

YAMAHA DTX900 POWER GUIDE – USING THE EFFECTS

Yamaha's digital signal processors (DSP's) have been revered by studio engineers for years, and inside the DTX900 you will find some very powerful effects that feature the latest in Yamaha DSP technology. Along with a selection of reverbs and delays there are emulations of classic vintage effects of yester-year, and some modern sounds that are so unique you won't find them everywhere else. Let's take a look at how the EFFECTS are implemented in the DTX900.

DISCLAIMER: This guide will cover the basics of digital signal processing and how the DSP is implemented on DTX900. It is not a lesson in digital effect programming. The more you learn about programming your own effects the more you will enjoy the built-in effects available in the DTX900. Follow this guide as a starting point, there is a lot to be discovered by simply experimenting. Let's look at the big picture.

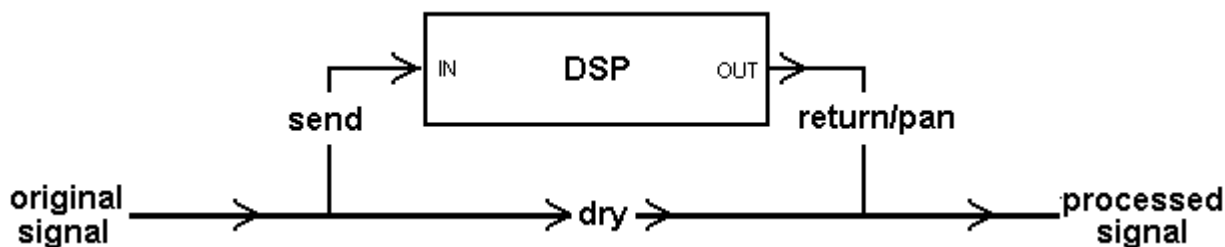
DTX900 DSP EFFECTS POWER GUIDE OUTLINE:

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DSP BASICS

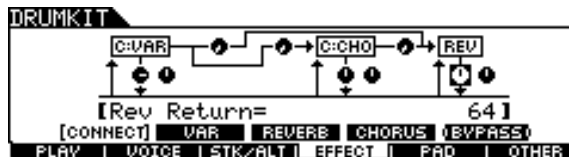
Before we begin, let's cover some basics about digital signal processing. There are two common scenarios for using effects that have to do with the way the audio signal is routed - send effects and insert effects.

SEND EFFECTS work by sending a portion of an audio signal to a DSP for processing, then returning the output of the effect back into the main signal where it gets blended with the dry signal (unprocessed sound).



Send effects are great when you have lots of different signals (like drum voices) that you want processed all the same way (with the same ambience, for example), but with various amounts. A benefit of send effects' structure is the ability to easily adjust the overall sound of the effect by controlling the amount that is mixed in (the return level) and you can also pan the effected signal left or right.

On the DTX900, there are three effects in DRUMKIT mode that can be configured as send effects: **Reverb**, **Chorus**, and **Variation**. You can see the effect connections page by pressing [F4] EFFECT then [SF1] CONNECT.

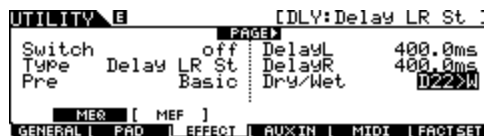


INSERT EFFECTS work like your guitar player's distortion pedal – the DSP is inserted between the original signal (an electric guitar) and the final output (the amplifier) so that 100% of the sound is processed.

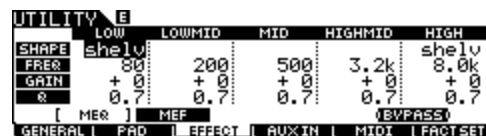


Insert effects are great for drastically changing the entire sound of a signal. Because they affect the entire signal there is usually a parameter to adjust the blend of original (dry) signal with the effected (wet) sound.

There are four insert effects in UTILITY mode: **Master EQ**, **Master Effects** (for the main mix outputs) and the Aux-In/Sampling jack **DUAL INSERT EFFECTS**. There is another unique way to achieve an Insert effect on the DTX900 but we'll get to that in a moment.



