Installing and Configuring Liberty Audiosuite

Hardware:

Your DSP card should be installed as directed in the instructions provided by its manufacturer. In general, to minimize noise pickup, it is best (but not essential) to install it in the slot farthest from the computer power supply.

If you already have a "Soundblaster" or equivalent soundcard installed in your system, it is often possible to install the ECHO DSP or Turtle Beach card along with the existing soundcard. (The ECHO DSP cannot, however, coexist with other soundcards which use either AD1848 or AD1846 CODEC chips, or chips which emulate these). In the case of the ECHO, be sure to connect the jumper on the ECHO DSP to the HIGHER PORT ADDRESS (HEX250) and DO NOT install the ECHO DRIVERS. LAUD is able to find the PSA type DSP cards at either of the two port addresses.

For PSA or ECHO cards:

Note that any multimedia software drivers or applications which might be supplied with the card are <u>not</u> needed or used by laud! If you will be using the dsp card only for measurement purposes, it is simpler to not install these drivers.

When using the MIC/PROBE preamp with a LAUD system, connect its outputs to the line (<u>not</u> mic) inputs on the back of the DSP card. This will require adapters along with cables. The DSP cards use miniature stereo phone connectors, while the MIC/PROBE preamp uses RCA connectors (because good quality RCA shielded stereo cables are the easiest and least expensive to obtain). The Channel 1 output of the MIC/PROBE Preamp should connect to the "left channel" input of the DSP card's input socket (the tip connection of the connector). The IMP or Mitey Mike microphone connects to the CH1 mic input and the two probe cables (with 47.5K ohm resistor probes at the other ends) connect to the provided input jacks. Initially set the gain switches to the 0dB positions.

The DSP card LINE outputs can be connected into an external power amplifier (for speaker tests) or used directly as a source to drive low-level input devices. Although software control of the output level is provided, an external manual volume control for this output level is required for practical application and safety.

For Turtle Beach cards:

For Windows systems, the card's software installation should be performed first as detailed in your Turtle Beach card's instruction manual. The installation should be done in **NON-PLUG-N-PLAY mode**, as LAUD must be able to consistently determine the card settings (which could change under PLUG-N-PLAY). In DOS (or Windows 3.1) installations, pay special attention to the instructions for adding or modifying the "EMM386" line in the CONFIG.SYS (or CONFIG.DOS) file.

For Turtle Beach cards, LAUD will look for the file "PINCFG.INI" in the "LAUD" hard disk directory – if the file is found, LAUD will attempt to use the Turtle Beach type card; if the file is not found, LAUD will instead search for a PSA type card.

When using a Turtle Beach type card without a mic/probe preamp, the Directprobes connect via adaptors and any desired extension cables (up to about 30 feet) to the LINE input of the card. The microphone (calibrated electret type) connects through a similar adaptor/extender to the LEFT (white, or tip connection) channel of the MIC input.

The DSP card LINE outputs can be connected into an external power amplifier (for speaker tests) or used directly as a source to drive low-level input devices. Although software control of the output level is provided, an external manual volume control for this output level is required for practical application and safety.

Software Installation:

The following procedures assume that the software is to be installed to drive C: from a floppy disk. If a drive other than C: is desired as the target, the file "INSTALL.BAT" should be edited (using the Windows Notepad or DOS Edit program) to change any references from drive C: to the desired drive before installation. If the floppy disk drive is not A:, substitute the drive letter you are using in the instructions below.

Three sets of install instructions are given below, for installation from DOS, Windows 3.1 or Windows 95:

TO INSTALL LAUD version 3 FROM DOS:
Put the floppy disk in your drive (probably A:) and log to that drive:
> **A:** [enter]
When you get the prompt for that drive, type:
> **INSTALL** [enter]
This will make a directory on your C: drive called "LAUD" and load the program to it.

