YAMAHA

DRUM TRIGGER SYSTEM

DTS70

OPERATION MANUAL

FCC INFORMATION (U.S.A.)

1. **IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!**
   This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Yamaha may void your authority, granted by the FCC, to use the product.
2. **IMPORTANT:** When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.
3. **NOTE:** This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the users manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

   Relocate either this product or the device that is being affected by the interference.

   Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

   In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

   If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you can not locate the appropriate, please contact Yamaha Corporation of America, Electronic Service Division, 6600 Orangethorpe Ave, Buena Park, CA 90620

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the manufacture of this product contains LEAD. In addition, the electrical/electronic and/or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT REMOVE ANY ENCLOSURE COMPONENTS! There are no user serviceable parts inside. All service should be performed by a service representative authorized by Yamaha to perform such service.

IMPORTANT MESSAGE: Yamaha strives to produce products that are both user safe and environmentally "friendly". We sincerely believe that our products meet these goals. However, in keeping with both the spirit and the letter of various statutes we have included the messages shown above and others in various locations in this manual.

* This applies only to products distributed by YAMAHA CORPORATION OF AMERICA.

CANADA

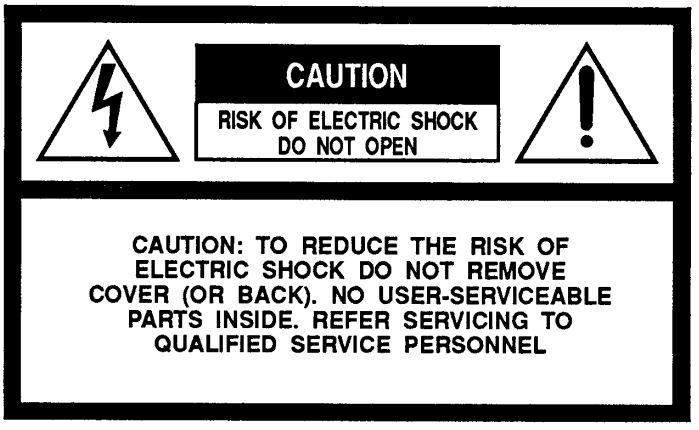
THIS DIGITAL APPARATUS DOES NOT EXCEED THE "CLASS B" LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATION OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

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

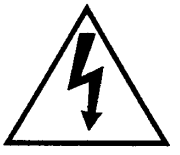
* This applies only to products distributed by YAMAHA CANADA MUSIC LTD.

SUPPLEMENTAL MARKING INFORMATION
SPECIAL MESSAGE SECTION

Your YAMAHA Drum Trigger System DTS70 will have labels similar to the graphics shown below or a molded/stamped facsimile of the graphics on its enclosure. The explanation of these graphics appears on this page. Please observe all cautions indicated.



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 product.



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.

ELECTROMAGNETIC INTERFERENCE (RFI): Your YAMAHA Digital Musical Instrument Product has been type tested and found to comply with all applicable regulations. However, if it is installed in the immediate proximity of other electronic devices, some form of interference may occur. For additional RFI information see the FCC information section located in this manual.

IMPORTANT NOTICE: This product has been tested and approved by independent safety testing laboratories in order that you may be sure that when it is properly installed and used in its normal and customary manner, all foreseeable risks have been eliminated. DO NOT modify this unit or commission others to do so unless specifically authorized by YAMAHA. Product performance and /or safety standards may be diminished. Claims filled under the expressed warranty may be denied if the unit is/ has been modified. Implied warranties may also be affected.

SPECIFICATIONS SUBJECT TO CHANGE: The information contained in this manual is believed to be correct at the time of printing. YAMAHA reserves the right to change or modify specifications at any time without notice or obligation to update existing units.

NOTICE: Service charges incurred due to a lack of knowledge relating to how a function or effect works (when the unit is operating as designed), are not covered by the manufacturer's warranty. Please study this manual carefully before requesting service.

STATIC ELECTRICITY CAUTION: Some YAMAHA Digital Musical Instrument products have modules that plug into the unit to perform various functions. The contents of a plug-in module can be altered/damaged by static electricity discharges. Static electricity build-ups are more likely to occur during cold winter months (or in areas with very dry climates) when the natural humidity is low. To avoid possible damage to the plug-in module, touch any metal object (a metal desk lamp, a door knob, etc.) before handling the module. If static electricity is a problem in your area, you may want to have your carpet treated with a substance that reduces static electricity build-up. See your local carpet retailer for professional advice that relates to your specific situation.

Model _____

Serial No. _____

Purchase Date _____

IMPORTANT
SAFETY AND INSTALLATION INSTRUCTIONS

INFORMATION RELATING TO POSSIBLE PERSONAL INJURY, ELECTRIC SHOCK AND FIRE HAZARD POSSIBILITIES HAS BEEN INCLUDED IN THIS LIST.

WARNING — When using electronic products, basic precautions should always be followed, including the following:

1. Read all Safety and Installation Instructions, Supplemental Marking and Special Message Section data, and assembly instructions (where applicable) BEFORE using your YAMAHA Drum Trigger System DTS70.
2. Main Power Supply Verification. YAMAHA DTS70 has been manufactured specifically for the main supply voltage used in your area. If you should move, or if any doubt exists, please contact your dealer for instructions. The main supply voltage required by your DTS70 is printed on the nameplate.
3. This product may be equipped with a plug having three prongs or a polarized line plug (one blade wider than the other). If you are unable to insert the plug into the outlet, contact an electrician to have the obsolete outlet replaced. Do NOT defeat the safety purpose of the plug. YAMAHA products not having three prongs or polarized line plugs incorporate construction methods and designs that do not require line plug polarization.
4. **WARNING** — Do NOT place objects on your DTS70's power cord or place the unit in a position where anyone could trip over, or walk on, or roll anything over cords of any type. Improper installation of this type create a possibility of a fire hazard and/or personal injury.
5. Environment: Your DTS70 should be installed away from heat sources such as radiators, heat registers and/or other products that produce heat.
6. Your DTS70 should be placed so that its location or position does not interfere with its proper ventilation.
7. Do NOT use your DTS70 near water or in wet environments. For example, near a swimming pool, spa, in a wet basement, or in the rain.
8. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure openings.
9. Your DTS70 should be serviced by a qualified service person when:
   a. The power-supply cord or plug has been damaged; or
   b. Objects have fallen or liquid has been spilled into the products; or
   c. The product has been exposed to rain; or
   d. The product does not operate or exhibits a marked change in a performance; or
   e. The product has been dropped or the enclosure of the product has been damaged.
10. When not in use, always turn your DTS70 "OFF". The power-supply cord of the product should be unplugged from the outlet when it is to be left unused for a long period of time. **NOTE:** In this case, some units may lose some user programmed data. Factory-programmed memories will not be affected.
11. Do NOT attempt to service the product beyond that described in the user-maintenance instructions. All other servicing should be referred to qualified service personnel.
12. Electromagnetic Interference (RFI). This YAMAHA electronic instrument utilizes digital (high frequency pulse) technology that may adversely affect radio/TV reception or the operation of other devices that utilize digital technology. Please read the FCC information for additional information.

PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE!

GROUNDING INSTRUCTIONS

This producy must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock.
This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordiances.

DANGER — Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or serviceman if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product-if it will not fit the outlet, have a proper outlet installed by a qualified electrician.

DTS70 PLUG and PLAY

This page is designed to give you a quick test drive. It skips some important information, so to get the most out of your DTS70, go through the manual – in particular the Guided Tour section.

Step 1: Mount the trigger pickups on your drums and plug them into the input jacks on the back of the DTS70. If you are using pads, you can just plug them into the DTS70 inputs. Any drum or pad can go into any DTS70 input.

Step 2: Setup your sound source:

- If you're using an analog tone generator, run a cable from the revelant DTS70 analog outputs to the tone generator. Each output sends a signal identical to the one received at the input.

- If you're using MIDI, connect the front panel MIDI Out Port or the back panel MIDI Out Port 1 of the DTS70 to the MIDI In of your drum machine or tone generator. Also connect the MIDI Out of your drum machine or tone generator to a MIDI In of the DTS70 (either front or back panel). Then, set the Attenuation switch over each input to the middle position (15db). If the trigger pickup is too hot and the LEARN procedures don't seem to work well, you might need less level; try the Attenuation switch at the 30db setting. To increase the incoming level, try the 0db setting.

Step 3: Have the DTS70 LEARN the triggering characteristics of your pickups or pads:

- Turn on the DTS70. After the opening screen, press the UTILITY button once. Check to see if MIDI IN and TRIGGER Learn modes are ON. If not, use the CURSOR ⇐ and ⇒ and the DATA ENTRY buttons to turn them both ON.

- Press the PERFORMANCE button once and then the EDIT/COMPARE button once. You are now on Performance Edit page 1. Press PAGE ⇓ once to get to Performance Edit page 2. Hit the drum or pad you want the DTS70 to learn about first. Now press CURSOR ⇒ to get to AUTOSET and use the DATA ENTRY buttons to select the type of drum being learned. The GAIN setting will change to HIT 3, indicating that the DTS70 wants to see three hard hits from you on that input. Wait until the drum dies down between each hit. When the DTS70 has learned about the incoming trigger signal, the AUTOSET parameter value will change to OFF and there will be an appropriate GAIN value assigned.

- Repeat this procedure for each input.

Step 4: Have the DTS70 MIDI LEARN which sounds you want to trigger:

- Press PAGE ⇑ once to get to Performance Edit page 1. Hit the drum or pad you want to assign a sound to. The upper left of the page will show the selected input. Then hit the pad on your drum machine that corresponds to the sound you want to trigger. The DTS70 will automatically assign the correct MIDI note and channel for that input. If you are not triggering a drum machine, the procedure is still the same, except that in order for the DTS70 to complete the learning process, the tone generator has to be able to send the MIDI note and channel that corresponds to the sound you want to trigger.

- Repeat this procedure for each input, making sure to select the desired input prior to "teaching" the DTS70 the correct MIDI note and channel. Now for the PLAY part...

YAMAHA DTS70

DRUM TRIGGER SYSTEM

Welcome to the Yamaha DTS70 – a state-of-the-art, dynamic triggering system. We'd like to thank you for your purchase and congratulate you on making a wise choice. In order to take full advantage of the DTS70, we recommend that you read this manual and try out the examples.

Table of Contents

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Precautions

As with any piece of electronic equipment, there are some precautions to be taken with your DTS70.

Location

Avoid placing the DTS70 in direct sunlight or close to a strong source of heat for long periods of time. Also avoid locations in which the device is likely to be subjected to excessive vibration, dust, cold or moisture.

Handling

Avoid applying excessive force to the switches, dropping or rough handling of any sort. When moving from one location to another, always carry the DTS70 in a carrying case or the box it came in. When transporting the DTS70 by airplane, be sure to ship it in Airline Travel Approved, or ATA style cases.

The Power Cord

Always grip the plug directly when removing it from an AC receptacle. Removing the plug by pulling on the cord can result in damage to the cord and possibly even a short circuit. Also, disconnect the DTS70 from the AC receptacle if you don't plan on using it for an extended period of time.

Cleaning

Use a mild detergent on a soft cloth and dry with another soft cloth. Never use solvents or abrasives as they can damage or discolor the finish.

Electrical Storms (Lightning)

The DTS70 is a highly sophisticated piece of computerized machinery. As such, it is sensitive to voltage spikes, power dips and various other abnormal power conditions. In the event of an electrical storm, the DTS70 should be unplugged to ensure that no damage can occur. Damage can still occur if the DTS70 is plugged in but not turned on, so remove the plug from the receptacle.

Electromagnetic Fields

Computer circuitry is also sensitive to electromagnetic radiation. Television sets, radio receivers and transmitters, and wireless microphone or intercom systems are all potential sources of this type of radiation and should be kept as far away as possible from the DTS70.

SECTION 1 DTS70 Overview

The DTS70 Drum Trigger System is designed to be the control center for any electronic drum system. The twelve, ¼-inch trigger inputs on the back can accommodate many different input sources through adjustment of the three-position input level switches on the back, through the internal software, or a combination of the two. Each input can be routed to sophisticated MIDI circuitry, or its own fast, dynamic trigger output. Once the analog input has been converted to the digital domain, the DTS70's processing power delivers the fastest possible conversion to MIDI, allowing accurate triggering from acoustic drums or electronic pads.

Here's an overview of some of the system's features:

- **12** trigger **inputs,** each with a 3-position **level Attenuator switch** for each
- **12 dynamic**, fast, direct trigger **outputs**
- **48** Performance memories
- **Sensible, easy-to-use** operating system
- **Automatic Trigger LEARN** function
- **Automatic MIDI LEARN** function
- **MIDI In, 2 MIDI Outs, MIDI Thru** on the **back panel**
- Additional **MIDI In** and **Out** on the **front panel**
- Assignable **MIDI Merge**
- **MIDI** capabilities include sending up to **4 notes per input** using Stack, Crossfade or Alternate modes
- **Individual trigger curves** for **every assigned MIDI note**
- **Total control** over MIDI **velocity** settings
- **Realtime trigger level readout**
- Sophisticated **Rejection parameters** for **eliminating double and false triggering**
- **Level** settings in **db** and **Gate times** in **fractions of seconds** (numbers that refer to the **real world**)
- **Bypass** input jack for foot pedal or pad control of the Bypass function
- **Internal power supply** with heavy duty, permanent AC cable

- **Large,** clear, informative **LCD display**
- **Large,** clear **LED** display of current **Performance** number
- Sends **16** MIDI **program changes per MIDI Out Port** (for up to 32 Program Changes each time a new Performance is selected)
- Accepts **incoming program changes on any channel**
- **Edit/Compare** feature
- **10-character names** for every **Performance** and **Chain**
- **32 chains** with 32 steps in each
- **System Exclusive** bulk storage
- **Increment/Decrement** footswitch/pad inputs on back panel – allows easy selection of Performances, Chain steps and inputs for editing
- Compatible line of **acoustic** drum **triggers** (YAMAHA DT10 Triggers)
- **Total compatibility** with Yamaha's existing **D8 System, RY30 Rhythm Programmer**, etc.

