**ERTS**

**LAB**

# Teach Pack

## Version 1.00

**May  2000**

# Getting Started

## License agreement

The ERTSLab teach package is intended to give educational departments a powerful and easy to administrate teaching tool for demonstrating psychological experiments and for giving students the opportunity to collect empirical data for teaching purposes.

The ERTSLab license is restricted to teaching purposes only. ERTSLab must not be used for any other type of data collection like research, clinical trials and other commercial studies. If you are interested in such applications, please ask for the professional ERTS package and/or the CogIt test manager.

ERTSlab may be installed on all computers that are permanently owned by the licensing department. This also includes local networks that are dedicated to be used by students of this department.

**The ERTSLab license expires annually**. It must not be used beyond this date under any circumstances without renewing the ERTSLab license. BeriSoft Cooperation's main interest is to offer new licenses for the following time periods but cannot guarantee the availability.

During the license period you may install additional experimental scripts as they become available. BeriSoft Cooperation encourages you to submit new or improved experiments created at your department to make them available to other ERTSLab users. Returning collected data is also appreciated for enabling BeriSoft Cooperation to improve experimental designs contained in the library.

BeriSoft Cooperation guarantees basic usability of the software excluding any liability concerning faultlessness and consequences of application like loss of data, down times or any other damage. The experiment library itself is shipped on an As-Is base.

All rights are reserved by BeriSoft Cooperation, this includes the experiment library provided by BeriSoft Cooperation. Experiments of this library may be freely exchanged between other owners of ERTSLab and owners of an educational ERTS license. The experiments must not be sold or used for any profit-related purposes.

Any illegal installation or usage of ERTSLab will be prosecuted and will automatically end the license period.

# Contents

# 1   Introduction

ERTSLab is an educational teach-ware package for students of the behavioral with an extensive library of computer based experiments together with background information about most experimental paradigms. ERTSLab provides an easy-to-use interface that is compatible to today's MS-Windows® standards. Thus, instructing students how to start experiments is virtually not required at all. The basic concepts are explained in the "Quick Starting Guide for Users" section.

To simplify administration ERTSLab introduces the concept of class room profiles that lets you customize the interface and the directory paths to support your individual teaching scenarios most efficiently. The "Setup Guide for Administrators" explains how to create and edit class room profiles.

ERTSLab is the teach-ware variant of the classic ERTS software package which is a very popular research and teaching tool for psychological reaction time experiments. ERTSLab scripts are 100% compatible to ERTS scripts and thus may be exchanged between users of the educational ERTS version and users of ERTSLab. This gives you the opportunity to extend the ERTSLab experiment library by your own research paradigms or to use ERTSLab experiments as templates for new ERTS scripts.

We strongly hope that the open architecture of the experiment library and the documentation encourages you to help us complementing the library by sending us feedback about documentation or results obtained by students. We would also appreciate suggestions for new paradigms that you consider as valuable examples for teaching students experimental psychology. Please keep in mind that you may benefit as well because we will make available any new paradigm immediately via Internet.


This documentation is split into two parts.

Read the **Setup Guide for Administrators** if you want to set up and configure ERTSLab to be used by your students.

Read the **Quick Starting Guide for Users** if you just want to use ERTSLab for the first time and want to get familiar with the basic principles.

# 2   Setup Guide for Administrators

## 2.1   Installing ERTSLab

ERTSLab is a 32 Bit Windows application whereas execution of experimental sessions is performed by calling an external DOS-Runtime Kernel. Nevertheless, ERTSLab and the DOS-Kernel are both capable of running under Windows 95/98 and Windows NT 4.0.

ERTSLab is shipped on two disks. Run Setup.exe on the first disk to install ERTSLab on a local hard drive or a network server.
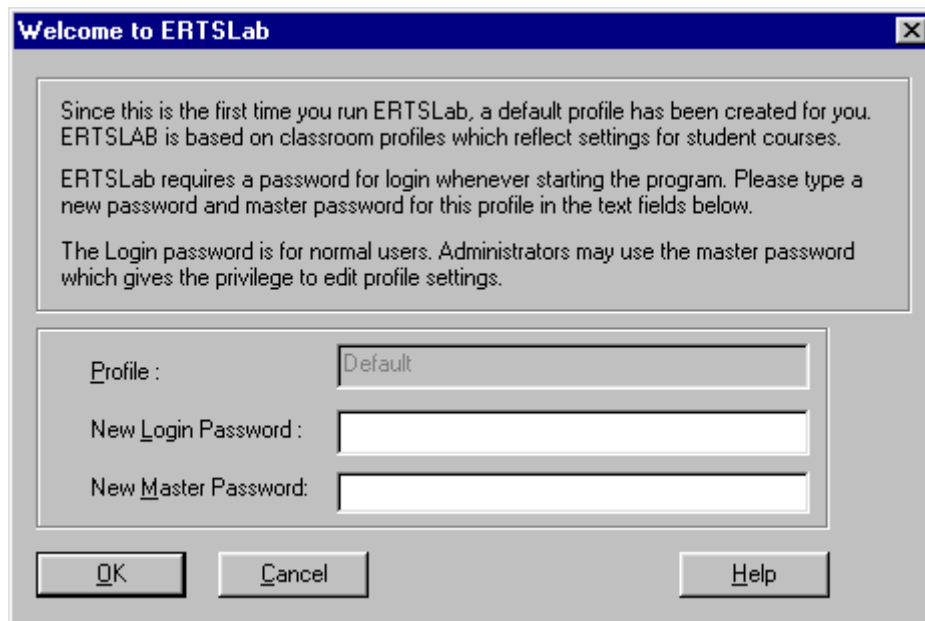
## 2.2   Starting ERTSLab for the First Time

