

REGNLY TIME RECORDER RTR 2 USERS MANUAL

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1 INTRODUCTION

This program-version of 11.05.92 includes eleven different choices of programs :

- 1 Registration of the finish time with a print-out
- 2 Registration of the starting number and the finish time with a print-out.
- 3 Registration of the starting number and the finish time with a print-out of the starting number, used time and finish time
- 4 Alpine with use of a starting gate, photocell(s), plus additional equipment (RAC-connection box and RKP-keypads). The starting number is registered wherever a time is taken
- 5 Plain alpine, a starting gate and photocell(s) are directly connected to the RTR 2
- 6 Cross country with a starting gate and a photocell at the finish-line, possible to take intermediate times with an extra Time Recorder.
- 7 Biathlon. Recording of misses at the stand (with RKP-keypads and a RAC-connection box), and intermediate times with an extra Time Recorder.
- 8 Parallel slalom
- 9 Time-taking in mass-arrangements. Time-taking by registration of the starting number
- 10 Time-taking in heats, one lane
- 11 Time-taking in heats, parted lanes

The additional equipment mentioned above is more thoroughly described in chapter 3. A general introduction of the different programs is given in chapter 5.

1.1 How should this users manual be read ?

This users manual is written in such a way that all users should read chapter 1 - 5, and chapter 7. Chapter 2 describes recharging and maintenance of the Time Recorder. Topical additional equipment for the RTR 2 is described in chapter 3. Chapter 5 gives a general description of the different programs. In this chapter you will find out what program that is most suitable for the competitions in which you are going to use the RTR 2. When you have chosen the program you want to use, it is sufficient to read the section in chapter 6 that deals with the chosen program.

1.2 Making use of a computer

In every RTR 2-program it is possible to transfer data, times taken, starting numbers and other data, to a computer or PC for further analysis. Chapter 5 describes what programs that are most suitable for transmission of data to a computer. For transmission of data you will need a data cable (that is possible to buy from Emit A/S) which is connected to the 9-pin connector named DATA on the RTR 2, and to a series input on the computer. Diagram of connections for the cable is shown in chapter 9. When the cable has been connected the RTR 2 is ready for data transmission.

The computer must have a suitable program to communicate with the RTR 2. There are

many distributors of such a result-program, and most of them can communicate with the RTR 2. In chapter 10 we have reproduced the communication-protocol between the RTR 2 and a computer, for those who want to make such a communication-program themselves.

The RTR 2 should be in users mode *before* the data-program in the computer starts to communicate.

2 CHARGING AND MAINTENANCE

2.1 The charger

The RTR 2 is powered by rechargeable nickel-cadium batteries. The batteries should be recharged with the included battery charger. It delivers 11.2 V charging voltage (\div at the centre-plug). The charger (50 Hz, 220 V) is connected to the light circuit. Charge the batteries at a normal room temperature. The batteries are completely charged in a 15 hours period. The RTR 2 can be used for at least 10 hours when fully recharged. The RTR 2 should be turned off when it is being charged. It is possible to use the RTR 2 while the charger is connected. *NB ! : Do not charge the batteries continuously for many days.*

To get the new batteries in top shape, you should charge and discharge the RTR 2 two to three times before using it. This can be done in the following way :

- Turn off the RTR 2. Charge it for minimum 15 hours. It is perfectly normal that the charger gets a little hot.
- When the RTR 2 is finished charging, turn it on and let it stay on for the next 24 hours.
- Do the procedure above at least once more. When the RTR 2 is fully charged the last time, the batteries should be in top shape.
- When the batteries are fully charged the RTR 2 can be used for at least 10 hours.

2.2 Maintenance of the batteries

The batteries needs to be fully discharged / recharged at least four times a year, preferably once a month.

Let the batteries be *recharged* when you're not going to use them for a longer period.

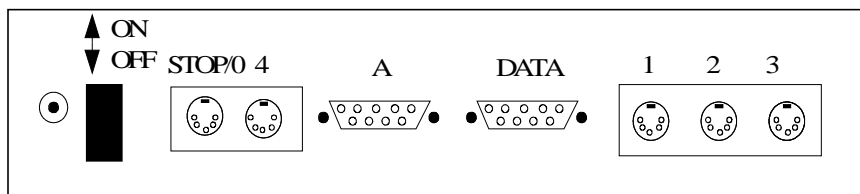
3 ADDITIONAL EQUIPMENT

Before the RTR 2 is turned on, all additional equipment must be connected. The following equipment may be used :

- Synchronising-box with 25 meters of cable when long chutes are being used
- Starting gate
- Photocell
- Extra timetaking button
- Barcode-reader for reading starting numbers with barcodes

- RAC-connection box with Regnly Key Pads (RKP). A RAC-connection box is a central that gathers information from units that register times, or starting numbers. The RAC-box sends the information further on to the RTR 2. The RAC-box receives two types of information, times and starting numbers/misses. Regnly Key Pad is a small keyboard which is used to transmit a number (starting number, misses, points) further on to the the RAC-box.
- RSB-connection box is a central that gathers information from many Time Recorders, before the information is transmitted to a computer (PC). The connection box has eight inputs, and one output for a computer.

Backside of the Regnly Time Recorder RTR2



Inputs :

- DATA : To a computer (PC).
 A : From the batterybox RPP 2, for the barcode-reader.
 1,2,3,4 : Equal inputs. Input 1 a photocell, a timetaking-button, a starting gate, another Time Recorder, ora RAC-box.
 STOP/0 : Input for a timetaking-button, possibly a synchronizing-box (Program 1, 2 og 3).

The input to the left of the ON/OFF-switch is for the connection of a battery-box.

4 Turning on

When the extra equipment is connected, the RTR 2 is turned on by using the ON / OFF switch. The switch can be locked in ON position

When the switch is turned on, the large display will shortly show :

**REGNLY
TIME RECORDER**

RTR 2 VER 11-05-92

If the RTR 2 contains any remaining data from the previous competition the large display will show :

RTR contains data

Save data ?

Yes - 1

No - 2 Choose:

The RTR wants to know if you want to save the data that is in the RTR 2's memory from the previous competition. In some cases you may wish to save the old data in the RTR 2 for transmission to a computer, look at chapter 7.4. Normally you want to start a new competition. Then you'll have to remove the old RTR 2's data, press 0 + ENTER. The large display then shows :

Choose Program no :

As explained in the introduction, you have the choice of 11 different programs. Each program is chosen by typing the program number and then ENTER.

5 GENERAL INTRODUCTION OF THE VARIOUS PROGRAMS

In this chapter we will describe how the different programmes work, and for what sports they are most suitable.

1 Registration of the finish-time with a print-out.. This program is suitable for small arrangements where only the finish-time, and not the starting number, is being registered. The timetaking-button is being used. The built-in printer prints all the finish-times. These finish-times are being numbered continuously, so that you can see how many times that has been taken.

2 Registration of the starting number and the finish-time with a print-out. This program register both the finish-time and the starting number. A timetaking-button is used at the finish-line, while the starting numbers are registered at the keyboard. The starting numbers can also be registered with a barcode-reader, that is if the starting numbers are written with barcodes. The RTR 2 doesn't calculate the used time itself, but the printer prints the starting number and the finish-time. This is probably the mostly used program, especially at common-start arrangements, and when a computer with a result-program is connected with the RTR 2. Typical sports are cross-country, orienteering, exercise runs and cycle-competitions.

3 Registration of the starting number and the finish-time with a print-out of the starting number, used time and finish-time. This program is most suitable to arrangements with interval-starting, where a computer isn't available. A timetaking-button is used for the registration of the finish-time, while the starting number is registered at the keyboard on the RTR 2. Possibly a barcode-reader can be used. The RTR 2 calculates the used time itself, and the printer prints the starting number, used time and finish-time. Typical sports are, as for program 2, cross-country, orienteering, exercise runs and cycle-competitions.

4 Alpine with use of a startgate, photocell(s), a RAC-box and RKP-keypads. This is a general alpine-program that covers all needs within alpine. At all timetaking stations the starting number is also registered to ensure right connection of time/starting number. The program can handle up to three intermediate stations, and several runners/competitors can be in the track at once. Times can be taken with a

starting gate, a photocell or a timetaking-button. The starting numbers are registered with the RKP-keypads at the start and the intermediate-station(s), while they are typed directly in at the RTR 2-keyboard at the finish. Times and starting numbers from the start and the intermediate-stations are transferred via the RAC-box, while times and starting numbers from the finish are transferred directly into the RTR 2. The RTR 2 prints all the intermediate- and finish-times.

5 *Plain alpine, a starting gate and photocell(s).*

This program is the most commonly used alpine-program. The starting gate and the photocell (at the finish-line, and possibly at the intermediate station(s)) are connected directly to the RTR 2. The program can handle up to three intermediate-stations, but while using intermediate-stations the connection of time/starting number is not as safe as in program 4. RTR 2 prints all intermediate- and finish-times.

6 *Cross-country with a starting gate, photocell(s) and intermediate-times with an extra RTR.* Program 6 is being used in important cross-country arrangements where there is a demand for a starting gate at the start, and a photocell at the finish. It is possible to take intermediate times, but then you'll need another RTR to keep track of the pairing of times/starting numbers. This RTR can be the elder model, RTR 1, or RTR 2. The photocell and/or the time-taking button are connected directly to the RTR 2. The starting gate can be connected directly to the RTR 2 (starting numbers are not stated), or it can be connected to the RAC-box together with the RKP-keyboard (used to register starting numbers at the start).

7 *Biathlon. Using the RAC-box with RKP to record misses, intermediate-times with an extra RTR.* In this program it is necessary with several types of external units. At the start, a starting gate and a RKP can be used to register times/starting numbers. At the finish, a photocell and/or a timetaking-button is used. Intermediate times are taken with a separate RTR, as in program 6. Besides, it is possible to type the number of misses by using the RKP-keypads stationed at the shooting-stand. The starting gate and the RKP-keypads are connected to the RAC-box, which is connected to the RTR 2.

8 *Parallelsalom.*

While using this program you'll need two photocells as additional external equipment. They are connected directly to the RTR 2. The program registers the winner and prints the difference between the two competitors.

9 *Timetaking in mass-arrangements. Timetaking by registration of starting numbers.*

While using this program you'll need a barcode-reader as external equipment. Further, it is assumed that all the competitors have a starting number with a barcode-label. The times are taken when the starting number are being read. If a competitor is missing his/hers barcode-label, the starting number can be typed at the RTR 2's keyboard. If you are using several finish-chutes, you'll have to use one RTR 2 for every chute. A Regnly connection-box (RSB) must be used between the different RTR's and the computer. The Regnly connection-box has got 8 inputs for RTR and one output to a computer. Both the types of RTR (no.1 and 2) can be connected to the Regnly connection-box in the same arrangement. This program is most suitable for

use in different types of mass-arrangements.

10 *Time-taking in heats, one lane.*

While using this program you'll need an external starting unit (photocell, starting gun, time-taking button), and a finish unit (photocell, time-taking button). The running time is calculated from the point of time the starting-pulse is received, and is finished when the competitor crosses the finish-line. When the final ranking is clear, the starting numbers are typed in. The printer prints the lane number and used times. This program is designed for heats with a common-start.

11 *Time-taking in heats, parted lanes*

While using this program you'll need an external starting unit (photocell, starting gun, timetaking-button). This starting unit will cover all the lanes (common-start). At the finish-line there must be a finish unit (photocell, timetaking-button) per lane that is being used. The finish unit is connected to a RAC-box that is connected to the RTR 2. The running time is calculated from the point of time the starting-pulse is received, and is finished when the competitors crosses the finish-line. The printer prints the lane number and used times. This program is designed for heats with a common-start and parted lanes.

6 PROGRAMMING AND USING THE VARIOUS PROGRAMS

Function keys

When you are in users mode of any of the programs the functionkeys have the following functions :

A-key : Paperfeed.

B-key : Failed, look at alpine-program 4,5 and 8.

C-key : Is used in special commands, look at chapter 7.

D-key : Delete last registered character.

ENTER : Finishes the input of starting numbers.

The RTR 2 will beep if you press something "wrong". "Wrong" means for example to choose the same input at the RTR 2 for two different functions. This is the same in all the programs.

6.1 Program 1. Times only

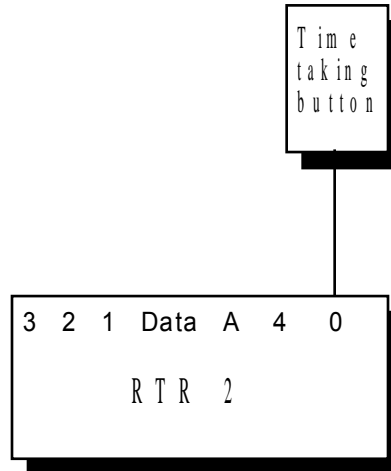
General

This program is chosen for various sports when the finish time only (and not the starting number) is to be registered.

Mounting

Only one RTR 2 and one timetaking-button are needed for timetaking, and possible one data cable if a computer is being used. For mounting-details, look at figure 6.1.1.

Figure 6.1.1. Program 1 .



Programming

Turn the Time Recorder on. After you have chosen the program (program 1) the large display shows :

Time is : 000:00

RTR 2 starts with
ENTER

The time is entered in minutes and seconds. The number of minutes range from 0 to 999. Most usually the time starts from 0 when the event starts. In cross country, the first start is often 11.00.30. The organizers then want the time to be 0 at 11.00.00. If the RTR 2 should display time 0.00 at 11.00.00, and is started at 10.30, type 970.00. Press ENTER exactly at 10.30.00. If you want to start the RTR 2 from 0.00, just press ENTER directly. The delete key D can be used to correct the time typed (before ENTER is pressed).

When the RTR 2 has been started the large display shows the running time, for example :

Time is : 23:29

The printer writes :

TIMES ONLY

The RTR 2 is now ready for use.

Users mode

The timetaking-button is pressed once each time a runner passes the finish line. The finish time is printed in minutes, seconds and 1/100 seconds. Every time is also numbered, starting from 1. This makes it possible to tell how many runners that have passed the finish line. The information at the printer, from left to right, is : The letter M (means finish time, not start-or intermediate time), thereafter the "number at the finish line" and to the far right the time in min.,sec.,1/100sec.

M	1	25:12.17
M	2	25:15.31
M	3	25:20.09

Pull out some blank printerpaper before tearing it off. Use the A-key once after tearing off the printerpaper to avoid partly overlapping of the first two lines.

