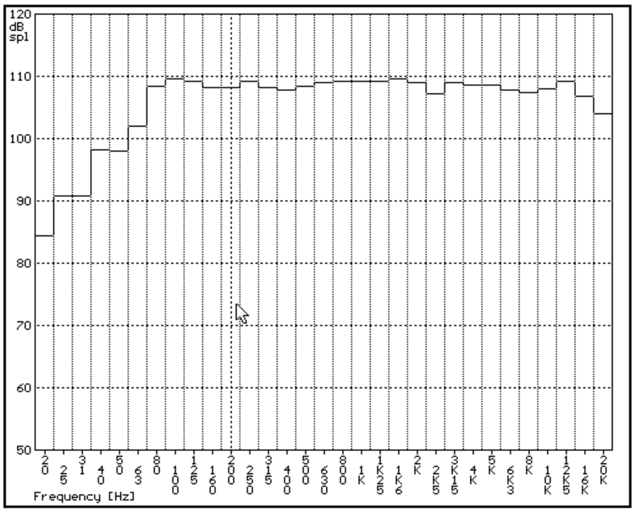
12 RTA MENU

12.1 INTRODUCTION

With this menu command it is possible to carry out one-third-octave analysis. The frequency range that is covered goes from the one-third of an octave centred on 20 Hz to the one centred on 20 kHz. The results of the measurement are plotted on the screen, and the plot is updated at a rate that is largely dependent on the speed of the PC.

12.2 ONE-THIRD-OCTAVE ANALYSIS USING CLIO

You can think of the pink noise analyzer as a series of constant percentage bandwidth bandpass filters, every one of which is centred on its own one-third of an octave. In our implementation there are a total of 31 one-third-octave bands, and these are evenly spaced when plotted on a logarithmic frequency scale. If plotted on a linear frequency scale, this kind of filter shows a bandwidth which increases with frequency. In other words, the 10 kHz filter, if excited with white noise, passes a larger amount of energy than the 1 kHz filter. Consequently, when using white noise (a signal that contains equal energy at all frequencies) the result would be a frequency response that increases with frequency. You may verify this by selecting the White signal on the control panel of the generator and then starting the analysis. The aim of this discussion has been to point out that the appropriate signal to be used with this menu is the one named Pink. This signal has an energy content that decreases with frequency at rate of 3 dB per octave, which produces a flat pink noise plot.



A typical third of octave analysis

NOTE: CLIO uses digital filters and the constant percentage bandwidth is emulated via software. This makes its function similar to a traditional one-third-octave analyzer.

NOTE: CLIO's Pink signal is not a true pink noise signal even though it has the same spectral content. It is a deterministic pseudo-random signal that fully utilises all the possibilities offered by a digital analyzer such as CLIO. The main advantage that this signal offers is that it is not necessary to wait for a large number of averages until the result stabilises. Therefore, it is advisable to utilise this signal as often as possible. In any case, this measurement may be carried out with an external signal generator; in this case you must wait several averages before the results stabilise. The difference between the use of external and internal signals is particularly evident at low frequencies.

12.3 RTA CONTROL PANEL

If the RTA menu is selected from the main menu bar, followed by the Analyze command, the control panel shown in Fig. 12.1 will be displayed if a calibration has already been carried out. The various buttons available on this control panel will now be described.

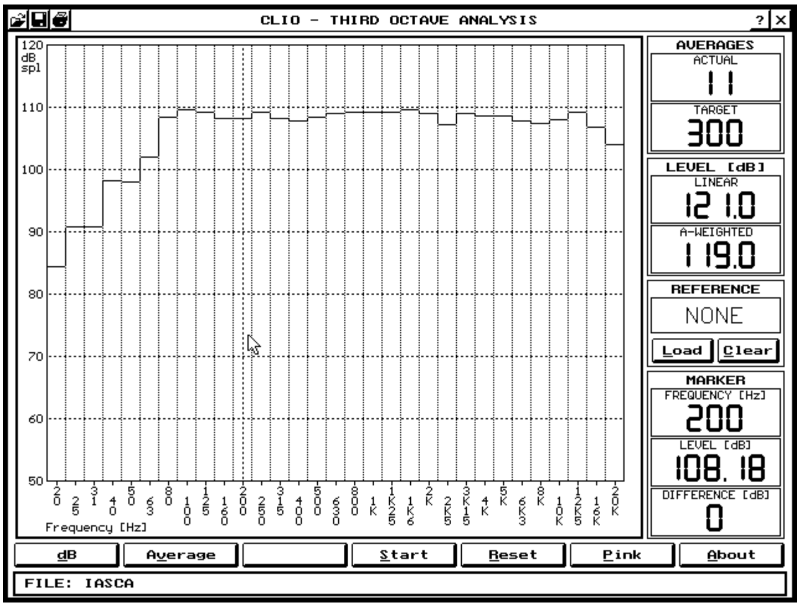


FIGURE 12.1 – The RTA control panel

dB — Allows one to modify the range to be covered by the amplitude display. The two possible scales are 10 dB and 5 dB per division. The total range in the first case is 70 dB, and 35 dB for the second.

A**v**erage — Opens a dialog box that includes an input field that allows the user to specify the desired number of averages after which the measurement is to stop. A check box is also available that allows the on-screen display of both the actual and average curves. The default target number of averages is 10.

