

# **Tact-2150 XDM**

## **Guide to Automatic Room Correction**

**Version 1.0**

## Contents

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<b>1</b>	<b>Introduction</b> .....	<b>2</b>
<b>2</b>	<b>Front Panel Main Screen</b> .....	<b>3</b>
2.1	Navigating Through 2150 XDM Menus .....	4
<b>3</b>	<b>Automatic Correction</b> .....	<b>5</b>
3.1	Measurement .....	5
3.2	Engage .....	7
3.3	Target Curve .....	8
<b>4</b>	<b>Measurement Sequence</b> .....	<b>9</b>

## 1. INTRODUCTION

The Tact-2150 XDM can perform room correction using PC software or automatically from the 2150 XDM front panel user interface.

PC based room correction requires that the 2150 XDM be connected to the RS232 port of a PC. The PC software is used just as a GUI (graphical user interface) to provide the user with graphical presentation of the correction process. After the room response measurement is completed, the room frequency response for both channels can be displayed on the screen. Crossover filters and actual correction filters can be viewed. The displayed graphs provide valuable information that helps users design their own optimum target curve.

The automatic room correction feature is designed to perform the entire room correction process without the PC interface. The Tact-2150 XDM has sufficient DSP processing power to perform room measurement, crossover filter design, target curve generation and correction filter calculation. The entire process is controlled from the 2150 XDM front panel **A-DRC** menu. Target curve and crossover filter adjustments can be made on the fly while the music is playing. Users can, for example, specify a boost at low frequencies or a roll-off at high frequencies. Values of the 'low' and 'high' frequencies can also be adjusted.

The Tact-2150 XDM memorizes two sets of target curves: computer generated and automatically generated target curves. When the automatic feature is turned OFF the Tact-2150 XDM will use a computer generated set of target curves. When the automatic feature is turned ON, the Tact-2150 XDM uses target curves generated by the Tact-2150 XDM front panel automatic correction feature.

When the Tact-2150 XDM is connected to a PC and the automatic feature is enabled, an automatically generated target curve will be uploaded onto the **RCS/DRC** screen. The curve can then be saved or modified. The modified curve can then be loaded back into the Tact-2150 XDM. However, the uploaded curve will not take effect until the automatic feature is disabled. Any target curve uploaded to the Tact-2150 XDM is saved as a PC generated target curve and this target curve takes effect only when the automatic feature is disabled. In other words, if the target curve is to be modified by the PC, the automatic correction feature has to be disabled.

This paper describes the Tact-2150 XDM automatic room correction process.

## 2. Front Panel Main Screen

When 2150 XDM power is turned ON after the initial calibration sequence, the main screen will be displayed:

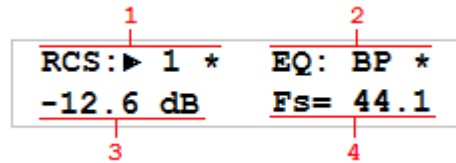


Fig. 2.1 Tact-2150 XDM main screen

The screen is divided into four blocks:

1. RCS - Room Correction System block.
2. EQ - Parametric Equalizer block
3. Master Level block
4. Fs - Input sampling frequency block.

From the main screen, you can select the correction and parametric EQ preset.

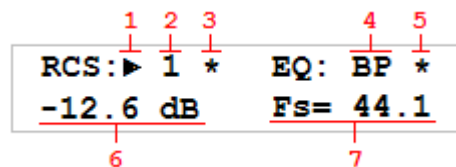


Fig. 2.2 Tact-2150 XDM main screen

1. Screen pointer. Use the remote control LEFT/RIGHT button to move the screen pointer from the RCS block to the EQ block. When the screen pointer points at the RCS block, use the remote control UP/DOWN buttons to scroll through all the correction presets, including BYPASS. To activate (engage) the displayed correction preset press the ENTER button.
2. Correction preset number. The 2150 XDM supports 9 correction presets plus bypass (BP).
3. The '\*' indicates active (engaged) correction preset. If the displayed correction preset does not have a '\*' next to it, that preset is not active. To activate the displayed preset, press the remote ENTER button. When preset is activated a "\*" will be displayed next to it.
4. Displays Parametric Equalizer preset number. The 2150 XDM supports 9 Parametric EQ presets plus bypass.
5. The '\*' indicates the active Parametric EQ preset. If the displayed EQ preset does not have a "\*" next to it, that preset is not active. To activate the displayed preset, press the remote ENTER button. When the preset is activated a "\*" will be displayed next to it.

6. Displays the 2150 XDM output signal level in dB relative to the maximum output. This number is equal to 99.9 – Master Level (as displayed on the big LED display) – Gain (as set in the GAIN menu).
7. Displays the selected digital input sampling frequency. The 2150 XDM can accept any input sampling frequency of up to 192 KHz. The input sampling frequency is automatically detected and displayed. Users have no control over this parameter.

