



Electronic Timing System R3

PC Software

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1. Software License

R3 Timing Computer Software License

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2. General Usage

The R3 Timing System is equipped with an internal memory and USB connection with a fully documented protocol. This gives a user a variety of usage scenarios.

These are the usual use cases:

- **offline use** – measurements are done without computer, Control Unit later connected to a computer and measured results are downloaded (see chapter *Control Unit Memory Download*),
- **online use** – the timekeeper uses a notebook computer, connected via USB to the Control Unit. The computer and available software enhances the functionality of the system (e.g. allows to display names of racers on the audience displays). The timekeeper can use an Excel table and copy results of each measurement into the unit; a provision is made that allows the timekeeper to switch the racer number (Racer ID) directly from Excel. A journal (detailed log) of measurements can be held;
- **combined use** – user can download “offline” memory from the Control Unit even after an online session – the Control Unit memory works independently.

The **R3 Timing** application, described in this document, can be used for all these use cases.

Users can also develop their own software working with R3 system, as the communication protocol is documented and source codes of the R3 Timing application are available.

For further reading, we should define basic **states of the control unit**:

- **READY**: unit is cleared (displayed time on the control unit is zero or full time in countdown modes) and ready to start,
- **RUNNING**: time is running, running time is displayed,
- **STOPPED**: measurement is finished, displayed is the total time. The measurement cannot be started from **STOPPED** state unless specially defined in the profile – the timekeeper has to move to **READY** state, usually by pressing **STOP** button on the Control Unit or using **RESET** button in PC software. According to profile definition, the unit can automatically transfer to **READY** state after a few seconds in **STOPPED** state.
- **BLOCKED** state: a special state used only while changing unit settings. Measurement functions are disabled (displays ***BLOCKED***).

The **profile** is a set of settings defining a current measurement mode (number of splits, time format etc.).

User can choose among many predefined profiles. These profiles are partly editable directly on the control unit and can be saved or recovered from PC.

In fact, an agility, athletics and soccer timing unit differs (except for the sensors) only in its profile sets.

Number format in the application is using profile settings, so the times are shown exactly like on the

Control Unit. One notable exception are Countdown modes, which display a normal, upward-going time with a “CN” prefix, and downloaded Control Unit Memory listings, which always use timestamps with maximal precision (0,001 s) and display a normal, upward-going time in countdown modes.

3. Drivers and Application Installation

This application supports Windows 7 and higher. Recommended Windows 10, 8 GB RAM, Intel i5 computer.

3.1. Driver Installation

As with each hardware device, a proper driver has to be installed.

On Windows 10, the driver should install automatically after connecting a powered R3 Control Unit with a computer. On older operating systems and in case the Windows 10 driver does not install automatically, please install FTDI CDM drivers from: http://www.ftdichip.com/Drivers/CDM/CDM21226_Setup.zip

In case of any problems with driver installation, please consult install guides: <http://www.ftdichip.com/Support/Documents/InstallGuides.htm>

Successful installation of the driver can be verified in Device Manager (Win + R, devmgmt.msc):