(If you are using a PSA/ECHO card, skip ahead to the section on running LAUD)

If you are using a Turtle Beach card for your LAUD system and do NOT have Windows 3.1 installed, you will not have been able to install your card's software or "INI" files by the procedure described in its hardware manual. You must perform these installations manually. You will first need to add or modify a line in your CONFIG.SYS file similar to:
> **DEVICE=C:\DOS\EMM386.EXE NOEMS X=D800-DFFF**
As described in your card's manual, the values following the "X=" in the line above reserve upper memory space. That space (which can be changed as described in your card's manual) must not already be reserved for use by another device. Your system must be rebooted after changing the CONFIG.SYS file for the change to have any effect.
Next, find the file on your Fiji or Pinnacle installation disk called "PINCFG.EXE" and copy it to your new C:\LAUD directory.
You should then find the files on your Fiji or Pinnacle installation disk called "PIN250.INI", "PIN260.INI" and "PIN270.INI". Choose the file which has the number matching the jumper setting you have chosen for your card's NON-PNP address, and copy that file to your C:\LAUD directory.
Then, you must change the name of that file (in the C:\LAUD directory) to "PINCFG.INI" using the DOS "ren" command.
Next, you must edit the file (using DOS EDIT or another simple text editor) so that it indicates the proper reserved memory area (as specified above in your CONFIG.SYS file). The section of the PINCFG.INI file which you must change is the parameter "RAMAddress" under the heading [LogicalDevice0], similar to that shown below:

> **// ld0 DSP**
> **[LogicalDevice0]**
> **Active=1**
> **IOAddress0=290**
> **IOAddress1=000**
> **IRQNumber=11**
> **RAMAddress=d800**

The RAMAddress value must match the first number after the "X=" in the edited line in CONFIG.SYS.

If the IO address "290" (hex) is already in use by another device, you may have to change the value "IOAddress0" in the same section of the PINCFG.INI file to another unused value (140,150, 160, 210, 230, 280, 290, 360, or 3E0).

Lastly, you must add a line to your AUTOEXEC.BAT file as follows:

C:\LAUD\PINCFG /FC:\LAUD\PINCFG.INI

You must reboot for this change to have effect.

To _run_ Liberty Audiosuite from DOS, first log to that drive and directory:

C: [enter]
CD [enter]
CD LAUD [enter]

Then type:

LAUD [enter]

You may wish to create a batch file called LAUD2.BAT, containing the command lines (given above) for running LAUD and save it to your root directory (or a directory listed in your DOS Path).

TO INSTALL AND RUN LAUD Version 3 from Windows 3.1:

(note: a greater amount of base memory may be required to run under Windows. Minimize the number of TSR -- "terminate and stay resident" -- programs which are being loaded by your AUTOEXEC.BAT file if there are difficulties in running LAUD from within Windows).

Put the floppy in the A: drive and from Program Manager, select RUN and then type:

A:INSTALL [Enter]

If you are using a Turtle Beach card for your LAUD system, you must first copy (not move!) the file "PINCFG.INI" from your C:\PINNACLE or C:\FIJI directory to your C:\LAUD directory (using the Program Manager) before running LAUD.

To run the program, use File Manager to find the LAUD directory on your C: drive. Double click on the LAUD directory and within it find the file LAUD.EXE. Double click on LAUD.EXE to start the program.

You can add LAUD as an iconized program item to your desktop in an existing group (or a new program group) by using the "New" menu option under "File" in the Program Manager. There is a special icon provided in your LAUD directory which can be used to identify the program item. Consult the Windows HELP file or manual if further details are required.

TO INSTALL AND RUN LAUD Version 3 from Windows 95:

Put the floppy in the A: drive and push the START button. Then click on RUN and type:

A:INSTALL

(If you are using a PSA/ECHO card, skip ahead to the section on running LAUD)

If you are using a Turtle Beach card for your LAUD system, you will need to install an INI file into the LAUD directory to inform Liberty Audiosuite of the proper two port addresses and memory range used by the card. This isn't difficult to accomplish, as detailed below. Be sure to do the following after you have done the Turtle Beach hardware and software installation into Windows95:

The first step is to determine the values of the three parameters. The parameter values are expressed in hexadecimal, that is, they may have the characters A through F, as well as the decimal characters 0 through 9. You need to locate <u>three</u> values.

1) The start of the address range for your card's <u>Control Port</u> (one of: **250, 260, or 270**. This value must match the jumper position you have set on the Fiji or Pinnacle board, as described in your card's manual.)

2) The start of the range for the <u>DSP Port</u> (usually one of the following: **140, 150, 160, 210, 230, 280, 290, 300, 3E0, or 360**.)

3) The start of the range for the <u>DSP Ram Address</u> (one of the following: **C800, D000, D800, E000, or E7FF**.)