## **2.1 Navigating Through 2150 XDM Menus**

To navigate through the 2150 XDM menu structure use the LEFT, RIGHT, UP, DOWN, ENTER and MENU buttons. While in the main screen (Fig. 2.1) use the MENU button to enter the first main menu screen (Fig. 3.2). To enter the main menu sub menus place the screen cursor over the desired menu and press ENTER. To go back from the selected sub menu use MENU button.

### 3. Automatic Correction

This section describes the 2150 XDM automatic room correction process. The automatic correction process consists of three steps: **Measurement**, **engage** auto correction and **target curve** customization.

#### 3.1 Measurement

Make sure that the correction bypass mode is selected. In the main screen and by using the LEFT/RIGHT remote control buttons, place the screen pointer over the RCS block and select BP correction preset (1) as displayed in Fig. 3.1.

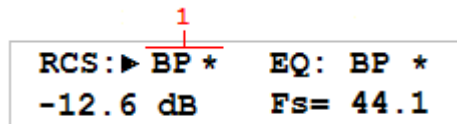


Fig. 3.1 Main Screen with RCS in bypass mode

Press the MENU button to enter the main menu first screen. Place the screen pointer over the **A-RCS** (1) option and press the ENTER button to enter the automatic correction screen.

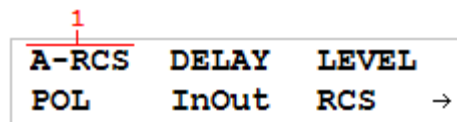


Fig. 3.2 Main menu – first screen

Note that while the 2150 XDM is in correction bypass mode the **A-RCS** screen has only the MSR (1) menu option enabled. Press the ENTER button to display the measurement screen

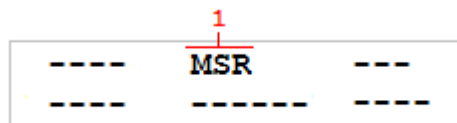


Fig. 3.3 A-RCS screen with RCS in bypass mode

Press the ENTER button to display the measurement parameter screen. The measurement parameter screen (Fig. 3.4) has three parameters: AVG, FILE and PULSE. Your 2150 XDM is factory preset to AVG=25, FILE=1 and PULSE=60. You will rarely need to change these parameters. If you do need to change them please refer to the following parameter description.

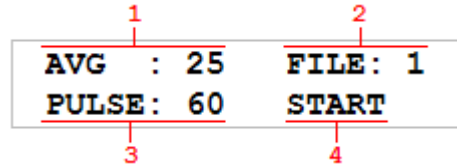


Fig. 3.4 Measurement parameter screen

1. **AVG** This is a very important measurement parameter. It equals the number of measurements that are averaged prior to being saved. The averaging process reduces the effects of random environmental noise. Typical Average values go from 10 to 30.
2. **FILE** Use this option to assign a File number to the measurement you are just about to perform. At the end of the measurement process, the measurement data for all four channels will be saved in the selected File number. The 2150 XDM supports up to seven measurement files. In other words you can save up to seven different measurements in the 2150 XDM internal memory.
3. **PULSE** This parameter sets the relative level of the output measurement pulse. The minimum level is 1% and the maximum level is 100%.
4. **START** – Place the screen cursor over this option and press the ENTER to start measurement.

To initiate the measurement process place the screen cursor over the START option and press the ENTER button. The following screen (Fig. 3.5) will be displayed and the measurement sequence will start. The 2150 XDM will start pulsing first the left channel and then the right channel. Field (1) will display the left channel and field (2) will display the right channel microphone preamplifier gain. Field (3) displays the current number of averaged measurements.

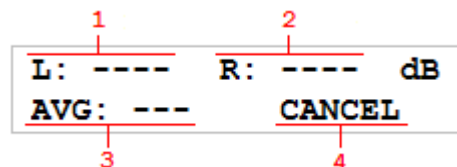


Fig. 3.5 Measurement screen

To cancel the measurement hold down the 2150 XDM front panel MUTE button until CANCELED is displayed. Press the MENU or ENTER button to go back to the measurement parameter screen (Fig. 3.4). You can restart the measurement again by selecting the START option.

Once the measurements are completed go back to the main screen (Fig. 3.1). *Please note that in this example (Fig. 3.4) measurement data is saved in measurement file number 1.*

### 3.2 Engage

In the main screen select correction preset 1. Preset 1 should be displayed in field (1) Fig. 3.6 with a ‘\*’ next to it.

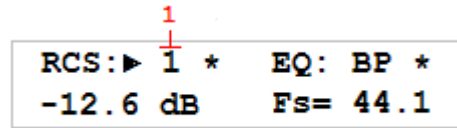


Fig. 3.6 Tact-2150 XDM main screen with correction preset 1.

After the correction preset is selected press the MENU button and then select the **A-RCS** screen. Note the change on this screen compared to the screen shown in Fig. 3.3 When the 2150 XDM is in a correction mode different than bypass (BP), the MSR menu option is disabled.

