

OrruSI rescues orienteering results

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Note: This is an automatic translation by Google Translate of the Swedish instruction document.

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Revisions

Audit	Date	Description
0	2024-01-05	Document created.
1	2024-01-07	Corrections and clarifications after Torbjörn Wikström's proofreading.
2	2024-01-15	Support for multi-day competitions and fixed handling of time adjustments that are so large that date changes. Default value for SI_turnoff in the configuration file changed to Yes.
3	2024-02-02	Modified view of handling ErrA after contacts with Peter Löfås. Addition of a chapter with technical information about the program.
4	2024-03-08	Changed formatting.
Version 2.0	2024-05-26	Support for random start times.
Version 2.1	2024-08-23	Manage competitions with direct entry only.
Version 2.2	2024-09-23	Allow selective loading and result generation if correct backup up to a certain point in time exists.
Version 3.0	2025-01-05	Interpolation of stamping times during ErrA stamping.
Version 3.1	2025-01-13	Intervals for competition time can also specify times.

Overview

OrruSI (Orienteering Result Reconstruction when Using SportIdent) can save the result from an orienteering competition with SI control units when the reading of the SI pins has failed for some reason.

This is done by reading the information in all the control units in the forest plus the start and target units and converting it into the format that a backup file from the reading unit provides.

The program cannot restore the result if touchfree stamping has been used, because touchfree stamping is not registered in the SI control units.

The conversion is done in stages so that manual interventions can be made along the way, which is often required to achieve an accurate result.

The program also attempts to recreate timestamps when the SI unit has failed to register the time due to the runner pulling the SI stick out of the unit too early. This is an increasing problem with newer types of SI sticks, as the SI unit gives the go-ahead before everything is registered.

The first step, loading the information from all SI units, can also be used separately to get information about all loaded SI units, as a lot of information is collected and presented in an Excel sheet.

Good advice to facilitate the reproduction of results

It may not be very helpful to give good advice in this instruction about what you should have done beforehand, but I still want to address a few points.

- Empty all SI units and set the correct time in them by doing the following:
 - o Set the correct time in the SI master using a computer and the SIConfig Plus program.
 - o Put the SI master into Extended Master mode by repeatedly inserting the Service Off pin into it until the display shows EXT MA.
 - o Insert the programming wand into the SI master.
 - o Start an SI unit with the Service Off pin.
 - o Place it on the SI master and wait for a double beep indicating that the device is ready.
 - o Check the device display to make sure it has the correct control type and control number.
 - o Turn off the SI unit using the Service Off pin.
 - o Repeat for all SI units to be used in the competition, including Empty, Check, Start and Finish units.
- Prepare a USB stick:
 - o Create a directory on it with the name "Competition name and date" (e.g. "Veteran Olympics 2023-12-14").
 - o Under the competition directory, create two directories: "Data" and "Backup".
 - o In Data, you place all files that are the basis for the competition, such as the files exported from Eventor and OCAD.
 - o In Backup you put all backups.

- Take a MeOS security backup to the Backup directory on the USB stick when all pre-registered participants are loaded and before the first registration is made during the competition.
- Start the automatic backup machine in MeOS and specify that the Backup directory on the USB stick should be used. I usually let the backup take place every minute, because it is so fast that there is no noticeable delay while it is in progress.
- Remember that you must restart the backup machine if for some reason you have to stop and restart MeOS during the competition. The machine will not restart automatically.

(The same applies to the live results export machine, which must also be restarted if MeOS has been stopped on the computer that is exporting the live results.)

- Take a new MeOS security backup when everyone has reached their destination.
- Export the results XML file from MeOS (which will be read into Eventor) to the Data directory on the USB stick. Now you can easily start MeOS and correct the results afterwards on another computer at a later time. It is more common than unusual to have to do this afterwards, because you want the results to be in Eventor as quickly as possible and have not had time to check everything yet.

Installation

Delivery

The installation file for the OrruSI program can be obtained from me, email lennart.almstrom@telia.com.

