SECTION 3/// Triggering Discussion

This section is a discussion of triggering principles and techniques. It is not intended to be the final and only word on the subject, but rather to bring up enough points to make you consider some things that otherwise might have slipped by unnoticed. The material covered here is accurate, but much of the "technique" of triggering is dependent on your ability to put the pieces of your own situation together. Experiment with the various aspects of your triggering setup; because of the great numbers of variables involved, what works for someone else won't always work for you.

GENERAL TRIGGERING OBSERVATIONS

Triggering is more experimentation and research than cold, hard scientific facts. No amount of scientific study or testing can change the fact that the objective is to obtain a clean, clear, consistent signal from something that's giving you extraneous frequencies, strange signal peaks and many other variables! These include drum size, room acoustics, type of pickup, playing style, pickup mounting, the trigger reading device, the triggered tone generator, type of drumhead and drum tuning. Triggering from electronic pads is usually easier because you have a direct, somewhat less affected trigger signal.

PICKUP PLACEMENT AND MOUNTING

Placement and mounting of the pickup can make a big difference. The most sensible place is the outside edge of the drumhead, close to the bearing edge of the drum. Ideally, the pickup should be mounted on the drumhead, very close to where you hit the drum, but this would put the pickup in constant danger of being hit. Since the drumhead is the first thing to vibrate, mounting the pickup on it allows the triggering system to be as fast and accurate as possible. If the pickup is being mounted on a coated drumhead, scrape away the coating at the place where it is to be mounted. A pickup can be placed inside the shell, outside the shell, on the counterhoop and a variety of other places, but placing it on the drumhead will always yield the fastest and most accurate trigger.

Yamaha DT10 pickups are supplied with double-sided sticky tape. This works well. As an alternative to sticky tape, clear silicone sealant can be used to mount the pickup. A thin coating of sealant should be applied to the drumhead at the point of contact with the pickup. The pickup should then be lightly pressed into the sealant and allowed to dry in that position. Check various brands of silicone sealant since some dry more quickly than others. The ideal material for mounting a pickup provides cushioned flexibility for it while allowing the accurate reading of dynamics.

Once the pickup is firmly mounted on the drumhead, a small piece of **cloth** duct tape should be applied over it. This adds further security for the pickup and protects it from flying objects such as drum sticks. Plumber's duct tape (often grey-colored) should not be used because it contains metal, which can cause false or double triggering problems. When changing pickups or drumheads, the cloth duct tape can be carefully peeled away. If the pickup is mounted with double sticky tape, it can be carefully removed by hand. If the pickup is mounted with silicone, it can be carefully removed with a small knife or razor blade.

When deciding to mount the pickup, try to keep the trigger out of the line of fire and away from other drums. This will decrease the possibility of false triggering.

DRUMS OF VARIOUS SIZES AND TYPES

In general, smaller drums are easier to trigger from than larger drums. There is less of an expanse of drumhead to vibrate and the signal settles into something "readable" much more quickly. The larger the drum, the longer it takes to reach its peak signal, and the more bashing around of frequencies occurs. Tuning also plays an important role in triggering. The more evenly the head is tuned, the more even and accurate the triggered response will be across the head.

The amount of force exerted on a bass drum head can be considerably more than on a drum hit with a stick. This makes it a special case for triggering. In general, the closer the pickup is mounted to the place where the beater hits, the quicker and more accurate the triggering will be. Snare drums have snares against the bottom head and this makes them another special case for triggering. As soon as you hit a snare drum, the snares snap back against the bottom head. This acts as a dampening factor and prevents the snare drum from ringing as long as a tom tom. This is a help for triggering. The shorter the decay of the drum, the less the likelihood of a double trigger occurring.

ELECTRONIC PADS

Electronic pads generally send out one of the cleanest, clearest and easiest-to-read trigger signals. They incorporate a pickup that has been shock-mounted into a frame that resonates much less than an acoustic drum. Some pickups are inherently "hotter" than others (they output greater voltages with softer hits). This is not particularly an advantage, since the DTS70 will perform equally well with varying degrees of input levels. Some adjustment of the input Attenuation switches may be necessary, but all incoming pad signals should be fairly easy to use as a triggering source. One thing to watch out for is the pad mounting systems. Some mounting systems allow for too much vibration between pads. Try to develop a mounting system that allows the pads to be tightened securely in place, while still being isolated from external vibrations.

SECTION 4 /// Technical Reference

This section is a step-by-step technical reference guide to the DTS70 functions and screens. It makes no attempt to walk you through specific procedures, but rather is included as a quick reference for those already familiar with the materials in the rest of this manual. It's the quickest way to answer most questions about the hardware and software in the DTS70.

PERFORMANCE MODE

This includes information about Performance Play, Edit and Store modes.

PERFORMANCE PLAY MODE

In this mode, you can select and play any of the DTS70's 48 performances.

If you exit back to this mode after editing, *but not storing*, a Performance, the word "PERF" in the LCD becomes "pERF" as a reminder that you haven't stored this Performance yet.