Master Effect



Master EQ

BENEFITS OF DIGITAL

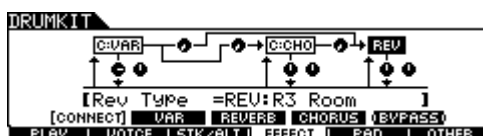
One of the best things about digital is that you can **store custom settings** for instant recall. In the DTX900, user effect settings for DRUMKIT mode are stored when you **store your kit to a user memory** location. The MASTER and AUX-IN effects are stored to the UTILITY mode, which is common to all kits. Storing is different from saving. All Kit and Utility files can be **saved and loaded to a USB device**, making it easy to change the Master and Aux-In effects. To really make the most of digital, always **SAVE** all your data to a USB drive and **back up user data to your computer**.

Most DSP's have **parameters** that determine specific settings relevant to how that effect will sound. Because they are digital they offer precise control. Because the effects are integrated into the system as a whole, many **effects can be synchronized to the sequencer**. Most DSP's also have a **bypass** switch that momentarily turns off the effect so you can hear the original un-processed sound.

DRUMKIT EFFECTS – PRE:01 Oak Custom

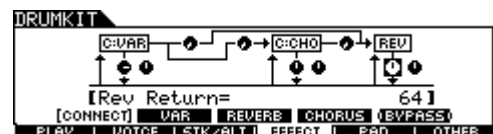
By analyzing how effects are used in the preset the kits you can learn about how to get the most out of them in your own custom user kits. Start by calling up the PRE: 01 Oak Custom kit

Press **[F4] EFFECT** then **[SF1] CONNECT** to view the effects connection settings. The connections are already in place - you can see the audio signal paths to each DSP represented by the arrows on the solid lines. By moving the cursor to the **effect box icons** at the top of the display you can view the effect category and effect type for each DSP.



Don't change them now; first we'll study how this kit uses effects.

By moving the cursor to the **knob icons** you have control over the return level and pan of each effect, and whether or not the effects are routed (sent) to other effects.



The buttons **[SF2] VAR**, **[SF3] REVERB**, and **[SF4] CHORUS** will take you to the settings pages for each respective DSP.

Pressing the **[SF5] BYPASS** button on this page will turn off all the effects on this page.

REVERB

Reverb is the first DSP in DRUMKIT mode. It is only capable of reverb-type effects so it is perfect for a Send effect. In the following tutorial you will test out different reverb effects on the PRE: 01 Oak Custom kit.

Press **[F4] EFFECT** then **[SF3] REVERB** to view Page One of the reverb's effect settings. The settings on the left side of the screen are Type and Pre. The **"Type" parameter determines the reverb algorithm** used, in this case it is a vintage Yamaha "R3 Room" effect that simulates - you guessed it - a room.



Scroll counter clock wise with the jog-dial to **select "Rev-X Hall"** which is an algorithm first introduced in the Yamaha SPX-2000 effects unit a few years ago (MSRP: \$1249.00, free with the DTX900). If you play the kit now the drums sound as if they are in a large concert hall.



The **Pre (Preset) parameter selects an effect preset** based on the effect Type. Effect Presets are cool because they give us a great starting point in creating sounds. Experiment with the different reverb types and presets.



The right side of the display shows the first page of **parameters** that let you customize the selected effect. The effect parameters are different for each different effect Type, and their values change with each Preset.

A list of all effects, presets and parameters can be found in the DTX900 Data List.

Pressing the **[SF5] BYPASS** button here will bypass only the reverb DSP. Press it again to re-activate the effect.

SEND LEVELS

We've been examining the reverb effect processor itself; now let's see how the drum signals are sent there. In the following tutorial you will adjust the reverb send levels for the different instruments of the kit.

Press **[F2] VOICE** then **[SF2] OUT-TUNE** and cursor to the right to page 2. Select the INPUT display mode (indicated in the upper left corner, toggle with **[SF6]**) and use the reverb send (**RevSend**) knob icon to control the send level of an input (all sources of a pad).



(When the SOURCE display mode is selected you can see the send level in numeric value, more in a moment...)