When starting ERTSLab for the very first time on a new computer it will ask you to type in your license identification code. Please type in the code as printed in your license agreement.
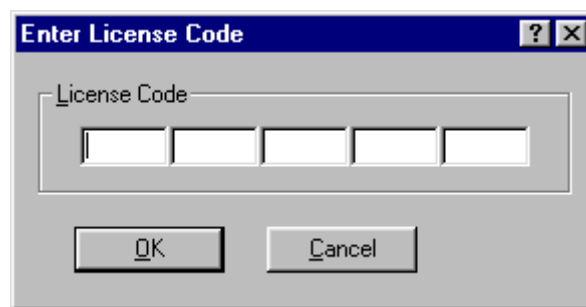


This license code must be hold confidential to avoid illegal installations of ERTSLab. Making this code public or performing any illegal installation will end the license period.

After successfully typing in the license code you will be asked to type in new passwords that will be used when users login to ERTSLab.

ERTSLab uses so-called **Classroom Profiles** to manage program-specific settings individually for different student classes. When logging on to ERTSLab for the first time, a profile with reasonable default settings will be created. See the Section **Configuring ERTSLab for different Student Classes** for information about how to customize profile settings.

As an administrator you also determine the password settings. Choose a **Login Password** to be used by your students when logging on to ERTSLab, and a **Master Password** that gives users the privilege to create and edit profiles. This should be used **by administrators only**! Editing classroom profiles is not available to users that have logged on with the normal login password. You must at least specify a master password. Leaving the login password empty enables any user to log in to this default profile.

Having left the dialog for password settings, the ERTSLab **Auto Installation** Manager will appear:
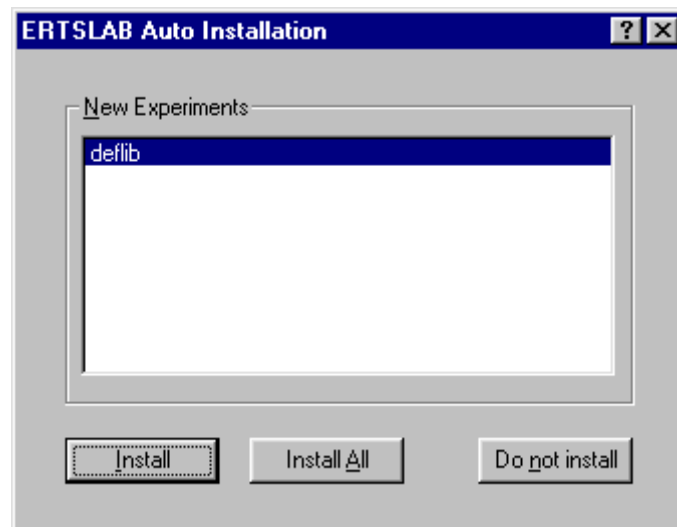
The auto installation manager always appears if ERTSLab finds one or more new experiment files in its subfolder *NewExp* during program start. Just click the **Install** button or the **Install All** button to let ERTSLab add selected or all experiments to the library. Dismissing the auto installation by selecting **Do not install** will skip the library update for this time, but you will be prompted for installation again when logging in for the next time. If, for some reason you want to prevent a new experiment from being added to the library you have to delete the file or move it to another folder. Note that ERTSLab will overwrite experiments in the library that have identical names. If you have changed any of the shipped experiments you must backup those before installing the new default library.

When running ERTSLab for the first time, ERTSLab will install its standard experiment library by applying this mechanism. Where the auto installation feature really comes in handy for you is after you have downloaded new experiments from the Internet. Then you simply have to make sure to place these files in the *NewExp* subfolder and start or restart ERTSLab to update your library.

When auto installation is complete the ERTSLab main window will appear. For more information about working with ERTSLab see the **Quick Starting Guide** in the second part of this documentation.

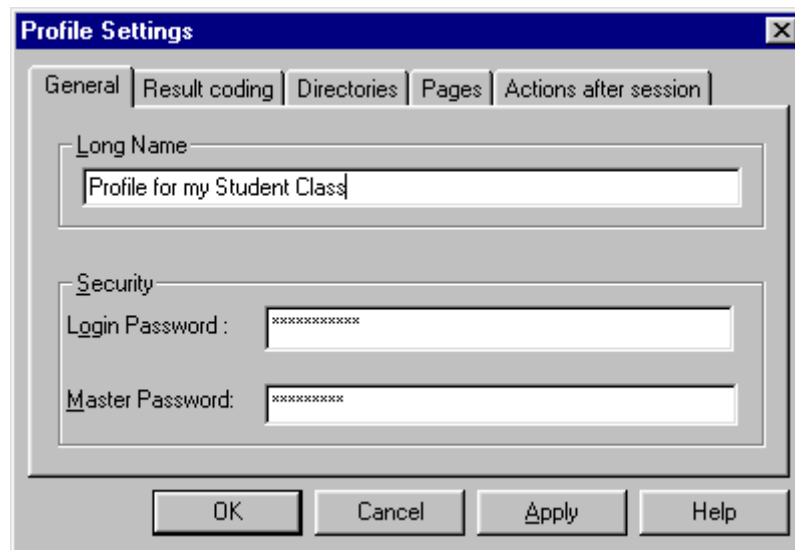## 2.3   Configuring ERTSLab for different Student Classes

