

# ChronoEXE Application User Manual

Manual update: 2026.06.24

## 1. Program purpose

The application is used to receive, edit, analyze and save velocity measurement data. Data can come from a COM port, a Bluetooth LE module or a text/CSV file. The program displays consecutive measurements in the data window, calculates statistics, draws the SHOTS/Velocity chart and allows analysis of a selected A/B range.

Typical uses:

- receiving a measurement series from a chronograph,
- manual editing or pasting of data,
- saving data to TXT/CSV,
- analysis of average, minimum, maximum, deviation and energy,
- comparison of measurement series,
- analysis of symmetry and velocity differences,
- working with the A/B range on the chart,
- automatic saving of a live series,
- JPG export with a statistics block including Me and CV%,
- filtering data by SHOTS and Velocity, including outside a range,
- analysis of local changes in a series, including dV, SYM and CMP.

## 2. Main form elements

### COM port selection

The COM port list lets you select the serial port from which data will be received. The OPEN/CLOSE button opens or closes the connection. If automatic port opening is enabled in the INI file, the program can open the port by itself at startup.

### Measurement data window

This is the main text field containing the list of measurements. Data from COM, BLE or a file is placed here. The data can also be edited manually. After editing, use the R function to recalculate statistics and rebuild the chart.

Example data:

```
291.4  
292.1  
290.8  
293.0
```

### Chart

The chart shows the shot number on the SHOTS axis and velocity on the Velocity axis. Depending on the settings, it can work as:

- a line with markers,
- a line with X markers,
- a bar chart.

The chart supports scaling, shifting the SHOTS range, A/B markers, right mouse button area selection and operation in result modes dV/SYM/CMP.

The default startup window of the SHOTS axis covers 25 positions. In bar chart mode, the bar width is calculated from ChartBarWidth as a percentage of the distance between points, with protection against bars merging during JPG export.

### **Statistics panel**

The statistics panel shows the basic results of the series: number of measurements N, VAVG/AVG average, maximum, minimum, dV spread, SV/SD standard deviation, energy or power factor and auxiliary values. The display depends on the current units and projectile weight.

In JPG export, Me is additionally calculated as the median of the currently analyzed points, and CV% is calculated as the coefficient of variation:  $SV/VAVG \times 100\%$ .

### **Weight field**

The weight field is used to enter the projectile weight. Weight is used to calculate energy and power factor. Depending on the unit settings, it can be interpreted as grams, grains, kilograms or pounds.

### **Unit switches**

The unit switches change the way velocity, weight and energy are presented. The program stores base data with higher precision; the visible view is only a conversion.

### **AUTO and AUTO50**

AUTO automatically fits the Velocity axis with a small margin. AUTO50 fits the Velocity axis with a larger margin. If both are disabled, the Velocity axis is handled by automatic chart scaling.

### **BLE panel**

The BLE panel contains controls for searching and connecting to a Bluetooth LE device. It can be hidden or shown with the Ble switch. The panel state is saved in the INI file as BLEP.

BLEP controls only the visibility of the lower panel. It is not the main Bluetooth switch. If automatic BLE is enabled in the settings, the program may try to connect even when the panel is hidden.

## **3. Buttons and functions**

### **OPEN / CLOSE**

Opens or closes the COM port. After opening, incoming data from the port is appended to the data window and the chart. If the port was opened automatically by OpenCom, the button shows the CLOSE state.

### **LOAD**

Loads data from a TXT/CSV file. After loading, the program recalculates statistics and rebuilds the chart. If [FILTER]/Filter=1 and filters are active, LOAD can load only data that meets the filter conditions.

### **SAVE**

Saves the current data to a TXT or CSV file according to the settings in the [TXTCSV] section.

### **CLEAR**

Clears the data, chart and statistics.

### **R**

Refreshes the data. The function reads the contents of the data window again, recalculates statistics and rebuilds the chart. R does not automatically apply the INI filter; it rebuilds the current Memo contents. When leaving dV/SYM/CMP, it restores source data and the standard view.

