7 CONFIGURING AND CALIBRATING CLIO

7.1 INTRODUCTION

This chapter explains how to correctly configure the CLIO system software in order to obtain the best results when performing electrical and acoustical measurements. Section 7.2 will explain how to configure CLIO at startup. Section 7.3 will deal with some software configuration issues related to the CLIO board that will affect all measurements. Section 7.4 will cover various aspects of configuration that are related to the PC platform (e.g. printer devices) and are usually found in all software products. Section 7.6 will explain how and when to calibrate the system.

7.2 SOFTWARE STARTUP OPTIONS

It is possible to run the CLIO software using the following syntax:

"CLIO *{menu}* *[opt. {work directory}]* *[opt. {file}]* "

The three parameters permit the user to directly access a measurement menu, select an optional work directory and load a previously saved file; they are defined as:

{menu} A three letter acronym to specify the relative menu:

FFT	FFT
MLS	MLS Analyze
WTF	MLS Waterfall
FRS	Sinusoidal Frequency Response
IMP	Sinusoidal Impedance
SML	Sinusoidal Parameters
DST	Sinusoidal Distortion
POL	Sinusoidal Polar
RTA	RTA Analyze
T60	T60
LEQ	Leq
SPE	Oscilloscope
QC	QC

{work dir.} A work directory already present under **DATA**\.

{file} A measurement file already saved on disk; it has to be specified with the correct extension.

As an example the following:

"CLIO MLS JOB1 SAMPLE.MLS"

will directly enter the MLS Analyze menu, select the JOB1 directory as the active one and load the SAMPLE.MLS file.

NOTE: All the measurement settings saved with the file are recalled and affect any measurement that will be executed after.

7.3 MEASUREMENT SETTINGS

The measurement specific configuration items can be input from within some control panels or even from the main window. There are **Local Measurement Settings** that are private to each type of measurement and are loaded every time one enters a control panel. There are also the **Global Measurement Settings** that are the default condition when the program is run for the first time, and these settings are subsequently saved in the CLIO.STP file (see section 7.4).

NOTE: Each time the program is run, all Local Measurement Settings are initialized to the Global Measurement Settings. During a work session one can freely change the Local Settings so that they will differ from each other and from the Global Settings. A common event that changes the Local Settings is when a measurement is loaded from disk: the Local Settings are also loaded from disk to match those of the loaded measurement.

The Measurement Settings can be changed from within the dialog box shown in Fig. 7.1. The measurements that are affected by these settings are: FFT, MLS, Sinusoidal Frequency Response, Sinusoidal Polar, RTA, Leq, Scope and the Generator & Level Meter. This dialog box can be recalled from within the various control panels (with the exception of Scope), by pressing the SHIFT-F1 hot-key or with the Sett button in the Generator & Level Meter control panel (see section 8.1).

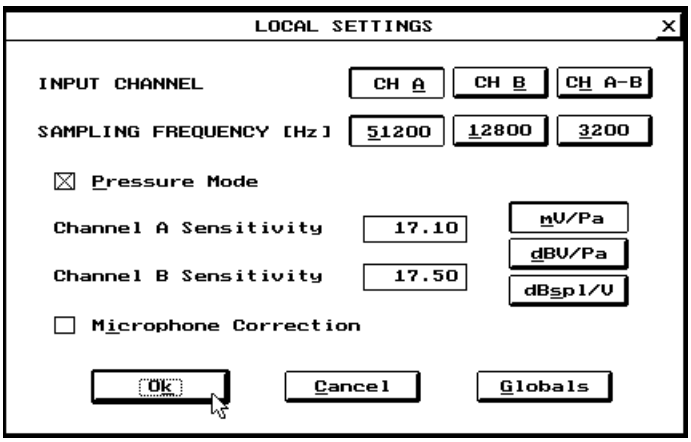


FIGURE 7.1 – The Measurement Settings dialog box

7.3.1 INPUT CHANNEL

It is possible to select the input channel for analysis. There are three possibilities:

CH **A** Channel **A** used as input in an unbalanced configuration.

CH **B** Channel **B** used as input in an unbalanced configuration.

C**H** A-B Both channels are used as input in a balanced configuration.

Please refer to paragraph 3.5 for details on the input connections to be realized in each situation.

7.3.2 SAMPLING FREQUENCY

It is possible to select one of three possible sampling frequencies: 51200 Hz, 12800 Hz, and 3200 Hz.