It is also possible to number each "tear-off". Type 0000 followed by ENTER before tear-off. A status line is then printed :

K=00 SYNC= 1 SUM= 3

The SYNC-number informs about how many times you have synchronized, or teared off the printer paper. The SUM is the total number of times taken. Notice that after synchronizing (0000 + ENTER), the numbering of the times starts again with 1.

6.2 Program 2. Starting numbers and times

General

In this program both starting numbers and times are recorded. The RTR 2 makes pairs of starting numbers and times, and prints out each pair. It is most commonly used in cross country, orienteering, exercise runs and bicycling. The program is relevant for interval start as well as mass start (common start).

In this program the RTR 2 does not calculate and print out the time taken (split time). Most often program 2 is used when a computer is connected to the RTR 2. The computer program will then do all the necessary calculations, and print the result-lists.

For timetaking in exercise runs, orienteering and cross-country it is practical to use one or more chutes at the finish. The finishline and the timetaking are at the entrance of the chute. The registration of the starting numbers is at the exit of the chute. There should always be a back-up system both for timetaking and for number registration.

The Regnly Time Recorder RTR 2 is used as the main timetaker. The timetaking-button is placed at the finish-line and times are transfered via the synchronizing-box to the RTR 2, that is placed at the exit of the chute. Here the starting numbers are registered, either by typing them at RTR 2's keyboard, or possibly by using a barcode-reader that is connected directly to the RTR 2. The RTR 2 prints pairs of times / starting numbers at the printer, and sends the same information to a computer (PC).

A printing clock should be used as a back-up clock. The controlcard is used as a back-up for the starting numbers. The controlcards are tread continuously on a nail or placed in a box.

Manning

We suggest the following manning per chute : two timetakers, one queue-arranger, one RTR 2-operator, two helpers and one synchronizing-person, seven persons altogether.

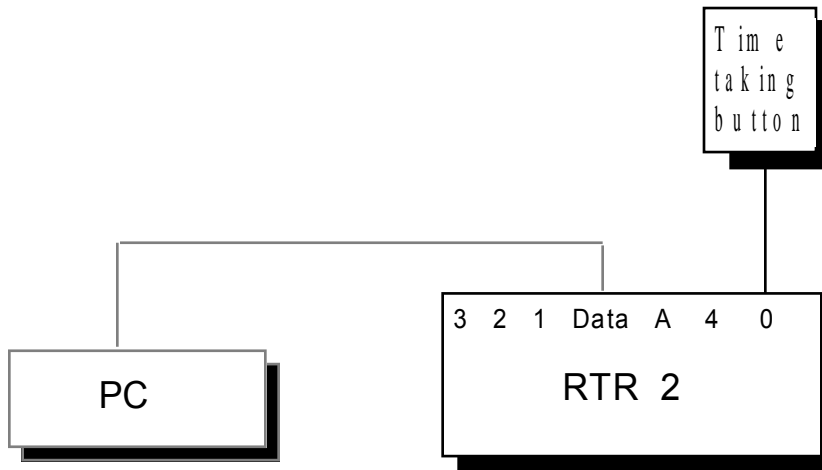
The helpers take the controlcards and file them on a nail or in a box. The synchronizing-person splits the arrangement into smaller units. Every time he passes the chute the RTR 2 has emptied possibly wrong registrations of times or starting numbers. The synchronizing-person tears off the back-up clock's print-out, takes his own time at the synchronizing-box, follows the stream of runners through the chute, and makes sure that his starting number (00) is registered by the RTR 2-operator. The RTR 2 will then print a status line. The RTR 2's print-out is teared off and tread at the nail together with the back-up clock's print-out.

Mounting

For timetaking one RTR 2, one timetaking-button, and one synchronizing-box with an extension cable (if long finish-chutes are being used) are needed. If a computer is being used you'll also need a datacable. For mounting-details, look at figures 6.2.1., 6.2.2. and 6.2.3.

If the timetakers are standing close to the RTR 2-operator, the timetaking-button is connected directly to "0/STOP", look at figure 6.2.1.

Figure 6.2.1. Program 2 . Cross-country.



In orienteering and exercise runs the time is usually taken at the finish line, 10-25 m before the starting number is recorded. The runners are then guided through a narrow chute after their times has been registered. In such cases an extension cable with a synchronizing-box is needed, look at figures 6.2.2. and 6.2.3.

Figure 6.2.2. Program 2 . Orienteering/exercise runs.

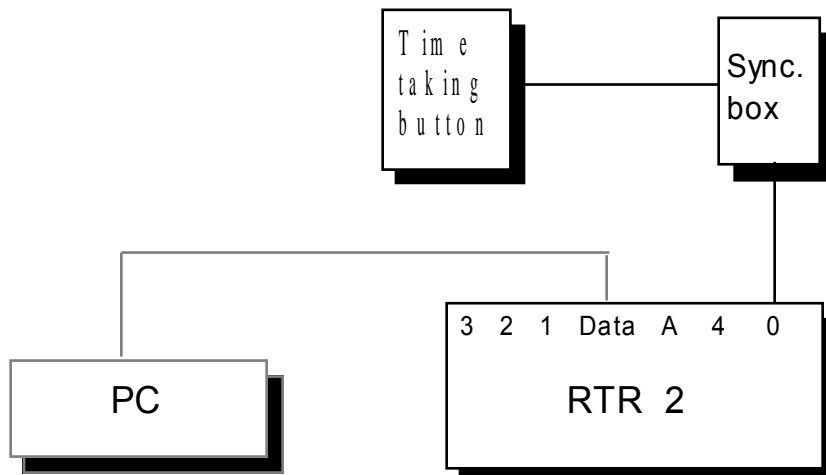
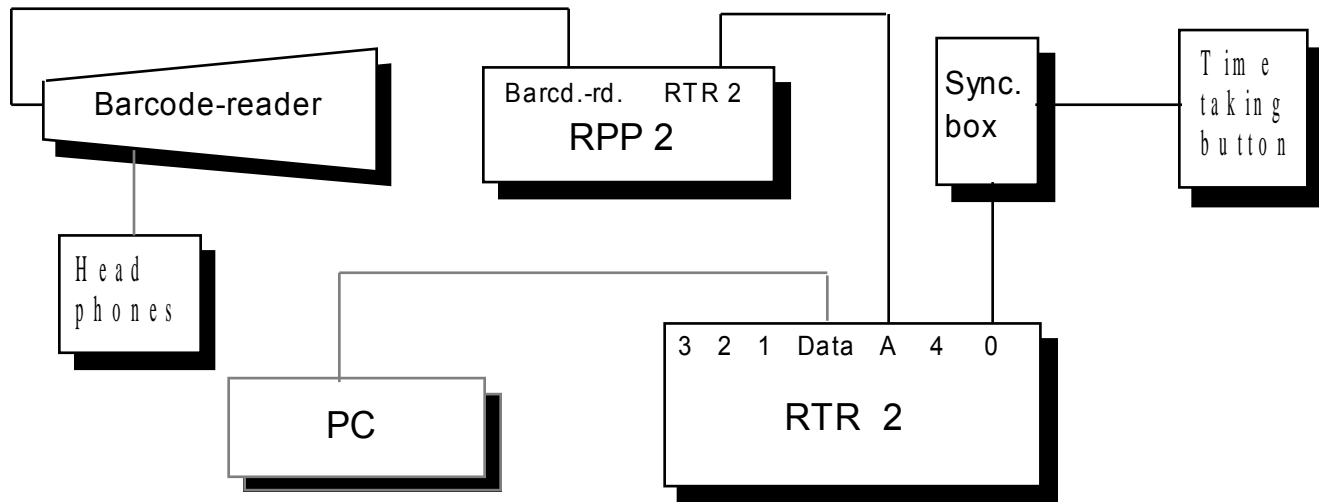


Figure 6.2.3. Program 2 . Orienteering/exercise runs.
Here we're using a barcode-reader for reading the starting numbers.



Programming

Turn the Time Recorder on. When program no.2 is chosen, the large display shows :

Time is : 000:00

RTR 2 starts with
ENTER

The time is entered in minutes and seconds. The number of minutes range from 0 to 999. Most usually the time starts from 0 when the event starts. In cross country, the first start is often 11.00.30. The organizers then want the time to be 0 at 11.00.00. If the RTR 2 should display time 0.00 at 11.00.00, and is started at 10.30, type 970.00. Press ENTER exactly at 10.30.00. If you want to start the RTR 2 from 0.00, just press ENTER directly. The delete key D can be used to correct the time typed (before ENTER is pressed).

Time is : 10:25
Startno:
Unpaired st.no : 0
Unpaired times : 0

The printer writes : "Startnumbers and times". The RTR 2 is now ready for use.

Users mode

The timetaking-button is pressed once each time a person passes the finish-line.

The starting number is entered via the keyboard, either by reading the breast-number or by means of the runners' starting card (control card). The number is presented in both displays. Press ENTER. The starting number is then stored in the RTR 2 and at the same

time erased from the displays. It is also possible to read the starting number with a barcode reader, which should be connected to the RTR 2's "A"-input. Avoid bright sunlight at the barcode-label while it is being read.

The order in which times and starting numbers are entered is indifferent. The printer writes pairs of starting numbers and times. This means that at least one time and one starting number must have been registered before the printer presents any output.

Normally times are taken before starting numbers are entered. When a time is taken, the number of unpaired times is increased with one in the large display. Each time a starting number is entered, the number of unpaired times is reduced with one. If seven times have been taken, and two starting numbers have been entered (no. 23 and 24), the large display will show :

```
Time is :           15:36
Startno :
Unpaired st.no:     0
Unpaired times :    5
```

And the printer has written :

```
M      23      13:42.19
M      24      13:58.43
```

When all times and all starting numbers have been registered, both the number of unpaired times and unpaired startnumbers should be 0.

Synchronizing

Synchronizing is a way to split the event into smaller parts. This opens for the possibility to start on scratch in pairing times and starting numbers, in case the timetaker or the RTR 2-operator has made a mistake. There are two routines for synchronizing, quatro-zero and double-zero (synchronizing with a synchronizing-box).

Quatro-zero (cross-country): The synchronizing-box is not being used. This method is used when the finish-area is empty (a gap between the runners), and all times and starting numbers have been registered. Normally the large display will then indicate 0 for the number of unpaired times and starting numbers. If the timetaker or the RTR 2-operator have made a mistake, the large display will indicate that one or more times or starting numbers are unpaired.

Synchronizing (quatro-zero) is obtained by typing 0000 and then ENTER.

If the pairing of starting numbers / times is correct, the printer just writes a status line. In the example below, three times have been taken and three starting numbers have been entered before quatro-zero was done. Then the complete print-out is :

```
M      23      13:42.19
```

```
M      24      13:58.43
M      27      14:04.81
K=00 SYNC= 1 SUM= 3
```

SYNC=1 indicates that this is the first synchronizing. SUM=3 indicates that a total of three starting numbers have been registered.

If there are any unpaired times or starting numbers, the printer will write those first, and then the status line. If two times are unpaired, the printer writes :

```
M - - - -      18:55.04
M - - - -      19:05.37
K=00 SYNC= 2 SUM= 3
```

SYNC= 2 indicates that this is the second synchronizing, SUM= 3 indicates that no new starting numbers have been registered since the preceding synchronizing.

Double-zero (with a synchronizing-box) : This synchronizing method is used when the chute never or rarely is empty. This happens most often in orienteering events and in exercise runs. In these arrangements the time is taken long before the starting number is registered. The runner then moves in a narrow chute (no by-passing) from the time is taken to the starting number is registered. When using this method the synchronizing-box with 25 meters of extension cable is being used. The timetaking-button is connected to the synchronizing-box.

When you want to synchronize (whenever there's a gap between the runners) the "synchronizer", or the zero-man as we will call him, enters the chute. He has a waistcoat with the starting number 00. None of the two timetakers (main RTR 2 timetaker and back-up timetaker) take the zero-man's time. The zero-man takes the time print-out paper from the back-up clock, takes his own time with the button on the synchronizing-box, and walks through the chute along with the runners. At the chute's other end, he checks that the RTR 2-operator types his starting number 00 + ENTER. Then he puts the paper-slip from the back-up clock on the "nail" on top of all the runners startcards, and the RTR 2-operator does the same thing with the paper-slip from the RTR 2. Then the zero-man goes back to his position at the entrance of the chute.

If the pairing of times and starting numbers are correct, the printer just writes a statusline :

```
K=00 SYNC= 3 SUM= 10
```

This message indicates that synchronizing has been made three times and that 10 starting numbers have been registered.

Remember that the RTR 2 must have both the starting numbers and the times entered before the pair can be written. If there are any unpaired times or starting numbers in the RTR 2, the situation is a little different. Let's assume that there are some times that are unpaired when the zero-man arrives. When the RTR 2-operator types 00+ENTER these times will be written before the statusline :

```

M ----- 22:45.16
M ----- 23:01.77
K=00  SYNC= 4  SUM= 10

```

SUM is still 10 because no more starting numbers have been registered.

If more starting numbers have been registered than times, the RTR 2 beeps a warning. Then the RTR 2-operator should check if the zero-man is inside the chute. If he isn't inside the chute, the RTR 2-operator should tell the zero-man to go through the chute as soon as possible. The printer will not give a print-out when the starting number is registered. This is because the RTR 2 doesn't have a time to pair the starting number with. If another starting number is registered, the RTR 2 will not beep, and the printer will not give a print-out.

Then we make a double-zero (after two unpaired starting numbers has been registered). The print-out is :

```

M      26      -----
M      27      -----
K= 00  SYNC= 4  SUM=12

```

After the double-zero has been made, the RTR 2's memory is clear again.

As soon as the zero-man has taken the back-up slip and taken his own time, new runners can be allowed to pass through the chute behind him. However, the zero-man must keep his place in the queue. At the moment the RTR 2-operator types 00+ENTER and registers the zero-man, the large-display will show the number of unpaired times. This is the number of runners that have got their times registered and are standing behind the zero-man in the chute. If the zero-man presses the synchronizing-box button twice before the RTR 2-operator types 00+ENTER, the time for the first synchronizing is written as an unpaired time. At the same time all the pairs of starting numbers / times up to the next synchronizing will be written. It has no effect if 00+ENTER is typed without the synchronizing-box button has been pressed.

