

FILM-TECH

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Setup Procedure for DTS-6AD Sub Bass

May 24, 2000

TN-E271

This notice is the setup procedure for the optical sub bass extension (OBE) and sub bass parametric equalization features that have been added to the DTS-6AD.

**** New software and firmware must be installed before using the sub bass feature ****

To determine what software is installed in the DTS-6AD, press MENU → VERSION. The screen below should appear:

CPU VERSION	1.03.0045
DSP CONTROLLER	1.03
DSP FIRMWARE	23.05

← VERSION screen displaying
 new OBE software

If lower version numbers appear, contact DTS and ask for the new DTS-6AD System Disc (that contains sub bass software) and V1.03 IC-1 programmed chip. The above software is an interim release to selected theaters.

Installation of V1.03 firmware (IC-1) on D741 (DSP) board

- **IC-1**, located on the D741 board, must be changed to **V1.03**. This part is sensitive to static discharge. Precautions must be taken, such as using a grounding strap or touching case before removing PC board.
- Power off DTS-6AD. Remove display and unplug both ribbon cables. On middle board (D741), gently pull out the ejector tabs until the board releases. Pull D741 board out.
- Remove programmed chip in IC-1 and insert new chip. Pin 1 must be lined up for proper orientation.
- Put D741 back into DTS-6AD. Slide into side rails and push in until the board seats in place.
- Plug the two cables back in and attach display to front panel.
- Power DTS-6AD on and verify unit boots properly.

System Disc (sub bass CPU software)

The instructions for using this disc are in the DTS-6AD manual and are also included with the disc. After changing IC1 chip and uploading software from the System Disc, check that the “VERSION” screen displays the correct software, as shown above.

Optical Sub Bass Extension (OBE) and Sub Bass Parametric Equalization (EQ)

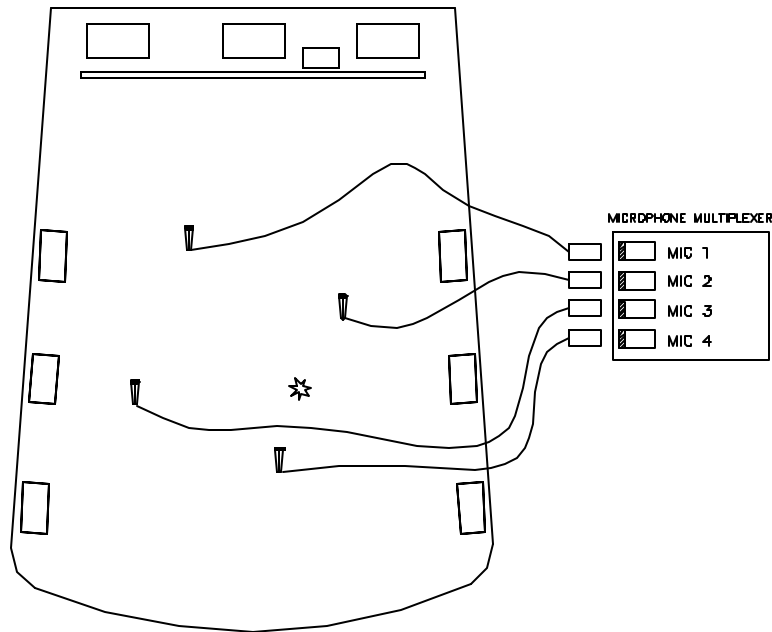
Optical sub bass and sub bass EQ have been added as a standard features to the DTS-6AD. To calibrate these features, the following equipment is required:

- DTS Setup Disc
- Calibrated Microphone or Mic Multiplexer
- Real Time Analyzer
- SPL meter (set for slow response and “C” weighting)

SETUP

Place multiplexer in auditorium as directed by manufacturer. Or, see diagram below.

SUGGESTED MICROPHONE PLACEMENT



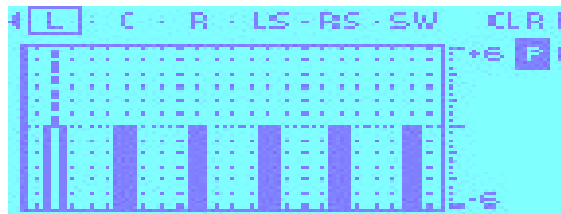
* MAKE ALL SPL READINGS AT THIS LOCATION.
IF USING A SINGLE CALIBRATED MICROPHONE FOR
ADJUSTING EQ, LOCATE THE MIC AT THIS LOCATION.