PERFORMANCE EDIT/COMPARE MODE

In this mode you can edit Performance parameters. To edit a Performance, first select the desired Performance in Performance Play mode and then press the EDIT button to enter Performance Edit mode.

When you begin to edit a Performance, you aren't actually working on the stored Performance information. Instead, you're working on a temporary copy of the Performance in the Edit buffer. This system protects you from inadvertantly ruining a Performance that you didn't intend to change. But, since the edited Performance isn't in permanent memory, you must use the Store mode to store it to one of the DTS70's 48 Performance memories if you would like to recall it at a later time.

When editing, you can press COMPARE to check the current edit of the performance to the previously stored version. The word "EDIT" in the LCD becomes "COMP," and the DATA ENTRY buttons do **not** function while you are listening to the stored version.

Page 1: MIDI Out Information

The first LCD page in this mode appears as follows:

```
┌─────────────────────────────────────────┐
│ EDIT IN- 1    NOTE     MIDI OUT   GATE   │
│ Pg 1          060(C  3) CH 1 PORT1 0.5s * │
└─────────────────────────────────────────┘
```

Input Number (1-12) (represented as IN- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.

Note Number (1st-4th)
Shows which note you are editing *when the DTS70 is in Multi mode* .

MIDI Note Number (0-127)
Selects the MIDI Note that will be transmitted.

MIDI Channel (1-16)
Selects the MIDI transmit channel for the MIDI note set above.

MIDI Port Number (1, 2)
Selects the MIDI Port through which the MIDI note will be sent.

Gate time (0.0-5.0)
Sets the time, in seconds, from when the Note On message is sent to when the Note Off message is sent. In simple terms, this determines how long a note lasts. Since most drum machines play the entire drum sample no matter how long or short the gate time is set, you'll normally want to stick with short gate times. On the other hand, if you want to play synthesizer or acoustic instrument sounds other than percussion, you'll need to set the gate time to fit the musical requirements of the part you're playing.

*

To send the currently selected note and "audition" the sound, move the cursor to " * " and press "+1/YES". The note will be sent with a MIDI velocity of 64.

The cursor "wraps around" this display for easier navigation to each parameter.

Page 2: Gain Control

```
┌─────────────────────────────────────────────┐
│ EDIT  IN- 1     GAIN    AUTOSET      LEVEL   │
│ Pg 2            0.0dB    OFF            %     │
└─────────────────────────────────────────────┘
```
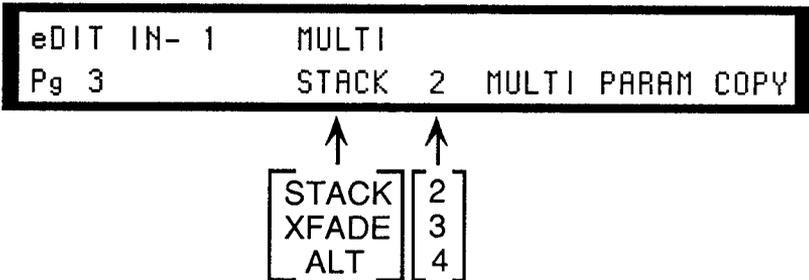
Input Number (1-12) (represented as IN- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.

Gain (-15.5dB-15.5dB)
Allows you to fine tune the level of the incoming trigger signal. The GAIN control
adjusts in both a positive and a negative direction from 0.0db. When the GAIN is set to
0.0db, the incoming trigger signal is being read exactly as it's coming in, modified only
by the Attenuation switch setting. Positive gain values increase the incoming trigger
level and negative gain values decrease the trigger level. The GAIN setting is
automatically adjusted when you use Autoset.

Autoset (OFF, PAD, SD, HTOM, LTOM, BD)
Helps you to set the response for each drum by monitoring the incoming trigger level
and automatically setting the optimum GAIN and WAIT settings. Once you select an
input, you turn AUTOSET ON by choosing the drum input type – PAD, SD, HTOM,
LTOM, BD – that matches the drum you want to set. For instance, if you want to set
the input trigger for a snare drum, then select SD when the cursor is under AUTOSET.
The DTS70 will monitor your next three hits on the selected input. Hard hits are
expected for all three hits. When you're finished, the GAIN and WAIT values are
automatically set. At its proper setting, the input level should be around 90-99% for a
hard hit on the drum.

Input Level Readout (0%-99%)
Shows the incoming trigger level as a percentage. This display is for monitoring only;
the value shown here can't be changed from the front panel of the DTS70.

Page 3: Multi Mode

```
┌─────────────────────────────────────────────┐
│ eDIT  IN- 1     MULTI                        │
│ Pg 3            STACK  2  MULTI PARAM COPY    │
└─────────────────────────────────────────────┘
                   ↑      ↑
              ┌───────┐┌───┐
              │ STACK ││ 2 │
              │ XFADE ││ 3 │
              │ ALT   ││ 4 │
              └───────┘└───┘
```

Input Number (1-12) (represented as I N- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.