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The next two pages illustrate and indentify all the buttons, plugs, switches and displays on the front and back panels of the DTS70.

Following those pages is a diagram of a sample DTS70 System Setup. While it represents only one particular setup, the basic principles of any DTS70 System are illustrated.

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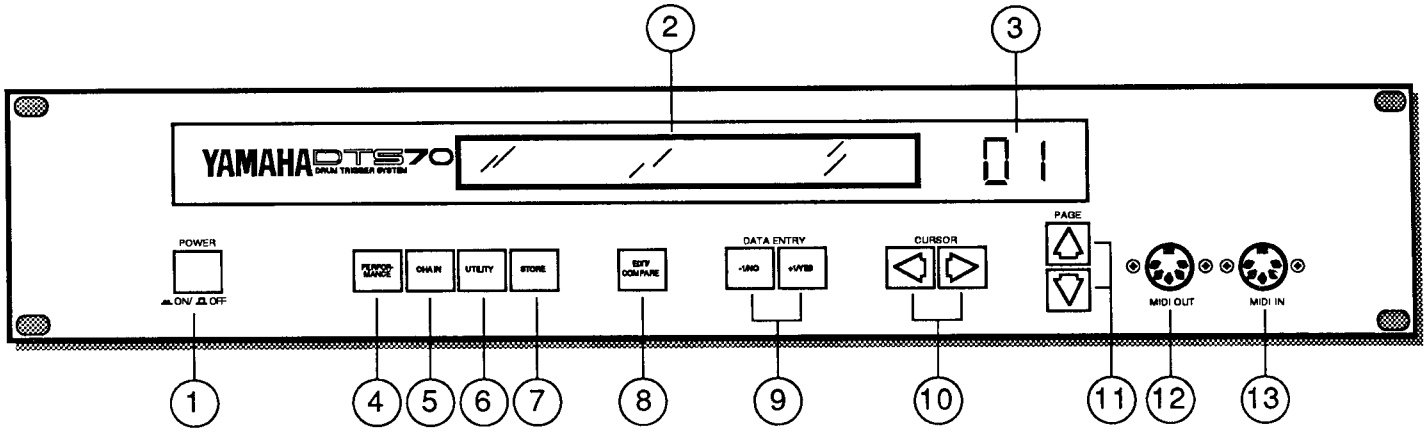
YAMAHA DTS70 FRONT PANEL



(1) POWER switch - This turns the DTS70 on and off. The LCD and LEDs will light up when the power is on.

(2) LCD (Liquid Crystal Display) - This display shows the various parameters available in all DTS70 modes.

(3) LED Display (in red) - displays the following information in each mode:

Performance Play mode	currently selected Performance number
Performance Edit/Compare mode	current Performance number being edited
Performance Store mode	Performance number where data is being stored
Chain Play mode	current Step number
Chain Edit mode	current Chain number being edited
Chain Store mode	Chain number where data is being stored
Utility Mode	"Ut"
Bypass mode	"- -"

(4) PERFORMANCE - selects Performance Play mode.

(5) CHAIN - selects Chain Play mode.

(6) UTILITY - selects Utility mode.

(7) STORE (labeled in red) - selects Store mode.

(8) EDIT/COMPARE (in green) - allows you to edit either Performances or Chains. It also allows you to compare edits with the stored version of the currently selected Performance.

(9) DATA ENTRY (-1/NO and +1/YES) buttons - allow you to either increment or decrement a parameter value or respond to a question with either YES or NO.

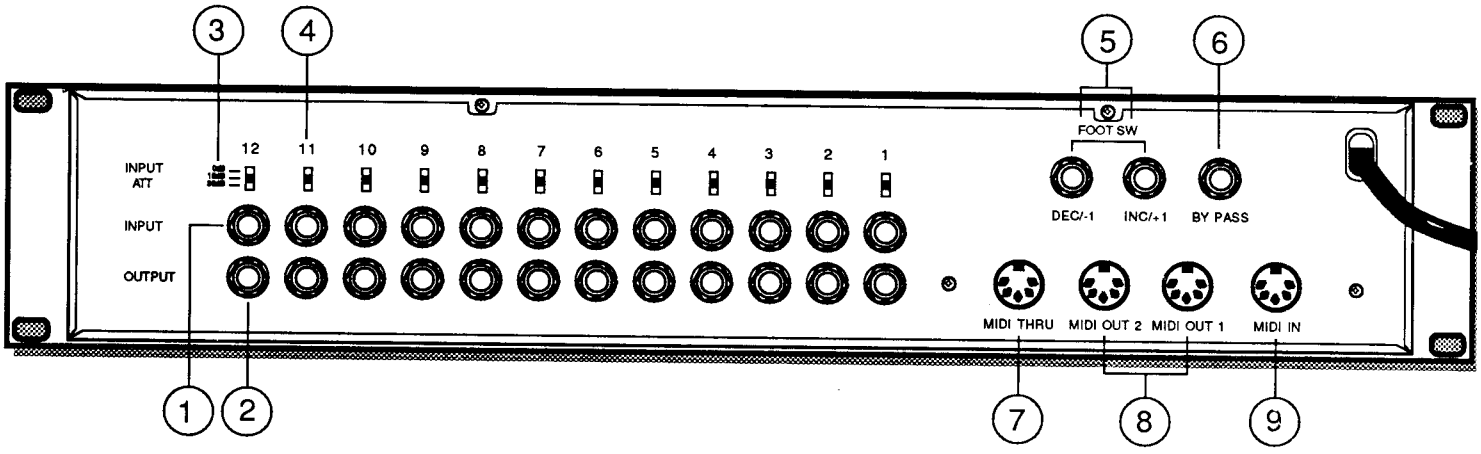
(10) CURSOR left (⇐) and right (⇒) buttons - allow you to move the cursor to the various parameters on each page.

(11) PAGE up (⇑) and down (⇓) buttons - allow you to quickly move from one LCD screen, or page, to another.

(12) MIDI Out - runs parallel to the rear panel MIDI Out Port 1. Anything assigned to MIDI Out Port 1 will be sent out both of these MIDI Outs.

(13) MIDI IN - allows easy MIDI access into the DTS70. When the front panel MIDI In is used, the rear panel MIDI In is disabled.

YAMAHA DTS70 BACK PANEL



(1) INPUT connectors - these 12 ¼-inch jacks are the analog inputs for your trigger pickups.

(2) OUTPUT connectors - these 12 ¼-inch jacks are the direct, analog outputs from the DTS70.

(3) INPUT LEVEL INDICATORS - each input has its own 3-position input level selector switch which is set to one of these levels (0db, 15db or 30db).

(4) INPUT LEVEL SELECTOR SWITCHES - each input has its own 3-position input level selector switch.

(5) FOOTSWITCH INPUTS - these two allow you to change the selected Performance, the selected input for editing, or the Step number in a Chain by pressing a footswitch.

(6) BYPASS - allows you to temporarily disable the MIDI outputs of the DTS70 by pressing a footswitch..

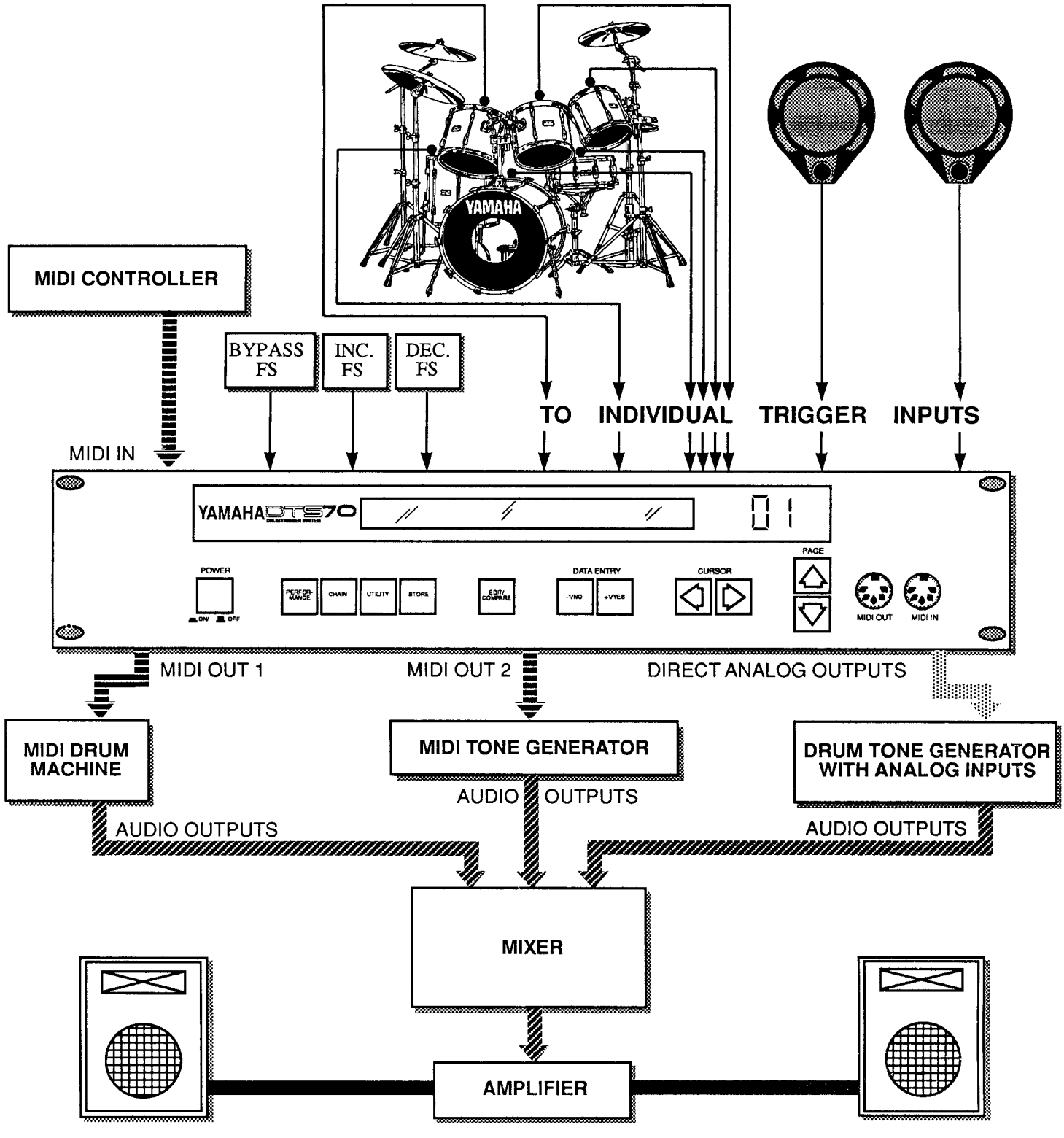
(7) MIDI THRU - this jack sends out, unchanged, all MIDI information received at either MIDI input.

(8) MIDI OUT 1 and 2 - these MIDI Out Ports can transmit simultaneous, discreet MIDI information. The front panel MIDI Out runs parallel to the rear panel MIDI Out Port 1. In other words, anything assigned to MIDI Out Port 1 will be sent out both MIDI Out 1 and the front panel MIDI Out. MIDI messages received at the MIDI In of the DTS70 can be merged out one of these Outs at a time.

(9) MIDI IN - allows an external MIDI controller, sequencer or other device to send program change messages to the DTS70 or be merged with the DTS70 messages and sent out one of the MIDI OUT Ports. Data received at this MIDI In is also passed, unchanged, out the MIDI Thru. When the front panel MIDI In is used, the rear panel MIDI In is disabled.

DTS70

System Setup



SECTION 2 /// Learning the DTS70

DTS70 TRIGGER SETUP INTRODUCTION

The DTS70 is designed to make setup easy and track your playing accurately. It will automatically learn the triggering characteristics of each input, and adjust the appropriate parameters accordingly. When the source of your trigger is an explosive, acoustic sound such as a drum, every element in the tracking process must be set correctly. As the saying goes, a chain is only as strong as its weakest link, and in this case the weak link could be a physical connection or a parameter that's set incorrectly.

So...a concept to remember: **The key to getting the best from the Yamaha DTS70 triggering system is in the initial setup.** The trigger pickup must be mounted properly. Then, if you establish the proper relationships between the input Attenuation switch position, the GAIN and LEVEL settings and the WAIT parameter setting, everything else will fall into place nicely. These are the parameters that determine how the DTS70 deals with the incoming trigger signal and how it sends that information back out. The DTS70 will automatically set these up for you (except for physically moving the Attenuation switch). But if you want to fine tune the response characteristics, these parameters form the foundation on which the rest of the machine operates.

As you learn about the DTS70's functions and features (including the Attenuation switch, GAIN, LEVEL and WAIT), remember that none of the cool stuff it can do will work well if the DTS70's trigger inputs haven't been properly set up. With a little attention paid to proper setup, the DTS70 will be following your playing as though it were wired to your hands and feet!

SETTING UP THE TRIGGERING SYSTEM

PADS AND TRIGGER PICKUPS

If you're using electronic pads ,simply decide which pad goes into which input on the back of the DTS70. Any pad or drum can be plugged into any input.

If you're using pickups on acoustic drums, set those up now. For the best results, they should be mounted on the drumhead, near the outside edge. Try to keep the pickups away from the side where you hit rimshots or crossticks, and also try to keep them isolated as much as possible from the stick attack areas of other drums. It's probably not possible to totally satisfy all these guidelines, but a happy medium will work very well. If you'd like more information about mounting pickups, refer to the Triggering

Discussion in Section 3 immediately following the Guided Tour.

SETTING THE ATTENUATION SWITCHES

Once your pads and/or drums are wired up, you'll need to set the Attenuation switch above each input to the proper position. These switches optimize each input for the incoming signal level. Changing from one position to another will drastically affect how the DTS70 treats that input. This will be reflected in how accurately the DTS70 reads your playing. There are three Attenuation switch positions available:

0dB: Low level and short envelope signals (snare drums)
This setting maintains the incoming signal at its normal level.

15dB: Regular signals from pickups (tom toms)
This setting attenuates, or limits the incoming signal by 15db; that is, the signal will be 15db weaker than normal.