6.3 Program 3. Programmable classes.

General

In the Program mode the class information is keyed in : The first starting number in each class, the first starting time and the starting interval. In users mode RTR 2 calculates and prints the time taken (split time) for each participant.

Program no. 3 is normally used when "split times" (used times) are wanted and a computer is not available. This program is, as program no. 2, used for sports with interval start or mass start, such as cross-country, orienteering, exercise runs and bicycling.

Mounting

For timetaking one RTR 2 and one timetaking-button are needed in cross-country arrangements. One synchronizing-box is also needed in orienteering- and exercise runs-arrangements. For mounting details, look at figures 6.3.1. and 6.3.2.

Figure 6.3.1. Program 3 . Cross-country

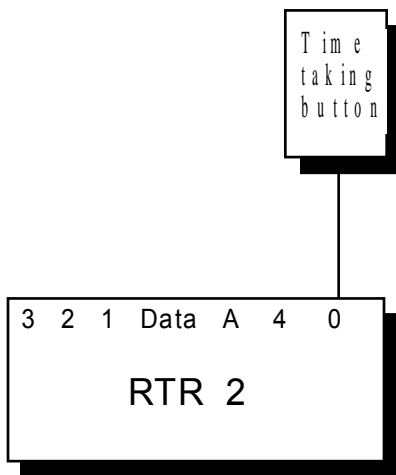
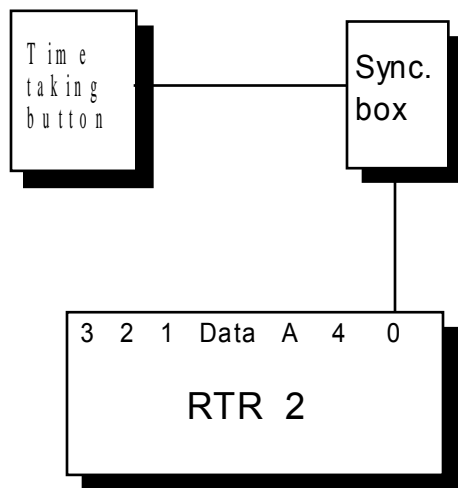


Figure 6.3.2. Program 3 . Orienteering/exercise runs.



Programming

Turn the Time Recorder on. Choose program no. 3. While programming type the class-information for every class : 1. starting number, 1. starting time, and starting interval. In the users mode RTR 2 calculates the used time for all the runners.

The large display presents the text :

1. Startno:

Type the first starting number (for example number 1, which then pops up to the right) and then ENTER. The next question is :

1. Start time: 000:00

With starting time we mean the time in minutes and seconds after the official clock is zero. If RTR 2 is to present zero time at 11.00.00, and the first start is at 11.00.30, then type 00030. The time displayed is 0:30. Press ENTER. The next question concerns the starting interval :

Interval : 0:00

Type the starting interval in minutes (one character) and seconds. With 30 seconds starting interval, type 030. Press ENTER. The next question is :

More classes ?

Yes - Type 1

No - Type 0

Choose :

If you want to have more than one class, type 1 and ENTER. Then you will have to start over again with the 1. starting number, etc for the other classes. Finally, type 0+ENTER when all classes are dealt with. The next menu is :

Double start ?

Yes - 1

No - 0

Choose :

Answer Yes if you want to have a double starts arrangement. At last the "time menu" is presented :

Time is : 000:00

RTR 2 starts with

ENTER

The time is entered in minutes and seconds. The number of minutes range from 0 to 999. Most usually the time starts from 0 when the event starts. In cross country, the first start is often 11.00.30. The organizers then want the time to be 0 at 11.00.00. If the RTR 2 should display time 0.00 at 11.00.00, and is started at 10.30, type 970.00. Press ENTER exactly at 10.30.00. If you want to start the RTR 2 from 0.00, just press ENTER directly. The delete key D can be used to correct the time typed (before ENTER is pressed).

Users mode

When the RTR 2 has been started with ENTER, the printer writes the class overview that we programmed earlier :

Programmable classes

```
1   0:30   0:30
100 30:00  1:00
```

The top line "Programmable classes" states that this is program no. 3. The second line means : For class number 1 the first starting number is 1, the first starting time is 30 seconds past, and the time interval is 30 seconds. The third line means : For class number 2 the first starting number is 100, the first starting time is 30 minutes past, and the time interval is 1 minute.

These two classes have the following first starting number, first starting time, and starting interval :

Class	1. startno.	1. start time	Interval
1	1	0:30	0:30
2	100	30:00	1:00

The large display picture is alike to the one we had in program number 2. The way of using the RTR 2 is just as in program number 2. The only difference is that the printer also writes out the used time (split time) for each runner.

As an example, let's use an event with the two classes mentioned above. The time has been taken for starting numbers 5, 8 and 6, being the three first runners at the finish. The starting numbers are typed, and finally we do a quatro-synchronizing. Then the print-out is :

```
M   5   0:43:50  46:20.84
M   8   0:42:25  46:25.80
M   6   0:43:29  46:29.56
K=00  SYNC= 1  SUM= 3
```

6.4 Program 4. Alpine with eksternal units

General

This program is a general alpine-program that covers all the needs within alpine timetaking. Up to three intermediate times can be taken, there can be more than one competitor in the track at the same time, and it is possible that the competitors passes each other.

All the places where times are taken a starting number is also registered to ensure the right pairing of times / numbers. The finish time and the corresponding starting number at the finish are transferred directly to the RTR 2. The starting time, the intermediate times and the corresponding starting numbers are transferred via a RAC-box to the RTR 2. The RAC-box has 10 inputs. Two inputs, one for times and one for starting numbers, are used everywhere a time is registered. Consequently the starting time and three intermediate times occupies eight inputs. Times may be taken with a starting gate, a photocell, or a timetaking-button. The starting number is typed using a Regnly Keypad, RKP, except at

the finish-line where the starting number is typed directly into the RTR 2. The RKP's are connected to the RAC-box.

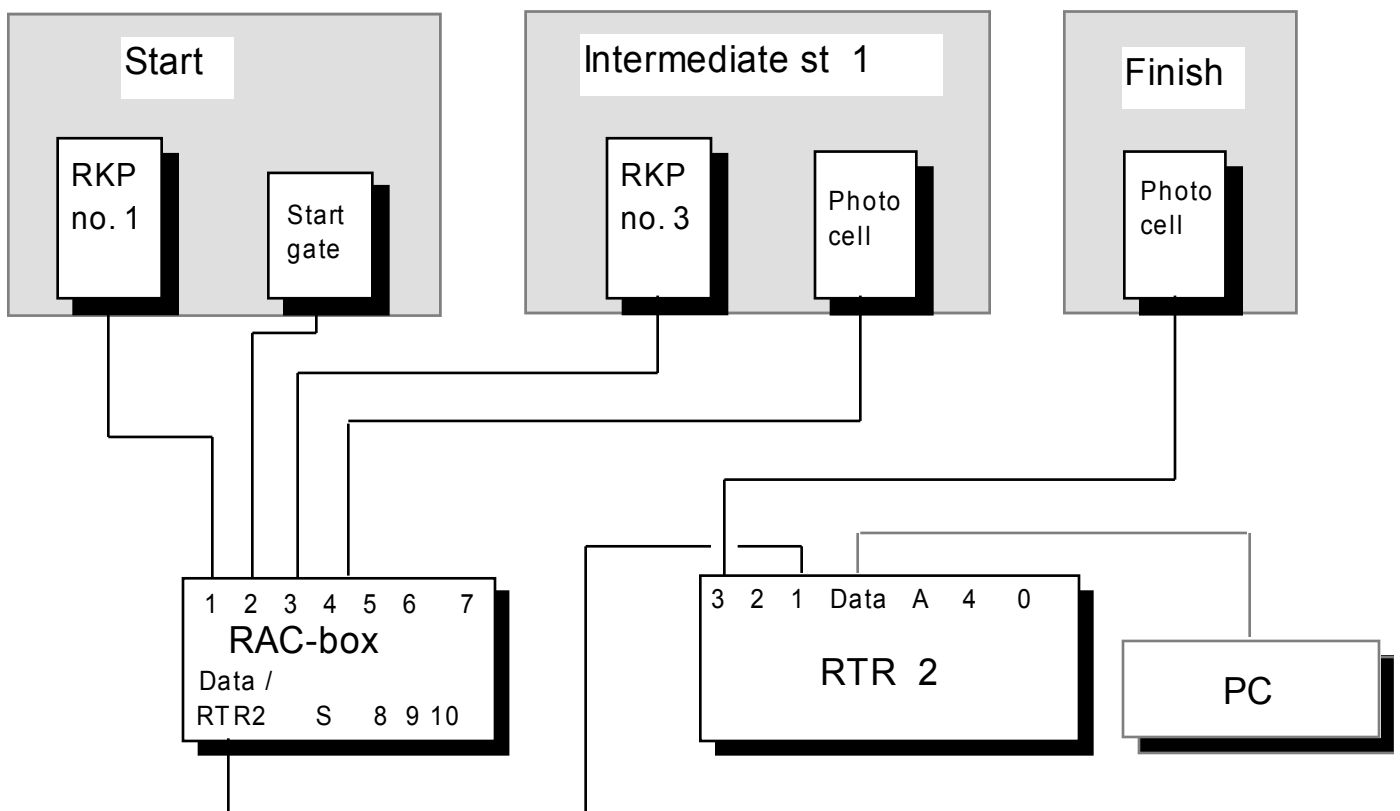
Mounting

For timetaking one RTR 2, one RAC-box, one timetaking-unit (starting gate, photocell or timetaking-button) per timetaking-station (start, intermediate station or finish), and one RKP for the starting station and each intermediate station. A data cable is also needed if a computer is being used.

Physically the RTR 2, the RAC-box and the RKP's are in the secretariat. The RKP operators have communication with the personnel at the corresponding timetaking-station. For mounting-details, look at figure 6.4.1. Connect the battery-charger to the RAC-box and plug it in the light circuit. (It will pull through without electricity if a power failure occurs). Turn on the RAC-box. The RKP's display shows : 1.01 (version-number), 16.11.89 (date) and then "no." succeeded by a number. If the number is 01 (keypad number 1), press SEND. The display shows 0 and is ready for use. If the numbers differs from 01, press SLETT (the keypad shows "no. 00"), and then 1 followed by SEND. The display shows 0 and is ready for use. The same procedure is used for the other RKP's.

Turn on the RTR 2 and carry through with the programming described below. When the RTR 2 is in its users mode, at least 15 seconds have to pass before times can be transferred via the RAC-box. The RAC-box will make a faint ticking sound when it is ready.

Figure 6.4.1. Program 4. Alpine with external units.
Here we're using one intermediate station.
The personnel at the start and the intermediate station must have communication with the operators of the RKP's and the RTR 2.



All the pairs of times / starting numbers will be written with an identification that describes what kind of time it is. The printer also writes the used times. The information may be transferred to a computer, if a computer is connected to the RTR 2.

Programming

Turn the Time Recorder on. When program no.4 is chosen, the large display shows :

Recording

no. / times at start

2 - RAC 3 - RTR 2

Choose unit:

The information concerning the starting numbers and the times can be send from the RAC-box or from another RTR 2. Normally, the first option will be the one you choose. We type 2+ENTER. Next question is :

Choose input for
connection to
RAC unit :

Here, choose which one of the RTR 2's inputs the RAC-box will be connected to. We choose input 1. Type 1+ENTER. Next option is :

Choose RKP-no for
recording
startno. at
start :

The RAC-box has 10 inputs. We start by choosing input 1. Type 1+ENTER. This means that the RKP-unit connected to input 1 must be "named" (programmed) number 1. Next option is where the corresponding starting time should be connected :

Choose RAC-input
for recording
times at
start :

We choose input 2. Type 2+ENTER. Next option is how many intermediate stations that should be used. We choose to use one intermediate station. Type 1+ENTER. Next question is about where the starting numbers and the times from the intermediate station(s) should be lead.

2 - RAC 3 - RTR 2

Choose unit for
rec. of no./times
at intermed. pos :

We choose to use the RAC-unit. Type 2+ENTER. Next question is what number the

RKP-unit, used for typing the starting numbers at intermediate station 1, should have.

Choose RKP-no. for
recording
startno. at
intermed. station:

We choose number 3, and connect this RKP-unit to input 3 at the RAC-box. Type
3+ENTER.

Choose RAC-input
for recording
times at
intemed. station:

Now, we choose the input for the corresponding intermediate time. Type 4+ENTER.
Then the RTR 2 asks what input it should use for the finish times.

Choose input on
RTR for recording
times
at finish line:

We choose input 3. Type 3+ENTER. Are the finish times taken by a timetaking-button or
by a photocell ?

1 - Button
2 - Photo cell
Choose unit for reg
of times :

In our case a photocell is being used. Type 2+ENTER. Finally the RTR 2 asks about the
arrangement time :

Time is : 000:00

RTR 2 starts with
ENTER

In alpine arrangements the real time is seldom interesting. Normally, just type ENTER,
and the time starts at 0. If another starting time is wanted, type this time by using three
numbers for minutes and two for seconds. In our case we only press ENTER. The large
display shows the running time in the upper right corner. The printer writes :

ALPINE

The RTR 2 is now ready for use.

Users mode

Imagine that communication is established (possibly with Regnly communication) between the start, the intermediate station(s), the RKP-operators and the RTR 2-operator.

Normally, the RTR 2-operator will be the one who decides when the next competitor can start. The RTR 2-operator asks if everything is ready at the start. If this is confirmed, he asks the first competitor to get ready. The starter confirms that starting number 1 is getting ready. The RKP-operator 1 (for the start) types 1, but not SEND yet. The starter says that starting number 1 is starting now. The RKP-operator 1 types SEND. Immediately the printer writes the starting time at the same time as it is transferred to a computer (if a computer is connected). The printer writes :

S 1 8:06.51

The large display shows the running time for starting number 1.

1 0:03

The RTR 2-operator wants to start new competitors every thirty seconds. He tells the next competitor to get ready. The starter confirms that this is starting number 2, and the RKP-operator types 2. The starter says that starting number 2 is starting now. The RKP-operator presses SEND. The printer writes :

S 2 8:37.37

The large display shows the running time for both starting number 1 and 2 :

1 0:37
2 0:06

The RTR-operator tells the next starting number to get ready. The starter confirms that starting number 3 is ready. The RKP-operator types 3. But before starting number 3 crosses the starting gate, starting number 1 passes the first intermediate station. The printer writes the intermediate time and the moment the passing was made.

