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# **D2 Acoustical Measurement System Quick Start Guide**

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# D2 Acoustical Measurement System: *Quick Start Guide*

Welcome to the **AcoustX D2 Acoustical Measurement System** and **win|RTA** software. This guide will provide you with an overview of setting up and connecting the hardware, and installing and running the software. The Quick Start Guide serves as basic reference for the D2 system, but is not intended as a detailed guide to operation of the system. More detailed reference information regarding system operation and the performance of acoustical tests is provided online and through separately offered training seminars. Contact AcoustX regarding availability of training seminars.

The *Quick Start Guide* is organized as follows:

## **System Diagram** (p.3)

This diagram provides a general overview of all the elements of the D2 Acoustical Measurement System, including a description of their function, and their relation to other system components.

## **Connection Diagram** (p.4)

The connection diagram depicts in detail the physical connections necessary to operate the D2 as described in this and other documents. Included are connector and cable types, and special notes regarding conditions that must be met for proper system operation.

## **D2 Plexer Panel Diagrams** (p.5)

These diagrams describe in detail the location and function of all connectors, controls, and indicators on the D2 Plexer.

## **D2 Controller Panel Diagrams** (p.5)

These diagrams describe in detail the location and function of all connectors, controls, and indicators on the D2 Controller.

## **USBPre Panel Diagrams** (p.6)

These diagrams describe in detail the location and function of all connectors, controls, and indicators on the USBPre Digital Audio Interface.

## **win|RTA Software Screen** (p.7)

This diagram provides an overview of the main software window of the **win|RTA** operating software, with labels indicating the function and usage of all user-interface elements.

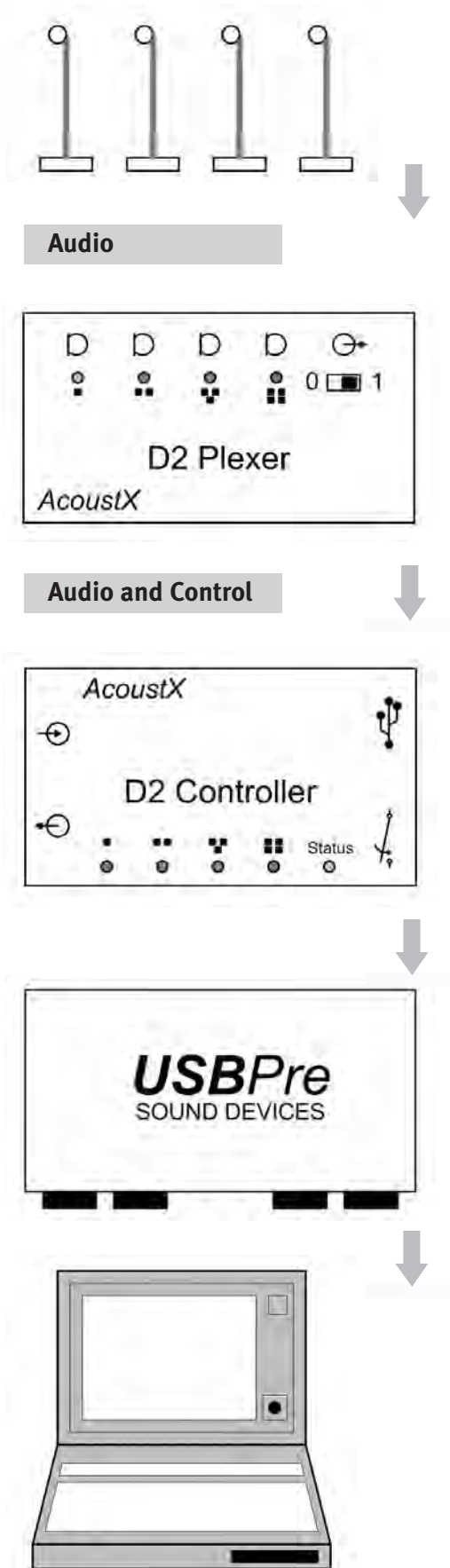
## **win|RTA Config Screen** (p.8)

This diagram provides the config section of the main software window of the **win|RTA** operating software, with labels indicating the function and usage of all user-interface elements.