The file OrruSI.zip

- Download the file OrruSI.zip to any directory, preferably Documents.
- Right-click the downloaded file and select Extract all.
- In the box that appears, press Browse and select your Documents directory.
- Then press Extract.
- The OrruSI directory will be created as a subdirectory of Documents.
- If you want, you can now delete the downloaded file OrruSI.zip, it is no longer needed.

From now on, all files needed will be located in or created in the OrruSI directory, so unless otherwise stated, you should look for all files there.

The configuration file OrruSI .cfg

OrruSI.cfg is a configuration file for the program, where you can change a number of properties.

Normally you don't need to change anything, but it might be good to know about the following possibilities:

- [window] Lines and Columns specify the size of the black box (Command Line Window) where you communicate with the program. It may be a good idea to adjust it to your screen size to accommodate the displayed lines without them being split across multiple lines.
- [Actions] SI_turnoff controls whether the SI units should be turned off automatically after they have been read. The default value is Yes, but you can change it to No if you want the units to be left on because you intend to do something else with them.
- [Actions] Correct_times provides the ability to automatically change the entered stamping times per unit, if the time has not been set correctly in some units before the competition. In this case, change the value to Yes and follow the instructions later to get the intended changes.
- [Actions] Approve_ErrA allows you to approve punches that have been made too quickly so that the SI unit has not yet had time to register the time of the punch. The punch may or may not have been registered in the SI stick. If OrruSI has access to the path file from OCAD or Purple Pen, the program will try to interpolate an approximate time for the incorrect punch. The default value is Yes, but if you do not want the ErrA punches to be included at all, change the value to No.
- [Actions] Ignore_setout_punches: The default value is Yes, which means that runs that lack both start and finish punches will be removed, as they are likely to be from test punches during the setting out of the controls. If this is not the case, there is the option to set the value No, which means that these runs will be retained.
- [Actions] Debug: The default value is No. If you change to Yes, you will get a variety of extra prints that can be helpful in finding errors in the program.

To make changes, open the file in Notepad or Wordpad, make your changes, and save it. Do not use Word to make changes to it, Word will like to add extra formatting information, which will make the file not work afterwards.

The log file OrruSI.log

If any errors occur during the runs, error information will be logged in the OrruSI.log file.

The program has been subjected to a limited amount of testing, so there may certainly be remaining errors. If so, please report it to me (lennart.almstrom@telia.com), send the log file and describe in what context the error occurred.

Carry out the rescue work

In the OrruSI directory there are five BAT files that will be used in the restoration work:

- Read_SI_units.bat: Retrieves information about all SI units used during the competition, including start and finish units.
- Get_Starttimes.bat: If fixed drawn start times are used, it converts the start times from Eventor to an Excel sheet Starttimes.xlsx, so that the created timestamp file can be supplemented with the fixed start times.
- Join_files.bat: Collects information from all files in the Punches subdirectory, performs any corrections to punch times, and creates a sorted file as a basis for creating the final results file.
- Clean_MeOS_Backup.bat: Removes all results from the MeOS backup, which will be used as a basis for recreating the results. This makes the backup file look as if all participants are registered and no one has crossed the finish line yet.
- Create_Readout_file.bat: Creates the file Readout.csv which can then be loaded into MeOS or another results program to recreate the competition results.

Step 1: Run Read_SI_units.bat

- Connect an SI reading device to the computer and insert a programming stick into it to be able to read all SI units in turn.
- Start the first SI unit to be read using the Service-off stick and place it on the reading unit. It does not matter in which order you read the SI units, but to keep track of all of them being read, it may be an advantage to take them in numerical order.
- Start the reading program by double-clicking the file Read_SI_units.bat.
- A question will appear in the Windows window: "Is this the first control unit read session for this competition? (y/n)": Answer y and press Enter as this is the first run.
- The following appears in the window: "Press <Enter> to read next remote station, or q to quit:". Respond by pressing Enter to read the first SI unit.
- If everything goes well, this will be evident from the printouts in the window. It also shows how many punches have been read in from the device. It sometimes happens (I have not been able to investigate why) that the reading fails without giving an error indication. Then you also get a prompt to check whether the device has been used during the competition and that if so, it should be read again.
- Remove the SI unit from the reading unit and stop it with the Service-Off pin, if you have not requested automatic shutdown (see earlier about OrruSI.cfg).
- Start the next SI unit, place it on the reading device and press Enter again to repeat the procedure.