30dB: High level and long envelope signals (floor toms and bass drums)
This setting is best suited to compensate for a very "hot" incoming signal, since it attenuates the signal by 30db; that is, the signal will be 30db weaker than normal.

Based on the above information, set the Attenuation switch to the position you think is appropriate. The middle setting of 15db (normal) is a good place to start. Finding the correct setting may involve some trial and error, but it's well worth the time spent. There are only 3 positions, so if one isn't right, you can easily come back and try another. This setting is an important step toward obtaining an accurate trigger; change it if the DTS70 doesn't seem to be reading your playing correctly. However, every time you change this switch, you should redo that input's AUTOSET procedure, unless your system is only using the direct, analog outputs and nothing is connected through MIDI. (see the following for details).

DIRECT ANALOG OUTS

Below each input is a direct, dynamic, analog output. The signal that's coming into the input above it is sent immediately out here. These outputs are ideal for triggering an older, non-MIDI drum machine (either dynamic or non-dynamic), a classic analog drum module such as the Simmons SDS5, Yamaha's PTX8 (which can be triggered via its analog inputs *or* through MIDI), or one of the current crop of samplers that work with incoming trigger voltages. If this is the only kind of triggering you'll be doing, then run the output of your pads or trigger pickups to the DTS70 analog inputs and connect the DTS70 analog outputs to the trigger inputs of your sound source. None of the DTS70's

MIDI manipulations are available in this type of triggering system, but the trigger response time is the fastest possible. Even the DTS70's optimized MIDI system is no match for the speed of this type of direct, dynamic, analog output!

The analog outputs can be used simultaneously with the DTS70's MIDI outputs, but because they aren't processed at all, the Bypass mode in the DTS70 will not affect them. Any signal appearing at a trigger input will be immediately sent to the corresponding analog output.

MIDI CONNECTIONS

On to the DTS70's MIDI prowess.....OK, now that you've got your pads and/or drums ready to go, connect the MIDI Out of the DTS70 to the MIDI In of your drum machine or sampler. Make sure that you use either MIDI OUT PORT 1 or the front panel MIDI Out of the DTS70, which runs parallel to MIDI Out 1 (the DTS70 comes preset for MIDI Out 1). Now make sure that you have a "MIDI loop" set up..... that is, also connect the MIDI Out of your drum machine or tone generator to the MIDI In of the DTS70.

FOOTSWITCH CONNECTIONS

The back panel has several footswitch inputs (see the back panel diagram). They will accept standard footswitches like the Yamaha FC5.

DEC/-1 and INC/+1
Two of these are for incrementing (increasing to the next one up) and decrementing (decreasing to the next one down) through Performances, inputs in Edit mode or steps in Chain mode. These switches are *not* polarity sensitive – basically this means that any on/off type switch will work for these functions.

BYPASS
The other input is also for the same type of switch, but when pressed, this footswitch will stop all MIDI output from the DTS70. Every press of this switch toggles the DTS70 between sending MIDI output and *not* sending MIDI output.

DTS70 SIGNAL FLOW NOTE: If you are somewhat familiar with triggering devices, or even if you're not, this might be a good time to reference the DTS70 Signal Flow Chart on page 72 in the Technical Reference Section. It gives a clear representation of the general signal flow in this device. And even if you're not used to looking at this type of diagram, you can see that the DTS70 does not have an overly complicated signal path. The key to the DTS70's success is in the efficient, accurate and logical manner with which it performs each step along the way, not in the complexity of its design.

DTS70 OPERATIONAL PROCEDURES
A STEP BY STEP GUIDED TOUR

This section of the manual is a guided tour of the DTS70. It walks you logically through the entire machine – hardware and software, and gives you a hands-on, real world look at all the functions and features at your command.

PERFORMANCE EDIT MODE and THE TRIGGER LEARN AND AUTOSET FUNCTIONS
(TEACHING THE DTS70 ABOUT EACH TRIGGER INPUT)

The TRIGGER LEARN function lets the DTS70 analyze the signal characteristics of each input. Armed with what it has learned, the DTS then automatically sets optimum values for the parameters in Performance Edit mode that control how it treats incoming trigger signals. Although slight fine tuning of these parameters manually can sometimes improve the response time or triggering accuracy, the DTS70's TRIGGER LEARN and AUTOSET functions should be all you need to establish excellent trigger response and accuracy.

Step 1: Turn on the DTS70 using the front panel power switch. The LCD display will briefly look like this:

Then the display will go to Performance Play mode. When you first turn the DTS70 on, it goes to the most recently selected Performance. This is convenient if there is a power failure – as soon as the power comes back on, you're in the same Performance! Fresh out of the box, Performance 01 will come up:

Step 2: Press the UTILITY button. You will be on the LEARN MODE page.

Step 3: If TRIGGER LEARN isn't ON, use CURSOR ⇒ to scroll over to the TRIGGER LEARN function. Use the +1/YES button to turn it ON.

Step 4: Also make sure MIDI IN LEARN MODE is ON. If not, use the cursor and the +1/YES button to turn it ON.

Step 5: Press the PERFORMANCE button and if it isn't on Performance 01, press the -1/NO button until you're at the first Performance.

Step 6: Press the EDIT/COMPARE button. You will be on page 1 of Performance Edit mode. Page numbers are at the lower left of the LCD.

Step 7: Press PAGE ⇓ once to get to page 2.

```
EDIT IN- 1     GAIN    AUTOSET      LEVEL
Pg 2           0.0dB     OFF          %
```

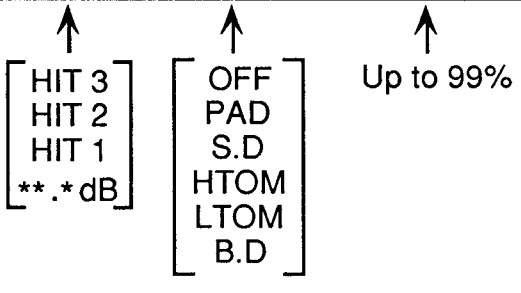
Step 8: Press CURSOR ⇒ so that the cursor is under the AUTOSET function (AUTOSET should be set to OFF).

Step 9: Hit the first drum or pad that you want the DTS70 to learn about. The upper left of the LCD will now read EDIT IN- followed by the number of the trigger input you just hit.

Step 10: Press +1/YES until AUTOSET shows you the type of input to be learned.

Electronic pad ..... press +1 once (PAD)
Snare drum ..... press +1 twice (S.D)
Small tom tom ..... press +1 three times (HTOM)
Large tom tom ..... press +1 four times (LTOM)
Bass drum ..... press +1 five times (B.D)

```
eDIT IN- 1     GAIN    AUTOSET      LEVEL
Pg 2           HIT 3     S.D          %
```



When you change the AUTOSET input type, the GAIN value will change from 0.0dB to HIT 3. The DTS70 is now waiting for you to hit the pad or drum three times at your maximum volume. Be careful to hit only this input on each successive hit. Wait for the drum to stop ringing between each hit. Each time you hit the pad or drum, you will notice the number in the GAIN display counts down one (3, 2, 1, OFF). After the third hit, the AUTOSET display returns to OFF, indicating that the DTS70 has learned the characteristics of that input.

GAIN SETTINGS

Note that an appropriate GAIN dB level has been set (if you don't notice a change, the DTS70 probably determined that the appropriate setting for this input is the default setting of 0.0db!). The GAIN setting is a way for you to modify or fine tune the incoming trigger signal. It adjusts in both a positive and a negative direction from 0.0db. At 0.0db, the incoming trigger signal is being read exactly as it's coming in, modified only by the Attenuation switch setting. The GAIN setting can be adjusted from +15db to -15db, increasing or decreasing the overall signal strength. To change the GAIN setting, use the CURSOR buttons to move the cursor to GAIN and press the +1 and -1 buttons to alter the value.

If the overall characteristic of the input signal is very strong, or "hot", the AUTOSET procedure has probably set the GAIN level to a minus value. If the overall characteristic of the input signal is very weak the AUTOSET procedure has probably set this level to a fairly high dB value (approximately +12 to +15.5 dB).

The right side of this display will show your incoming level as a percentage each time you hit a pad or drum. This is one way to gauge whether the GAIN setting and the Attenuation switch are correctly set, and whether your initial trigger setup is performing accurately – if all is set correctly, soft hits will show up as fairly low percentages in this display and loud hits will get you a 90-99% reading. If this isn't happening, try raising or lowering the GAIN setting.

GAIN NOTE: If there is a problem with the initial setup (pickup came loose, wrong Attenuation switch setting, etc.), adjusting the GAIN setting may not help. If the trigger pickup is in place correctly, you may want to change the Attenuation switch position and redo the AUTOSET procedure.

eDIT NOTE: In the upper left of the display the word "EDIT" has changed to "eDIT" – this indicates that you've modified this Performance. When you are done modifying this Performance you will need to store it in order to be able to recall it in its finished, fully-edited form.

AUTOSET THE REST OF THE INPUTS

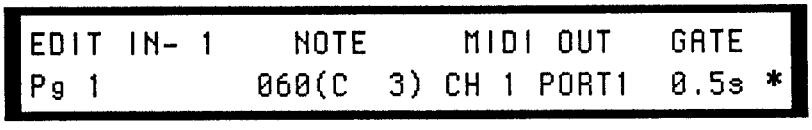
Hit the next input that you want the DTS70 to learn. The top left of the display will change to show the input number that you just hit. Move the cursor to AUTOSET and repeat the above procedure. Continue this procedure for each input into the DTS70.

USING MIDI LEARN MODE

MIDI LEARN MODE provides a shortcut for assigning MIDI note numbers and channels to trigger inputs. Instead of manually entering each note and channel for every sound you want to trigger, this mode lets you hit a drum or pad, and then hit a pad on your drum machine or send the appropriate note from your sampler; the DTS70 reads the incoming MIDI note and channel and automatically assigns it to the selected input. Just what the doctor ordered to shave some time off of those electronic setup days!

The **key** to the MIDI LEARN function is the ability of your sound source to transmit MIDI notes and channels to the DTS70. If your tone generator can't do this, MIDI LEARN won't work but you can assign MIDI information manually, so read on...

Press PAGE ⇑ to get to page 1.



The cursor will be flashing over the MIDI note. You can now easily line up all of the sounds that you want to trigger with the drums or pads that you want to hear them from:

Step 1: Lightly hit the first drum or pad that you want to set up. The DTS70 LCD will indicate the correct input number in the upper left of its display (IN- 5, IN- 8, etc.). That's because TRIGGER LEARN is turned on.

Step 2: Press the pad on the drum machine that corresponds to the sound you want to trigger from that DTS70 input. If you are not using a drum machine, have the tone generator transmit the MIDI note and channel that corresponds to the sound you want to trigger.

The DTS70 will read the incoming MIDI note and MIDI channel and assign it to the selected input. The display will show the newly received MIDI note number and MIDI channel. Hit the drum that you're working on and you'll hear the selected sound being triggered.

THE ASTERISK FUNCTION: Another way to hear the sound is to move the cursor over the asterisk (*) and press the +1/YES button.

Step 3: Repeat Steps 1 and 2 for each DTS70 input and you're set to play!

MIDI LEARN MODE – MANUALLY

You can also set up MIDI notes and channels manually:

Step 1: Lightly hit the first drum or pad that you want to set up. The DTS70 LCD will indicate the correct input number in the upper left of its display (IN- 5, IN- 8, etc.).

Step 2: Move the cursor to NOTE and use the INC/DEC buttons to assign the desired note number. Notice that the NOTE display shows you the MIDI note in two different forms: as a note and octave, and a note *number*. This is for convenience in dealing with different types of sound sources and how they represent MIDI note information.

Step 3: Move the cursor to MIDI OUT CHannel and use the INC/DEC buttons to assign the desired MIDI channel. Do the same for the desired MIDI Out Port. Hit the drum that you're working on and you'll hear the selected sound being triggered. Another way to hear the sound is to move the cursor over the asterisk (*) and press the +1/YES button.

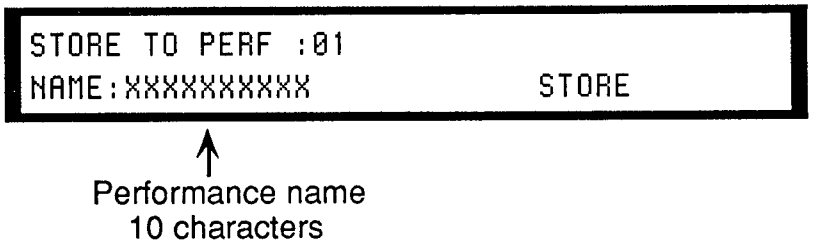
Step 4: Repeat Steps 1 through 4 for each DTS70 input and you're ready to play the sounds you've set up!

CURSOR WRAP FEATURE: For editing convenience, the cursor can wrap around in this display. When the cursor is on the asterisk, pressing CURSOR ⇒ will put the cursor over the MIDI note number selection. From there, pressing CURSOR ⇐ twice will put the cursor back on the asterisk. Going to the left, the cursor passes by the input select parameter, giving you the opportunity to change the selected input.

STORING A PERFORMANCE

If everything sounds good and you want to store this Performance:

Step 1: Press the STORE button.



The DTS70 allows you to give each of the 48 Performances its own name. The name can be up to ten characters long. To name the Performance:

Step 2: Press CURSOR ⇒ and use the DATA ENTRY −1 and +1 buttons to select the first character of the name. CURSOR ⇐ and ⇒ will move you back and forth from one character to the next. If you want a blank space, press and hold the -1/NO button.

Step 3: When you're finished naming the Performance, press the STORE button again, or press and hold CURSOR ⇒. Either way, the lower right of the display will ask you if you are sure you want to save this Performance. If you are sure, press the +1/YES button. If you have any doubts, press the NO button.

If you pressed the NO button, pressing the EDIT/COMPARE button will take you back into the Performance Edit mode.

If you pressed the YES button, the display will show Done!.

Press the PERFORMANCE button and you're ready to play that Performance.