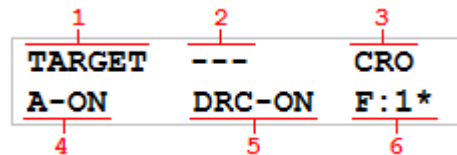


Fig. 3.7 A-RCS screen when a correction preset different than bypass is selected.

1. **TARGET** menu option. Use this option to customize automatically generated target curves.
2. Disabled MSR option.
3. Crossover menu option. Use this option to add crossover filtering to the automatic correction.
4. Automatic correction ON/OFF option. Place the cursor over this option and then press the ENTER button to turn the automatic correction ON or OFF.
5. Dynamic room correction ON/OFF option. Place the cursor over this option and then press the ENTER button to turn the dynamic room correction feature ON or OFF.
6. Measurement file selection. Place the cursor over this option and then use the UP/DOWN buttons to scroll through all seven available measurement files. To engage the displayed measurement file press the enter button. The ‘\*’ next to the file number indicates that active room correction is performed based on the measurement data contained in the selected measurement file number.

To enable (engage) automatic room correction place the screen cursor over the A-OFF option and then press the ENTER button. As soon as the A-ON is displayed, automatic room correction is engaged and you can perform your first listening test.

### 3.3 Target Curve

To customize automatically generated target curves place the screen cursor over the TARGET option (Fig. 3.8 option 1) and press ENTER to display the target curve screen.

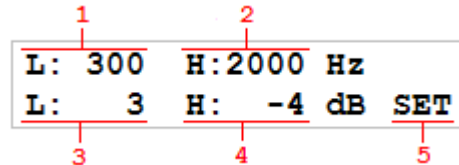


Fig. 3.8 Target curve screen.

Using the target curve screen you can add boost or attenuation at frequencies below (1) and above (2). For example, if you want to add a boost of 3 dB to frequencies below 300 Hz, set the fields (1) and (3) as displayed in Fig. 3.8. To add attenuation of -4 dB to frequencies above 2000 Hz set the fields (2) and (4) as displayed in Fig. 3.8.

To engage the changes made in this screen place the cursor over SET option (5) and press the ENTER button.

Please note that target curve changes do not take effect until the SET option is selected. As soon as the SET command is executed, the entire room correction process is recalculated and you are ready to perform a listening test.

To add crossover filtering to the correction process from the **A-RCS** screen (Fig. 3.7) select the CRO menu option. The crossover screen will be displayed (Fig. 3.9).

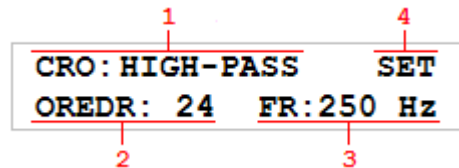


Fig. 3.9 CRO screen.

1. Place the cursor over this field and select NONE, LOW-PASS or HIGH-PASS crossover filter.
2. Use this field to select crossover filter order. Filter order determines the filter slope. Maximum filter order is 24 corresponding to filter slope of 144 dB per octave.
3. Use this field to select the crossover filter cutoff frequency. The minimum crossover cutoff frequency is 40 Hz and the maximum cutoff frequency is 500 Hz.
4. Place the cursor over this option and press the ENTER button to engage any change made on this screen.

Please note that the crossover changes do not take effect until the SET option is selected. When the SET command is executed new correction filters that incorporate the crossover filter are generated.

The crossover option is usually set to NONE. This option is used if the system consists of two main channels and one or two subwoofers. In the case of the 2150 XDM driving main channels, select the appropriate high-pass filter. If the 2150 XDM is connected to subwoofers set this option to the appropriate low-pass filter. The filter cutoff frequency (Fig. 3.9 option 3) is determined by the loudspeaker characteristics. Please refer to your loudspeaker owner's manual for proper cutoff frequency selection.

#### **4. Measurement Sequence**

The Tact-2150 XDM is capable of performing room response measurement without the assistance of a personal computer (PC). The measurement sequence consists of two phases:

1. Microphone preamp calibration phase. During the microphone preamp calibration phase, the 2150 XDM outputs a sequence of short microphone calibration pulses. These pulses are used to determine the optimum input microphone preamp gain. First, the left channel is pulsed a number of times and when optimum preamp gain is achieved the same process is repeated for the right channel. During this phase the 2150 XDM will make a determination whether there is sufficient signal energy for reliable measurement. If that is the case, the 2150 XDM will jump to the next phase to perform actual room response measurement. If one of the channels does not have sufficient signal energy a "LOW" message will be displayed.
2. Measurement phase. During this phase the 2150 XDM pulses each channel the AVG number of times. AVG is specified in the measurement screen (Fig. 6. option 1). At the end of the measurement the 2150 XDM will resume normal operation.

In the case when one of the channels detects insufficient signal energy a "LOW" message will be displayed next to it. To fix the problem make sure that the Tact microphone is connected to the MIC input connector, check your loudspeaker connections and repeat the measurement. If a "LOW" message is displayed, again increase the PULSE parameter in the measurement parameter screen (Fig. 3.4 option 3) and repeat the measurement. If the problem persists please contact Tact technical support.