M1 0:59.53 9:06.04

M1 indicates that this is the first intermediate station (finish time is stated by a M). The large display shows :

1 0:59.53 1:01
2 0:31

The starter reports that starting number 3 is starting now, the RKP-operator presses SEND. The printer writes :

S 3 9:07.80

The display shows :

1	0:59.52	1:08
2		0:38
3		0:08

After starting number 1 has passed the finish line and starting number 2 has passed the first intermediate station, the printer writes :

M	1	1:27.57	9:35.43
M1	2	0:58.05	9:36.92

After starting number 4 has started and starting number 2 has passed the finish line, the large display shows :

2	0:58.05	1::26.87
3		0:57
4		0:27

Consequently, the display shows the status for the last three competitors.

Special functions

Time without a starting number / starting number without a time

If a starting number is registered alone (without a time), the "unpaired" starting number will be written after a delay of 10 seconds. If a time is registered alone (without a starting number), the time will be written after a delay of 10 seconds. This is the same at the start, the intermediate station(s), and at the finish.

If two times have been registered without any starting number in between them, the first unpaired time will be written immediately (without a starting number). The second time will be paired with the starting number, as long as this starting number is registered within 10 seconds. Accordingly, if two starting numbers are registered without any times being registered, the first starting number will be written alone without a time. The second starting number will be paired with the next time, as long as this time is registered within 10 seconds.

Emptying of the RTR 2

If one or more persons have got wrong times and/or starting number, it is possible to hold back the next starting number until all competitors that are in the track at the moment have passed the finish line. Then type 0000+ENTER and all the times/starting numbers in the RTR 2 are emptied. After this the next competitor can start and the RTR 2 is ready again.

6.5 Program 5. Alpine without external units.

General

This program is mainly used for simple alpine-arrangements. With simple alpine-arrangements we mean competitions (preferably) without intermediate stations, and where the organizers have a good chance to control that the public don't make many false finish line (photocell) signals.

In the following it is assumed that communication is established between the RTR 2-operator and the starter, possibly with Regnly communication (that uses the same pair of cables as the starting signal).

Mounting

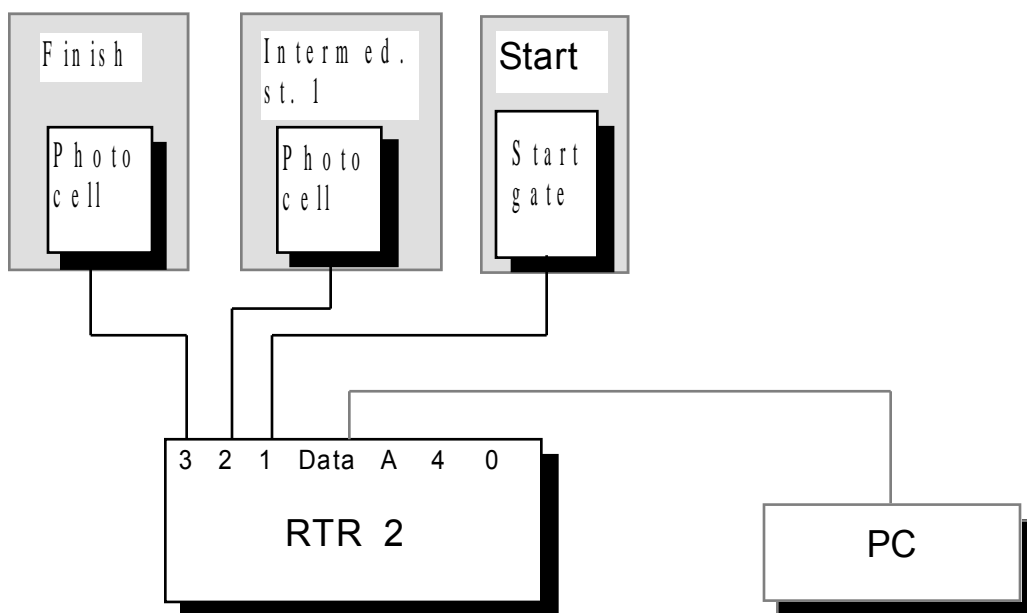
For timetaking one RTR 2, one starting gate and one photocell/timetaking-button for the finish line are needed (possibly a photocell or a timetaking-button from a intermediate station). A datacable is also needed if a computer is being used. For mounting-details, look at figure 6.5.1.

Figure 6.5.1. Program 5. Alpine. Simple program .

Here we're using one intermediate station.

The times are taken with photocells. Time-taking buttons can also be used.

The starter and the operator of the RTR 2 must have communication with each other.



Programming

Turn the Time Recorder on. When program no.5 is chosen, the large display shows :

Choose input on
RTR for recording
times
at start :

The question is which one of RTR 2's inputs we should use for the starting gate cable.
You are free to choose from input 1, 2, 3 or 4. We choose 1. Type 1+ENTER.
Next question is :

1 - Button
2 - Photo cell
Choose unit for reg.
of times :

Normally the starting times are taken with a starting gate. This works in the same way as a
timetaking-button. We type 1+ENTER. Next question is :

Number of
intermed. times :

We choose to have one intermediate station. Type 1+ENTER. Next picture is :

Choose input on
RTR for
recording
intermed. times:

We choose to use input 2. Type 2+ENTER. Next question is :

1 - Button
2 - Photo cell
Choose unit for reg.
of times :

Here, we can choose if we want to take the intermediate time with a timetaking-button or a
photocell. We type 1+ENTER. The large display shows :

Choose input on
RTR for recording
times
at finish line:

We used input 1 for the starting signal and input 2 for the intermediate time. Inputs 3 and
4 are free to use. We choose input 3 for the connection of the finish line photocell. Type
3+ENTER. The next question is :

1 - Button

2 - Photo cell

Choose unit for reg.
of times :

This time we choose to use the photocell. Type 2+ENTER. Finally the RTR 2 asks about the arrangement time :

Time is : 000:00

RTR 2 starts with
ENTER

In alpine arrangements the real time is seldom interesting. Normally, just type ENTER, and the time starts at 0. If another starting time is wanted, type this time by using three numbers for minutes and two for seconds. In our case we only press ENTER. The large display shows the running time in the upper right corner. The printer writes :

ALPINE

The RTR 2 is now ready for use.

Users mode

Imagine that communication is established (possibly with Regnly communication) between the starter and the RTR 2-operator. Normally, the RTR 2-operator will be the one who decides when the next competitor can start. The RTR 2-operator asks if everything is ready at the start. If this is confirmed, he asks the first competitor to get ready. The starter confirms that starting number 1 is getting ready. The RTR 2-operator types 1, but not ENTER yet. The starter says that starting number 1 is starting now. The RTR 2-operator presses ENTER. Immediately the printer writes the starting time at the same time as it is transferred to a computer (if a computer is connected). The printer writes :

S 1 8:06.51

The large display shows the running time for starting number 1.

1 0:03

The RTR 2-operator wants to start new competitors every thirty seconds. He tells the next competitor to get ready. The starter confirms that this is starting number 2, and the RTR 2-operator types 2. The starter says that starting number 2 is starting now. The RTR 2-operator types ENTER. The printer writes :

S 2 8:37.37

The large display shows the running time for both starting number 1 and 2 :

1	0:37
2	0:06

The RTR-operator tells the next starting number to get ready. The starter confirms that starting number 3 is ready. The RTR 2-operator types 3. But before starting number 3 crosses the starting gate, starting number 1 passes the first intermediate station. The printer writes the intermediate time and the moment the passing was made.

M1	0:59.53	9:06.04
----	---------	---------

M1 indicates that this is the first intermediate station (finish time is stated by a M). The large display shows :

1	0:59.53	1:01
2		0:31

The starter reports that starting number 3 is starting now, the RTR 2-operator presses ENTER. The printer writes :

S	3	9:07.80
---	---	---------

The display shows :

1	0:59.52	1:08
2		0:38
3		0:08

After starting number 1 has passed the finish line and starting number 2 has passed the first intermediate station, the printer writes :

M	1	1:27.57	9:35.43
M1	2	0:58.05	9:36.92

After starting number 4 has started and starting number 2 has passed the finish line, the large display shows :

2	0:58.05	1::26.87
3		0:57
4		0:27

Consequently, the display shows the status for the last three competitors.

Special functions

A competitor fails

If a competitor fails and doesn't reach the finish of the track, type his starting number + B. The printer writes (if starting number 5 fails) :

B 5 -----

Uncouple (unpairing) a competitor's finish time/starting number

If the finish-line is crossed by someone that is not in the competition (organizers, public, etc.), the time that is taken will be paired with the next incoming competitor. To remove this unwanted time type 00+ENTER. Let's assume that starting number 10 was paired with an unwanted finish time. By typing 00+ENTER, the running time for starting number 10 will proceed at the display. The printer writes :

N 10 -----

When starting number 10 passes the finish line, the correct time will be paired with this competitor.

Emptying of the RTR 2

If one or more persons have got wrong intermediate times, or their times and/or starting number are wrong, it is possible to hold back the next starting number until all competitors that are in the track at the moment have passed the finish line. Then type 0000+ENTER and all the times/starting numbers in the RTR 2 are emptied. After this the next competitor can start and the RTR 2 is ready again.

Time without a starting number / starting number without a time

If the starter lets a competitor start without registering his starting number, the "unpaired" time will be written after a delay of 10 seconds. If a starting number is registered alone (without a time), the starting number will be written after a delay of 10 seconds.

If two times have been registered without any starting number in between of them, the first unpaired time will be written immediately (without a starting number). The second time will be paired with the starting number, as long as this starting number is registered within 10 seconds. Accordingly, if two starting numbers are registered without any times being registered, the first starting number will be written alone without a time. The second starting number will be paired with the next time, as long as this time is registered within 10 seconds.

6.6 Program 6. Cross-country with eksternal units.

Mounting

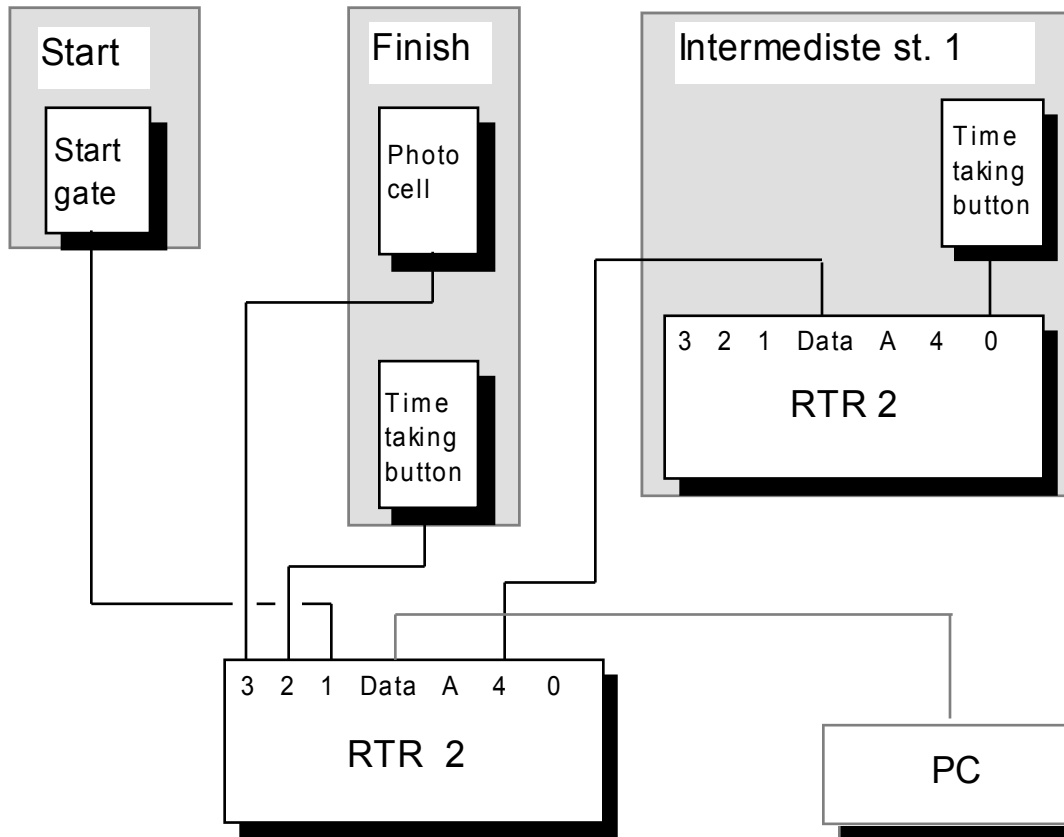
For timetaking one RTR 2, one starting gate, (one RKP-keypad, one RAC-box), and one photocell and/or timetaking-button are needed. A datacable is also needed if a computer is being used.

This program can be used in two different ways. For mounting-details, look at figure 6.6.1., method 1 and 2.

Figure 6.6.1. Program 6. Cross-country with starting gate, photocell and one intermediate station.

Here we're using a starting gate and another RTR for the intermediate station.

Method 1: At the start only starting times are registered.