SAVING MULTIPLE VERSIONS OF THE SAME PERFORMANCE

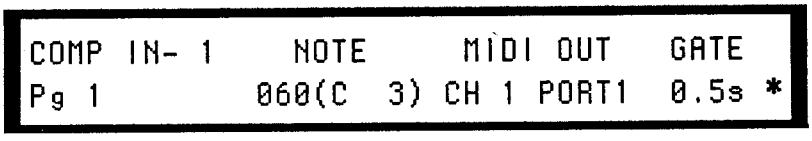
You can also save the same Performance to several different Performance locations (1-48). This is convenient for creating modified versions of the same Performance. Repeat the above STORE procedure but after initially pressing STORE, use the DATA ENTRY buttons to select a new Performance location for the save. It's a good idea to rename each new version of the Performance.

CREATING NEW PERFORMANCES RECOMMENDATION: It is recommended that you use this last approach for creating new Performances since it keeps all of your triggering setup information intact from one Performance to the next.

Go ahead and save a new version of your original Performance to a new location. After you've done that, press the EDIT/COMPARE button to enter the EDIT mode and use the newly copied version as a starting point for a new Performance. You'll be on page 1 of the EDIT mode in your new Performance.

COMPARE MODE

Change some MIDI note numbers so that you're triggering a couple of new sounds. Suppose you can't decide which version of this Performance is better – the original or your newly edited one. Pressing the EDIT/COMPARE button lets you quickly compare the two.



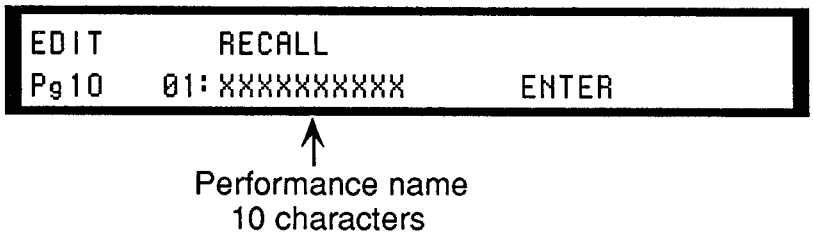
When editing, if you COMPARE the current edits to the previously stored version, the word "EDIT" in the LCD becomes "COMP," and DATA ENTRY buttons do **not** function while you are listening to the stored version. They still function normally when you're listening to the edited version.

EDIT RECALL

Let's say you decide that your new edits are exactly what you have in mind. As soon as you edit even one parameter of a Performance, the DTS70 puts that Performance into an Edit "buffer". This is a separate area of memory that stores the last Performance you were working on. It stores it *until you edit a new Performance.* But by accident, you leave the EDIT mode and change to another Performance, thereby losing all your edits. You even missed the display change that an *edited but unsaved* Performance offers up as a last warning: in Performance Play mode, "Perf" in the upper left of the LCD screen becomes "perf".

So, if you remember that you neglected to store your edits **before** you **begin** editing a new Performance, you can use the EDIT RECALL page in the new Performance's EDIT mode to retrieve the "lost" edits of your previous Performance.

Press PAGE ⇓ until you get to the EDIT RECALL page.



The display on this page shows you which Performance is in the Edit buffer, by name and Performance number (it will be the last one you edited).

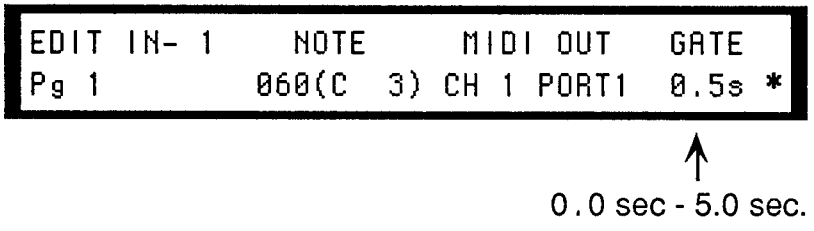
To RECALL the unsaved edits of your last Performance:

Step 1: Press CURSOR ⇒. ENTER will change to Are you sure?

Step 2: Pressing +1/YES will keep you in Performance Edit mode but you will now be editing your *last* Performance, complete with all of the edits that you hadn't saved. If you now want to preserve that Performance, the standard Performance Store function can be used.

THE GATE PARAMETER

The right side of Performance Edit page 1 allows you to change something called GATE.



This refers to the outgoing MIDI gate time. It is represented in seconds, and it refers to the length of time that a triggered sound will last. The DTS70 can send a MIDI note-off after a selected period of time, cutting off the sound being triggered. Of course, if the sound is only 1 second long, setting this parameter to 3 seconds won't lengthen the sound beyond its original length! Most drum machines are not set up to respond to GATE time information. Most synthesizers and keyboard tone generators do respond to GATE time. A lot of samplers give you the *option* of ignoring note-off messages. Each note sent out of the DTS70 through MIDI can have its own GATE time, so if you are triggering sounds that respond to that, set their desired lengths with this parameter.

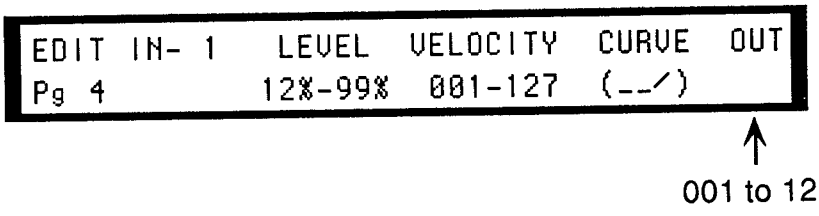
SETTING THE MIDI OUT CHANNELS AND PORTS

Performance Edit page 1 is where you select a MIDI Out channel (1-16) for every assigned note. The DTS70 can transmit MIDI information on sixteen different MIDI channels for each Out Port. This means that it's possible to set up a system with thirty-two channels of MIDI information being sent simultaneously, sixteen out MIDI Port 1 and sixteen out MIDI Port 2.

You can also select MIDI Out Port 1 or 2 from Performance Edit page 1. Each MIDI note that is assigned in the DTS70 can be sent out either Port 1 or Port 2. Use the CURSOR buttons to select the MIDI Port number and the DATA ENTRY buttons to select Port 1 or 2. Remember that the front panel MIDI Out Port will carry the same information as the back panel MIDI Out Port 1.

CURVES

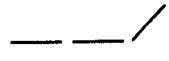
Press PAGE ⇓ until you are on page 4. The upper left portion of *this* page also shows which input is currently being edited (as do most Performance Edit pages).



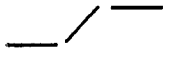
A curve is a pattern or preset shape of dynamics that defines how the DTS70 translates the strength of each hit on your pad or drum into outgoing MIDI velocity information. In other words, the DTS70 Curves allow you to *adjust* the MIDI velocity information that gets sent out relative to how hard you hit the pad or drum. You can even set up a CURVE that causes the DTS70 to send out high MIDI velocities when you play softly and low MIDI velocities when you play loudly.

Press CURSOR ⇒ four times until the cursor is on the CURVE settings. Hit a pad or drum to select it for editing. You will notice that the far right of the display shows a number every time you hit the drum. This is the **outgoing MIDI velocity** that was sent when you hit the pad or drum. It's basically the MIDI equivalent of the volume level that was received from your last hit. MIDI velocities range from 001-127, with 001 being as soft as it gets and 127 as loud as it gets.

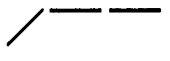
There are seven curves, one of which can be chosen for each assigned MIDI note:

Curve #1 

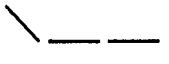
CURVE # 1 is the default curve. Unless you change it, this curve will appear for every note. It sends fairly low MIDI velocities until you start to play pretty hard. It then increases quickly, finally matching your loudest volume level.

Curve #2 

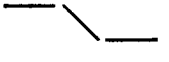
Press the +1/YES button once. This will select **CURVE #2.** This curve does the best job of recreating normal, acoustic dynamics. In other words, it most accurately duplicates the way you really play. With this curve, playing softly generates low MIDI output velocities, playing at a medium volume generates medium MIDI output velocities and playing loudly generates high MIDI output velocities.

Curve #3 

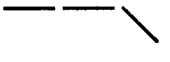
Press the +1/YES button again. This will select **CURVE # 3.** This curve gets loud quickly and stays loud. It's best suited for rock style playing or for someone who hits lightly but wants a big sound.

Curve #4 

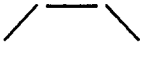
Press the +1/YES button once. This will select **CURVE # 4.** This curve is very loud to start with and then tapers down to very soft. So, playing softly generates high MIDI output velocities, and playing at a medium or loud volume generates soft MIDI output velocities. This curve is primarily suited for crossfade situations (something we'll get into later).

Curve #5 

Press the +1/YES button once. This will select **CURVE # 5.** This curve is the opposite of curve #2. It makes fairly smooth transitions in MIDI velocity output but it makes them directly opposite to the way you are playing. Playing softly generates high MIDI velocities and as you play louder, MIDI velocity output lowers. When you play at full volume this curve is sending out very low MIDI velocities.

Curve #6 

Press the +1/YES button once again. This will select **CURVE # 6.** This curve is the opposite of curve #1. Soft and medium hits generate high MIDI velocities and only when you approach the louder end of your playing do MIDI velocities start to lower. It is most useful in either a crossfade situation (more on this later) or in a situation where you want to be able to hit a pad or drum very lightly and trigger a sound through MIDI at full volume.

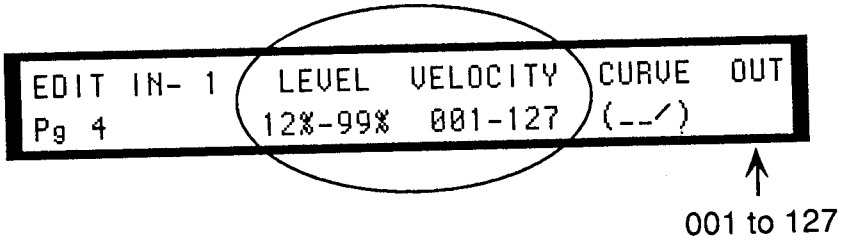
Curve #7 

Press the +1/YES button. This will select **CURVE #7.** This curve goes from soft to loud like curve #3. But when you play loudly this curve generates lower MIDI velocities. It's primarily designed for use in crossfade situations.

CURSOR WRAP FEATURE:
To assist you in the editing process, the cursor can wrap around in this display. So if you press and hold the CURSOR ⇒ button, the cursor will move all the way to the right of the display and then immediately jump back to the first parameter on the left. CURSOR ⇐ works in a similar fashion. For example, when the cursor is on CURVE, pressing CURSOR ⇒ will put the cursor back on the left of the display over LEVEL. Pressing CURSOR ⇐ twice from this position will put the cursor back on CURVE.

LEVEL/VELOCITY SETTINGS

The rest of page 4 in Performance Edit mode plays an important role in defining how the DTS70 responds to your playing.



LEVEL refers to incoming trigger level. The percentage on the left side of LEVEL represents your minimum trigger level. The percentage on the right side represents your maximum trigger level.

VELOCITY refers to outgoing MIDI velocity levels. The percentage on the left side of VELOCITY represents the minimum outgoing MIDI velocity. The percentage on the right side represents the maximum outgoing MIDI velocity.

Here's how these four values relate:
The minimum incoming trigger level relates directly to the minimum outgoing MIDI velocity level. The maximum incoming trigger level relates directly to the maximum outgoing MIDI velocity level. Here's what the default settings mean (see the diagram following this explanation):

- At 12% of your maximum playing volume, the DTS70 will send out a MIDI velocity of 001.
- At 99% of your playing volume (the loudest you play), the DTS70 will send out a MIDI velocity of 127.

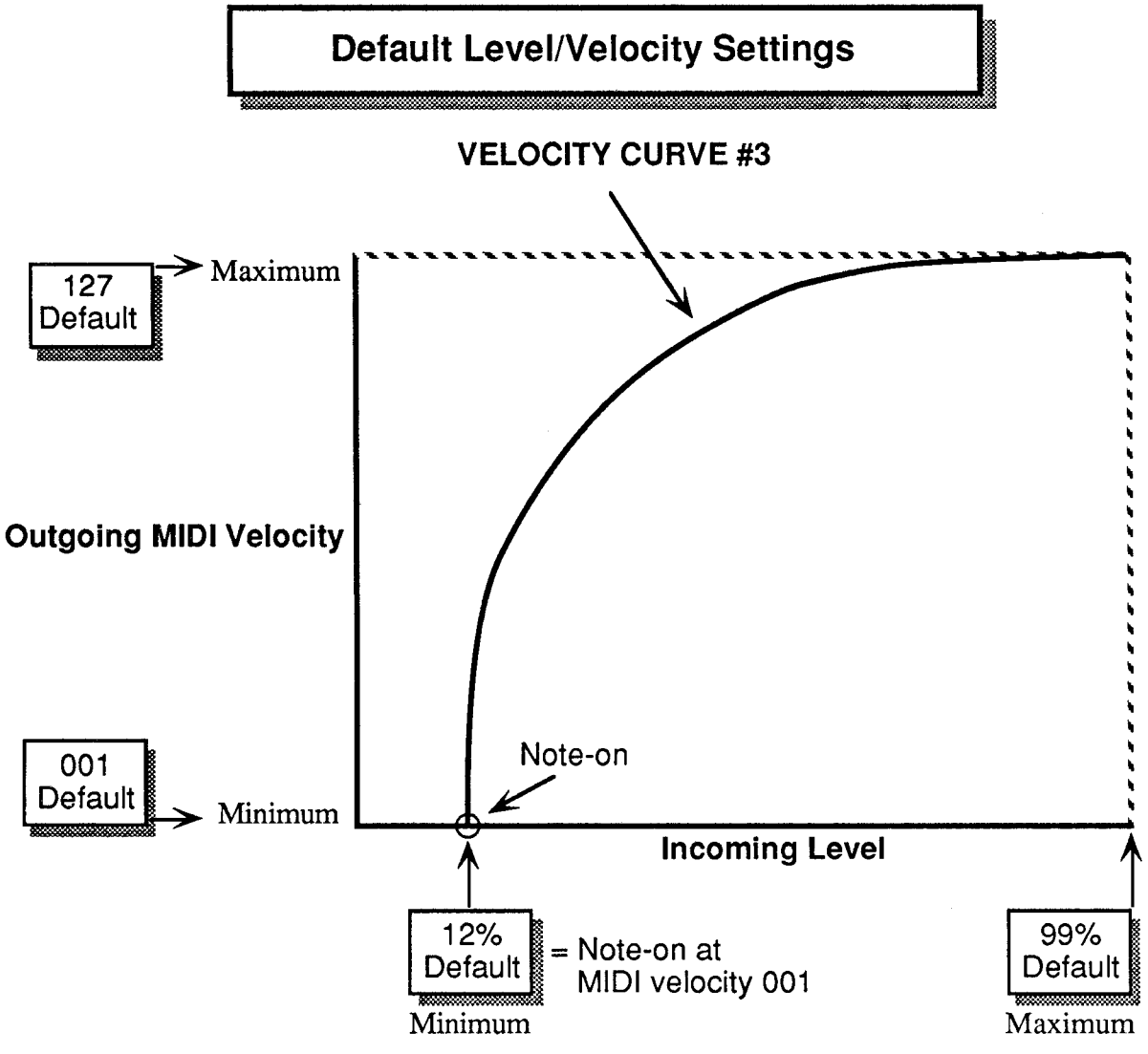
As an example of how to use these percentages and levels, let's say you don't even want to hear the sound until you're at about half your maximum volume, and you want the sound to kick in at MIDI velocity 64 or halfway up the MIDI velocity scale. Once the