After login with the administrator password choose the option **Edit Profiles** from the **Settings** menu to open a list of available profiles. The profile currently being in use is initially highlighted.
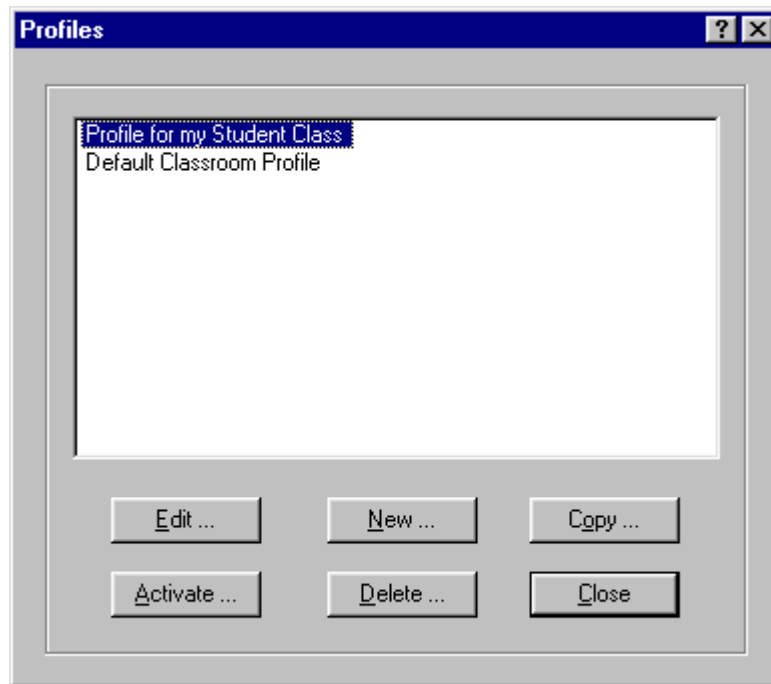


You may create a new profile, copy, activate, and delete existing profiles by clicking the appropriate button. Click the **Edit** button to edit the selected profile. A property sheet will open containing five pages. Each page stands for a specific set of options you may want to customize for your student class. See the section **Creating and Editing Profiles** in the online documentation for detailed information about these options.
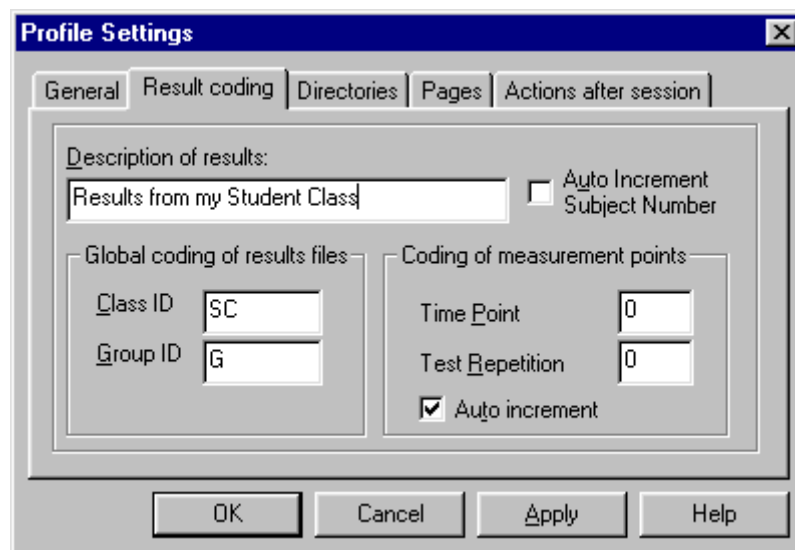
### General Settings

Use the **Long Name** to provide a meaningful description for your profile. Note that during login it is the long name, not the filename of the profile, that will be visible to your students. The **Login Password** should be used by regular student users during login. **Administrators only** may use the **Master Password** which gives the privilege to edit profiles.

**Profile Settings**

General | Result coding | Directories | Pages | Actions after session

Long Name

Profile for my Student Class

Security

Login Password :          ***********

Master Password:        *********

OK          Cancel          Apply          Help

## Result Coding

ERTSLab offers a pre-defined scheme for coding names of result files. You may customize these entries within the profile for distinguishing and categorizing results from different experimental sessions and/or student courses

**Profile Settings**

General | Result coding | Directories | Pages | Actions after session

Description of results:

Results from my Student Class          ☐ Auto Increment Subject Number

Global coding of results files

Class ID    SC
Group ID    G

Coding of measurement points

Time Point          0
Test Repetition          0
☑ Auto increment

OK          Cancel          Apply          Help

7

ERTSLab result file names are limited to the 8.3 character format. The first two letters are used to identify the student class. The third character is used to code different groups within the student class e.g. for between subjects designs. If you leave one of these entries empty, subjects can fill in values when starting the experiment. Typically, you will set a constant identifier for student classes already within the profile to ensure proper name coding of the result files.