## **Software Installation and Startup** (p.9)

This section describes the steps necessary to successfully install the **win|RTA** software from the distribution disk, and run the installed software.

# D2 Acoustical Measurement System: *System Diagram*



## Microphones

The D2 utilizes rugged, low diffraction, electret condenser microphones for accurate repeatable measurements. Each microphone is calibrated against a Bruel & Kjaer® 1/4 inch laboratory microphone and matched to a specific input (1, 2, 3, or 4) of the D2 Plexer. Microphones include an thin 40' cable for attachment to the D2 Plexer.

## D2 Plexer

The D2 Plexer is a compact, 4-channel microphone preamp that provides remotely-controllable microphone selection. The selected microphone signal is relayed to the D2 Controller via a lightweight, 75' interconnect cable. Remote control is via win|RTA Software and the D2 Controller.

## D2 Controller

The D2 Controller is a USB device that remotely controls microphone selection on the D2 Plexer, and that provides a relay closure to control pink noise for reverberation measurements. The audio signal from the selected Plexer channel is amplified and sent to the USBPre Digital Audio Interface.

## USBPre Digital Audio Interface

The Sound Devices USBPre Digital Audio Interface is recognized throughout the industry for its quality and reliability. It is used to convert audio signals from the D2 Plexer to digital signals that are relayed to a remote computer via the Universal Serial Bus (USB).

## Host Computer with win|RTA Software

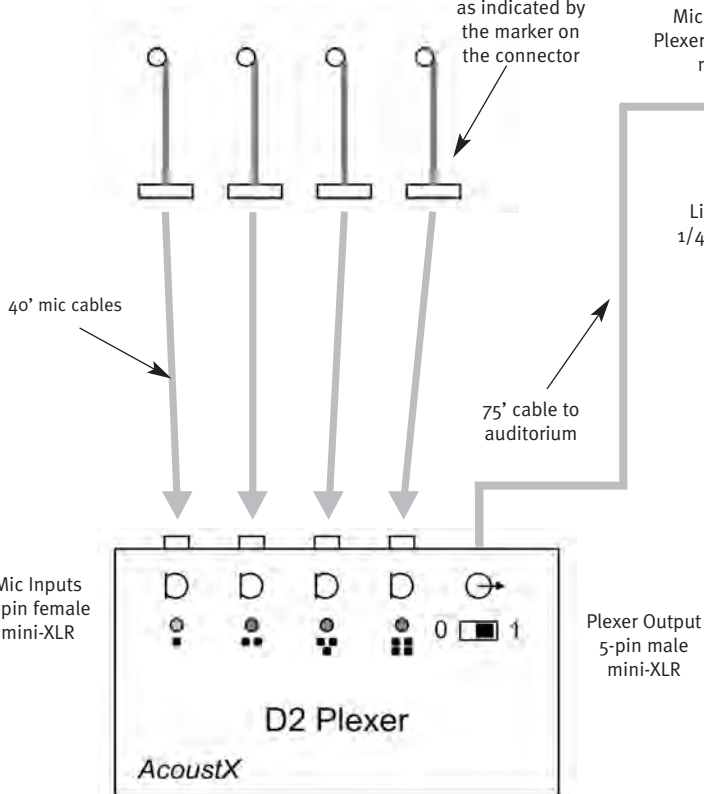
The win|RTA software provides high resolution audio measurements of frequency response (1/1, 1/3, 1/6, 1/12 octave), background noise (NC), and reverberation time (RT60). It includes the **Comprehensive Theatre Test**, which organizes all necessary tests in an easy-to-follow sequence. win|RTA requires a Microsoft® Windows XP/2000 computer with 2 USB ports (USB hubs are not acceptable).