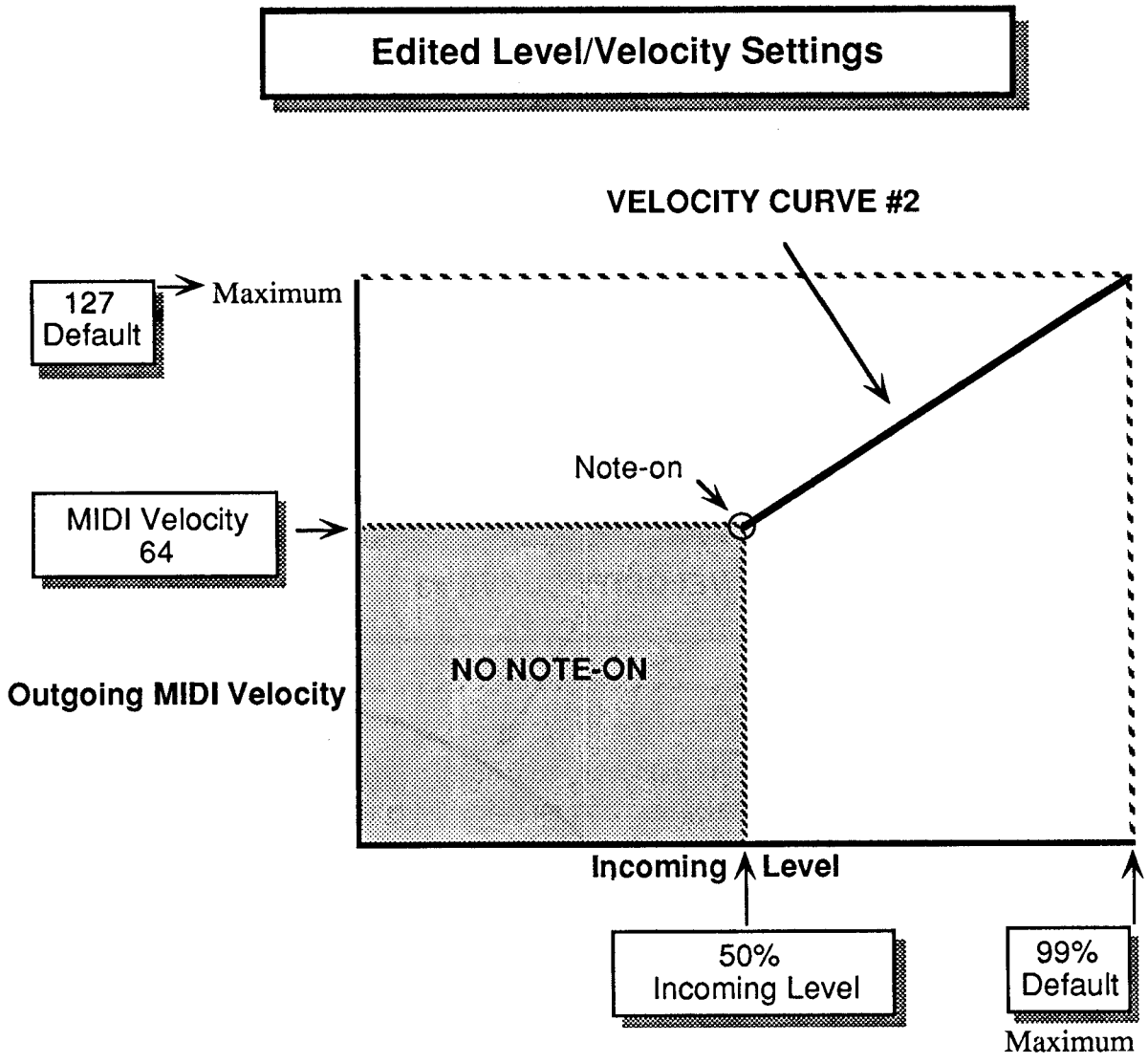
sound kicks in, you want it to continue normally to full volume. Here's the edit procedure:

Step 1: Put the cursor on the minimum level setting (12%). Use the +1/YES button to increase this number to 50%.

Step 2: Use the CURSOR ⇒ button to move to the minimum outgoing velocity value. Use the +1/YES button to increase this number to 64.

The following two diagrams illustrate the principles of the DTS70 LEVEL/VELOCITY settings – the first one represents the default settings, the second is the above edit:





Here's another example of how to use these percentages and levels – let's say you want every one of your hits, whether soft or loud, to send out maximum velocity through MIDI:

Step 1: Put the cursor on the minimum velocity setting (001).

Step 2: Use the +1/YES button to increase this number to 127. Now any incoming volume level from 12% to your maximum volume (99%) will generate a MIDI velocity of 127 (or full blast).

SPECIAL MIDI VELOCITY HINTS:

HINT #1: Some MIDI tone generators don't respond well to very soft incoming MIDI velocities. For these, it might be useful to set the minimum outgoing MIDI velocity to 10, 15, 20, or in some cases, even higher.

HINT #2: One trick to making a trigger pickup more sensitive (so that it will pick up a signal at a lower playing level) is to lower the *minimum incoming level percentage*. Be careful though; if you lower this percentage too far you increase your chances of false or double triggering. If you're trying to play closed rolls, you could also try *raising* the minimum incoming level percentage. You'll start to lose dynamic range as you increase this parameter, but it may enable you to play closed rolls and have the DTS70 send all the correct information. Hopefully, your tone generator will be able to *respond* accurately.

HINT #3: The DTS70 has a safeguard built in to its operating system that prevents you from setting the *maximum* outgoing MIDI velocity to a value less than the *minimum* outgoing MIDI velocity. This avoids some potential problems where your parameter settings might prevent the triggered sound from being heard.

HINT #4: Don't forget the key relationships between the rear panel Attenuation switch, Performance Edit page 2 GAIN settings and the LEVEL and VELOCITY settings on Performance Edit page 4. If the DTS70 doesn't seem to be tracking your playing correctly or the translation to MIDI information isn't accurate, check each of those settings. Think about the relationship that each one has to the others and make adjustments that keep them working together. Re-read the appropriate sections of this Guided Tour if you forget the relevant information. Check the Diagnostics/Troubleshooting section later in this manual for more help and information on this subject.

CUSTOM LEVEL/VELOCITY SETTINGS AND CURVE BEHAVIOR: If you use the LEVEL and VELOCITY settings to change the range of dynamics that are sent out, the selected CURVE fits itself into the new range. As an example, if you change the outgoing MIDI velocity settings to a minimum of 045 and a maximum of 088, the selected CURVE will exist in its full form within those velocity parameters.

THE REJECTION BROTHERS: SELF and OTHER

Press PAGE ⇓ once to get to Performance Edit page 5.

EDIT IN- 1	SELF	OTHER	WAIT
Pg 5	30ms	30%	1.2ms

The parameters on this page are some of your best tools for insuring accurate triggering and avoiding false and double triggering. SELF and OTHER are preset to normal optimum values, but some situations may require some slight adjustments. The WAIT value is set during the AUTOSET process for each input, but careful fine tuning may improve the overall trigger speed and response for each input.

The SELF parameter gives you the ability to ignore hits on the same input for a preset amount of time, which can help to eliminate double triggering. This value is expressed in milliseconds (ms). The default value of 30ms means that once you hit a pad or drum, the DTS70 will not acknowledge another trigger from the same drum for a period of 30 milliseconds. This value is adjustable, but if you make it too low, your chances of false triggering increase greatly. Twenty to forty milliseconds is an acceptable value for most situations.

If you want to check out the other end of the SELF extreme, use the +1/YES button to increase this value to 400 ms. Now play triplets on the selected pad or drum at a tempo of 120 bpm. The DTS70 will only play the first note of each triplet, because the other two notes fall within the set Rejection time period.

OTHER gives you the ability to avoid falsely triggering a sound from having hit other drums near it. The basic principle here is that you don't want to hit your bass drum or tom tom and inadvertently trigger your snare drum. The DTS70 allows you to assign a rejection percentage to each input. This will reject a percentage of the combined signals from the other DTS70 inputs. The value is represented as a percentage from 0 to 99%. The default level of 30% will be adequate for most situations. Setting this percentage too high will affect your polyphonic capabilities, that is, your ability to strike multiple drums simultaneously. Ideally, you should try to keep this percentage as low as your false triggering situation will allow.

THE WAIT PARAMETER

EDIT IN- 1	SELF	OTHER	WAIT
Pg 5	30ms	30%	1.2ms

Performance Edit page 5 also contains a key parameter in determining how well the DTS70 tracks your playing: WAIT. It's automatically adjusted during the AUTOSET procedure, so you really don't need to change it; but sometimes some slight adjustments can achieve favorable results. Adjusting it the wrong way can achieve worse results. It's a subtle, but powerful parameter, so it's worth your time to get an understanding of how it works.

WAIT is a parameter that programs the DTS70's internal timing mechanism for reading the peak of a wave generated by a hit on a pad or drum. When you hit a drum, the first instant of sound is literally an explosion of frequencies. In the midst of all these frequencies, there's a trigger pickup sending voltage (level) information to the DTS70. The DTS70 is looking for the earliest possible solid, steady voltage reading to use as a foundation for consistent and accurate triggering. Once the signal is accurately read and in digital format, the DTS70 can start to do some tricks with it, including all its neat MIDI stuff. Bear in mind that this is all taking place in an incredibly short period of time.

There are a number of variables that determine the absolute best instant for the DTS70 to "look" at that incoming barrage of frequencies and take its reading. The idea is to take the reading at the first possible instant that the signal is stable and clear to read. In general, the bigger, lower pitched and more resonant the drum, the longer after the initial strike it should wait. The smaller, higher pitched and more muffled the drum, the shorter the WAIT time. We're talking about increments of less than 1 millisecond of time here, which is much less than the time it takes you to say, "B"!

There are a number of factors that have an effect on the readability of the incoming signal, including drum size, tuning, head choices, muffling (if any), trigger pickup characteristics, trigger pickup mounting, Attenuation switch setting, GAIN setting and playing style. Each one of these affects how the others are working, so it's very important to establish the right relationships between these parameters. See the Diagnostics/Troubleshooting section later on in this manual for some suggestions on making these adjustments.

Here's the basic rule of thumb on WAIT:

The longer the WAIT time, the more precise the peak detection and dynamic response will be, but the slower the MIDI response (not by a whole lot, really, but slightly

slower). This setting is best for larger, lower pitched, more resonant drums.

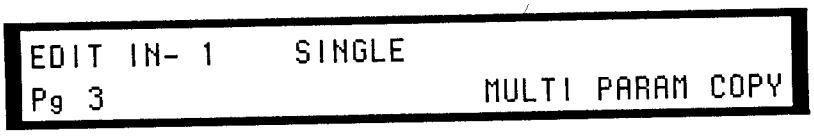
On the other hand, the shorter the WAIT *time, the quicker the response time will be, but the less accurate the peak detection and dynamic sensitivity. This setting is best suited for higher pitched, tighter, smaller drums.*

Electronic trigger pads are usually so clean that they need little or no WAIT. The DTS70's AUTOSET procedure recognizes this and will set an appropriately low WAIT time when you AUTOSET a pad.

Also, if the outgoing MIDI velocity is fixed (using Performance Edit page 4:LEVEL percentages and VELOCITY values to always send the same MIDI velocity no matter how hard you strike the drum), there is no need to detect the peak – WAIT time can be set to 0.

MULTI MODE

Press PAGE ⇑ twice to get to Performance Edit page 3.

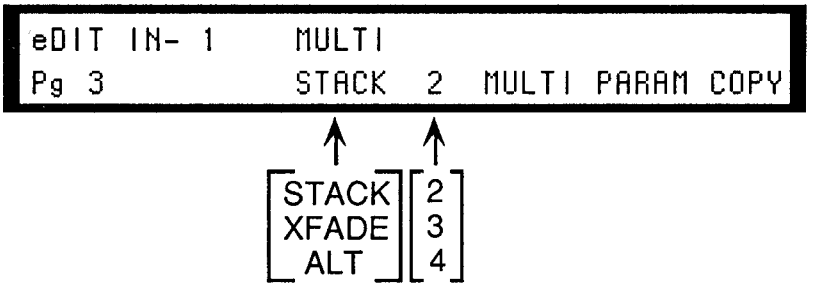


In its default mode, the DTS70 transmits one MIDI note for each input per Performance. This is represented by the word SINGLE in the display. In MULTI mode, it can also transmit two, three or four notes per input and these can change for every Performance. You can send multiple notes in one of three modes:

1. You can STACK two, three or four notes.
2. You can XFADE (crossfade) between two, three or four notes.
3. You can ALT (alternate) between two, three or four notes.