The next three characters represent the three digit subject number. This number can be set to auto-increment which will cause ERTSLab to increase subject numbers automatically. This will only work if you use one single shared folder for collecting results.

The last two characters are more or less repetition counters that may be used to code repeated execution of an experiment. The time point may be used to code repeated experimental sessions (e.g. across several days). The last character is the repetition counter and may be used to code repeated execution of an experiment within the same session. This can be set to auto-increment as well. In this case, the entries in these fields represent the starting values.

## Directories

In this page all working paths of ERTSLab are defined. The ERTS-path points to the directory where the DOS-runtime kernel is located. This path will usually never change for an existing ERTSLab installation. By changing the library path you can determine what set of experiments students will see when they login using this profile.

The three remaining entries are used to direct results, case reports and group reports to certain directories. If you specify a shared folder on a network server you will be able to collect data from several clients within one directory on the server.
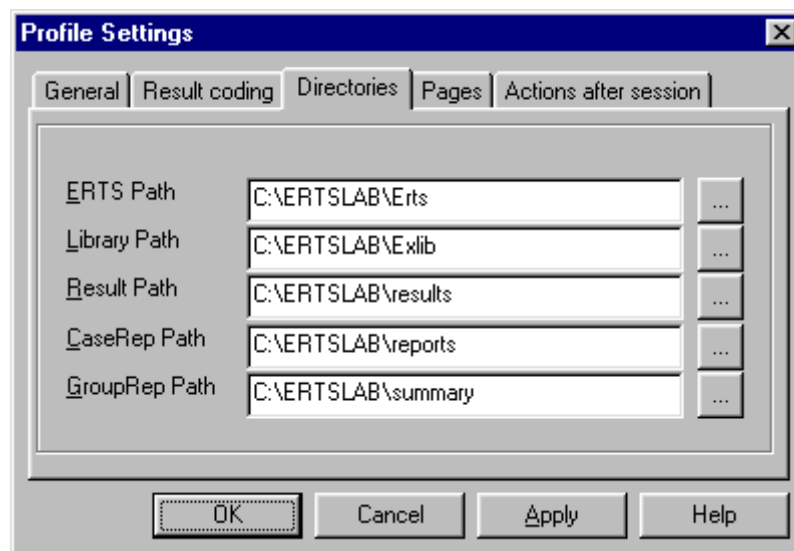
Note, that the paths for results, case reports, and group reports must not be write protected since ERTSLab attempts to create files in these directories when executing an experiment. For the same reason make sure to permit your users write access to these directories and least read access to the ERTS and Exlib path when using the NTFS privilege features of Windows NT.

ERTSLab supports network paths and UNC-names allowing access to shared network directories on remote servers. Note that if you use ERTSLab from a remote server, all remote paths must be mapped to a drive letter. Which drive letter you use is not relevant as ERTSLab will translate this drive-based name into the corresponding UNC-name anyway.

## Pages

ERTSLab can be configured to show only a part of the available information about experiments. Each page stands for a specific information about a paradigm, but only the pages you select are exposed to your students. For example you might not want your students to read about the theoretical backgrounds of an experiment in order to let them play naive subjects. If you want to force students to calculate aggregated data by their own you also might want to disable the Case or Group page. This will also disable the feature to produce aggregated data.



## Actions after Session

ERTSLab offers automatic generation of case reports at the end of an experimental session. Use this page to enable or disable this feature and to determine what kind of information will be displayed at the end of each experimental session.
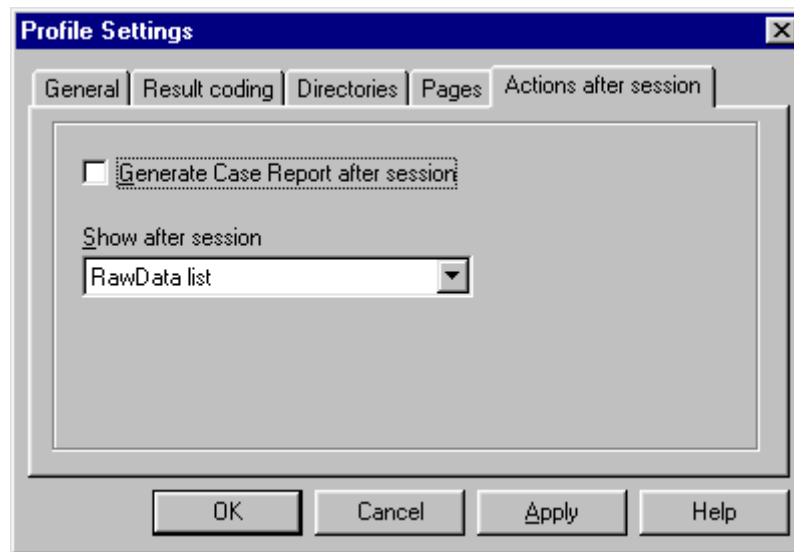
## 2.4  Installing your own Experiments

If you have experience in programming ERTS scripts you may wonder how to add experiments you have designed to the ERTSLab library. Here is how it works. You are at least required to supply an experiment file (extension EXP) and an experiment definition file (extension EXD). See the ERTS User's Manual (only shipped with the classic ERTS package) for detailed information on how to create the experiment file. The following example exemplifies the structure of experiment definition files:

```
VERSION             :1.0
TITLE               :Find d
EXT                 :FDD
CASEREP             :caserep %s /E /Q
GROUPREP            :caserep %s /S /E /Q
MERGEREP            :export %s /M /E /Q
TIME                :20
```

VERSION and TITLE should be self-explanatory. EXT specifies the file extension ERTSLab appends to generated result, case report, and group report files. The key words CASEREP, GROUPREP, and MERGEREP determine command line parameters being passed to ERTSCODE, when creating case reports, group reports, or export files respectively. See the ERTSCODE Manual for detailed information about all available command line parameters. TIME is a parameter that is currently

reserved for future use. When typing the source code for your experiment definition file, keep the format shown in the example above and take care, not to insert any white spaces between the colon and the following parameter.

