represents the channel(s) using the dynamics processor settings.

● DYN LibraryXX is Read Only!	An attempt was made to store to a read-only dynamics library entry
● Can't Recall DYN LibraryXX.	An attempt was made to recall an empty dynamics library entry
✔ OK to Overwrite DYN LibraryXX from YY?	A request was made to store an entry to a non-empty dynamics library entry
✔ Stored to DYN LibraryXX from YY.	Storing to the dynamics library entry is complete
✔ DYN LibraryXX Recalled to YY.	A dynamics library entry has been successfully recalled
✔ Can't undo Dynamics recall	No dynamics library entry has yet been recalled for undoing
✔ YY Dynamics Recall Undone	The recall operation has been undone
✔ YY Dynamics Recall redone	The undo operation has itself been undone

14.6.7 EQ library

In these messages, XX represents the library entry, and YY represents the channel(s) using the EQ setting.

● EQ LibraryXX is Read Only!	An attempt was made to store to a read-only EQ library entry
● Can't Recall EQ LibraryXX.	An attempt was made to recall an empty EQ library entry
✔ OK to Overwrite EQ LibraryXX from YY?	A request was made to store an entry to a non-empty EQ library entry
✔ Stored to EQ LibraryXX from YY.	Storing to the EQ library entry is complete
✔ EQ LibraryXX Recalled to YY.	An EQ library entry has been successfully recalled
✔ Can't undo EQ-Recall	No EQ library entry has yet been recalled for undoing
✔ EQ Recall Undone	The recall operation has been undone
✔ EQ Recall redone	The undo operation has itself been undone

14.6.8 Effect library

In these messages, XX represents the library entry.

● Effect LibraryXX is Read Only!	An attempt was made to store to a read-only effect library entry
● Can't Recall Effect LibraryXX.	An attempt was made to recall an empty effect library entry
✔ OK to Overwrite Effect LibraryXX?	A request was made to store an entry to a non-empty effect library entry
✔ Stored to Effect LibraryXX.	Storing to the effect library entry is complete
✔ Effect LibraryXX Recalled.	An effect library entry has been successfully recalled
✔ Can't undo Effect-Recall	No effect library entry has yet been recalled for undoing
✔ Effect Recall Undone	The recall operation has been undone
✔ Effect Recall redone	The undo operation has itself been undone

14.6.9 Stereo link (using SEL keys)

✔ ST LINK ON ([1st channel] [2nd channel])	The **SEL** keys have been pressed to link two adjacent channels
✔ ST LINK OFF ([1st channel]-[2nd channel])	The **SEL** keys have been pressed to unlink two adjacent channels

14.6.10 Computer communications (automation)

● <Rx Error> xx-x-xxxxxxxx	Internal errors. It may be possible to continue working after these errors have occurred, but we do not recommend it. Please make a note of the numbers that appear (represented by x) and communicate them to TASCAM service, together with an account of the accompanying circumstances, as far as possible.
● <Internal cmd Error> xx-x-xxxxxxxx	
● <Host Communication Error> XX-XX-XXXXXXXX	An error (probably not serious) has occurred in the communication between the TM-D4000 and the host computer. Check communication speed settings, cable connections, etc. before trying communication again.

● Host TX Command Buffer Overflow.	Internal error — note that some of the data being transmitted to and from the TM-D4000 will have been lost of one of these messages appears. Re-attempt the data transmission.
● Host TX Bulk Buffer Overflow.	
● Host RX Bulk command Buffer Overflow.	
● Host RX command Buffer Overflow.	

14.6.11 MIDI

✔ MIDI active sensing has been discontinued	This appears if Active Sensing is turned on and the Active Sensing messages stop
✔ MIDI System Reset Received, Reboot Mixer?	Provides the option to honor or ignore a received MIDI Reset message
✔ Please check MIDI IN Port	The MIDI connection to the TM-D4000 may not be correctly made
● Please Set Comms Speed to MIDI in the Automation Setup screen first	An attempt is made to use the MIDI Bulk Dump function with a speed other than MIDI selected as the communications speed