This selection will take effect *only* in the following measurements:

– Generator & Level Meter
– FFT

– MLS
– Scope

NOTE: The lower the sampling frequency that you choose, the slower will become some of the measurements. This fact is readily understood if one considers the theory behind the sampling process. For example, if executed using a 3200 Hz sampling rate, the MLS measurement will take about 16 times the length of time it takes if executed at 51200 Hz (in fact the generator needs exactly 16 times the time to play the MLS of the same length).

7.3.3 PRESSURE MODE AND MICROPHONE CORRECTION

It is possible to select the Pressure measuring mode. When not in Pressure mode, the readings displayed by the instrument and the amplitude scales on all the graphs will be in Volts (Vrms or dBV). When in Pressure mode, the readings and the scales will be in Pascals (Pa or dB SPL). In this case, the software will assume that you are measuring a pressure quantity and it therefore needs to know a conversion factor that defines the voltage produced by the microphone when it is measuring a certain pressure. This conversion factor is usually the sensitivity of the microphone (as found in the microphone's calibration chart) or the sensitivity of the microphone + preamplifier chain of equipment. When working with the CLIO system there are two possible cases:

a) you are using the microphone MIC-01 or MIC-02, so it is necessary to input the sensitivity of the microphone (in mV/Pa).

b) you are using the 3381/A preamplifier, so it is necessary to input the value of the scale selected on the preamplifier (in dB SPL/V).

NOTE: It is necessary to input two separate sensitivities, one for channel **A** and one for channel **B**. When it is selected the **A-B** balanced input configuration the software will use the channel **A** sensitivity.

It is also possible to activate, in Pressure mode, the Microphone Correction check box; if activated the software will correct the measured curve according to the data stored in the "MIC.CAL" file. The example below shows a sample text file created to store the microphone frequency response:

```
Freq     dB     Phase
1000     0        0
4000     0.25     0
8000     0.33     0
10000    0.5      0
15000    1.75     0
20000    2.5      0
```

NOTE: This correction will take effect in the MLS Analyze, Sinusoidal Frequency Response and RTA control panels. Always remember that the measurement data, stored in all CLIO files, are NOT corrected by the microphone file data.

NOTE: When working with the preamplifier, take care that CLIO's input gain is never set below –10 dBV; this prevents the possibility of overloading the preamplifier without having any status message displayed.

7.3.4 THE Globals BUTTON

This is a quick way to reset the Local Measurement Settings to the actual Global Measurement Settings.

7.4 THE DISK Setup CHOICE

After choosing Setup from within the Disk command presented on the menu bar, one enters the Setup dialog box, which is shown in Fig.7.2. It is possible to configure your printer, on-screen colours, as well as CLIO's I/O address from the various parameters displayed in this dialog box.

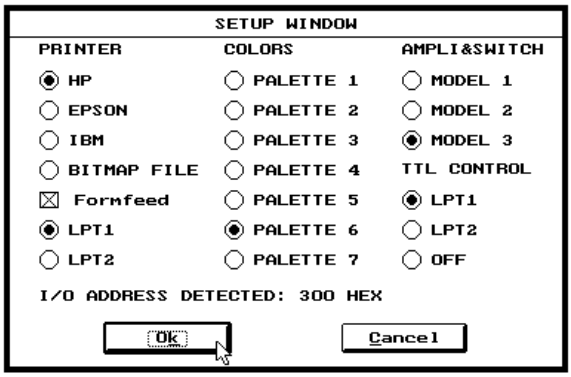


FIGURE 7.2 – The Disk Setup dialog box

7.4.1 PRINTERS

It is possible to select one of three popular printer families: Hewlett-Packard (HP), Epson, and IBM; otherwise the printout can be redirected to a standard Windows ".BMP" black-and-white bitmap file. It is also possible to select the output printer port (LPT1 or LPT2) and set an option via a check box to send a form-feed command after each measurement is printed.

7.4.2 COLOURS

This option lets the user select from one of seven different colour choices.

NOTE: Palettes 6 and 7 have been developed for use with monochrome displays.

7.4.3 I/O ADDRESS

The CLIO system software automatically detects the board I/O address at startup. It is nevertheless possible to configure the I/O address of the CLIO board in order to avoid conflicts with other boards that are installed in your computer. Refer to Fig.7.3 where you can see the two possible positions of JP2. The I/O space used by CLIO is four bytes wide, and starts at the base address that has been selected (i.e. 300-303 HEX if the 300 HEX choice has been made).