Optionally you may provide one or more of the following files for documentation purposes: Instruct, Design, Theory, Reference, Author. These files have to be provided either as RTF-formatted files (extension RTF) or as simple text files (TXT). If present, the contents of these files will be shown within the appropriate page of the ERTSLab main window.

Having created all necessary files, open the Windows Explorer and change to the directory ERTSLab has been installed to. Change to the subdirectory *Exlib* which contains the entire experiment library. Create a new folder, that is named after your experiment, anywhere within the directory hierarchy. Copy the Experiment File (extension EXP), the Experiment Definition File (extension EXD), and optionally one or more documentation files into this folder. Start or restart ERTSLab. Your experiment will appear in the experiment library tree and will be ready to use.

## 2.5   ERTSLab Timing under Windows NT

If you run ERTSLab under Windows NT you may improve timing accuracy by enabling the built-in Pentium Timer. This option is only available on machines with a Pentium or Pentium compatible CPU (family model 5 or higher). Select **System Info** from the **Help** Menu to make sure that your processor supports this timing mode. To enable Pentium timing on your computer follow these steps:

- Log on to Windows NT with an administrator account.

- Invoke the registry file *NTPenTSC.reg* by a double-click that is located in the ERTSLab home directory. This will merge the necessary entries into the registration database. The ERTSLab home directory is also available from the **System Info** dialog box.

- Reboot the machine.

## 2.6   Global ERTSLab Settings for Individual Machines

There are a few settings that might depend on the hardware and software configuration ERTSLab is running on:

| | |
|---|---|
| **7-Bit ASCII code in report files:** | Enables 7-bit ASCII symbols for tables. Activate this option if your case report tables contain wrong characters. This is due to the fact that ERTSLab expects codepage 437 to be the OEM codepage. |
| **Disable Pentium Timer:** | Disables use of Intel Pentium® timer. Activate this option if you encounter problems starting experiments on Windows NT® machines. |

**Run Experiments in High Resolution:**  This option causes all experiments to run in 800x600 resolution. You can greatly enhance quality by using this option. However, under Windows NT® this option is not available.

Select **Global Setting** from the **Settings** Menu to open a dialog that lets you change these settings.
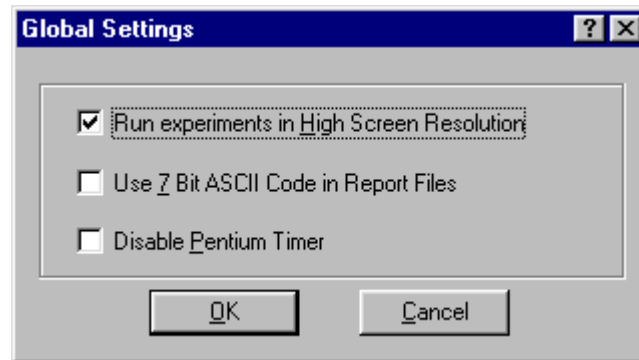


## 2.7  Obtaining System Information

Select **System Info** from the **Help** Menu to open a dialog that offers information about the basic software and hardware configuration of the environment ERTSLab is running in. Next to items like operating system, CPU type, and license expiration date this dialog shows you the type of software timing. ERTSLab may use different software timers depending on the hardware and software configuration of your computer system. The following timers are supported:

**Windows Timer:**          ERTSLab uses a Windows 95 / 98 based timer.

**Pentium Timer:**          ERTSLab uses an Intel Pentium® based timer.

**Timer Chip:**             ERTSLab uses the standard timer chip. This is timer provides millisecond resolution as well but with slightly reduced accuracy. This mode is used as a fall back if no other timer is available.

Note that although the resolution of all timers is better or equal to one millisecond, some distortions may occur due to the inappropriate architecture of the MS-Windows® operating systems for real-time applications.
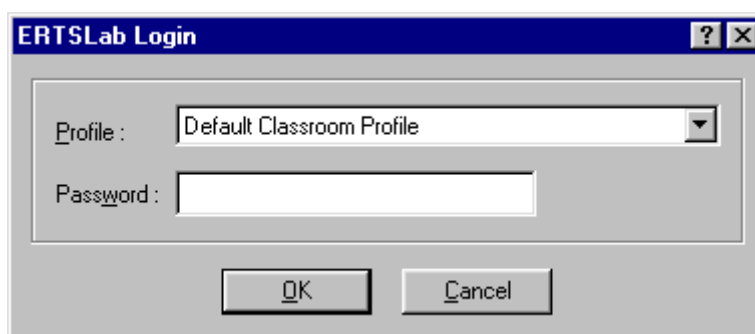
12

# 3   Quick Starting Guide for Users

## 3.1   Starting ERTSLab

ERTSLab uses so-called **Classroom Profiles** to manage program-specific settings individually for different student courses. ERTSLab requires you to log in with a valid profile name and a password for that profile each time you start the program:



The most recently used profile will be initially displayed in the drop down list. If this is not appropriate select the desired profile from the list and type the user password for that profile in the text field below the profile list. Ask your administrator if you are uncertain about which profile to use or if you have forgotten the login password for the profile you want to load.