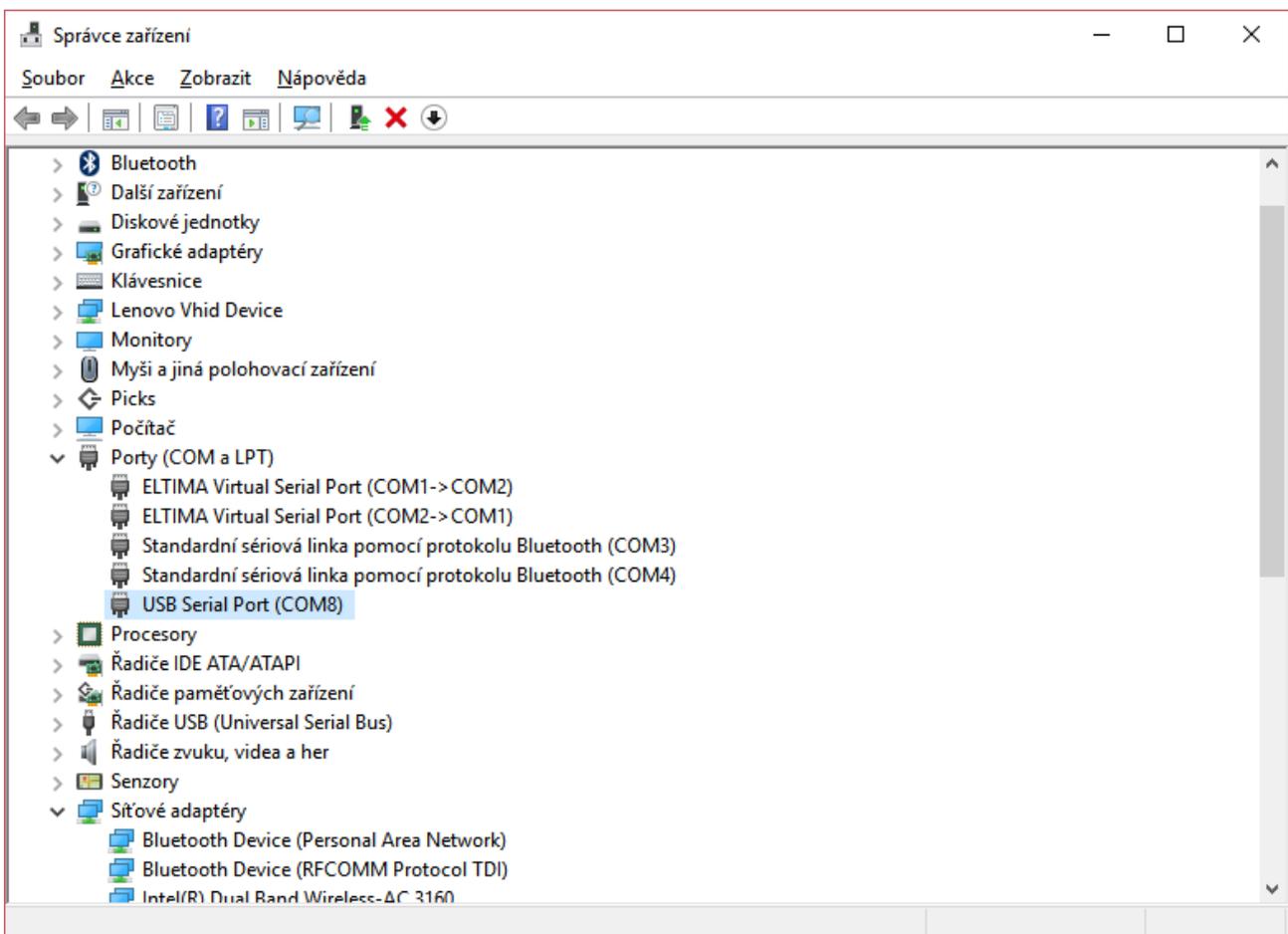


fig. 1: Device Manager

There should be a USB Serial Port item in Ports (COM and LPT) subtree. Some other hardware devices also demonstrate itself as a USB Serial Port, so there can be more USB Serial Ports shown – you should see

that one USB Serial Port disappears when you disconnect the Control Unit from your computer.

3.2. Application Installation

Application can be downloaded from our website www.egmenergo.cz (special versions are distributed separately), unpacked and installed by running *setup.exe* file.

In case of an installation problem, please at first please to remove the old version of our program before installing the new version.

4. Description of Functions

4.1. Status Display



fig. 2: Main Window

The main window of the application (fig. 2) consists of three parts.

The **upper part** shows current state of the system: on this figure, we can see the measured time (17.52), counters (1/2), racer number (16), control unit state (Running) and racer name (No name, see chapter 4.8).

The measured time background is light blue while the system is in *READY* state, light green while *RUNNING*, light gray while *STOPPED* and red in *BLOCKED* state.

In case of a connection error, a message is displayed below the *R3 Timing Online* title and a rotating blue sign is shown. The communication errors are generally recoverable – a reconnection of the cable allows the user to continue without a need to restart the application. Note: a connection outage can lead to a loss of data in *online* modes, e.g. the *Results* field may miss a measurement, but the *offline* Control Unit Memory is not affected.

There is a tabbed page control in the **middle part**. The most important for online usage is the *Results* tab with current measurement results, described in detail in the following chapter.

The **lower part** consists of a four button strip for changing display mode – these buttons copy the function of the same buttons on the control unit, a set of controls for racer number management and a set of four colored buttons with miscellaneous functions.