The situation depicted in Fig. 7.3a is the factory default.

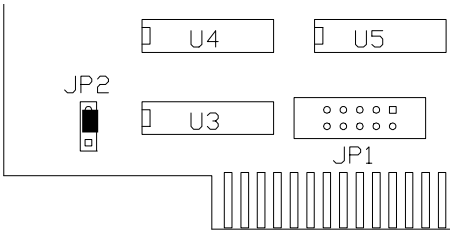


FIGURE 7.3a – I/O address 300 HEX

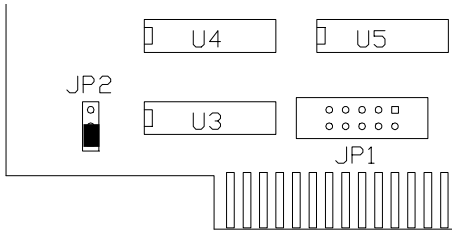


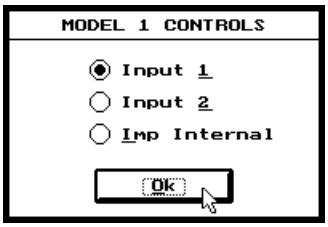
FIGURE 7.3b – I/O address 310 HEX

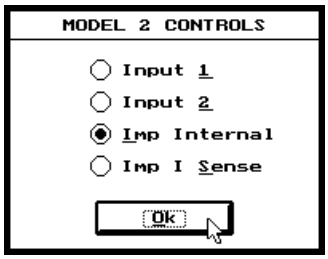
7.4.4 EXTERNAL HARDWARE CONTROL

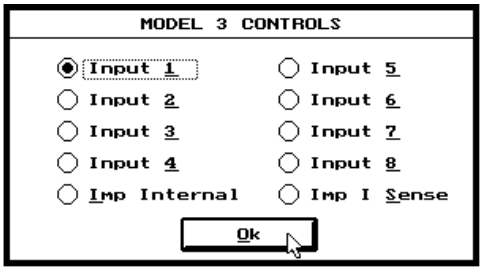
The CLIO software release 4 and QC is able to control external hardware by means of the TTL signals generated with the parallel printer port of the PC. It is possible to activate the selected printer port for external control or disable it. If **TTLCONTROL is left to OFF no output control is performed** (also the SHIFT-F4 hot key is disabled). Actually we have three possibilities:

1) The control of CLIOQC Amplifier & Switch Box

First select the model of the CLIOQC Ampli&SwitchBox with the "AMPLI&SWITCH" radio button. After you have connected the unit to the PC printer port it is possible to control its internal switches simply pressing **SHIFT-F4**; one of the following dialog boxes appear:





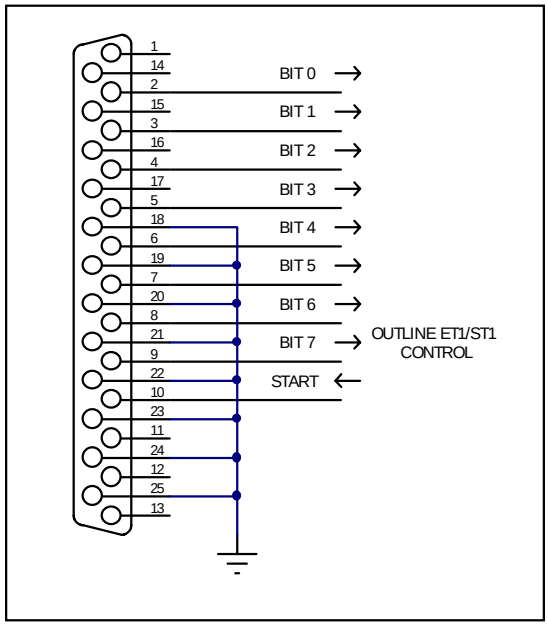


It is straightforward to understand its functionality; refer also to figure 3.17 when selecting one of the input for a response measurement and to figure 3.18 when selecting the impedance connection.

NOTE: This dialog box is active **only** if a printer port is selected; if the TTL CONTROL radio button is OFF then no dialog box appears when **SHIFT-F4** is pressed.

2) The control of the Outline ET1/ST1 Turntable

When making polar measurements (see paragraph 11.6) CLIO is able to directly control the OUTLINE ET1/ST1 Turntable by means of **BIT 7** of the selected parallel printer port (see figure right).