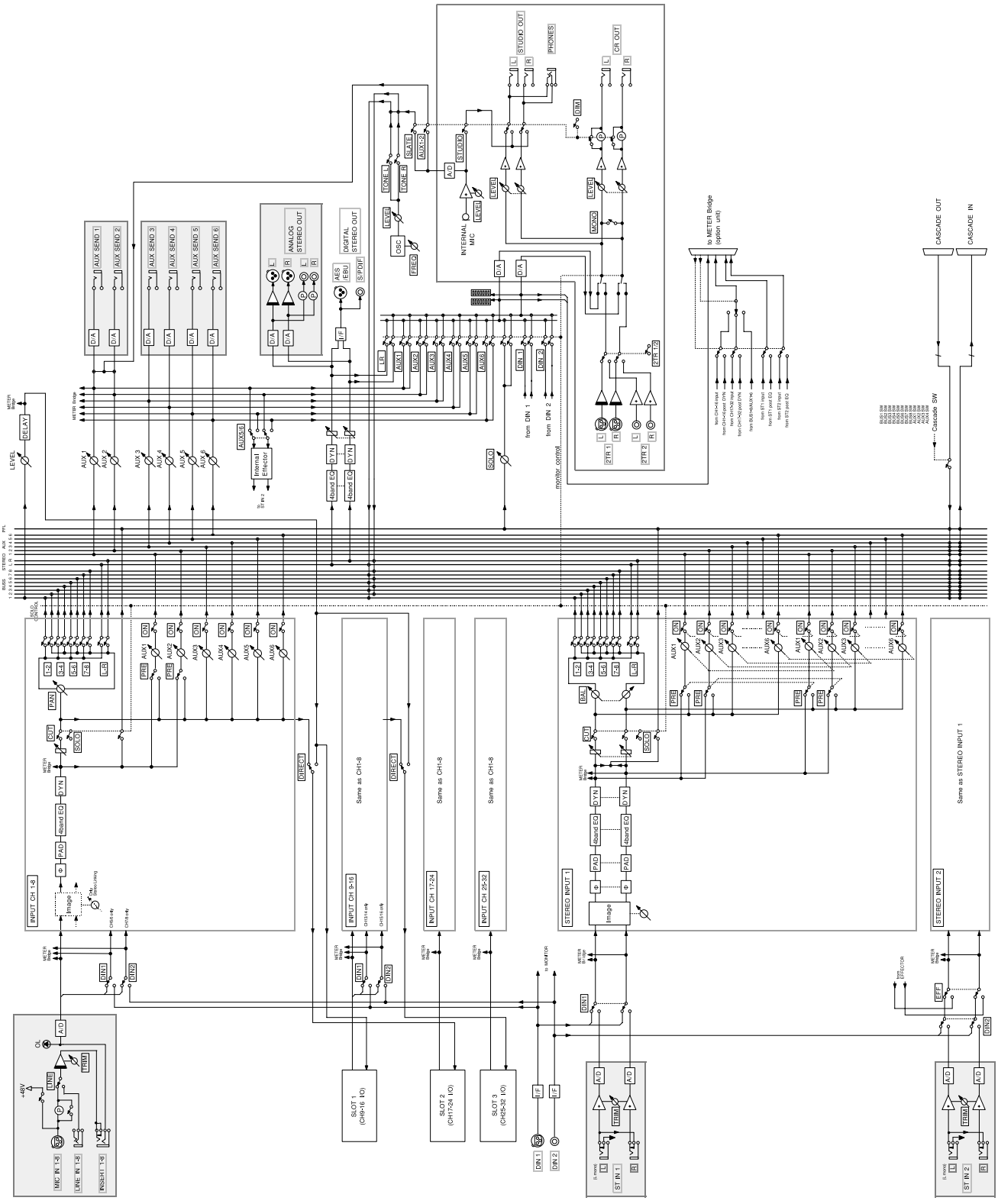
14.6.12 Fatal System Errors

NOTE

These messages should not occur. However, if you do see such a message, please make a note of the number displayed, and contact TASCAM Service. Inform them of the error and, if possible, a brief description of your system and the events leading up to the error. No recovery is possible from these errors— you must turn down the level of the monitoring system, power down the TM-D4000 and wait a few seconds before switching it on again.

✘ Fatal Error : XX-YYYYYYYY-ZZ	An unrecoverable error has occurred. Contact TASCAM Service.
● Out of range in sram.type=	Though these are not fatal messages (the TM-D4000 will attempt a recovery from them), internal memory may not be completely as it was before the event occurred. Check the memory contents before continuing.
● Out of range in current sram.tyoe =	
● Unexpected Effector command 0xXXXXXXXX	

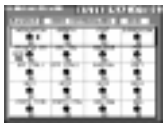
14.7 Block diagram

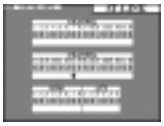
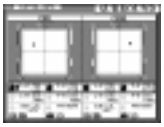


14.8 Screen details

The following is a list of screens (sorted alphabetically by screen name) that appear, together with their functions, and the principal places in this manual where they are described:

Screen name		Key to access the screen	What can be done using this screen	Main description
	ASSIGN	**ASSIGN**	Assignment of modules and input channels to busses (or surround busses)	4.4, “Channel-to-buss assignments”
	AUTOMATION SETUP	**AUTOMATION SETUP**	Setup of various automation parameters	In automation guide
	AUXn (1 through 6)	**AUX1** through **AUX6**	Levels of Aux sends (and pan settings, in the case of linked stereo sends)	4.5, “Aux sends”
	CASCADE	**DIGITAL I/O** key (alternates with above two screens)	Allows control of cascade parameters when TM-D4000s are linked together	11, “Cascade”
	CLOCK	**DIGITAL I/O** key (alternates with screen above and following screen)	Word clock selection and checking	3.2, “CLOCK setup”
	DELAY	**DELAY**	Sets delay for output busses, individually or together	4.11, “Buss delay”
	DUMP (MIDI System Exclusive Dumps)	**MIDI/MC** key (alternates with above two screens)	Storing and recall of library entries, etc. on remote MIDI devices	8, “Library functions” and 10.2, “MIDI data dumps”
	DYNAMICS	Module **SEL** key, then **DYNAMICS** (mixer section)	Sets parameters of dynamics processor for selected channel	4.6, “Dynamics processor settings”
	DYNAMICS LIB (dynamics library)	**DYNAMICS** key (in library section)	Manages dynamics library entries	8.2, “Other libraries”
	EFFECT	**EFFECT** key (in mixing section)	Makes settings for internal effect processor (parameters vary depending on processor effect type)	7.2, “Effect types”
	EFFECT LIB (effect processor library)	**EFFECT** key (in library section)	Manages effect processor setting library entries	7.2, “Effect types”