THEATER.DWG

****Before starting setup, verify new software and firmware are installed****

1. SUB BASS PARAMETRIC EQ

- 1.1 Use the DTS-6AD internal pink noise generator to set levels. Press MENU → SYSTEM SETUP → AUDIO → LEVEL. The screen below should appear:

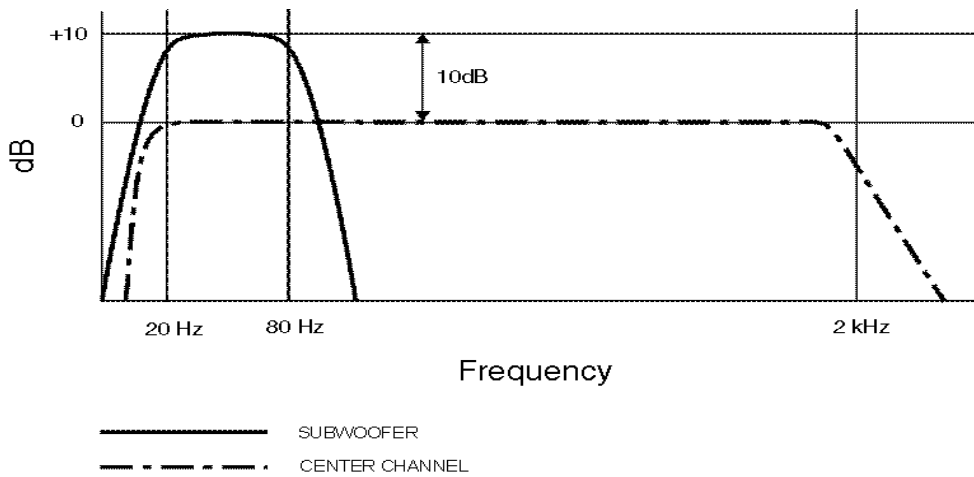


- The sub bass level should be at “0”, the center line, as shown above. Use F3 & F4 ▲ ▼ to make adjustment, if necessary.

1.2. Check the **digital sub bass**.

- Verify the digital subwoofer level has 10dB in-band gain as compared to the center channel.

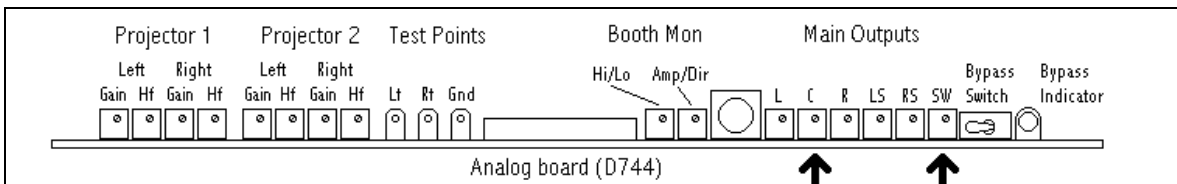
10dB In-Band Gain, “0” is the baseline (center channel)



- While in the DTS-6AD LEVEL screen (step 1.1), press F7 ➤ to advance to “C” (center channel) and press F6 to enable “P” (pink noise). Make a baseline measurement on the RTA. The SPL meter should read 85dBC for the center channel. Adjust D744 “C” trimpot if necessary.

NOTE: Left, center, right channels should be 85dBC and surrounds 82dBC. All adjustments to these channels must be done with internal pink noise and D744 trimpots.

- Press F7 ➤ to advance to “SW” (sub woofer) with pink noise enabled. Now, verify the level seen on the RTA has increased by 10dB. Adjust D744 “SW” trimpot if necessary.



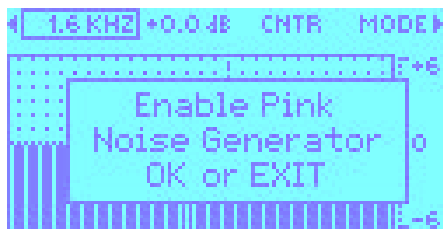
- Press FMT to return to the normal operating screen.