3) The control of an external automation in a QC production line

During a Quality Control test setup it is possible to integrate CLIO in a line automation (see chapter 15); the QC measurement can control up to eight different signals to reflect the result of an executed test and can also be externally triggered in order to realize a fully automated environment.

7.5 THE SETUP FILE

All the above mentioned software configuration items are saved in a setup file called CLIO.STP that is saved in the main CLIO directory. This file will be loaded automatically every time CLIO is started, thus re-configuring it to the last used state.
NOTE: If, for any reason, you want to return to a known default condition, you can delete the CLIO.STP file. This will cause the CLIO software to load a built-in default configuration.

7.6 CALIBRATING CLIO

To calibrate CLIO it is necessary to connect the **A** output directly to the **A** input.

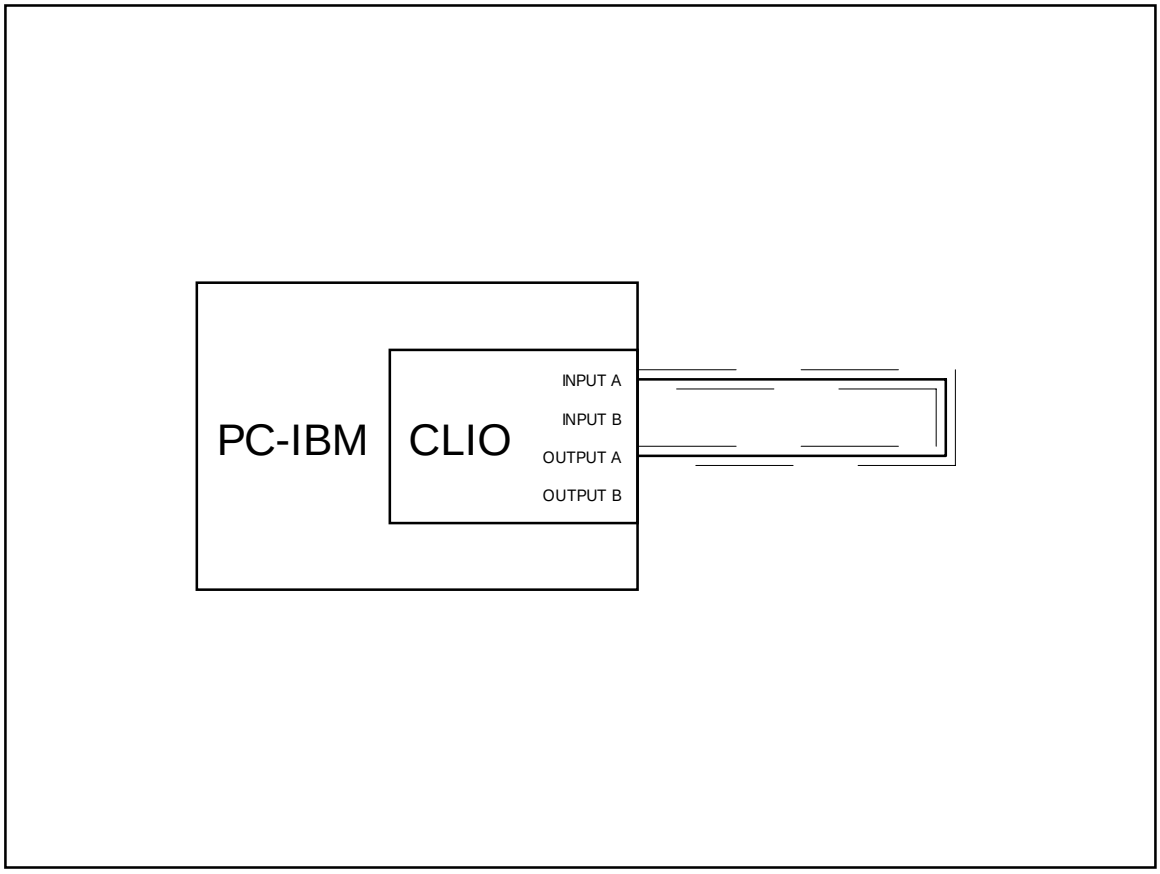


FIGURE 7.6 – Connection for calibration

NOTE: Always wait for the computer system and the installed CLIO board to reach a stable temperature. Never try to calibrate or verify the accuracy during the first few minutes that the computer has been on. You should wait at least fifteen minutes before trying any calibration operation.