SINGLE/MULTI
Puts the DTS70 in S I NGLE mode (1 note per trigger input) or MULT I mode (up to 4
notes per trigger input).
Multi Type Select (STACK, XFADE, ALT)
Selects the type of Multi mode to be used:

STACK   A maximum of 4 MIDI notes are output simultaneously.
XFADE   A maximum of 4 different MIDI notes are output according to velocity.
ALT   A maximum of 4 different MIDI notes are output, each on a successive hit.

Number of notes to be output (2, 3, 4)
In Multi mode, sets the maximum number of notes to be output. The number of notes
can be set separately for each selected trigger input.

Multi Param Copy
In Multi mode, allows you to quickly set up multiple note configurations by copying the
first note's MIDI parameters to each additional note. In STACK and ALT modes the
MIDI note, channel, Port and gate time are copied. In XFADE mode, the DTS70
automatically sets up crossfade LEVELs, VELOCITYs and CURVEs for you, in addition
to copying the MIDI parameters.

Page 4: Velocity

```
┌──────────────────────────────────────────┐
│ EDIT  IN- 1    LEVEL  VELOCITY  CURVE  OUT│
│ Pg  4          12%-99%  001-127  (__╱)    │
└──────────────────────────────────────────┘
                                      ↑
                                 001 to 127
```

Input Number (1-12) (represented as I N- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.
Note Number (1st-4th)
Shows which note you are editing when the DTS70 is in MULT I mode.

Input Level Range (0%-99%)
Determines what part of the input trigger range will be recognized and what part will be
ignored when converting to MIDI. For instance, if you set the range to 50%-99%, only
fairly hard hits result in a MIDI note being sent. In this case, drum hits that fall below
the 50% input level range are ignored.

Velocity Range (1-127)
Determines the outgoing MIDI velocity range. This control works hand-in-hand with the input LEVEL range setting. 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.

Velocity Curve (7 types)
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 it sends out relative to how hard you hit the pad or drum. Any curve you select will be compressed or expanded to fit the velocity range you set above.

Outgoing MIDI Velocity Readout (1-127)
Shows the outgoing MIDI velocity for each drum hit. This display is for monitoring only; the value shown here can't be changed from the front panel of the DTS70.

See the Guided Tour portion of this manual for two detailed drawings outlining the relationships between LEVELS and CURVES.

Page 5: Rejection Control

```
┌─────────────────────────────────────────────────┐
│ EDIT  IN- 1      SELF      OTHER      WAIT        │
│ Pg 5             30ms      30%        1.2ms       │
└─────────────────────────────────────────────────┘
```

Input Number (1-12) (represented as IN- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.

Self Rejection (15ms-995ms)
During the time set here, the DTS70 does not accept additional trigger signals from the drum or pad that was just hit. This is primarily an aid to controlling double triggering.

Other Rejection (0%-99%)
Gives you the ability to avoid cross talk from an external source. Since you can inadvertantly trigger a specific drum from an adjacent drum, the DTS70 allows you to set a value representing a percentage of the outside interference you want to reject. **CAUTION:** Setting this percentage too high (60 to 99%) can interfere with polyphony, that is, your ability to strike multiple drums simultaneously. Ideally, you should try to keep this percentage as low as your cross talk situation will allow.

Wait Parameter (0.0ms-4.0ms)
Optimizes the DTS70's internal timing mechanism for reading the peak of a wave generated by a hit on a pad or drum. The idea is to take the reading at the first possible instant that the signal is stable and clear to read, rather than when the drum is initially struck and the signal is still a bit chaotic. In general, the bigger, lower and more resonant the drum, the longer the WAIT time. The WAIT time is automatically set when you use AUTOSET.

Page 6: Input Copy

```
┌─────────────────────────────────────────────┐
│ EDIT IN- 1  COPY TO  PERF  INPUT             │
│ Pg 6                  01    1-12   ENTER      │
└─────────────────────────────────────────────┘
```

Input number (1-12) (represented as IN- 1, 2, 3, etc.)
Indicates which of the 12 inputs is currently selected for editing.

Performance number to be copied (1-48)
Sets the number of the performance that you want to copy from.

Input numbers to which Performance data is copied (1-12)
Sets the number(s) of the input(s) that will be copied to. The numbers in this display constitute a range of inputs that will receive the copy. So, if you want to copy to only one input, you must make both of these numbers the same (e.g., 1-1). If you'd like to make multiple copies, set a copy range (e.g., 1-4).

Page 7: MIDI Merge

This lets you set the MIDI MERGE function, which merges MIDI information coming in from the front or rear panel MIDI In Port with the internal DTS70 information, then sends them both out either MIDI Out Port 1 or 2. Only MIDI Channel messages are merged. MIDI System messages are ignored, including clocking information from sequencers.

```
┌─────────────────────────────────────────────┐
│ EDIT          MIDI IN                         │
│ Pg 7          MERGE OFF                        │
└─────────────────────────────────────────────┘
```