To find these values: <u>right</u>-click on the **"My Computer"** icon on your open desktop (using the right mouse button, rather than the usual left mouse button). Then in the displayed menu list, <u>left</u>-click on **"Properties"**. Left-click on the "**Device Manager**" tab. Then locate the "**Sound, Video and Game Controllers**" group (you may need to scroll down on the list to find it). To see the specific "**Sound, Video and Game Controllers**", left-click on the (+) sign to the left of the words. You should see an entry for the "**TBS Pro Series Digital Audio**" device. Left-click on this entry to highlight the words, then left-click on the "**Properties**" button and left-click on the "**Resources**" tab. In the displayed window, you should see <u>two</u> ranges for "**Input-Output Range**". The beginning of one of these ranges will be the <u>Control Port</u> value (either 250, 260 or 270; ignore the leading zero in the values). The beginning value of the other range is the <u>DSP Port value</u>. The first value shown in "**Memory Range**" is the <u>DSP Ram Address</u> (do not use the leading three "0"s in the Memory Range value).

To make a PINCFG.INI file with the correct parameters, you will use one of the three files "PIN250.INI", "PIN260.INI" or "PIN270.INI". These can be found on your Pinnacle or Fiji Install floppy disk (or in your hard drive's "PINNACLE" directory, under the "PROGRAM" subdirectory). Use your "My Computer" icon (or Explorer) to locate these files. Choose and double click on the file with the port number (250, 260 or 270) of your card's Control Port. This should bring up the Windows95 **NOTEPAD** editor.

- In this file, the information under the heading "// ld0 DSP" should be edited, if necessary, so that "IOAddress0" equals the number for your DSP port. To edit, just left-click your mouse to position the text cursor just after the equal sign and use the "Delete" key to remove the current value. Then type in the new value.

- Similarly, the value "RAMAddress" under the same "// ld0 DSP" heading should be edited to equal the DSP Ram Address.

- No other values in this file need be changed for LAUD use.

- When the changes have been made, you then need to save this file into your LAUD directory under the name "PINCFG.INI". To do this, click on the menu item **"File"** at the top of Notepad, and then on "**Save <u>A</u>s**". In the "Save As" window, browse to your "LAUD" directory (usually on the "C" drive, unless you installed it elsewhere) and then change the "**File <u>n</u>ame**" at the bottom of the window from "PIN250.INI" (or PIN260 or PIN270) to "PINCFG.INI". Then click the "**Save**" button. Then close the NOTEPAD.

To run the program, use the Explorer to find the LAUD directory on your C: drive. Double click on the LAUD directory and within it find the file LAUD.EXE. Double click on LAUD.EXE to start the program.

Program Configurations:

After installation, the initial program configuration for LAUD can be easily accomplished by use of a built-in Easy Script. To run this, first start up the LAUD program. On first startup and after the title screen (which will stay until a key is pressed or the mouse is clicked), the computer will sound a tone and a message will appear at the top of the screen warning that the "STANDARD"

configuration file can not be found. This file, called STANDARD.ICF, is a special file in which LAUD stores parameters about the physical configuration of the system (DSP card type, printer type, system gains, etc.) and your choice of various default start-up display, acquisition and processing parameters. The warning serves to alert you that the file needs to be created. Just press the [Enter] key to continue.

Creating the STANDARD configuration file is easy in LAUD version 3. A special Easy Script is built into the program which will prompt you for some information, direct you through any actions which might be required, and create the STANDARD configuration file (it also provides a good introduction on how to use Easy Scripts).

To start the Easy Scripts, identify the large button near the bottom of your screen. Click your mouse on this button (using the LEFT mouse button), or press the "reverse apostrophe" key (the ` key, usually at the top left corner of most keyboards). This will bring up a pop-up window with a selection of different Easy Scripts. You may make your selection by either pressing the number key (not the function key) associated with the desired choice or by clicking on the line containing the Easy Script selection number. Script number 1 offers brief descriptions of the Easy Scripts. The second to last selection in the first Window is for the Software Installation script which will create your STANDARD configuration file.

The same Easy script can also be used later should you want or need to change some of the primary system characteristics with your installation of LAUD. Of course, the STANDARD configuration file can also be updated without the script by using normal menu options within LAUD. If you are using a Turtle Beach card, an ECHO DSP/mod, or another extended low frequency card, you may skip the next section.

Creating and Declaring BAL Data

NOTE: If you are using LAUD with a Turtle Beach card, the Echo DSP/mod or any card which has been modified for extended low frequency performance, the BAL data and process should **NOT** be used -- just skip this section. **Bal** is intended to compensate, in software, for differing rates of low-frequency rolloff which occur within the measurement band in some DSP cards sold for multimedia soundcard use. By not using the BAL facility, you can achieve faster program operation and lower memory utilization.