1.3. From normal operating screen, enter the SUB BASS PARAMETRICAL EQ screen by pressing MENU ➔ SYSTEM SETUP ➔ AUDIO ➔ ROOM EQ ➔ SUB. The screen below should appear:

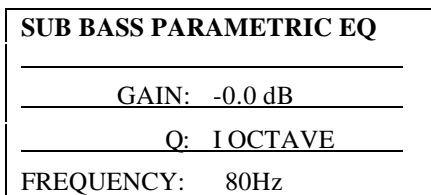


- The above screen will appear if the master volume not set to 7.0, press OK.

- (1.3) • The screen below will appear. To enable pink noise for the sub bass, press OK. Once pressed, pink noise should be heard coming from the sub bass in the theater and booth monitor (if enabled).

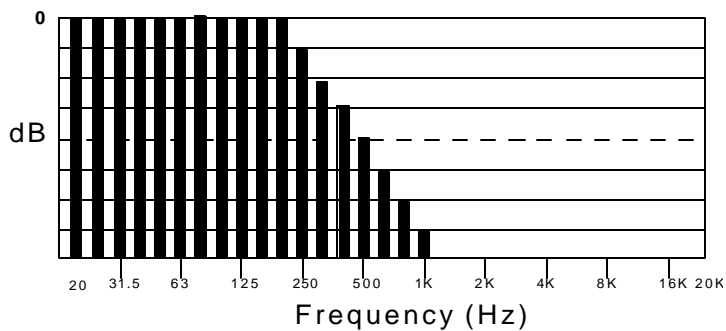


- The screen below should now appear:

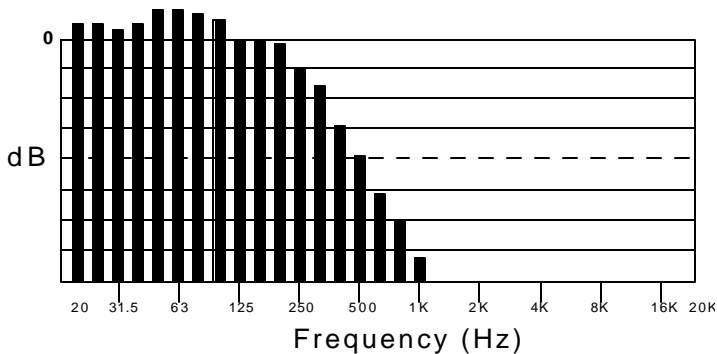
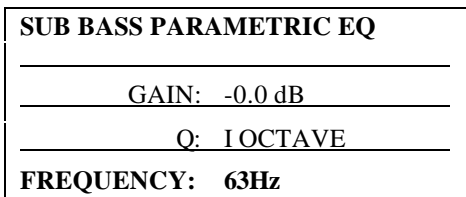


- ⊗ **Gain** adjustment is in ½ dB steps from +6.0dB to -6.0dB
- ⊗ Available octave (**Q**) range is: 1 octave, 1/3 octave, 2/3 octave
- ⊗ Available **frequencies** are: 100Hz, 80Hz, 63Hz, 50Hz, 40Hz, 31.5Hz, 25Hz.

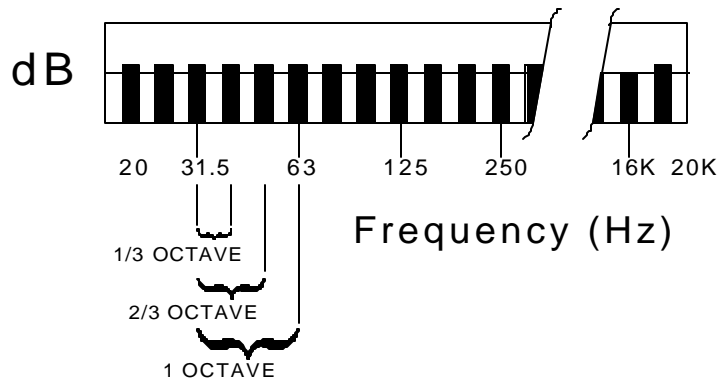
- 1.4. The frequency range of the sub bass pink is from 20Hz to 250Hz. Using the SUB BASS PARAMETRIC EQ screen, adjust the sub bass EQ so that the pattern on the RTA has a flat response, as shown below:



- 1.5. **EXAMPLE:** The graph below shows that an area around 63Hz needs adjustment. Start by first choosing the frequency and then the octave range so adjustments can be made. In this instance, set **FREQUENCY** to **63Hz**.