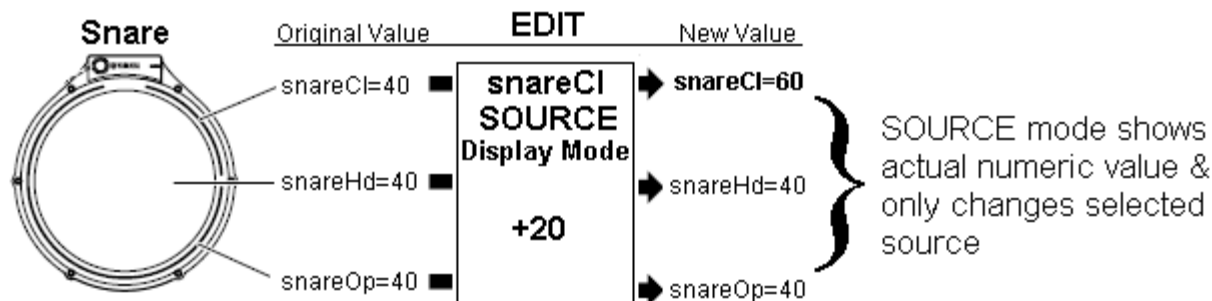
Play the snare head and **adjust the Reverb Send level with the jog-dial** to lessen the amount of reverb for the snare voice. Keep going and you will eventually take it down to zero and you will only hear the "dry" Oak Custom snare. You can then set the send to an amount that suits your ear. Naturally you can do this for all voices in a kit.

NOTE: Using the INPUT display mode is all about using your ears. It is also good for our tutorial because when adjusting send levels for the snare, you usually get the most natural results when the levels for rim-shot and cross-stick follow the changes you make to the head. Using INPUT mode will automatically adjust the values of all the sources for the snare (and for the "snares-off" voices) in one step. Let's take a closer look at the relationship between INPUT editing and SOURCE editing.

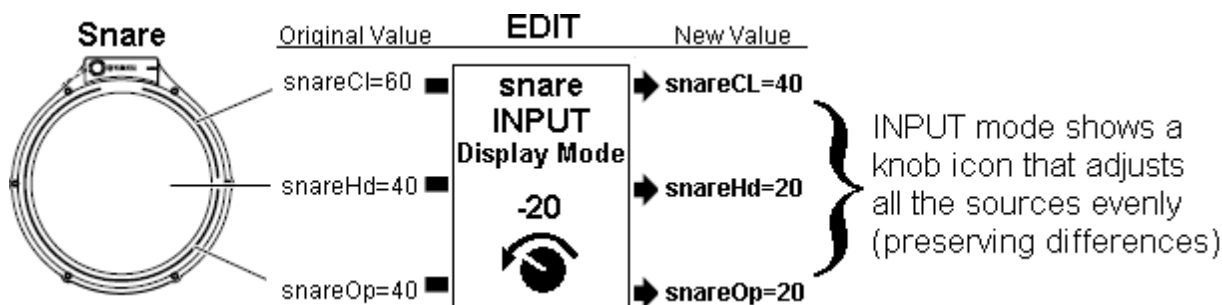
INPUT vs. SOURCE EDITING

The difference between the INPUT and SOURCE display modes should be noted here. As opposed to viewing a virtual knob icon in the INPUT display mode, the SOURCE display mode shows a numerical value for the Reverb Send level. Begin this section by selecting the [F2]VOICE [SF2]OUT-TUNE page 2.

Press [SF5] SOURCE (SOURCE mode indicated in upper left) and **strike the snare head**. Use the jog-dial to **set the snareHd RevSend value to 40**. Next, strike the snare open rim-shot and set the value to **40**. Strike the snare closed-rim source and set its reverb send level to **60**.

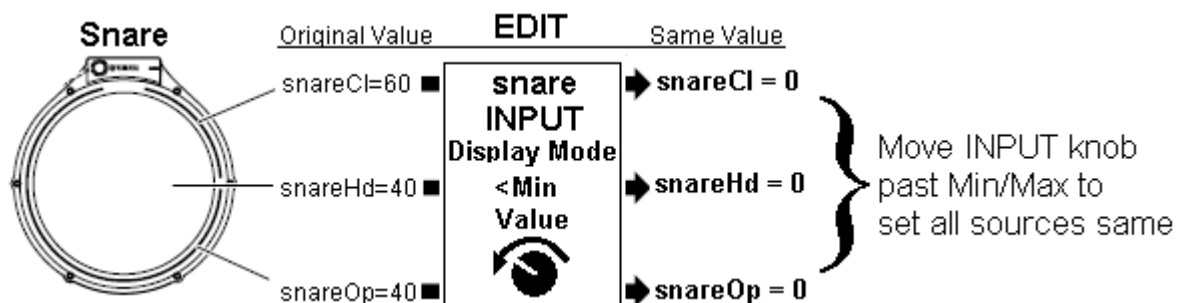


Press the [SF5] INPUT button to view the INPUT display mode (INPUT mode indicated in upper left). Now, there's still a lot of reverb on the snare, so **use the jog-dial (the RevSend knob icon will move) to reduce the amount of reverb** (approx 20 clicks). Play the snare head as you turn the jog-dial counterclockwise slowly until there is just a taste of reverb.