MULTI PARAM COPY DEFINITION

The lower right side of the LCD reads MULTI PARAM COPY. This stands for Multiple Parameter Copy. It's function is to assist you in quickly setting up multiple note configurations. Selecting and executing MULTI PARAM COPY copies the first note's MIDI parameters to each additional note specified in STACK or ALT modes. In XFADE mode, it also automatically sets up crossfade LEVEL, VELOCITY and CURVE values for you, maintaining the same MIDI note, channel, port and gate time you set for the first note.



When you change to a multiple note mode you're automatically in STACK , XFADE or ALT mode. It's not necessary to do a MULTI PARAM COPY to enter a multiple mode. MULTI PARAM COPY's main function in life is to save you time when you're setting up multiple modes, but it's an entirely optional function. If you would rather set these modes up manually, you can do so.

STACK MODE

STACK mode allows you to layer two, three or four sounds on top of each other. STACKing notes can be accomplished with several variations, a few of which are:

1. All STACKed sounds appear at every dynamic level. In other words, when you play softly you hear all STACKed sounds softly and as you get louder all STACKed sounds get louder with you.

2. STACKed notes can be arranged so that certain sounds appear only at one dynamic extreme or another, e.g. STACKed sound #1 only appears when you play softly and STACKed sound #3 only appears when you play loudly.

3. All STACKed sounds can appear at every dynamic level, but no matter how loudly or softly you play, the STACKed sounds will always play at full volume.

By manipulating the parameters on Performance Edit page 4 you can create many variations on the STACK mode.

BUILDING A STACK

Set up your first SINGLE note parameters so that the drum plays nicely, then go to Performance Edit page 3. The center of the display will show SINGLE, indicating that you are transmitting a single MIDI note for this input.

Step 1: Tap on the drum or pad you want to edit and make sure that the upper left of the display indicates that the correct input is selected for editing. Put the

cursor over SINGLE and press the +1/YES button to change SINGLE to MULTI, indicating that you are sending more than one MIDI note for the selected input.

Step 2: Press CURSOR ⇒ twice and increase the number of STACKed notes to 2. Do not put the cursor over MULTI PARAM COPY; if, by accident, you do, pressing the -1/NO button will stop execution of the MULTI PARAM COPY function.

Underneath MULTI the display now reads STACK 2, indicating that you are stacking two notes simultaneously for this input. The first note you're sending is the note that you already set up. The second note is at the default value, which is 060 (C3) on MIDI channel 1. This can easily be changed.

```
EDIT IN- 1    MULTI
Pg 3          STACK 2    MULTI PARAM COPY
```

Step 3: You will probably want to press PAGE ⇑ to access Performance Edit page 1 and change the MIDI note numbers for note 2. When you change from SINGLE mode to MULTI mode (2, 3, or 4 notes), Performance Edit page 1 will also show a slight change. At the lower left of the page, you can now use the DATA ENTRY buttons to select each new note (1st, 2nd, 3rd or 4th). The cursor is now flashing over 1st. Cycling through each of the notes in your STACK allows you to then use the CURSOR and DATA ENTRY buttons to manually alter individual STACKed note parameters.

```
EDIT IN- 1    NOTE      MIDI OUT   GATE
Pg 1  1st   060(C  3) CH 1 PORT1  0.5s *
```

Also 2nd,3rd,4th

You can either use the MIDI LEARN function (see the beginning of Section 2) to automatically set the second note's MIDI note and channel or you can set them manually. Don't forget about putting the cursor on the asterisk and hitting the +1/YES button to audition the sound.The asterisk feature will audition whatever sound is called up (1st, 2nd, 3rd or 4th).

Step 4: Depending on the effect you're after, you may also want to go to Performance Edit page 4 and change the LEVEL, VELOCITY or CURVE settings to affect when the sound appears, relative to your playing dynamics. You may not

want every selected note of your STACK to appear at all dynamic levels. The lower left section of Performance Edit page 4 will exhibit the same changes as just described for Performance Edit page 1.

CURSOR WRAP FEATURE: Remember, the cursor can wrap around in this display. Press and hold the CURSOR ⇒ button and the cursor will move all the way to the right of the display and then immediately jump back to the left. CURSOR ⇐ works in a similar fashion. When the cursor is on the asterisk, pressing CURSOR ⇒ will put the cursor over the STACKed note selection (1st, 2nd). Pressing CURSOR ⇐ twice will put the cursor back on the asterisk (it makes a stop on the way back to see if you want to change the input selected for editing).

ADDING NOTES TO A STACK

Step 1: If necessary, use the PAGE ⇑ or ⇓ button to get to Performance Edit page 3.

Step 2: Press CURSOR ⇒ twice to place the cursor over the selected number of notes.

Step 3: Use the +1/YES button to change the 2 to a 3 or 4. You will now be transmitting three or four notes for this input and you can go back to Performance Edit page 1 to set the MIDI Out information.

Step 4: Repeat Steps 1, 2 and 3 for each desired input.

ADDING MULTI NOTES: When you're creating or adding notes to a STACK, each note comes in at the default settings for LEVEL, VELOCITY and CURVE, NOTE, etc. This is different if you add the notes using the MULTI PARAM COPY feature (see description following).

CYCLING THROUGH INPUTS NOTE: You can cycle through all the DTS70 inputs in Performance Edit mode by using the footswitches or pads connected to the rear panel Dec/Inc inputs. This provides a silent way of switching to a different input. Alternately, you could turn all MIDI output OFF by hitting a footswitch or pad connected to the rear panel BYPASS input, and if the TRIGGER LEARN function is turned ON – select inputs for editing by lightly tapping with your hand on the pickup connected to the desired input. Remember, though, that this won't disable the analog output signals.

MULTI PARAM COPY IN STACK MODE

Let's say that you want each input to be sending **four** notes STACKed. Your sound source is set to receive on MIDI channel 1. You are sending MIDI information from the DTS70's MIDI Out Port 1. You've set your *first* note's LEVEL, VELOCITY and CURVE values on Performance Edit page 4 to your liking. **BEFORE** you set up the other three notes for each input, go to Performance Edit page 3.

Step 1: Tap on the drum or pad you want to edit and make sure that the upper left of the display indicates that the correct input is selected for editing. Put the cursor over SINGLE and press the +1/YES button to enter the STACK mode.

Step 2: Press CURSOR ⇒ twice and increase the number to 4.

Step 3: Press CURSOR ⇒ once more and MULTI PARAM COPY will change to Are you sure?. Press +1/YES to indicate that you want the DTS70 to **copy** the MIDI parameters **from** the **first** note of this STACK **to the other three notes**. Notes 2 through 4 will now have the same MIDI Note Number, Channel, Port, Gate, Level percentages, Velocity values and Curve as Note number 1. This is a convenient way to quickly obtain the first note's settings as a starting point for additional STACKed notes.

Step 4: You will probably want to press PAGE ⇑ to access Performance Edit page 1 and change the MIDI note numbers for notes 2, 3 and 4.

Step 5: Depending on the effect you're after, you may also want to go to Performance Edit page 4 and change the LEVEL, VELOCITY or CURVE settings to affect when the sound appears, relative to your playing dynamics. You may not want every selected note of your STACK to appear at all dynamic levels.

Step 6: Repeat Steps 1 through 4, with Step 5 as an option, for each desired input.

XFADE MODE

Crossfading allows you to switch smoothly from one sound to the next based on your playing dynamics. But instead of a specific switch point where you cease to hear the first sound entirely and then only hear the second sound, crossfading allows there to be an area where the two sounds overlap. So as you begin to play louder, the first sound will start to fade away. As it's fading away the second sound will appear on top of it, and eventually the first sound will disappear. This principle is the same but more complex for three and four note crossfades.

BUILDING A CROSSFADE (XFADE)

Set up a drum or pad so that it's triggering a single note well, then press the PAGE ⇑ or ⇓ button to go to Performance Edit page 3.

Step 1: Hit the drum or pad that you just set up in SINGLE mode. Make sure that the upper left of the display indicates that the correct input is selected for editing. Put the cursor over SINGLE and press the +1/YES button to change it to MULTI mode.

Step 2: Press CURSOR ⇒ once and then use the +1/YES button to change SINGLE to XFADE. If the display is not XFADE 2 , press CURSOR ⇒ and then use the DATA ENTRY buttons to set the number to 2.

```
eDIT IN- 1     MULTI
Pg 3           XFADE 2     MULTI PARAM COPY
```

You are now set up to crossfade from one sound to another. However, **in XFADE mode you should take advantage of the MULTI PARAM feature.** It is not advisable to set up crossfades manually unless you are very familiar with crossfade setups already. The best thing to do is to let the DTS70 set them up automatically for you, using the MULTI PARAM COPY feature, and then fine tune the settings to your liking. Otherwise, you'll have to manually set up all your crossfade LEVELS, VELOCITIES and CURVES, as well as your MIDI notes and channels. The MULTI PARAM COPY feature will automatically set up separate crossfade parameters for each note. You'll still need to select the different MIDI notes and channels that you want to send, either by using the MIDI LEARN function or setting them manually.

Step 3: When you change from SINGLE mode to MULTI mode (2, 3, or 4 notes), Performance Edit pages 1 and 4 will also change, allowing you to manually alter parameters separately for each note of your MULTI. At the lower left of both of these pages, you can now use the DATA ENTRY buttons to select each new note (1st, 2nd, 3rd or 4th) – see the reference diagram under STACK mode.

CHANGING A CROSSFADE BACK TO A SINGLE NOTE: Once you've entered XFADE mode, if you decide that you would like to return to normal SINGLE mode, the first note of your crossfade will then become the SINGLE note. But that note's LEVEL, VELOCITY and CURVE settings are still set up to be the first note in a crossfade. You will want to go immediately to Performance Edit page 4 and change these settings back to more normal SINGLE note values (see the default screens for LEVEL, VELOCITY and CURVE, Performance Edit page 4 for a starting point).

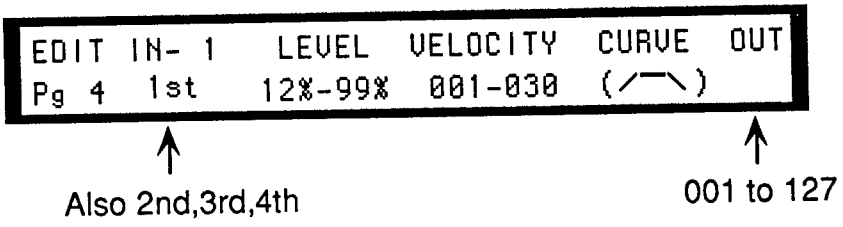
MULTI PARAM COPY IN XFADE MODE

Step 1: Assuming you have your first note set up, go to Performance Edit page 3, put the cursor on the word SINGLE and press the +1/YES button.

Step 2: Press CURSOR ⇒ and use the DATA ENTRY buttons to select XFADE 2.

Step 3: Press CURSOR ⇒ twice to MULTI PARAM COPY and press the +1/YES button to the question, Are you sure?

Step 4: Press PAGE ⇓ once to get to the LEVEL, VELOCITY and CURVE screen, Performance Edit page 4 .



MULTI PARAM COPY operates very differently in the XFADE mode. Instead of duplicating all of the first note's parameters, it automatically creates a crossfade from the first note to the second note. If you use the DATA ENTRY buttons to change between the first and second notes of your crossfade, you will notice that your maximum outgoing MIDI VELOCITY settings and your CURVE settings have been adjusted to set up a dynamic crossfade (and depending on the number of notes in the crossfade, the minimum incoming LEVEL might also get modified).

Step 5: Press PAGE ⇑ to get to Performance Edit page 1 and use the DATA ENTRY buttons to check your first and second MIDI note numbers and channels. The two are currently identical, so in order for your crossfade to be effective and "fade" from one sound to the next, change one of the notes.

This procedure will work in the same manner for crossfading between three or four notes. MULTI PARAM COPY will set up the dynamic crossfades for you , but you will have to go and assign the different MIDI notes and/or channels that you want to send.

CYCLING THROUGH INPUTS NOTE: You can cycle through all the DTS70 inputs in Performance Edit mode by using the footswitches or pads connected to the rear panel Dec/Inc inputs. This provides a silent way of switching to a different input. Alternately, you could turn all MIDI output OFF by hitting a footswitch or pad connected to the rear panel BYPASS input, and if the TRIGGER LEARN function is turned ON – select inputs for editing by lightly tapping with your hand on the pickup connected to the desired input. Remember that this won't disable the analog output signals.

ADDING NOTES TO A CROSSFADE (XFADE)

Step 1: If necessary, use the PAGE ⇑ or ⇓ button to get to Performance Edit page 3.

Step 2: Press CURSOR ⇒ twice to place the cursor over the selected number of notes.

Step 3: Use the +1/YES button to change the 2 to a 3 or 4. You will now be transmitting three or four notes for this input and you can go back to Performance Edit page 1 to set the MIDI Out information.

Step 4: The new notes will be added to the upper range of your playing dynamics. If you want to change the order of "dynamic appearance" (*when* the notes appear relative to your playing dynamics), you can go to Performance Edit page 1 and change the MIDI note numbers, selecting the new dynamic position in which each sound will appear by altering its order in the crossfade. You can also go to Performance Edit page 4 and note the various LEVEL, VELOCITY and CURVE settings for each note, making the desired changes to alter where each sound appears in your dynamic range.

Step 5: Repeat Steps 1, 2 and 3 for each desired input.

ALT MODE

Like XFADE mode, Alternate mode lets you switch between two, three or four notes, but unlike XFADE mode, no two notes ever play simultaneously. Instead, with each successive hit on the drum or pad, the DTS70 cycles through the notes you've assigned to that input. In other words, the first hit sends note #1, the second will send note #2, and so on, until the cycle begins again at note #1. **When** the new notes appear has

nothing to do with your playing dynamics – the notes will switch with each successive hit whether you are playing loudly or softly.

BUILDING AN ALTERNATE (ALT)

Go to Performance Edit page 3. Hit a drum or pad that's still in SINGLE mode or change another one back to SINGLE mode. Make sure you're only triggering one sound.