## **SYM**

Symmetry analysis of the series. The function compares corresponding points from the beginning and end of the series. If A/B is active, statistics and the mask should refer to the selected analysis area.

## **CMP**

Compares data with a file or a second series. The function is used to compare current data with reference data. In CMP mode, live input from COM/BLE is blocked to avoid mixing source data with the result.

## **dV**

Creates an analysis of velocity differences between points. It is useful for observing increases, changes and stability of the series. In dV mode, the program keeps the source data in a buffer, and R returns to the base data.

## **IMG**

Exports a JPG image with statistics and the chart. The image contains AVG, MAX, MIN, dV, SD, ES/P.F., N, Weight and additionally Me and CV%. When A/B is active, JPG statistics are calculated from points selected by the mask.

In JPG export, the chart is drawn on a white background. For a bar chart, bar width is recalculated separately for the bitmap size, and after saving the screen state is restored.

## **+ and -**

Change the visible range of the SHOTS axis. In full chart mode, the program should aim to show all SHOTS. In moving-window mode, the program zooms in or out on the visible fragment.

## **X0 / XN**

Move the SHOTS axis view to the beginning or the end of the series.

# **4. Mouse operation on the chart**

### **Left mouse button**

Clicking a point on the chart can highlight or indicate the corresponding line in the data window.

### **Right mouse button - A/B**

If the A/B function is enabled and the markers are visible:

- RMB on marker A or B moves that marker,
- RMB on the gray area moves the whole A/B mask,
- RMB outside the gray area can select a new view area.

### **Right mouse button - area selection**

Dragging with the right mouse button over the chart defines a fitting rectangle. After releasing the button, the chart sets the view to the selected area.

If A/B is disabled, the selected area can prepare the A/B range for the next activation. If A/B is already enabled, RMB outside the mask changes only the chart view, while the A/B markers remain in their positions.

# **5. Keyboard shortcuts**

### **ALT+B**

Enables or switches A/B mode on the chart. Markers A and B define the analysis range. The starting marker positions are fixed: A(1;0), B(25;25), and later the positions are set manually or by RMB selection.

Operation:

- the first use shows the A/B mask,
- the next use can switch the way the SHOTS view is centered on the A/B range,
- CTRL+B and CTRL+ALT+B do not control A/B markers.

### **ALT+A**

Applies the A/B mask to the data. Compact mode - outside the selected area, data can be removed or skipped without inserting zeros.

### **ALT+N**

Applies the inverse logic of the A/B mask. This is useful when you want to analyze data outside the selected range.

### **CTRL+ALT+A**

Classic masking with zeros for the A/B range.

### **CTRL+ALT+N**

Classic masking with zeros for the inverse of the A/B range.

### **CTRL+R**

Refreshes data, similar to the R button. It does not apply the INI filter.

### **CTRL+F**

Filters the current Memo1 contents according to [FILTER], regardless of Filter=0/1. This function is useful when you want to manually apply a filter to already loaded or pasted data.

## **6. A/B function**

The A/B function defines an analysis area on the chart. The gray field shows the active range.

By default, A/B starts with fixed markers:

```
A = (1; 0)
B = (25; 25)
```

The fixed start makes program startup repeatable. Marker positions can then be changed manually with RMB or by selecting a new area on the chart.

When selecting with RMB, A/B can be set to the selected data fragment. In that case:

```
A.X = beginning of the SHOTS selection
B.X = end of the SHOTS selection
A.Y = minimum Velocity in the selection
B.Y = maximum Velocity in the selection
```

The SHOTS axis view can be expanded or centered on A/B so that the gray area is readable and has context on the left and right sides.

If A.X is less than or equal to B.X, the mask works as an internal range. If A.X is greater than B.X, the logic is reversed and points outside the range are analyzed. The Velocity range works in the same way.

In dV, SYM and CMP modes, the program can show a temporary gray result area. R restores the source A/B and the view from before entering the result mode.