Note that the window can be maximized to full height of the screen. The window is „Stay on Top“, so can be placed above other programs and won't let hide itself.

4.2. Results View

The *Results* tab contains a list of measurements records made in *online* mode, e.g. while the Control Unit is connected to PC and the application is running.

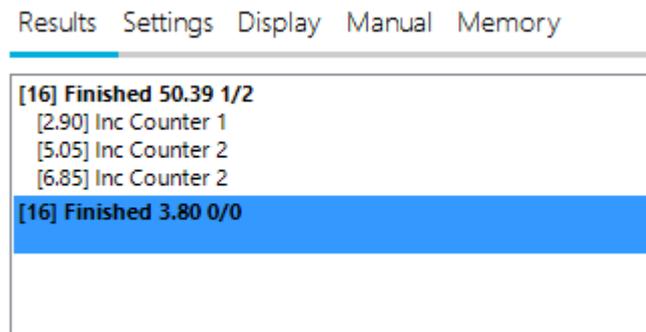


fig. 3: Results View

New measurements are added at the end of the list.

Each record contains a header in format: “[RACER ID] status time counters” and then a list of timestamps of splits (split/lap photocells, according to selected profile). A special kind of a split time is a timestamp of a Counter increment/decrement event (as shown in fig. 3).

Please note that Counters can be incremented/decremented even after finishing the measurement, while in *STOPPED* state. As the time is not running in *STOPPED* state, these increment/decrement events do not create a split time timestamp.

Records can be deleted by pressing Delete key. Shift + mouse click or arrows allows to select more than one record.

Note: in case there are any measurements made after startup of the Control Unit and the PC application started later, the *Results* tab will be populated with the last measurement made without PC connection.

4.3. Results Copy

One of the most used functions in *online* measurement scenarios is copying of the records from *Results* view, usually to a spreadsheet.

Pressing the *Copy Meas* button in the lower part of the application window copies the selected record(s) from *Results* view into system clipboard. The button is highlighted green while the clipboard contains the data.

The results format can be selected in *Settings* tab from a simple time, time with counters, time with counters and split time including or excluding timestamps of Counter increment/decrement events or in a text format, same as in the *Results* view.

You can use this function in both ways:

- manually select a result or results in *Results* view, press *Copy Meas* button and paste for example into a MS Excel table (Ctrl-V in Excel),
- or press *Copy Meas* button after the measurement has *STOPPED* and paste for example into a MS

Excel table. As each measurement event causes an automatic selection of the last result in the *Results* list, there is no need to manually select a result if you wish to copy the last result.

As most users use the second option, an automation is possible: by pressing the *Auto Copy* button (highlights green), the *Copy Meas* function is executed automatically everytimes the timing system gets into *STOPPED* state or a result is modified in *STOPPED* state. This in fact means that your clipboard always contain the last result after finishing the measurement, so you do not have to manipulate with the application. It is then enough to press Ctrl-V in Excel after each measurement.

4.4. Control Unit Memory Download

Each measurement is stored into results memory of the Control Unit, regardless if the Control Unit is connected to PC or not.

This memory can be exported to an XLSX spreadsheet file and viewed in MS Excel 2003+.

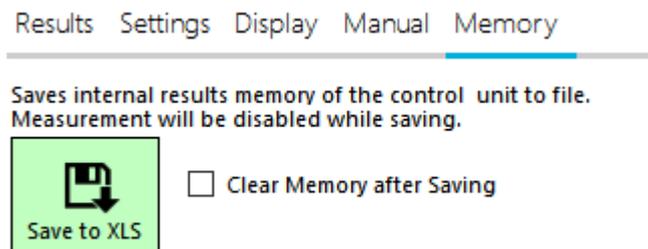


fig. 4: Memory tab

Download can be initiated from *Memory* tab of the PC application. The *Clear Memory after Saving* clears the Control Unit results memory.