# D2 Acoustical Measurement System: *Connection Diagram*

## Equipment in Auditorium

### Microphones

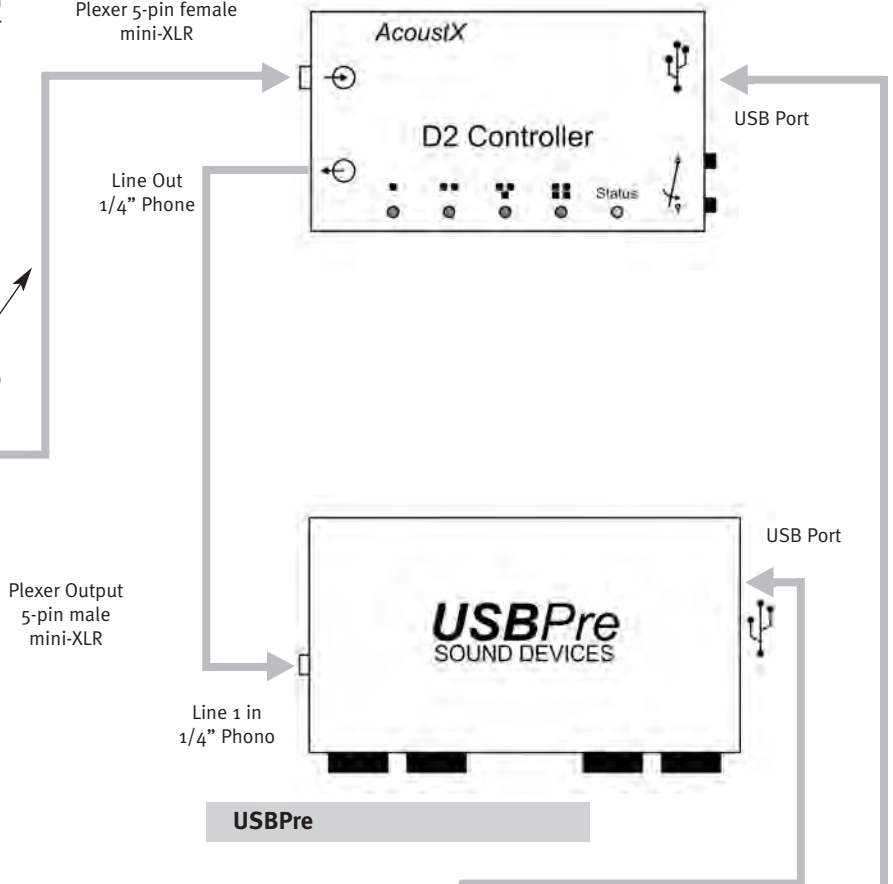
Each microphone must be matched to a specific input as indicated by the marker on the connector