Screen name		Key to access the screen	What can be done using this screen	Main description
	EQ LIBRARY	**EQ** key (in library section)	Manages EQ library entries	8.2, “Other libraries”
	EXTERNAL CTRL (external control)	**EXT CTRL**	Controls external devices (the appearance and functionality will change according to the device being controlled)	9, “Machine Control”
	FADER POSITION	**FADER POSITION**	Shows fader position for all modules or all buss masters and Aux sends (also provide s buss and Aux send meters)	4.10, “Checking fader and cut status”
	GROUPING	**GROUPING** key	Allows fader group and cut group assignments to be made	4.9, “Fader and cut groups”
	I/O SETUP	**DIGITAL I/O** key (alternates with following two screens)	Digital input assignments, etc.	3.1, “I/O setup”
	MACHINE CTRL (machine control)	**MIDI/MC** key (alternates with screen above and following screen)	Selection and setup of remote devices to be controlled by the TM-D4000	9.1, “Selecting devices for control”
	MODULE (EQ/ AUX/PAN)	Module **SEL** key (alternates with screen below)	Sets parameters of EQ, pan and Aux send levels	4, “Module operations”
	MODULE (EQ/ DYN)	Module SEL key (alternates with screenabove)	Sets parameters of EQ and dynamics processor	4, “Module operations”
	PAD/Φ	**PAD/Φ** key	Sets the digital pad and the phase for input modules	4.8, “Pad and phase(F)”
	PAN/BAL (pan/ balance)	PAN/BAL key	Sets the pan and balance for many modules on one screen	4.7, “Pan and balance”
	SETUP	**OPTION** key (alternates with following two screens)	General setup parameters, oscillator, etc.	3.3, “Option setup”
	SETUP (MIDI and Machine control)	**MIDI/MC** key (alternates with following two screens)	Sets MIDI and basic machine control options	10.1, “MIDI settings” and 9.2, “General parameters”

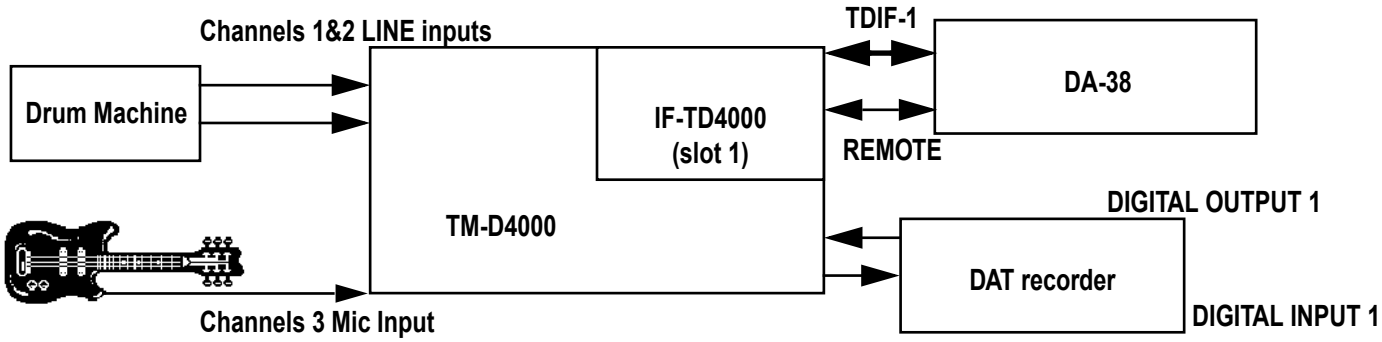
Screen name		Key to access the screen	What can be done using this screen	Main description
	SNAPSHOT LIB (snapshot library)	**SNAPSHOT** key	Manages snapshot library entries	8.1, “Snapshot memories”
	SOLO	**OPTION** key (alternates with screen above and following screen)	Sets IPS solo protection, solo mode, etc.	5.4, “SOLO”
	ST-LINK	**ST-LINK** key	Allows setting of modules, master busses, Aux sends, as stereo pairs	4.2, “Stereo linking”
	SURROUND	When surround mode is selected, **PAN/BAL**, and module **SEL**	Movement of module signal within surround matrix (surround “panning”)	6.4, “Modules in the surround mix”
	SURROUND	**OPTION** key (alternates with above two screens)	Selects surround mode and surround buss assignment	6.1, “Selecting a surround mode”

This section will take you through a very basic recording/mixdown session using as an example a drum machine, electric bass, a DA-38 and a DAT machine. The purpose of this tutorial is to familiarize you not only with the basic routing/functions on the TM-D4000 but also with the gain structure of a digital mixer which is different from an analog mixer. We suggest that you take the time to go through this brief section so that you can get the most out of your new TM-D4000 right away.

T1 Connections

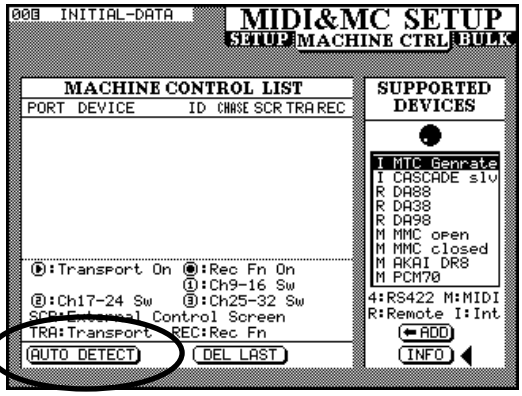
(Refer to section 1.3 for installing the IF-TD4000 TDIF interface card)

Be sure to make the connections in the diagram below with the power off on all units.
This will avoid possible damage to your equipment and allow the individual units to perform any needed communication across the connections during power up.