	A	B	C	D	E	F	G	H	I	J	K
1	R3 Results										
2	Download time: 3. 4. 2017 17:23										
3	R3 Unit: Agility, control Unit FW version: 1										
4											
5	Results List Line	Racer ID	Total Time	Counter 1	Counter 2	Profile	Counter 1 (0) [1]	Counter 1 (0) [2]	Counter 1 (0) [3]	Counter 1 (0) [4]	Counter 2 (0) [1]
176	171	100	00:00:14,091	1		2 A-2 +count	00:00:03,975	00:00:03,975	00:00:03,975	00:00:03,975	00:00:05,
177	172	120	00:01:41,788	0		0 A-2 +count					
178	173	121	00:00:11,687	0		4 A-2 +count					00:00:05,

fig. 5: Excel Export from Control Unit Results Memory

As you can see in fig. 5, the results table is rather complex: except for Racer ID (number), total time and counter states the table includes also all splits/timestamps, including timestamps of counters incrementation and decrementation events. Note that Counter manipulations that occurred after finishing the measurement (in *STOPPED* state) are not displayed as splits/timestamps, as the time is meaningless after stopping the timing.

The table includes a *START* time and a *FINISH* time (not visible on fig. 5). The *START* time is zero and the *FINISH* time is in normal cases equal to the *Total Time*.

All splits/timestamps include a comment, shown after hovering a mouse over the given spreadsheet cell. These comments include information about used input – this gives the user a possibility to find out which photocell has been used to finish the measurement or whether the measurement has been stopped by a

photocell or a pushbutton on the Control Unit (this can be seen in comments of the FINISH colums).

All times are shown in full resolution. Countdown measurements are shown as if the time was running normally, e.g. 5-minutes countdown stopped after 60 seconds will be shown as 1:00,000 – not 4:00,000.

Please note that the Control Unit memory is big. It can contain hundreds of thousands of measurements and its download can take many minutes. It is therefore recommended to clear the memory (using the Control Unit touch display menu) before an event to avoid confusion with old records.

4.5. Manual Control

Buttons on the *Memory* tab allows the user to manually start, stop and reset the measurement. The *Manual Journal entry* field is described in Ch. 4.9.

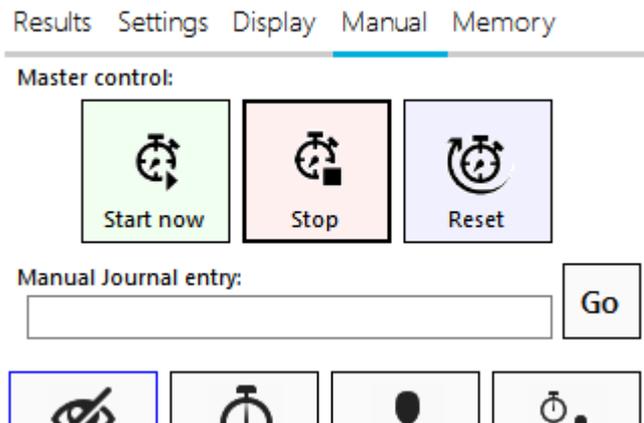


fig. 6: Manual Control

The *Reset* button is duplicated in the lower left corner of the application. This buttons is highlighted yellow after measurement, e.g. when the Control Unit state is *STOPPED*.

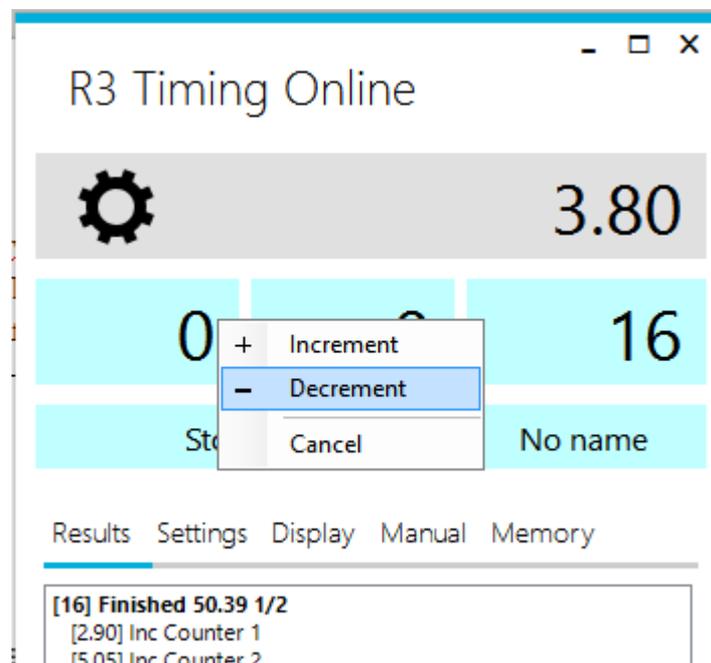


fig. 7: Manual Counters Modification

A manual modification of Counters values is possible by clicking on the Counters values boxes in the upper part of the window.