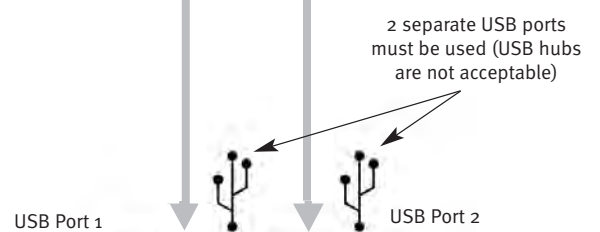
### D2 Plexer

## Equipment in Projection Booth

### D2 Controller



### USBPre

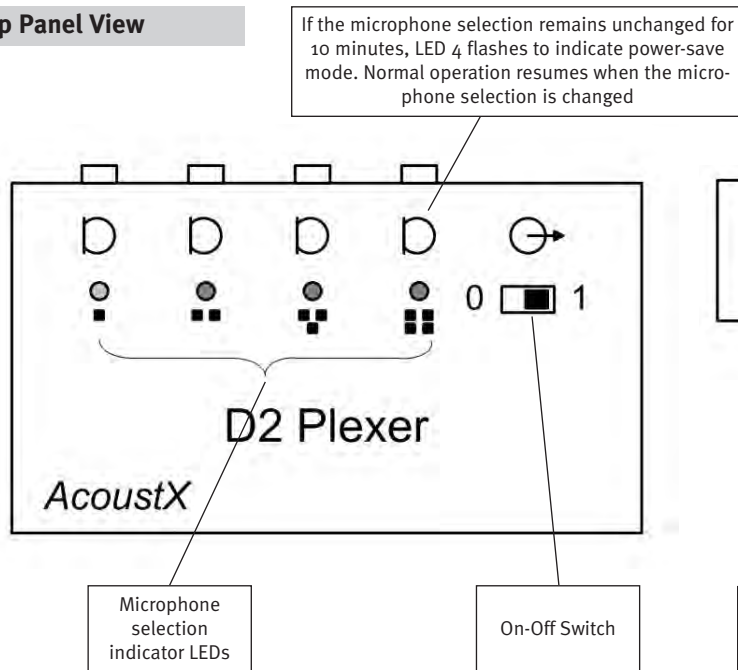


Once installed, the devices should always be connected to the same physical port for proper operation