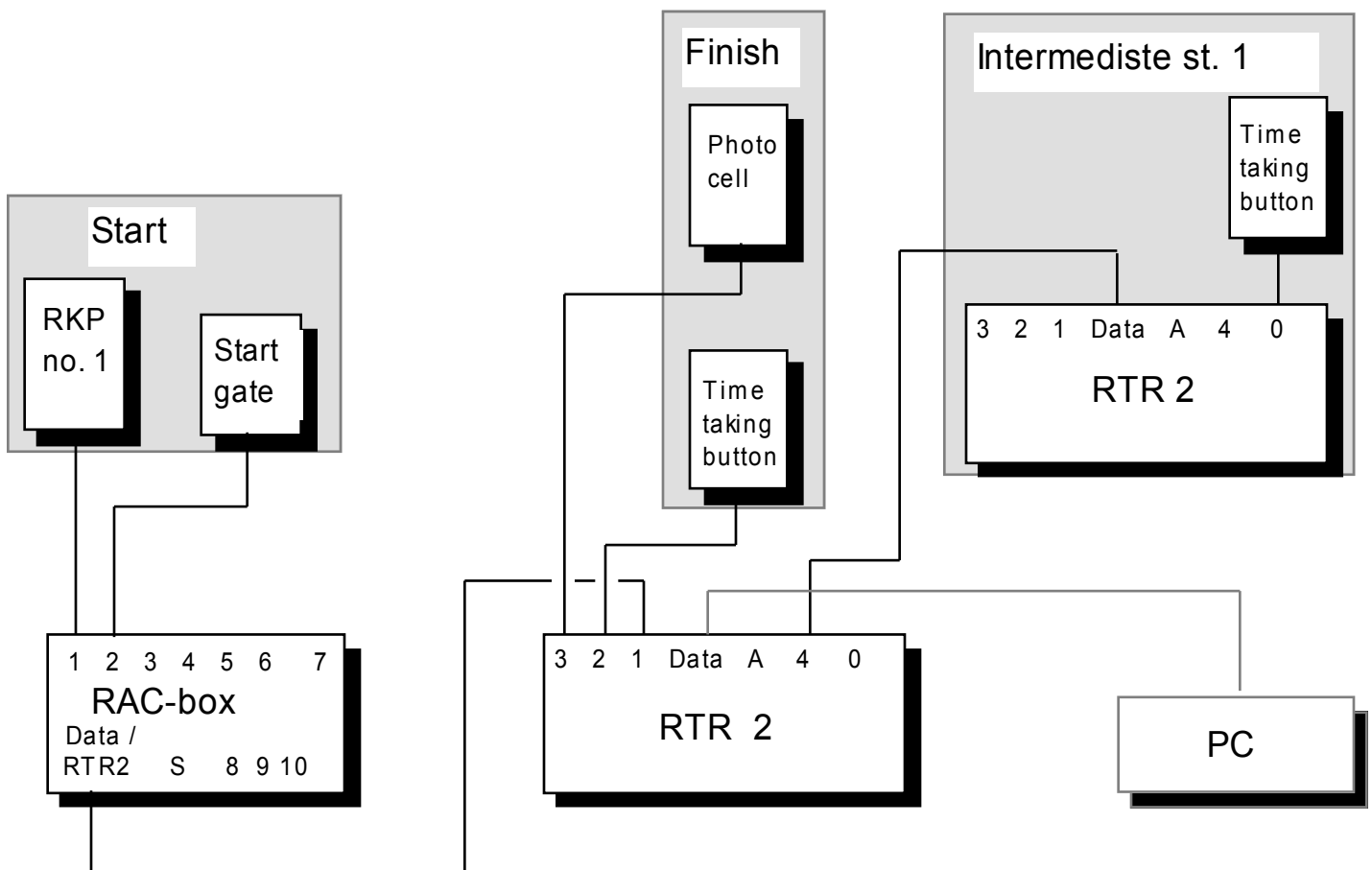


In program 6 there are three alternatives for timetaking at the finish line :

- 1 Timetaking-button
- 2 Photocell
- 3 Timetaking-button and photocell

If you choose to use a photocell you must know about the limitations a photocell involves. If two competitors come closer than 0.35 seconds to each other they will be registered as one competitor. If you choose to use one of the two first choices, the timetaking-button/photocell are connected directly to the RTR 2, via input 1. The third choice is the best one. Both a photocell and a timetaking-button are being used here, and they both are connected to a different input (for example input 2 and 3). In most cases where there is doubt if the photocell will register all the competitors, the timetaking-button will be used in addition. The timetaking-button has a higher priority than the photocell. This means that when both the timetaking-button and the photocell are being used, the timetaking-button time is the one that counts. The RTR 2 makes a time-gap of +/- 0.5 seconds around the photocell time. If a time is taken with the timetaking-button inside this time-gap, the timetaking-button time will be the one that counts.

Method 2: At the start both the times and the starting numbers are registered.



All units are connected as shown in figure 6.6.1., method 1 or 2. In method 2 the RAC-box's battery charger must be connected to the light circuit. (It will pull through without electricity if a power failure occurs). Turn on the RAC-box. The RKP's display shows : 1.01 (version-number), 16.11.89 (date) and then "no." succeeded by a number. If the number is 01 (keypad number 1), press SEND. The display shows 0 and is ready for use. If the numbers differs from 01, press SLETT (the keypad shows "no. 00"), and then 1 followed by SEND. The display shows 0 and is ready for use.

Turn on the Time Recorder and proceed with the programming described below. When RTR 2 is in its users mode, at least 15 seconds must pass before times can be transferred through the RAC-box. The RAC-box will make a faint ticking sound when it is ready. Then one of the two indicator-lights will flick every 15 seconds.

The RTR 2 doesn't calculate used times, for the printer, in program 6.

Programming

Turn the Time Recorder on. When program no.6 is chosen, the large display shows :

Registration of
starting times ?

Yes - 1

No - 0 Choose:

Do you have electronic timetaking (a starting gate) at the start ? If you answer No, the

next question will be concerning if you have any intermediate stations, look below. If you answer Yes, next question is :

Input of no./times

at start 1 - Direct

RTR (times only) 2- RAC

3- Ext RTR

Choose:

Here, you must choose if the starting times are transferred directly to the RTR 2, if the starting times and the starting numbers are transferred via a RAC-box, or if the starting times and the starting numbers are transferred via another RTR 2. If you choose to transfer the starting times directly to the RTR 2 (method 1), the starting numbers will not be registered. Then you must have a computer program that numbers the competitors by using the starting list. Then the next question will be which one of RTR 2's inputs that should be used to register the starting times. Choose for example input 1. Then RTR 2 want to know if we are using a timetaking-button or a photocell to register the starting times. Normally a starting gate will be used (starting gate = timetaking-button). Next question is if intermediate times are to be taken, look below.

If you choose to use an extra RTR at the start, next question is which one of the main RTR 2's inputs the extra RTR should be connected to. Choose for example input 1. Next question is if intermediate times are to be taken, look below.

The most common thing to do is to use a RAC-box. Therefore, we choose to use a RAC-box. Type 2+ENTER. The large display shows :

Choose input for
connection to
RAC unit :

Here, we are to choose where the cable from the DATA / RTR 2-output on the RAC-box, should be connected to the RTR 2. We can choose from inputs 1, 2, 3, and 4. We choose tu use input 1. Type 1+ENTER. The large display shows :

Choose RKP-no for
recording
startno. at
start :

Now we must state where the keypad (RKP) should be connected to the RAC-box. You are free to choose from inputs 1 to 10. We choose to use input 1. Type 1+ENTER. (This means that this keypad must be named number 1. We have earlier described how the keypad should be programmed.) The large display shows :

Choose RAC-input
for recording
times at
start :

If input 1 (RKP-number 1) is already in use, you can choose between inputs 2 to 10. We choose to use input 2. Type 2+ENTER. Then, the RTR 2 wants to know how many RTRs we are using for the intermediate stations :

Number of RTR for
intermed. times :

We type 1+ENTER. The large display shows :

Choose input for
connection to
external RTR 2 :

Here you must choose what input that should be used to connect the external RTR (intermediate station) to the main RTR 2. We choose to use input 4. Type 4+ENTER. The next question is :

Timetaking at finish
1 - Button
2 - Photo cell
3 - Button and photo

The question is what timetaking-unit we want to use at the finish-line. We decide to use choice number 3, both timetaking-button and photocell. The large display shows :

Choose input on
RTR for
connection to
button :

Which one of the RTR 2's inputs should the timetaking-button be connected to ? We have already used inputs 1 and 4, and now we are free to choose either 2 or 3. We choose to use input 2. Type 2+ENTER. The large display shows :

Choose input on
RTR for
connection to
photo cell :

Now, RTR 2 wants to know what input the photocell is to be connected to. Only input 3 is

free to use. Type 3+ENTER. The large display shows :

Time is : 000:00

RTR 2 starts with
ENTER

The time is entered in minutes and seconds. The number of minutes range from 0 to 999. Most usually the time starts from 0 when the event starts. In cross country, the first start is often 11.00.30. The organizers then want the time to be 0 at 11.00.00. If the RTR 2 should display time 0.00 at 11.00.00, and is started at 10.30, type 970.00. Press ENTER exactly at 10.30.00. If you want to start the RTR 2 from 0.00, just press ENTER directly. The delete key D can be used to correct the time typed (before ENTER is pressed).

Time is : 10:25
Startno:
Unpaired st.no : 0
Unpaired times : 0

The printer writes : "Cross-country". The RTR 2 is now ready for use.

Users mode (We assume that you have chosen to use a RAC-box)

The recommended starting-procedure is like this : The starter says via his headset that starting number 12 is ready for start. The RKP-operator types 12. The starter says via his headset that starting number 12 is starting NOW. The RKP-operator types SEND. The RKP-display shows 0, and the RTR 2's printer writes :

S 12 06:01.46

This means that starting number 12 started at the arrangement time 06:01.46 (real time). None of RTR 2's displays show any information from the start.

The intermediate times are taken on an external RTR 2 that runs in program 2 (modus 2 on a RTR 1). At this RTR the print-outs is as usual. The pairs of starting numbers / times are also written at the main RTR 2's printer. However, the intermediate station's synchronizing is not shown at the main RTR 2's printer. A typical line is :

M1 13 15:12.89

The M1-code shows that this is intermediate station 1, and not the finish.

The finish-line procedure is alike to the one described in program 2, except that we in program 6 use both a timetaking-button and a photocell.

As a methode of synchronizing we recommend the quatro-zero synchronizing used in program 2 (look at chapter 6.2).

6.7 Program 7. Biathlon

General

The biathlon-program is being used in arrangements where Regnly keypads (RKP) are used to register the number of shooting-misses. At the start a starting gate is being used for taking the times, and the starting numbers are typed using a RKP. At the finish the times may be taken with a photocell or a timetaking-button. Intermediate times may be taken with an external Time Recorder, RTR 1 or RTR 2. This may be practical when intermediate times and finish times often are taken at different places.

In the following we assume that a starting gate is used at the start, that a photocell / timetaking-button is being used at the finish, that RKP-keypads are used for typing the misses at the shooting-stand, and that an external RTR is used at the intermediate station.

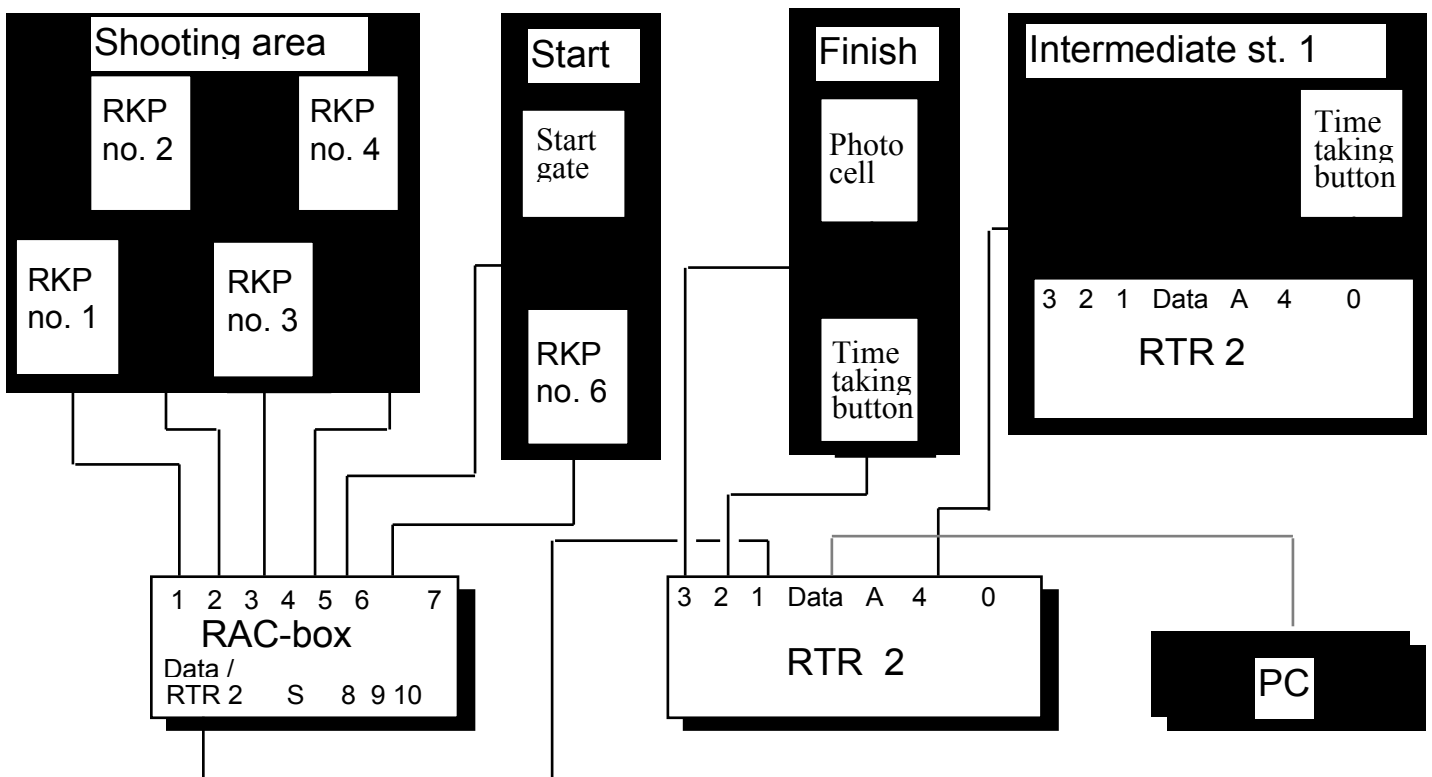
Mounting

For timetaking one RTR 2, one starting gate, one RAC-box, one photocell/timetaking-button, four-five RKP keypads, and one extra RTR for the intermediate station are needed. A datacable is also needed if a computer is being used.

All the units are connected to each other as shown in figure 6.7.1.

Figure 6.7.1. Program 7. Biathlon with typing of misses and one intermediate station.

RKP no. 1 - no. 4 are used for typing of misses at the shooting area. These keypads must be connected to RAC-input no.1 to no. 4. RKP no. 6 is used for typing the starting numbers at the start.