Play the Closed-rim source; you should notice there is more than a taste of reverb for that source. Let's verify this by pressing [SF5] SOURCE and going back to source display mode. You will notice that the **Reverb send level for the snareCl is still "20 more"** than the send levels for the snareHd and snareOp. The usefulness of this is that you can make subtle tweaks to your settings in INPUT edit mode and still preserve the relationships established in SOURCE edit mode. This works for other parameters on the OUT-TUNE, EQ-TONE and OTHER pages for INPUT and SOURCE and even works on drum voices that are part of a trigger source's STK/ALT function.

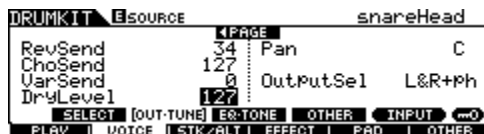
Another useful aspect of this relationship is if you want to set all the SOURCES to the same value, simply make your changes in the INPUT display mode and **scroll past the max/min value**. This will "erase" any relationships between individual drum voices and **set them all to the same value**. When this technique is used in INPUT mode, all voices for all sources (including STK/ALT drum voices) are set to the same value. When used in SOURCE mode only the drum voices of the selected source are set to the same value.



PRE-FADER and POST-FADER CONTROL

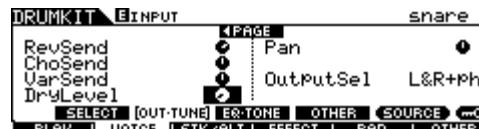
If you reduce or raise the Volume of a drum voice that is being sent to the reverb (from the [SF3] OUT-TUNE page one) the reverb level will reduce or rise accordingly. This is commonly called a **"post-fader"** setup.

Notice there is a parameter called **Dry Level** that **controls the amount of direct signal for each voice**. "Dry" is term that describes the un-effected drum sound and is normally set to 127 (maximum).



This is because the sound produced by the Effects Return level (which is determined on [F4] EFFECT > [SF1] CONNECT page) typically only produces reverberated (or other processed) sound.

Turn the Dry Level down for the snare. Play the snare as you spin the jog-dial counter-clockwise. Listen to how the sound seems to get farther away from you as you turn down the dry level. (If you have trouble hearing this you might try it with a higher level of reverb send.)



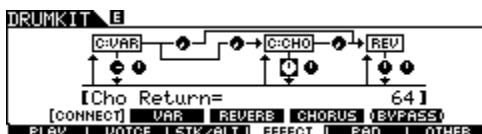
By removing the dry signal you have just setup what is called a **"pre-fader"** send effect.

Reverb is a great example for a send effect because all drums can share the same "space" but in various amounts (as set by the individual send levels per drum). Chorus effects are also usually routed this way,

CHORUS

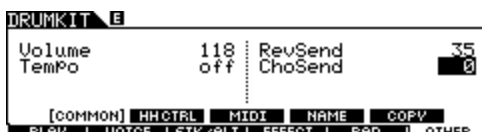
The CHORUS effect is the second DSP in DRUMKIT mode. It is capable of many types of effect including flanger & phaser, early reflections, delays effects and of course, chorus. This tutorial will shed some light on the use of the chorus effect in the PRE: 01 Oak Custom Kit and the DTX900.

You may have noticed that ALL the voices have a Chorus Send (ChoSend) level of 127. Hmm, then why don't we hear any chorus-like effects? Let's look at the details. Press the [SF1] CONNECT button.



In this screen we can see the category reads **CHO** within a **solid line** (non-bypassed) effect box and the return level reads **64**, meaning the chorus effect is indeed turned on and turned up. So why can't we hear it?

Here's why. Check out the [F6] OTHER [SF1] COMMON page.