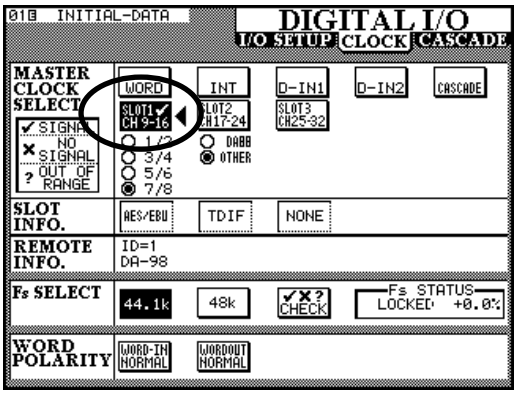
1. Connect a TDIF cable between the IF-TD4000 card in slot #1 on the mixer and the TDIF port on the back of the DA-38.
2. Connect a Remote Cable (PW/848) from the Remote Out port on the IF-TD4000 card in slot #1 on the mixer to the Remote In port on the back of the DA-38.
3. Connect an SPDIF cable from the SPDIF output of the mixer to the SPDIF input of the DAT machine and an SPDIF cable from the SPDIF output of the DAT machine to the SPDIF input of the mixer.
4. Connect the CR OUTPUT from the TM-D4000 to your speakers' power amp input or directly to powered speakers.

T2 Setup



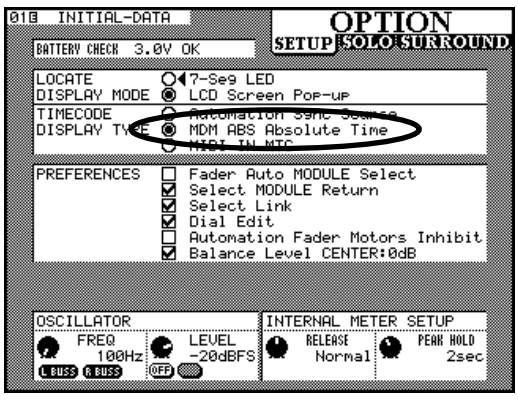
1. Power up your units in the following order: DA-38, your DAT machine, the TM-D4000, power amp/apeakers.
2. Press the SHIFT key so that the indicator lights and then press the MIDI/MC key until the screen at right appears.
3. Using the cursor keys move the cursor to the on-screen button *AUTO-DETECT* and press ENTER.
4. The DA-38 should be detected and listed in the Machine Control List on this screen together with the appropriate unit ID. Chase mode should be OFF.
5. Move the cursor up to the right of the line representing the DA-38 in the Machine Control List and press ENTER twice to engage Transport Control and Track Arming from the mixer. When you make this selection, the TM-D4000 also sends a command to the DA-38 to make the DIGITAL In setting.

You may also want to set a check mark in the SCR box providing additional controls for the DA-38 from the mixer, but this step is not essential.



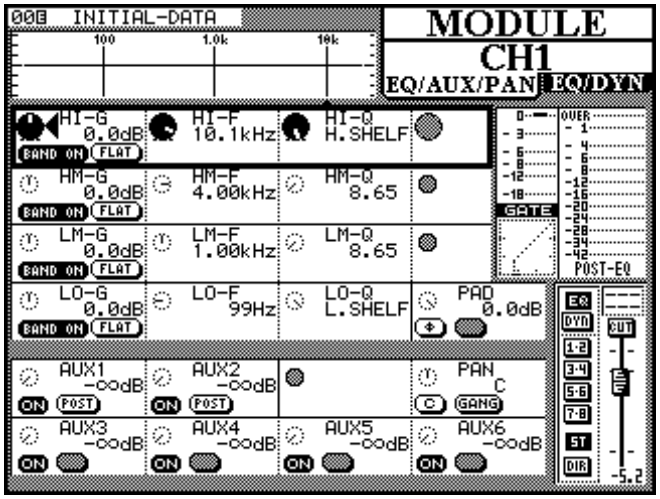
6. Press the SHIFT key so that its indicator is unlit, then press DIGITAL I/O until the screen at right appears.
7. Using the cursor keys move the cursor to the square representing SLOT1 and press ENTER.

A box will appear asking you to confirm your selection of the DA-38 connected to Slot #1 as the word clock master, press ENTER to confirm. On the far left angled surface of the mixer, under CLOCK the light indicating SLOT should be lit.



8. Press OPTION until the screen at left appears.
9. Use the JOG DIAL (or the Cursor Keys) to move the cursor to MDM ABS Absolute Time and press ENTER. This will display ABS time from the DA-38 on the TM-D4000's time counter.
10. Insert a formatted tape into the DA-38 and test the transport controls. The MDM LOCK indicator above the time counter should light when you press PLAY on the TM-D4000's transport control, indicating the DTRS unit is communicating successfully with the mixer.