- Continue until all SI units used, including the start and target units, have been loaded. If you wish, you can also load the empty and check units. They are not used to produce the result, but the information will be transferred to MeOS, so that the punches are reported there.

Some notes to keep in mind when reading:

- Read_SI_units.bat can be rerun as many times as you like to add additional SI units or re-read a unit if there were problems with the first read. Just make sure to answer n when asked if this is the first read round for reruns. Each time you answer y, all previously read information will be deleted and you will have to restart all reading from the beginning.
- If you are unsure whether a device has already been read, there is no problem reading it again; any previous reading will simply be replaced by the new one.
- If multiple SI units have been used in the same check, just enter them all.
- A common problem when reading is that there is no contact with the reading device. In this case, it may help to disconnect it from the computer and reconnect it. It may also help to remove the running SI unit from the reading device, stop it and start it again before placing it back on the reading device.
- The information about all loaded SI units is stored in the Excel file Adjustments.xlsx and the punches per unit are stored as separate files in the Punches subdirectory.
- You can open Adjustments.xlsx at any time to check what has been loaded and what properties the loaded units have. Just remember to close the excel sheet again before resuming the loading, otherwise the loading program cannot update the excel sheet.
- If touch-free stamping was used in the competition, it is not possible to reconstruct the result using this method, as the touch-free stampings are not recorded in the SI units. However, it is possible to use this method to restore the result for those who have applied regular stamping, even if the SI units have been activated for touch-free.

[Check the contents of Adjustments.xlsx](#)

The Excel sheet Adjustments.xlsx has two tabs Statistics and Race_dates_times (see at the bottom of the Excel sheet).

The Statistics tab is the one that is displayed from the beginning and contains all the statistics about the loaded SI units. Here you can check that all the used units have been loaded and that everything seems OK.

Among other things, you can see if the units' time errors seem reasonable. The time in all SI units drifts a bit randomly, so if the reading is done several days after the competition, it is reasonable that there is an error of a few seconds.

Should there be a large time error on any device, the time was probably not set correctly in it before the competition and it may be a good idea to let the program adjust the time for the punches on that device.

Then you can delete the values in the Time Error column except in the row for the unit for which you want to correct the time. Then you activate the time correction in the file OrruSI.cfg (see description earlier). Then the times for that unit will be corrected in the next step. If you have a better suggestion for the size of the time correction, you can change the error time in the excel sheet. The value can be positive or negative. A positive value means that the clock is ahead and will therefore be corrected backward in time, a negative value the opposite.

If you have missed setting the correct time for all the units so that they have very varying error times, it may be reasonable to let the program adjust all the times.

If you have made changes to Adjustments.xlsx and then regret it, there is the file Adjustments_backup.xlsx that contains the original values.

Then go to the Race_dates_times tab by clicking on that tab.

It contains four values, the from and to date and time when the competition took place. The date has been taken from the last timestamp on the first loaded device and set in both date fields. The time is set to 00:00:00 – 23:59:59.

If there are stampings in the units that do not belong to the competition to be reconstructed, you can adjust the time interval so that the irrelevant stampings are not included.

If the excel sheet does not show the correct competition day or if the competition spans several days, you must change to the correct dates, as the program will only read timestamps that have been made within the specified date-time interval.

Step 2 : Run Get_Starttimes .bat if drawn start times are available

If the competition has fixed drawn start times for some or all classes, so that the runners in these classes do not start, the xml file with start times that was uploaded to Eventor must also be uploaded to OrruSI.