As described elsewhere, Bal (balance) data is a correction file for the frequency domain differences between the two channels at lower frequencies. A Bal data set, if used, should be made when LAUD is initially installed and need only be changed if you change probes, your DSP card or your mic/probe preamp.

To generate this data set, connect both probes to the same output of your DSP card (to the same channel). The Line outputs are preferred. Press the [%] key so that Dual Channel mode is selected. Go to the SINE instrument and select [Acquire Freqs] and then select [Log_f]. Temporarily choose a first frequency of 200 Hz, a last frequency of 400 Hz and Num_points equal to about 100.   (NOTE: the menus are navigated by either clicking on the designated menu words in order, or by pressing the key which is capitalized or highlighted in each word. The frequency range parameters will be prompted for -- just type in each number and press [Enter]). See the connection diagram following this text.

Be sure that the word "PROBE" is displayed in the top-of-screen box marked "4:INPUT". IF not, press [F4] until it is. Also, if the box marked "9:DLAY" does not show "0.000", use [F9] to set it to zero.

Now go to [* Acquire Set_levs Auto_adj], and select "Both_match". Now go back to {* Acquire Freqs] and change the first frequency to 2 Hz. Then go to the [* Acquire Modes] menu and set [Resp_mode] to [Optimized] and at 5 cycles.   Also ensure that the Gating parameter under [* Acquire Modes Resp_mode] is set to OFF.

Press [* Acquire sWeep Freq_response] and take the time to read through your documentation while Liberty Audiosuite compares your two channels at low frequencies. After the process has completed, go to the [* System Z_set] menu and choose [Set_bal], and answer affirmative to the "are you sure?" question. The data will be automatically saved, ready for future use.
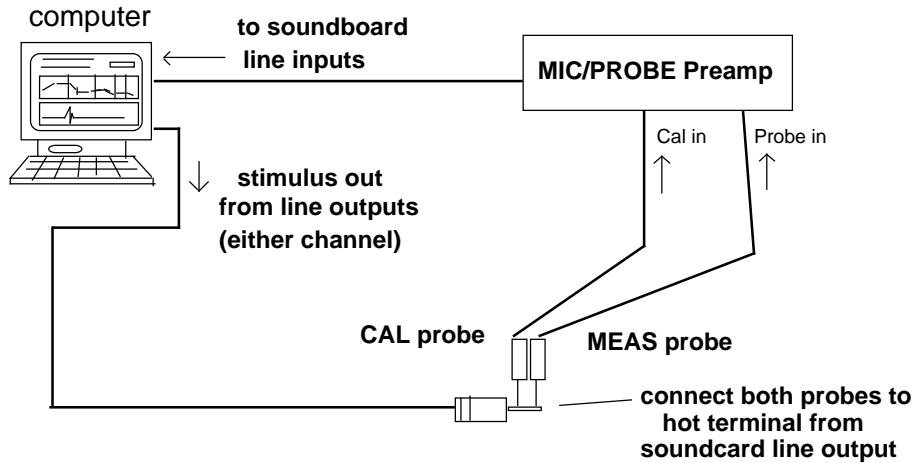
"Bal" file creation equipment setup

(SEE NOTE ABOUT APPLICABLE DSP CARDS)

Using the Turtle Beach Pinnacle™ or Fiji™ without a Mic/Probe Preamp ("Directprobe"):

When LAUD is used with the ECHO or other PSA type soundcards, the Mic/Probe Preamp is needed for most practical measurements. This is because the microphone preamp in those cards does not generally have a sufficiently extended flat response range for measurement purposes.   That card design also lacks sufficient gain or adjustment range on the Line inputs to allow resistor probes to adequately handle a wide enough range of input levels with a direct connection. The Mic/Probe Preamp therefore provides the needed flat gain mic stage as well as an interface to allow resistor probes to be used safely and switchable attenuator steps to greatly extend the input range.