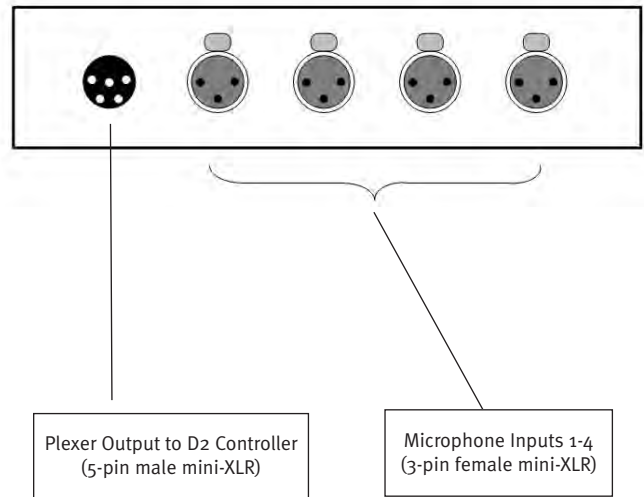
### Host Computer

# D2 Acoustical Measurement System: D2 Plexer Panel Diagrams

Top Panel View

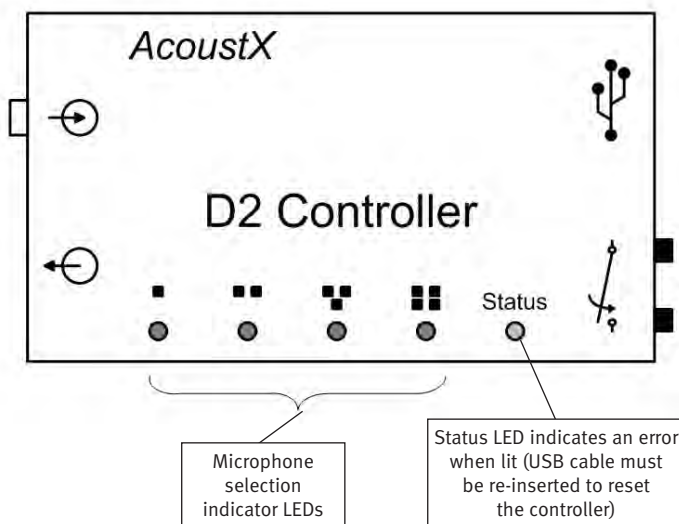


Rear Panel View

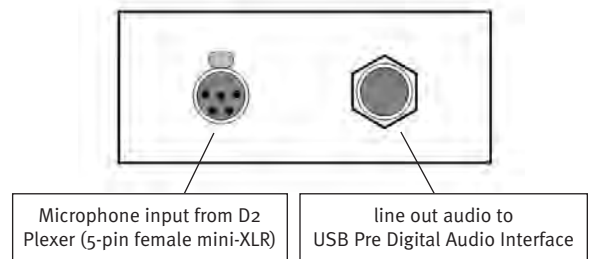


# D2 Acoustical Measurement System: D2 Controller Panel Diagrams

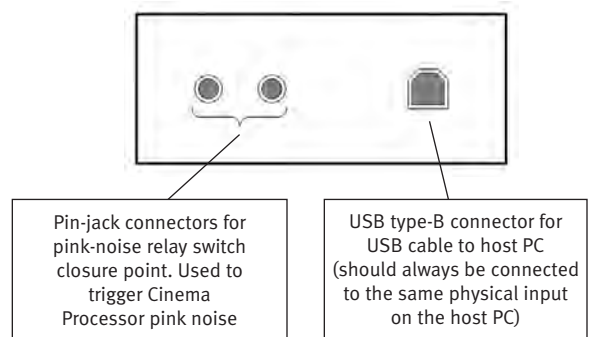
Top Panel View



Left Panel View



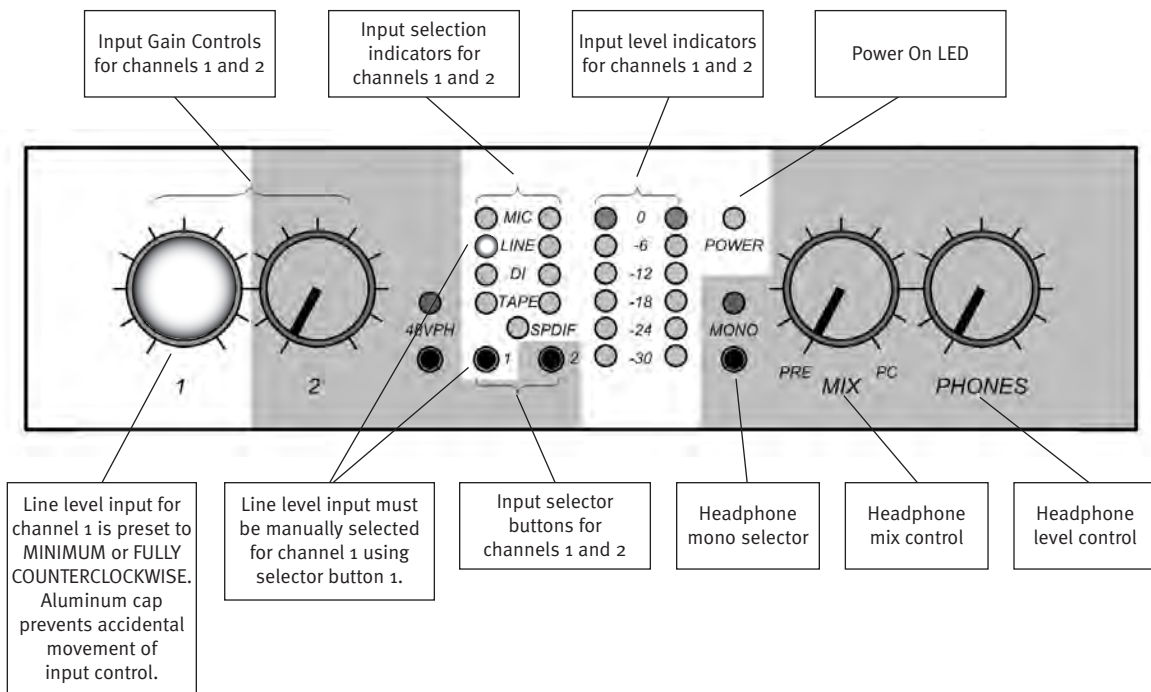
Right Panel View



# D2 Acoustical Measurement System: *USBPre Panel Diagrams*

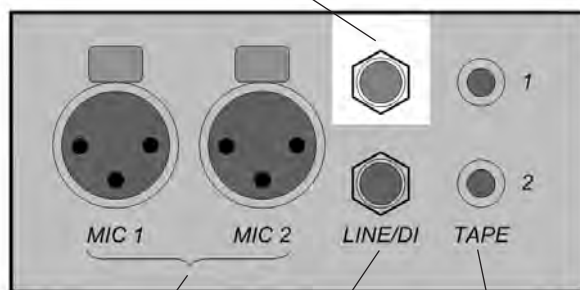
## Front Panel

NOTE: Grayed-out areas of the drawings represent controls and inputs/outputs that are not used by the D2 Acoustical Measurement System



## Input (Left) Panel

Line input for channel 1 must be connected to the line out connector of the D2 Controller. This input is also used for A-chain measurements.