Pages 8a, b, c: Program Change Table 1

On these three screens (8a, 8b, 8c) you can construct a table of **outgoing** program changes for MIDI Out **Port 1**. A separate program change (1-128) can be sent on each MIDI channel (1-16). The progam changes are actually sent whenever the performance is selected in Performance Play mode. You can use the PAGE buttons to move through these screens or you can use the CURSOR ⟸ and ⟹ buttons.

```
EDIT  PORT1 CH       1   2   3   4   5
Pg 8a PGM CHNG      OFF OFF OFF OFF OFF >
```

```
EDIT  PORT1 CH       6   7   8   9  10
Pg 8b PGM CHNG  < OFF OFF OFF OFF OFF >
```

```
EDIT  PORT1 CH      11  12  13  14  15  16
Pg 8c PGM CHNG  < OFF OFF OFF OFF OFF OFF
```

Page 9a, b, c: Program Change Table 2

On these three screens (9a, 9b, 9c) you can construct a table of **outgoing** program changes for MIDI Out **Port 2**. The procedure for setting the Port 2 Program Change table is identical to the Port 1 procedure described above.

```
EDIT  PORT2 CH       1   2   3   4   5
Pg9a PGM CHNG       OFF OFF OFF OFF OFF >
```

```
EDIT  PORT2 CH       6   7   8   9  10
Pg9b PGM CHNG  < OFF OFF OFF OFF OFF >
```

```
EDIT  PORT2 CH      11  12  13  14  15  16
Pg9c PGM CHNG  <  OFF OFF OFF OFF OFF OFF
```

Page 10: Edit Recall

Even after exiting from Edit mode and selecting a new Performance, you can recall the Performance you have just edited, allowing you to save the changes or do further editing. The EDIT RECALL screen will show you by name and Performance number exactly which Performance is residing in the Edit buffer.

```
┌─────────────────────────────────────────────┐
│ EDIT      RECALL                             │
│ Pg10    01:XXXXXXXXX           ENTER         │
└─────────────────────────────────────────────┘
                    ↑
            Performance name
             10 characters
```

PERFORMANCE STORE MODE

```
┌─────────────────────────────────────────────┐
│ STORE TO PERF :01                            │
│ NAME:XXXXXXXXX                STORE          │
└─────────────────────────────────────────────┘
                ↑
        Performance name
         10 characters
```

Performance number (1-48)
Selects the Performance number that you will be saving to.

Performance name (10 characters)
Each of the DTS70's 48 Performances can have its own name. Use the CURSOR ⇐
and ⇒ buttons to move from one character to the next. The DATA ENTRY buttons
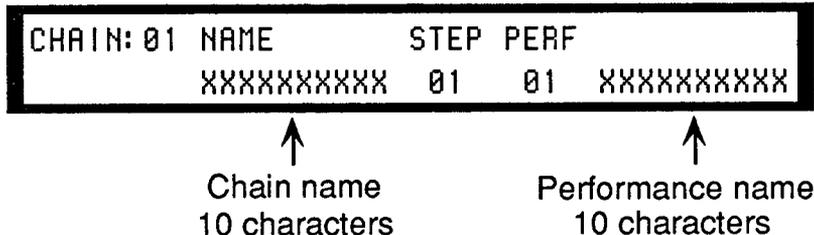select the letters.

STORE procedure: Move the cursor over to STORE or press the STORE button again.
If you're sure you want to save the Performance, press +1/YES. The LCD will display,
DONE!.

CHAIN MODE

This includes information about Chain Play, Chain Edit and Chain Store modes.

CHAIN PLAY MODE

In this mode, you can select any of the DTS70's 32 Chains. Chains allow you to arrange
Performances in a preset order so that you can quickly move from one Performance to
another. Each Chain has 32 steps.

```
┌─────────────────────────────────────────────┐
│ CHAIN: 01  NAME        STEP PERF             │
│            XXXXXXXXXX   01   01   XXXXXXXXXX  │
└─────────────────────────────────────────────┘
                   ↑                 ↑
              Chain name        Performance name
             10 characters       10 characters
```

Chain number (1-32)
Shows the currently selected Chain number.

Step number (1-32)
Indicates the Chain step that's presently active. The Performance number and name set for this step also appear in the LCD. In addition, the Chain step number is indicated in the DTS70's LED.

CHAIN EDIT MODE

In this mode you can edit the sequence of Performances in a Chain. To edit a Chain, first select the desired Chain in Chain Play mode and then press the EDIT button to enter Chain Edit mode.

When you begin to edit a Chain, you aren't actually working on the stored Chain information. Instead, you're working on a temporary copy of the Chain in the Edit buffer. This system protects you from inadvertantly ruining a Chain that you didn't intend to change. But, since the edited Chain isn't in memory, you must use the STORE mode to store it to one of the DTS70's 32 Chain memories if you would like to recall it at.a later time.

Compare doesn't function in Chain edit mode.

```
┌─────────────────────────────────────────────┐
│ 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    │
└─────────────────────────────────────────────┘
```

Step number (page 1=1-8, page 2 =9-16, page 3 =17-24, page 4= 25-32)
Performance number (1-48)
Chain Edit mode is divided into four pages with eight of the Chain's 32 steps shown on each page. Chains are constructed by using the CURSOR and PAGE buttons to move through the steps and the DATA ENTRY buttons to assign DTS70 Performances to the steps.