Step 1: Tap the drum or pad that you want to edit and make sure that the upper left of the display indicates that the correct input is selected for editing. Set up your first SINGLE note parameters so that the drum plays nicely.

Step 2: Go to Performance Edit page 3, and use the DATA ENTRY buttons to change SINGLE to MULTI. Press CURSOR ⇒ once and use the +1/YES button to select ALT. If the display is not ALT 2, press CURSOR ⇒ and use the DATA ENTRY buttons to set the number to 2.

```
eDIT IN- 1     MULTI
Pg 3           ALT  2     MULTI PARAM COPY
```

You are now set up to alternate between two sounds.

Step 3: The second sound will be at the default MIDI note 060 (C3), so you'll probably want to press PAGE ⇑ to go to Performance Edit page 1 and change the MIDI note number for note 2.

When you change from SINGLE mode to MULTI mode (2, 3, or 4 notes), Performance Edit page 1 will show a slight change. At the lower left of the page, you can now use the DATA ENTRY buttons to select each new note (1st, 2nd, 3rd and 4th). Cycling through each of the notes in your ALT allows you to then use the CURSOR and DATA ENTRY buttons to manually alter individual ALT note parameters.

```
eDIT IN- 1     NOTE      MIDI OUT    GATE
Pg 1  1st    060(C  3) CH 1 PORT1   0.5s *
```

↑
Also 2nd,3rd,4th

Step 4: Depending on the effect you're after, you may also want to use the PAGE ⇓ button to go to Performance Edit page 4 and change the LEVEL, VELOCITY

or CURVE settings to affect when each sound appears and how it plays, relative to your playing dynamics. They'll be at the default settings. With the *possible* exception of changing the CURVE setting (default is CURVE 1), the other settings on this page should be fairly normal and playable. In case you do want to make some changes in your ALT, Performance Edit page 4 will show the same changes to its screen as described previously for Performance Edit page 1.

ADDING NOTES TO AN ALTERNATE (ALT)

Step 1: If necessary, use PAGE ⇑ or ⇓ to get to Performance Edit page 3.

Step 2: Press CURSOR ⇒ twice to place the cursor over the selected number of notes.

Step 3: Use the +1/YES button to change the 2 to a 3 or 4. You will now be transmitting three or four notes for this input and you can go back to Performance Edit page 1 to set the MIDI Out information.

Step 4: You might want to use the PAGE ⇑ or ⇓ button to get to Performance Edit page 4 to adjust the LEVEL, VELOCITY or CURVE settings.

Step 5: Repeat Steps 1, 2, 3 and 4 for each desired input.

CYCLING THROUGH INPUTS NOTE: You can cycle through all the DTS70 inputs in Performance Edit mode by using the footswitches or pads connected to the rear panel Dec/Inc inputs. This provides a silent way of switching to a different input. Alternately, you could turn all MIDI output OFF by hitting a footswitch or pad connected to the rear panel BYPASS input, and if the TRIGGER LEARN function is turned ON – select inputs for editing by lightly tapping with your hand on the pickup connected to the desired input. Remember that this won't disable the analog output signals.

MULTI PARAM COPY IN ALT MODE

Again, tap the drum or pad that you want to edit and make sure that the upper left of the display indicates that the correct input is selected for editing. Set up your first SINGLE note parameters so that the drum plays nicely. Now before you add any notes to create an Alternate:

Step 1: Go to Performance Edit page 3, and use the DATA ENTRY buttons to change SINGLE to MULTI, then cursor over and select ALT 2.

Step 2: Press CURSOR ⇒ and then +1/YES to OK the MULTI PARAM COPY.

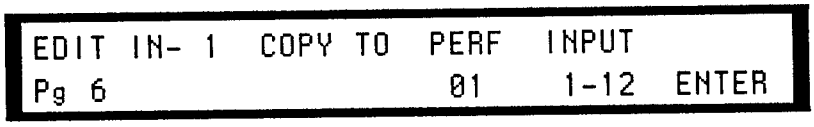
Step 3: Press PAGE ⇑ to get to Performance page 1 and select a new note for either your first or second note. In ALT mode, MULTI PARAM COPY once again duplicates your first note's parameters to the second, third and forth notes, as in STACK mode. This is a convenient way to quickly obtain the same settings as a starting point for multiple notes. Remember, in ALT mode each successive hit on the drum or pad triggers a new sound (either two, three or four different sounds). If you want the same sound twice in a row, simply assign the same MIDI note number twice in a row.

It's easy to customize MIDI responses in ALT mode. For instance if you want the third note to speak only at full velocity, go to Performance Edit page 4 and change the minimum outgoing velocity to 127.

COPY MODE

Press PAGE ⇓ to get to Performance Edit Page 6. This page allows you to copy any input's parameters in a number of different ways:

- copy one input's settings to another in the *same* Performance
- copy one input's settings to another in a *different* Performance
- copy one input's settings to *several* other inputs in the *same* Performance
- copy one input's settings to *several* other inputs in a *different* Performance



The upper left of the display shows your source input (the input you're copying **from**). The rest of the display indicates the Performance and inputs you'll be copying **to**. On this page you can alter which input you want to copy from and where you'd like to copy it. The currently selected Performance is always the default COPY TO Performance..

For example, if you want to copy the currently selected input settings to another input in the same Performance:

Step 1: Check to be sure that the correct source input and Performance are selected. These are the ones you are copying **from**...

Step 2: Press CURSOR ⇒ until the cursor is flashing over the first of the two input numbers. You can select a single input by setting both input numbers to the

same number (8 – 8). You can select multiple inputs to copy to by setting an input range (8 – 12).

Step 3: To execute the copy, press CURSOR ⇒ until the word ENTER changes to Sure?.

Step 4: If you change your mind, pressing the -1/NO button immediately stops the copy procedure.

Step 5: When the correct copy parameters have been set, press the +1/YES button to execute the copy.

COPYING AN ENTIRE PERFORMANCE TO A NEW LOCATION: You can copy an entire Performance to a new location by simply storing it to a different Performance number using the standard Performance STORE function.

MIDI MERGE AND MIDI THRU

Press PAGE ⇓ to get to Performance Edit page 7.

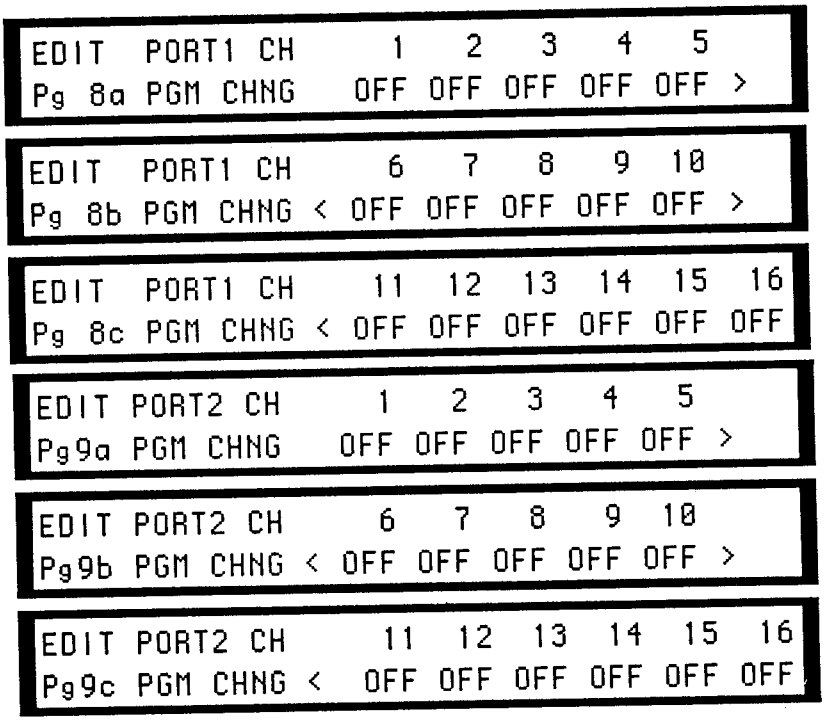
This page addresses only one thing – MIDI MERGE. Merging refers to the ability of a microprocessor to combine two sets of MIDI signals without garbling the digital messages they contain. What this means in the everyday MIDI world is that you can plug another MIDI controller or sequencer into the MIDI In of the DTS70 and MERGE it with your playing, so that they can both access the same tone generator. The DATA ENTRY buttons allow you to select either PORT 1 or PORT 2 as the port through which merged data is sent.

There may be occasions when you don't want to merge anything to either PORT 1 or PORT 2. For this sort of situation, turn MIDI MERGE OFF.

Whether MIDI MERGE is turned ON or OFF, messages received at a DTS70 MIDI In will automatically be passed unchanged out the MIDI Thru. MIDI Thru can be useful for accessing two tone generators from a MIDI controller with only one MIDI Out, although it will introduce a bit more delay in the response time of the sound source accessed from the MIDI Thru. It can also be convenient for sending program change messages to effects devices and other non-tone generating equipment.

OUTGOING MIDI PROGRAM CHANGES

Press PAGE ⇓ once to get to Performance Edit page 8a. The next six pages let you select MIDI program changes to be sent out the MIDI ports every time you select the current Performance. Pages 8a, 8b and 8c let you set the outgoing MIDI program changes for MIDI Out PORT 1. Pages 9a, 9b and 9c let you select the outgoing MIDI program changes for MIDI Out PORT 2.



The top row of each page shows you which MIDI Port these changes will be sent out from and on what MIDI channel. The bottom row of each page shows you the program change number being sent on each channel. The program change number to be sent can be any number from 1 to 128. If you don't want or need a program change sent on a particular channel, set the program number to OFF.

As usual, the PAGE buttons move you from one page to the next. But there's another convenient way to get around pages while you're working with the program change tables. As long as you're working within the settings for one MIDI Out Port, the CURSOR buttons will move you from one page to the next. So CURSOR ⇒ will move you through all the pages for PORT 1. When you're ready to work on the Port 2 Program Change Table, press the PAGE ⇓ button. Again, pressing CURSOR ⇒ will move you through all the PORT 2 pages.

The DATA ENTRY buttons scroll through all the available program change numbers.

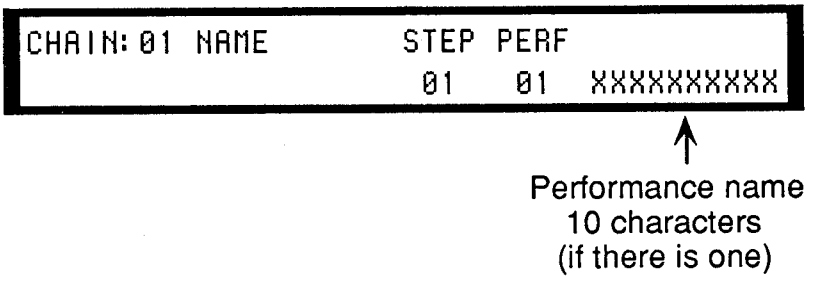
Each MIDI Port can send up to 16 program changes per DTS70 Performance. This means that you can send a total of 32 separate program changes for each Performance (16 program changes out each Port – one for each MIDI channel).

CHAIN MODE

The DTS70 has 32 Chains. Each Chain has 32 steps, each of which is one DTS70 Performance. This allows you to step through a preset sequence of Performances in any order you choose. Chain mode works like Performance mode in that the only way to edit a Chain is by pressing the EDIT/COMPARE button.

CHAIN PLAY

Press the CHAIN button on the DTS70 front panel to access the Chain Play mode.



Each of the 32 Chains are numbered and can be named, but since this one hasn't been named yet, the display simply says NAME. The currently selected STEP and the Performance assigned to it are indicated. If the Performance has been named, its name as well as number will show up in this display.

No editing can be performed in Chain Play mode. You can move the cursor to the STEP parameter and use the -1 and +1 buttons to move through the Chain, but you can't edit any STEPS. While in Chain Play mode, pressing a footswitch or hitting a pad connected to the FOOTSWITCH INC/+1 and DEC/-1 inputs on the back of the DTS70 will move you forward or backward through the Chain.

CHAIN EDIT

Press the EDIT/COMPARE button once to edit a Chain.

```
CHAIN:01  STEP  01 02 03 04 05 06 07 08
Pg 1      PERF  01 02 03 04 05 06 07 08

CHAIN:01  STEP  09 10 11 12 13 14 15 16
Pg 2      PERF  09 10 11 12 13 14 15 16

CHAIN:01  STEP  17 18 19 20 21 22 23 24
Pg 3      PERF  17 18 19 20 21 22 23 24

CHAIN:01  STEP  25 26 27 28 29 30 31 32
Pg 4      PERF  25 26 27 28 29 30 31 32
```

The 4 pages of CHAIN Edit mode allow you to select one DTS70 Performance for each STEP of the Chain. To edit the chain:

Step 1: If you want to edit STEP 1, the cursor is already in position. If not, press the CURSOR ⇒ button until the cursor is below the STEP you want to edit.

Step 2: Use the DATA ENTRY buttons to scroll up and down through the available Performance numbers (1-48). Insert the desired Performance number at any STEP by calling up its number below that STEP.

Step 3: The PAGE ⇑ and ⇓ buttons will move you through the Chain Edit pages.

CHAIN STORE

When the CHAIN is set up to your liking, press the STORE button once.

```
STORE TO CHAIN:01
NAME:XXXXXXXXXX          STORE
```

Chain name
10 characters

At this point, you can name the Chain. Each of the 32 Chains can be given a name up to 10 characters long. To name and store the Chain:

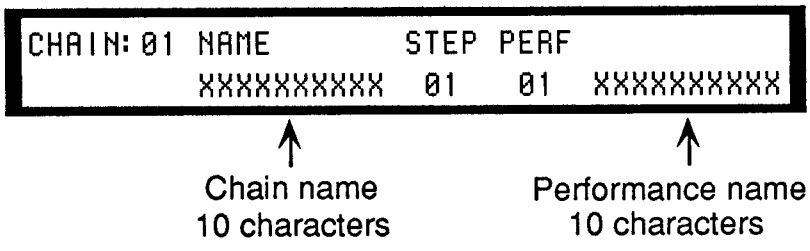
Step 1: Press CURSOR ⇒ once and use the DATA ENTRY −1 and +1 buttons to select the first character of the name. CURSOR ⇐ and ⇒ will move you back and forth from one character to the next. If you want a blank space, press and hold the -1/NO button.