- The “Q” range is determined by looking at the width of the area in need of adjustment.
- In the example, notice the area in need of adjustment is between 63dB and 125Hz. This is one octave, so in this case, set 1 OCTAVE. If the range needing adjustment was smaller, then choose 2/3 OCTAVE. If only a spike appeared, then try 1/3 OCTAVE.



- Now scroll to GAIN and make adjustments so that the pattern on the RTA is as flat as possible.

SUB BASS PARAMETRIC EQ

GAIN: -1.0 dB

Q: 1 OCTAVE

FREQUENCY: 63Hz

NOTE: The DTS-6AD responses slowly to EQ gain adjustments, so give it a few seconds to finish the measurement.

- Save setting by pressing OK twice. Press FMT to return to the normal operating screen.

2. OBE Adjustment

- 2.1. The B-chain and A-chain should be aligned as discussed in the DTS-6AD installation manual. Complete the Sub Bass Parametric EQ as discussed in step #1 of this document.
- 2.2. From the normal operating screen, enter the Optical Bass Setup screen by pressing MENU → SYSTEM SETUP. The “System Setup Menu” should show the addition of “optical bass”.

OLD SCREEN

◀ AUDIO ▶ TC RDR OFFSET ▶ OPTICAL	OPTIONS ▶ PASSWORD ▶
SYSTEM SETUP MENU	

NEW SCREEN

◀ AUDIO ▶ TC RDR OFFSET ▶ OPTICAL ▶ OPTICAL BASS	OPTIONS ▶ PASSWORD ▶
SYSTEM SETUP MENU	

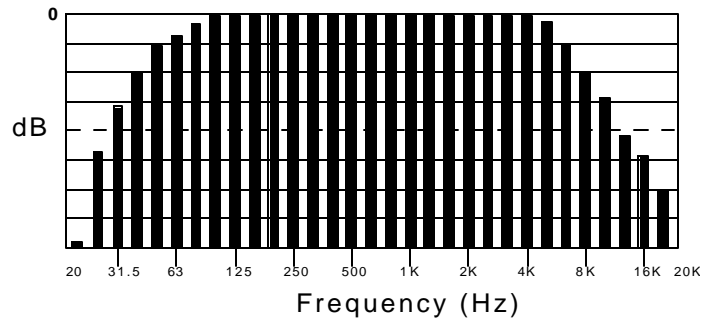
2.3. Press F4 **OPTICAL BASS** and the screen below should appear:

	PINK-CENTER ➤
	PINK-SUB BASS ➤
<hr/>	
OBE ENABLE:	OFF
<hr/>	
OBE GAIN:	0.0 dB
<hr/>	
OBE LP FILTER:	50Hz

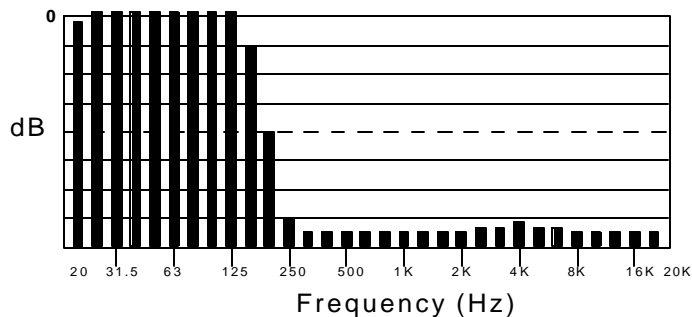
2.4. Use the F7 & F8 ◀ ▶ buttons to scroll through the choices and F4 & F5 ▲ ▼ to make adjustments. Enable OBE (on) and adjust the optical sub bass extension low pass filter (**OBE LP FILTER**). The adjustment range is from 50Hz to 120Hz, in 10dB steps.