Do this:

- Store the xml file with start times in the OrruSI directory where the other files are located and name it "startlist.xml".
- Double-click the Get_Starttimes.bat file to run step 2 of the results rescue.
- The Excel sheet Starttimes.xlsx will be created.
- Open and adjust the contents of the excel sheet if necessary. For example, it may be that start times have been changed afterwards or new participants have been added who are not on the start list.

It may also be that classes that are to be clocked in have been added to the start list with a start time of, for example, 10:00 for all. These must then be removed from the excel sheet. This is easily done because the class is included among the information in the excel sheet.

The only columns that need to be changed are the first three, SI Number, Start date and Start time. The other columns are only to facilitate any manual adjustments.

- If the excel sheet has been changed, save it again.

- The excel sheet will be read in step 3 and supplemented with start times for the SI-ids that are included in the sheet. The start times will be entered unconditionally, so if a runner in a drawn class has been allowed to start, for example due to a problem in the start procedure, the row with his drawn start time must be removed from the excel sheet.

Load the path file from OCAD if ErrA stampings are to be timed

Copy the xml file with the courses from OCAD or Purple Pen to the OrruSI directory and rename it to courses.xml.

If this is done, all timestamps will be matched against the courses and ErrA timestamps on otherwise correct races will be given a time proportional to the average of the runners' times from the previous and subsequent control. Should there be no correct times to compare with, the time will instead be distributed according to the length of the sections.

If the above matching would result in an impossible time with respect to the times at which the previous and subsequent punches were made on the same control unit, the time is moved so that it falls 5 seconds into the possible interval. Should the possible interval be less than 10 seconds, the time is instead set to the middle of the possible interval.

Step 3 : Run Join_files.bat

- Double-click the Join_files.bat file to run step 3 of the results rescue.
- If you have enabled time correction in OrruSI.cfg, you will be asked “Should time corrections ... be applied?”. If you answer y, time corrections according to the contents of Adjustments.xlsx will be performed. If you answer n instead, the time corrections will be skipped even if you have enabled them.
- The contents of Adjustments.xlsx will then be displayed and you will be asked to confirm that it is correct.
- A file Totalsort.csv is created. It contains one line for each timestamp made, sorted by participant (i.e. SportIdent id) and (possibly corrected) timestamp. This file is then used to create a reading file in step 5.

Make any adjustments to the Totalsort.csv file.

If there are stamps that should not be included in Totalsort.csv, you can open the file in Excel or a similar spreadsheet program and make manual corrections, especially removing stamps that should not be included.

For example, there may be stampings that have been made to test the equipment.

The control postponers' stamps are automatically removed if they do not have a start and finish stamp. This function can be removed in OrruSI.cfg if necessary.

If not too many corrections are needed, they can also be made in the Readout.csv file after step 5 or in MeOS after loading there, but as soon as there are stamps that have not been made by registered participants in the competition, loading into MeOS becomes more cumbersome.

To ensure that it is correct when the csv file is saved again after the corrections, make sure that the semicolon is specified as the only separator character when loading.

Some explanations for the columns:

- SIID is SportIdent ID
- Control time is the (possibly corrected) date and time of the stamping
- Code number is the SI unit number
- Punch DateTime is the (possibly corrected) time of the punching
- Operating mode is the SI unit's operating type

Step 4 : Prepare the MeOS backup file to be used as a basis for recreating the competition results in MeOS