In program 7, as in program 6, there are three choices for timetaking at the finish-line :

- 1 Timetaking-button
- 2 Photocell
- 3 Timetaking-button and photocell

If you choose to use a photocell you must know about the limitations a photocell involves. If two competitors come closer than 0.35 seconds to each other they will be registered as one competitor. If you choose to use one of the two first choices, the timetaking-button/photocell are connected directly to the RTR 2, via input 1. The third choice is the best one. Both a photocell and a timetaking-button are being used here, and they both are connected to a different input (for example input 2 and 3). In most cases where there are doubt if the photocell will register all the competitors, the timetaking-button will be used in addition. The timetaking-button has a higher priority than the photocell. This means that when both the timetaking-button and the photocell are being used, the timetaking-button time is the one that counts. The RTR 2 makes a time-gap of +/- 0.5 seconds around the photocell time. If a time is taken with the timetaking-button inside this time-gap, the timetaking-button time will be the one that counts.

Connect the batterycharger to the RAC-box and to the light circuit. Turn on the RAC-box. The RKP's display shows : 1.01 (version-number), 16.11.89 (date) and then "no." succeeded by a number. If the number is 01 (keypad number 1), press SEND. The display shows 0 and is ready for use. If the numbers differs from 01, press SLETT (the keypad shows "no. 00"), and then 1 followed by SEND. The display shows 0 and is ready for use. As a control, when you turn on or off the RAC-box, the RKP-keypads used for the shooting stand should show 1 to 4, while the one used at the start should show 6. Press SEND on all keypads, the displays show 0 and is ready for use.

Turn on the Time Recorder and proceed with the programming described below. When RTR 2 is in its users mode, at least 15 seconds must pass before times can be transferred through the RAC-box. The RAC-box will make a faint ticking sound when it is ready. Then one of the two indicator-lights will flick every 15 seconds.

Programming

Turn the Time Recorder on. When program no.7 is chosen, the large display shows :

Choose input for
connection to
RAC unit :

In accordance to figure 6.7.1. we choose RTR 2's input 1 to connect the RAC-box to. Type 1+ENTER. Next question is :

Number of RKP-units
for reg of
startno / number
of misses Choose :

Above we assumed that four RKP-keypads should be used the to register the misses at the shooting stand. Type 4+ENTER. Next question is :

Registration of
starting times ?
Yes - 1
No - 0 Choose:

Do you have electronic timetaking (a starting gate) at the start ? If you answer No, the next question will be concerning if you have any intermediate stations, look below. If you answer Yes, next question is :

Input of no./times
at start 1 - Direct
RTR (times only) 2- RAC
3- Ext RTR Choose:

Here, you must choose if the starting times are transferred directly to the RTR 2, if the starting times and the starting numbers are transferred via a RAC-box, or if the starting times and the starting numbers are transferred via another RTR 2. If you choose to transfer the starting times directly to the RTR 2, the starting numbers will not be registered. Then you must have a computer program that numbers the competitors by using the starting list. Then the next question will be which one of RTR 2's inputs that should be used to register the starting times. Choose for example input 1. Then RTR 2 want to know if we are using a timetaking-button or a photocell to register the starting times. Normally a starting gate will be used (starting gate = timetaking-button). Next question is if intermediate times are to be taken, look below.

If you choose to use an extra RTR at the start, next question is which one of the main RTR 2's inputs the extra RTR should be connected to. Choose for example input 1. Next question is if intermediate times are to be taken, look below.

The most common thing to do is to use a RAC-box. Therefore, we choose to use a RAC-box. Type 2+ENTER. The large display shows :

Choose RKP-no for
recording
startno at
start :

Now, we must state which one of the inputs at the RAC-box we will use to connect to the RKP-keypad used at the start. We must choose a number that is higher than the number of RKP-

units used at the shooting stand. This is because these units must have the inputs with the lowest numbers. In accordance to the figure above we choose to use input 6. Type 6+ENTER. (This means that the keypad must be named number 6). The large display shows :

Choose RAC-input
for recording
times
at start :

The starting gate is connected to input 5 at the RAC-box. Type 5+ENTER.
Next question is about how many RTRs we want to use for intermediate times :

Number of RTR for
intermed. times :

We type 1+ENTER. The large display shows :

Choose input for
connection to
external RTR 2 :

Here you must choose what input that should be used to connect the external RTR (intermediate station) to the main RTR 2. We choose to use input 4. Type 4+ENTER.
The next question is :

Timetaking at finish
1 - Button
2 - Photo cell
3 - Button and photo

The question is what timetaking-unit we want to use at the finish-line. We decide to use choice number 3, both timetaking-button and photocell. The large display shows :

Choose input on
RTR for
connection to
button :

Which one of the RTR 2's inputs should the timetaking-button be connected to ? We have already used inputs 1 and 4, and now we are free to choose either 2 or 3. We choose to use input 2. Type 2+ENTER. The large display shows :

Choose input on
RTR for
connection to
photo cell :

Now, RTR 2 wants to know what input the photocell is to be connected to. Only input 3 is

free to use. Type 3+ENTER. The large display shows :

Time is : 000:00

RTR 2 starts with
ENTER

The time is entered in minutes and seconds. The number of minutes range from 0 to 999. Most usually the time starts from 0 when the event starts. In cross country, the first start is often 11.00.30. The organizers then want the time to be 0 at 11.00.00. If the RTR 2 should display time 0.00 at 11.00.00, and is started at 10.30, type 970.00. Press ENTER exactly at 10.30.00. If you want to start the RTR 2 from 0.00, just press ENTER directly. The delete key D can be used to correct the time typed (before ENTER is pressed).

Time is : 10:25
Startno:
Unpaired st.no : 0
Unpaired times : 0

The printer writes : "Biathlon". The RTR 2 is now ready for use.

Users mode (We assume that you have chosen to use a RAC-box)

The recommended starting-procedure is like this : The starter says via his headset that starting number 12 is ready for start. The RKP-operator types 12. The starter says via his headset that starting number 12 is starting NOW. The RKP-operator types SEND. The RKP-display shows 0, and the RTR 2's printer writes :

S 12 06:01.46

This means that starting number 12 started at the arrangement time 06:01.46 (real time). None of RTR 2's displays show any information from the start.

After a competitor is finished shooting the RKP-operator types the starting number, period and then the number of misses. Zero misses must also be typed. Assume that RKP number 4 was being used for starting number 13 who got two misses. We type 13.2 followed by SEND. The main RTR 2 writes :

C 13 2 4

The print-out tells you at what keypad the misses were registered.

The intermediate times are taken on an external RTR 2 that runs in program 2 (modus 2 on a RTR 1). At this RTR the print-outs is as usual. The pairs of starting numbers / times are also written at the main RTR 2's printer. However, the intermediate station's synchronizing is not shown at the main RTR 2's printer. A typical line is :

M1 13 15:12.89

The M1-code shows that this is intermediate station 1, and not the finish.

The finish-line procedure is alike to the one described in program 2, except that we in program 7 use both a timetaking-button and a photocell.

As a methode of synchronizing we recommend the quatro-zero synchronizing used in program 2 (look at chapter 6.2).

6.8 Program 8. Parallelsalom

General

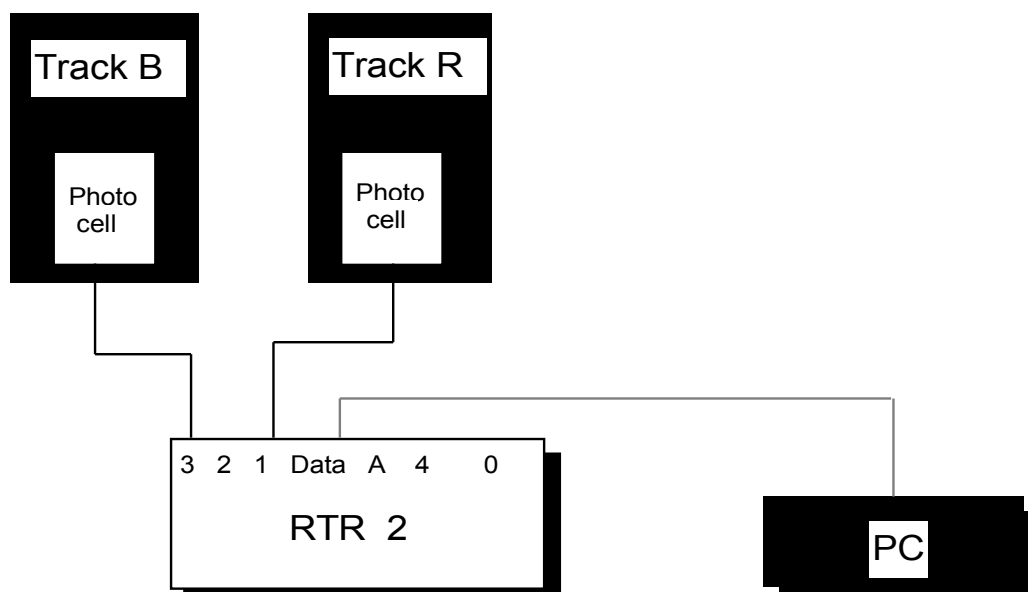
This program is made for parallelsalom. Two competitors start at the same time and race side-by-side down the track. The first competitor to cross the finish-line is the winner. Used times are not taken, only the difference in time between the two competitors. One of them race down track R (red), the other track B (blue). In the next round the competitors change the tracks. If the same competitor wins both rounds, he is the winner. If the competitors win one round each, the one with the best time-difference is the winner.

The RTR 2 states the winner of each heat and calculates the time-difference.

Mounting

For timetaking one RTR 2, two photocells, and two cables from the photocells to RTR 2 are needed. A datacable is also needed if a computer is being used. For mounting details, look at figure 6.8.1.

Figure 6.8.1. Program 8. Parallelsalom.



Programming

Turn the Time Recorder on. When program no.8 is chosen, the large display shows :

Choose input RTR 2
for photo cell
track R :

Type 1+ENTER. The display shows :

Choose input RTR 2
for photo cell
track B :

Type 3+ENTER. The display shows :

Time is : 000:00

RTR 2 starts with
ENTER

In parallelsalom the real time is not interesting. Therefore we can start the RTR 2 from 0 right away. Type 0+ENTER. Now we are in the users mode. The printer writes :

PARALLEL SLALOM

Users mode

The display shows :

Punch startno. 0:35
track R :

Now we must tell the RTR 2 what starting number that's starting in track R. Let's say that it is starting number 25. Type 25+ENTER. The display shows :

Punch startno. 1:05
track R : 25
track B :

Type the starting number for track B. For example number 26. Type 26+ENTER. The display shows :

 1:16
R : 25
B : 26

The competitors start. Starting number 25 in the red track crosses the finish-line first. The display shows :

3:52
 R : 25 0:00.000
 B : 26 0:01

The display shows that starting number 25 won the race (0 time) while the time is running for starting number 26. The printer writes :

M1 25 0.000 3:51.265

Then starting number 26 crosses the finish-line. The display shows :

1:17
 R : 25 0:00.000
 B : 26 0:01.182

This means that starting number 25 won the race with a time-difference of 1.182 seconds. The printer writes :

M2 26 1.182 3:52.447

Making RTR 2 ready for the next race

To make RTR 2 ready for the next race type 0000+ENTER.

A competitor fails

If a competitor fails, type hos starting number+B. If starting number 31 and 32 start in the same race, 31 crosses the finish-line while 32 fails, type 32+B. The display shows :

_____10:22
 R : 31 0:00.000
 B : 32

The printer writes :

M1 31 0.000 10:16.915
 B 32 -----

False finish time

A false finish time is erased by typing 00+ENTER. Assume that starting number 41 and 42 start, and that the photocell in track R is crossed by one of the organizers. Then the RTR-operator must type 00+ENTER. The Time Recorder is again ready to receive the finish times. The display shows :

12:58
 R : 41
 B : 42

The printer has written :

M1	41	0.000	12:52.741
N	41	-----	

6.9 Program 9. Time-taking in mass-arrangements

General

This program is specially made for mass-arrangements (exercise runs, mass cross-country arrangements) where a certain number of competitors pass the finish-line every minute. The time is not taken with a timetaking-button, but is being read when the starting number is registered. With that clarity is obtained in the pairing between time and starting number. The drawback is that the time is registered after the competitor has passed the finish-line. It is possible to correct this in the computer-program, or by, on purpose, delaying Time Recorder a few seconds (4-5 sec.) in proportion to the starting clock. This program supposes use of a barcode-reader and the competitors must have a starting number with a barcode-label. (Avoid bright sunlight on the barcode-label while reading it.) If some of the competitors don't have a barcode-label, the starting number may be typed at RTR 2's keyboard. The time is taken when the registration is finished by pressing ENTER.

In arrangements where program 9 is used there are normally shorter chutes (3-5 meter). Not that many organizers are needed per chute as in program 2. Three organizers per chute should be sufficient. Person no. 1 is placed in the chute about 3-4 meters behind the finish-line. He tears the barcode-label off the starting number and gives the label to person no. 2. Person no. 2 reads the barcode-label with the barcode-reader and puts the label into a box. Person no. 3 keeps track of the labels in the box, plus once every minute he puts a minute-note in the box. The box containing the barcode-labels and the minute-notes act as a back-up for the RTR 2. When you have many parallel chutes the outputs from the RTR 2s are connected to a Regnly connection-box (RSB), before the information is transferred to a computer. The reason for this is that most computers only have one free serial-input for information from the Time Recorder.

Mounting

For timetaking one RTR 2, one barcode-reader, one RPP2 battery-box and one datacable (to a computer or to RSB) are needed per chute. We also recommend to use headphones for the barcode-reader. This makes it easier to know when the barcode-reader has made a registration. For mounting-details, look at figures 6.9.1. and 6.9.2.

Figure 6.9.1. Program 9. Mass-arrangement.

In this example we're only using one funnel.