## 7. Usage examples

### Example 1 - receiving data from COM

- Select a COM port from the list.
- Click OPEN.
- Take measurements.
- Data appears in the data window and on the chart.
- When finished, click SAVE to save the series.

### Example 2 - analyzing data from a file

- Click LOAD.
- Select a TXT or CSV file.
- The program loads the data, recalculates statistics and displays the chart.
- Use R if you manually correct values in the data window.

### Example 3 - analyzing the A/B range

- Load or receive data.
- Press ALT+B.
- Move the A/B markers with the right mouse button.
- Use ALT+A to apply analysis to the selected range.
- Use R to return to the standard data view.

### Example 4 - quick zoom of a chart fragment

- Drag with RMB over the interesting area on the chart.
- After releasing the button, the chart fits the view to the selection.
- If A/B was not enabled, the next ALT+B can use this area as the analysis range.

### Example 5 - comparing two series

- Load the first series.
- Use CMP and select the second series or comparison file.
- The program displays differences between the series.

### Example 6 - JPG export with Me and CV%

- Load or receive a data series.
- If you want to analyze only a fragment, set A/B.
- Click IMG.
- The JPG file contains statistics, the chart, median Me and coefficient CV%.

## 8. INI file - user parameters

The INI file is located next to the EXE file. If it does not exist, the program creates it automatically with default values.

## Section [Settings]

```
[Settings]
Style=1
TXT=0
Multiplier=1.0
MultiplierG=1.0
CheckBoxScroll=1
ComPort=
OpenCom=
CheckBoxAuto=0
CheckBoxAuto50=0
CNV=0
useKmh=0
LabelVi=0#
LabelVG=0#
LabelE=00
ChartType=0
ChartColor=1
ChartLineWidth=1
ChartMarkerSize=5
ChartBarWidth=35
CheckBoxBTAuto=0
MU=10
FREQ=0
GATE=0
A=0
```

### Description:

- Style - application visual style.
- TXT - text data mode.
- Multiplier - weight visible in the edit field.
- MultiplierG - base weight in grams, used for accurate conversions.
- CheckBoxScroll - SHOTS chart window mode.
- ComPort - last selected COM port, for example COM3.
- OpenCom - automatic port opening at startup. 0, missing or empty means manual opening. Any other value means auto OPEN.
- CheckBoxAuto - automatic Velocity scale with a small margin.
- CheckBoxAuto50 - automatic Velocity scale with a larger margin.
- CNV - enables or disables unit conversion.
- useKmh - additional unit mode, for example km/h, mph, kg, lb.
- LabelVi - display format of the last velocity.
- LabelVG - display format of velocity statistics.
- LabelE - display format of energy.
- ChartType - chart type: 0 line with markers, 1 line with X markers, 2 bar chart.
- ChartColor - point coloring: 0 default color, 1 variable colors, 2 color by increase or decrease compared with the previous measurement.
- ChartLineWidth - chart line thickness.
- ChartMarkerSize - point marker size.
- ChartBarWidth - bar width as a percentage of the distance between points.
- CheckBoxBTAuto - automatic BLE connection or setting, depending on program version. This setting is independent of BLEP, which controls only panel visibility.
- MU - auxiliary program parameter.
- FREQ - frequency for velocity calculations.
- GATE - measurement gate distance.
- A - correction constant; it can be positive or negative.

## Section [BLE]

```
[BLE]
Last=
BLEP=1
```

Description:

- Last - last BLE device.
- BLEP - visibility of the lower BLE panel: 1 panel visible, 0 panel hidden. Hiding the panel does not mean disabling BLE support or automatic connection.

## Section [FILTER]

```
[FILTER]
Filter=0
Shots=S(~)
Velocity=V(~)
```

Description:

- Filter - enables automatic data filtering for LOAD. For COM, the filter works only when Filter=1 and an active Velocity or Shots filter has a + sign at the end.
- Shots - SHOTS number filter, for example S(10~30), S<10~30> or S(30~10).
- Velocity - velocity filter, for example V(290~310), V<290~310> or V(310~290).