4.6. Audience Display Functions



fig. 8: Display Mode Buttons

There are four Display Mode buttons on the application window. These buttons work exactly as the buttons on the touch screen interface of the Control Unit. Selected Display Mode is highlighted with a blue border and text.

Using the PC application, the external audience display can be used to display a custom text. This is done by entering a text into *Custom text* field on *Display* tab.

Results Settings **Display** Manual Memory

Custom text (see manual for formatting codes):

 Display Time

fig. 9: Custom Display Text

You can use following special formatting codes to change the text appearance:

Formatting Code	
\x012	Moves to X-position 12 (Standard display width is 96 pixels.)
\r	Red font
\g	Green font
\a	Amber font
\u	Use upper line
\l	Use lower line
\b	Tall font, use both lines
\d	Double width font
\n	Normal width font

Example: \r\b\dHELLO

The Custom text is disabled by choosing any Display mode using Display mode buttons of the Control unit or in the lower middle part of the application window.

By checking the *Display Time* checkbox, a system time is displayed on the audience displays.

4.7. Profile Switching

The *Selected profile* combo box in *Settings* tab allows users to easily select another profile. The selection is disabled in case the time is running.

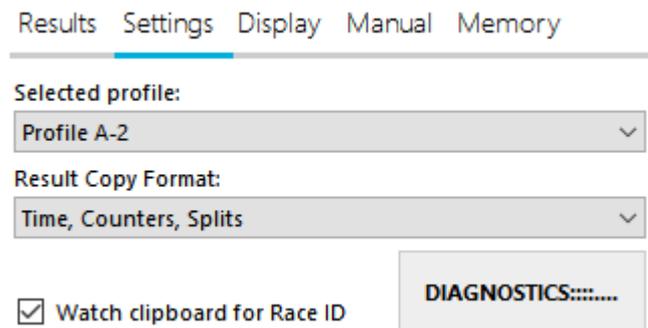


fig. 10: Settings tab

4.8. Race ID and Racer Names

The system uses Racer IDs (numbers) in range 0 – 65535. These numbers are displayed on the audience display and are saved as a part of the result data in the Control Unit results memory.

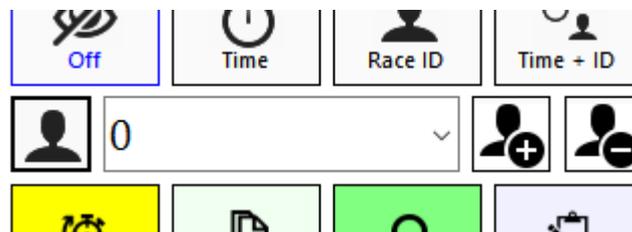


fig. 11: Racer ID controls

There is a strip of Racer ID control between two lines of big buttons in the lower part of the application (fig. 11). From left, there is a Racers List button, a New Racer ID field, Racer ID increment and decrement button.

User can increment or decrement Racer ID by one by pressing Racer ID increment or decrement buttons. Alternatively, user can directly enter new Racer ID into the New Racer ID field (with “0” value on figure) and confirm the entry with ENTER key. Then, the new Racer ID is shown in the upper part of the application, on right just below the time (fig. 2).

Each Racer ID can have a Racer name attached. The racer names are used for the external audience display – there is no other use of Racer names in the system. There is no need to define names for all racers; users who do not want to use the Racer name on external audience display feature do not have to populate Racer names.

Racer names can be attached in Racers List Window. This window can be accessed by pressing the

Racers List icon (on the left).