T3 Basic Routing



1. Plug the outputs of the drum machine into line inputs 1&2. (Analog connections to the mixer may be made with the power on, just be sure that the speakers are turned down!)
2. Plug the electric bass through a direct box into mic input 3. (It can also be connected directly to the line input.)
3. Recall Snapshot 000 to "zero" the mixer: First, press the - or + keys in the Library section on the angled surface of the mixer until a small "00" appears in the upper left corner of the screen, then press RECALL. A box confirming "Snapshot00 Recalled" will appear briefly on the LCD. Next, pull the faders all the way down for channels 1-32 (fader layers 1 & 2, leave up the master faders). Now we can start from scratch with the TM-D4000's default settings.
4. Press the key labeled MODULE, be sure you have CH 1-16 selected in Layer Status, then press the SEL button on channel 1 to display that channel's information in the LCD screen.
5. Since the output of the drum machine is stereo link inputs 1&2 as a stereo pair so that fader levels, EQ adjustments, etc. can be applied to both channels simultaneously. Press and hold the SEL button on channel 1 and press the SEL button on channel 2. A box will appear asking you to confirm the stereo link on channels 1&2. Press ENTER to confirm. (When moving a pair of motorized faders it is only necessary to move one of them, it doesn't matter which one, the other will follow. **Attempting to move both faders may damage the motors.**)
6. Press the Line button just above the Trim pot for channels 1&2 to select line input instead of mic.
7. Turn the volume control for your speakers (CR LEVEL) all the way down.
8. Make sure the Trim Pots on channels 1&2 are all the way down. Press and hold the CLR button under the numeric keypad and press either channel's SEL button. This automatically moves the faders to unity gain for recording.
9. Begin playing the drum machine, set it to loop so that you can make mixer adjustments while it is playing. Slowly turn up the CR LEVEL control, you should hear the drum machine and see level on the stereo meters. (Make sure your power amp or speakers are turned on!)
10. Press the REC buttons on channels 9&10 to arm tracks 1&2 on the DA-38 for recording. The REC indicators will blink. (NOTE: Track arming is not part of the stereo link, each track will have to be armed separately.)
11. The SEL indicators on channels 1&2 should still be lit, if not, press the SEL button for either channel to select the linked pair. To the right of the LCD, under the contrast control is a vertical strip of buttons. Press the button labeled STEREO to take the drum machine inputs out of the stereo buss. Press the button labeled BUSS 1-2 to assign the drum machine inputs to busses 1&2 which feed tracks 1&2 of the DA-38. You should now see level on meters 1&2 of the DA-38.
12. Make a stereo link for channels 9&10. (Remember how? See #5 above!) Slowly raise the linked faders 9&10. You should again hear the drum machine and see it on the stereo meters. (The point of all this is to be listening from the tape machine, not the inputs that get sent to it.)

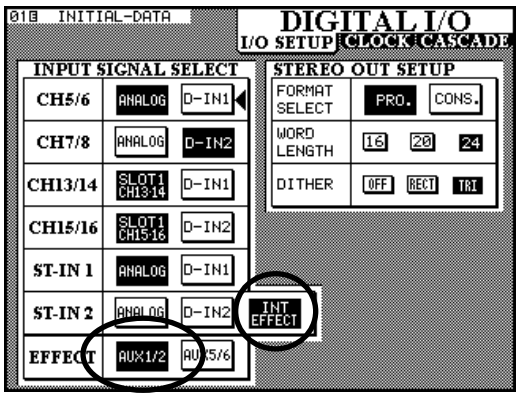
T4 Gain Structure

Now that things are going where they belong, let's put some nice hot signals to tape! (It may become necessary to adjust listening volume with CR LEVEL while performing the steps below.)

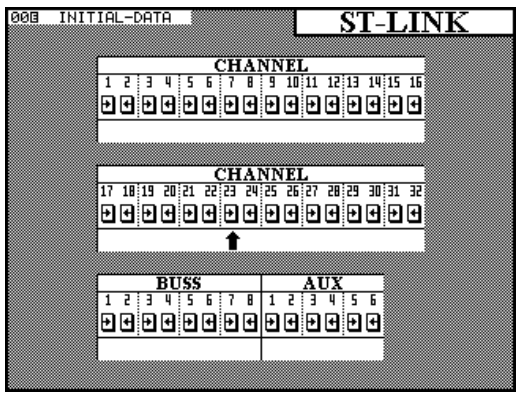
1. Slowly turn up the input trim pots on channels 1&2 until you get as loud a signal as possible on the DA-38 without causing the OL light illuminate next to the trim pot. (Since the drum machine gives a consistent output level this is easy.) When recording a live instrument or vocals leave some space on the trim pot before the OL light comes on for volume fluctuations. (NOTE: The trim pots are not part of the stereo link, they will have to be adjusted individually.)
2. You may now want to adjust your tape return levels on channels 9&10 for a reading near the middle of the range of the stereo buss meters just above the time display. We're not going all the way to the top yet so that there will be room to add other instruments that will increase this level.

T5 Adding Effects

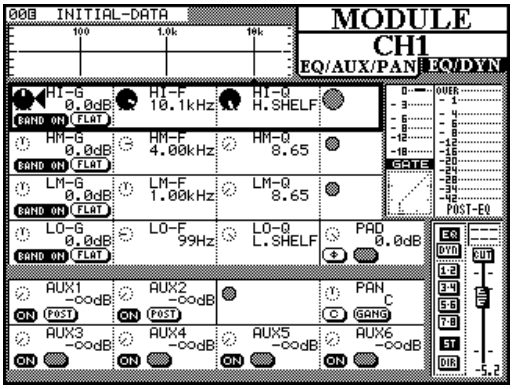
1. Press DIGITAL I/O until the screen at left appears. Use the cursor keys to move the cursor next to the box labeled INT EFFECT on the line labeled ST-IN 2 and press ENTER. This assigns the output of the internal effect processor to the ST IN 2 fader. This is a stereo fader so the left and right return levels will be controlled by this one fader.
2. Next, use the cursor keys to move the cursor to the box labeled AUX5/6 on the line labeled EFFECT and press ENTER. This assigns Auxiliary sends 5 and 6 to the input of the internal effect processor. Leave Auxiliary sends 1 and 2 open for now in case you want to use them for pre-fader headphone sends.