When LAUD is used with the Multisound Pinnacle™ or Multisound Fiji™ cards, the system can be operated without a Mic/Probe preamp. This is practical because the mic and line input hardware of these cards have very low noise as well as a wider adjustment range. This type of operation, in which LAUD operates with the Pinnacle™ or Fiji™ cards but without an external Mic/Probe Preamp, is referred to in the documentation and Help files as a **"Directprobe"** configuration. *Note that much of this manual will describe only (or primarily) the Mic/Probe Preamp-based configurations. If you are using the Directprobe configuration, you may ignore references herein to external Mic/Probe switches and most External Gain or Attenuation settings. Note that the probes used with this Directprobe connection are not the same as those used with a Mic/Probe Preamp based system.   Rather than connecting the microphone and probes through the Mic/Probe Preamp, these devices will instead connect directly to the Turtle Beach card as shown below:*
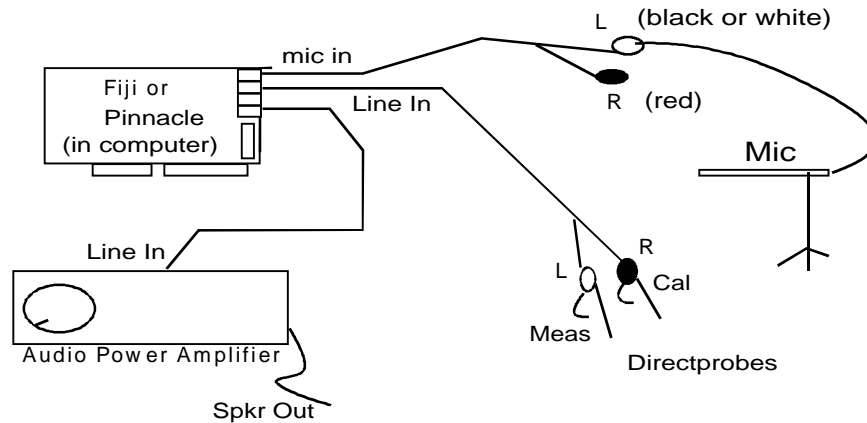
Note: In most cases, the ground leads of the probes (black, green or blue) need not and SHOULD not be connected at all.

Directprobe operation of the Multisound Pinnacle™ or Multisound Fiji™ cards is generally simpler than is operation with the Mic/Probe Preamp. There are fewer hardware switches and connections to worry about and one less piece of equipment to purchase or maintain. Measured distortion residuals are considerably lower with the Directprobe connection (it avoids the inevitable distortion which would otherwise be added by the Mic/Probe Preamp's circuitry).   Also, there is less need for keeping the LAUD software informed about external settings. For example, when using the Mic/Probe Preamp, you must make certain that the "INPUT" ([F4]) button of LAUD matches the switch setting of the Preamp. But with Directprobe operation this occurs automatically because the LAUD software is able to directly switch between the Microphone and the Line (probe) hardware.

There are some special considerations, however, when operating LAUD in the "Directprobe" connection:

* **The microphone correction data** (its "calibration" file) may not be correct for the bias conditions provided with direct mic connection to the Turtle Beach™ cards. The correction data provided for capsules intended for use with the Mic/Probe Preamp assume a source bias of 2.5Volts, supplied via a resistor of 2.2k ohms. The Turtle Beach cards provide a source bias of 5.0Volts, supplied through a resistor of 4.7k ohms. Typically this will result in the reference sensitivity being 3.4dB higher (a voltage ratio of 1.48x) when the microphone is powered directly from the card rather than from a Mic/Probe Preamp. If your microphone's calibration was done previously only for the Mic/Probe Preamp, a good compensation can be provided by changing the first line in its calibration data file so that the number provided there (the "mV/PA" value) is 1.48 times its original value. For example, if the sensitivity value was 6.30 mV/Pa, it should be changed to 9.32 mV/Pa. Alternately, the capsule can often be recalibrated by its supplier for the new conditions at a nominal cost.

* The resistor probes used with the Directprobe connection are of different construction than are the "IMP" style probes used with the Mic/Probe Preamp. The IMP probes used a single 47.5k ohm resistor in series with the hot lead (this worked against the 2.2k load resistance of the Mic/Probe Preamp's input to provide attenuation and voltage protection). This provided protection to terminal voltages up to 100V peak, and linear operation up to 40V peak.
    The Directprobe probes, however, contain both a series resistor of 7.68K ohms and a shunt resistor of 2.87k ohm (the "1x" directprobe). This provides DSP card protection for terminal voltages of up to 40Vpeak and linear operation to 20V peak.   *Do NOT use* *these probes at points which may potentially exhibit voltages above 40V*

peak. Liberty Instruments, Inc. shall NOT be responsible for damage to equipment due to excessive voltages at probed points .