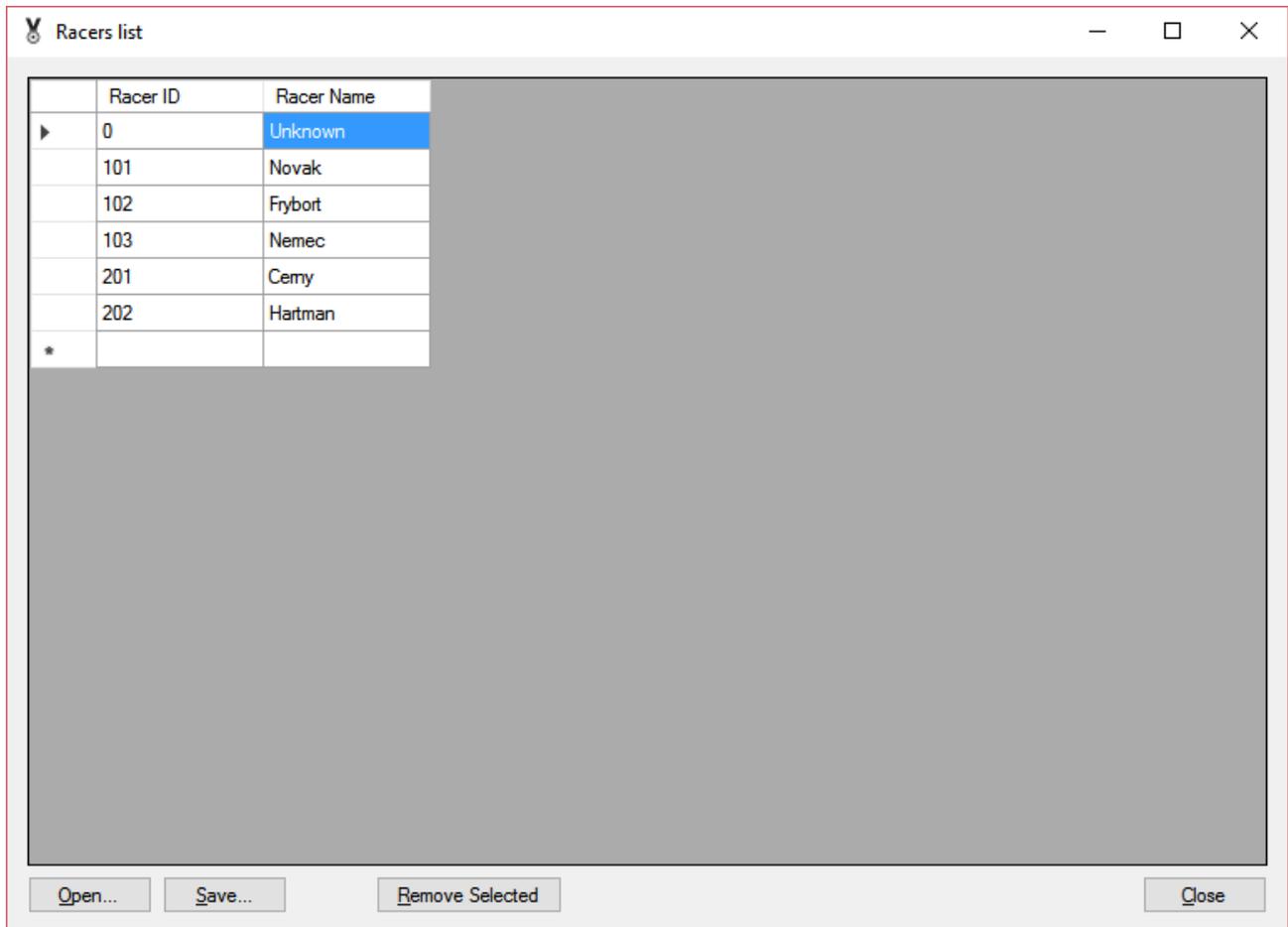


fig. 12: Racers List

This simple editor allows to enter Racer ID – Racer Name pairs and save them in an CSV file. There is no need to connect the Control Unit while creating the ID – Name pairs.

The editor intentionally does not sort values and does not check for duplicates in Racer ID column. However, if there are more lines with the same Racer ID, only the first line is used to determine the racer name.

The pairs file can be also edited in a spreadsheet (Excel, Openoffice). You have to export the file in CSV format from spreadsheet and ensure that the first column contains Racer IDs and the second column contains names. Then, load the data using *Open...* button. The parser is rather tolerant, can parse files with more columns, with comma- or semicolon separated columns and with empty or text (header) rows. Usually, a normal racers list, similar like below, can be used and there is no need to create a separate table just to generate the pairs.