- This only covers what to do if MeOS is used as a competition system. If you use another results program, you will need to adapt the handling to that.
- Hopefully you have used the automatic backup feature in MeOS so that you have a backup fairly close to the time when the data management has failed for some reason. I usually run the automatic backup feature at an interval of 1 minute. It doesn't bother me because the backup is fast and each time creates a file that is not very large. I also make sure to put the backups on a USB stick so that I am protected in the event of a total disk failure on the computer.
- The older your last backup is, the more problems you will have with manually re-registering the most recently directly registered runners.
- If you do not have a backup at all, you can recreate the competition manually, possibly from the beginning, and re-enter the participant registrations. If you have a backup, continue as below.
- Copy your latest backup (however you made it) to the OrruSI directory. Rename the copy in the OrruSI directory to lastbackup.meosxml.
- If your chosen backup was taken during the competition and the finishing runs and readings have already taken place, you can choose to keep the results that have already been recorded. This way, you do not risk these participants possibly being affected by the ErrA problems that experience has shown can occur when the results are restored from the devices in the forest.
- If you want to keep the already recorded results, do not perform the next step (Clean_MeOS_Backup).
- **Perform this step only if you need or want to restore all results:**
Double-click the Clean_MeOS_Backup.bat file to delete all recorded results from the lastbackup.meosxml file and create a new backup file lastbackup_cleaned.meosxml.
- (If you have performed the above step and regret it and instead want to keep already recorded results: Delete the file lastbackup_cleaned.meosxml.)

Step 5 : Run Create_Readout_file.bat

- Double-click the Create_Readout_file.bat file to run step 5 of the results save.
- If in the previous step you chose to keep already registered competition results and therefore did not create the file lastbackup_cleaned.meosxml, only the results that are not already in the file lastbackup.meosxml will be included.
- The run creates the file Readout.csv, which is the file to be read into MeOS or another results program to recreate the competition results.

Make any adjustments to the Readout.csv file.

It is also possible to make manual adjustments to the Readout.csv file before it is loaded into MeOS, by opening it in Excel in the same way as described above for Totalsort.csv.

Readout.csv contains a long line for each participant, so deleting some participants may be easier to do in this file.

Step 6 : Recreate the competition results in MeOS

- This only covers what should be done in MeOS. If you use another results program, you can adapt the handling to it.
- If you have run the Clean_MeOS_Backup.bat procedure in step 4, you should now import the backup file lastbackup_cleaned.meosxml as a new competition to MeOS. If you did not run it, the backup file lastbackup.meosxml should be imported instead. You can do the import by pressing Import competition... on the MeOS home page.
- When the import of the competition is complete, select the Sportident tab, make sure that the Reading/Radio times function is selected, uncheck Interactive reading and check Use runner database (if you have loaded it).
- Then select Import from file ... and select the Readout.csv file created in Step 5.
- Select Save if you are satisfied with the participants displayed.
- MeOS generally fails to pair all runners with the results. You can find those that MeOS has failed to pair if you select the Participants tab and then Manage tokens. Participants that need to be managed manually are named Unpaired. Double-click on those that are named Unpaired and you will get a menu where you can link the SI pin to the runner that the pin belongs to.
- Please note that there may be some runners who should not be paired, such as control delayers who have proof-stamped the controls. They are included now because we have read in all the stampings that have occurred in any control.
- Then make any further adjustments that may be needed. For example, mark No start for registered participants who have not received any results.

- If you need to redo the import into MeOS, for example because you had to rerun previous steps to make further adjustments, it is generally easier to import the MeOS backup again as a new competition and start from there. There will be a lot of manual handling involved if you import the results again in the same competition.

It is no problem to rerun earlier steps in the reconstruction several times when the conditions have changed, for example if you discover that you need to adjust the time corrections. The program does not know in which order the runner has taken the controls, but places the punches in the corrected time order. Incorrect time corrections can lead to the controls appearing to have been taken in the wrong order, so that the corrections need to be changed. Since the time corrections are made in step 3, you only need to rerun from there, without loading all the SI units again.

Using step 1 only to extract statistics

The first step to read the SI units can also be used separately as a simple and quick way to retrieve information about the units.

All types of devices that can be read with a reading device and a programming stick can be read, even if they are not of a type that registers punches.