Examples:

Round brackets mean an open boundary, while < or > means a closed boundary. The A~B notation means a range from A to B. If A>B, the filter selects values outside the range.

```
Velocity=V(290~310)
Passes Velocity values from 290 to 310.

Shots=S(10~30)
Passes SHOTS from 10 to 30.

Velocity=V(310~290)
Reversed range - filter outside the range, i.e. values greater than 310 or less than 290 according to the brackets.

Velocity=V(290~310)+
The same Velocity filter, but with permission to filter incoming COM data when Filter=1.
```

CTRL+F applies the filter manually to the current Memo1 and does not require Filter=1.

The + sign at the end of a filter means permission to filter incoming COM data. COM still additionally requires Filter=1.

## Section [TXTCSV]

```
[TXTCSV]
Folder=./MYSHOTS
FileName=Chrono_$
INDEX=001
```

Description:

- Folder - TXT/CSV save folder.
- FileName - file name pattern.
- INDEX - number of the next file.

Meaning of special characters:

- \$ - place where the index is inserted,
- no \$ - the file may have a fixed name and may be overwritten.

Example:

```
FileName=Chrono_$  
INDEX=001  
  
produces files:  
Chrono_001.csv  
Chrono_002.csv  
Chrono_003.csv
```

## Section IMG

```
[IMG]  
Folder=./IMG  
FileName=Stat%_$  
INDEX=001
```

Description:

- Folder - JPG image save folder.
- FileName - image name pattern.
- INDEX - number of the next image.

Special characters:

- % - function suffix, for example DV, SYM, CMP,
- \$ - file index.

JPG export uses % as the function suffix: empty for STAT, DV for dV, SYM for SYM and CMP for CMP. Me and CV% statistics are calculated from the currently visible/analyzed set of points.

## Section [AUTOSAVE]

```
[AUTOSAVE]  
AUT=0  
Folder=./AUTOSAVE  
FileName=Chrono_$  
INDEX=001
```

Description:

- AUT=0 - autosave disabled.
- AUT=N - save every N new live measurements from COM/BLE. LOAD, manual editing, pasting data and R do not increase the autosave counter.
- Folder - autosave folder.
- FileName - file name pattern.
- INDEX - number of the next file.

Example:

```
AUT=10  
FileName=Chrono_$  
INDEX=001
```

The program saves data after 10, 20, 30 measurements and so on, creating consecutive indexed files.

If FileName does not contain \$ or INDEX is empty, the program may overwrite one fixed file containing the current data state. In the variant with \$ and INDEX, consecutive indexed files are created.



## 9. Usage recommendations

- After manual data editing, use R.
- Use RMB for quick selection of a chart fragment.
- Use ALT+B and A/B markers for range analysis.
- For live saving, set [AUTOSAVE]/AUT.
- If COM data should start automatically, set ComPort and OpenCom.
- In bar chart mode, adjust ChartBarWidth so that bars do not merge when there are few data points.
- Before larger INI changes, make a backup copy of the file.
- If you want to filter COM data, add + at the end of an active Velocity or Shots filter and set Filter=1.
- If the BLE panel is hidden, remember that BLEP=0 hides only the interface and does not always block automatic BLE.
- After dV, SYM and CMP modes, use R to return to source data and unblock live input.
- Use IMG for reporting a series because it contains Me and CV%, which you do not need to calculate manually.

## 10. Notes for the current version

After entering data manually in the edit window, use R to update statistics and the chart.

- R/CTRL+R rebuilds the view without automatic filtering.
- CTRL+F filters the current Memo1 according to [FILTER].
- LOAD applies the filter only when [FILTER]/Filter=1 and Shots or Velocity is active.
- COM applies the filter only when [FILTER]/Filter=1 and the filter has a + sign.
- dV/SYM/CMP block appending new live data until returning with R.
- IMG export calculates Me and CV% from data currently included in the analysis, not from the whole buffer, if the A/B mask is active.