Step 2: When you're finished naming the Chain, press the STORE button again, or press and hold CURSOR ⇒. Either way, the lower right of the display will ask you if you are sure you want to save this Chain. If you are sure, press the +1/YES button. If you have any doubts, press the NO button.

Step 3: If you pressed the NO button, pressing the EDIT/COMPARE button will take you back into the Performance Edit mode.

Step 4: If you pressed the YES button, the display will read "Done!".

Step 5: Press the CHAIN button and you're ready to play that Chain.



You can save the same Chain to several different Chain locations (1-32), using the standard Chain STORE mode. This is convenient for creating modified versions of the same Chain. You might want to rename each new version of the Chain. Press the CHAIN button to return to Chain Play mode.

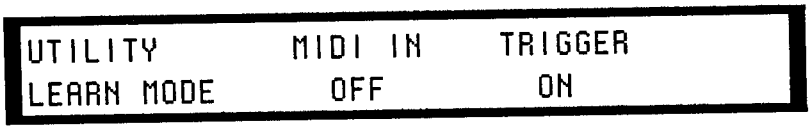
UTILITY MODE

This mode lets you set and modify global parameters for the DTS70's operating system. Global simply refers to those parameters whose settings do **not** change per Performance or Chain – their settings remain intact until you come back into UTILITY mode and change them. UTILITY mode also lets you save and load System Exclusive bulk information and create custom incoming Program Change tables.

Every time you enter UTILITY mode, the display will default to page 1 and the red LED display will change to Ut.

LEARN MODES

Press the UTILITY button. Both of the DTS70 LEARN modes are on page 1.



MIDI IN LEARN MODE provides a shortcut for teaching the DTS70 what sounds you want to trigger and from which inputs. If your drum machine or tone generator can send MIDI note and channel information, turning MIDI IN LEARN MODE to ON will let you send that information to the DTS70. To do this:

Step 1: After turning MIDI IN LEARN MODE ON, go to Performance Edit page 1 and select an input. This can be done if TRIGGER LEARN mode is ON by just tapping on the drum or pad. Otherwise, use the CURSOR and DATA ENTRY buttons to change the selected input, or hit footswitches or pads connected to the INC and DEC inputs on the DTS70's back panel. Check the upper left of the display to make sure that the correct input is selected for editing.

Step 2: Have the tone generator transmit the sound you want that drum or pad to trigger. If you read the very beginning of Section 2, the Guided Tour, you're probably already familiar with this function. If not, here's a quick explanation:

Assuming you have your drums or pads wired up and connected to the DTS70, connect a MIDI cable from the MIDI Out of your drum machine or tone generator to a MIDI In on the DTS70. Connect a MIDI cable from the MIDI Out of the DTS70 to the MIDI In of your drum machine. Now hit the drum machine pad that corresponds to the sound you want to trigger, or have your tone generator transmit the corresponding MIDI note number and channel to the DTS70.

Step 3: Repeat Steps 1 and 2 for each desired input.

TRIGGER LEARN MODE provides two services:

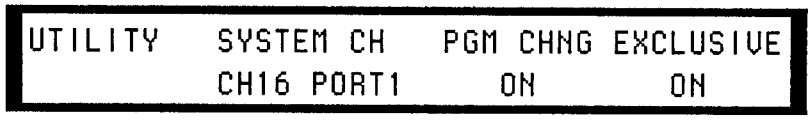
1. Turning it ON enables the AUTOSET function in Performance Edit mode to work.

2. It gives you an easy way to select which input you're editing in Performance Edit mode. With TRIGGER LEARN ON, striking the drum or pad will automatically select that input for editing.

MIDI and TRIGGER LEARN MODE ON WARNING: If you leave MIDI and TRIGGER LEARN MODES on all the time, every time you're on Performance Edit page 1, an incoming MIDI note could reset the values for the currently selected input's MIDI note number and channel. If nothing is connected to a DTS70 MIDI In, there's nothing to worry about. And if this does happen, don't save the new information to your Performance and no permanent damage will have occurred, but this could give you a reason to turn MIDI and TRIGGER LEARN MODES off after you initially AUTOSET your drums.

SYSTEM EXCLUSIVE SETUP

Press PAGE ⇓ to get to UTILITY page 2. This page lets you set parameters that control how the DTS70 deals with MIDI System Exclusive information.



System Exclusive bulks contain all of the information stored in the DTS70 at a particular time. This information can be saved out through MIDI to any device that stores generic system exclusive bulks and can then save them onto a floppy disk or other appropriate storage medium. Common storage devices used for this purpose are personal computers and some keyboards with disk drives. There are also some disk drive-based devices on the market that are designed specifically for this purpose.

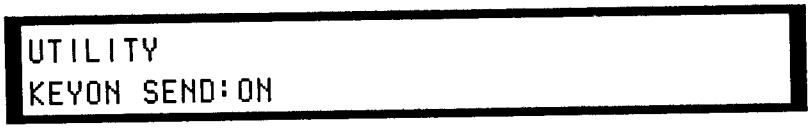
The **left** side of the display allows you to set the System Channel and Port. When you save the DTS70's internal settings through a MIDI System Exclusive bulk dump, these two settings will determine which Port the information goes through (1 or 2) and the MIDI channel it's sent on (1-16). The MIDI channel must be set to the same one when the bulk is sent back into the DTS70 for it to recognize it. These settings also determine the Port and Channel on which the DTS70 will respond to incoming MIDI program changes.

The **center** of this page lets you enable or disable the SYSTEM PROGRAM CHANGE function. If it's turned ON, the DTS70 will respond to incoming MIDI program changes *if they arrive via the designated* SYSTEM CHANNEL *and* PORT. If this function is turned OFF, the DTS70 will not respond, regardless of their Port or Channel.

The **right** side of this page allows you to turn SYSTEM EXCLUSIVE ON or OFF. With SYSTEM EXCLUSIVE OFF, the DTS70 will not be able to receive a MIDI System Exclusive bulk through either of its MIDI In Ports. Default is ON, which allows System Exclusive bulks to be received.

KEY ON SEND

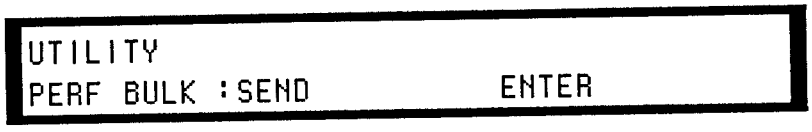
Press PAGE ⇓ to get to the KEYON SEND page.



Setting KEYON SEND to ON allows the DTS70 to send MIDI data. With this function set to OFF, no MIDI data will be output from any of the DTS70's MIDI Out Ports. Turning this function OFF is the equivalent of putting the DTS70 in BYPASS mode. Notice that setting the KEYON SEND to OFF causes the red LED display duplicates its BYPASS mode look (- -).

PERFORMANCE BULK DUMP

Press PAGE ⇓ to get to the PERFORMANCE BULK page.



This page lets you send a MIDI System Exclusive bulk dump of all 48 Performances and related data in the DTS70. The bulk will be sent out the Port and on the Channel specified on the System Exclusive setup page in UTILITY mode. To send the bulk:

Step 1: Press CURSOR ⇒ to place the cursor over the word ENTER, changing it to Are you ready? If you change your mind and don't want to send the bulk, pressing the -1/NO button will cancel sending the bulk.

Step 2: Before you transmit, make sure that the device on the receiving end of the bulk is prepared to receive. Press the +1/YES button when the display reads Are you ready?. As the bulk is being sent, the display will read Sending: 01, Sending: 02, etc. After sending Performance 48, the display will return to its original look.

Step 3: Check the receiving device to be sure that the transfer of information was successful. Then take the appropriate measures to save the bulk to a more permanent location, such as onto a disk.

The DTS70 can receive a System Exclusive bulk dump while you are in Performance Play, Chain Play or Utility modes. The bulk must be received on the same channel on which it was originally sent, otherwise the DTS70 will ignore it. To send a bulk back to the DTS70, simply connect a MIDI cable from the MIDI Out of the sending device to the MIDI In of the DTS70. Be sure EXCLUSIVE on Utility mode page 2 is turned ON. The DTS70 will not increment through the Performances when receiving as it does when sending. If you send a Performance bulk in while the DTS70 is on Utility page 2, this is how the LCD will look when the transfer is completed (the upper half of the display will always remain intact):

CHAIN BULK DUMP

Press PAGE ⇓ to get to the CHAIN BULK page.

This page lets you send a MIDI System Exclusive bulk dump of all 32 Chains and related data in the DTS70. The bulk will be sent out the Port and on the Channel specified on the System Exclusive setup page in UTILITY mode. To send the bulk:

Step 1: Press CURSOR ⇒ to place the cursor over the word ENTER, changing it to Are you ready? If you change your mind and don't want to send the bulk, pressing the -1/NO button will cancel sending the bulk.

Step 2: Before you transmit, make sure that the device on the receiving end of the bulk is prepared to receive. Press the +1/YES button when the display reads Are you ready?. As the bulk is being sent, the display will read Sending: 01, Sending: 02, etc. After sending Chain 32, the display will return to its original look.

Step 3: Check the receiving device to be sure that the transfer of information was successful. Then take the appropriate measures to save the bulk to a more permanent location, such as onto a disk.

The DTS70 can receive a System Exclusive bulk dump while you are in Performance Play, Chain Play or Utility modes. The bulk must be received on the same channel on which it was originally sent, otherwise the DTS70 will ignore it. To send a bulk back to the DTS70, simply connect a MIDI cable from the MIDI Out of the sending device to the MIDI In of the DTS70. Be sure EXCLUSIVE on Utility mode page 2 is turned ON. The DTS70 will not increment through the Performances when receiving as it does when sending. If you send a Chain bulk in while the DTS70 is on Utility page 2, this is how the LCD will look when the transfer is completed (the upper half of the display will always remain intact):

```
UTILITY   SYSTEM CH   PGM CHNG EXCLUSIVE
 *****  Chain  Bulk  Received:32  *****
```

SPECIAL FUNCTION PAD

Press PAGE ⇓ to get to the special FUNCTION PAD page.

```
UTILITY              IN-10    IN-11    IN-12
FUNC PAD  :OFF       NORMAL   NORMAL   NORMAL
```

Although this page is filled with text, there's really only one thing you can do here – use the DATA ENTRY buttons to toggle this feature ON or OFF. With it OFF, Inputs 10, 11 and 12 function as normal inputs. Use the DATA ENTRY buttons to toggle this function ON and the display will change to:

```
UTILITY              IN-10    IN-11    IN-12
FUNC PAD  :ON        BYPASS   INC/+1   DEC/-1
```

With it ON, these three inputs on the back panel of the DTS70 no longer function as normal inputs. They function only as follows:

- Input 10 functions as a BYPASS input.
- Input 11 functions as an INCREMENT/+1 input.
- Input 12 functions as a DECREMENT/-1 input.

This also lets you use a piezo-type pad instead of a footswitch to perform the BYPASS, INCREMENT and DECREMENT functions. The normal BYPASS, INCREMENT and DECREMENT inputs are still active with this function turned on, so you could have two sets of controls if you wanted.

Although Yamaha's PTT8 Electronic Percussion Pads can be plugged into the normal back panel BYPASS, INCREMENT and DECREMENT inputs, other pads may output more voltage than would be healthy for the DTS70. If you think you might want to use a non-Yamaha pad for these functions, **PROCEED WITH CAUTION**. They can severely damage the DTS70. Turn this special function on and plug the questionable pads into inputs 10, 11 and 12 to access these functions.

INCOMING MIDI PROGRAM CHANGE TABLE

Press PAGE ⇓ to get to the first page of the incoming Program Change Table pages. These 6 pages allow you to customize how the DTS70 responds to incoming MIDI program changes. Under normal (and DTS70 default) circumstances, incoming program changes will call up the directly corresponding DTS70 Performance. That is, if you send the DTS70 MIDI program change 26, it will go to its stored Performance number 26.

Due to the increasing size and complexity of MIDI systems and the desire for reducing the time spent programming, Yamaha has included a flexible MIDI program change table. You can customize the DTS70's response to any incoming program changes so that any incoming MIDI program change number from 1 to 128 can call up your choice of DTS70 Performances.

PERF No.	01	02	03	04	05	06	07	08
PGM CHNG	001	002	003	004	005	006	007	008

PERF No.	09	10	11	12	13	14	15	16
PGM CHNG	009	010	011	012	013	014	015	016

PERF No.	17	18	19	20	21	22	23	24
PGM CHNG	017	018	019	020	021	022	023	024

PERF No.	25	26	27	28	29	30	31	32
PGM CHNG	025	026	027	028	029	030	031	032

PERF No.	33	34	35	36	37	38	39	40
PGM CHNG	033	034	035	036	037	038	039	040

PERF No.	41	42	43	44	45	46	47	48
PGM CHNG	041	042	043	044	045	046	047	048

As an example, let's say you want Performance 05 to be called up when you send the DTS70 a MIDI program change of 97. To modify the table:

Step 1: Be sure that you've set the incoming Program Change function on the System Exclusive setup page in UTILITY mode to ON. Also note the SYSTEM CHANNEL on the same page. The program change will have to come into the DTS70 on this channel for the DTS70 to recognize it and call up the correct Performance.

Step 2: Use the CURSOR buttons to place the cursor under PERF No. 05 and change the value underneath it to 97. Now, sending the DTS70 a program change of 97 calls up Performance 05.

Step 3: Repeat the above procedure for each DTS70 Performance that requires customization. The PAGE ⇑ and ⇓ buttons will move you through the Incoming MIDI Program Change table pages.

The incoming MIDI Program Change Table does not need to be stored.

CLOSING STATEMENT TO THE GUIDED TOUR

This concludes the guided tour portion of the DTS70 manual. We hope that you found it informative and useful. The DTS70 is designed with the needs of the acoustic and electronic drummer/percussionist in mind. We think you'll find it to be friendly to use and powerful enough to deserve the command of your system.