CHAIN STORE MODE

```
┌─────────────────────────────────────────────┐
│  STORE TO CHAIN:01                            │
│  NAME:XXXXXXXXX              STORE             │
└─────────────────────────────────────────────┘
```

↑
Chain name
10 characters

Chain number (1-32)
Selects the Chain number that you will be saving to.

Chain name (10 characters)
Each of the DTS70's 32 Chains can have its own name. Use the CURSOR ⇐ and ⇒ buttons to move from one character to the next. The DATA ENTRY buttons select the letters.

STORE procedure: Move the cursor over to STORE or press the STORE button again. If you're sure you want to save the Chain, press +1/YES. The LCD will display, DONE!.

UTILITY MODE

This mode lets you modify and set global parameters for the DTS70's operating system. It also lets you save System Exclusive bulk information. Utility mode parameters are NOT memorized per input, Performance or Chain and can't be stored. Settings you make in Utility mode will always remain as you left them no matter which mode of the DTS70 you are using.

Page 1: Learn Mode

```
┌─────────────────────────────────────────────┐
│  UTILITY         MIDI IN     TRIGGER          │
│  LEARN MODE        OFF         ON             │
└─────────────────────────────────────────────┘
```

MIDI LEARN (ON/OFF)
Enables you to automatically set the MIDI note and channel information for a selected
input. Hit a key or pad on a drum machine or any other sound source connected to one of
the DTS70 MIDI Ins that can transmit notes and channels through MIDI. The MIDI
Note display in Performance Edit mode will automatically read the incoming MIDI
channel and MIDI note number from the sound source, assigning it to the input
displayed.

TRIGGER LEARN (ON/OFF)
With Trigger Learn turned on, the DTS70 will automatically change the input number to
match the drum you've just hit. This function must be enabled in order for AUTOSET to
work.

Page 2: System Exclusive Setup

```
┌─────────────────────────────────────────────────┐
│ UTILITY    SYSTEM CH    PGM CHNG EXCLUSIVE        │
│            CH16 PORT1      ON        ON           │
└─────────────────────────────────────────────────┘
```

System Channel (1-16)
You can select any of the DTS70's 48 Performances by sending program changes on the
channel that you set here (as long as the System Program Change funtion is turned
ON). This is also the channel that's used when sending or receiving DTS70 MIDI
System Exclusive information.

System Port (1, 2)
System Exclusive information will be sent out the port you select here.

System Program Change (ON/OFF)
Determines whether DTS70 Performances can be selected by MIDI Program Change
commands. If this is turned OFF, MIDI Program Change commands will be ignored
even if they are sent on the System Channel set above.

System Exclusive (ON/OFF)
Determines whether the DTS70 will receive System Exclusive bulks over MIDI. This
switch does not affect the ability to send System Exclusive bulks.

Page 3: KEYON SEND

```
UTILITY
KEYON SEND:ON
```

Key Send (ON/OFF)
Turns MIDI note transmission ON or OFF. This is essentially a more "permanent" version of the BYPASS function.

Page 4: Performance Bulk Dump
You can save all of your Performances over MIDI to a computer or data recorder with a System Exclusive bulk dump.

```
UTILITY
PERF BULK :SEND            ENTER
```

To send a bulk dump put the data recorder in record mode and move the cursor to ENTER. The display will show Are you Sure?. Press the +1/YES key and the display will count up as each of the 48 Performances are sent.

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. 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):

```
UTILITY    SYSTEM CH    PGM CHNG EXCLUSIVE
*****    Perform Bulk Received:48    *****
```

Page 5: Chain Bulk Dump
You can save all of your Chains over MIDI to a computer or data recorder with a System Exclusive bulk dump.

```
UTILITY
CHAIN BULK:SEND           ENTER
```

To send a bulk dump put the data recorder in record mode and move the cursor to

ENTER. The display will show Are you Sure? . Press the +1/YES key and the display will count up as each of the 32 Chains are sent.

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. 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  *****       │
└─────────────────────────────────────────────┘
```

Page 6: Function Pad (special Trigger Pad input mode)

This function lets you use a piezo-type pad instead of a footswitch to perform the BYPASS, INCREMENT and DECREMENT functions. The normal footswitch inputs for these functions are still active when this function is turned on.

```
┌─────────────────────────────────────────────┐
│ UTILITY           IN-10   IN-11   IN-12      │
│ FUNC PAD  :OFF    NORMAL  NORMAL  NORMAL     │
└─────────────────────────────────────────────┘
```

Function Pad (On/Off)
When the FUNC PAD mode is ON, Inputs 10-12 function as BYPASS, INCREMENT and DECREMENT. As long as FUNC PAD remains turned ON these inputs will no longer send MIDI Note-On messages.