CSV file format example:

```
User No,User Name,Age,Dog
CATEGORY A
100,Nowak,17,Labrador
101,Muller,16,Baskerville
CATEGORY B
102,Christik,12,Wolfhound
103,Angelsohn,11,Labrador
```

Note that very long Racers names can mess the audience display graphics – please shorten very long names.

Note that the Racer name is transferred into the Control unit only in case the Racer ID changes. So, a change of a Racer name in the Racers list is not reflected on the external audience display until the Racer ID is changed.

The drop-down arrow on the New Racer ID field in the main window displays a list of defined Racer ID – Racer Name pairs. Alternatively, user can click into the New Racer ID field (not on the arrow) and press up or down arrow key to move one line in the list a time, then confirm by pressing Enter key.

Many users populate the pairs list in the sequence the racers should start (usually by exporting CSV file from a modified Excel file with event racers list). This is especially convenient when using the down arrow key to navigate in the New Racer ID field.

The last option to set the Racer ID is via the clipboard. The application can watch the system clipboard and in case the clipboard contains a “IDXXX” value, where XXX is a racer ID, the racer ID is set to XXX and clipboard content replaced with a single space. This function must be enabled in *Settings* tab, by the *Watch clipboard for Race ID* checkbox.

So, a user can change the Racer IDs by simply copying a IDXXX text, where XXX is Racer ID, into clipboard. Some users use a prepared Excel spreadsheet that contains prepared Racer IDs, for example as below.

	A	B	C	D
1	User No	User Name	Set RID	
2	100	Nowak	ID100	
3	101	Muller	ID101	
4	102	Christik	ID102	
5	103	Angelsohn	ID103	
6			=CONCAT("ID";A5)	
7				
8				

fig. 13: Spreadsheet with IDxxx Cells

The Racer ID can be then simply chosen by navigating onto a given cell in Set RID column (e.g. ID101) and pressing Ctrl-C. An Excel formula for creating the Idxxx notation from a numeric Racer ID is shown in the figure.

4.9. Journal File

The *Journal* is a logbook containing information about all timing operations. Each start, finish or counters or splits update operation is logged.

A *journal* record can be initiated by pressing *Journal* button in the lower right corner of the application. The program then asks for a file name (in case an existing file is chosen, the new data will be appended) and starts the journal recording. The *Journal* button is then highlighted blue.

Another click on the *Journal* button disables recording, the highlight disappears.

User can enter a note into the *Journal* file using the *Manual Journal Entry* field on *Manual* tab.

This is an example of a *journal* file.

```
2017-04-03T00:17:27.5887090+02:00 [journal begin] filename: C:\Users\istrasil\Documents\test3.txt
2017-04-03T00:17:27.5897283+02:00 R3Timing application v. 1.0.0.0
2017-04-03T00:17:27.5897283+02:00 Comms log in C:\Users\istrasil\AppData\Local\Temp\tmpFCF0.tmp
2017-04-03T00:17:27.5897283+02:00 .
2017-04-03T00:17:33.8291360+02:00 START, profile: Profile A-2 +count
2017-04-03T00:17:35.3942508+02:00 Splits or Counters update
2017-04-03T00:17:35.3942508+02:00 [1] Running 0/1
2017-04-03T00:17:35.3942508+02:00 [1.75] Inc Counter 2
2017-04-03T00:17:36.8963722+02:00 Splits or Counters update
2017-04-03T00:17:36.8963722+02:00 [1] Running 0/2
2017-04-03T00:17:36.8963722+02:00 [1.75] Inc Counter 2
2017-04-03T00:17:36.8963722+02:00 [3.43] Inc Counter 2
2017-04-03T00:17:39.4201007+02:00 Splits or Counters update
2017-04-03T00:17:39.4201007+02:00 [1] Running 0/3
2017-04-03T00:17:39.4201007+02:00 [1.75] Inc Counter 2
2017-04-03T00:17:39.4201007+02:00 [3.43] Inc Counter 2
2017-04-03T00:17:39.4201007+02:00 [5.94] Inc Counter 2
2017-04-03T00:17:40.4898594+02:00 STOP/FINISH:
2017-04-03T00:17:40.4898594+02:00 [1] Finished 7.00 0/3
2017-04-03T00:17:40.4898594+02:00 [1.75] Inc Counter 2
2017-04-03T00:17:40.4898594+02:00 [3.43] Inc Counter 2
2017-04-03T00:17:40.4898594+02:00 [5.94] Inc Counter 2
2017-04-03T00:17:53.2298948+02:00 Journal closed by user.
```

Please contact us for a direct journal printing solution.