On the right side of the LCD the overall Reverb Send and Chorus Send levels are displayed. The Chorus Send is at zero! As we turn up the Chorus Send level past 64 we can start to hear the effect, most noticeably on the cymbals and snare. **Set the Common Chorus Send level at about 86** and try some other effects.

Go to the [F4] EFFECT [SF4] CHORUS page and move the cursor to the Type parameter. As you scroll through the choices try out some of the different delay effect types. Scroll counter-clockwise and try out the Tempo Flanger and Phaser settings. If you find a Type you like try out some of the available presets.



By now, you should be thinking of ways to use these effects and come up with some cool kits of your own, and that's great! But there is one more trick I have to tell you about regarding the Chorus effect.

There is a Pad Song #87 called "ChorusFX". It is a 2-measure song that turns the Common Chorus Send level to 86 in the first measure, and to zero in the second. With this pad song you can essentially turn the chorus effects on and off during a performance.

To try it, **assign Pad Song #87 to repeat in Chase mode** (the mode is important) to a trigger. Set the Common Chorus Send level back down to zero and **STORE** the kit to user memory.



When you strike the trigger it plays the first measure and turns up the Common Send level for the chorus effect. The next time the pad song is triggered it will play measure 2 and turn off the effect - Pretty neat trick.

You can try it for yourself on **PRE: 35 Movin'** by playing a straight beat and then hitting Tom3Rm1 to turn on and off the chorus effects.

VARIATION EFFECT

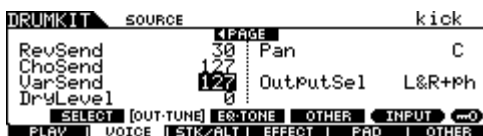
The VARIATION effect is the third DSP in DRUMKIT mode. It is capable of 51 different types of effects - from compressors to tech effects. This tutorial will show how variation is used in the Oak Custom kit.

We've seen how the DRUMKIT effects can be used as send effects, "pre-fader" effects, and how they can be turned on/off with a pad song. Now we'll look at another application. Call up PRE: 01 Oak Custom.

Press **[F2] VOICE [SF1] SELECT** and **[SF5] SOURCE** and kick the bass drum trigger.



Press **[SF2] OUT-TUNE** and cursor right to page 2. Note that the Dry Level is at 0 and the Variation Send level (VarSend) is at 127.



That indicates that the entire sound of the bass drum is coming from the output of the Variation effect and we are hearing **NONE** of the direct sound. What's happening here?

In this case **the VARIATION effect is being used as an insert effect**, not a send effect. This is because 100% of the bass drum voice is being sent into the Variation DSP and we hear only the output of the effect and none of the original dry signal. To be fully accurate, there is a slight amount (30) of reverb on the kick voice. Play the kit and you will see that the Kick is the **ONLY** voice being sent to the Variation effect.

So why did Yamaha do that? Well, if you look at the **[F4] EFFECT [SF2] VAR** page you will see that **the variation effect is set to a compressor**. A compressor is typically "inserted" into the signal path and often used to give a sound more "presence" while keeping the overall level from getting too high.



There are several ways to approach using compression on drums. Some engineers use insert compression (as seen here on the Oak Custom kick sound) and some use buss compression (where the compressed signal is combined with the dry signal like in the reverb send example above). The Yamaha DTX900 is flexible enough to allow the user to choose either of these methods – and other techniques - depending on the sound they are going for. This flexible effects system gives the DTX900 incredible sonic power.

PRE: 02 BirchCstmAbs & PRE: 03 Power Kit

In the PRE: 02 BirchCstmAbs kit the Variation effect is a 5-band EQ and is configured as an insert effect on all the drums and cymbals. In the PRE: 03 Power Kit the Variation effect is a compressor and used as an insert on all the cymbals. By studying the different preset kits, a lot can be learned about this powerful DSP.

UTILITY MODE – MASTER EFFECTS

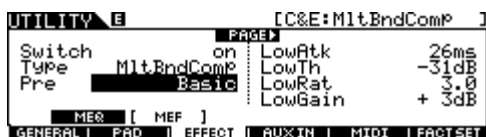
The UTILITY mode is where you find the **Master Effects** and the **Master EQ**. These two DSP's are inserted in the signal path between the DRUMKIT and the main outs. Sounds that are sent to the individual outputs will not be processed. The Effect is inserted before (pre) the EQ. Let's take a tour.