After login you can activate another profile at any time without restarting ERTSLab. Simply choose the option **Activate Profile** from the **Settings** menu and follow the login steps described above.

## 3.2   The ERTSLab Main Window

The ERTSLab main window is split into two panes. The left pane contains all available experiments in a hierarchical order with files and folders similar to a directory tree. You may browse through the experiment library just as you do when using the Windows Explorer. Folders may contain other folders in order to arrange the material, or executable experiments symbolized by a stop watch icon. The right pane contains up to eight pages, each providing certain pieces of information about the experiment or the category of experiments being selected in the left pane. Simply click on the header of a page to view its contents.
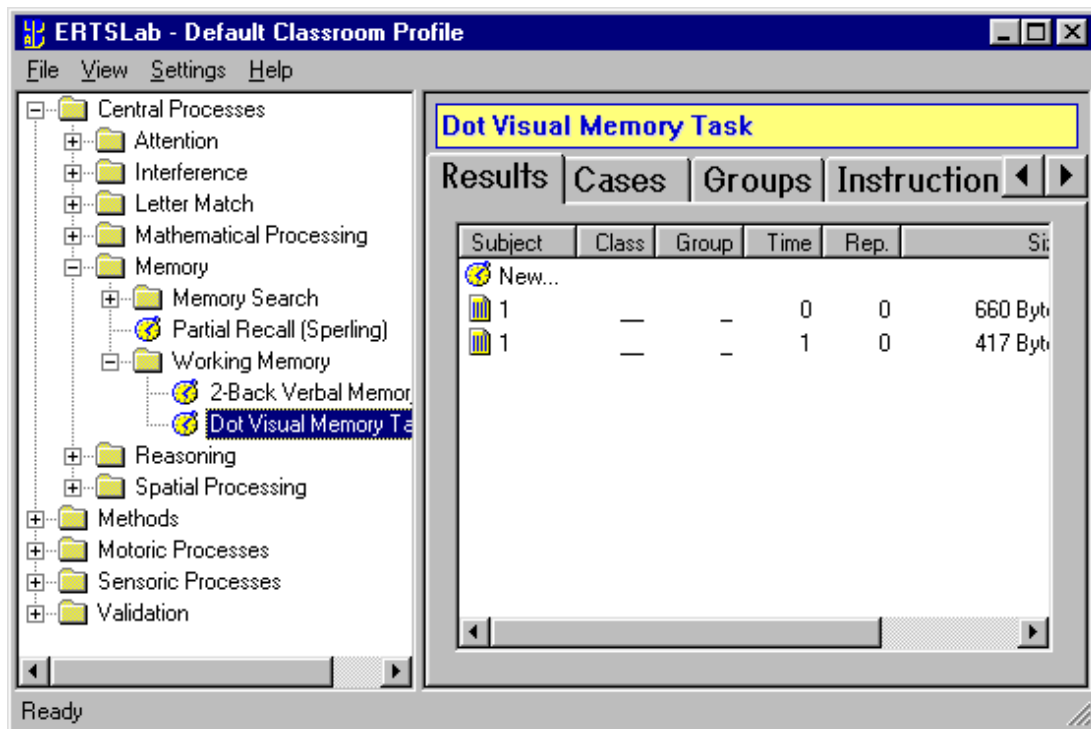
| **Result Page** | lists all result output files for the selected experiment. |
|---|---|
| **Case Report Page** | lists all case reports (descriptive statistics for a single result file) for the selected experiment. |
| **Group Report Page** | Lists all group reports (descriptive statistics over a set of result files) for the selected experiment. |
| **Instruction Page** | Contains instructions on how to perform the selected experiment. |
| **Design Page** | Explains the experimental design of the selected experiment. |
| **Theory Page** | Contains information about the theoretical background of the selected experiment. |
| **References Page** | Contains the most important references in literature concerning the selected experiment. |
| **Author Page** | Contains the authorship of the selected experiment. |

Note that not all pages mentioned are necessarily visible. The selection of accessible information depends on the settings of the classroom profile you are working with. You can print all of the accessible information on an experiment at once by clicking on its entry within the library tree with the right mouse button and choosing **Print Documentation** from the popup menu.

16

## 3.3   Performing an Experiment

To perform an experiment follow these steps:

Browse through the experiment library in the left pane to select the experiment you want to perform.

Double-click the entry for the experiment or press enter while the entry is selected. If the result page in the right pane is currently active you may also double click the "New..." entry on top of the result file list.