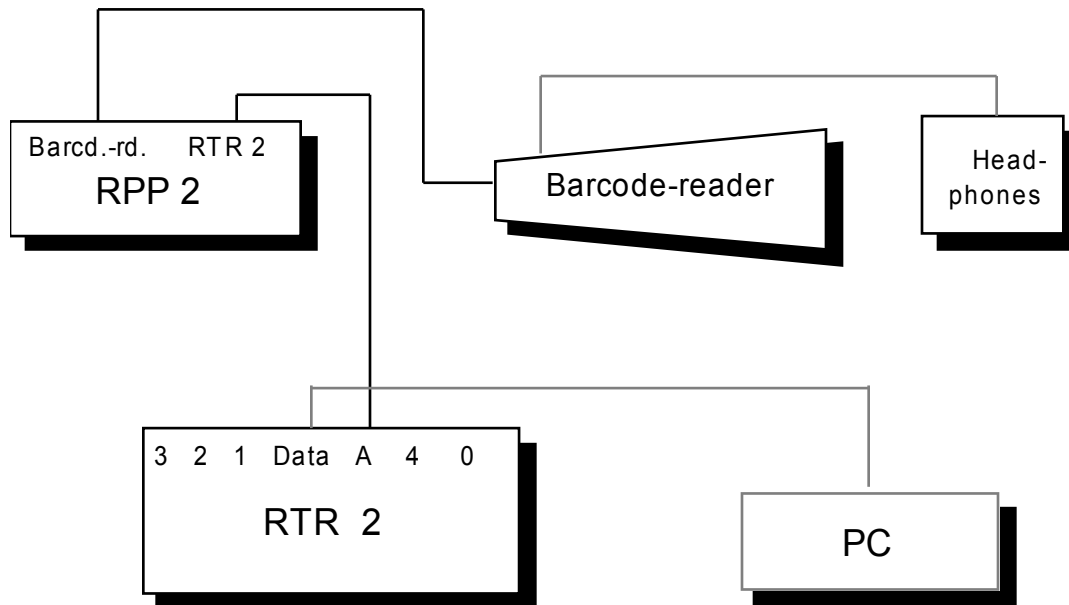
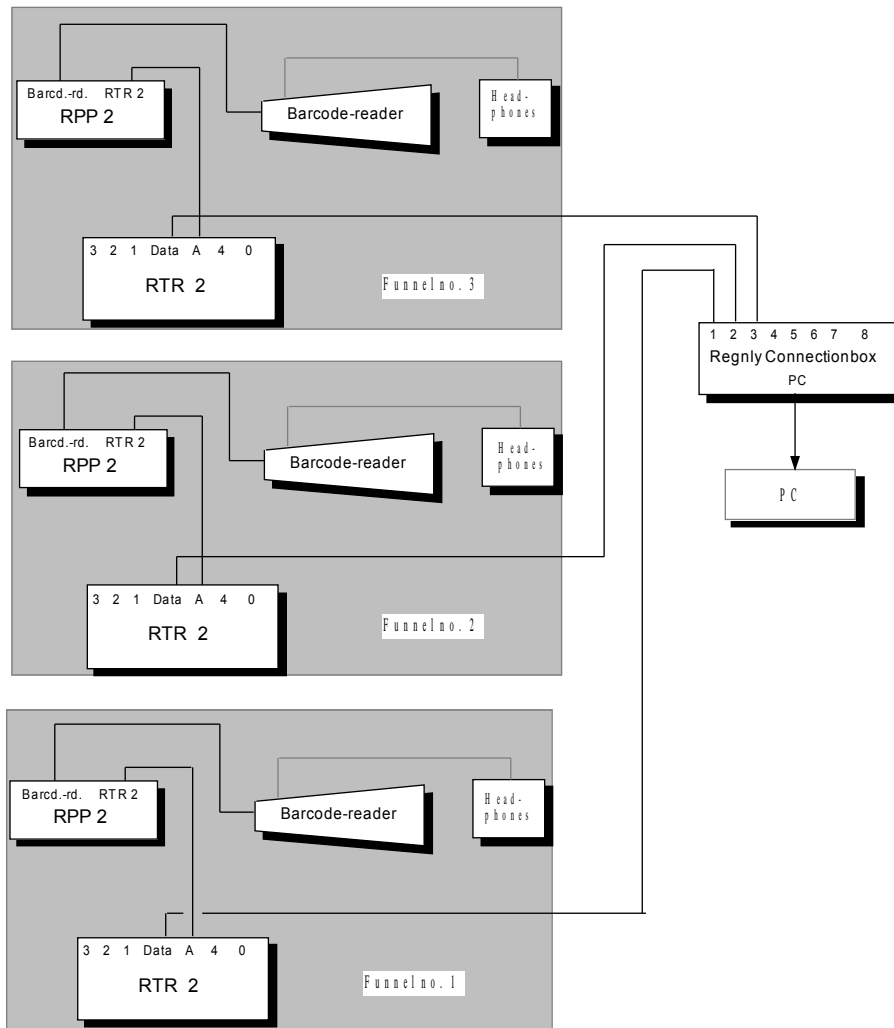


Figure 6.9.2. Program 9. Mass-arrangement.
In this example we're using three funnels.



Programming

Turn the Time Recorder on. When program no.9 is chosen, the large display shows :

Output on printer ?

Yes - 1

No - 0 Choose :

Normally a receipt is wanted for all “happenings”. But program 9 automatically pairs the time with the starting number. Then you don’t have the same need to study the print-out for finding any possible mistakes. In our case we answer Yes. Type 1+ENTER. The display shows the normal “Time is”-picture :

Time is : 000:00

RTR 2 starts with
ENTER

We start the clock five seconds after the starting clock. Press ENTER five seconds after the competitors have started. This leads to that most of the competitors get about one second better time than their actual time.

Users mode

The display shows :

Time is : *15:09*

and the printer writes :

COMBINED TIMES / STARTNO

The equipment is ready for use. When the competitor passes the finish-line the barcode-label is torn off. The label is being read with the barcode-reader. The receipt for a correct reading is :

- The barcode-reader “beeps”. The beep is clearly heard if you’re using headphones.
- A red flash occurs once in the round window of the reader.
- The starting number that has been read is shown at the RTR 2’s number display.

When the label for starting number 1289 is registered the number 1289 will be shown at RTR 2’s number display until another number is read. (You may remove it by pressing ENTER.) The large display shows only the running arrangement-time.

The printer writes :

M 1289 32:16.51

If the barcode-reader and the battery-box are connected to the RTR 2 after the clock has been put in the users mode, the first print-out may be (for any starting number) :

M 99999 35:42.19

The problem is avoided by pressing ENTER after you have connected the barcode-reader and before the first registration is made. Then all the barcodes will be read normally.

When a barcode-reader is being used you don’t have to type anything at RTR 2’s keyboard, except if a competitor has lost his/hers barcode-label. Then type the starting number the usual way. The time is registered when ENTER is being pressed. While typing the starting number it will be shown in both the number display and the large display. The number is removed when ENTER is pressed.

You don’t use a synchronizing box while using program 9. If you want to divide the arrangement into smaller units, it is possible to make a quatro-zero synchronizing. Just type 0000+ENTER. The printer writes :

K=00 SYNC= 1 SUM= 8

This means that eight persons were registered at the finish-line when the first synchronizing was made.

6.10 Program 10. Time-taking in heats, one lane

General

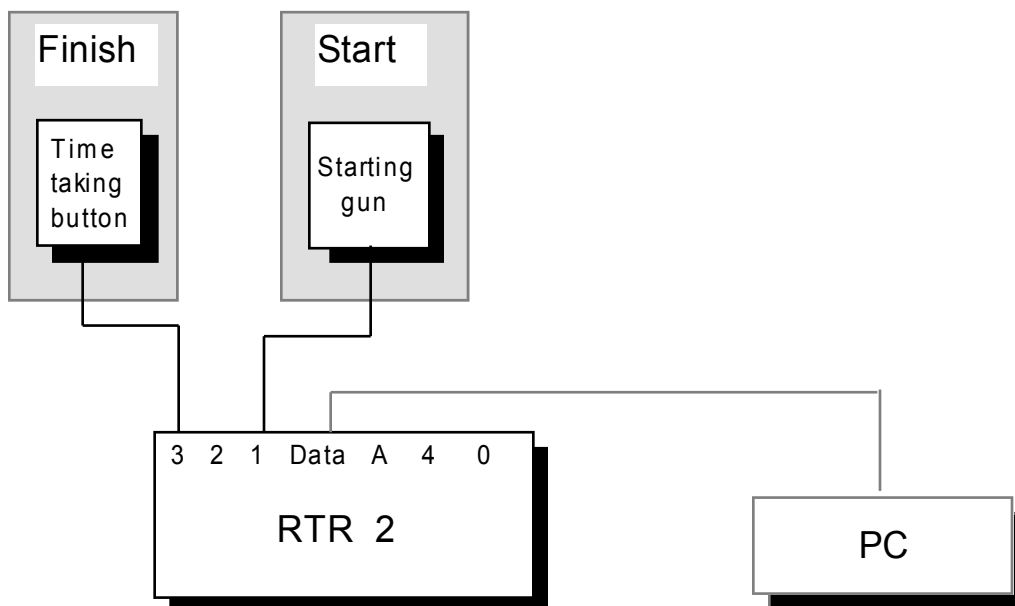
This program is made for heat in tracks with a common start. The running time is estimated from the point of time when the starting-pulse is received (photocell, starting gun, timetaking-button). When the runners pass the finish-line their times are taken with a timetaking-button or a photocell, like in program 2. When the final ranking is clear the starting numbers are typed.

Mounting

For timetaking one RTR 2, one starting gun (or equivalent), a cable from start to RTR 2 and a timetaking-button are needed. A data cable is also needed if a computer is being used. For mounting details, look at figure 6.10.1.

Figure 6.10.1. Program 10. Heat, one lane.

In this example we have chosen to use a starting gun at the start, and a time-taking button at the finish.



Programming

Turn the Time Recorder on. When program no.10 is chosen, the large display shows :

Choose input on
RTR for recording
times
at start :

Type 1+ENTER. The large display shows :

1 - Button

2 - Photo cell

Choose unit for reg.
of times :

We choose to use choice number 1, timetaking-button (and starting gun). Type 1+ENTER.
The large display shows :

Choose input on
RTR for recording
times
at finish line :

Type 3+ENTER. The display shows :

1 - Button

2 - Photo cell

Choose unit for reg.
of times :

We want to use choice number 1, timetaking-button. Type 1+ENTER. The display shows :

Time is : 000:00

RTR 2 starts with
ENTER

Real time is seldom interesting in program 10. Press ENTER. RTR 2 is now in the users mode.

Users mode

The display shows :

Time is : 0:45

Unpaired st.no. : 0

Unpaired times : 0

while the printer writes :

TRACK AND FIELD

When the first heat is starting the display shows the running time :

Time is : 3:51
 0:07
 Unpaired st.no. : 0
 Unpaired times : 0

The printer writes the starting time related to the real time :

S 3:51.58

When the runners are crossing the finish-line their times are registered with the timetaking-button, and their starting numbers are typed when the ranking is clear. It is possible to read the starting numbers with a barcode-reader, as long as the runners have barcode-labels on their starting numbers. When the first runner crosses the finish-line, the display shows :

Time is : 9:13
 5:22.01 5:22
 Unpaired st.no. : 0
 Unpaired times : 1

The best runner finished at the time 5:22.01. His/hers starting number has not been registered yet, but as we can see one time is registered by the RTR 2. The printer doesn't write anything before it has pairs of times/starting numbers. Four more runners passes the finish-line. The display still shows the best time (the winner's time). The running time is still running. "Unpaired times" is now showing that five runners have got their times taken. We register the following starting numbers : 1, 13, 9, 15, and 7. The display still shows the best time, and the running time is still running. The printer has written :

M	1	5:22.01	9:13.59
M	13	5:42.64	9:34.22
M	9	5:45.16	9:36.74
M	15	5:45.58	9:37.16
M	7	5:47.89	9:39.47

To clear the clock's memory and make it ready for another heat type 0000+ENTER. Then the second line is cleared and the printer writes the normal "receipt-line" with the number of synchronizings and runners that have finished. If the number of unpaired starting numbers or times had been different from zero, these "loose" times or starting numbers would be written and emptied from the RTR 2 the same way as in program 2.

It is important that the RTR 2-operator and the starter communicate so that the RTR 2-operator can make a quatro-zero synchronizing before the next heat starts. If the synchronizing is not made the best time (the winner's time) at the display will be arbitrary. Beside from that, the RTR 2 behaves normally and writes the correct finish-times. Be aware that if a runner from one heat arrives so late that the next heat has started he/she will get a used time that is calculated from the new starting time. Then it is probable that this time will be the best time in this heat.

6.11 Program 11. Time-taking in heats, parted lanes

General

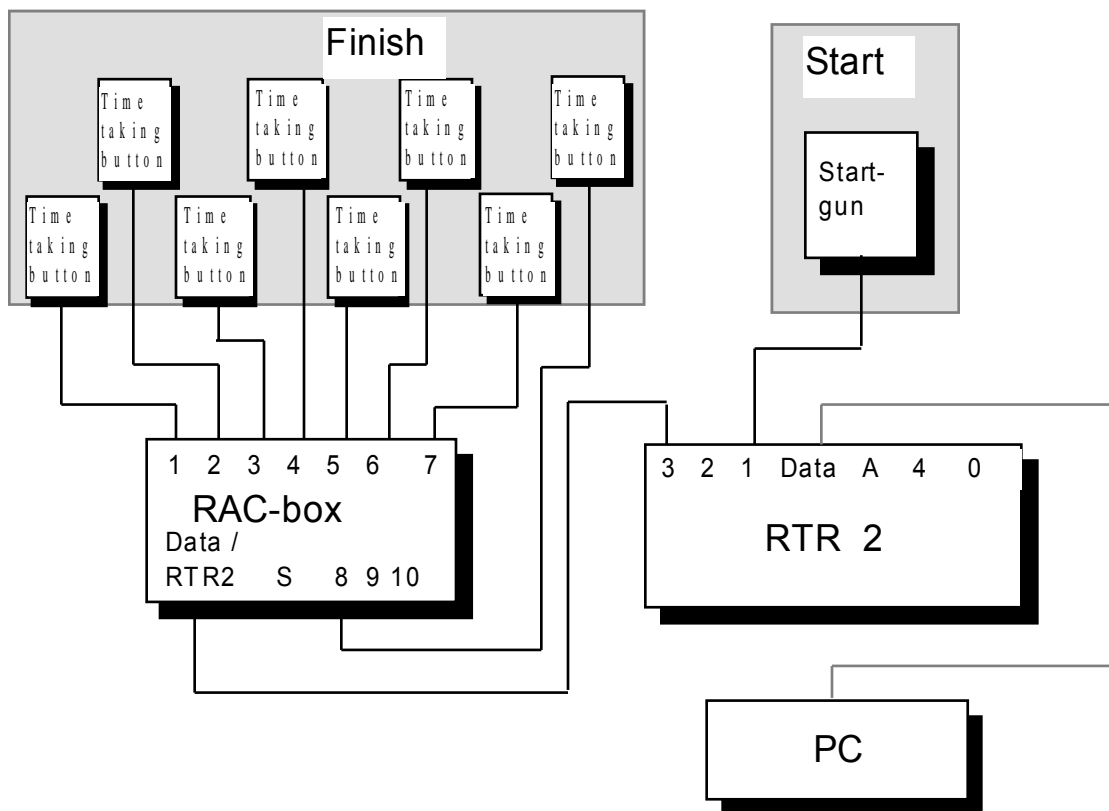
This program is meant for heat with parted lanes with a common start. The running time is estimated from the point of time when the starting-pulse is received (photocell, starting gun, timetaking-button). When the runners pass the finish-line their times are taken with a timetaking-button per lane (maximum eight lanes).