	PINK-CENTER ➤
	PINK-SUB BASS ➤
<hr/>	
OBE ENABLE:	ON
<hr/>	
OBE GAIN:	0.0 dB
<hr/>	
OBE LP FILTER:	80Hz

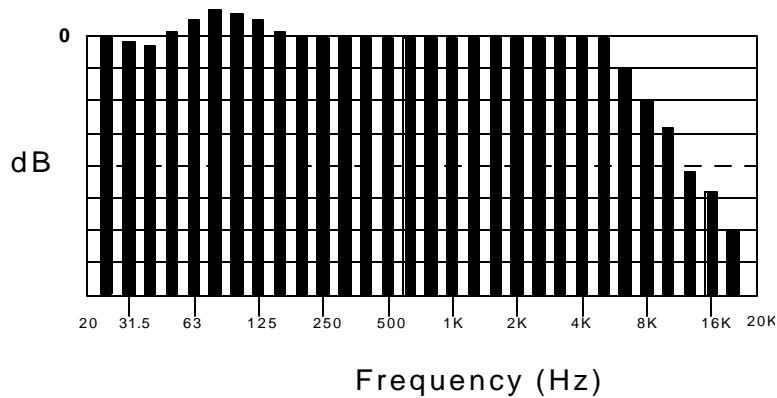
- The intent is to get rid of any low-end frequency cross-points when the sub bass channel and center channel are combined.
- To determine the crossover, first enable the **PINK-CENTER** and the pattern on the RTA should look very similar to the graph below:



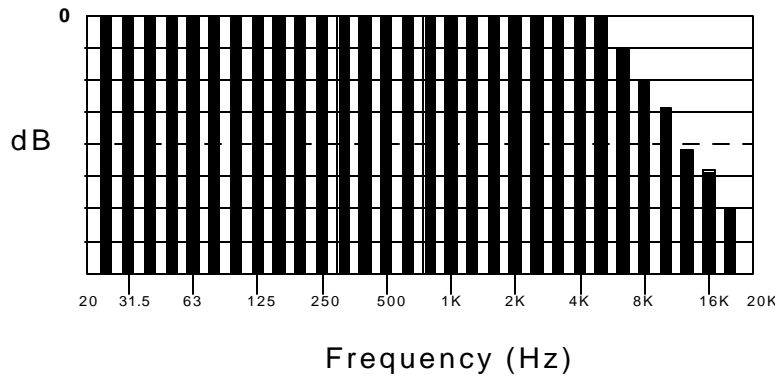
- Disable the **PINK-CENTER** and enable **PINK-SUB BASS**. The pattern on the RTA should look very similar to the graph below:



- (2.4) • Now enable both the **PINK-CENTER** and **PINK-SUB BASS**. If a peak or valley appears in the pattern between 50Hz and 120Hz when both are on, then use the **OBE LP FILTER** to even it out. Choose the frequency to filter by pressing F3 & F4 ▲ ▼. In the example below, filtering is needed around 80Hz.



- When the filter has been correctly set, the pattern on the RTA should look very similar to the graph below:



2.5. Press F4 ▲ to enable OBE. Once done, the screen should show: OBE ENABLE: ON

- Press F5 to enable **PINK CENTER**. The SPL meter should read **85dBC**. Press F5 to disable PINK-CENTER.
- Press F6 to enable **PINK-SUB BASS**. The SPL meter should read **85dBC**. If the sub bass level needs adjustment, press F7 ➤ to scroll to **OBE GAIN**. Use F3 & F4 ▲ ▼ to make level changes. The range is in ½ dB steps, from -6.0 dB to +6.0 dB.
- Once the center and sub bass channels are set, now enable pink noise for **both channels**. The SPL meter should reflect a **+3dB gain**. This confirms the sub bass channel is working correctly.

	PINK-CENTER ➤
	PINK-SUB BASS ➤
<hr/>	
OBE ENABLE:	ON
<hr/>	
OBE GAIN:	0.0 dB
<hr/>	
OBE LP FILTER:	50Hz

- Disable pink noise for both channels. OBE should remain enabled.

- 2.6. Once settings are finished, press OK twice to save. Press FMT to return to the normal operating screen.
- 2.7. Run a trailer or feature reel in analog. Choose material that has subwoofer. Verify the subwoofer is heard at a good balanced level. Try enabling and disabling the OBE. The subwoofer should be apparent only when the OBE is enabled.
- 2.8. Once happy with the sub bass settings, store settings by entering the LOAD/STORE screen by pressing MENU → SYSTEM SETUP → AUDIO → LOAD/STORE.
 - Save settings in a file for “standard” use.
 - If other menus are “stored” that must also have sub bass adjustments, then load those and redo the procedure. Be sure to re-store those files and re-load “standard” file.
 - If files have been downloaded onto a computer, then be sure to download these “updated” files.

Please refer questions to DTS Field Support

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Thank you for choosing DTS !