XLR mic inputs

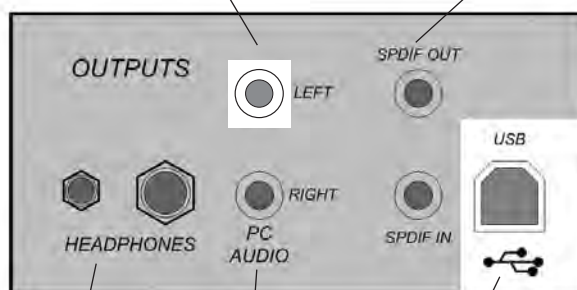
Line and direct inputs

Tape inputs

## Output (Left) Panel

Pink noise output. Note: The Windows volume control affects the level of this output. To be sure of the pink noise level, loop PC audio output to Line 1 input.

SPDIF inputs and outputs



Headphone outputs

PC audio outputs

USB type-B connector for USB cable to host PC (must always be connected to the same physical input on the host PC)



# D2 Acoustical Measurement System: *Main Software Screen*

The screenshot shows the WINRTA software interface. At the top, there are buttons for '1', '2', '3', '4', and 'PLEX'. Below these are 'RUN', 'STOP', 'GO', and 'PINK' buttons. A status bar shows 'C:/Data/plex.rtx' and 'CLEAR' and 'B' buttons. The main display is a bar chart with a vertical axis from 40 to 80 dB and a horizontal axis with frequency values from 25 to 20k. A current SPL reading of 83.5 dB is shown in a black box. On the right side, there are controls for 'RTA', 'CONFIG >>', a '60' second timer, a '70 dB' reference line, 'SLOW' response, and '5', '1/3', 'FLAT', 'A' settings. At the bottom, there are function keys labeled 'F1 Mic 1' through 'F10 File A'.

**Callouts:**

- Selects single mic input mode for mics 1-4
- Exits the program
- Turns on analyzer
- Stops all processes
- Starts the selected test
- Turns pink noise ON or OFF
- Vertical scale decibel reference values
- Horizontal scale frequency reference values. The number of displayed values depends on the frequency resolution setting (1/1, 1/3, 1/6, 1/12)
- Saves the current measurement (shift-click to export as text)
- Selects mic plex input mode
- Prints the screen
- Clears the screen
- Current SPL reading
- Selects test to display as file B (right bar when A and B selected)
- Displays information for file B
- Selects analyzer function (RTA, NC, REV, CTT)
- Selects SPL weighting (dBA, dBC, Flat, mV, dBu)
- Opens the win/RTA software configuration screen
- Select length of timed average (20, 30, 60 seconds)
- Time remaining in average
- Reference line
- Moves reference line up or down
- Selects screen response (Fast, Slow, S5, S10)
- selects vertical resolution (1, 2, 5, 10)
- Selects file view mode (A, B, A-B, B-A, A&B)
- Selects screen offset (Flat, X, User)
- Selects frequency resolution (1/1, 1/3, 1/6, 1/12)
- User definable Function Key shortcuts. Shift key enables new row of function keys.

**NOTE:**

- ESC key kills all processes
- PgUp/PgDn moves reference line



# D2 Acoustical Measurement System: *Main Software Screen Config*

After installation, enable microphone calibration by selecting mic cal numbers in the config menu. The mic serial numbers are typically assigned with Mic 1 as the lowest serial number through Mic 4 as the highest serial number (Microphone calibration files correspond to the serial numbers on each microphone cable). Then click on "Mic Cal" in the config menu. Finally, click Save to store the configuration.