Fill out the start session form for coding the session as necessary. If an entry is non-editable, it is predefined within the profile settings and you do not have to care about it.



| | |
|---|---|
| **Class** | Two symbols for coding the student class. This entry is either optional or non-editable due to predefinition within profile settings. |
| **Group** | One symbol for coding different groups within a student class (between subject conditions). This entry is either optional or non-editable due to predefinition within profile settings. |
| **Subject** | Three digits for coding the subject number. This entry is required but may be non-editable due to the auto-increment feature enabled in the profile settings. |
| **Time** | Time of experimental session. This is typically used to code several sessions on different days. This entry is either optional or non-editable due to predefinition within profile settings. |
| **Repetition** | Number of repetition. This is typically used to code test repetitions within one session. This entry is either optional or non-editable due to predefinition within profile settings. |

**Session-ID**      Optional session ID, that will appear in the first column of the result file.

Click the start button to run the experiment.


## 3.4   Looking at Data

After finishing the session a new result file is listed in the result page. This file contains the raw data of your experimental session. By double clicking a result file you will see its contents. For printing a result file choose **Print** from the **File** menu.

ERTSLab offers various features for selecting result files and then aggregating and exporting those selected data. You activate these options by first selecting result files and then pressing the right mouse button. This will bring up the context menu that contains all available options.

For producing aggregated data you may either create a case report which will contain descriptive statistics for one single session (case), or you may create a group report that will contain descriptive statistics averaged across sessions. You create both types of reports by first selecting the result files and then choosing the appropriate option from the context menu (right mouse button).

Note that some of the report features might be disabled according to the classroom profile settings.


### Raw data

The format of the result file depends on the experimental paradigm. In general, each line represents one trial. Reaction times are listed in the columns R1 to Rn and key names of registered responses are listed in columns K1..Kn. Treatments are coded in different columns depending on the experimental paradigm. See the design documentation for an explanation of the coding scheme.


### Case Report

A case report is produced by selecting a result file and then activating the "Create Case Report"-option in the right mouse button menu. ERTSLab aggregates the raw data into a table with descriptive statistics. The format depends on the experimental paradigm. After reading the design documentation the labels should be self-explanatory.


### Group Report

A group report is identical to the case report except that the table contains not the statistics of one single case but of a group of selected result files. When selecting more than on result file ERTSLab will automatically offer this option within the right mouse button menu.

## Exporting merged data into semicolon-delimited file

You may activate this option in the right mouse button menu for exporting statistics from one or more result files into a semicolon delimited output file. This file will contain the most important statistics of the experimental design.

## Copying data into clipboard

To transfer raw data or merged data into other software applications you may also copy selected files into the clipboard and insert them into other software from the clipboard. ERTSLab copies data in a tab-delimited format into the clipboard.

## Selecting result files

There are several ways of selecting the appropriate set of result files. Besides CTRL+A and SHIFT+left mouse click, you may also use the "Mark Results"-option from the right mouse button menu. This option lets you mark multiple files as selected by specifying a name filter.
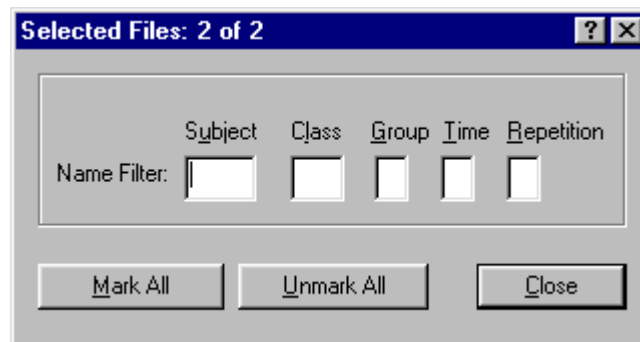


After typing in the correct filter values press either the "Mark All" button to mark all matching result files as selected or press "Unmark All" to unmark all matching files as not selected.
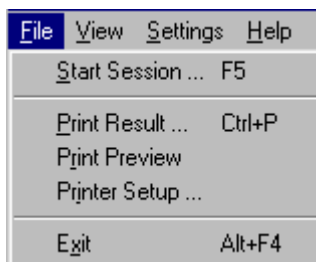
# 4   ERTSLab Menu Commands at a Glance

This section summarizes all menu commands ERTSLab provides either in its menu bar or by its popup menus that appear after a right mouse button click on an object.

## Menu Bar Commands

### File Menu



| Start Session | Starts a session of the currently active experiment. |
|---|---|
| Print Result | Prints the file, that is currently selected in result, report, or summary view or that is currently visible in instruction, design, theory, references, or author view. |
| Print Preview | Shows a WYSIWYG print preview for the currently selected result, report, or summary file. |
| Printer Setup | Opens the dialog for printer setup. |
| Exit | Exits ERTSLab. |

**View Menu**
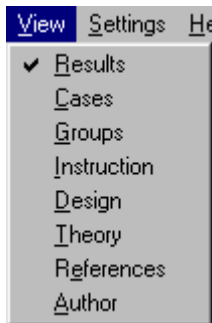


This menu displays the corresponding page in the right frame.