4.10. Technical Log File

A technical (communication and program flow) log file is created with each program run in Windows temporary files folder. The exact file name and location is noted at the beginning of each *Journal* file, see listing above (3rd line – *Comms log*).

4.11. Diagnostics

There is an extensive diagnostics subsystem available. The Diagnostics window can be opened by pressing *Diagnostics* button on *Settings* tab.

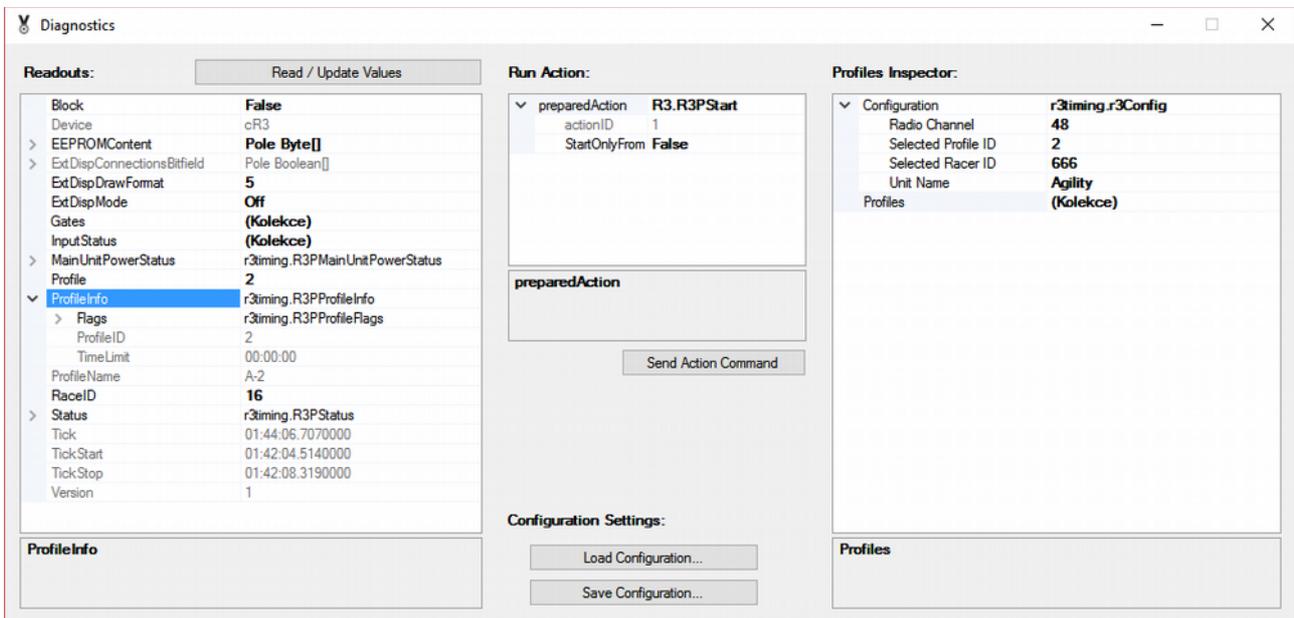


fig. 14: Diagnostics

We do not recommend to change anything in this windows unless asked by the Technical Support.

The only controls, useful for an end user, are *Load Configuration...* and *Save Configuration...* buttons – these buttons allow to save and load back the full configuration (e.g. all profiles). By loading a default configuration from a provided file, user can reset the timing system settings to factory defaults.

4.12. Keyboard Shortcuts

There are global keyboard shortcuts defined:

- Ctrl+Alt+A / S / D / F change the Display mode to Off / Time / Race ID / Both,
- Ctrl+Alt+B / N increments or decrements the Racer ID (number).

These shortcuts work even out the application window.

On some systems, these global shortcuts can be used by a different application (e.g. Winamp), so our application cannot hook on them. In this case, an error message can be seen at the beginning of the *Technical Log file*. This can be solved by disabling the shortcuts or the whole conflicting application and restarting R3 Timing application.