7.6.1 THE DISK Calibration CHOICE

If you really need to calibrate simply press “D” from the main menu to access the Disk menu and then “C” or click on the corresponding choice. Confirm the choice by clicking on Ok as shown in Fig. 7.7.

Because it is best to calibrate the system as few times as possible, if you did not want to make this choice press “Cancel” to exit rather than proceed.

FIGURE 7.7 – Prompt for calibration

The calibration procedure is completely automatic and several progress indicators will accompany all the executed measurements.

After about some minutes (depending on the computer speed) calibration process will be concluded and the program will once again enable the user to select commands. The calibrations will be saved (inside the CLIO directory) in six different files with the names “MLS1.CAL”, “MLS2.CAL”, “MLS3.CAL”, “SIN.CAL”, “LEV.CAL” and “RTA.CAL”.

NOTE: Calibrating a measurement system is a delicate operation and needs to be conducted with care. After its completion, it is also a good rule to check that it has gone well. In order to carry out such a check, execute the following procedure:

A) Leave the board connected as during calibration.

B) Enter the MLS Analyze control panel; press “G” and execute a measurement; a flat line in both the amplitude measurement and the phase should be obtained, as shown in Fig. 7.8 (with a resolution in amplitude of 50 dB). If the line is not perfectly flat, those results which give a line that varies by no more than ±1 pixel may be considered a correct calibration.

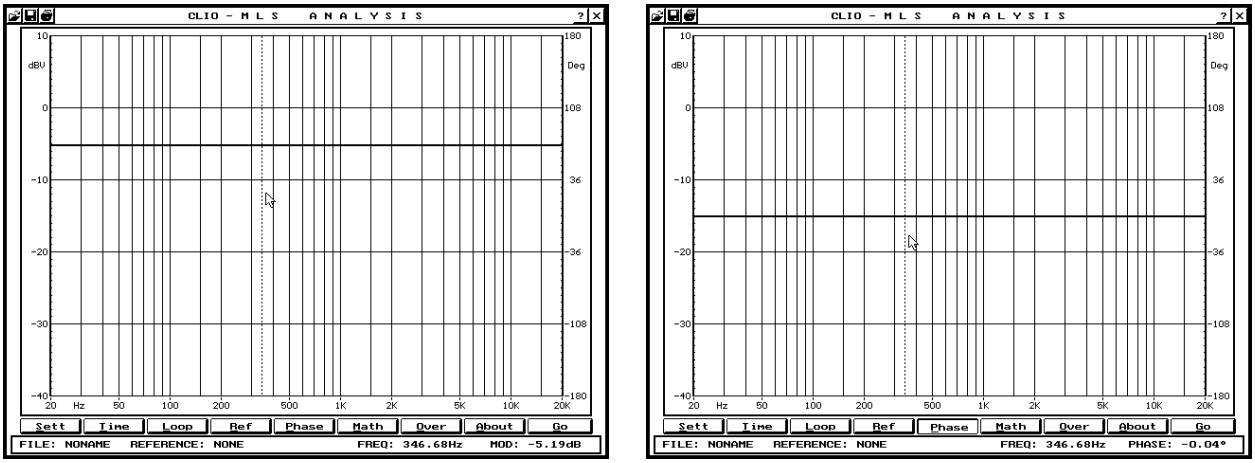


FIGURE 7.8 – MLS calibration check

C) Enter the Sinusoidal Frequency Response control panel; press “G” and execute a measurement; a flat line in both the amplitude measurement and the phase should be obtained.

D) Enter the RTA Analyze control panel; press “P” to turn the pink signal on and then press “S” to execute a measurement; a flat line should be obtained.

Should the results be extremely different it is most likely that installation problems are present. Please refer to Chapter 3 for potential problems that might be encountered during the installation of a CLIO system.

Always keep in mind that a calibration has to be made:

– when first installing CLIO
– every time the software is reinstalled
– every time the program requests it (by means of an appropriate message)
– when, in the user's judgement, the measurement conditions have changed.

In order to determine, at any given time, if it is necessary to calibrate CLIO, one must first let the system warm up. Then proceed to perform the procedure described before and consequently you should be able to decide whether or not to calibrate. The result of the measurement may vary in some way from the time we calibrated because of many small changes in measurement conditions, including changes in the atmospheric conditions, the season, and the mains voltage.