**Settings Menu**



| | |
|---|---|
| Activate Profile | Activates a different classroom profile. |
| Edit Profiles | Opens the dialog for classroom profile management. This option is only available after login with master password. |
| Global Settings | Opens the dialog for customizing profile-independent program settings. |

**Help Menu**
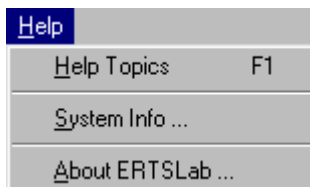


| | |
|---|---|
| Help Topics | Opens the ERTSLab Online Help. |
| System Info | Displays information about CPU type and software timing mode |
| About ERTSLab | Displays program information, version number, and copyright. |

## Popup Menu Commands

### Right click on an experiment within the experiment library
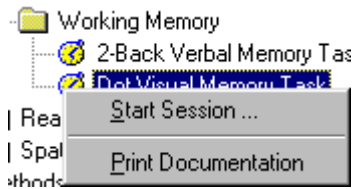


| | |
|---|---|
| Start Session | Starts a session of the currently selected experiment. |
| Print Documentation | Prints all available documentation files belonging to the currently selected experiment. |

### Right click on single result file
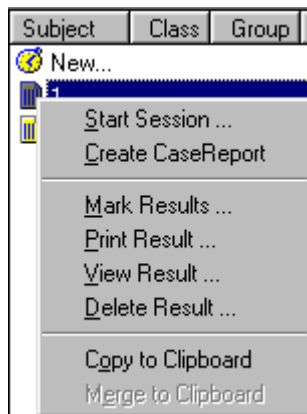


| | |
|---|---|
| Start Session | Starts a session of the currently selected experiment. |
| Create Case Report | Creates a case report (descriptive statistics) of the selected result file (see online help for details). |
| Mark Results | Opens a dialog for incremental selection of result files using a name filter. The specified subset can then be used in one of the ERTSLab report functions (see below). |
| Print Result | Prints the selected result file. |
| View Result | Shows the contents of the selected result file in a new window. |
| Delete Result | Deletes the selected result files. |
| Copy To Clipboard | Copies the contents of the selected result file into the clipboard from where it can be pasted into another application. |

**Right click on multiple selected files**
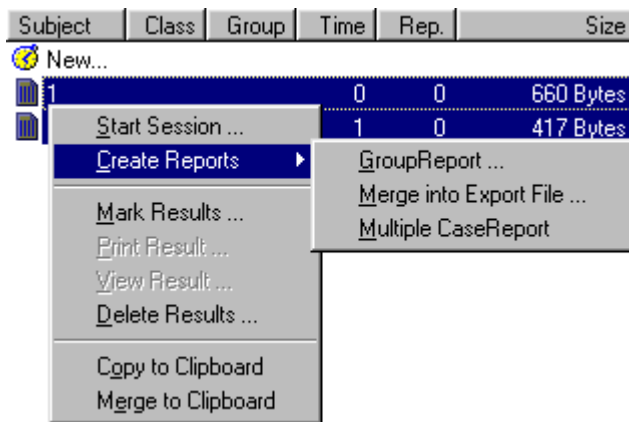


GroupReport              Creates a group report (descriptive statistics) over all selected result files (see online help for details).

Merge into Export File   Exports the selected result files to an external file.

Multiple CaseReport      Creates a case report (descriptive statistics) for each selected result file (see online help for details).

# 5   Format of Result Files

This section explains the generic meaning of columns contained in the result file table.

| Label | Description |
|---|---|
| **SessID** | Any alphanumeric text coding the session. This column appears only if a session identification was specified |
| **SNo** | Subject number |
| **Blk** | Running block number |
| **Time** | Time point of block begin in HH.MM day time |
| **Point** | Time point of trial begin in SS.mmm day time. If this column is included, the previous Time colum does list the HH:MM of each trial begin |
| **Cn** | N-th code column coding the factor levels as defined at the beginning of the block definition |
| **Spec** | Number of trial specification within block definition |
| **Trl** | Running trial number |
| **Fn** | N-th feedback column containing the response classification (1-12) generated by a FB command. Typically, a 2 stands for correct responses, a 1 for wrong response and a 3 for a missing response |
| **Res** | Number of registered responses within this trial |
| **Rn** | Reaction time of the n-th response within this trial [ms] |
| **Kn** | Key name or string input of the n-th response within this trial |
| **SpecID** | User-defined alphanumeric text coding individual trial specifications |
| **Block** | Name of running block |
| **Trial** | Name of running trial |
| **V1...Vn** | Value for n-th variable argument within this trial definition |
| **L1...Ln** | N-th generated random value within this trial |

## Special Columns for Tracking Results

| Label | Description |
|---|---|
| **Trl** | Running number of tracking interval |
| **TrkTime** | Time within tracking task [ms]. |
| **Track** | Position of signal [mm]. |
| **Tracker** | Position of subject input [mm]. |
| **Prevw** | Preview [ms] |
| **LRand** | Left Tracking Border [ mm/10] |
| **RRand** | Right tracking border [mm/10] |
| **Tone** | Name of warning tone |
| **Sens** | Sensitivity of input device |
| **Amp** | Max Amplitude of random signal |
| **Filt1** | Frequency of first filter |
| **Filt2** | Frequency of second filter |
| **Wave** | Name of wave definition |
| **Disturb** | Position of disturbance signal (only if disturbance is defined and data are uncompressed) |
| **AAE** | Average Absolute Error instead of Track (only if data compression was used) |
| **RMS** | Root Mean Squared Error instead of Tracker (only if data compression was used) |
| **Err** | Number of lost of controls |
| **Lambd** | Instability of bar |
| **Gain** | Sensitivity of input device |
| **Range** | Tracking range [mm/10] |
| **NI** | Number of tracking data within one compression interval. |
| **Tone** | Name of warning tone |