2.87k

7.68k

"Hot"   (red, yellow or white)

ground

(black, blue or green)

inline "RCA" phono jack
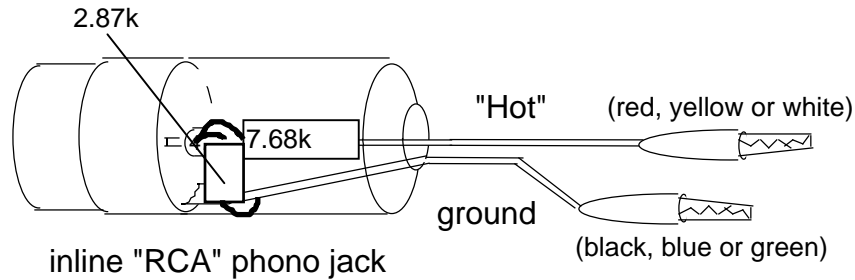
Directprobe, 1x type (for use with Turtle Beach cards only)

For higher voltages, a "10x" Directprobe can also be purchased or constructed. This, however, is unlikely to be needed by most users. A 10x Directprobe provides 20dB more attenuation and is usable to levels of approximately **100Vpeak, (use above this level is not recommended for safety reasons)**. A 10x Directprobe uses a series resistor of 9.76k ohms and a shunt resistor of 232 ohms.

Using the Turtle Beach Pinnacle™ or Fiji™ WITH a Mic/Probe Preamp:
Use of LAUD *with* the Turtle Beach DSP cards and *with* the Mic/Probe Preamp is done the same as is done when using the ECHO/PSA cards. The Mic/Probe Preamp's outputs connect to the Line In jack of the DSP card (Channel 1 = left channel = "tip connection" = white or black connector). Use of the Mic/Probe Preamp provides some advantages:
- The microphone input sensitivity is considerably increased
- The input voltage handling range is greater (without changing to different kinds of probes)
- The attenuator (GAIN) switches on the Mic/Probe Preamp provide greater versatility
- Cable lengths can be longer (the low impedances of the DSP card's line output and the Mic/Probe Preamp's output allow cable lengths of up to several hundred feet, if required).

Using the Turtle Beach Pinnacle™ or Fiji™ both ways:
You can easily change back and forth, as desired, between using these cards with or without the Mic/Probe Preamp. This way, you can use the Directprobe connection for best convenience and lowest distortion residuals for most uses, but add the Mic/Probe Preamp when you need the extra microphone sensitivity or must use longer cable runs between the computer and the measurement area. To do this, use the following process:
1.   After hardware and software installation of the card and LAUD software, use the Installation **Easy Script** to configure your system for the Turtle Beach card as connected without the Mic/Probe Preamp. Be sure to have 1x "Directprobes" connected to the card, and to use a microphone correction data set which is appropriate for direct connection to the card (5V bias, 4.7K feed). Complete the setup, all the way through where it modifies your "STANDARD" configuration file. This is very easy and takes only a few minutes.
2.   Then, rerun the the Installation **Easy Script** to configure the system for the Turtle Beach card with the Mic/Probe Preamp. Be sure to use the microphone correction data, in this case, which is correct for use with the Mic/Probe Preamp (2.5V bias, 2.2k feed). However, at the last step in the Script, instead of allowing the "STANDARD.ICF" file to be overwritten, instead choose "**NOT ACCEPT and leave the configuration file unchanged**". Then immediately use the menu selections: [* System Config_file Save MPP] and press the [Enter] key. To do this, as will be explained in the chapter on "Shared System Characteristics", only the following keys should be pressed, in the following order:

*SCSMPP
and then press the **[Enter]** key. If you are asked if the existing file "MPP" should be overwritten, press the **y** key ("yes") in response.

When you start up LAUD, it will normally come up configured for use <u>WITHOUT</u> the Mic/Probe Preamp, as saved in the "STANDARD" configuration file. If you wish to use it on this occasion <u>with</u> the M/PP, just use the menu selections [* System Config_file Use MPP] and press the [Enter] key. This will then restore the configuration (mic correction file, gain settings, etc.) for using LAUD <u>with</u> the M/PP. If you later wish to make changes to this configuration, be sure to save the Config_file under the name "MPP", rather than "STANDARD" (because STANDARD is being used for the more commonly used "Directprobe" configuration).