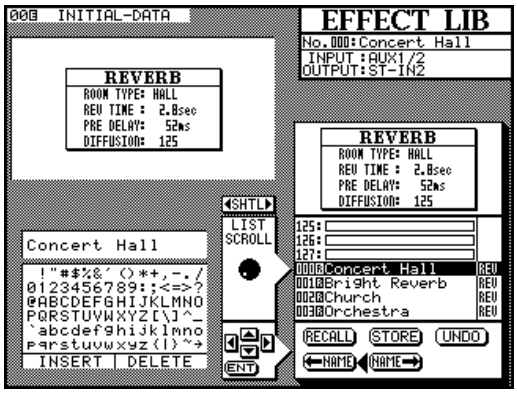


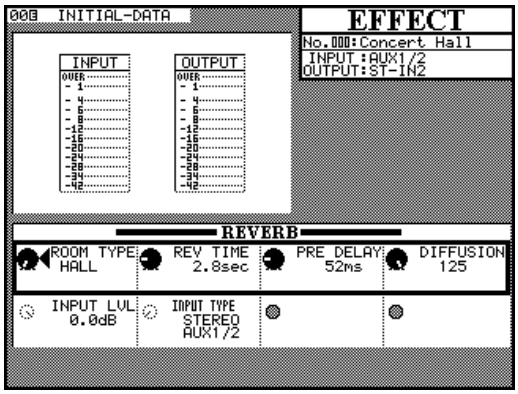
3. Press ST LINK until the screen at left appears. You will notice that this screen displays the two linked stereo pairs that you have already set up on channels 1&2 and 9&10. Use the cursor keys to move the cursor below AUX 5 or 6 and press ENTER. This is another way to set up stereo linked pairs.



4. Press MODULE then press the SEL button on either channel 9 or 10 until the Module screen showing AUX sends on the bottom appears. Notice that repeated presses of a channel's SEL button toggles between AUX sends and dynamic processor controls.
5. Use the ROW CURSOR buttons under the lower right of the LCD to move the blinking highlighted box down the screen until it is around the on-screen controls for AUX sends 3 through 6. The four continuous trim pots under the LCD (called the POD) will now adjust the four on-screen controls in the highlighted box.
6. Be sure the ST2 fader is turned up.
7. Play the drum machine and turn up the far right trim pot until you hear reverb on the drums. This effect is going directly to the stereo buss and will not be recorded on the DA-38.







7. Want a different kind of reverb? Press the EFFECT button in the LIBRARY section to the left of the LCD. *(Don't confuse this button with the one in the MIXING section, we'll get to that later…)*
8. Use the JOG DIAL to select a different preset then use the cursor keys to move the cursor to the on-screen RECALL button and press ENTER. A box will appear briefly on the screen confirming your selection.
9. Now press the EFFECT button in the MIXING section just above the faders. On the screen that appears, you will be able to adjust the parameters of your selected effect.
10. Do you like your edited effect so much that you want to store your setting for later use? Press EFFECT in the LIBRARY section, use the JOG DIAL to scroll down to an empty memory location (0-50 are read-only presets), use the cursor keys to move the cursor to the on-screen STORE button and press ENTER. A box will briefly appear on the screen to confirm your action.
11. To name your effect setting turn the SHUTTLE WHEEL to the left and use the cursor keys to highlight a character and ENTER to select it. If you make a mistake the JOG DIAL will move though the naming field. When you have the name you want turn the SHUTTLE WHEEL to the right, use the cursor keys to move the cursor to the on-screen NAME button with an arrow pointing to the right and press ENTER.
12. Press MODULE to return to the module screen, this is the screen you will likely be using most often and can be used as a "home base".

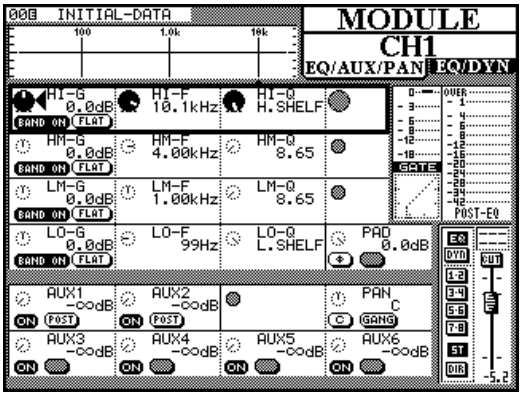
T6 Transport Control

Let's start recording at around one minute on the DA-38:

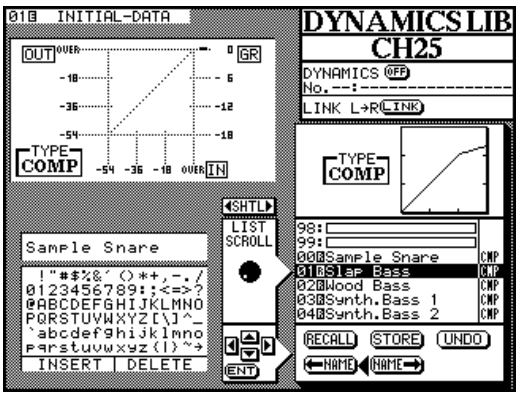
1. Press MANUAL LOCATE just to the left of the numeric keypad so that its indicator lights. Using the numeric keypad enter 1:00:00 so that 1 minute, 00 seconds and 00 frames are displayed in the time counter. It is not necessary to enter ":" (there is no ":" key!) Simply press 10000 and the TM-D4000 will fill it in for you in the time display.
2. Press ENT on the numeric keypad to send the DA-38 to that location.
3. Press PLAY then RECORD on the TM-D4000's transport control to begin recording on the DA-38. Play your drum machine loop to record it to tape. Stop the drum machine when you've had enough!
4. Press STOP on the TM-D4000. Next, press MANUAL LOCATE again and the value you entered before will still be there. Press ENT to go back to the top.
5. Press the REC buttons on channels 9&10 on the TM-D4000 to disarm tracks 1&2 of the DA-38.
6. Play back the drum tracks "just to make sure they got there".

T7 Gain Structure Revisited (Adding Channel Dynamic Processing & EQ

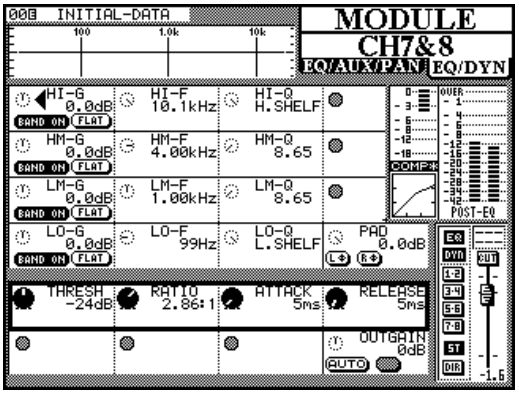
1. With the bass plugged into channel 3, select that channel and bring the fader to unity gain. (#8 under BASIC ROUTING) Make sure channel 3 is showing in the LCD and press the STEREO assign button to take the bass input out of the stereo buss and reassign it to BUSS 3-4.



2. But we only want it to go to buss 3! Using the ROW CURSOR keys under the LCD highlight the box with the PAN control. If the PAN control is not on the screen, press the MODULE key to toggle the display. Use the POD to pan channel 3 all the way to the left. The PAN value will display L45. Now the signal from channel 3 will only go to buss 3. *(If we had panned all the way to the right the signal would only go to buss 4. This is called "Odd/Even Panning". Odd numbered busses are Left and even numbered busses are Right. Using this technique it is possible to take many input channels and combine them to a single stereo pair of tape tracks.)*
3. Arm track 3 by pressing the REC button on channel 11. Raise channel 11's fader to about even with channels 9&10.
4. Play the bass and turn up the trim pot for channel 3 until you have a good level on the DA-38. You want to record the bass as loud as possible but since it's a live instrument you have to leave some room for volume changes. By adding some dynamics processing (compression), we can reduce those volume changes and get a louder overall signal to tape.



5. You can start by recalling a preset from the DYNAMICS LIBRARY. Make sure channel 3 is selected. Press DYNAMICS in the LIBRARY section, use the JOG DIAL to highlight preset #1, "Slap Bass", select the on-screen button labeled RECALL and press ENTER. A box will appear on the screen confirming your selection.



6. Go back to the MODULE screen and press the DYNAMICS button in the assign section to the right of the LCD to turn on the compressor. You can press the MODULE button to toggle the LCD display until you see compression controls on the bottom of the screen instead of Auxiliary Sends. From this screen you can adjust the compression settings but for now let's use the preset.
7. Use the ROW CURSOR buttons under the LCD to highlight the four different bands of EQ. The four trim pots of the POD directly under the screen will adjust the highlighted row of controls on the LCD. Go ahead and experiment with the EQ. Notice how the level on the DA-38 and the compression meter on the LCD change as you boost or cut with the EQ. The on-screen PAD control can be used to compensate if the amount of EQ boost has caused too much level to go to the DA-38 or if you can hear the compressor working too hard.
8. Finally, experiment with the on-screen OUTGAIN control and AUTO feature. This allows you to raise the volume after the compressor to get a loud signal on tape. The AUTO feature is directly connected to the amount of compression being used and can be a good place to start before adjusting OUTGAIN.
9. Now record!

Using the steps above go ahead and record more tracks. Notice that we never moved the fader away from unity gain. Our main level adjustments were made with the trim pot while minor adjustments were made with compression or the digital pad. In this way we can keep optimal headroom without distortion.