```
┌─────────────────────────────────────────────┐
│ UTILITY           IN-10   IN-11   IN-12      │
│ FUNC PAD  :ON     BYPASS  INC/+1  DEC/-1     │
└─────────────────────────────────────────────┘
```

Page 7: Incoming MIDI Program Change Table

Performance number (1-8, 9-16, 17-24, 25-32)
Program Change number (1-128)

These six screens define which DTS70 Performances will be selected by incoming MIDI Program Change messages. Each of the numbers on the upper half of the display represents one of the DTS's 48 Performances. Eight Performance numbers are shown on each of the six Program Change Table pages. The Program Change numbers assigned to each Performance are shown on the bottom half of the display. To change the Program Change number for a particular Performance use the CURSOR and PAGE buttons to move to the desired Performance and use the DATA ENTRY buttons to select a new Program Change number. When the DTS70 receives that Program Change on its System Channel it will select the assigned Performance. Remember, if the System Program Change switch is turned OFF, MIDI Program Change commands will be ignored.

```
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
```

****
****

FACTORY RESET   DANGER! DANGER!

This function resets all the parameters of the DTS70 to their factory, "out-of-the-box" default values. Be sure that this is exactly what you want to do. It is irreversible unless you have System Exclusive bulks of the current DTS70 internal Performances and Chains.

Turn the DTS70 ON while simultaneously pressing the UTILITY and EDIT/COMPARE buttons and all the factory preset data will be restored. Note that all existing PERFORMANCE, CHAIN and UTILITY data will be replaced by the factory default settings.

****
****

SPECIFICATIONS

INPUTS	Trigger In	12 (¼-inch Phone)
	MIDI IN	2 (5 pin standard DIN)
	Footswitch	2 (¼-inch Phone)
	Bypass	1 (¼-inch Phone)

OUTPUTS	Analog Out	12 (¼-inch Phone)
	MIDI Out	3 (5 pin standard DIN)
	MIDI Thru	1 (5 pin standard DIN)

| DISPLAY | 7 seg x 2 (LED) | 1 |
| | 40 x 2 (LCD) | 1 |

CONTROL KEYS:

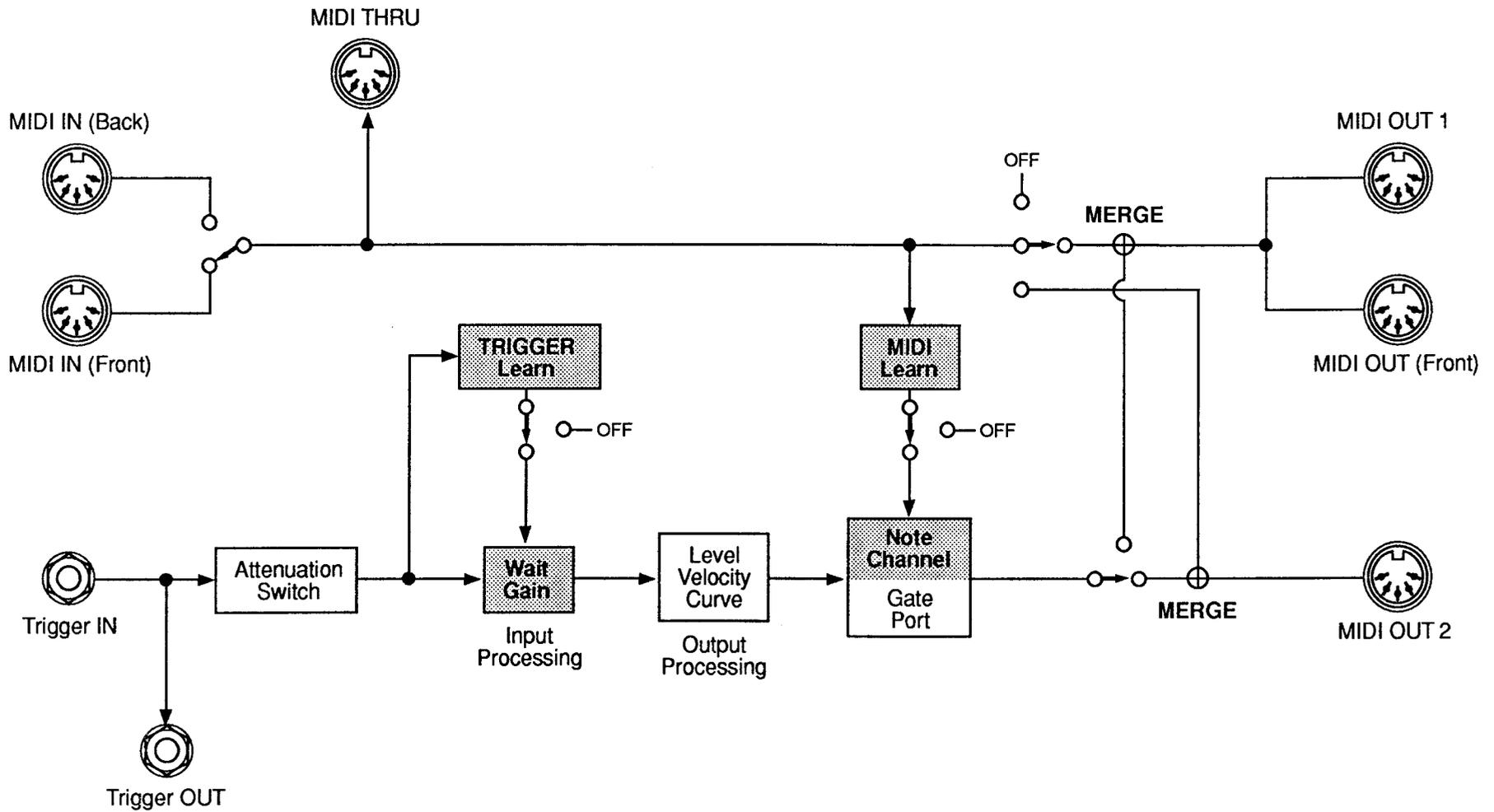| Mode Select | 5 (Performance, Chain, Utility, Store, Edit/Compare) |
Inc. (+1/YES)	1
Dec.(–1/NO)	1
Page	2
Cursor	2

MEMORIES:

| Performance | 48 |
| Chain | 32 |

| SIZE | 2U |

The following page shows the signal flow (audio and MIDI) through the DTS70:

DTS70 Signal Flow Chart

MIDI THRU

MIDI IN (Back)

MIDI IN (Front)

MIDI OUT 1

OFF

MERGE

MIDI OUT (Front)

TRIGGER
Learn

OFF

MIDI
Learn

OFF

Trigger IN

Attenuation
Switch

Wait
Gain

Input
Processing

Level
Velocity
Curve

Output
Processing

Note
Channel

Gate
Port

MERGE

MIDI OUT 2

Trigger OUT