Mounting

For timetaking one RTR 2, one timetaking-button at the start (or a starting gun), a cable from the start to the RTR 2, one timetaking-button per lane that is used and one RAC-box are needed. A data cable is also needed if a computer is being used. For mounting details, look at figure 6.11.1.

Figure 6.11.1. Program 1 1. Heats, parted lanes.

In the example below we use a starting gun at the start, and a timetaking-button at the finish.



Programming

Turn the Time Recorder on. When program no.11 is chosen, the large display shows :

Choose input on

RTR for recording
times
at start :

Type 1+ENTER. The large display shows :

1 - Button
2 - Photo cell
Choose unit for reg.
of times :

We choose to use choice number 1, timetaking-button (and starting gun). Type 1+ENTER.
The large display shows :

Choose input for
connection to
RAC unit :

We choose to use input 3 at the RTR 2 to connect the RAC-box to. Type 3+ENTER. The
display shows :

Time is : 000:00

RTR 2 starts with
ENTER

Real time is seldom interesting in program 11. Press ENTER. RTR 2 is now in the users
mode.

Users mode

The display shows the running real time in the upper right corner, plus :

Punch heatno. :

Now you must choose what heat-number you want to start first. Type 1+ENTER. The
display shows :

Heatno. 1

When the first heat starts the running time is stated at the display :

Heatno. 1 0:13

At the same time the printer writes the starting time and the heat-number :

S 1 0:32.71

When the runners pass the finish-line and their times are registered, the printer writes the

lane-number, used time and the real time :

M	1	1:23.89	1:55.72
M	4	1:24.72	1:57.90
M	3	1:25.13	1:58.27
M	2	1:26.45	1:59.71

The display still shows the running time for heat-number 1 :

Heatno. 1 : *1:33*

The heat is finished by typing 0000+ENTER. Then the running time for this heat disappears, but the real time is still running. The printer writes a synchronizing-message :

K=00 SYNC= 1 SUM= 4

This means that this is the first synchronizing that has been made, and that four runners have been registered.

The Time Recorder is now ready for the next heat. The display shows :

Punch heatno. :

Repeat the procedure explained above.

The program accepts that the starting time is registered before the heat-number is typed, but the heat-number must be typed before the running time for this heat is showed. The used time at the finish cannot be calculated before the heat-number is typed.

If more than one heat-number is typed when the heat has started, or more than one starting time is received, they will be ignored.

7 VARIOUS

7.1 The printer / printerpaper

Use thermopaper 57 mm, black. The paper is inserted when you repeatedly turn the RTR 2 on / off. Vertical stripes / weak signs may be caused by some speck of dust under the printerhead. Clean it carefully ! If the the printer-paper is stuck, please do the following : Pick out the paper that blockades the paperfeed. Then type 1111+C. The printer-mechanism is then released, and all of the data that was registered while the printer was blockaded will now be printed. Transmission of data to the computer is not affected of a printer that is blockaded.

7.2 Changing the arrangement-time

After the RTR 2 has been programmed and is in users mode , it is possible to change the arrangement-time. Type 2222+C. The display will then show :

Time is : 000:00

RTR 2 starts with
ENTER

The new arrangement-time is now typed. When ENTER is being pressed the RTR 2 starts with the new arrangement-time. Times registered before the changing of the arrangement-time are based on the original arrangement-time. Times registered after the change will be based on the new arrangement-time.

7.3 Erasing registered starting-numbers and times

It is possible to delete all registered times and starting numbers that the RTR 2 contains without turning it off. This possibility can be useful in certain situations. An example is when the RTR 2 has been used for training the finish-staff. The data that is inside the RTR 2 after the training is finished, which you probably want to remove, can be erased using this procedure before you connect the RTR 2 to the computer.

To erase all data in the RTR 2 type 3333+C. The display shows :

ERASE all
times and startno
registered on RTR ?
Yes - 1 No - 0 Choose:

If you choose YES, all data will be erased and you will return to the standard display in users mode. If you choose No, no data will be erased and you will return to the standard display in users mode.

7.4 Repeated transmissions of data to the computer

In chapter 4 we mentioned that the RTR 2 can remember data even if it has been turned off. This can be very helpful if you want to transmit data to the computer at the arrangement-place, or if you want to repeat the transmission later.

When you turn the RTR 2 on the display shows :

RTR contains data
Save data ?
Yes - 1
No - 0 Velg(choose):

Normally you would choose No. If you want a to connect with a computer for transmission of data, you should choose Yes. The RTR 2 shows in its display :

Program for transfer
of old data
to PC

The RTR 2 is now ready for a transmission of data.

8 TECHNICAL SPECIFICATIONS

Here is a list of the different technical specifications for the RTR 2 :

- Battery-powered, built-in rechargeable batteries, can be used for minimum 10 hours.
- Remembers registered data even if the Time Recorder is turned off.
- Remembers 5.000 pairs of times / starting numbers.
- Up to 125 different classes.
- Up to 255 unpaired (unconnected) times or starting numbers can be remembered at a time.
- Display for displaying the starting number.
- 4 lines display for messages, while programming and running the RTR 2.
- Built-in printer that prints all "happenings".
- RS 232 series-output for transferring of data to a computer.
- RS 232 series-input for connecting of a barcode-reader.
- 5 extra input-/output-connectors for connecting of external equipment.
- Measurements : 22 x 28 cm.
- Weight : 1.8 kg.

9 DIAGRAM OF CONNECTIONS FOR THE RTR 2 AND THE EXTERNAL EQUIPMENT

The figures show the diagram of connections for different cables that are used between the RTR 2 and external equipment.

The terms to the far right and left show between what units the cables should be used.

10 COMMUNICATION PROTOCOL RTR 2 / COMPUTER

Communication takes place in series over a RS-232 line. This means that 3 pins on the RS-232 plug on the PC will be connected to the Time Recorder RTR 2, one line for "SEND", one line for "RECEIVE" and one line for "GROUND". The schematic follows below.

The speed of transmission is 1200 baud. Each byte contains 1 start bit, 8 data bits (LSB first, non-parity) and 1 stop bit.

Communication routine

In what follows <cr> means carriage return (ASCII 0D hex)
 s means space (ASCII 20 hex)

RTR 2 will only transmit data on request from the PC. When the PC wants data from the RTR 2, two bytes must be transmitted from the PC.

The format of the request shall be :

?<cr>

RTR 2 will answer with a message of 24 byte if it has got some new data. The contents of these bytes will be explained below. If the RTR 2 does not have any new data, it answers with the following two bytes :

-<cr>

If the PC does not understand the message it can ask another time by transmitting ?<cr>. RTR 2 will then transmit the same message over again.

When the PC has read and approved the message, it shall acknowledge the receipt by transmitting :

+<cr>

If this isn't done, the RTR 2 will continue to send the same message every time it receives ?<cr>.

The next data can be transferred by the same procedure.

Repetition of earlier transmitted data :

Data may be transmitted again when the PC sends a command for winding to the RTR. Before winding, it may be useful to send :

+<cr>

(The +<cr> command may lead to the print-out "Unreadable data" at the RTR 2). The format for the winding-command is :

!-nnnn<cr>

where nnnn (always 4 numbers) is the number of registrations (paired data, loose numbers and times, synchronizing) that you want repeated and CR is carriage return.

If nnnn is larger than the number of registrations, the RTR will send all registrations starting on number 1. Tip : If you want to transmit all the data, send !-9999CR.

After the winding-command has been send, you must not send another command to the RTR 2, before it has answered with a receipt, that looks like this :

+<cr>

The winding-command can also be used when you are using a Regnly Connection Box (RSB). The winding-command will then affect all RTR 2's that are connected to the RSB.

Transmission of the running time

The PC can also ask for the running time from the RTR 2. The format of the request is :

T<cr>

RTR 2 will answer with a message of 24 byte which includes the time. In this instance, the PC is allowed to ask again by sending a new T<cr>. Then the RTR 2 will answer with a new upgraded running time. This message shall also be approved by sending

+<cr>

before normal communication is resumed with ?<cr>.

Format of the different data types transmitted

Please find the format for the messages between the RTR 2 and the PC below.

m - tells if the message concerns start, intermediate station or finish

9 - start

1-3 intermediate

0 - finish

r - identity for RTR 2. For the time being just 0 if the RTR 2 is coupled directly to the PC, 1-8 if a collecting box is used (up to 8 RTR 2 as input, one connector out to PC).

- p - package counter, counts from 0 to 9, increments for every new message transmitted
- i - input on RTR 2 (concerns finish button, photocell, connector to RAC, connecting to external RTR 2) where time is registered
 - 0 - stop/synchronizing
 - 1-2-3-4
 - 5- A
- j input on the RAC unit where time is registered, on those accounts where the RAC unit is used
- c checksum, calculated by adding character no. 1 to and including character no 22 in one byte. Let the most significant bit be zero. If the sum is less than 32 (20 hex), add 32 to the sum. The method is chosen such that readable ASCII-symbols represents the checksum.

The following type of messages are presently available :

(Message no. 6 is a reply to T<cr>, all the other messages are replies to ?<cr>.

1. Normal combination of starting no. and time

Amrxxxxxyyy:yy.yypijc<cr>

where xxxxxx is the starting no. or any other identification of the participant, and yyy:yy.yyy is the time in minutes, sec and 1/1000 sec

2. Single (surplus) starting no.

Bmrxxxxxxxxxxxxxxxxspijc<cr>

where xxxxxx is the starting no. or any other identification of the participant.

3 Single (surplus) time

Cmrssssyyy:yy.yypijc<cr>

where yyy:yy.yyy is the time in min., sec and 1/1000 sec

4 Synchronizing

Dmrxxxxxyyyssssspijc<cr>

where xxxx is the no. of synchronizings, and yyy is the total no. of paired starting no. and time.

5 Time without starting no.

Fmrssssyyy:yy.yypijc<cr>

where yyy:yy.yyy is the time in min., sec and 1/000 sec.

Only used for an extra pressure of the synchronizing button, and to transmit times without a starting number (program 6 and 7).

6 Time of arrangement

Gmrssssssyyy:yy.yyypijc<cr>

where yyy:yy.yyy is the time in min., sec, and 1/1000 sec. The letters m, p, i, and j are always transmitted as 0 (zero) in this message.

7 Outgoing startnumber (alpine program no 4 and 5, the participant will not finish)

Imrxxxxxssss000006pijc<cr>

where xxxxxx is the starting no. or any other identification of the participant.

8 Single (free) starting no.(used in alpine program no 5)

(The starting no. has earlier been coupled to a time which was not correct. If another time is coupled to the starting no. at a later time, it will be transmitted in a later message).

Imrxxxxxssss000007pijc<cr>

where xxxxxx is the starting no. or another identification of the participant.

9 Combination of starting no. and misses (biathlon)

Jmrxxxxxssssyyyyyypijc<cr>

where xxxxxx is the starting no. or any other identification of the starting no., and yyyyyy is the number of misses.

10 Collection box

When a collection box is used the following special message of 4 bytes can be transmitted

H0r<cr>

which means that the collection box has lost the communication with The Time Recorder coupled to input no. r. An attempt to re-establish the contact will be made once every minute.

Example no. 1

The RTR 2 is being used in program no. 2, starting numbers without classes.

All the messages below from the PC and the RTR 2 must be finished with <cr>.

<u>Send(PC)</u>	<u>Received from the RTR 2</u>	<u>Comments</u>
?		Questions if the RTR 2 has got some data.
	A00001234200:11.530100P	Finish-line time for starting no. 1234.
+		Receipt for a received message.
?		Question if the RTR 2 has got more data.
	A00005678200:12.040200^	Finish-line time for starting no. 5678.
?		The PC asks again.
	A00005678200:12.040200^	The message is repeated.
+		
?		
	C00 200:12.960300r	The superfluous time at a synchronizing.
+		
?		
	D00 0001 0002 400;	Synchronizing bunch no. 1.
+		
?		
	B00009876 5005	The superfluous starting no.'s at a synch.
+		
?		
	D00 0002 0002 600>	Synchronizing bunch no. 2.
+		
?		
	-	The RTR 2 hasn't got any more data.
+		
T		Question from the PC about the real time.
+	G00 202:45.180000u	The real time from the RTR 2.

Example no. 2

The RTR 2 is being used in program no. 5, simple alpine.

A starting-gate is connected to input no. 4, intermediate time is connected to input no. 2, and a photocell at the finish-line is connected to input no. 3.

All the messages below from the PC and the RTR 2 must be finished with <cr>.

<u>Send(PC)</u>	<u>Received from the RTR 2</u>	<u>Comments</u>
?		Question if the RTR 2 has got some data.
	A90000001100:09.110140T	Starting time for starting no. 1.
+		Receipt for a received message.
?		Question if the RTR 2 has got more data.
	A10000001100:29.010220L	Intermediate time for starting no. 1
+		
?		
	A00000001100:49.480330Z	Finishline time for starting no. 1.
+		
?		
	B90000002 440%	Single starting no. 2 (without time), doesn't pass the start.
+		
?		
	A90000003101:11.500540W	Starting time for starting no. 3.
?		The PC asks again.
	A90000003101:11.500540W	The message is repeated.
+		
?		
	A10000003101:31.840620W	Intermediate time for starting no. 3.
+		
?		
	A00000003101:35.820730Z	A false time at the finishline for st.no. 3.
+		
?		
	I00000003 000007830.	Starting no. 3 is released because we want to give it a new time.
+		
?		
	A00000003101:52.380930O	The correct finishline time for st.no. 3.
+		
?		
	A90000004102:17.910040_	Starting time for starting no. 4.
+		
?		
	I00000004 000006130'	Starting no. 4 has failed.
+		
?		
	C00 102:48.790230	Loose (false) finishline time.
+		
?		
	-	The RTR 2 hasn't got any more data.
+		