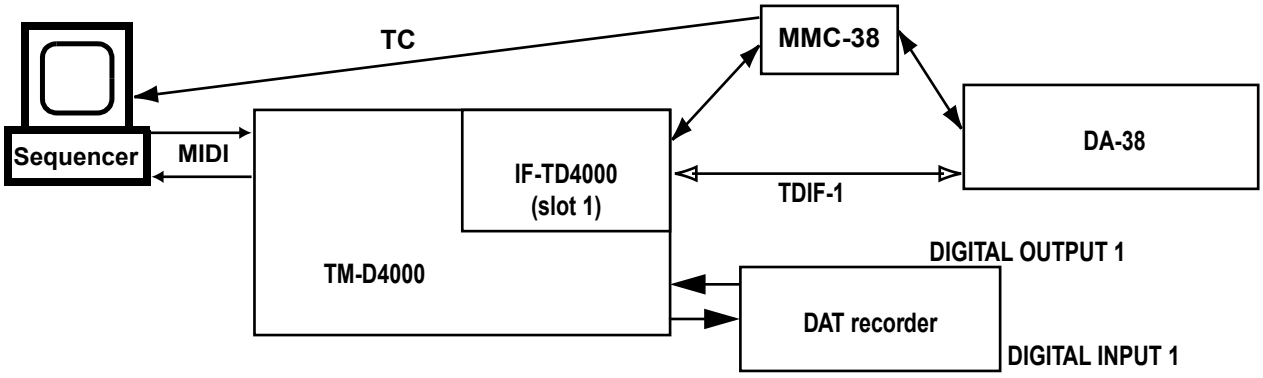
T8 Snapshots

Using the techniques you've learned for navigating the TM-D4000 to access EQ, dynamics processing, panning and effects, experiment with your mix until you like what you hear. Once you have a mix that you like, let's save it as a snapshot. A snapshot stores all your settings… effects, EQ, auxiliary send levels, fader levels, stereo links, all of it!

Use the - and + keys in the LIBRARY section to select an empty snapshot location in the upper left corner of the LCD. An empty location is indicated by a number with an empty bar where a name would be. Press STORE. A box will appear on the screen confirming your action. This is a quick way to store and recall snapshots.

To name your snapshots or to more visually scroll through them, press the SNAPSHOT button in the LIBRARY section. The screen that appears works exactly the same way as the other library screens for effects, EQ and dynamics.

You can have a different snapshot for every section of a song and recall them manually during your mix. Or if you are using a MIDI sequencer the snapshots can be recalled automatically from the sequencer.



1. Set up the snapshots for the different sections of your song. Then, with the sequencer locked to tape and the TM-D4000 connected to your MIDI interface on its own MIDI channel, play the tape and recall the snapshots while recording to an open track of the sequencer. The recall button will transmit the program change values to be recorded exactly when you press the button.
2. When the sequence is played back the program changes will be transmitted to the TM-D4000 recalling the snapshots. Snapshots can be stored and recalled in any order, they do not need to be sequential.

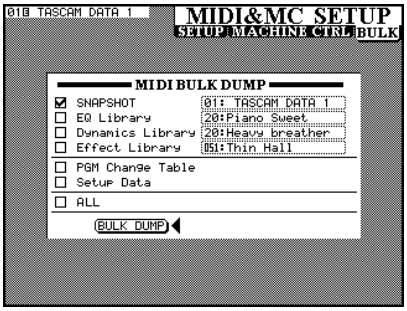
T9 Data Backup

Once you have all your snapshots stored in the TM-D4000, you can dump them onto an open track of your sequencer so that the snapshots for a song are stored right in that song's MIDI file.

1. Open up an empty track on your sequencer. Make sure it is not set to filter System Exclusive or SysEx data.
2. Press SHIFT then MIDI/MC until the screen below appears. Select the items that you want to store, begin recording on the sequencer and select the on-screen button BULK DUMP. A box will appear displaying the status of the transfer. This box will disappear when the transfer is finished.

Some time later you may want to load the data from the sequencer back into the TM-D4000. This is as easy as playing the sequencer track back into the mixer.

1. First make sure that you have saved the snapshots that are in the TM-D4000. When the data from the sequencer is transferred into the mixer, any existing data in the mixer will be erased. **There is no Undo**.
2. No set up is required on the TM-D4000, simply begin playing the track containing the snapshot data into the mixer via a standard MIDI connection. The mixer will detect the incoming data an display a box on the LCD confirming the transfer. When the transfer is finished the box will disappear.



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TASCAM
TEAC Professional Division

TM-D4000

TEAC CORPORATION
Phone: (0422) 52-5082 — 3-7-3, Nakacho, Musashino-shi, Tokyo 180-8550, Japan

TEAC AMERICA, INC.
Phone: (323) 726-0303 — 7733 Telegraph Road, Montebello, California 90640

TEAC CANADA LTD.
Phone: 905-890-8008 Facsimile: 905-890-9888 — 5939 Wallace Street, Mississauga, Ontario L4Z 1Z8, Canada

TEAC MEXICO, S.A. De C.V
Phone: 5-658-1943 — Privada De Corina, No.18, Colonia Del Carmen Coyoacon, Mexico DF 04100

TEAC UK LIMITED
Phone: 01923-819699 — 5 Marlin House, Marlins Meadow, The Croxley Centre, Watford, Herts. WD1 8YA, U.K.

TEAC DEUTSCHLAND GmbH
Phone: 0611-71580 — Bahnstrasse 12, 65205 Wiesbaden-Erbenheim, Germany

TEAC FRANCE S. A.
Phone: 01.42.37.01.02 — 17 Rue Alexis-de-Tocqueville, CE 005 92182 Antony Cedex, France

TEAC BELGIUM NV/SA
Phone: 0031-30-6048115 — P.A. TEAC Nederland BV, Perkinsbaan 11a, 3439 ND Nieuwegein, Netherlands

TEAC NEDERLAND BV
Phone: 030-6030229 — Perkinsbaan 11a, 3439 ND Nieuwegein, Netherlands

TEAC AUSTRALIA PTY.,LTD. A.C.N. 005 408 462
Phone: (03) 9644-2442 — 106 Bay Street, Port Melbourne, Victoria 3207, Australia

TEAC ITALIANA S.p.A.
Phone: 02-66010500 — Via C. Cantù 11, 20092 Cinisello Balsamo, Milano, Italy

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