The data read from the device and reported in Adjustments.xlsx is:

Control	Device number	Normally 31-511 for controls, 1 – 30 for other functions. Some SIAC functions, such as SIAC off, have no number and are reported as 0.
Fashion	Device function name	If the function name starts with Bc, the device is set for touch-free stamping (Beacon mode). The other names are hopefully self-explanatory.
Serial	The serial number	Set during manufacture.
Time error	How much the clock is wrong	A positive value means that the clock in the device is ahead of the correct time, a negative value means that it is behind. Note the period between seconds and milliseconds (not commas). If the error is greater than 60 seconds, minutes and possibly hours are reported with a colon in between.
Voltage	Battery voltage in volts	This is the most important value for assessing the condition of the device. If the value is below 3.00 V, the device will emit an extra beep to alert you when you turn it on. This is an indication that the battery should be replaced as soon as possible. However, it will generally last for another period of use.
Active time	How many minutes it takes for the device to turn off after inactivity	In a training context, the time can be short to save battery. The only thing that happens when you punch again after the device has turned off is that the first punch takes a fraction of a second longer, because the device has to start up first.
Capacity	Battery energy content in mAh when installed	This value should be set by the person replacing the battery in accordance with the capacity stated on the new battery, but it is sometimes forgotten or set incorrectly.
Firmware	Software version in the device	The newest version has been 656 for a long time (at the end of 2023).
Battery date	The date the battery was last replaced	This value should also be set by the person who replaces the battery and is therefore only correct if it has been handled correctly when replacing the battery. Initially the value is = Build date.

Battery %	Remaining battery capacity in percent	This is a value that is probably calculated by the device from the total time the device has been running since the last battery change. The value is generally considered to be very uncertain. It is the Voltage value that should be used primarily to determine whether a battery change should be made.
Build date	Date the device was manufactured	Set by Sportident from the beginning and never changed.
Modification date	Last date and time when any changes to the device settings were made	SIConfig+ or an SI Master sets this value when the settings in the device are changed.
Last punch date	Last date and time when a stamp was made on the device (the information disappears when the device is emptied)	If there are timestamps, the time of the last timestamp is reported.

The art of getting a safer Voltage value

When a device has just been turned on, the Voltage value can vary quite a bit. To get a more reliable value, the device should therefore have been running for a while, the longer the safer the value. I have seen recommendations of up to 2 hours.

To prevent the device from automatically turning off when you intend to leave it on for a while to stabilize the Voltage value, it should be started with a normal SI pin, not the Service-off pin. When a device is started in Service mode with the Service-off pin, it will automatically turn off after 10 minutes of inactivity. This is done because the Service mode mode consumes significantly more power than the normal mode.

(When reading units to recreate a competition result, you should not use a regular SI stick, as it causes an extra stamping in the unit. Instead, use the Service-off stick to start the unit, as indicated in the previous section on reading.)

A good idea when measuring a series of units is to start all units first with a normal SI stick and then start the measurement only after another while (as long as you have the desire and patience to wait). The value will in any case be more reliable than if you measure immediately after starting each unit.

If you also activate the function in OrruSI.cfg to automatically turn off the SI units after loading, you then only need to enter the SI units one by one and press Enter on the screen to measure a whole series of units.

If you want to save the statistics, you can simply rename Adjustments.xlsx to a different name or save it under a different name. The next time you run the program, a new file Adjustments.xlsx will be created.

Technical information about the program that you don't need to read to use it

The program has been tested in Windows 10 and 11, but it should work in all modern Windows versions.

The program is delivered as a zip file, which upon installation as above expands to a directory OrruSI, which contains a number of bat files to run the various steps and two subdirectories lib and Punches.

In addition, the OrruSI directory contains the source code for the program and this documentation in PDF format.

The program is written in Python version 3 and compiled into an exe file OrruSI.exe, which utilizes a large runtime library located in the lib subdirectory.

For reading the SI controls, a modified version of the sireader module is used, which has the following copyright:

```
# Copyright (C) 2008-2014 Gaudenz Steinlin <gaudenz@durcheinandertal.ch>
# 2014 Simon Harston <simon@harston.de>
# 2015 Jan Vorwerk <jan.vorwerk@angexis.com>
# 2019 Per Magnusson <per.magnusson@gmail.com>
#
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# (at your option) any later version.
#
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```