**Configuration Options**

- Operator: [Text Field]
- Company: [Text Field]
- Room ID: [Text Field]
- PINK Button:  Relay  Generator
- Octave Grid:
- Show Values:
- D2 System:
- Balloon Help:
- Cell Uniformity:
- Mic Cal:
- Mic 1 S/N: [Text Field] Clear
- Mic 2 S/N: [Text Field] Clear
- Mic 3 S/N: [Text Field] Clear
- Mic 4 S/N: [Text Field] Clear
- Mic 1 Bump: 0 [Spin Box]
- Mic 2 Bump: 0 [Spin Box]
- Mic 3 Bump: 0 [Spin Box]
- Mic 4 Bump: 0 [Spin Box]
- Mic Disable:  1  2  3  4
- Data Dir: [Text Field] C:/Data
- Save: [Button]
- Reset to defaults: [Button]

**Callout Boxes:**

- Technician name
- Theatre name
- Auditorium number
- Activate relay and/or internal pink noise generator
- Show marker at each octave
- Display bar values when mouse is moved over each bar
- Uncheck when using win|RTA without other D2 components
- Adjust the gain of microphone #1
- Adjust the gain of microphone #2
- Adjust the gain of microphone #3
- Adjust the gain of microphone #4
- Restore default values to Config menu
- Select directory for stored data Directory defaults to C:/Data. Operator must create this directory if it does not exist, or select an already existing directory.
- Write configuration data to disk
- Select directory for stored data
- Remove a microphone from the plex cycle
- Select calibration file for Mic 4
- Select calibration file for Mic 3
- Select calibration file for Mic 2
- Select calibration file for Mic 1
- Activate microphone calibration files
- Set Display for Cat. No. 566 Test Film
- Enable balloon help
- Mic Cal – select this checkbox to enable mic calibration
- Mic S/N 1-4 – click on each button to assign microphone calibration files

# D2 Acoustical Measurement System: *Installation and Startup*

Installation and first-time startup of the **D2 Acoustical Measurement System** is accomplished through a four (4) step process as follows:

1. Install the **USBPre Digital Audio Interface** first.

Please refer to the documentation accompanying the USBPre Digital Audio Interface for complete installation and operating instructions. Select “Preferred Installation” after inserting the USBPre software CD. Refer to the connection diagram on page 4, and to the USBPre panel diagrams on page 6 for information on proper connection of the device. (Note: The USBPre device must be connected directly to a USB input on the computer instead of through a hub).

2. Connect the D2 Controller as shown in the connection diagram on page 5. The Controller must be connected directly to a USB port on the computer, instead of through an external hub. When the Controller is connected, the computer should prompt for drivers for the device. The necessary drivers are found on the **win|RTA** CD.

3. Insert the **win|RTA** software CD into an available drive on the host computer. Open the CD and double click in “Setup”. Follow the instructions and prompts of the installation procedure to install the **win|RTA** operating software onto a disk drive of the host computer. A short-cut icon for the **win|RTA** software will be placed on the desktop of the host computer during the installation procedure.

4. Connect the remaining components of the D2 Acoustical Measurement System (D2 Plexer and microphones) as shown in the connection diagram on pages 4-5 and the panel diagrams on pages 6-9.

5. Install the 9V alkaline battery in the Plexer by opening battery cover on the back panel. If you want to use a rechargeable battery, a NiMH battery with 9V battery with 250 mAh or greater rating is recommended.

6. Double-click the short-cut icon placed on the desktop in step (3) to start the **win|RTA** software. Note that a default configuration (preferences) file will be created the first time the program is executed. The user should customize this information as appropriate to the location or facility where the software is installed (see the “CONFIG” button on the **win|RTA** software screen diagram on page 7).

7. After installation, enable microphone calibration by selecting mic cal numbers in the config menu. (see the “CONFIG” diagram on page 8) The mic serial numbers are assigned with Mic 1 as the lowest serial number through Mic 4 as the highest serial number. Then click on “Mic Cal” in the Config menu. Finally, click Save to store the configuration.

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