MASTER EFFECT

The Master Effect is capable of nine different effects from subtle to wild. Enter **UTILITY** mode and press **[F3] EFFECT** then **[SF2] MEF** to view the Master Effects page.

The left side of the display has the familiar values for Type and Pre.

Set the **Switch = On**, set the **Type = MltBndComp** and the **Pre = Basic**.



In order to hear the effects of the Multi-Band Compressor, play one of the preset songs (with the drum part activated). As the song plays try the different presets and listen to what they do to the sound.

You can experiment with other effects and presets, but turn the **Switch = Off** before moving on to the next section.

MASTER EQ

The Master EQ is a five-band parametric digital equalizer. Enter UTILITY mode press the **[F3] EFFECT** then **[SF2] MEQ** buttons to view the Master EQ page.

The display shows all five bands, each with the values for their parameters listed below each band. The parameters are Shape (for low and high bands only), Frequency, Gain, and Q (frequency bandwidth).

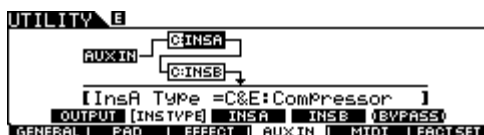
	LOW	LOWMID	MID	HIGHMID	HIGH
SHAPE	shelv				shelv
FREQ	80	200	500	3.2k	8.0k
GAIN	+0	+0	+0	+0	+0
Q	0.7	0.7	0.7	0.7	0.7

Use the Master Effects whenever you want to give the mix a little polish (with multi-band compression) or a wild effect (try the Basic preset on the Dynamic Filter). Use the Master EQ when you need to adjust the sound of the mix – as when performing in a particular venue or when recording. Either way, if you customize the MEQ and MEF you must **STORE any user MEQ and MEF settings to Utility mode**. A small “E” indicates that the Utility has been edited, press STORE and YES to execute the store procedure.

AUX-IN DUAL INSERT EFFECTS

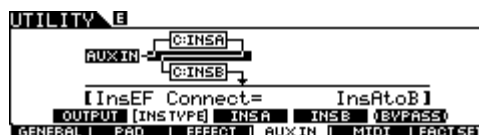
There are two insert effects called **INS A** and **INS** that process external audio arriving via the Aux-In/Sampling jack. Each is capable of 51 effects just like the Variation effect. Let's check 'em out:

From UTILITY mode, then press **[F4] AUX-IN** and **[SF2] INS TYPE** to view the Insert Effects Connections page. The audio connection is represented by the solid line from the Aux-In through the two insert effects to the rest of the mix.



By moving the cursor to the **effect box icons** you can set the category and effect type for each DSP.

By moving the cursor to the wire you can also change the order in which they are connected.



CREATIVE APPLICATIONS

The Insert Effects offer many creative possibilities. One application is to add effects to an audio signal before sampling it. If you are using a microphone for sampling, you can set the INS A effect to a compressor and INS B to an equalizer and greatly improve your results. The sheer number of effects available, along with different presets for each effect, gives the DTX900 user a ton of possibilities for creative sound design. Try sampling your floor tom with the Auto Synth effect, or sampling your voice through the Pitch Change effect.

It is also possible to send a drum voice(s) to a pair of individual outs and run them into the Aux-In jack using an insert cable. If you try this **Note: AUX-IN MUST BE SET TO "LINE" LEVEL.** This allows you to use aux-in effects on select kit voices. Because they are in Utility mode, the same effects selected will be used for all kit voices sent to the same pair of individual outs.

You can even plug an electric guitar into the Aux-in jack and apply an Amp Simulator, Distortion and other guitar effects. Get a splitter and you can have a headphone jam session. You could assign the Reverb and Chorus effects to the MIDI Parts of a DRUMKIT and trigger notes on those parts for even more DSP fun.

CONCLUSION

The DTX900's built-in Digital Effects offer a lot of power for creating great drum sounds and adding special effects to your drumming experience. I sincerely hope this guide helps you in your enjoyment of the Yamaha DTX900. Be sure to visit www.DTXPERIENCE.com for the latest DTX news and info.

Thanks for listening and until next time, Happy Drumming!

Tom Griffin
Technical Sales Specialist
Product Support Group
Pro Audio & Combo Division
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