```
[ Drum Trigger System      ]                    Date : 02/05 1991
  Model DTS70   MIDI Implementation Chart       Version : 1.1
```

Function	Transmitted	Recongnized	Remarks
Basic Default Channel Changed	1-16 1-16	1-16 1-16	memorized
Mode Default Messages	X OMNIon,OMNIoff POLY,MONO	X OMNIon,OMNIoff POLY,MONO	 *1 *1
Note Number : True voice	0-127 **************	0-127 0-127	
Velocity Note on Note off	0 0	0 0	 *1
After Key's Touch Ch's	0 0	0 0	*1 *1
Pitch Bender	0	0	*1
Control 0-121 Change	0	0	*1
Program 0 0-127 Change : True # : **************	0 0-127 	0 0-127 0-127	
System Exclusive	0	0	
System : Song Pos : Song Sel Common : Tune	X X X	X X X	
System :Clock Real Time:Commands	X X	X X	
Aux :Local ON/OFF :All Notes OFF Mes- :Active Sense sages:Reset	0 0 0 X	0 0 X X	*1 *1
Notes	*1 Recognized as merge data. Transmitted when received during MERGE switch is on.		

```
Mode 1 : OMNI ON,  POLY    Mode 2 : OMNI ON,   MONO        O : Yes
Mode 3 : OMNI OFF, POLY    Mode 4 : OMNI OFF,  MONO        X : No
```

SECTION 5 /// DTS70 Diagnostics

TROUBLESHOOTING or What to do if.......

This section addresses some of the more common questions and problems regarding the use of the DTS70. Check for answers here before calling your local music store or Yamaha.

The DTS70 isn't reading your playing at all/there's no triggered sound

1. Check to see that your sound source is plugged in and functioning properly on its own.
2. Be sure that the trigger pickup is plugged into the DTS70 input.
3. Make sure that the DTS70 isn't in BYPASS mode.
4. Make sure that all MIDI connections are correct.
5. Make sure all MIDI channel and Port assignments for both machines are correct
6. Go to Performance Edit page 2 and see if the right side of the LCD is showing any incoming level when you hit the drum.
7. The pickup has worked its way loose from the drum or the cable has come loose.
8. There's a short in the pickup itself or the wire from it to the DTS70.
9. The Attenuation switch setting needs to be set higher – try 0db.
10. Raise the GAIN setting on Performance Edit page 1.
11. Check the CURVE setting on Performance Edit page 4 – try CURVE # 2 or 3.
12. On Performance Edit page 4, the LEVEL and VELOCITY settings are stopping the sound from being heard. Make sure that the *minimum* incoming LEVEL is *low* enough to read most of your hits (between 4% and 20%). Also make sure that the *maximum* outgoing VELOCITY is *high* enough to give you audible sound (between 100 and 127). Unless you're after some special effect, these settings represent normal playing ranges.
13. Redo the AUTOSET procedure and be sure you select the right type of drum to AUTOSET.

The AUTOSET procedure doesn't work

1. Try setting the WAIT time to be relatively long *before* you perform the AUTOSET function (2.0 or higher). This way the DTS70 can detect the peak more precisely, making the AUTOSET procedure easier.
2. The pickup or cable have worked their way loose and the pickup is no longer able sense velocity accurately.
3. The pickup has a bad cable.
4. There's a cable plugged into an input that's not connected to anything at the other end.

5   Redo the AUTOSET procedure to make *sure* it's not working and be sure you select the right type of drum to AUTOSET.

You started to AUTOSET a drum, then changed your mind and now pushing any button on the front panel does absolutely nothing

1.   You must leave AUTOSET mode by turning AUTOSET to OFF before you can proceed with anything else.

The drum is double triggering itself

1.   Raise the SELF rejection on Performance Edit page 5 by 5 to 20 milliseconds.
2.   Redo the AUTOSET procedure on Performance Edit page 2 and be sure you choose the right type of drum to AUTOSET.
3.   The pickup or cable are faulty.

One drum is triggering every time another drum plugged into the DTS70 is hit

1.   Raise the OTHER rejection percentage on Performance page 5.
2.   Check to be sure that no drums are touching each other.
3.   The pickup or cable are faulty.
4.   Redo the AUTOSET procedure and be sure you select the right type of drum to AUTOSET – Performance Edit page 2.

The DTS70 is tracking velocities very inconsistently

1.   Check the pickup and cable.
2.   Lengthen the WAIT time on Performance Edit page 5.