S**t**op — Stops the analyzer, even if it has not reached the target number of averages.

Start/Co**n**tinue

Starts the analyzer. After the measurement has started, if you terminate it by pressing Stop, or if it stops automatically because it reached the specified number of averages, the button will become Continue. This allows you to continue the measurement, increasing the number of averages beyond the target. This key will return to Start when the Reset button is pressed (see below).

Reset — Resets the average buffer and the count of actual averages is reset to zero.

Pink — Starts the generation of a Pink signal. Because this is the most used signal from inside this control pannel, this button provides a shortcut to avoid opening the generator control panel and selecting the Pink signal from there. When pressed for the first time the button is activated, and when it is pressed a second time it deactivates and stops the generation of the Pink signal.

About Used to add, view, and modify a comment on the present measurement. This comment will be saved along with the measurement and will also be reloaded with it. The print routine will print this comment along with the measurement.

Load Used to load on screen a reference curve that was obtained from an earlier measurement that had been saved on disk.

Clear Clears the reference curve from the screen.

12.4 AUXILIARY INFORMATION

On the right hand side of the screen, taken in order from top to bottom, the following numerical information is displayed:

Averages The first number, labelled by “Actual”, shows the number of averages that have been performed at any instant during the measurement process. The second number, labelled by “Target”, shows the number of target averages that have been selected by the user for this measurement. When the actual number of averages reaches the target the measurement stops, and you may continue the measurement process by pressing the Continue button. The Reset button zeros both the actual number of averages and any measurements contained in the buffer used to store the averaged data.

Level The first number, labelled as “Lin”, shows the unweighted total level. The second number, labelled as “A”, shows the A-weighted total level. While the analyzer is running, both values refer to each individual measurement. When the analyzer is stopped, then the numbers correspond to the value associated with the average of all the measurements that were actually taken.

Reference Shows the name of the file from which the reference curve was loaded. In no reference file has been used, then the word “NONE” displayed.

Marker Shows the level and frequency corresponding to a selected one-third-octave band. If a reference curve has been loaded, the difference is also displayed.

NOTE: Keep in mind that, when you stop the analyzer, the curve you see on the screen is an average curve. When changing the signal or any other parameter in the measurement environment, always remember to reset the average buffer unless you want to average different situations.

NOTE: When the measurement is loaded from disk, the number of averages are also loaded. If you start a measurement at this point, this means that it will be averaged with the one you loaded.

12.5 IASCA SCORING

NOT available in Lite version!

This dialog box (fig. 12.2) calculates the International Auto Sound Challenge Association (IASCA) scoring for the SPL/RTA tests, as is reported on the Official Judging Rules.

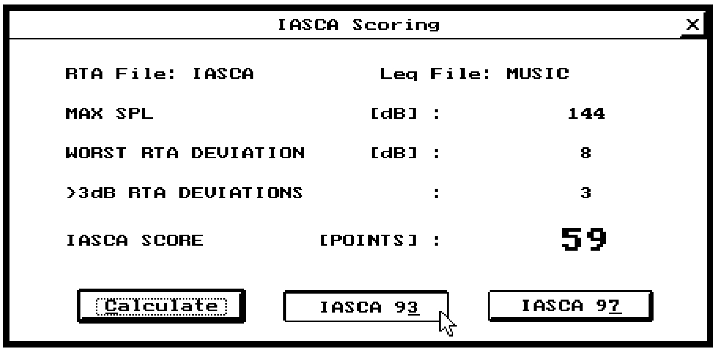


FIGURE 12.2 – The IASCA scoring dialog box (with 1993 rules)

The score is calculated starting from the RTA and the LEQ measurements loaded in memory; it is necessary to perform at least one of the two measurements in order to obtain a calculation.

For what concerns SPL tests remember to perform the LEQ measurement with the “FAST” averaging selected and for a measuring time of 30 seconds.

NOTE: the IASCA score can be calculated following the rules revised in 1993 (see figure 12.2) or in 1997 (figure 12.3).

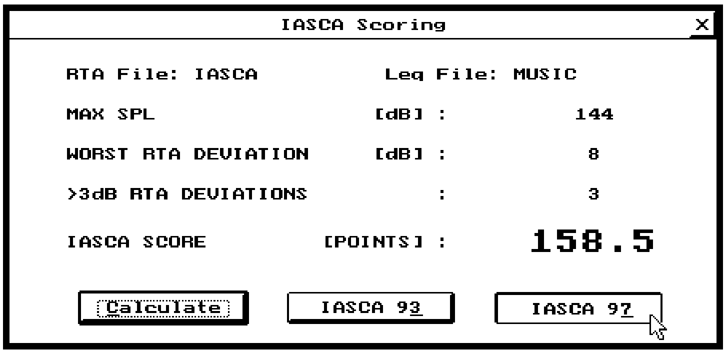


FIGURE 12.3 – IASCA scoring with 1997 rules

Refer to chapter 14 for any detail about the LEQ control panel and LEQ measurements; in IASCA score calculations it is used only the MAX value observed during the measurements.

NOTE: if a IASCA score has been succesfully calculated it will be printed with the associated RTA printout.