3.   Check the CURVE setting on Performance Edit page 4 – try CURVE # 2 or 3.
4.   Redo the AUTOSET procedure and be sure you select the right type of drum to AUTOSET – Performance Edit page 2.

Every hit is too loud

1.   The rear panel Attenuation switch is set too high.
2.   Lower the GAIN setting on Performance Edit page 2.
3.   Check the LEVEL, VELOCITY and CURVE settings on Performance Edit page 4 – make sure that both the *minimum* and *maximum* outgoing MIDI VELOCITIES are *not* set to 127. Also be sure that you haven't selected CURVE #5 or 6.
4.   Redo the AUTOSET procedure and be sure you select the right type of drum to AUTOSET – Performance Edit page 2.

The DTS70 went into BYPASS mode all by itself

1. You plugged a footswitch into the BYPASS input on the rear panel *after the DTS70 was already ON*.

You accidentally just trashed all your work by switching to a new Performance before storing the one you were working on

1. Go to the EDIT RECALL page in Performance Edit mode in the newly selected Performance. The last Performance you were editing will be listed on this page, by number and name (if it has been named). After executing the RECALL, you will be able to save your work.

You were trying out a crossfade and then decided to go back to playing in SINGLE mode and now your first SINGLE sound isn't triggering correctly

1. When leaving XFADE mode to return to SINGLE mode, your first (and now only) note will still have its XFADE LEVEL, VELOCITY and CURVE settings. Go to Performance Edit page 4 and reset those parameters.

You're editing a Performance and the DATA ENTRY buttons stop working

1. You accidentally hit the EDIT button;you're in COMPARE mode. Hit it again.

You can't play a buzz roll on your snare drum

1. Take some lessons.

2. Try increasing the minimum incoming level percentage. After a point, you will start to sacrifice the full available dynamic range for the ability to trigger a buzz roll.

The rear panel MIDI In isn't working

1. A MIDI cable is connected to the front panel MIDI In.

The DTS70 is not responding to incoming MIDI program changes

1. Check the second page in UTILITY mode to see that the Program Change function turned ON.

2. Check the same page to see that you are sending program changes on the

assigned MIDI channel and to the assigned Port.

When you send the DTS70 a program change it changes Performances, but not to the one you want

1. Check the last 6 pages of UTILITY mode. The incoming Program Change table needs to be adjusted.

2. Check to be sure that there aren't two MIDI devices sending program change messages to the DTS70.

The DTS70 sings your national anthem to you

1. Take a long break.

For information, please contact our nearest subsidiary or the authorized distributor listed below.

Pour plus de détails, veuillez vous adresser au concessionnaire ou distributeur pris dans la liste suivante le plus proche de chez vous.

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M1S 3R1, Canada
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Siemensstraße 22-34, D-2084 Rellingen, F.R. of
Germany
Tel: 04101-3030

AUSTRIA/HUNGARY
Yamaha Music Austria GmbH.
Schleiergasse 20, A-1100 Wien Austria
Tel: 0222-60203900

THE NETHERLANDS
Yamaha Music Benelux B.V.,
Verkoop Administratie
Kanaalweg 18G , 3526KL, Utrecht, The Netherlands
Tel: 030-828411

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Yamaha Music Benelux B.V.,
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Portugal
Tel: 01-443-3398/4030/1823

GREECE
Philippe Nakas S.A.
Navarinou Street 13, P.Code 10680, Athens, Greece
Tel: 01-364-7111

SWEDEN
Yamaha Scandinavia AB
J. A. Wettergrens gata 1, Box 30053, 400 43
Göteborg, Sweden
Tel: 031-496090

DENMARK
Yamaha Scandinavia Filial Danmark
Finsensvej 86, DK-2000 Frederiksberg, Denmark
Tel: 31-87 30 88

FINLAND
Fazer Music Inc.
Länsituulentie 1A, SF-02100 Espoo, Finland
Tel: 90-435 011

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Narud Yamaha AS
Østerndalen 29, 1345 Østerås
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HEAD OFFICE   Yamaha Corporation, Electronic Musical Instrument Division
Nakazawa-cho 10-1, Hamamatsu, Japan 430
Tel: 81(County Code)-53-460-2445

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